LANDFILL MONITORING AND MAINTENANCE

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BACKGROUND:

SOLID WASTE MANAGEMENT REGULATIONS

SOLID WASTE LANDFILLS MUST BE DESIGNED TO PROTECT THE ENVIRONMENT FROM CONTAMINANTS THAT MAY BE PRESENT IN THE SOLID WASTE STREAM. RCRA SUBTITLE D ADDRESSES SOLID WASTE MANAGEMENT AND WAS DESIGNED TO ASSIST WASTE MANAGEMENT OFFICIALS IN DEVELOPING AND ENCOURAGING ENVIRONMENTALLY SOUND METHODS FOR THE DISPOSAL OF NONHAZARDOUS SOLID WASTE (RCRA §4001).

Promulgated under the authority of Subtitle D, the municipal solid waste landfills (MSWLF) regulations in Part 258 establish a framework at the federal level for planning and implementing municipal solid waste landfill programs at the state and local levels. This framework sets minimum standards for protecting human health and the environment, while allowing states to develop more flexible MSWLF criteria.

OUR SERVICES AND APPROACH:

LANDFILL MONITORING & MAINTENANCE REQUIREMENTS

Sage assists clients throughout the U.S. in evaluating, planning, installing, implementing, reporting, and negotiating landfill programs. The types and levels of landfill monitoring and maintenance are summarized as follows:

GROUNDWATER MONITORING

Nearly all MSWLFs are required to monitor the underlying groundwater for contamination during their active life and post-closure care period. The exceptions to this requirement are small landfills that receive less than 20 tons of solid waste per day, and facilities that can demonstrate that there is no potential for the migration of hazardous constituents from the unit into the groundwater. All other MSWLFs must comply with the groundwater monitoring requirements found at 40 CFR Part 258, Subpart E–Ground-Water Monitoring and Corrective Action.

LANDFILL MONITORING & MAINTENANCE REQUIREMENTS

To monitor groundwater, facility owners and operators must install a groundwater monitoring system that collects samples from the uppermost aquifer (defined as the geological formation nearest the natural surface that is capable of yielding significant quantities of groundwater to wells or springs). The groundwater monitoring system consists of a series of wells placed upgradient and downgradient of the MSWLF. The samples from the upgradient wells show the background concentrations of constituents in the groundwater, while the downgradient wells show the extent of groundwater contamination caused by the MSWLF.

The required number of wells, spacing, and depth of wells is site-specific and based on the aquifer thickness, groundwater flow rate and direction, and the other geologic and hydrogeologic characteristics of the site. All groundwater monitoring systems must be certified by a qualified groundwater scientist and must comply with the sampling and analytical procedures outlined in the regulations.

DETECTION MONITORING

Detection monitoring requires MSWLF owners/operators to monitor for the 62 constituents listed in Appendix I of 40 CFR Part 258. This consists of sampling at least semiannually throughout the facility's active life and post-closure care period. The frequency of sampling is determined on a site-specific basis by the state regulatory agency.

If at any time during the detection monitoring phase, one of the 62 constituents is detected at a statistically significant higher level than the established background level, the MSWLF owner/operators must notify the state regulatory agency. The facility must establish an assessment monitoring program within 90 days unless the owners/operators can prove that the detection of the constituent(s) was the result of a sampling, analysis, or statistical evaluation error (i.e., a false positive result); a natural fluctuation in groundwater quality; or caused by another source.

ASSESSMENT MONITORING

Within 90 days of detecting a statistically significant increase in the constituents listed in Appendix I constituents, a MSWLF must begin an assessment monitoring program. As a first step, samples must be taken from all wells and analyzed for the presence of all 214 constituents listed in Appendix II of 40 CFR Part 258. If any of the constituents listed in Appendix II are detected, the owners/operators must then establish the background levels for these constituents and a groundwater protection standard (GWPS) for each. The GWPS represents the maximum allowable constituent level in the groundwater, and is based either on the Safe Drinking Water Act (SDWA) Maximum Contaminant Level (MCL) for that constituent, or the background level of the groundwater at the site if no MCL exists. In cases where the site-specific background level is higher than the MCL, the background level is used for the GWPS.

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Within 90 days of establishing the background levels and the GWPS, the owners/operators must then resample for all constituents listed in Appendix I and Appendix II previously detected. Re-sampling then must be repeated at least semiannually. If none of the Appendix II constituents are found to exceed the GWPS for two consecutive sampling events, the facility may return to the detection monitoring phase. If, however, any of the constituents are detected at a statistically significant level higher than the GWPS, the owners/operators of the MSWLF must characterize the nature of the release, determine if the contamination has migrated beyond the facility boundary, and begin assessing corrective measures.

CORRECTIVE ACTION

Based upon the assessment of corrective measures, a remedy is selected and corrective action begins. Any corrective measure selected must be protective of human health and the environment, meet the GWPS, control the source(s) of the release to prevent further releases, and manage any solid waste generated in accordance with all applicable RCRA regulations. The facility must continue these remedial actions until it has complied with the GWPS for three consecutive years and can demonstrate that all required actions are completed.

METHANE MONITORING

Landfills are the third largest human-related source of methane in the U.S., accounting for 17 percent of all methane emissions in 2009. Owners or operators of MSWLF units must implement a routine methane monitoring program to ensure that the concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane in facility structures (excluding gas control or recovery system components), and that the concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary.

POST-CLOSURE CARE REQUIREMENTS

The closure and post-closure care requirements for MSWLFs establish the minimum requirements with which MSWLF owners/operators must comply once the landfill stops receiving waste and begins closure. Owners/operators also are required to continue monitoring and maintaining the landfill once it is closed to protect against the release of hazardous constituents to the environment. The closure and post-closure care regulations are found at 40 CFR Part 258, Subpart F - Closure and Post-Closure Care.

Post-closure care entails a 30-year period after closure during which the owner and operator must conduct monitoring and maintenance activities to preserve the integrity of a MSWLF system. The purpose of post-closure care is to ensure that landfills are closed in a manner that controls, minimizes, or eliminates the escape of waste, leachate, contaminated rainfall, or waste decomposition products to soils, waters, and the atmosphere. Post-closure care requires maintaining the following:

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- Integrity and effectiveness of all final covers
- Leachate collection system, in accordance with §258.40
- Applicable groundwater monitoring system, in accordance with Subpart E requirements
- Methane gas monitoring system required by §258.23

In addition to the planning and implementing the above monitoring and maintenance programs, Sage also performs pre-inspection audits and system effectiveness and compliance evaluations for existing systems throughout the U.S.