Mark Gordon, Governor

Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Todd Parfitt, Director

MEMORANDUM

TO: Steve Lenz, Chairman, Environmental Quality Council
Water and Waste Advisory Board
David Dewald, Senior Assistant Attorney General
State Government Information Coordinator, State Library

FROM: Suzanne Engels, Administrator, Solid and Hazardous Waste Division, DEQ SE

DATE: January 23, 2023

SUBJECT: Notice of Final Adoption of Solid Waste Rule
Chapter 3: Industrial Landfill Regulations

Please consider this memorandum as notice of final adoption of the revised Wyoming Solid Waste Rule (SWR) Chapter 3, Industrial Landfill Regulations. The revisions to Chapter 3 remove redundant and irrelevant language, corrects grammar, restructures passages for clarity, provides consistency with other chapters of the SWR, updates the permit terms, as well as, the standards for location, design and construction, operating, monitoring, recordkeeping, reporting, closure and post-closure, and corrective action; and formats the rule to meet the Secretary of State requirements.

The Environmental Quality Council adopted the revised rule at a public hearing at the Capitol Extension Public Meeting Room 5, Herschler Building, 122 W. 25th Street, Cheyenne, Wyoming on November 15, 2022. The final rule was filed with the Wyoming Secretary of State on January 13, 2023.

If you have any questions concerning this rule adoption, please contact Jody Weikart at jody.weikart@wyo.gov or 307-777-3501.

Enclosures: Copy of SWR Chapter 3
SWR Chapter 3 Certification page

cc: Jody Weikart, SHWD

Environmental Quality, Dept. of

Solid Waste Management

Chapter 3: Industrial Landfill Regulations

Effective Date:	01/13/2023 to Current
Rule Type:	Current Rules & Regulations
Reference Number:	020.0009.3.01132023

CHAPTER 3

INDUSTRIAL LANDFILL REGULATIONS

Section 1. In General.

(a) This Chapter is promulgated pursuant to the Wyoming Environmental Quality Act, Wyoming Statute (W.S.) § 35-11-503.

(b) These rules set forth permit application requirements and to establish minimum standards for the location, design, construction, operation, monitoring, closure, and post-closure maintenance of industrial landfills.

(c) The definitions in W.S. § 35-11-103(a) and (d) and Chapter 1 of these rules apply to this Chapter.

(i) "Major Amendment" means major change as defined in Chapter 1 Section 1(b)(xlvi) of these rules.

Section 2. Industrial Landfill Application Requirements.

(a) Permit transition: The following rules concerning permit application submittals under Chapter 1 of these rules shall apply.

(i) Existing industrial landfills that do not have a lifetime permit and intend to continue disposal of industrial solid waste after the effective date of this Chapter, shall submit a permit application under this Chapter no later than twelve months prior to the expiration date of the facility's existing permit unless an alternate schedule is approved by the Administrator for good cause.

(ii) Existing industrial landfills that do not have a lifetime permit and intend to cease disposal of all industrial solid waste before obtaining a lifetime permit, shall submit a closure permit application no later than twelve months prior to the expiration date of the facility's existing permit or the date the facility is anticipated to cease disposal of industrial solid waste, whichever comes first, unless an alternate schedule is approved by the Administrator for good cause.

(b) Permit application requirements:

(i) Permit applications for new facilities and renewal permit applications shall contain a completed application form and a written report containing the applicable information in Sections 3 through 18 of this Chapter, and shall meet all applicable standards. Records and supporting documents such as well logs, maps, cross-sections, and monitoring reports shall be supplied as appendices.

(ii) All permit application forms shall be completed in accordance with W.S. § 35-11-506 of the Act and signed by the operator, the landowner, and any real property lienholder of public record. Applications submitted by a municipality, state, federal or other public agency, shall be signed by the head of the agency or ranking elected official.

(iii) Where the applicant for an existing industrial landfill for disposal of solid wastes associated with oil and gas production holds a legal interest of record entitling dominant use of the site surface for purposes related to oil and gas production, but another party or parties share common ownership in the site surface rights and consent from all such surface landowners cannot be obtained as required in (b)(ii) above, the Administrator may approve the application if, in lieu of surface landowner consent, if the Administrator finds:

(A) The applicant has identified all parties sharing common ownership of record in the site surface rights and has made all reasonable efforts to directly notify each party of the application, obtain their consent for it, and inform them of their right to review by the Environmental Quality Council in the event the Department approves the application without their consent;

(B) The landfill will be used only for disposal of non-hazardous wastes associated with oil and gas production activities at the site;

(C) The application and plans demonstrate that the landfill will be closed and reclaimed in a manner that restores the surface to its prior usefulness;

(D) The applicant has provided a bond in an amount sufficient to serve the purpose specified in W.S. § 35-11-416, where appropriate;

(E) The applicant has provided an affidavit stating that it will be solely responsible for disposed solid wastes at the landfill and will protect non-consenting surface owners from liability under 42 U.S.C. § 9607 (CERCLA) or other applicable laws.

(iv) All permit applications shall be prepared under the supervision of a Wyoming licensed professional engineer. All permit application forms shall be stamped, signed, and dated by a Wyoming licensed professional engineer. In addition, all portions of the permit application that require geological services shall be stamped, signed, and dated by a Wyoming licensed professional geologist.

(c) Permit terms:

(i) Permits for new industrial landfills will be issued for the operating life of the facility through post-closure.

(ii) Renewal permits for existing industrial landfills will be issued for the operating life of the facility through post-closure.

(iii) Closure permits will be issued for a period that includes the time required

to complete closure activities and the minimum post-closure period specified at Section 12 of this Chapter. The closure permit will extend until the Administrator finds that the facility has been adequately stabilized and the environmental monitoring or control systems have demonstrated that the facility closure is protective of human health and the environment consistent with the purposes of the Act. If, following receipt of documentation from the operator, the Administrator determines that all closure and post-closure activities have been completed and closure is protective of human health and the environment, the permit shall be terminated as specified in Chapter 1 of these rules.

(d) Permit amendments:

(i) All amendments shall comply with the location, design and construction, operating, monitoring, and closure standards of the applicable chapters of these rules. No amendment shall be implemented by the operator without the prior written authorization of the Administrator.

(ii) The operator shall submit the proposed amendment in a format approved by the Administrator unless an alternative is approved by the Administrator. Permit amendments may be proposed independently or in conjunction with a permit renewal or closure permit application.

(A) Minor permit amendments will be processed in accordance with Chapter 1, Section 3 of these rules.

(B) Major permit amendments will be processed in accordance with this section. The application shall include a cover letter describing in detail the amendment sought. The application for amendment shall include revisions to the permit application sufficient to fully describe the proposed amendment including a revised table of contents and replacement text, plates, and drawings that are fully formatted and numbered for insertion into the permit application.

(I) The Administrator shall review major permit amendment applications for completeness in accordance with W.S. § 35-11-502(e) and (f). After the application is determined complete, the applicant shall give written notice of the application as required in Chapter 1, Section 2(c)(i) of these rules.

(II) The Administrator shall determine whether a proposed permit amendment complies with applicable standards and is suitable for publication under W.S. § 35-11-502(h). The applicant shall provide written notice of a proposed permit amendment as specified in Chapter 1, Section 2(c)(ii) of these rules.

(III) The Director shall render a decision on the major permit amendment in accordance with W.S. § 35-11-502(k) and (m).

(e) Closure permit application requirements: Closure permit applications shall include information to demonstrate compliance with the requirements in Section 12 of this

Chapter and include a narrative describing the site operating history including the dates of operation, the disposal methods used, and the types and amounts of solid waste accepted, a final contour map, and information demonstrating compliance with the closure standards in Chapters 6, 7, and 8, as applicable.

Section 3. General Facility Information.

(a) Operator: The name, address, and telephone number of the legal operator of the facility to whom the permit would be issued, and a listing of any administrative order, civil or administrative penalty assessment, bond forfeiture, misdemeanor or felony conviction, or court proceeding, for any violations of any local, state or federal law relating to environmental quality or criminal racketeering, in which the applicant (including any partners in a partnership or executive officers in any corporation, if the applicant is a partnership or corporation) has been or is currently involved.

(b) Manager: Position title, address and telephone number of the solid waste manager. A description of the solid waste manager training and examination program to be used by the operator to ensure compliance with the requirements of this chapter. The description shall include a specific listing of the training courses, and the required frequency of attendance at each course by the solid waste manager.

(c) Legal description: Legal description of the property to be used as a disposal facility. The complete legal description shall consist of a plat and legal description, monumented and signed in accordance with Wyoming Statutes by a Wyoming licensed land surveyor.

(d) Facility narrative: A description of the disposal facility and the planned solid waste disposal activities, including the facility size, area fill, trench fill, special waste areas, and the type, amount, and source of incoming solid waste.

(e) Surface and mineral ownership: Information describing surface and mineral ownership of the site and surface ownership of all lands within one mile of the facility boundary.

(f) Service area: The service area and the solid waste type including trade and common names, and quantity ranges of solid waste on a daily, weekly or monthly basis that will be disposed at the facility.

(g) Capacity: Estimate site capacity in tons or cubic yards of solid waste and site life, including the calculations on which these estimates are based.

(h) Potential to impact surface and groundwater: An evaluation of the facility's potential to impact surface and groundwater quality, based on the facility design and hydrogeologic characteristics;

(i) Waste analyses: As requested by the Administrator, including:

(i) A description of the physical condition of the solid waste;

(ii) Chemical analyses of the total concentrations of solid waste constituents specified by the Administrator;

(iii) Leachate analyses from the extraction procedure specified by the Administrator;

(iv) Analysis of hazardous waste characteristics; and

(v) A description of the sampling and testing protocols to be used in the collection and analysis of solid waste samples. Testing protocols shall be approved by the Administrator and sampling protocols shall allow collection of samples representative of the total solid waste stream, soil, gas, or liquid.

Section 4. Location Standards.

(a) New Facilities: New industrial landfills, regardless of size, shall be located in accordance with the standards of W.S. § 35-11-502(c) and the standards described in this Section.

(i) Local zoning ordinances: Facility locations shall not conflict with local zoning ordinances or land use plans that have been adopted by a county commission or municipality.

(ii) Wild and Scenic Rivers Act: Facility locations shall not diminish the scenic, recreational, and fish and wildlife values for any section of river designated for protection under the Wild and Scenic Rivers Act, 16 U.S.C. §§ 1271 et seq., and implementing regulations.

