

Sanitary Disposal Project Name

20xx (Semi-)Annual Water Quality Report

Landfill Unit Name

Permit #XX-SDP-XX-XXP

Site Owner

Site Location

Date

Prepared by:

Entity or Individual


Entity Address

City, Zip Code

Certification

Prepared by: _____ Date: _____

Typed: _____

| | | |
|---|---|------------|
|  | I hereby certify that this plan was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa. | |
| | Signature _____ | Date _____ |
| | Printed or Typed Name _____ | |
| | My license renewal date is December 31, _____ | |
| Pages or sheets covered by this seal: <u>A.1, B.1, C.1, X.1-X.5</u> | | |

Certification page **(114.26(8)"d")**

An annual report summarizing the effect of the facility on groundwater and surface water quality shall be submitted to the department each year. The summary is to be prepared by an engineer registered in the state of Iowa.

Executive Summary

Period of Report Coverage

(Narrative listing monitoring event dates that this report addresses)

Report Priority

Provide narrative discussion on urgency or lack thereof for a DNR review based on conclusions, recommendations, demonstrations, proposals or requests. Include a review of impact on rules schedule that DNR review time may have. Identify any action or activity that is on hold due to completion of DNR review or comment.

Provide actions and/or permit amendments needed based on this year's results (114.8)

(Actions can either be requested by the permit holder or initiated by the DNR).

Requests for permit amendments must be submitted in writing to the DNR with supporting documentation and justification.

Site Status and Applicable Rules (see Figure 1-Site Plan)

(this narrative describes the site status as a solid waste landfill, i.e. closed areas, open areas, types of waste accepted, and applicable IAC rules)

Acronyms/ Abbreviations

Acronyms/Abbreviations:

AL = Action Level

CL = Control Limit (M+/-2SD)

GWQAP = Groundwater Quality Assessment Plan

LEL = Lower Explosive Limit

M+/-2SD = Mean Plus/Minus Two Standard Deviations

MCL = EPA Maximum Contaminant Level

NC = No Change

RAMP = Remedial Action/Mitigation Plan

RL = Reporting Limit

SS = Statewide Standard

TSS = Total Suspended Solids

The worksheets contain a comment section for the user of this template to further explain results, evaluations, and conclusions. Use additional pages if necessary.

Also included on the bottom of some worksheets *in italics* is the DNR's intended purpose for these worksheets.

Acronyms/ Abbreviations



Site Background History

Comments: Site background consists of a brief history of the site and hydrogeology.

**Table 1
Monitoring Program Summary
2015 Annual Water Quality Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P**

| Monitoring Well | Formation | Current Monitoring Program | Change for next sampling event | Control Limit Exceedances | Total # of Samples in each monitoring program since January 1, 2018 | | |
|--------------------------------|-----------------------------|----------------------------|--------------------------------|----------------------------------|---|--------------|-----------------|
| | | | | | Routine | Supplemental | Remedial Action |
| MW-1 | Weathered Till | Background | NC | None | 4 | 0 | 0 |
| MW-2 | Weathered Till | Remedial Action | NC | cis-1,2-DCE Carbon Tetrachloride | 0 | 8 | 5 |
| MW-3 | Weathered Till | Supplemental | Remedial Action | Pb | 2 | 8 | 8 |
| MW-4 | Weathered Till | Supplemental | NC | As, Pb | 1 | 7 | 0 |
| MW-5 | Weathered Till | Routine | NC | None | 5 | 0 | 0 |
| MW-6 | Weathered Till | Supplemental | NC | Benzene, Vinyl Chloride, TCE | 1 | 4 | 0 |
| MW-7 | Weathered Till | Routine | NC | None | 3 | 0 | 0 |
| MW-8 | Weathered Till | Background | NC | None | 6 | 0 | 0 |
| MW-9 | Weathered Till | Remedial Action | NC | Ba, 1,1-Dichloroethylene | 1 | 3 | 7 |
| MW-10 | Upper Limestone | Routine | NC | None | 2 | 0 | 0 |
| GU-1 | Underdrain - Weathered Till | Routine | NC | None | 8 | 0 | 0 |
| Other monitoring points | | | | | | | |
| MW 28 | Weathered Till | Plume delineation | Supplemental | Benzene | 4 | 6 | 0 |
| MW 29 | Weathered Till | Water Level | NC | None | 3 | 2 | 1 |
| MW 30 | Weathered Till | Remedial Action | NC | Vinyl Chloride | 5 | 2 | 2 |
| MW 31 | Upper Limestone | Water Level | NC | None | 2 | 4 | 1 |

A1

Comments: (insert clarifications, deviations to HMSP or notes as needed). Include a discussion on any new monitoring points added or deleted from HMSP and relevant DNR approval or approval status of such changes.

This worksheet:

- 1) Provides a summary of the monitoring points and in which phase of monitoring they are in,
- 2) Verifies conformance with the approved HMSP network,
- 3) Gives a summary of the monitored aquifer,
- 4) Provides the size of the dataset,
- 5) Provides a summary of current contaminants above background and whether they exceed a Control Limit
- 6) States the phase for the next sampling event,
- 7) Mentions additional site sampling that may be occurring on a temporary basis to achieve a delineation or remedial action goal, and
- 8) Provides any deviations to current HMSP.

Site Figures

Comments: (Provide a figure for each monitored system [for example upper and lower hydrogeologic strata] within the report or in an appendix and identify them by a Figure #. All figures should contain a legend, scale bar, north arrow, date of topographic survey, limits of waste, permitted boundary and property or legal entitlement boundary).

(Map must contain ground water and leachate elevations (if applicable) for each sampling event and each monitored unit.)

Table 2
Monitoring Program Implementation Schedule
2020 Annual Water Quality Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P

| Monitoring Well | Recent Sampling Dates and Constituents | | | Upcoming Sampling Dates and Constituents | | | |
|-----------------|--|---------------------|---------------------|--|---------------------|---------------------|---------------------|
| | 5/13/2018 | 9/12/2018 | 4/1/2019 | July 2020 | October 2020 | March 2021 | September 2021 |
| MW-1 | List A, List B | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-2 | List A, List B | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-3 | List A, List B | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-4 | List A, List B | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-5 | N/A - Dry | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-6 | List A, List B | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-7 | List A, List B | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-8 | List A, List B, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |
| MW-9 | List A, TSS | List A, List B, TSS | List A, List B, TSS | List A, List B, TSS | List A, List B, TSS | List A, List B, TSS | List A, List B, TSS |
| MW-10 | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS | List A, TSS |

Comments: (insert clarifications or notes as needed) Explain deviations from schedules listed in rules/permit and reason(s) for deviations.

List A-(list applicable constituents)
List B-(list applicable constituents)

This worksheet tracks compliance with permitted sampling frequencies and required parameters and to aid in scheduling.

