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SOLID WASTE
RULES AND REGULATIONS

Chapter 2
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CHAPTER 2

MUNICIPAL SOLID WASTE LANDFILL REGULATIONS

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Section 1. In General.

(a) Authority: The authority for the rules and regulations promulgated in this chapter is the Wyoming Environmental Quality Act, W.S. 35-11-101 et seq.

Section 2. Municipal Solid Waste Landfill (MSWLF) Permit Application Requirements.

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

(i) Existing facilities:

(A) Existing facilities that have received wastes after September 13, 1989:

(I) Existing facilities with closure permits issued before July 1, 2012, shall continue closure and post-closure under their existing permits.

(II) Existing facilities that intend to cease disposal of all waste before July 1, 2017, need not submit a renewal application, but shall submit a closure permit application no later than twelve (12) months prior to the expiration date of the facility's existing permit or the date the facility is anticipated to cease disposal of waste, whichever comes first, unless an alternate schedule is approved by the Administrator for good cause.

(III) Existing facilities that do not have a lifetime permit and intend to continue disposal of waste after July 1, 2017, shall submit a permit renewal application twelve (12) months prior to the expiration of their current permit, unless an alternate schedule is approved by the Administrator for good cause.

(B) Existing facilities that have not received wastes after September 13, 1989:

(I) The operator may be required to submit a closure permit application upon request by the Administrator.

(II) The Administrator may request such an application whenever the Administrator has reason to believe that health and safety hazards are present, there has been evidence of environmental contamination, or the facility does not comply with the location, monitoring, closure or post-closure standards.

(ii) New facilities:

(A) The operator of any new facility shall submit an operating permit application in accord with the requirements set forth in these rules.

(iii) Closing facilities:

(A) Anticipated closure: For facilities where disposal of all waste is anticipated to cease before July 1, 2017, the operator shall submit a closure permit application no later than twelve (12) months prior to the expiration date of the facility's existing permit or the date the facility is anticipated to cease disposal of waste, whichever comes first, unless an alternate schedule is approved by the Administrator for good cause. For facilities where disposal is anticipated to continue after July 1, 2017, the operator shall submit a closure permit application no later than twelve (12) months prior to the date the facility is anticipated to cease disposal of waste, unless an alternate schedule is approved by the Administrator for good cause.

(B) Unanticipated closure: In the event any solid waste management facility ceases operation, as determined by nonreceipt of solid wastes for any continuous nine (9) month period, the facility operator shall provide written notification to the Administrator no later than thirty (30) days after the end of such nine (9) month period. This notification shall be accompanied by a closure permit application unless the Administrator approves interim measures with delayed final closure for good cause upon application by the operator.

(b) Permit application requirements:

(i) The permit application shall contain a completed application form, and a written report containing the applicable information in sections 3 through 18 of this chapter. Records and supporting documents such as well logs, maps, cross-sections, and monitoring reports should generally be included in the written report as appendices. Documents previously submitted and approved by the Department may be included by reference.

(ii) All permit application forms shall be signed by the operator, the landowner and any real property lien holder of public record. All applications shall be signed by the operator under oath subject to penalty of perjury. All persons signing the application shall be duly authorized agents. The following persons are considered duly authorized agents:

(A) For a municipality, state, federal or other public agency, by the head of the agency or ranking elected official. A copy of a valid lease agreement from a federal agency shall satisfy this requirement;

(B) For corporations, at least one principal officer;

(C) For a sole proprietorship or partnership, a proprietor or general partner, respectively.

(iii) All permit applications shall be prepared under the supervision of a professional engineer registered in the State of Wyoming. All permit application forms shall be stamped, signed and dated by a professional engineer. In addition, all portions of the permit application which require geological services or work shall be stamped, signed and dated by a professional geologist.

(c) Renewal application requirements: Renewal applications shall be submitted as required in Chapter 1 and shall include a compilation of previous permit application materials and supplemental information updated and revised as necessary to document facility operations and activities carried out during the last permit term. Renewal applications shall include a copy of the approved permit or renewal permit application or revisions to the

previous application if the revised and updated pages and drawings are appropriately numbered and dated to facilitate incorporation into the previous permit document.

