HOOD RIVER COUNTY PUBLIC WORKS

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ANNUAL LEACHATE IRRIGATION SYSTEM REPORT
HOOD RIVER LANDFILL, PERMIT #168
2022-2023 SEASON

This report describes the 2022-2023 leachate spray irrigation season for the Hood River Landfill. The leachate spray irrigation season encompasses the period between July 1, 2022, and June 30, 2023. This report is required in accordance with Section 13.1 of Solid Waste Disposal Site Closure Permit No. 168, issued by the State of Oregon Department of Environmental Quality (DEQ) on March 31, 2023. The reporting period has been selected to coincide with the reporting period of the Annual Environmental Monitoring Report (AEMR), also required by the DEQ in accordance with Section 13.2 of the Permit.

Site Conditions

Grassy vegetation continues to be generally well established on the landfill cover and no standing water was observed. The vegetation in spots is a mixture of grasses and various weeds, but functions sufficiently as an erosion control measure and no re-grading of the landfill cover appears to be necessary. Surface runoff entering the leachate collection system continued to be minimal due to adequate percolation capacity and no failures were noted in the surface water diversion structures.

Signage and gated access to the area continued to minimize trespassing and vandalism, however, evidence suggests occasional access by ATV's and motorcycles continues to occur. Past measures have repeatedly been taken to minimize ATV and motorcycle access, but due to their size and mobility it has been difficult to eliminate it completely and no substantial damage or negative impacts to the site have resulted from it. Prior vandalism damage still exists at the upper pumphouse, including graffiti and multiple bullet-holes through the corrugated-metal exterior walls. All signs previously marked with graffiti were replaced in 2020 and several signs that were damaged with bullet-holes were replaced in 2021. Additional warning signs are scheduled to be installed during the fall of 2023 and will be positioned to best deter further vandalism. No vandalism to the spray irrigation system has been observed.

Site inspections were performed periodically throughout the summer and fall months when runoff was minimal or non-existent, and performed more frequently during the winter and spring months when runoff was constant. Summer and fall inspections included observing the area for signs of trespassing, vandalism, evaluation of fire fuels (i.e., dry grass, dead trees, etc.), and water levels in the upper pond. Winter and spring inspections included the same general observations, but also included inspecting the lower pond and sprinkler system for signs of activity, water/leachate levels, debris, repair needs, and to record the volume of leachate pumped.

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Leachate Spray Irrigation

Similar to the 2021-2022 leachate irrigation season which began flowing in December 2021, the 2022-2023 season began flowing the last week of December 2022 and continued through June 2023. Both the landfill site and the leachate spray irrigation system were inspected regularly during normal work hours and the system was maintained and kept in working order. Readings from the flow meter dial located in the upper pumphouse were photographed at regular intervals, typically at least once per month. In July 2023, it was realized that the monthly reading had not changed since early May, indicating the meter dial had failed sometime between April 26 and May 8 (the prior reading dates with different flow values). Subsequently, the total volume of leachate distributed through the sprinkler system for the 2022-2023 season cannot be accurately determined and must be estimated.

To estimate the total volume of leachate dispersed during the 2022-2023 season, similar meter readings for the 2020-2021 and 2021-2022 seasons were reviewed. During the 2020-2021 season, a total volume of 9,035,525 gallons were dispersed, with approximately 95% being dispersed between December 2020 and April 2021 and approximately 5% being dispersed between May 2021 and June 2021. Similarly, during the 2021-2022 season, a total volume of 13,666,158 gallons were dispersed, with approximately 65% being dispersed between December 2021 and April 2022 and approximately 35% being dispersed between May 2022 and June 2022. Although only two seasons of comparable data were available to use as a reference baseline, it can reasonably be estimated that the volume of leachate distributed between December 2022 and April 2023 was between 65% and 95% of the total volume dispersed for the entire season. Using a December 2022 meter reading of 23,470,200 gallons (beginning of season) and a May 2023 meter reading of 29,222,870 gallons[1], it can reliably be reported that 5,752,670 gallons of leachate were dispersed before the meter dial failed. Assuming this volume is between 65% and 95% of the total volume dispersed for the season, it is estimated that the total volume dispersed was likely between 6,055,442 and 8,850,261 gallons, and a median volume of 7,452,850 gallons is being reported.