(iii) National Historic Preservation Act: Facilities shall not be located in areas where they may pose a threat to an irreplaceable historic or archeological site listed pursuant to the National Historic Preservation Act, 16 U.S.C. §§ 470 et seq. and implementing regulations, or to a natural landmark designated by the National Park Service.

(iv) Endangered Species Act: Facilities shall not be located within a critical habitat of an endangered or threatened species listed pursuant to the Endangered Species Act, 16 U.S.C. §§ 1531 et seq., and implementing regulations, where the facility may cause destruction or adverse modification of the critical habitat, may jeopardize the continued existence of endangered or threatened species or contribute to the taking of such species.

(v) Big game winter range/grouse breeding grounds: Facilities shall not be located within critical winter ranges for big game or breeding grounds for grouse unless the Administrator, after consultation with the Wyoming Game and Fish Department, determines that facility development will not conflict with the conservation of Wyoming's wildlife resources.

(b) New units, existing units, and lateral expansions shall not be located in violation of the standards below. Any supporting information needed to demonstrate compliance with

these standards shall be provided in an appendix to the permit application.

(i) Floodplains: New landfill units, existing units, new landfill units at existing facilities, and lateral expansions of existing facilities, shall not be located in a 100-year floodplain, unless the operator demonstrates that the facility or unit will not restrict the flow of a 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste.

(ii) Wetlands: New landfill units, and lateral expansions, shall not be located in wetlands.

(iii) Fault areas: New units and lateral expansions shall not be located within 200 feet (60 meters) of a fault that has had displacement in Holocene time unless the operator demonstrates that an alternative setback distance of less than 200 feet (60 meters) will prevent damage to the structural integrity of the unit and will be protective of human health and the environment.

(iv) Seismic impact zones: New units and lateral expansions shall not be located in seismic impact zones, unless the owner demonstrates to the Administrator that all containment structures, including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site;

(v) Unstable areas: New units and lateral expansions shall not be located in an unstable area unless the owner has demonstrated to the Administrator that engineering measures have been incorporated into the facility's, unit's, or area fill's design to ensure that the integrity of the structural components of the facility, unit, or area fill will not be disrupted. The demonstration must consider:

(A) On-site or local soil conditions that may result in significant differential settling;

(B) On-site or local geologic or geomorphologic features; and

(C) On-site or local human-made features or events (both surface and subsurface).

(c) Facilities regulated under Chapter 6 or 8: Facilities that are also subject to regulation under Chapter 6 or 8 of these rules shall not be located in violation of the standards in Chapter 6 or 8.

(d) Access roads: The roads leading to industrial landfills shall not be subject to the location standards described in this Section.

Section 5. Regional Geology.

The permit application shall include a description of any available regional geologic or hydrologic information, including copies of all available well logs for wells located within one mile of the proposed facility. Supporting documentation such as cross-sections, and maps shall be supplied as an appendix to the permit application.

Section 6. Site-Specific Geology.

(a) Soil types: A description of the soil types according to the Unified Soil Classification System, and the estimated thickness of the unconsolidated soil materials;

(b) Geologic conditions: Information on the geologic conditions, including structure, bedrock types, estimated thickness and attitude, and fracture patterns;

(c) Unstable areas: Identification of unstable areas caused by natural features or man-made features or events, and which may result in geologic hazards including, but not limited to, slope failures, landslides, rockfalls, differential and excessive settling or severe erosion;

(d) Groundwater information: Including the depth to the uppermost groundwater, aquifer thickness and hydrologic properties such as the groundwater flow direction and rate, and the potentiometric surface, the existing quality of background groundwater and groundwater beneath the facility; and

(e) Supporting documentation: Such as well completion logs, geologic cross-sections, soil boring lithological logs, potentiometric surface maps and soil or groundwater testing data shall be supplied as an appendix to the permit application.

Section 7. Design and Construction Standards.

(a) Surveyed corners: All facility boundary corners shall be surveyed and marked with permanent survey caps.

(b) Access roads: Facility access roads shall be constructed to enable use under inclement weather conditions.

(c) Buffer zones: All facilities shall be designed and constructed with a buffer zone that is a minimum of twenty feet wide within the facility perimeter fence.

(d) Cover material: Sufficient cover material shall be available to properly operate the facility through the closure period.

(e) Surface water structures: Surface water structures shall be designed and constructed to:

(i) Prevent flow onto the active portion of the landfill during the peak discharge from a 25-year storm;

(ii) Collect and control run-off from the active portion of the landfill from at least the water volume resulting from a 24-hour, 25-year storm;

(f) Sediment control structures: Sediment control structures shall be designed and constructed in accordance with Chapter 11 of the Water Quality Rules.

(g) Engineered containment system or performance-based design:

(i) The Administrator may require either:

(A) An engineered containment system, including a composite liner, leachate collection system, and final cover with a permeability less than or equal to the permeability of the bottom liner system, in new units and lateral expansions, or

(B) A performance-based design that complies with the requirements set out in W.S. § 35-11-527 and demonstrates that concentrations of pollutants will not exceed groundwater protection standards at the relevant point of compliance established by the Administrator that is no more than 150 meters (492 feet) from the solid waste management unit boundary on land owned, leased, or otherwise controlled by the owner of the landfill under any of the following conditions:

(I) When native soils underlying the landfill are sufficiently permeable to allow potential contamination of groundwater through operation of the facility;

(II) When solid waste types or operation practices create a reasonable potential for contamination of underlying soils or groundwater;

(III) When site hydrologic conditions create a condition whereby groundwater is not sufficiently protected from contamination; or

(IV) At any facility which receives greater than 500 tons of industrial solid waste per operating day, on a monthly average. Containment systems at these facilities shall include leachate collection and leak detection systems.

(h) Engineered containment systems, if required by the Administrator, shall be designed and constructed as specified in Chapter 2, Section 7(g) and (h) of these rules.

(i) Slope stability for excavations: Trench walls shall not exceed a ratio of 1.5:1 (horizontal:vertical) unless a slope stability analysis demonstrates steeper slopes can be safely constructed and maintained. This analysis may be based on site-specific soil stability calculations or Wyoming Occupational Safety and Health Administration regulations for excavations.

(j) Methane control systems for on-site structures: All structures on the facility will be designed to prevent the accumulation of methane such that the concentration of methane gas in facility structures does not exceed 25% of the lower explosive limit for methane.

Section 8. Operating Standards.

(a) Qualified solid waste manager: Each facility shall be managed by a qualified solid waste manager. In the event that a qualified solid waste manager terminates employment for any reason, a new solid waste manager shall be designated within three months of such termination. For any facility that is constructed, operated, and monitored in compliance, the solid waste manager's qualifications shall be presumed to be adequate. For any facility that is not being constructed, operated, or monitored in compliance, the solid waste manager may be required to complete additional training or demonstrate his or her qualifications by written or oral examination. Within six months of assuming responsibility for operating a facility, a qualified solid waste manager shall:

(i) Possess a complete working knowledge of the facility construction, operating and monitoring procedures, as specified in the permit application and the permit letter issued by the Director.

(ii) Successfully complete a training program described in the approved permit application, which shall include training for the identification of polychlorinated biphenyl (PCB) wastes and hazardous waste regulated under Subtitle C of the federal Resource Conservation and Recovery Act and the Wyoming Hazardous Waste Rules.

(iii) Attend any training course required by the Administrator to provide training on changes to state or federal solid waste rules or guidelines. For any such mandatory training course, the Administrator shall provide each operator with a minimum of forty-five days notice prior to the scheduled training course.

(b) Copy of plan: A copy of the operating plan shall be available at the facility when landfill personnel are on-site or at an alternate location approved by the Administrator.

(c) Access restrictions:

(i) The facility shall be fenced in such a manner as to discourage people and livestock from entering the facility and to contain litter within the facility.

(A) Additional fencing may be required to restrict access to reclaimed areas or other areas that may present public health and safety hazards.

(B) If the facility is located on property that already has a restrictive perimeter fence, the requirement for a perimeter fence around the working area may be waived. However, the Administrator may require suitable litter screens or fences.

(ii) If the public has access to the facility:

(A) Access shall be prohibited at any time other than the facility’s posted operating hours; and

(B) The access road shall be equipped with a gate that shall be locked when the facility is unattended.

(d) Liquid wastes: Liquid wastes shall not be disposed of, unless the facility has been permitted by the Director to receive such wastes at a separate solid waste management unit for treatment.

(e) Hazardous wastes:

(i) No industrial landfill may accept hazardous wastes regulated under 40 CFR, Part 261, with the exception of, hazardous waste excluded under 40 CFR Part 261 if specific authorization is granted in writing by the Administrator;

(ii) The facility operator shall implement a program of random inspections of incoming solid wastes or take other steps to detect and prevent the disposal of regulated hazardous wastes and PCB wastes; and

(iii) The facility operator shall promptly notify the Administrator if regulated hazardous wastes or PCB wastes are discovered at the facility.

(f) Waste screening: The application shall include solid waste screening procedures that shall ensure disposal of authorized solid wastes only.

(g) Posting: Each point of access shall be identified by a sign, which shall be easily readable and maintained in good condition, and that contains at a minimum the following information:

(i) For facilities not used by the public:

(A) Identification of the site as a solid waste landfill; and

(B) Solid wastes that are accepted for disposal at the facility.

(ii) For facilities used by the public:

(A) The facility name;

(B) The name and phone number of the responsible person to contact in the event of emergencies;

(C) The hours of operation; and

(D) Solid wastes that are accepted for disposal at the facility.

(h) Traffic: If the facility is open to the public, signs shall be posted to direct traffic to the proper area for disposal. Public access shall be controlled so that unauthorized vehicular

traffic and illegal disposal of solid wastes are prevented. The facility shall use artificial barriers, natural barriers, or both, as appropriate to protect human health and the environment.

(i) Salvaging: Salvaging shall be conducted in such a manner as not to interfere with normal operations.

(j) Burning: No open burning of solid waste is allowed, with the exception of clean wood, tree trimmings, and brush with prior approval from the Air Quality Division.

(k) Fire protection and other emergency protection measures: Facilities shall maintain, at a minimum, an unobstructed ten foot firelane around all active solid waste management units or within the perimeter fence. The landfill personnel shall have access to portable fire extinguishers when on-site. Personnel shall have a communication system with which to alert the local fire department.

(l) Litter: The operator shall maintain an effective routine litter collection program that shall take place both within the landfill perimeter and off-site. The program shall describe the frequency of litter collection for internal fences, perimeter roads, and off-site areas. The program shall also describe special operating procedures to be used during periods of high wind and provide wind speed and direction data available for the local area.

