



Landfill Groundwater Monitoring

The Alaska Department of Environmental Conservation (ADEC) Solid Waste Program is providing this checklist to outline the minimum required content for a landfill groundwater monitoring report. ADEC can and will require additional information on a site specific basis. This checklist is not intended as a comprehensive groundwater monitoring guidance. For additional guidance please refer to your facility's approved Quality Assurance Project Plan (QAPP) and other ADEC Solid Waste Program guidance documents available at <http://dec.alaska.gov/eh/solid-waste>.

CHECKLIST DESCRIPTION		PAGE/SECTION
Project Management		
1.	Title page	
2.	Distribution list	
3.	Table of contents	
4.	List of tables – groundwater elevations, field parameters, summary data tables	
5.	List of figures – vicinity map, site map with facility boundary, facility infrastructure, monitoring locations, and prevailing groundwater flow direction	
6.	List of appendices – field logs, monitoring log forms, chain of custody and sample receipt documentation, statistical testing summaries, data set for statistical testing, all historic data, laboratory reports, data review	
7.	List of acronyms and abbreviations	
Introduction		
8.	Name and location of facility	
9.	Brief description of purpose of report (detection or assessment monitoring, or corrective action)	
10.	Project/Task organization - identify who conducted monitoring, prepared, reviewed and approved the report	
11.	Date of monitoring event	
12.	List the monitoring procedures followed, citing appropriate regulations, guidance, QAPP, etc.	
13.	Identify whether wells are in detection or assessment monitoring program	
Background		
14.	Location - geographic location of facility including map(s)	
15.	Discuss the operational history of the facility and current permit status	
16.	Geology and hydrogeology <ul style="list-style-type: none"> a. Description of geology and hydrogeology of the area b. Reference any hydrogeological study including date(s) performed c. Site map with all monitoring locations identified and prevailing water flow direction 	
17.	Monitoring program overview – history and current status of monitoring program. <ul style="list-style-type: none"> a. Identify all monitoring locations, specify as background or compliance points, status (active or inactive, water elevation or water quality parameters only, in need of maintenance, or decommissioning) b. Frequency of sampling and sampling schedule c. Discuss any ADEC approved changes to monitoring program 	

CHECKLIST DESCRIPTION		PAGE/SECTION
Description of Sampling Event		
18.	Date(s) of sampling	
19.	Include a list of monitoring locations sampled during the monitoring event. If a monitoring location scheduled to be sampled was not included, discuss why, and how this may be addressed in the future.	
20.	Sampling procedure details	
	a. Who performed sampling	
	b. Groundwater level measurements	
	c. Water quality stabilization parameters	
	d. How samples were handled in field (collected in one day or over several days, how samples were stored until shipment to lab, how samples were shipped to lab, etc.)	
	e. Analytical laboratory sample collection – which constituents were sampled, order of sampling, sample containers, preservation and hold times	
	f. Field instrument/equipment use, maintenance, calibration	
	g. Description of field Quality Assurance (QA)/Quality Control (QC) - field duplicates, equipment blanks, trip blanks	
	h. Sampling documentation – field logs, monitoring log forms, Chain of Custody (COC)	
21.	Discuss any field sampling issues	
	a. Sheen	
	b. Odor or color	
	c. Dry or frozen well	
	d. Extreme field parameters measured	
	e. Problems with equipment during sampling	
	f. Well condition issues (not locked, frost-jacking, damage, blocked, etc.)	
Laboratory Analysis		
22.	Analytical lab(s), including appropriate certifications	
23.	Analyses performed by lab and analytical methods	
24.	Analytical turn-around time (TAT) – standard TAT is 30 days	
25.	Discussion of detection limit adequacy to meet monitoring program objectives	
26.	Discussion of analytical results – which constituents were detected	
27.	Summary of results should be included in report text, but all analytical results should be provided in a table format (electronic file acceptable)	
Quality Control		
28.	Review the approved QAPP and discuss any non-conformances in, including but not limited to, sampling, lab analyses, analytical sensitivity, or reporting	
Data Interpretation/Statistical Analysis		
29.	Identify applicable criteria	
	a. Background – discuss the background value being used, how it was determined, and how/when it is updated	
	b. Groundwater Protection Standard (GWPS) (if applicable) – source of the value being used for each constituent	
	i. Drinking water maximum contaminant level (MCL) under 40 CFR 141	