Table 3
Monitoring Well Maintenance and Performance Revaluation Schedule
2015 Annual Water Quality Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P

| Compliance with: | Monitoring Calendar Years | | | | | | |
|---|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| 567 IAC 114.21(2)"a" high and low water levels (add required frequency) | Completed | | Completed | | Scheduled | | Scheduled |
| 567 IAC 114.21(2)"b" changes in the hydrologic setting and flow paths | Completed | | Completed | | Scheduled | | Scheduled |
| 567 IAC 114.21(2)"c" well depths | Completed | Completed | Completed | Scheduled | Scheduled | Scheduled | Scheduled |
| 567 IAC 114.21(2)"d" in-situ permeability tests | Completed | | Completed | | Scheduled | | Scheduled |

Comments: (insert clarifications or notes as needed) Explain deviations from schedules listed in rules/permit and reason(s) for deviations

This worksheet;
 1) Summarizes compliance, and
 2) Aids in scheduling future tasks.

**Table 4
Monitoring Well Maintenance and Performance Summary
2015 Annual Water Quality Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P**

(includes all wells, underdrains etc.)

| Well | Top of Casing | Top of Screen | Total Depth | | Date of Measurements | | Maximum Depth Discrepancy (ft) | Baseline Permeability (cm/s/date) | Current Permeability | |
|---------|---------------|---------------|-------------|--------------------------------|----------------------|-----------|--------------------------------|-----------------------------------|----------------------|----------|
| | | | | | 3/25/2018 | 8/31/2018 | | | 3/25/2018 | % Change |
| MW-1 | 1251.8 | 1234.7 | 22.1 | Groundwater Level (ft) | 5.35 | 8.34 | 1.3 | 4.40E-05 1/28/2015 | 4.10E-05 | -7% |
| | | | | Groundwater Elevation (Ft MSL) | 1246.45 | 1243.46 | | | | |
| | | | | Measured Well Depth (ft) | 21.2 | 20.8 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-2 | 1230.8 | 1218.9 | 16.9 | Groundwater Level (ft) | 2.95 | 4.2 | 1.7 | 3.20E-06 1/28/2015 | 1.10E-06 | -66% |
| | | | | Groundwater Elevation (Ft MSL) | 1227.85 | 1226.6 | | | | |
| | | | | Measured Well Depth (ft) | 15.4 | 15.2 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-3 | 1231.2 | 1208.9 | 32.3 | Groundwater Level (ft) | 3.21 | 4.84 | 1.2 | 7.20E-05 1/28/2015 | 2.00E-05 | -72% |
| | | | | Groundwater Elevation (Ft MSL) | 1227.99 | 1226.36 | | | | |
| | | | | Measured Well Depth (ft) | 31.3 | 31.1 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-4 | 1238.2 | 1226.6 | 21.6 | Groundwater Level (ft) | 2.75 | 6.52 | 4.6 | 4.50E-05 1/28/2015 | 1.02E-04 | 127% |
| | | | | Groundwater Elevation (Ft MSL) | 1235.45 | 1231.68 | | | | |
| | | | | Measured Well Depth (ft) | 18 | 17 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-5 | 1239 | 1196.6 | 52.4 | Groundwater Level (ft) | 3.35 | 6.65 | 1.7 | 5.20E-05 1/28/2015 | 5.80E-05 | 12% |
| | | | | Groundwater Elevation (Ft MSL) | 1235.65 | 1232.35 | | | | |
| | | | | Measured Well Depth (ft) | 51.1 | 50.7 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-6 | 1215.5 | 1203.7 | 21.8 | Groundwater Level (ft) | 17.1 | 19.4 | 4.6 | 5.40E-06 1/28/2015 | 7.80E-06 | 44% |
| | | | | Groundwater Elevation (Ft MSL) | 1198.4 | 1196.1 | | | | |
| | | | | Measured Well Depth (ft) | 17.2 | 17.3 | | | | |
| | | | | Submerged screen | N | N | | | | |
| MW-7 | 1215.8 | 1174.7 | 51.2 | Groundwater Level (ft) | 5.15 | 4.29 | 0.3 | 4.90E-05 1/28/2015 | 6.60E-05 | 35% |
| | | | | Groundwater Elevation (Ft MSL) | 1210.65 | 1211.51 | | | | |
| | | | | Measured Well Depth (ft) | 50.9 | 51.1 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-8 | 1220.2 | 1209.3 | 15.9 | Groundwater Level (ft) | 4.21 | 6.81 | -0.1 | 2.60E-06 1/28/2015 | 7.50E-06 | 188% |
| | | | | Groundwater Elevation (Ft MSL) | 1215.99 | 1213.39 | | | | |
| | | | | Measured Well Depth (ft) | 16 | 16 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-9 | 1221.6 | 1204.8 | 26.8 | Groundwater Level (ft) | 5.25 | 6.98 | 2.4 | 3.30E-05 1/28/2015 | 9.70E-05 | 194% |
| | | | | Groundwater Elevation (Ft MSL) | 1216.35 | 1214.62 | | | | |
| | | | | Measured Well Depth (ft) | 24.4 | 26.7 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-10 | 1230.1 | 1263.7 | 33.6 | Groundwater Level (ft) | 3.48 | 4.94 | 0.2 | 6.20E-06 1/28/2015 | 8.61E-06 | 39% |
| | | | | Groundwater Elevation (Ft MSL) | 1226.62 | 1225.16 | | | | |
| | | | | Measured Well Depth (ft) | 33.4 | 33.5 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-28 | 1230 | 1198 | 42 | Groundwater Level (ft) | 2.95 | 4.11 | 1.5 | 4.80E-06 1/28/2015 | 2.04E-06 | -58% |
| | | | | Groundwater Elevation (Ft MSL) | 1227.05 | 1225.89 | | | | |
| | | | | Measured Well Depth (ft) | 41.3 | 40.5 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-29 | 1274.5 | 1218.5 | 15.8 | Groundwater Level (ft) | 10.69 | 11.7 | 0.2 | 4.10E-05 1/28/2015 | 2.75E-05 | -33% |
| | | | | Groundwater Elevation (Ft MSL) | 1263.81 | 1262.8 | | | | |
| | | | | Measured Well Depth (ft) | 16 | 15.6 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-30 | 1274.2 | 1253.2 | 31.3 | Groundwater Level (ft) | 10.45 | 11.39 | 0.6 | 5.70E-05 1/28/2015 | 3.30E-05 | -42% |
| | | | | Groundwater Elevation (Ft MSL) | 1263.75 | 1262.81 | | | | |
| | | | | Measured Well Depth (ft) | 30.9 | 30.7 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| MW-31 | 1241.39 | 1275.8 | 34.41 | Groundwater Level (ft) | 12.25 | 12.84 | 0.21 | 3.54E-06 1/28/2015 | 8.11E-06 | 129% |
| | | | | Groundwater Elevation (Ft MSL) | 1229.14 | 1228.55 | | | | |
| | | | | Measured Well Depth (ft) | 34.5 | 34.2 | | | | |
| | | | | Submerged screen | Y | Y | | | | |
| PZ-PH-1 | 1248.76 | 1237.5 | 31.3 | Groundwater Level (ft) | 9.49 | 11.21 | 0 | 4.04E-05 1/28/2015 | 3.25E-05 | -20% |
| | | | | Groundwater Elevation (Ft MSL) | 1239.27 | 1237.55 | | | | |
| | | | | Measured Well Depth (ft) | 31.3 | 32.3 | | | | |
| | | | | Submerged screen | Y | Y | | | | |

Groundwater Underdrain Piezometer

| Well | | Date of Measurements | |
|---------|----------------------------------|----------------------|-----------|
| | | 3/25/2018 | 8/31/2018 |
| GPZ - 1 | bottom of waste (feet MSL) | 1074 | |
| | Groundwater Elevation (feet MSL) | 1072 | 1068 |
| | Separation distance (feet) | 2 | 6 |

Comments: (insert clarifications or notes as needed) Provide schedule for any repair, redevelopment, or replacement of monitoring points.