(m) Vectors: On-site populations of disease vectors shall be prevented or controlled using techniques appropriate for the protection of human health and the environment.

(n) Dust and odors: Adequate measures shall be taken to minimize dust and odors, and to prevent the occurrence of any public nuisance.

(o) Confined working face: The working face shall be confined to the smallest practical area using signs and physical barriers, if necessary. All solid wastes shall be deposited in a manner to limit windblown litter.

(p) Topsoil: Topsoil from all disturbed areas shall be stripped and stockpiled in an area that will not be disturbed during facility operation. These stockpiles shall be identified by signs and vegetated for stabilization. This topsoil shall be used for site reclamation. Topsoil shall not be removed from the facility without written authorization from the Administrator.

(q) Routine cover: All facilities are required to cover all solid waste with an approved cover material at least monthly, or more frequently if required by the Administrator.

(i) Industrial landfills that receive less than twenty cubic yards of solid waste in any calendar month may instead be covered whenever the solid waste on the working face reaches a depth of three feet, so long as the solid waste stream does not include any putrescible waste; and

(ii) Cover material shall be comprised of no less than six inches of uniformly compacted soil or any alternative material approved by the Administrator to control infiltration,

fires, litter, odor, disease vectors, and scavenging.

(r) Intermediate cover: For any area where solid wastes will not be disposed for a period of 180 days, that area shall be covered with the required six inches of cover material and an additional twelve inches of intermediate cover.

(s) Phased reclamation: All completed solid waste fill areas shall be promptly reclaimed with final cover, topsoil and revegetation in accordance with the requirements in Section 12 of this Chapter in order to stabilize the landfill surface and reduce the potential for leachate generation.

(t) Surface water contact: Standing or running water shall not be allowed to come into contact with solid waste. Adequate measures shall be taken to prevent and alleviate ponding of water over filled areas. Surfaces shall be graded to promote lateral surface water run-off.

(u) Surface water discharges: Facilities shall be operated such that leachate, contaminated groundwater, and surface water run-off from the active portion of the facility is not allowed to enter any surface water, either on-site or off-site, unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit pursuant to the Clean Water Act.

(v) Groundwater contact: Solid wastes shall not be placed in contact with groundwater.

(w) Groundwater discharges: Solid waste disposal facilities shall not alter groundwater quality, as determined by groundwater monitoring.

(x) Leachate management: Leachate shall be contained in leachate management systems and structures approved by the Administrator.

Section 9. Monitoring Standards.

(a) Collection and management of samples: Groundwater, soil core, vadose zone, and decomposition gas samples shall be collected and managed in accordance with Department guidance or equivalent methods approved by the Administrator.

(b) Groundwater monitoring:

(i) Industrial landfills shall comply with the following groundwater monitoring requirements:

(A) Applicability:

(I) Once established at a facility or unit, the groundwater monitoring program required under this Section shall be conducted throughout the active life and post-closure care period, unless modified by the Administrator.

(II) The Administrator may establish an alternate schedule for compliance with any deadline specified in paragraphs (b)(i)(B) through (E) of this Section.

(III) The Administrator may suspend the groundwater monitoring requirements of this Section if the operator demonstrates that there is no potential for migration of hazardous constituents from the facility or unit to the uppermost aquifer. This demonstration must be made by a qualified scientist or engineer, and must consider:

(1.) Site-specific field measurements, and information about the specific solid wastes to be disposed at the facility or unit; and

(2.) Contaminant fate and transport predictions, which maximize contaminant migration and consider impacts on human health and the environment.

(IV) The groundwater monitoring requirements of this Section do not apply to:

(1.) Industrial landfills which ceased receiving solid wastes before January 1, 1998;

(2.) Industrial landfills which do not receive very small quantity generator (VSQG) hazardous wastes; or

(3.) Industrial landfills which accept less than twenty tons of solid waste per day (annual average) for disposal, have no evidence of existing groundwater contamination, serve communities that have no practicable solid waste management alternatives and are located in an area that receives less than or equal to twenty-five inches of precipitation annually.

(B) Groundwater monitoring systems:

(I) A groundwater monitoring system must be installed with a sufficient number of groundwater monitoring wells to monitor water from the uppermost aquifer that may be affected by leakage from the facility. The system must be capable of monitoring the background water quality and groundwater passing the relevant point of compliance pursuant to Section 7(g) of this Chapter. Groundwater monitoring well locations must be approved by the Administrator, and downgradient groundwater monitoring wells shall be placed in locations within 150 meters (492 feet) of the solid waste management unit boundary on land owned, leased, or otherwise controlled by the operator.

(II) The Administrator may approve a groundwater monitoring system designed to monitor groundwater from the facility, in lieu of individual solid waste disposal units, if the system is determined to be capable of adequately detecting groundwater pollution. In approving a facility-wide groundwater monitoring system, the Administrator shall consider:

(1.) Number, spacing, and orientation of the individual solid waste units at the facility;

(2.) Hydrologic setting;

(3.) Site history and design; and

(4.) Type of solid waste accepted at the individual solid waste units.

(III) The design of the groundwater monitoring system must be based on site-specific information on aquifer thickness, aquifer properties, groundwater flow direction and rate (including seasonal variations), soil information, and any aquitards, aquicludes, or confining formations at the site. The design of the system must be approved by the Administrator.

(C) Groundwater sampling and analysis shall meet the requirements of Chapter 2, Section 9(b)(i)(C)(I) through (VII).

(D) Detection monitoring:

(I) Each facility shall institute a detection monitoring program by sampling each groundwater monitoring well at least semiannually and testing each sample for the constituents specified in Appendix A, unless the Administrator:

(1.) Deletes a constituent because the operator shows that it is not likely to be present in the solid waste disposed at the facility;

(2.) Establishes an alternate list of inorganic indicator parameters in lieu of some or all of the heavy metals, if the alternative parameters provide a reliable indication of inorganic releases from the facility or unit, considering the following factors:

a. The types, quantities, and concentrations of constituents in solid wastes managed at the facility or unit;

b. The mobility, stability, and persistence of solid waste constituents or their reaction products in the groundwater;

c. The detectability of indicator parameters, solid waste constituents, and reaction products in the groundwater; and

d. The concentration or values and coefficients of variation of monitoring parameters or constituents in the groundwater background; or

(3.) Determines that a different, but no less frequent

than annual, monitoring schedule is appropriate, considering the following factors:

a. Lithology of the aquifer and unsaturated zone;

b. Hydraulic conductivity of the aquifer and unsaturated zone;

c. Groundwater flow rates;

d. Minimum distance between the edge of the solid waste boundary at the facility or unit and the downgradient groundwater monitoring well(s); and

e. The classification of the aquifer under Chapter 8 of the Water Quality Rules.

(II) A minimum of four individual samples must be collected and analyzed from each groundwater monitoring well (background and downgradient) during the first year of sampling. At least one sample must be collected and analyzed from each groundwater monitoring well during subsequent sampling events.

(III) If a statistically significant difference in water quality between background and any groundwater monitoring well at the relevant point of compliance is detected, the operator must:

(1.) Notify the Administrator in a written report with supporting documentation and place a copy of the report in the facility operating record within fourteen days and start assessment monitoring within ninety days; or

(2.) Demonstrate to the Administrator that the statistically significant increase over background is not due to the solid waste disposal facility or unit, but that the difference is due to another source of pollution, error in sampling, analysis or statistical evaluation, or natural variation in groundwater quality. The operator shall prepare a report documenting this demonstration and, following approval by the Administrator, place the report in the operating record for the facility. If the report is approved, the operator shall continue detection monitoring . If, after ninety days, a successful demonstration is not made, the operator must initiate an assessment monitoring program.

(E) Assessment monitoring:

(I) Assessment monitoring is required whenever a statistically significant increase over background water quality has been detected, subject to the exception in paragraph (b)(i)(D)(III)(2.) of this Section.

(II) Within ninety days of triggering an assessment monitoring

requirement, and annually thereafter, the operator must sample and analyze all downgradient groundwater monitoring wells for all Appendix B constituents. A minimum of one sample from each downgradient groundwater monitoring well must be collected during each annual sampling event. If any Appendix B constituent is detected for the first time in any downgradient groundwater monitoring well, the owner or operator must promptly collect a minimum of four additional independent samples from each background and downgradient well. These samples must be analyzed for each Appendix B constituent which was detected in the initial assessment monitoring sampling event.

(III) The Administrator may specify an appropriate subset of groundwater monitoring wells to be sampled and analyzed during assessment monitoring, and may delete Appendix B constituents from the monitoring requirements if it can be shown that the deleted constituents are not reasonably expected to be contained in or derived from the solid waste contained in the facility or unit. The Administrator may also specify an appropriate alternate frequency for the collection of the additional independent samples considering the following factors:

(1.) Lithology of the aquifer and unsaturated zone;

(2.) Hydraulic conductivity of the aquifer and unsaturated zone;

(3.) Groundwater flow rates;

(4.) Minimum distance between the facility and the downgradient groundwater monitoring well(s);

(5.) Classification of the aquifer under Chapter 8 of the Water Quality Rules; and

(6.) Nature (fate and transport) of any constituents detected under assessment monitoring.

(IV) After obtaining the results from any assessment monitoring sampling event, the operator must:

(1.) Within fourteen days, notify the Administrator in a written report and place a copy of the report in the operating record identifying the Appendix B constituents that have been detected;

(2.) Within ninety days, and on at least a semiannual basis thereafter, resample all groundwater monitoring wells, conduct analyses for all constituents required under detection monitoring of this Section, and for all Appendix B constituents that have been detected under assessment monitoring, and record their concentrations in the operating record. At least one must be collected from each groundwater monitoring well during each sampling event under this paragraph. The Administrator may approve an alternate sampling

frequency, no less than annual, considering the factors in paragraph (b)(i)(E)(III) of this Section;

(3.) Establish background concentrations for any constituents detected for the first time; and

(4.) Request in writing that the Administrator establish groundwater protection standards for all constituents detected.

(V) Within thirty days after completing sampling and analysis, unless an alternate time-frame is approved by the Administrator, the operator must determine whether there has been a statistically significant increase over established groundwater protection standards at each groundwater monitoring well specified by the Administrator.

(VI) If the concentrations of all Appendix B constituents are at or below background values for two consecutive sampling events, the operator must notify the Administrator and may return to detection monitoring under this Section.

(VII) If the concentrations of any Appendix B constituents are above background values, but all concentrations are below the groundwater protection standard, using the approved statistical procedures, the operator must continue assessment monitoring.

