Environment Health & Safety
INTERNATIONAL PLACE, TOWER III
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July 15, 2019

U.S. Environmental Protection Agency, Region V
Superfund Remedial Response, Section VI (SR-6J)
77 West Jackson Boulevard
Chicago, Illinois 60604
Attn.: Ms. Lauren McCarrell
Remedial Project Manager

Wisconsin Department of Natural Resources - RR/5
1300 W. Clairemont Avenue
Eau Claire, Wisconsin 54702
Attn.: Ms. Mae Willkom
Remedial Project Manager

RE: Semi-Annual Progress Report
January 1 – June 30, 2019
Tomah Municipal Sanitary Landfill
Tomah, Wisconsin

Dear Ms. McCarrell and Ms. Willkom:

This semi-annual progress report is being submitted under the reporting requirements of the Operable Unit 1 (OU1) Consent Decree (CD), (effective date February 19, 2002) and Operable Unit 2 (OU2) CD (effective date April 29, 2005). This report presents a summary of efforts by International Paper and the City of Tomah to fulfill the requirements of the OU1-CD and the OU2-CD during the period of January 1 through June 30, 2019.

Correspondence, Meetings, and Events

January 22, 2019	GHD, on behalf of IP and the City of Tomah, submits the Semi-Annual Data Submittal (July-December 2019) to the USEPA and the WDNR.
January 22, 2019	GHD, on behalf of IP and the City of Tomah, submits the Semi-Annual Progress Report (July-December 2019) to the USEPA and the WDNR.
February 14, 2019	GHD receives a letter from the USEPA approving GHD's request, dated November 9, 2018, to abandon twelve monitoring wells and reduce the sampling frequency of three more monitoring wells.
March 28, 2019	GHD sends letters to property owners and residents informing them of the upcoming well sampling schedule. The letters to John and Tom Pleuss were sent by Certified Mail.
April 2, 2019	GHD notifies the USEPA and the WDNR of the schedule of the upcoming May 2019 sampling event at the Tomah Landfill.

April 2, 2019	GHD receives signed letter from Tom Pleuss requesting that GHD collect a water sample from his residential well.
April 5, 2019	GHD receives signed letter from John Pleuss requesting that GHD collect a water sample from his residential well.
April 9, 2019	GHD notifies the USEPA and the WDNR of signed access to both John and Tom Pleuss' property.
May 8, 2019	Representatives from the USEPA, WDNR, International Paper, City of Tomah, and GHD meet at the landfill to conduct a site walk.
May 30, 2019	GHD informs the USEPA and WDNR that the Larry Friske residential well will be resampled due to a detection of PCE in the initial sample.
June 13, 2019	GHD informs the USEPA and WDNR that PCE was again detected in the Larry Friske residential well resample but was not detected in the treated sample collected from the kitchen sink.
June 19, 2019	GHD sends letters to the Friske, T. Pleuss, J. Pleuss, and the Heffel residences informing him of their well sampling results.
June 21, 2019	GHD submits an EDD and signed data certification form to WDNR associated with OU1 and OU2 monitoring events conducted during the period from July 2018 – June 2019.

Field Activities

- The OU1 monthly landfill gas monitoring event was conducted on January 15, 2019.
- The OU1 quarterly inspection event was conducted on January 15, 2019.
- The OU1 monthly landfill gas monitoring event was conducted on February 11, 2019.
- The condensate tank was emptied on February 11, 2019.
- The OU1 semi-annual blower discharge sampling event was conducted on February 22, 2019.
- The OU1 monthly landfill gas monitoring event was conducted on March 21, 2019.
- The condensate tank was emptied on April 4, 2019.
- The OU1 monthly landfill gas monitoring event was conducted on April 8, 2019.
- The OU1 quarterly inspection event was conducted on April 8, 2019.
- The OU2 semi-annual/annual groundwater sampling event was conducted on May 7-9, 2019.
- The OU2 annual residential well sampling event was conducted on May 7, 2019.
- The OU2 semi-annual surface water sampling event was conducted on May 7, 2019.
- The OU1 annual condensate tank sampling event was conducted on May 9, 2019.
- The condensate tank was emptied on May 28, 2019.
- The OU1 monthly landfill gas monitoring event was conducted on May 30, 2019.

- The Friske residential well resample was conducted on June 3, 2019.
- The OU1 semi-annual gas extraction system alarm testing was conducted on June 6, 2019.
- The OU1 monthly landfill gas monitoring event was conducted on June 6, 2019.

Sampling and Test Data

- OU1 OU2 Monitoring Report (January - June 2019) - GHD (7/18/2019).

Key Findings

Based on the review of monitoring data collected during this reporting period, and comparison of current data with historical monitoring results, GHD, on behalf of IP and the City of Tomah, concludes the following, as presented in the OU1 and OU2 Monitoring Report (January – June 2019).