This worksheet;
 1) Summarizes data used to evaluate Monitoring Well Maintenance and Performance, and
 2) Identifies monitoring wells that have submerged screens.

Table 5
Background Summary
2020 Annual Water Quality Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P

Interwell Background/Control Limit (MW-1 and MW-8)

| Constituent | Units | Samples | Detections | Background level | Statistical Test | Action Level | Source |
|--------------------------------------|-------|---------|------------|------------------|------------------|--------------|--------|
| Inorganics | | | | | | | |
| Barium (Ba) | µg/l | 8 | 6 | 1571 | M+/-2SD | 2000 | MCL |
| Beryllium (Be) | µg/l | 8 | 4 | 1.7 | M+/-2SD | 4 | MCL |
| Cadmium (Cd) | µg/l | 8 | 0 | 0.1 | M+/-2SD | 5 | MCL |
| Chromium (Cr) | µg/l | 8 | 0 | 2 | M+/-2SD | 100 | MCL |
| Copper (Cu) | µg/l | 8 | 0 | 2 | M+/-2SD | 1300 | MCL |
| Lead (Pb) | µg/l | 8 | 0 | 0.5 | M+/-2SD | 15 | MCL |
| Mercury (Hg) | µg/l | 3 | 0 | 0.2 | M+/-2SD | 2 | MCL |
| Selenium (Se) | µg/l | 8 | 0 | 0.7 | M+/-2SD | 50 | MCL |
| Zinc (Zn) | µg/l | 8 | 7 | 173.8 | M+/-2SD | 2000 | SS |
| Organics - Supplemental | | | | | | | |
| Benzene | µg/l | 8 | 0 | 0.1 | M+/-2SD | 5 | MCL |
| cis-1,2-dichloroethene (cis-1,2-DCE) | µg/l | 8 | 0 | 1 | M+/-2SD | 7 | MCL |
| Trichloroethene (TCE) | µg/l | 8 | 0 | 0.22 | M+/-2SD | 5 | MCL |
| Vinyl Chloride | µg/l | 8 | 0 | 0.25 | M+/-2SD | 2 | MCL |
| Organics - Remedial Action | | | | | | | |
| Vinyl Chloride | µg/l | 3 | 0 | 0.5 | M+/-2SD | 2 | MCL |

Comments: (insert clarifications or notes as needed) Provide a narrative of water quality results and effectiveness of the statistical data evaluation criteria. Include a summary, if applicable, of any changes to the previous statistical methods that were made in this reporting period, including notifications of changes to the Department and approval dates.

This worksheet;

- 1) Summarizes the size and quality of the data record of the background data,
- 2) Summarizes the current statistical method,
- 3) Examines how background levels were determined,
- 4) Examines whether background levels are reasonable,
- 5) Identifies background water quality that is impacted.

Table 6

Summary of Well/Detected Constituent Pairs With No Immediately Preceding Control Limit Exceedances
 2020 Annual Water Quality Report
 Cyclone County Sanitary Landfill
 Permit No. 00-SDP-01-74P

| Well | Constituent | Units | Most recent result | Control Limit |
|-------|-------------|-------|--------------------|---------------|
| MW-1 | Barium | µg/l | 561 | 1571 |
| | Beryllium | µg/l | 0.6 | 1.7 |
| | Nickel | µg/l | 6.3 | 51 |
| | Zinc | µg/l | 71 | 173.8 |
| MW-2 | Antimony | µg/l | 2.8 | 5.2 |
| | Arsenic | µg/l | 20.7 | 15.2 |
| | Barium | µg/l | 378 | 1571 |
| | Nickel | µg/l | 7.9 | 51 |
| MW-3 | Barium | µg/l | 121 | 1571 |
| | Nickel | µg/l | 17.6 | 51 |
| | Zinc | µg/l | 87.2 | 173.8 |
| MW-4 | Arsenic | µg/l | 3.3 | 15.2 |
| | Barium | µg/l | 838 | 1571 |
| | Nickel | µg/l | 22 | 51 |
| | Zinc | µg/l | 48.6 | 173.8 |
| MW-5 | Arsenic | µg/l | 2.6 | 15.2 |
| | Barium | µg/l | 153 | 1571 |
| | Zinc | µg/l | 42.1 | 173.8 |
| MW-6 | Antimony | µg/l | 3.4 | 5.2 |
| | Arsenic | µg/l | 2.5 | 15.2 |
| | Barium | µg/l | 1125 | 1571 |
| | Nickel | µg/l | 10 | 51 |
| | Zinc | µg/l | 22.6 | 173.8 |
| | Toluene | µg/l | 6.8 | 0.22 |
| MW-7 | Arsenic | µg/l | 4.1 | 15.2 |
| | Barium | µg/l | 316 | 1571 |
| | Cobalt | µg/l | 3.8 | 2.45 |
| MW-8 | Arsenic | µg/l | 4.7 | 15.2 |
| | Barium | µg/l | 1468 | 1571 |
| | Nickel | µg/l | 37 | 51 |
| | Zinc | µg/l | 21.7 | 173.8 |
| MW-9 | Zinc | µg/l | 27.7 | 173.8 |
| MW-10 | Arsenic | µg/l | 2.2 | 7.38 |
| | Barium | µg/l | 671 | 1738 |
| | Nickel | µg/l | 11.2 | 8.854 |
| | Zinc | µg/l | 14.7 | 81.7 |
| GU-1 | Arsenic | µg/l | 2.8 | 15.2 |
| | Zinc | µg/l | 13.9 | 173.8 |
| MW-28 | Arsenic | µg/l | 2.8 | 15.2 |
| MW-30 | Arsenic | µg/l | 3.3 | 15.2 |
| | Cobalt | µg/l | 1.7 | 2.45 |

Comments: (insert clarifications or notes as needed) Provide a narrative discussion of any problems with the current detection network such as dry points, damaged or inaccessible points, laboratory issues, impact of problems on efficacy of HMSP, proposed remedies if necessary and schedule to implement remedies. Also describe if alternative constituent list or sample frequencies have been approved.