(VIII) If one or more Appendix B constituents are detected at statistically significant levels above the groundwater protection standard in any sampling event, the operator must, within fourteen days of this finding, notify the Administrator of the constituents detected above the groundwater protection standard in a written report with supporting documentation and place a copy of the report in the operating record. The operator must notify all local government officials in writing, as determined by the Administrator, and:

(1.) Characterize the nature and extent of the release by installing additional groundwater monitoring wells as necessary;

(2.) Install at least one additional groundwater monitoring well at the facility boundary downgradient of the release and sample the groundwater monitoring well in accordance with paragraph (b)(i)(E)(IV)(2.) of this Section;

(3.) Notify all persons who own or reside on the land that directly overlies any part of a plume of contamination that migrated off-site; and

(4.) Initiate an assessment of corrective measures within ninety days; or

(5.) Demonstrate to the Administrator in writing that the contamination was caused by another source or resulted from an error in sampling, analysis or statistical evaluation, or from natural variation in groundwater quality. The operator shall prepare a report documenting this demonstration, and following approval by the Administrator, place the report in the operating record. If a successful demonstration is made, the operator must continue

monitoring under the assessment monitoring program, or may return to detection monitoring if all Appendix B constituents are at or below background. Until a successful demonstration is made, the operator must comply with paragraph (b)(i)(E)(VIII) of this Section including initiating an assessment of corrective measures under Section 13 of this Chapter.

(IX) The operator must request in writing that the Administrator establish a groundwater protection standard for each Appendix B constituent detected in the groundwater. The Administrator shall establish groundwater protection standards for such constituents, which shall be:

(1.) For constituents where a maximum contaminant level (MCL) has been promulgated, the MCL for that constituent;

(2.) For constituents for which MCLs have not been promulgated, the background concentration; or

(3.) For constituents for which the background level is higher than the MCL or health-based level established under subsection (b)(i)(E)(X), the background concentration.

(X) The administrator may establish an alternative groundwater protection standard for constituents for which MCLs have not been established. These groundwater protection standards shall be health-based levels. For constituents where a MCL does not exist, the alternative groundwater protection standard shall be the more stringent standard meeting the requirements of Water Quality Rules, Chapter 8, Table 1 based on groundwater class of use or the Drinking Water Equivalent Level as determined by the procedures found in the Storage Tank Rules Chapter 1, Section 39(e).

(ii) Industrial landfills excluded from groundwater monitoring requirements under paragraph (b)(i)(A)(IV) of this Section, shall, if required by the Administrator, comply with the following groundwater monitoring and corrective action requirements:

(A) Groundwater monitoring well placement: All facilities required to install groundwater monitoring wells shall place them in locations approved by the Administrator. Following initial placement of the groundwater monitoring wells, the operator shall confirm that the groundwater monitoring wells are capable of measuring groundwater quality that is representative of conditions hydraulically upgradient and downgradient of the solid waste disposal facility.

(B) Groundwater monitoring well design, construction/installation and abandonment: All groundwater monitoring wells shall be designed, constructed and installed in accordance with the Water Quality Rules Chapter 26 requirements. All abandoned groundwater monitoring wells shall be plugged and sealed in accordance with the Water Quality Rules Chapter 26 requirements.

(C) Permits required: Prior to groundwater monitoring well

installation, the groundwater monitoring well design, construction and location specifications shall be approved by the Administrator.

(D) Analyses:

(I) Baseline monitoring: The initial groundwater samples shall be analyzed for pH, Total Dissolved Solids (TDS), Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), Ammonia as N, Nitrate as N, Bicarbonate, Carbonate, Chloride, Fluoride, Calcium, Magnesium, Potassium, Sodium, Sulfate, Copper, Iron, Manganese, Nickel, Zinc, Arsenic, Barium, Cadmium, Chromium, Cyanide, Lead, Mercury, Selenium, and Silver. Additionally, water temperature, specific conductance, pH and static water level shall be measured in the field during each baseline monitoring event. The length of this baseline monitoring period shall not exceed one year, and samples shall be obtained at least quarterly during this period.

(II) Detection monitoring: Following the initial baseline monitoring period, the Administrator may specify a reduced set of sampling parameters to be analyzed at least semi-annually. The reduced set of parameters shall include, at a minimum: pH, temperature, static water level, Total Dissolved Solids (TDS), Chlorides, Ammonia (as N), Iron, Hardness, and Total Organic Carbon (TOC). Additionally, water temperature, specific conductance, pH, and static water level shall be measured in the field during each semi-annual monitoring event.

(III) Assessment monitoring: Should groundwater monitoring data cause the Administrator to determine the facility may be impacting groundwater quality, additional groundwater monitoring wells, a revised set of sampling parameters, and a revised sampling schedule may be required by the Administrator to define the nature and extent of contamination.

(IV) The Administrator may specify alternative or additional water quality parameters for analyses, including organic chemical constituents, based on the Administrator's review of the solid wastes likely to be disposed at any specific solid waste disposal facility.

(E) Corrective actions: Whenever there is a release of contamination which adversely impacts groundwater quality, the operator shall institute corrective actions approved by the Administrator, as specified in Section 13 of this Chapter.

(iii) Operators of industrial landfills that are subject to the groundwater monitoring requirements shall submit groundwater monitoring data electronically in a format specified by the Administrator.

(c) Methane:

(i) Facilities shall be operated such that the concentration of methane at the facility boundary does not exceed the LEL for methane and in facility structures does not exceed

25% of the LEL. If methane levels exceed these limits, the operator must:

(A) Immediately notify the Administrator and take steps to protect human health;

(B) Within seven days of detection, place a copy of the methane test data and a written description of the steps taken to protect human health in the operating record; and

(C) Within sixty days of detection, implement a remediation plan that has been approved by the Administrator, and place a copy of that plan in the operating record.

(ii) The Administrator may establish alternative schedules for demonstrating compliance with the requirements of paragraphs (c)(i)(B) and (C) of this Section.

(iii) Methane probe system design: Methane probe design, construction, installation, and location shall be adequate to monitor compliance.

(iv) Abandonment of methane probe boreholes: Abandoned methane probe boreholes shall be plugged and sealed in accordance with Department recommendations.

(v) Analyses: Methane analyses shall be conducted at least quarterly, if required, using equipment capable of monitoring LEL and percent volume methane and following the manufacturer's recommended procedures.

(d) Air monitoring: Air monitoring, if required, shall be conducted in accordance with the Air Quality Rules.

(e) Soil core monitoring: Soil core monitoring, if required, shall be conducted in accordance with a plan approved by the Administrator.

(f) Vadose zone monitoring: Vadose zone monitoring, if required, shall be conducted in accordance with a plan approved by the Administrator.

Section 10. Recordkeeping.

(a) Three-year recordkeeping: The following records shall be maintained at the facility or an approved alternative location and available for inspection and copying for a minimum of three years from the date of recording:

(i) Log of litter collection activities specifying the dates and areas of litter collection;

(ii) Types and disposition of special wastes, specifying the volume, date of disposition, and source of special waste;

(iii) Records of solid waste sold or otherwise salvaged; and

(iv) Record of any problems causing operations to cease, including but not limited to fire or equipment failure.

(b) Long-term recordkeeping: The following records shall be maintained at the facility or an approved alternative location and available for inspection and copying through the end of the post-closure period:

(i) Any permit application prepared under this Chapter;

(ii) If not contained in the permit application, any location restriction demonstration that is required;

(iii) Log of random inspections or other screening activities for regulated hazardous wastes and PCB wastes specifying the date, time, and name(s) of the inspection personnel and any notifications to the Administrator;

(iv) Records of training of landfill operators to detect hazardous wastes and PCB wastes;

(v) Monitoring results and any notification or remediation plans;

(vi) As-built specifications for disposal units, including liners, caps, and leachate collection systems, with their dates of construction, location, length, width and depth;

(vii) Dates when trenches and units are completed, and their contents;

(viii) Closure and post-closure plans, if not already contained in the permit application, and any monitoring, testing, or analytical data required in the plans;

(ix) Any cost estimates and financial assurance documentation;

(x) Any performance based design demonstration;

(xi) Dates when reclamation activities took place including a description of the areas reclaimed; and

(xii) Copies of written correspondence with the Department.

Section 11. Reporting Standards.

(a) Annual reports: Annual reports for the previous calendar year shall be submitted, by March 1, in a format approved by the Administrator, unless an alternate date is approved by the Administrator. Annual reports shall include:

(i) A summary description of facility operations and activities carried out during the last year including, but not limited to, the construction of new solid waste disposal units, the tons of solid waste received (estimated if the facility has no scales), and the cubic yards of estimated air space used; and

(ii) A description of any final cover and reclamation activities completed and evaluation of revegetation results during the last year with supporting documentation that reclamation was completed in accordance with the Solid Waste Rules and the facility permit.

(iii) Environmental monitoring data: On an annual basis, operators shall provide the Administrator with electronic copies of all required environmental monitoring data not previously submitted, in a format specified by the Administrator.

(b) Additional information: The Administrator may require reporting of additional information needed to demonstrate compliance with these rules.

Section 12. Closure and Post-Closure Standards.

(a) Commencement of closure: Approved closure activities shall commence no later than thirty days after the facility stops receiving solid wastes and shall be completed within twelve months following commencement of closure activities. The Administrator may approve:

(i) Delayed closure of a facility or unit if the facility or unit has additional remaining disposal capacity, and the owner demonstrates that there will be no threats to human health or the environment from the unclosed facility or unit; and

(ii) Extensions of the closure period if needed to adequately complete closure activities and the owner demonstrates that there will be no threats to human health or the environment from the unclosed facility or unit.

(b) Notification and certification of facility and unit closure: Prior to the commencement of unit and facility closure activities, the operator shall notify the Administrator in writing and place a notice of closure in the operating record. Within ninety days following closure of each unit and facility, the operator shall submit a certification with supporting documentation signed by a Wyoming registered professional engineer that closure has been completed in accordance with the approved closure plan and place a copy of the certification in the facility operating record.

(c) Notice on deed: At facility closure, an instrument that clearly gives notice of the restrictions that apply to future activities on the disposal facility property shall be filed for recording by the registrar of deeds (county clerk) in the county where the facility is located. The wording of such an instrument shall indicate that the property has been used as a solid waste disposal facility. This shall be recorded prior to any property transaction resulting in another use for the property. The owner or operator, and its successors, shall ensure that post-closure use of the property is restricted to prevent any disturbance to the facility's containment system including caps and liners, or the functioning of the facility's monitoring system. The owner or operator may

request permission from the Administrator to remove the notation from the deed if all solid wastes are removed from the facility.