CHECKLIST DESCRIPTION		PAGE/SECTION
	ii. When no standard is available in 40 CFR 141, a statistically-derived background value or other health-based levels approved by ADEC	
	iii. Background if higher than MCL or no MCL available, and how it was statistically determined	
30.	Discuss apparent detections/exceedances of monitored constituents (Appendix I, Appendix II, Table F, other)	
31.	Statistical evaluation of results	
	a. Identify data used for statistical test such as: the historical data set used; how duplicates, non-detects (NDs), and qualified results were used; and outliers and rationale for excluding. (Note: The complete data set used, preferably in electronic format such as Excel, should be provided in the report for review purposes.)	
	b. Identify statistical tests used including error rates	
	c. Provide statistical testing summary sheets	
32.	Discuss statistical validation of detections, exceedances, trends, correlations, etc.	
33.	Notify ADEC within 14 days of owner/operator receiving sample results indicating any statistical exceedances of background or GWPS	
Analytical Results Table		
34.	Sample ID (include field sample ID and corresponding laboratory ID)	
35.	Identify sample location as background or compliance point	
36.	Parameter tested [gasoline-range organics (GRO), volatile organic compounds (VOCs), etc.]	
37.	Analytical method (AK101, SW8260, etc.)	
38.	Detection limits	
39.	Quantitation limits	
40.	Results comparison criteria and source of criteria	
41.	Present all results (not just detections or exceedances)	
42.	Units of measure	
43.	Flag qualified data	
44.	Report all ND results with associated detection limit	
45.	Identify detections and exceedances of criteria by bolding or highlighting	
46.	Include footnotes to define flags and all acronyms, and identify sources of criteria	
Summary and Recommendations		
47.	Summarize the results of laboratory and statistical analyses	
48.	Identify any potential problems or other monitoring program concerns	
49.	Discuss any quality control issues with sampling, lab analysis, or reporting	
50.	Discuss any deviations from the QAPP and any associated corrective actions	
51.	Provide recommendations for future monitoring events or corrective actions based on this report's findings	
References		
52.	List of references	
Required Attachments		
53.	Laboratory or monitoring report - each laboratory or monitoring report must include the detection limit, limit of detection, and limit of quantitation for each constituent in each sample	
54.	Field notebook and monitoring logs	

CHECKLIST DESCRIPTION		PAGE/SECTION
	a. Site conditions (weather, temperature, secure or not, etc.)	
	b. Well condition (secure, signs of tampering, damaged or destroyed, unable to locate)	
	c. Water level measurement data, purging/sampling data, water quality data (turbidity, odor, color, conductivity, pH), and remarks	
	d. Sampling time, date, and sampler	
	e. Units of measurement on everything	
	f. All corrections to field notes should be made by marking a single line through and initialing and dating the change so that it remains legible	
55.	Laboratory data reports – should include all analytical results, QA/QC sample results, case narrative noting any laboratory QA/QC issues	
56.	Monitoring well hydrographs	
57.	COC Paperwork – original COC documenting sample custody from sampling, shipping (airway bill), to lab receipt (laboratory receipt form)	
58.	Graphs of constituent concentrations	
59.	Data set for statistical testing, statistical results tables, control charts, etc.	
60.	Historical data file – all historic monitoring data should be provided with each report - preferably in electronic format (Excel)	



Monitoring report must be submitted to ADEC within 90 days of the sampling event.

If questions arise about what to include and discuss in a monitoring report, please contact your ADEC Solid Waste Program project manager.