Rainfall totals during the same period measured 21.92 inches.[2] As shown in the chart below, annual rainfall for the season was approximately 27% less than the previous season while the estimated volume of leachate pumped was approximately 45% less. The variance in pumping volumes in relation to rainfall totals can be attributed to a variety of factors and led to the installation of the analog flow meter in December 2019. The addition of the flow meter has increased confidence in the reporting volumes each year, however, due to the failure of the flow meter in 2022-2023 additional measures will be taken to increase reliability. Specifically, the flow meter dial will be replaced during the next “off” season, and a second, possibly third, at-grade in-line flow meter will be installed between the upper pumphouse and the sprinkler system. It is expected that having two or possibly three meters available for reading will reduce chances of further failure and provide reference values to ensure the flow meters are correctly calibrated.

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Irrigation Season July 1 – June 30 [3]	Month Pumping Began	Month Pumping Ended	Rainfall (in.) July 1 – June 30 [2]	Total Gallons Pumped
2010-2011	N/A	N/A	37.0	14,200,000
2011-2012	N/A	N/A	30.6	12,000,000
2012-2013	November 2012	June 2013	24.3	5,600,000
2013-2014	November 2013	July 2014	29.5	12,700,000
2014-2015	December 2014	June 2015	23.4	12,600,000
2015-2016	November 2015	July 2016	32.5	25,700,000
2016-2017	November 2016	August 2017	33.2	20,100,000
2017-2018	November 2017	August 2018	30.2	22,700,000
2018-2019	December 2018	June 2019	21.7	6,300,000
2019-2020	December 2019	June 2020	22.7	5,900,000
2020-2021	January 2021	June 2021	21.51	9,035,525
2021-2022	December 2021	June 2022	29.95	13,666,158
2022-2023	December 2022	June 2023	21.92	7,452,850

Maintenance and Repairs

Dual pumps are in place at the lower pumphouse as well as the upper pumphouse that distributes leachate to the sprinkling system. Both pump systems are configured so one pump acts as an emergency backup in the event the other fails. During normal use, pump cycles alternate to minimize wear and further extend pump life. In 2017 a replacement program was implemented so that one lower pump is replaced every year, thereby ensuring neither pump is more than two years old. This practice continued through 2023 and is expected to continue in the future. Additionally, a spare pump is kept at the County Public Works shop in the event of a pump failure and is part of the scheduled pump rotation program. Pumps are typically rotated at the end of the leachate collection season (i.e., summer-fall) and part of the annual maintenance schedule. Annual maintenance generally includes rotating one lower pump, cleaning pump components, cleaning the lower pumphouse piping, cleaning or replacing the lower pond screen assembly, and completing any deferred repair work.

To increase monitoring capabilities, a game camera was installed near the lower pond in fall 2021. The camera collects an image of the lower pond level every three hours and emails it to three separate County employees. The camera was not intended to replace regular inspection schedules but rather provide more frequent observations of potential issues and to provide visual documentation in the event a failure occurs. A second camera was added to the upper pond in 2022 and provides a similar image every six hours. The frequency at which images are provided

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and the number of recipients the images are emailed to are programmable and can be modified as necessary.

Several sprinkler-heads either needed to be replaced or needed to be purged of debris, but otherwise no other repair work was necessary during the 2022-2023 season and all pumps and piping functioned as intended.

Additional maintenance work performed in spring 2023 included clearing and removing brush to provide better and safer access to the various monitoring probes located throughout the landfill, as well as improving access to the leachate seep above the lower pond and to the surface water collection point located below the lower pond.