(d) Erosion and ponding problems: Facilities shall be engineered to inhibit future problems with erosion or ponding of surface water over filled areas. This may be done through site grading and revegetation, placement of rip rap, or other appropriate means. The application shall describe the method and length of time that surface water will be diverted from the site and the methods by which surface erosion or water ponding problems will be identified and corrected.

(e) Final cover design and construction: At closure, an infiltration barrier layer of subsoil, or a combination of materials as specified in the permit, a minimum of two (2) feet thick shall be constructed over the solid waste or any intermediate cover already in place. This infiltration barrier layer shall be covered with a minimum of six (6) inches of topsoil and graded to prevent erosion or surface water ponding. The infiltration barrier layer shall be constructed to minimize the total amount of moisture and the rate at which moisture infiltrates the final cover system. The Administrator may specify more stringent cover requirements if the Administrator determines that the site poses a significant threat to public health or the environment.

(f) Revegetation: At facility closure, any portion of the facility that has been disturbed by solid waste disposal activities shall be revegetated to minimize wind and water erosion of the final cover, consistent with the post-closure land use. The operator shall use a diverse vegetation mix, selected to be compatible with the climatic conditions, require little maintenance, and have root depths that will not exceed the depth of the final cover.

(g) Surveyed corners: At facility closure, all facility boundary corners shall be surveyed and marked with permanent survey caps.

(h) Access control: Facility fences, gates, and any other access restrictions shall be maintained until the site has been satisfactorily closed and revegetated, if post-closure land use requires establishment of vegetative cover.

(i) Waste containment systems: Waste containment systems, including but not limited to liners, leachate detection, collection and management systems, final cover systems, surface water structures, environmental monitoring systems, and corrective action systems shall be maintained throughout the closure and post-closure periods.

(j) Post-closure period:

(i) The post-closure period for industrial landfills that are required to comply with the groundwater monitoring requirements of Section 9(b)(i) of this Chapter shall extend for a period of not less than thirty years after certification of closure activities is approved by the Administrator. The minimum post-closure period may be terminated by the Administrator at an earlier date if the Administrator determines that the facility has been adequately stabilized and that the environmental monitoring or control systems have demonstrated that the facility closure is protective of public health and the environment consistent with the purposes of the

Environmental Quality Act.

(ii) The post-closure period for industrial landfills that are not required to comply with the groundwater monitoring requirements of Section 9(b)(i) of this Chapter shall extend for a period of not less than five years after certification of closure activities is approved by the Administrator.

(iii) Following the initial minimum post-closure period specified in this subsection, the post-closure period shall be automatically extended until such time when the Administrator determines, upon petition by the operator accompanied by submission of relevant information, that the facility has been adequately stabilized in a manner protective of human health and the environment.

Section 13. Standards for Corrective Action.

(a) Assessment of corrective measures: All facilities required to start a corrective measures assessment shall initiate assessment of corrective measures within ninety days of a groundwater quality exceedance and complete the assessment in a reasonable time, determined by the Administrator. The owner or operator shall:

(i) Continue to conduct an assessment monitoring program;

(ii) Analyze the effectiveness of potential corrective measures to meet any alternate remedies that are being considered under paragraph (b) of this Section, considering:

(A) The performance, reliability, ease of implementation, and potential impacts of appropriate alternate remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;

(B) The time required to begin and complete the remedy;

(C) The costs of remedy implementation; and

(D) The institutional requirements such as state or local permits or other environmental or public health requirements that may substantially affect implementation of the remedy.

(iii) Provide an opportunity for public review of the corrective measures assessment, prior to selection of the remedy.

(b) Selection of remedy:

(i) The landfill operator must demonstrate to the Administrator how the selected corrective action remedy meets the remedy standards established in this subsection. The Administrator must approve the selected remedy and the remedial activities schedule before it is implemented.

(ii) The selected remedy must:

(A) Be protective of human health and the environment;

(B) Attain the groundwater protection standard;

(C) Control the source of releases of pollution so as to reduce or eliminate, to the maximum extent practicable, further releases of constituents into the environment that may pose a threat to human health or the environment; and

(D) Comply with standards for management of solid wastes specified in this Chapter.

(iii) The selection of the corrective action remedy must consider the following factors:

(A) Short- and long-term effectiveness of the remedy and the degree of certainty that the remedy will be effective, considering:

(I) Magnitude of reduction of existing risk to public health and the environment;

(II) Magnitude of risk of further releases of pollution;

(III) Type and degree of long-term management required, including monitoring, operation, and maintenance;

(IV) Short-term risks of exposure to the community, workers, or the environment during any excavation, transportation, and redisposal of solid wastes;

(V) Time until full protection is achieved;

(VI) Potential for exposure to humans and the environment from remaining solid wastes;

(VII) Long-term reliability of the engineering and any institutional controls; and

(VIII) Potential need for replacement of the remedy.

(B) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:

(I) The extent to which containment will reduce further releases; and

(II) The extent to which treatment technologies will be used.

(C) The ease or difficulty of implementing the potential remedy, considering:

(I) Difficulty in constructing the technology;

(II) Expected reliability of the technology;

(III) Availability of necessary equipment and specialists; and

(IV) Available capacity of needed treatment, storage, and disposal facilities.

(D) Practicable capability of the operator, including a consideration of the technical and economic capability.

(E) The degree to which community concerns are addressed by a potential remedy.

(F) The need to coordinate with and obtain necessary approvals and permits from other agencies.

(iv) The Administrator shall approve a schedule for initiating and completing remedial activities, considering the following factors:

(A) Extent and nature of contamination;

(B) Practical capabilities of remedial technologies in achieving compliance with groundwater protection standards and other objectives of the remedy;

(C) Availability of treatment or disposal capacity for wastes managed during implementation of the remedy;

(D) Desirability of utilizing technologies that are not currently available but may offer significant advantages over already available technologies in terms of effectiveness, reliability, safety, or ability to achieve remedial objectives;

(E) Potential risks to human health and the environment from exposure to contamination prior to completion of the remedy;

(F) Classification of the aquifer under Chapter 8 of the Water Quality Rules, plus a consideration of the following factors:

(I) Current and future uses;

(II) Proximity and withdrawal rate of users;

(III) Groundwater quantity;

(IV) The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to solid waste;

(V) The hydrologic characteristics of the facility and surrounding lands;

(VI) Groundwater removal and treatment costs; and

(VII) The cost and availability of alternative water supplies;

(G) Practicable capability of the operator; and

(H) Any other factor considered relevant by the Administrator.

(v) The Administrator may determine that remediation of a release from a facility is not necessary if the operator demonstrates to the satisfaction of the Administrator that:

(A) The groundwater is additionally contaminated by substances that have originated from a source other than the facility, and those substances are present in concentrations such that the cleanup of the release from the facility would provide no significant reduction in risk to actual or potential receptors;

(B) The constituent is present in groundwater that is not currently or reasonably expected to be a source of drinking water and is not hydraulically connected with waters to which the hazardous constituents are migrating or are likely to migrate in a concentration that would exceed the groundwater protection standards established under Section 6 of this Chapter; or

(C) Remediation of the release(s) is technically impracticable; or

(D) Remediation would result in unacceptable cross-media impacts.

(vi) A determination by the Administrator not to require remediation under paragraph (v) of this Section shall not affect the authority of the Administrator to require the operator to undertake source control measures or other measures that may be necessary to eliminate or minimize further releases to the groundwater, to prevent exposure to the groundwater, or to remediate the groundwater to concentrations that are technically practicable and significantly reduce threats to human health or the environment.

(c) Corrective action implementation:

(i) On a schedule approved by the Administrator, the operator must:

(A) Implement the selected remedy as approved by the Administrator;

(B) Continue groundwater monitoring to meet the requirements of the assessment monitoring program and to demonstrate the effectiveness of the selected remedy in meeting established water quality standards; and

(C) Take interim measures as determined necessary by the Administrator to ensure protection of public health and the environment. The Administrator shall consider the following factors in determining the need for interim measures:

(I) Time required to develop and implement a final remedy;

(II) Actual or potential exposure of nearby populations or environmental receptors to hazardous constituents;

(III) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

(IV) Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously;

(V) Weather conditions that may cause hazardous constituents to migrate or be released;

(VI) Risks of fire or explosion, or potential for exposure to hazardous constituents as a result of an accident or failure of a container or handling system; and

(VII) Other situations that may pose threats to human health and the environment.

(ii) If the selected remedy is not meeting the corrective action standards, the operator shall implement other methods or techniques that have been approved by the Administrator that could practicably achieve compliance with the requirements, unless there is no practicable alternative and the operator meets the requirements of paragraph (c)(iii) of this Section.

(iii) If a selected remedy cannot be practically achieved with any currently available methods, the operator must:

(A) Demonstrate to the satisfaction of the Administrator that the remedy cannot be achieved;

(B) Implement alternative measures which have been approved by the Administrator to control exposure of humans or the environment to residual contamination, as

necessary to protect human health and the environment; and

(C) Implement alternate measures for control of the sources of contamination, which are consistent with the overall objective of the remedy and which are technically practicable.

(iv) All solid wastes managed pursuant to a remedy or interim measure under this Section shall be managed in a manner that complies with the requirements of this Chapter and that is protective of human health and the environment.

(v) Remedies shall be considered complete when:

(A) The operator complies with the groundwater protection standards at all points within the plume of contamination that lie beyond the relevant point of compliance established by the Administrator.

(B) Compliance with the groundwater protection standards shall be considered complete when concentrations of Appendix B constituents have not exceeded the groundwater protection standard(s) for a period of three consecutive years using the approved statistical procedures. The Administrator may approve an alternate length of time during which the operator must demonstrate compliance with the standard(s), considering:

(I) Extent and concentration of the release(s);

(II) Behavior characteristics of the hazardous constituents in the groundwater;

(III) Accuracy of the data; and

(IV) Characteristics of the groundwater; and

(C) All actions required to complete the remedy have been satisfied.

(vi) When the corrective action remedy is complete, the operator must:

(A) Notify the Administrator in writing, with supporting documentation, and place a notice in the facility operating record certifying that the remedy has been completed in compliance with Section 13(c)(v); and

(B) Petition the Administrator to be released from the financial assurance requirements for corrective action under Chapter 7 of these rules.

Section 14. Financial Assurance Standards.

Any operator of an industrial landfill subject to the financial assurance requirements of Chapter 7 of these rules, shall demonstrate compliance with the requirements of Chapter 7 of

these rules.