This worksheet presents a summary of background comparisons for well constituents pairs that are in the routine monitoring program. If exceedances are confirmed an investigation of a new release is necessary.

Table 7
Summary of Ongoing and Newly Identified Control Limit Exceedances
2020 Annual Water Quality Report
Hawkeye County Sanitary Landfill
Permit No. 00-SDP-01-74P

| Well | Constituent | Units | Most recent result | Background Standard |
|------|----------------------------|-------|--------------------|---------------------|
| MW-2 | Arsenic | µg/l | 20.7 | 15.2 |
| | cis-1,2-DCE | µg/l | 3.4 | 1 |
| | TCE | µg/l | 17.8 | 0.22 |
| MW-3 | Cobalt | µg/l | 1.97 | 2.45 |
| MW-4 | Cobalt | µg/l | 8.97 | 2.45 |
| | Vanadium | µg/l | 12 | 0.5 |
| MW-6 | Benzene | µg/l | 3.14 | 0.1 |
| | Toluene | µg/l | 6.8 | 0.22 |
| | Vinyl Chloride | µg/l | 5.4 | 0.25 |
| MW-7 | Cobalt | µg/l | 3.8 | 2.45 |
| MW-9 | Barium | µg/l | 1974 | 1571 |
| | cis-1,2-DCE | µg/l | 1.5 | 1 |
| | bis(2-ethylhexyl)phthalate | µg/l | 6.98 | 0.5 |

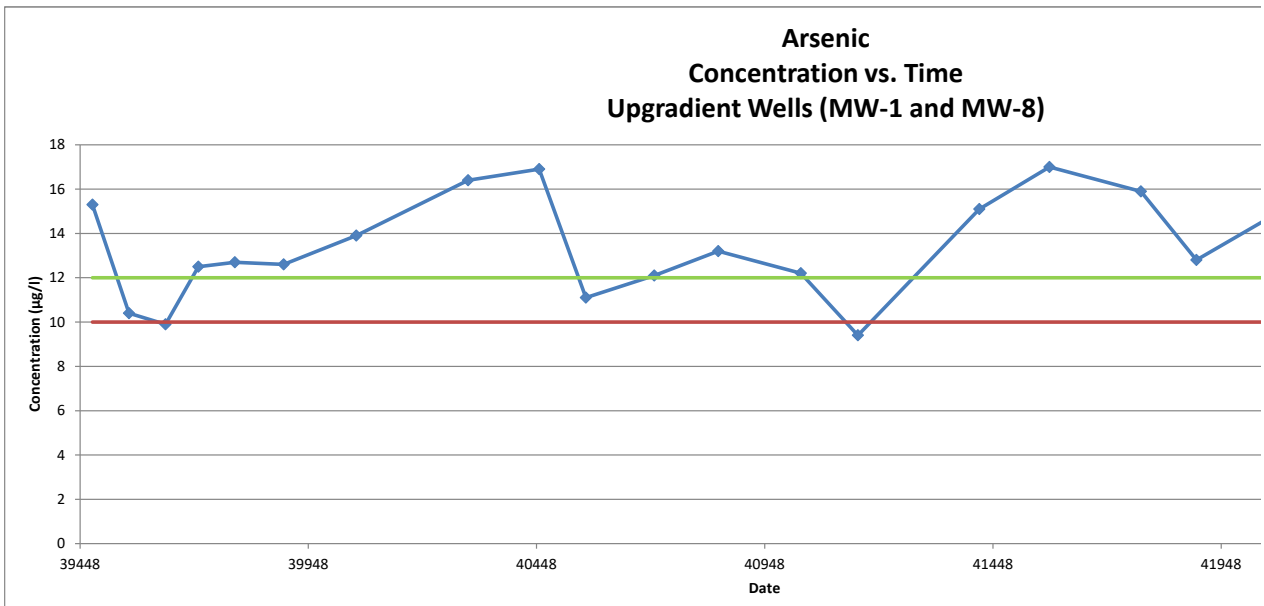
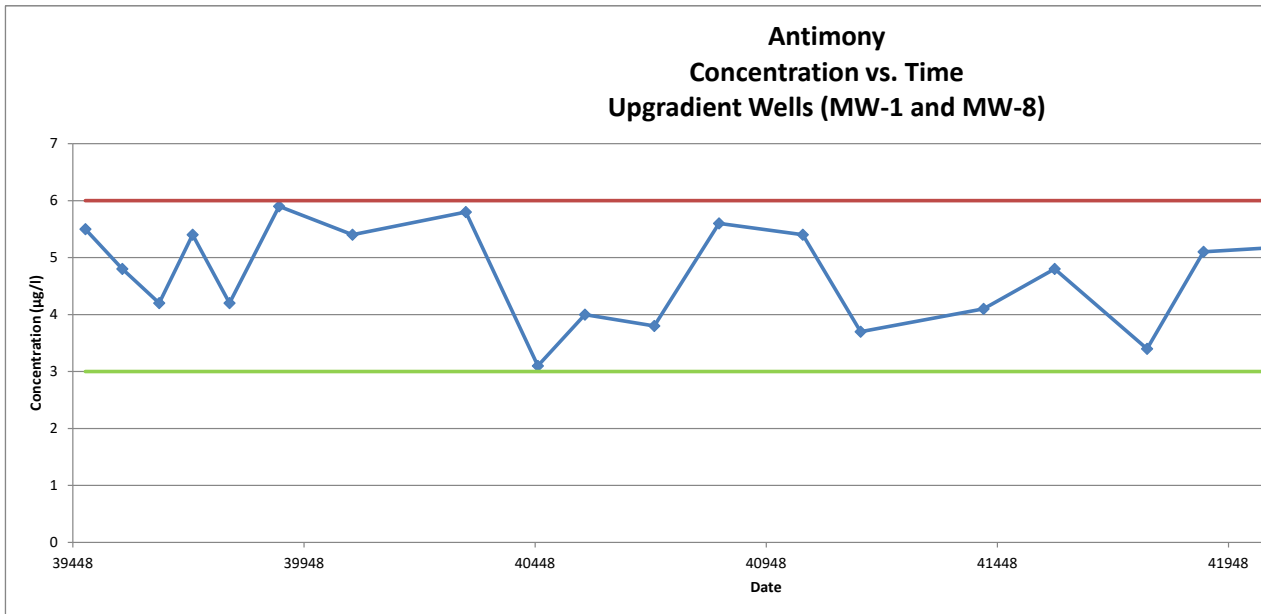
Comments: (insert clarifications or notes as needed) Provide a narrative discussion of any problems with tl of problems on efficacy of HMSP, proposed remedies if necessary and schedule to implement remedies. A describe the status of plume delineation activities and property owner notifications, as necessary.)