1. Decreasing vinyl chloride (VC) concentrations at groundwater monitoring wells located immediately downgradient of the Tomah Municipal Sanitary Landfill (TMSL) boundary indicate that OU1-source controls (i.e., the landfill cap and active gas extraction system), implemented in 2000, are effectively reducing and removing volatile organic compounds (VOCs) from the TMSL.
2. The current OU2 MNA monitoring wells have defined the TMSL plume boundaries, both horizontally and vertically (see Section 2.4). Although deep wells (MW-18D and MW-22D) near the TMSL show VOC levels above the Wisconsin Enforcement Standard (WES), there are upgradient and downgradient deep wells that quantitatively define the groundwater plume (i.e., MW-7D, MW-13C, and MW-19D).
3. The primary contaminants of concern in groundwater continue to be VOCs, specifically vinyl chloride. The current VOC plume dimensions are smaller compared to the plume dimensions from the 2014 MNA evaluation and the VOC mass has been reduced by approximately 72% since installation of the OU1 remedy due to natural attenuation processes.
4. Increasing vinyl chloride concentrations at MW-20B indicate the migration of the impacted zone of groundwater from the TMSL, prior to the implementation of the OU1 source controls. This zone is isolated and no longer connected to the TMSL. Vinyl chloride concentrations at MW-20B are expected to diminish similar to the decreasing trends observed upgradient at MW-3C, MW-7C, MW-12C, MW-18C, and MW-22C.
5. Gas extraction system monitoring at the extraction wells indicates methane and VOCs are being removed from the TMSL. Since full scale operation of the active gas extraction system began in September 2000, approximately 190 pounds of vinyl chloride and 17 pounds of benzene have been removed from the TMSL.

6. Operation of the active gas extraction system is reducing the potential for landfill gas migration off-Site. Monitoring of the off-Site gas probes indicates no off-Site migration of landfill gases towards the residential homes south of the landfill.

Based on the results of the updated MNA Evaluation, the following conclusions are made:

1. The OU1 Remedy is effectively reducing the amount of contaminant mass affecting the groundwater system, as evidenced by decreasing VOC concentrations measured at monitoring wells along the former TMSL boundary. Since 2000, there is a 99 percent decrease in the VC mass leaving the former TMSL. Geochemical conditions continue to remain favorable for biodegradation downgradient of the former TMSL landfill boundary. These favorable conditions include reduced iron (III), elevated levels of TOC and methane, and the presence of ethene.
2. The vast majority of the TMSL plume exists under stable conditions with the exception of two discontinuous zones of elevated cis-1,2-dichlorethene (C12DCE) and VC in the northeast and southeast portions of the TMSL plume. These higher concentration zones are attenuating as they migrate; but they may cause a temporary expansion in those portions of the TMSL plume. However, this expansion is considered temporary, because mass loading from the source area is diminishing. The geochemical conditions in these areas represent a transition between the strongly reducing anaerobic conditions and the natural aerobic groundwater. As this portion of the TMSL plume continues to migrate it will interact with the aerobic groundwater and allow for VC degradation via aerobic cometabolism.
3. The continued presence of methane in downgradient monitoring wells affects the biodegradation rate of VC. As methane migrates from the Site, the groundwater remains under anaerobic conditions. Eventually, the methane infused groundwater interacts with the aerobic groundwater and becomes mineralized to carbon dioxide. However, the biodegradation process for VC is affected by the presence of elevated methane concentrations. As the methane becomes mineralized to carbon dioxide the dissolved oxygen in groundwater will increase and become aerobic. Under aerobic conditions, VC can cometabolize to carbon dioxide.
4. The northeast portion of the TMSL plume is confined to the upper horizons of the aquifer. Shallow groundwater from the TMSL plume discharges to Deer Creek where VC and methane are readily oxidized by the highly aerobic surface water. While VC has not been detected north of Deer Creek, PCE was detected at low concentrations north of Deer Creek in a residential well for the first time in May 2019. However, a water treatment system is in place at this residence to treat VOCs. Subsequent monitoring confirms the treatment system is effective in removing PCE.

Based on the conclusions noted above, GHD recommends the following:

1. Collect a sample from MW-12D (an annual sampling location) in the fall of 2019 to confirm the VC detection from the May 2019 sampling round.
2. Collect a sample from MW-21B (a biennial sampling location) in the fall of 2019 to confirm the PCE detection from the May 2019 sampling round.
3. Because of the potential expansion of the TMSL plume near MW-20B, the City of Tomah and IP will communicate with the closest groundwater receptor, Larry Friske (24173 Flatter Avenue). GHD plans to collect another round of pre and post treatment from the Friske residential well in the fall of 2019.
4. Install a monitoring well nest approximately 400 hundred-feet downgradient of the MW-20 nest. The new nest would be located between the MW-20 nest and the Friske residential well. The new wells would help delineate the leading edge of the TMSL plume.
5. Abandon the MW-14 well nest. The MW-14 well nest is located less than 200-feet east of the MW-21 well nest and has historically been non-detect for VOCs since its installation in 2000.
6. Continue all other OU2 groundwater and surface water monitoring as outlined in Table 2.2 of the OU1 and OU2 Monitoring Report (January – June 2019).
7. Provide an updated MNA evaluation in 2024 in preparation for USEPA's next scheduled Five-Year Review (2025).

Continue monitoring the OU1 gas extraction system in accordance with the approved monitoring program.

Upcoming Events (July 1, 2019 through December 30, 2019)

- International Paper and the City of Tomah will continue to implement the CD requirements for OU1 and OU2.
- OU1 monthly landfill gas monitoring will continue.
- OU1 semi-annual blower discharge sampling will be conducted in August 2019.
- The OU1 semi-annual gas extraction system alarm testing will be conducted in November 2019.
- The OU2 semi-annual monitoring well sampling event will be conducted in November 2019.
- The OU2 annual surface water sampling event will be conducted in November 2019.

Anticipated Problems or Delays

No problems or delays are anticipated for these upcoming semi-annual activities.

Please do not hesitate to contact me if you need any additional information or have any questions or comments.

Very truly yours,

INTERNATIONAL PAPER COMPANY

Philip J. Slowiak, Sr., CSP
Senior Project Manager

c.c.: Roger Gorius; City of Tomah
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