Section 15. Transfer, Treatment, and Storage Facility Standards.

The permit application shall demonstrate compliance with the requirements of Chapter 6 of these rules, if applicable.

Section 16. Special Waste Standards.

The permit application shall demonstrate compliance with the requirements of Chapter 8 of these rules, if applicable.

Section 17. Commercial Solid Waste Facility Standards.

The permit application shall demonstrate compliance with the requirements of Chapter 10 of these rules and W.S. § 35-11-514, if applicable.

Section 18. Supporting Documentation/Appendices.

(a) A USGS topographic map with a scale of 1:24,000 showing the proposed facility location or, if a 1:24,000 map is unavailable, USGS topographic map with a scale of 1:62,500 or another suitable topographic map.

(b) A map or aerial photograph of the area showing land ownership, land use, and zoning within one mile of the disposal site. The map or photograph shall be of sufficient scale to show all city boundaries, occupied dwelling, schools, hospitals, industrial buildings, water wells, water courses, roads, and other applicable details.

(c) A general facility plot plan (map) with a scale and contour intervals approved by the Administrator. The general facility plot plan shall at a minimum illustrate the following features:

(i) Landfill facility boundaries;

(ii) Points of access;

(iii) Location of soil borings and monitoring wells;

(iv) Location of proposed trenches or area fill locations;

(v) Working area/perimeter fire lane;

(vi) Working area/perimeter fence location; and

(vii) Locations of any facility buildings at the landfill.

(d) Additional facility plot plans at the same scale as the general facility plot plan, shall be submitted as necessary to show orderly development and use of the facility through the life of the site. These plot plans shall at a minimum contain the following information:

(i) Excavation plans for development of trenches or preparation of area fill locations;

(ii) Development of temporary surface water diversion structures which may be necessary to adequately control surface water run-on and run-off;

(iii) Access to active solid waste disposal areas, including development of internal roads;

(iv) Cover stockpile locations;

(v) Topsoil storage pile locations;

(vi) Litter screen placement information, if applicable;

(vii) Location of special waste management or disposal areas, if applicable; and

(viii) Other details pertinent to the development and use of the facility.

(e) A map showing proposed final post-closure contours prepared at the same scale as the general facility plot plan.

(f) If the industrial solid waste facility is included in a larger industrial property, a map that shows the facility boundaries in relation to the overall boundaries of the industrial property.

(g) Cross sections or drawing with sufficient specifications to describe:

(i) Internal litter catch screens or fences, if applicable;

(ii) Working area/perimeter fencing;

(iii) Access roads;

(iv) Trench or area fill method;

(v) Special waste areas, where appropriate;

(vi) Systems used for monitoring, collection, treatment, and disposal of leachate, if applicable;

(vii) Groundwater monitoring well design;

(viii) Methane gas venting and monitoring system, if applicable;

(ix) Surface and subsurface drain systems to control run-on, run-off and, inflow;

(x) All components of engineered containment systems, if applicable, which include, but are not limited to, liners, caps, and berms; and

(xi) Any other design details requested by the Administrator.

(h) Recordkeeping logs: A copy of the recordkeeping logs/forms that will be maintained during the operating life, closure, and post-closure maintenance period.

Appendix A - Constituents for Detection Monitoring[1]			
Inorganics (15)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Antimony	(Total)	Antimony	6010 6020 7000 7010
Arsenic	(Total)	Arsenic	6010 6020 6200 7010 7061 7062 7063
Barium	(Total)	Barium	6010 6020 6200 6800 7010
Beryllium	(Total)	Beryllium	6010 6020 7000 7010
Cadmium	(Total)	Cadmium	6010 6020 6200 6800 7000 7010
Chromium	(Total)	Chromium	6010 6020 6200 6800 7000 7010
Cobalt	(Total)	Cobalt	6010 6020 6200 7000 7010

Copper	(Total)	Copper	6010 6020 6800 7000 7010
Lead	(Total)	Lead	6010 6020 6200 6800 7000 7010
Nickel	(Total)	Nickel	6010 6020 6200 6800 7000 7010
Selenium	(Total)	Selenium	6010 6020 6200 6800 7010 7741 7742
Silver	(Total)	Silver	6010 6020 6200 6800 7000 7010
Thallium	(Total)	Thallium	6010 6020 6200 6800 7000 7010
Vanadium	(Total)	Vanadium	6010 6020 6200 6800 7000 7010

Zinc	(Total)	Zinc	6010 6020 6200 6800 7000 7010

Appendix A - Constituents for Detection Monitoring[1]			
Volatiles (47)			
Common name[2]	CAS RN[3]	Chemical Abstracts service index name[4]	Suggested methods[5]
Acetone	67-64-1	2-Propanone	8015 8260 8261 8315
Acrylonitrile	107-13-1	2-Propenenitrile	8015 8031 8260 8261 8316
Benzene	71-43-2	Benzene	8015 8021 8260 8261
Bromochloromethane; Chlorobromomethane	74-97-5	Methane, bromochloro-	8021 8260 8261
Bromodichloromethane; Dibromochloromethane	75-27-4	Methane, bromodichloro-	8021 8260 8261
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8021 8260 8261
Carbon disulfide	75-15-0	Carbon disulfide	8260 8261
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8021 8260 8261 8535
Chlorobenzene	108-90-7	Benzene, chloro-	8021 8260 8261
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8021 8260 8261

Appendix A - Constituents for Detection Monitoring[1]			
Volatiles (47)			
Common name[2]	CAS RN[3]	Chemical Abstracts service index name[4]	Suggested methods[5]
Chloroform; Trichloromethane	67-66-3	Methane, trichloro-	8021 8260 8261
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8021 8260 8261
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8011 8021 8081 8260 8261 8270
1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4	Ethane, 1,2-dibromo-	8011 8021 8260
o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8021 8121 8260 8261 8270 8410
p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8021 8121 8260 8261 8270 8410
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	8260 8261
1,1-Dichloroethane; Ethylidene chloride	75-34-3	Ethane, 1,1-dichloro-	8021 8260 8261
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,1-dichloro-	8021 8260 8261
1,1-Dichloroethylene; 1,1-Dichlorothene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8021 8260 8261
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2	Ethene, 1,2-dichloro-, (Z)-	8021 8260 8261

Appendix A - Constituents for Detection Monitoring[1]			
Volatiles (47)			
Common name[2]	CAS RN[3]	Chemical Abstracts service index name[4]	Suggested methods[5]
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5	Ethene, 1,2-dichloro-, (E)-	8021 8260 8261
1,2-Dichloropropane; Propylene dichloride	78-87-5	Propane, 1,2-dichloro-	8021 8260 8261
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8021 8260 8261
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8021 8260 8261
Ethylbenzene	100-41-4	Benzene, ethyl-	8015 8021 8260 8261
2-Hexanone; Methyl butyl ketone	591-78-6	2-Hexanone	8260 8261
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8021 8260 8261
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8021 8260 8261
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8021 8260 8261
Methylene chloride; Dichloromethane; DCM	75-09-2	Methane, dichloro-	8021 8260 8261
Methyl ethyl ketone; MEK; 2-Butanone	78-93-3	2-Butanone	8015 8260 8261
Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8260 8261
4-Methyl-2-pentanone; Methyl isobutyl ketone; MIBK	108-10-1	2-Pentanone, 4-methyl-	8260 8261
Styrene	100-42-5	Benzene, ethenyl-	8021 8260 8261

Appendix A - Constituents for Detection Monitoring[1]			
Volatiles (47)			
Common name[2]	CAS RN[3]	Chemical Abstracts service index name[4]	Suggested methods[5]
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8021 8260
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8021 8260 8261
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4	Ethene, tetrachloro-	8021 8260 8261
Toluene	108-88-3	Benzene, methyl-	8015 8021 8260 8261
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8021 8260 8261
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8021 8260 8261
Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro-	8021 8260 8261 8535
Trichlorofluoromethane; CFC-11	75-69-4	Methane, trichlorofluoro-	8021 8260 8261
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8021 8260 8261
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8260
Vinyl chloride; Chloroethene	75-01-4	Ethene, chloro-	8021 8260 8261
Xylene (total)	See Appendix B Note 6	Benzene, dimethyl-	8015 8021 8260 8261

1. The regulatory requirements pertain only to the list of substances; the right hand column (Suggested Methods) is given for informational purposes only. See also footnotes 5.

2. Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

3. Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.

4. CAS index names are those used in the 9th Collective Index.

5. Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846. “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), and V (2015).” Analytical details can be found in SW-846. CAUTION: The methods listed are representative SW-846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.

Appendix B – Constituents for Assessment Monitoring[1]			
Inorganics (19)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Antimony	(Total)	Antimony	6010 6020 6200 6800 7000 7062
Arsenic	(Total)	Arsenic	6010 6020 6200 7010 7061 7062 7063
Barium	(Total)	Barium	6010 6020 6200 6800 7000 7010
Beryllium	(Total)	Beryllium	6010 6020 7000 7010
Cadmium	(Total)	Cadmium	6010 6020 6200 6800 7000 7010
Chromium	(Total)	Chromium	6010 6020 6200 6800 7000 7010
Cobalt	(Total)	Cobalt	6010 6020 6200 7000 7010

Appendix B – Constituents for Assessment Monitoring[1]			
Inorganics (19)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Copper	(Total)	Copper	6010 6020 6200 6800 7000 7010
Cyanide	57-12-5	Cyanide	9010 9012 9013 9014 9015 9016 9213
Lead	(Total)	Lead	6010 7420 6020 6200 6800 7000 7010
Mercury	(Total)	Mercury	6010 6020 6200 6800 7470 7471 7472 7473 7474
Nickel	(Total)	Nickel	6010 6020 6200 6800 7000 7010
Selenium	(Total)	Selenium	6010 6020 6200 6800 7010 7740 7741

Appendix B – Constituents for Assessment Monitoring[1]			
Inorganics (19)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Silver	(Total)	Silver	6010 6020 6200 6800 7000 7010
Sulfide	18496-25-8	Sulfide	9030 9031 9215
Thallium	(Total)	Thallium	6010 6020 6200 6800 7000 7010
Tin	(Total)	Tin	6010 6200 7000
Vanadium	(Total)	Vanadium	6010 6020 6200 6800 7000 7010
Zinc	(Total)	Zinc	6010 6020 6200 6800 7000 7010

Appendix B – Constituents for Assessment Monitoring[1]			
Volatiles (64)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Acetone	67-64-1	2-Propanone	8015 8260 8261 8315