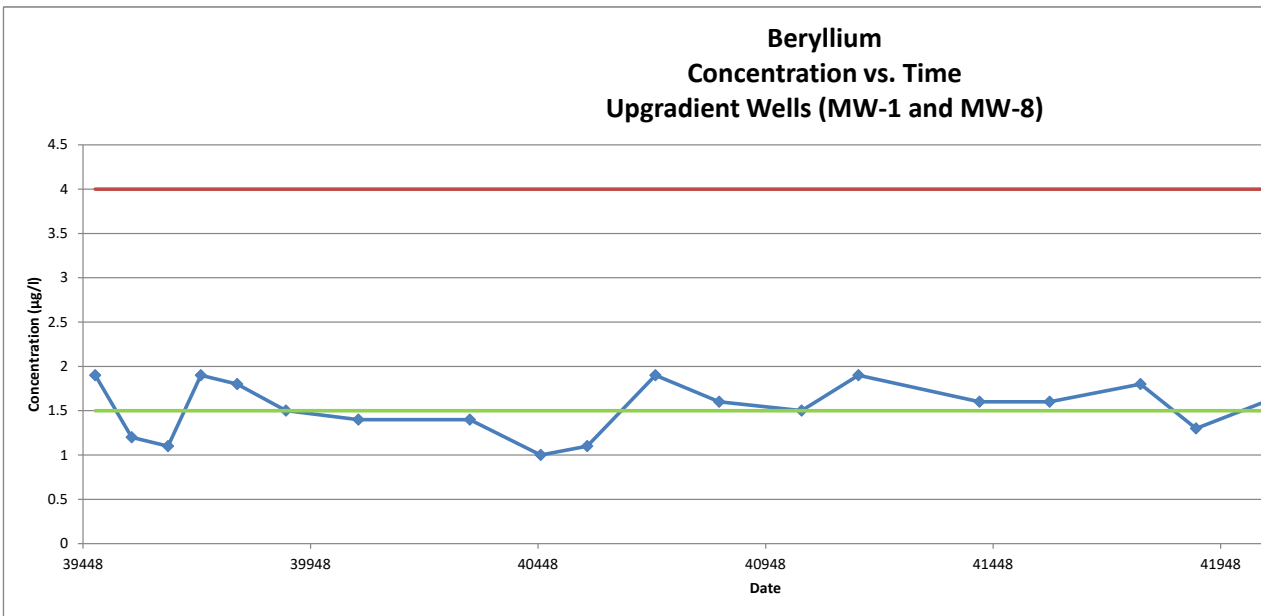
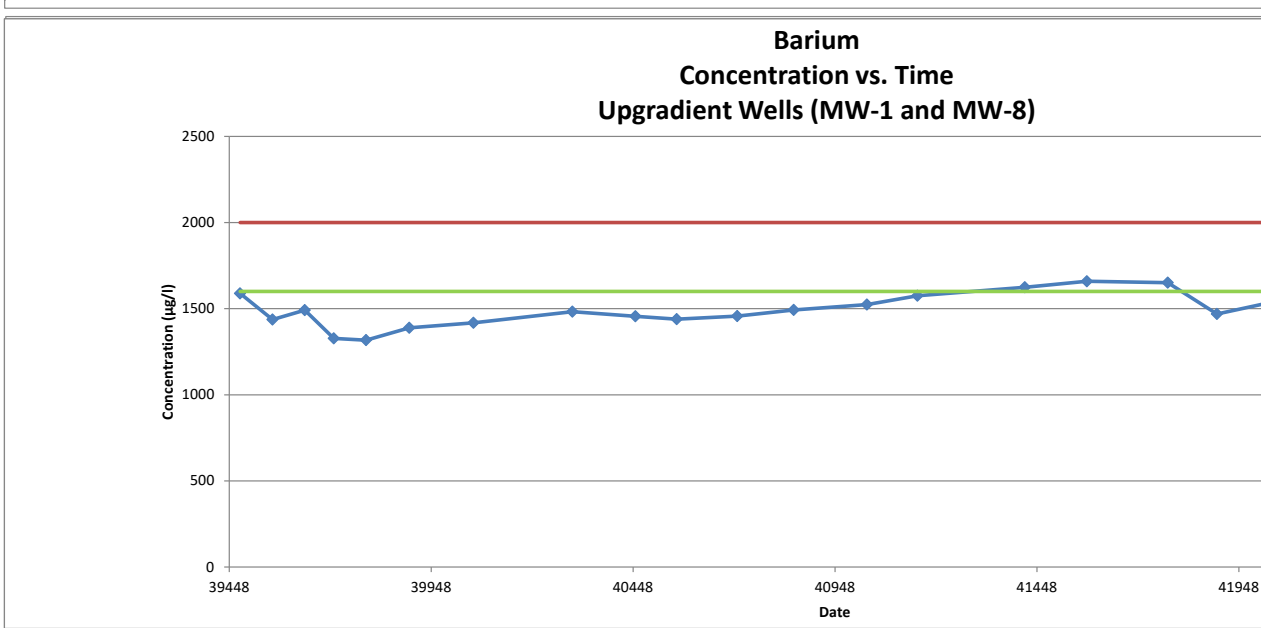
| Action Level/ Statewide Standard |
|-------------------------------------|
| 15.2 |
| 7 |
| 5 |
| 2.8 |
| 2.8 |
| 35 |
| 5 |
| 1000 |
| 2 |
| 2.8 |
| 2000 |
| 7 |
| 6 |

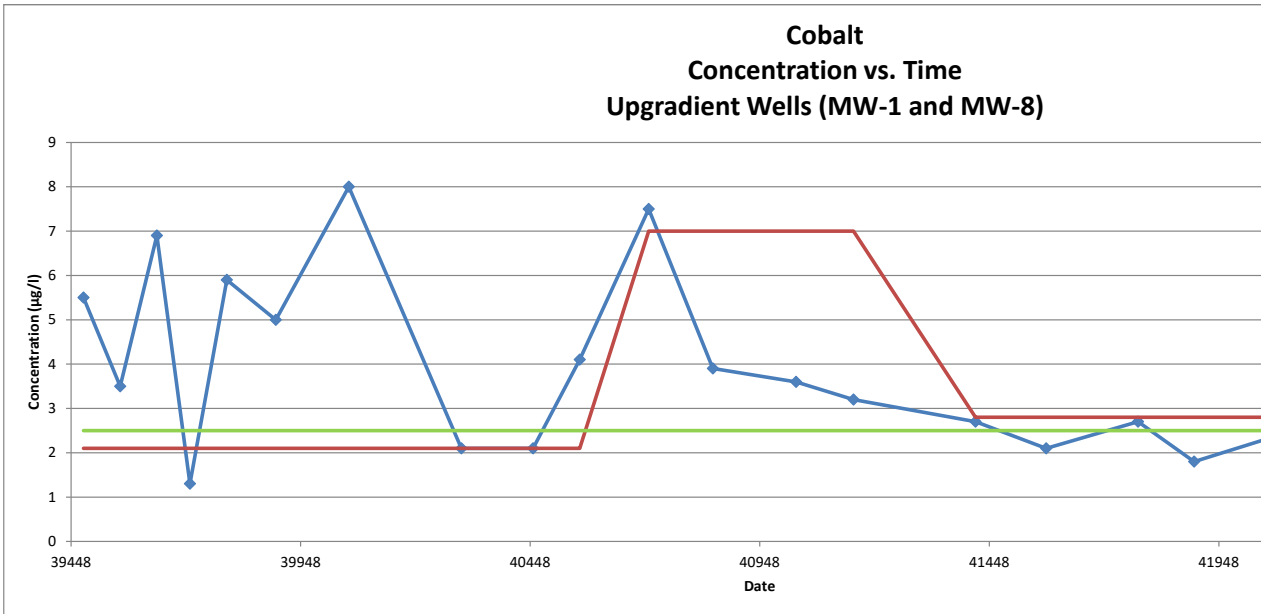
he current network such as dry points, damaged or inaccessible points, laboratory issues, impact
 Iso describe if alternative constituent list or alternative frequency has been approved. Also