Potential Health Risks

Attempts were made to collect groundwater samples from all three monitoring wells in April 2023, however, like previous years well No.1 (MW-1) and well No.2 (MW-2) were dry. Subsequently, samples were only collected from well No.3 (MW-3). The spring monitoring event was initially scheduled to be performed in late March 2023 but was ultimately delayed until April 10th due to staff availability and weather conditions.

The analysis results from MW-3 samples were generally consistent with prior years analysis. All Group 1a and 1b indicator parameter values ("parameters") were within historic ranges. Additionally, all Group 2a total-concentration parameters were within historic ranges, except for nitrate (0.37 mg/l) which was marginally above its historic range but below its Maximum Containment Level (MCL). Analysis of Group 2a dissolved-concentration parameters indicated that the iron (0.017 mg/L) and manganese (0.0019 mg/L) concentrations were significantly lower than the total-concentration values, and all Group 2b total-concentration parameters were within prior concentration ranges and no MCLs were exceeded. Of the Group 2b dissolved-concentrations, copper (3.17 ug/L) was above the total concentration (3.08 ug/L) but below the MCL (1,000 (ug/L). Lastly, no Group 3 VOCs were detected and, overall, the data did not indicate a change in groundwater quality.

Analysis results from the leachate samples were similar in that they do not indicate a change in leachate quality. Group 1a parameters were consistent with prior concentrations, except for Redox (-43 mV), which was lower than historically reported but higher than reported in 2022 (-34 mV), and pH (7.13) which was the highest on record. Group 1b parameters were also mostly consistent with prior concentrations, except for pH (6.93) which was the highest historical value, and conductivity (377.5 uS/cm), which was the lowest historical value. Group 2a parameters indicated that iron (8.62 mg/L), magnesium (11.35 mg/L), manganese (3.96 mg/L), silica (12.30 mg/L), and chloride were all detected at the lowest historic concentrations, while sulfate (7.09 mg/L) was detected at the highest historic concentration. All Group 2b parameters were within historical concentration ranges, except for barium (251 ug/L) and cobalt (32.35 ug/L) which were detected at the lowest historic concentrations. One Group 3 VOC, chlorobenzene,

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was detected in both the sample and duplicate samples at concentrations above the method reporting limit (MRL). Chlorobenzene is the only VOC to have been detected in all sampling events since 2009.

Analysis results from the surface water samples are only the third collected since 2017 (collected 2021, 2022, and 2023) and therefore difficult to compare with previous years. However, analysis of the 2023 samples indicate that all Group 1a parameters were within historical ranges, except for dissolved oxygen (6.63 mg/L) and field conductivity (221 uS/cm) which were the lowest historical values. Most Group 1b parameters were consistent with historic ranges, except for conductivity (214 uS/cm), hardness (71.2 mg/L), TDS (116 mg/L), and TOC (1.3 mg/L), which were all detected at the lowest historical concentrations. Additionally, pH (6.50) and laboratory conductivity (214 uS/cm) were both lower than the field measured values. Group 2a total concentrations were generally consistent with prior ranges, except for calcium (18.1 mg/L), potassium (1.59 mg/L), sodium (12.9 mg/L), and chloride (8.23 mg/L) were the lowest historical c concentrations and nitrate (0.76 mg/L) was the highest historical concentration. As in some previous events, iron (0.31 mg/L) exceeded the MCL (0.30 mg/L). All Group 2b detected parameters were within historical ranges, except for barium (33.8 mg/L) which was at the lowest historical value, and no MCL values were exceeded. Lastly, no Group 3 VOCs were detected and the overall surface water quality parameter concentrations were either consistent with or lower than previous range values and do not indicate a substantial change in surface water quality.

Methane gas monitoring was performed in November 2022 and again in April 2023. Detection levels were consistent with historical records since 2016, in that methane was detected in the probes located within the waste boundary but not in probes located outside the boundary. The data indicates that offsite methane migration is not occurring and that concentrations are not exceeding the lower explosive limit (LEL) of 5% by volume at the property boundary.