Appendix B – Constituents for Assessment Monitoring[1]			
Volatiles (64)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Acetonitrile; Methyl cyanide	75-05-8	Acetonitrile	8015 8033 8260 8261
Acrolein; Propenal	107-02-8	2-Propenal	8015 8260 8261 8315 8316
Acrylonitrile	107-13-1	2-Propenenitrile	8015 8031 8260 8261 8316
Allyl chloride	107-05-1	1-Propene, 3-chloro-	8021 8260 8261
Benzene	71-43-2	Benzene	8015 8021 8260 8260
Bromochloromethane; Chlorobromomethane	74-97-5	Methane, bromochloro-	8021 8260 8261
Bromodichloromethane; Dibromochloromethane	75-27-4	Methane, bromodichloro-	8021 8260 8261
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8021 8260 8261
Carbon disulfide	75-15-0	Carbon disulfide	8260 8261
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8021 8260 8261 8535
Chlorobenzene	108-90-7	Benzene, chloro-	8021 8260 8260

Appendix B – Constituents for Assessment Monitoring[1]			
Volatiles (64)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8021 8260 8261
Chloroform; Trichloromethane	67-66-3	Methane, trichloro-	8021 8260 8261
Chloroprene; 2-Chloro-1,3-butadiene	126-99-8	1,3-Butadiene, 2-chloro-	8021 8260
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8021 8260 8261
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8011 8021 8081 8260 8261 8270
1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4	Ethane, 1,2-dibromo-	8011 8021 8260
o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8021 8121 8260 8261 8270 8410
m-Dichlorobenzene; 1,3-Dichlorobenzene	541-73-1	Benzene, 1,3-dichloro-	8021 8121 8260 8261 8270 8410
p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8021 8121 8260 8261 8270
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	8260 8261
Dichlorodifluoromethane	75-71-8	Methane, dichlorodifluoro-	8021 8260 8261

Appendix B – Constituents for Assessment Monitoring[1]			
Volatiles (64)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
1,1-Dichloroethane; Ethylidene chloride	75-34-3	Ethane, 1,1-dichloro-	8021 8260 8261
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,1-dichloro-	8021 8260 8261
1,1-Dichloroethylene; 1,1-Dichlorothene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8021 8260 8261
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2	Ethene, 1,2-dichloro-, (Z)-	8021 8260 8261
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5	Ethene, 1,2-dichloro-, (E)-	8021 8260 8261
1,2-Dichloropropane; Propylene dichloride	78-87-5	Propane, 1,2-dichloro-	8021 8260 8261
1,3-Dichloropropane; Trimethylene dichloride	142-28-9	Propane, 1,3-dichloro-	8021 8260 8261
2,2-Dichloropropane; Isopropylidene chloride	594-20-7	Propane, 2,2-dichloro-	8021 8260 8261
1,1-Dichloropropene	563-58-6	1-Propene, 1,1-dichloro-	8021 8260 8261
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8021 8260 8261
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8021 8260 8261
Ethyl benzene	100-41-4	Benzene, ethyl-	8015 8021 8260 8261
Ethyl methacrylate	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	8260 8261
2-Hexanone; Methyl butyl ketone	591-78-6	2-Hexanone	8260 8261

Appendix B – Constituents for Assessment Monitoring[1]			
Volatiles (64)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Isobutyl alcohol; 2-Methyl-1-propanol	78-83-1	1-Propanol, 2-methyl-	8260 8261
Methacrylonitrile	126-98-7	2-Propenenitrile, 2-methyl-	8260 8261
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8021 8260 8261
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8021 8260 8261
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8021 8260 8261
Methylene chloride; Dichloromethane; DCM	75-09-2	Methane, dichloro-	8021 8260 8261
Methyl ethyl ketone; MEK; 2-Butanone	78-93-3	2-Butanone	8015 8260 8261
Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8260 8261
Methyl methacrylate	80-62-6	2-Propenoic acid, 2-methyl-, methylester	8260 8261
4-Methyl-2-pentanone; Methyl isobutyl ketone; MIBK	108-10-1	2-Pentanone, 4-methyl-	8260 8261
Naphthalene	91-20-3	Naphthalene	8021 8100 8260 8261 8270 8275 8310 8410
Propionitrile; Ethyl cyanide	107-12-0	Propanenitrile	8015 8260 8261
Styrene	100-42-5	Benzene, ethenyl-	8021 8260 8261

Appendix B – Constituents for Assessment Monitoring[1]			
Volatiles (64)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8021 8260
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8021 8260 8261
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4	Ethene, tetrachloro-	8021 8260 8261
Toluene	108-88-3	Benzene, methyl-	8015 8021 8260 8261
1,2,4-Trichlorobenzene	120-82-1	Benzene, 1,2,4-trichloro-	8021 8121 8260 8270 8275 8410
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8021 8260 8261
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8021 8260 8261
Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro-	8021 8260 8261 8535
Trichlorofluoromethane; CFC-11	75-69-4	Methane, trichlorofluoro-	8021 8260 8261
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8021 8260 8261
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8260
Vinyl chloride; Chloroethene	75-01-4	Ethene, chloro-	8021 8260 8261

Appendix B – Constituents for Assessment Monitoring[1]			
Volatiles (64)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Xylene (Total)	See Note 6	Benzene, dimethyl-	8015 8021 8260 8261

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	8100 8270 8275 8310
Acenaphthylene	208-96-8	Acenaphthylene	8100 8270 8275 8310 8410
Acetophenone	98-86-2	Ethanone, 1-phenyl-	8261 8270
2-Acetylaminofluorene; 2-AAF	53-96-3	Acetamide, N-9H-fluoren-2-yl-	8270
4-Aminobiphenyl	92-67-1	[1,1'-Biphenyl]-4-amine	8270
Anthracene	120-12-7	Anthracene	8100 8270 8275 8310 8410
Benzo[a]anthracene; Benzanthracene	56-55-3	Benz[a]anthracene	8100 8270 8275 8310 8410
Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	8100 8270 8275 8310
Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene	8100 8270 8275 8310

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Benzo[g,h,i]perylene	191-24-2	Benzo[ghi]perylene	8100 8270 8275 8310
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	8100 8270 8275 8310 8410
Benzyl alcohol	100-51-6	Benzenemethanol	8270
Bis(2-chloroethoxy)methane	111-91-1	Ethane, 1,1'-[methylenebis (oxy)]bis[2-chloro-	8111 8270 8410
Bis(2-chloroethyl)ether; Dichloroethhyl ether	111-44-4	Ethane, 1,1'-oxybis[2-chloro-	8111 8270 8410 8430
Bis(2-chloro-1-methylethyl) ether; 2,2'-Dichlorodiisopropyl ether; DCIP, See note 7	108-60-1	Propane, 2,2'-oxybis[1-chloro-	8021 8111 8270 8410
Bis(2-ethylhexyl) phthalate	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester	8061 8270 8410
4-Bromophenyl phenyl ether	101-55-3	Benzene, 1-bromo-4-phenoxy-	8111 8270 8275 8410
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	8061 8270 8410
p-Chloroaniline; 4-Chloroaniline	106-47-8	Benzenamine, 4-chloro-	8131 8270 8410
Chlorobenzilate	510-15-6	Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl)-α-hydroxy-, ethyl ester	8081 8270
p-Chloro-m-cresol; 4-Chloro-3-methylphenol	59-50-7	Phenol, 4-chloro-3-methyl-	8041 8270 8410

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
2-Chloronaphthalene	91-58-7	Naphthalene, 2-chloro-	8121 8270 8410
2-Chlorophenol	95-57-8	Phenol, 2-chloro-	8041 8270 8410
4-Chlorophenyl phenyl ether	7005-72-3	Benzene, 1-chloro-4-phenoxy-	8111 8270 8410
Chrysene	218-01-9	Chrysene	8100 8270 8275 8310 8410
m-Cresol; 3-Methylphenol	108-39-4	Phenol, 3-methyl-	8041 8270
o-Cresol; 2-Methylphenol	95-48-7	Phenol, 2-methyl-	8041 8270 8410
p-Cresol; 4-Methylphenol	106-44-5	Phenol, 4-methyl-	8041 8270 8410
Diallate	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S- (2,3-dichloro-2-propenyl) ester	8081 8085 8270
Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene	8100 8270 8275 8310
Dibenzofuran	132-64-9	Dibenzofuran	8270 8275 8410
3,3'-Dichlorobenzidine	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	8270 8325
2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	8041 8270 8410
2,6-Dichlorophenol	87-65-0	Phenol, 2,6-dichloro-	8041 8270

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Diethyl phthalate	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	8061 8270 8410
Thionazin; Zinophos	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	8141 8270
Dimethoate	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester	8141 8270 8085 8321
p-(Dimethylamino)azobenzene; Dimethylaminoazobenzene;	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	8270
7,12-Dimethylbenz[a]anthracene	57-97-6	Benz[a]anthracene, 7,12-dimethyl-	8270
3,3'-Dimethylbenzidine	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	8270 8325
2,4-Dimethylphenol; m-Xylenol	105-67-9	Phenol, 2,4-dimethyl-	8041 8270
Dimethyl phthalate	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	8061 8270 8410
m-Dinitrobenzene; 1,3-DNB	99-65-0	Benzene, 1,3-dinitro-	8091 8095 8270 8330
4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	534-52-1	Phenol, 2-methyl-4,6-dinitro-	8270 8410
2,4-Dinitrophenol	51-28-5	Phenol, 2,4-dinitro-	8041 8270 8410
2,4-Dinitrotoluene; 2,4-DNT	121-14-2	Benzene, 1-methyl-2,4-dinitro-	8091 8095 8270 8330 8410
Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8061 8270 8410

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
2,6-Dinitrotoluene; 2,6-DNT	606-20-2	Benzene, 2-methyl-1,3-dinitro-	8091 8095 8270 8330 8410
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	8041 8085 8151 8270 8321
Di-n-octyl phthalate	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	8061 8270 8410
Diphenylamine	122-39-4	Benzenamine, N-phenyl-	8270
Disulfoton	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl]ester	8085 8141 8270 8321
Ethyl methanesulfonate	62-50-0	Methanesulfonic acid, ethyl ester	8270
Famphur	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl]-O,O-dimethyl ester	8141 8270 8321
Fluoranthene	206-44-0	Fluoranthene	8100 8270 8275 8310 8410
Fluorene	86-73-7	9H-Fluorene	8100 8270 8275 8310 8410
Hexachlorobenzene	118-74-1	Benzene, hexachloro-	8081 8085 8121 8270 8275 8410