Graphs

| Sample Date | Antimony (µg/l) | | Arsenic (µg/l) | | | Barium (µg/l) | | | Beryllium (µg/l) | | Cobalt (µg/l) | | | |
|-------------|-----------------|--------|----------------|--------|----|---------------|--------|------|------------------|--------|---------------|--------|------|-----|
| | PL | MCL/SS | PL | MCL/SS | | PL | MCL/SS | | PL | MCL/SS | PL | MCL/SS | | |
| 1/28/2008 | 5.5 | 6 | 3 | 15.3 | 10 | 12 | 1588.5 | 2000 | 1600 | 1.9 | 4 | 1.5 | 5.5 | 2.1 |
| 4/17/2008 | 4.8 | 6 | 3 | 10.4 | 10 | 12 | 1436.6 | 2000 | 1600 | 1.2 | 4 | 1.5 | 3.5 | 2.1 |
| 7/6/2008 | 4.2 | 6 | 3 | 9.9 | 10 | 12 | 1491.7 | 2000 | 1600 | 1.1 | 4 | 1.5 | 6.9 | 2.1 |
| 9/16/2008 | 5.4 | 6 | 3 | 12.5 | 10 | 12 | 1327.1 | 2000 | 1600 | 1.9 | 4 | 1.5 | 1.3 | 2.1 |
| 12/5/2008 | 4.2 | 6 | 3 | 12.7 | 10 | 12 | 1316.9 | 2000 | 1600 | 1.8 | 4 | 1.5 | 5.9 | 2.1 |
| 3/22/2009 | 5.9 | 6 | 3 | 12.6 | 10 | 12 | 1388.3 | 2000 | 1600 | 1.5 | 4 | 1.5 | 5 | 2.1 |
| 8/28/2009 | 5.4 | 6 | 3 | 13.9 | 10 | 12 | 1417.9 | 2000 | 1600 | 1.4 | 4 | 1.5 | 8 | 2.1 |
| 4/30/2010 | 5.8 | 6 | 3 | 16.4 | 10 | 12 | 1482.9 | 2000 | 1600 | 1.4 | 4 | 1.5 | 2.1 | 2.1 |
| 10/3/2010 | 3.1 | 6 | 3 | 16.9 | 10 | 12 | 1455.2 | 2000 | 1600 | 1 | 4 | 1.5 | 2.1 | 2.1 |
| 1/13/2011 | 4 | 6 | 3 | 11.1 | 10 | 12 | 1438.8 | 2000 | 1600 | 1.1 | 4 | 1.5 | 4.1 | 2.1 |
| 6/12/2011 | 3.8 | 6 | 3 | 12.1 | 10 | 12 | 1456.6 | 2000 | 1600 | 1.9 | 4 | 1.5 | 7.5 | 7 |
| 10/30/2011 | 5.6 | 6 | 3 | 13.2 | 10 | 12 | 1492.9 | 2000 | 1600 | 1.6 | 4 | 1.5 | 3.9 | 7 |
| 4/28/2012 | 5.4 | 6 | 3 | 12.2 | 10 | 12 | 1523.8 | 2000 | 1600 | 1.5 | 4 | 1.5 | 3.6 | 7 |
| 8/31/2012 | 3.7 | 6 | 3 | 9.4 | 10 | 12 | 1575.3 | 2000 | 1600 | 1.9 | 4 | 1.5 | 3.2 | 7 |
| 5/24/2013 | 4.1 | 6 | 3 | 15.1 | 10 | 12 | 1624.2 | 2000 | 1600 | 1.6 | 4 | 1.5 | 2.7 | 2.8 |
| 10/25/2013 | 4.8 | 6 | 3 | 17 | 10 | 12 | 1659.1 | 2000 | 1600 | 1.6 | 4 | 1.5 | 2.1 | 2.8 |
| 5/13/2014 | 3.4 | 6 | 3 | 15.9 | 10 | 12 | 1650.6 | 2000 | 1600 | 1.8 | 4 | 1.5 | 2.7 | 2.8 |
| 9/12/2014 | 5.1 | 6 | 3 | 12.8 | 10 | 12 | 1468.7 | 2000 | 1600 | 1.3 | 4 | 1.5 | 1.8 | 2.8 |
| 4/1/2015 | 5.2 | 6 | 3 | 15.2 | 10 | 12 | 1571 | 2000 | 1600 | 1.7 | 4 | 1.5 | 2.45 | 2.8 |







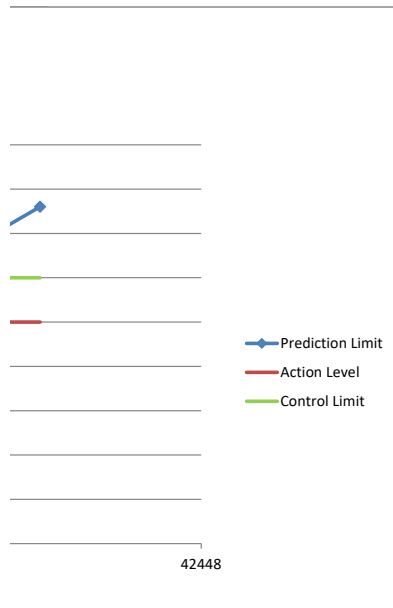
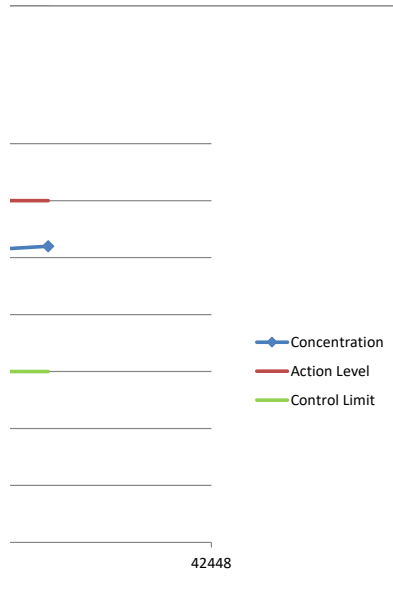
Comments: (insert clarifications or notes as needed) Explain any substantial control limit fluctuations.