Please refer to the 2023 Annual Environmental Monitoring Report prepared by VISTA GeoEnvironmental Services for specific groundwater, surface water, leachate, and methane test results and analysis.

The risk of exposure to leachate continues to be minimized by security measures installed around the site. Security measures include: a locked gate at the landfill entrance, the display of “Unauthorized Entry Prohibited” signage around the irrigation system, the installation of “Danger – Contaminated Water” signage at the lower pond in 2023, the installation of chain-link fencing around the upper pond, and minor fencing across the top of the lower pond dam. Fencing at the upper pond also includes a locked gate to limit access to only County personnel, and measures are taken when appropriate to mitigate trespassing by ATV’s, motorcycles, or other off-road vehicles.

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Landfill Closure

Access to the site continues to be monitored and kept to a minimum. No dumping or open burning was observed at the site and onsite roads have been maintained to provide reasonable, all-weather vehicle access to monitoring and maintenance locations. Evidence of trespassing by ATV and other off-road vehicles has significantly decreased from prior years but still occurred during 2022-2023, and resulted in the theft of the camera positioned at the lower pond. The camera was replaced and additional security measures implemented to deter further theft.

Landfill Budget

The County expended a total of approximately $60,360 on landfill monitoring and testing during its 2023 fiscal year (July 1, 2022 – June 30, 2023). The amount accounts for an approximate 80% increase in expenditures for similar costs during the prior year ($33,212). Contributing factors for the significant increase include costs for consulting services to prepare an Environmental Monitoring Plan, and contracted service costs for maintenance and monitoring staff due to the County ceasing to provide General Fund staff for the landfill program.

The County's fiscal year coincides with the irrigation season and includes all funding expended on leachate evaluation, consultant services, maintenance and repair needs, general operations, and staff services. The County does not have a reserve fund for landfill monitoring, maintenance, or any other solid waste permit activities and therefore all funding for landfill activities is appropriated on an annual basis from the County General Fund and subject to Budget Committee and County Board of Commissioner approval. Although appropriations from a reserve fund would be subject to the same Committee and Commission approvals, the lack of a dedicated reserve for landfill activities means that unanticipated costs, such as additional testing, re-testing, or high-dollar repair costs, may need to be deferred until the following fiscal year when additional funding can be appropriated. Additionally, the County does not provide dedicated staff employees for the landfill and all staff time has historically been provided by the Parks & Buildings Supervisor or contracted through the County Public Works Department Administration Division. Any costs related to work performed by Public Works staff are reimbursed via the Landfill Budget to account for the use of staff positions funding with restricted State Highway Fund dollars. In February 2023, the Parks & Buildings Supervisor retired from employment with the County and subsequently all further monitoring and maintenance work was performed specifically by Public Work staff.

For the FY2024 budget year, the County has appropriated a total of $62,500 for landfill maintenance activities, a slight decrease of approximately 2% from the previous year.

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Acknowledgements

1. Meter readings taken on April 26, 2023 were 29,108,040 gallons and meter readings taken on May 8, 2023 were 29,222,870. Readings taken in July 2023 were the same as on May 8, indicating the meter dial failed sometime between April 26 and May 8, 2023. For the purposes of estimating 2022-2023 volumes, it is assumed the reading taken on May 8, 2023 is accurate.

2. Source records for annual rainfall prior to the 2020-2021 season are unavailable. Rainfall data for the 2020-2021 season were provided by www.hoodriverweather.org and obtained from https://www.usbr.gov/pn/agrimet/wxdata.html for the 2021-2022 and 2022-2023 season.

3. The Irrigation and Rainfall reporting seasons have varied prior to 2020 and have typically coincided with the calendar year. The reporting season was changed in 2020 to coincide with the AEMR reporting season and to comply with the Closure Permit. However, the acknowledged dates have been added at the request of the DEQ and represent current reporting practices.