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Hexachlorobutadiene; 1,3-Hexachlorobutadiene	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8021 8121 8260 8261 8270 8410
Hexachlorocyclopentadiene	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	8081 8085 8121 8270 8410
Hexachloroethane	67-72-1	Ethane, hexachloro-	8121 8260 8270 8410
Hexachloropropene	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	8141 8270
Indeno(1,2,3-cd)pyrene	193-39-5	Indeno[1,2,3-cd]pyrene	8100 8270 8275 8310
Isodrin	465-73-6	1,4,5,8-Dimethanonaphthalene,1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a hexahydro-(1α,4α,4aß,5ß,8ß,8aß)-	8081 8270
Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl-	8270 8410
Isosafrole	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	8270
Kepone	143-50-0	1,3,4-Metheno-2H-cyclobuta- [cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachloro-octahydro-	8270
Methapyrilene	91-80-5	1,2,Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	8270
3-Methylcholanthrene	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	8100 8270
Methyl methanesulfonate	66-27-3	Methanesulfonic acid, methyl ester	8270

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
2-Methylnaphthalene	91-57-6	Naphthalene, 2-methyl-	8261 8270 8410
Methyl parathion; Parathion methyl	298-00-0	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	8085 8141 8270 8321
1,4-Naphthoquinone	130-15-4	1,4-Naphthalenedione	8270 8091
1-Naphthylamine	134-32-7	1-Naphthalenamine	8270
2-Naphthylamine	91-59-8	2-Naphthalenamine	8270
o-Nitroaniline; 2-Nitroaniline	88-74-4	Benzenamine, 2-nitro-	8131 8270 8410
m-Nitroaniline; 3-Nitroaniline	99-09-2	Benzenamine, 3-nitro-	8131 8270 8410
p-Nitroaniline; 4-Nitroaniline	100-01-6	Benzenamine, 4-nitro-	8131 8270 8410
Nitrobenzene; NB	98-95-3	Benzene, nitro-	8091 8095 8260 8270 8330 8410
o-Nitrophenol; 2-Nitrophenol	88-75-5	Phenol, 2-nitro-	8041 8270 8410
p-Nitrophenol; 4-Nitrophenol	100-02-7	Phenol, 4-nitro-	8041 8085 8151 8270 8410
N-Nitrosodiethylamine	55-18-5	Ethanamine, N-ethyl-N-nitroso-	8261 8270
N-Nitrosodimethylamine	62-75-9	Methanamine, N-methyl-N-nitroso-	8070 8261 8270 8410

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
N-Nitroso-di-n-butylamine; N-Nitrosodibutylamine	924-16-3	1-Butanamine, N-butyl-N-nitroso-	8015 8260 8261 8270
N-Nitrosodiphenylamine	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8070 8270 8410
N-Nitrosodipropylamine; N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine	621-64-7	1-Propanamine, N-nitroso-N-propyl-	8070 8261 8270 8410
N-Nitrosomethylethylamine	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8261 8270
N-Nitrosopiperidine	100-75-4	Piperidine, 1-nitroso-	8270
N-Nitrosopyrrolidine	930-55-2	Pyrrolidine, 1-nitroso-	8270
5-Nitro-o-toluidine	99-55-8	Benzenamine, 2-methyl-5-nitro-	8270
Pentachlorophenol	87-86-5	Phenol, pentachloro-	8041 8085 8151 8270 8410
Phenanthrene	85-01-8	Phenanthrene	8100 8270 8275 8310 8410
Phenol	108-95-2	Phenol	8041 8270 8410
p-Phenylenediamine	106-50-3	1,4-Benzenediamine	8270
Pentachlorobenzene	608-93-5	Benzene, pentachloro-	8121 8270
Pentachloronitrobenzene; PCNB	82-68-8	Benzene, pentachloronitro-	8081 8091 8270
Phenacetin	62-44-2	Acetamide, N-(4-ethoxyphenyl)	8270

Appendix B – Constituents for Assessment Monitoring[1]			
Semi-Volatiles (108)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Phorate	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	8085 8141 8270 8321
Pronamide; Kerb	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	8085 8270
Pyrene	129-00-0	Pyrene	8100 8270 8275 8310 8410
Safrole	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-	8270
1,2,4,5-Tetrachloro-benzene	95-94-3	Benzene, 1,2,4,5-tetrachloro-	8121 8270
2,3,4,6-Tetrachlorophenol	58-90-2	Phenol, 2,3,4,6-tetrachloro-	8041 8085 8270
o-Toluidine	95-53-4	Benzenamine, 2-methyl-	8015 8260 8261 8270
2,4,5-Trichlorophenol	95-95-4	Phenol, 2,4,5-trichloro-	8041 8085 8270 8410
2,4,6-Trichlorophenol	88-06-2	Phenol, 2,4,6-trichloro-	8041 8085 8270 8410
O,O,O-Triethyl phosphorothioate	126-68-1	Phosphorothioic acid, O,O,O-triethyl ester	8270
sym-Trinitrobenzene; 1,3,5-TNB	99-35-4	Benzene, 1,3,5-trinitro-	8095 8270 8330

Appendix B – Constituents for Assessment Monitoring[1]			
Pesticides			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Aldrin	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1α,4α,4aß,5α, 8α,8aß)-	8081 8085 8270
alpha-BHC; α-BHC; α-Hexachlorocyclohexane	319-84-6	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α, 2α,3ß,4α,5ß,6ß)-	8081 8085 8121 8270
beta-BHC; ß-BHC; ß-Hexachlorocyclohexane	319-85-7	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α,2ß,3α,4ß,5α,6ß)-	8081 8085 8121 8270
delta-BHC; δ-BHC; δ -Hexachlorocyclohexane	319-86-8	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α, 2α,3α,4ß,5α,6ß)-	8081 8085 8121 8270
gamma-BHC; γ-BHC; γ -Hexachlorocyclohexane; Lindane	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α,2α,3ß,4α,5α,6ß)-	8081 8085 8121 8270
Chlordane	See Note 8	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	8081 8085 8270
4,4'-DDD	72-54-8	Benzene 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	8081 8085 8270
4,4'-DDE	72-55-9	Benzene, 1,1'-(dichloroethenylidene)bis[4-chloro-	8081 8085 8270
4,4'-DDT	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	8081 8085 8270
Dieldrin	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexa,chloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aα,2ß,2aα,3ß,6ß,6aα,7ß,7aα)-	8081 8085 8270

Appendix B – Constituents for Assessment Monitoring[1]			
Pesticides			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Endosulfan I	959-98-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aß,6α,9α,9aß)-	8080 8250
Endosulfan II	33213-65-9	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aα,6ß,9ß,9aα)-	8081 8085 8270
Endosulfan sulfate	1031-07-8	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3,3-dioxide	8081 8085 8270
Endrin	72-20-8	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aα, 2ß,2aß,3α,6α, 6aß,7ß,7aα)-	8081 8085 8270
Endrin aldehyde	7421-93-4	1,2,4-Methenocyclopenta[cd]pentalene-5-carboxaldehyde, 2,2a,3,3,4,7-hexachlorodecahydro-, (1α,2ß,2aß,4ß,4aß,5ß,6ß,,6bß,7R*)-	8081 8085 8270
Heptachlor	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	8081 8085 8270
Heptachlor epoxide	1024-57-3	2,5-Methano-2H-indeno[1,2-b]oxirene, 2,3,4,5,6,7,7-heptachloro-1a,1b,5,5a,6,6a,-hexahydro-, (1aα,1bß,2α,5α,5aß,6ß,6aα)	8081 8085 8270
Methoxychlor	72-43-5	Benzene, 1,1'-(2,2,2,trichloroethylidene)bis[4-methoxy-	8081 8085 8270

Appendix B – Constituents for Assessment Monitoring[1]			
Pesticides			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Parathion; Ethyl Parathion	56-38-2	Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester	8085 8141 8270
Toxaphene	See Note 9	Toxaphene	8081 8270 8272 8276

Appendix B – Constituents for Assessment Monitoring[1]			
Herbicides (3)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
2,4-D; 2,4-Dichlorophenoxy-acetic acid	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-	8085 8151 8321
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	8151
Silvex; 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	8085 8151 8321

Appendix B – Constituents for Assessment Monitoring[1]			
PCBs (7)			
Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]
Polychlorinated biphenyls; PCBs; Aroclors	See Note 10	1,1'-Biphenyl, chloro derivatives	8082 8270

1. The regulatory requirements pertain only to the list of substances; the right hand column (Suggested Methods) is given for informational purposes only. See also footnotes 5.

2. Common names are those widely used in government regulations, scientific publications, and commerce; synonyms exist for many chemicals.

3. Chemical Abstracts Service registry number. Where "Total" is entered, all species in the groundwater that contain this element are included.

4. CAS index names are those used in the 9th Collective Index.

5. Suggested Methods refer to analytical procedure numbers used in EPA Report SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), and V (2015)." Analytical details can be found in SW-846. CAUTION: The methods listed are representative SW-846 procedures and may not always be the most suitable method(s) for monitoring an analyte under the regulations.

6. Xylene (total): This entry includes o-xylene (CAS RN 96-47-6), m-xylene (CAS RN 108-38-3), p-xylene (CAS RN. 106-42-3), and unspecified xylenes (dimethylbenzenes) (CAS RN 1330-20-7).

7. This substance is often called Bis(2-chlorolsopropyl) ether, the name Chemical Abstracts Service applies to its noncommercial isomer, Propane, 2,2"-oxybis[2-chloro- (CAS RN 39638-32-9)

8. Chlordane: This entry includes alpha-chlordane (CAS RN 5103-71-9), beta-chlordane (CAS RN 5103-74-2), gamma-chlordane (CAS RN 5566-34-7), and constituents of chlordane (CAS RN 57-74-9 and CAS RN 12789-03-6).

9. Toxaphene: This entry includes congener chemicals contained in technical toxaphene (CAS RN 8001-35-2), i.e., chlorinated camphene.

10. Polychlorinated biphenyls (CAS RN 1336-36-3); this category contains congener chemicals, including constituents of Aroclor 1016 (CAS RN 12674-11-2), Aroclor 1221 (CAS RN 11104-28-2), Aroclor 1232 (CAS RN 11141-16-5), Aroclor 1242 (CAS RN 53469-21-9), Aroclor 1248 (CAS RN 12672-29-6), Aroclor 1254 (CAS RN 11097-69-1), and Aroclor 1260 (CAS RN 11096-82-5).