This worksheet;

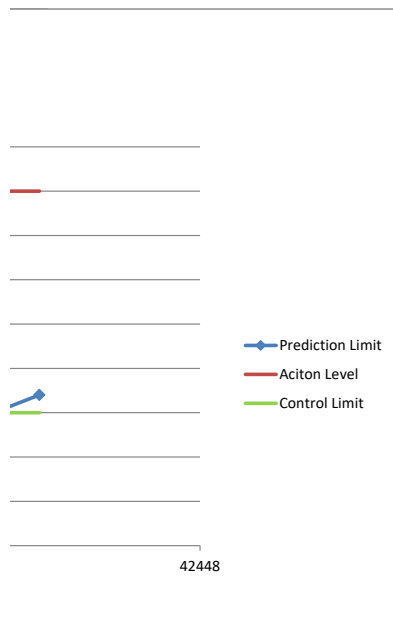
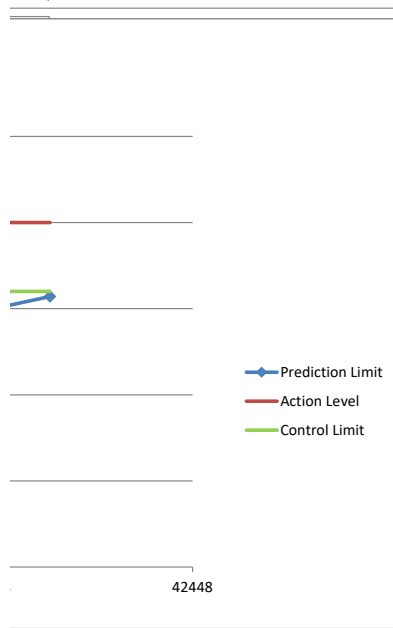
- 1) Summarizes changes to health based standards,
- 2) Highlights large changes or trends in Control Limits for further review,
- 3) Highlights when Control Limits are greater than Action Level for further review of cause, and
- 4) Potentially identifies that a monitoring program is the correct phase such as assessment or detection monitoring.

Exceedance

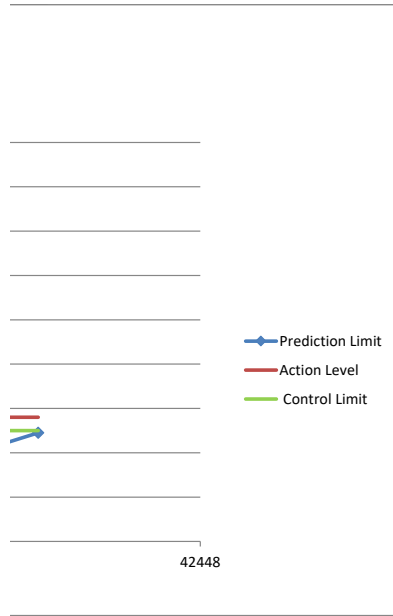
2.5 **yes**
2.5 **yes**
2.5 **yes**
2.5
2.5 **yes**
2.5 **yes**
2.5 **yes**
2.5
2.5
2.5 **yes**
2.5 **yes**
2.5
2.5
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2.5
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2.5
2.5
2.5



Graphs



Graphs



| | | | | | | | | | | | | | | | |
|--|--|--|------|------|------|------|------|------|------|------|------|-------|------|-------|-------|
| | | | MW-1 | MW-8 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | MW-7 | MW-9 | MW-10 | GU-1 | MW-28 | MW-30 |
|--|--|--|------|------|------|------|------|------|------|------|------|-------|------|-------|-------|

Sampling Protocol

Provide a discussion on the effectiveness of the Sampling Protocol as described in 114.20.

Table 9
Historic Control Limit & Action Level Exceedances
2020 Annual Water Quality Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P

| Key: gray =CL; black =action level | | S p r i n g 2016 | F a l l 2016 | S p r i n g 2017 | F a l l 2017 | S p r i n g 2018 |
|------------------------------------|--------------------------|------------------------------------|--------------------------|------------------------------------|--------------------------|------------------------------------|
| Well | Constituent | | | | | |
| MW-2 | Arsenic | | | | | |
| | Cobalt | | | | | |
| | cis-1,2-Dichloroethylene | | | | | |
| | Trichloroethylene | | | | | |
| | Vinyl chloride | | | | | |
| MW-3 | Arsenic | | | | | |
| | Cobalt | | | | | |
| MW-4 | Cobalt | | | | | |
| | Vanadium | | | | | |
| MW-5 | (none) | | | | | |
| MW-6 | Benzene | | | | | |
| | Vinyl Chloride | | | | | |
| MW-7 | (none) | | | | | |
| MW-9 | Arsenic | | | | | |
| | Barium | | | | | |
| | cis-1,2 Dichloroethylene | | | | | |
| | Vinyl Chloride | | | | | |
| MW-10 | (none) | | | | | |

Comments: (insert clarifications or notes as needed)

This worksheet;
1) Summarizes the historical extent of groundwater impact,
2) Tracks GWQAP effectiveness, and
3) Potentially highlights sequential degradation of
contaminants of concern.

Table 10
Groundwater Quality Assessment Plan Trend Analysis
2020 Annual Water Quality Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P

| Well | Current SSL | Trend |
|------|----------------|------------|
| MW-2 | Arsenic | decreasing |
| MW-2 | TCE | decreasing |
| MW-3 | TCE | increasing |
| MW-3 | Vinyl Chloride | decreasing |
| MW-9 | Benzene | decreasing |
| MW-9 | TCE | decreasing |

- * - Permit holder addresses adequacy of groundwater quality assessment plan measure when trend is not
- * - Permit holder shall adjust groundwater quality assessment plan action for financial assurance as compl

Comments: (insert

This worksheet summarizes progress to ending groundwater quality assessment.

Recommendations

Provide a brief summary of the impact the site has on the groundwater being monitored. Provide narrative discussion on proposed monitoring for the next and future sampling events, including installing/abandoning wells, adding/removing wells from the approved HMSP, modifying sampling and analysis of constituents, modifying statistical procedures, etc.

Groundwater Sampling Field Sheet

Site Name: _____ Permit No.: _____
 Well/Piezometer: _____ Weather: _____
 Date: _____ Personnel: _____

Monitoring Well Details

Borehole diameter (in): _____ Casing Diameter (in): _____ Ground surface elevation (ft. MSL): _____
 Top of screen (ft. TOS): _____ Materials: _____ Top of Casing elevation (ft. MSL): _____

Locked (Y/N) _____

| | Before purging | After purging | Before sampling |
|---------------------------|----------------|---------------|-----------------|
| Water Level (ft. TOC): | _____ | _____ | _____ |
| Water elevation (ft. MSL) | _____ | _____ | _____ |

3 Well Volumes (gal): _____ Screen submerged? (Y/N): _____

| | Constructed | Measured | Difference |
|----------------------|-------------|----------|------------|
| Well Depth (ft. TOC) | _____ | _____ | _____ |

Well conditions commentary: _____

Sampling Details

Sampling Method: (circle one) Pump (conventional or low flow?) _____ No-purge (specify sample interval) _____
 Bailer _____ Other (specify) _____

Equipment type: (check one) Submersible pump _____ Peristaltic pump _____ Bladder pump _____ Inertial lift pump _____
 Bailer _____ No-purge (specify): _____ Other (specify): _____

Equipment name/description: _____ Dedicated? (Y/N) _____ Disposable? (Y/N) _____

Decontamination method: _____

| Sample Name(s) | Method(s) | Container(s) | Filtered? (if yes, filter size) |
|----------------|-----------|--------------|---------------------------------|
| | | | Yes or No |
| | | | Yes or No |
| | | | Yes or No |
| | | | Yes or No |

Field Analysis

| | | | | | | | Final Reading |
|---------------------|--|--|--|--|--|--|---------------|
| Time | | | | | | | |
| Temp (°C) | | | | | | | |
| Sp. Cond (umhos/cm) | | | | | | | |
| pH | | | | | | | |
| DO (mg/l) | | | | | | | |
| ORP (mV) | | | | | | | |
| Turbidity (NTU) | | | | | | | |

Equipment depth: _____ Flow Rate: _____ Volume removed: _____ Volume sampled: _____
 Well dry? (Y/N) _____ Odor? (Y/N) _____ Color? (Y/N) _____

Comments: _____

Table 11
Leachate Management Summary
2020 Leachate Control System Performance Evaluation Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P

| Month | Maximum Head on Liner (ft) | | | | Leachate Collected (gal) | | | | Volume Utilized for Dust Control (gal) | | Discharge to Campbell Falls POTW (gal) |
|-------------------|----------------------------|-------|-------|-------------------|--------------------------|-----------|-----------|-----------------|--|---------|--|
| | PZ1-1 | PZ1-2 | PZ2-1 | PZ-PH-1 (unlined) | Unlined Cells | Phase 1 | Phase 2 | Site wide total | Phase 1 | Phase 2 | |
| January | 0.25 | < 0.1 | < 0.1 | 16 | 35,690 | 112,634 | 245,623 | 393,963 | 2,716 | 2,827 | 388,420 |
| February | 0.25 | < 0.1 | < 0.1 | 16 | 94,131 | 203,006 | 524,096 | 821,249 | 2,729 | 2,830 | 815,690 |
| March | 0.25 | < 0.1 | 0.3 | 23 | 41,717 | 199,205 | 586,067 | 827,012 | 4,521 | 4,632 | 817,859 |
| April | 0.314 | < 0.1 | 0.3 | 15 | 83,482 | 106,335 | 425,266 | 615,098 | 4,456 | 4,345 | 606,297 |
| May | 0.8 | 0.3 | 0.68 | 21 | 25,283 | 241,485 | 370,727 | 637,518 | 5,397 | 5,286 | 626,835 |
| June | 1.2 | 0.58 | 0.999 | 17 | 120,744 | 172,647 | 641,917 | 935,328 | 5,443 | 5,334 | 924,551 |
| July | 0.6 | 0.3 | 0.75 | 19 | 79,865 | 76,387 | 262,333 | 418,606 | 5,969 | 5,858 | 406,779 |
| August | 0.4 | 0.2 | 0.52 | 21 | 56,735 | 233,994 | 108,627 | 399,378 | 6,315 | 6,426 | 386,637 |
| September | 0.3 | 0.3 | 0.6 | 22 | 111,948 | 102,918 | 544,660 | 759,549 | 5,289 | 5,390 | 748,870 |
| October | 0.25 | 0.1 | 0.3 | 18 | 43,723 | 209,290 | 120,465 | 373,497 | 4,789 | 4,890 | 363,818 |
| November | 0.25 | < 0.1 | 0.1 | 20 | 76,289 | 100,005 | 393,151 | 569,465 | 3,938 | 3,827 | 561,700 |
| December | 0.25 | < 0.1 | < 0.1 | 22 | 61,182 | 148,105 | 239,108 | 448,417 | 2,926 | 2,815 | 442,676 |
| 2015 Annual Total | | | | | 830,789 | 1,906,011 | 4,462,040 | 7,199,080 | 54,488 | 54,460 | 7,090,132 |

NA - Measurement not available (clarify)

Comments: (insert clarifications or notes as needed) Recommended changes to the leachate collection system, if any. Also, describe maintenance performed on the leachate collection system in the previous year.

This worksheet:

- 1) Summarizes data used to evaluate leachate control system performance,
- 2) Reviews compliance and trends of leachate head levels,
- 3) Reviews adequacy of leachate storage volume,
- 4) Reviews that an approved POTW is being utilized.

**Table 12
Gas Monitoring Summary
2020 Gas Monitoring Report
Cyclone County Sanitary Landfill
Permit No. 00-SDP-01-74P**

| Monitoring Points | | | Methane Results (% LEL) | | | | | | | |
|-------------------|-----------------|----------------------------------|-------------------------|---|--------------------|---|---------------------|---|----------------------|---|
| Name | Type | Description | 1/12/2018 - S (Y/N) | | 4/1/2018 - S (Y/N) | | 7/13/2018 - S (Y/N) | | 10/22/2018 - S (Y/N) | |
| BLDG-1 | Indoor | Office | 0 | | 0 | | 0 | | 0 | |
| BLDG-2 | Indoor | Scale House | 0 | | 0 | | 0 | | 0 | |
| BLDG-3 | Indoor | Recycling Building | 0 | | 0 | | 0 | | 0 | |
| BLDG-4 | Indoor | Maintenance Building | 0 | | 0 | | 0 | | 0 | |
| UTILITY-1 | Utility Trench | Along north property boundary | 0 | | 0 | | 0 | | 0 | |
| GU-1 | Underdrain | Phase 1 & 2 Underdrain | 0 | | 0 | | 0 | | 0 | |
| GMP-1 | Monitoring Well | West side of Phase 1 | 12 | N | 7 | N | 0 | N | 0 | N |
| GMP-2 | Monitoring Well | Property boundary near residence | 0 | N | 0 | N | 0 | N | 0 | N |
| GMP-3 | Monitoring Well | North side of Phase 2 | 0 | N | 0 | N | 0 | N | 0 | N |
| GMP-4 | Monitoring Well | Along east property boundary | 0 | N | 0 | N | 0 | N | 0 | N |
| MW-6 | Monitoring Well | South side of unlined area | 0 | N | 0 | N | 0 | N | 0 | N |

S(Y/N) - Was screen submerged, yes or no or blank is non-applicable

Comments: (insert clarifications or notes as needed) Describe actions taken to comply with exceedances.

*This worksheet ;
1) Summarizes gas monitoring plan and schedule, and
2) Identifies potential exceedances.*

Gas Monitoring Map

(Map must contain gas monitoring locations.)