(i) Renewal applications shall contain:

(A) Any necessary plan revisions for the upcoming permit renewal period and any requests for approval of amendments;

(B) Detailed construction and operation specifications for the upcoming permit period, if such specifications were not included in an approved facility permit application;

(d) Permit terms:

(i) Effective July 1, 2012, new MSWLF operating permits and renewal permits for existing MSWLFs shall be lifetime permits.

(ii) Closure permits shall be for a period which includes the time required to complete closure activities and the post-closure term specified in Section 12 of this chapter. The closure permit period 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.

(e) Permit amendments constituting a major change:

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

(ii) The operator shall submit three (3) complete paper copies and one (1) complete electronic copy of the proposed amendment 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. Permit amendments may be proposed in conjunction with annual reports, but must be separately designated as amendments. Minor permit amendments proposed in conjunction with annual reports will be processed in accordance with Chapter 1, Section 3 of these rules. 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/or drawings which are fully formatted and numbered for insertion into the permit application.

(iii) The Administrator shall conduct a completeness review and notify the applicant within sixty (60) days of receipt of the application whether or not it is complete. If the Administrator deems the application incomplete, he or she shall so advise and state in writing to the applicant the information required. All items not specified as incomplete at the end of the first sixty (60) day period shall be deemed complete for the purposes of this subsection.

(A) If the applicant resubmits an application or further information, the Administrator shall review the application or additional information within sixty (60) days of each submission and advise the applicant in writing if the application is complete.

(B) After the application is determined complete, the applicant shall give written notice of the application as required in Chapter 1, Section 2(b)(i)

(iv) The Administrator shall review the application and unless the applicant requests a delay, advise the applicant in writing within ninety (90) days from the date of determining that the application is complete, that a proposed permit amendment is suitable for publication under Chapter 1, Section 2(b)(ii), or that the application is deficient, or that the application is denied. All reasons for deficiency or denial shall be stated in writing to the applicant. All items not specified as being deficient at the end of the first ninety (90) day period shall be deemed sufficient for the purposes of this subsection.

(A) If the applicant submits additional information in response to any deficiency notice, the Administrator shall review such additional information within thirty (30) days of submission and advise the applicant in writing if a proposed permit amendment is suitable for publication, or that the application is still deficient, or that the application is denied.

(B) If the application is determined to be complete and demonstrates compliance with the applicable standards, the Administrator shall prepare a proposed permit amendment. The applicant shall provide public notice as specified in Chapter 1, Section 2(b)(ii).

(C) If no hearing is requested, the Director shall render a decision on the proposed permit amendment within thirty (30) days after completion of the notice period. If substantial written objections are received by the Director by 5:00 pm on the last day of the public comment period, a public hearing will be held within twenty (20) days after the last day of the public comment period, unless a different schedule is deemed necessary by the council. The council or Director shall publish notice of the time, date, and location of the hearing in a newspaper of general circulation in the county where the applicant plans to locate the facility or where the facility is located, once a week for two (2) consecutive weeks immediately prior to the hearing. The hearing shall be conducted as a contested case in accordance with the Wyoming Administrative Procedures Act, and right of judicial review shall be afforded as provided in that Act. The Director shall issue or deny the permit amendment no later than fifteen (15) days from receipt of any findings of fact and decision of the environmental quality council.

(D) In granting permit amendments, the Director may impose such conditions as may be necessary to accomplish the purpose of the act and which are not inconsistent with the existing rules, regulations, and standards.

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, at a minimum, a summary, listing of any administrative order, civil or administrative penalty assessment, bond forfeiture, civil, misdemeanor, or felony conviction, or court proceeding for any violations of any local, state or federal law occurring within a minimum of five (5) years of application submittal relating to environmental quality or criminal racketeering, of the solid waste manager, the applicant, or if the applicant is a partnership or corporation, any partners in the partnership or executive officers or corporate directors in the corporation;

(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 site. The complete legal description shall consist of a plat and legal description, monumented and signed by a Wyoming licensed land surveyor;

(d) Facility narrative: A brief narrative describing the disposal facility. The narrative should include an estimate of the size of the facility, the type of waste disposal activities that are planned (area fill, trench fill, special waste areas) and the type, amount, and source of incoming waste;

(e) Surface and mineral ownership: Information describing surface and mineral ownership of the site and surface ownership of all lands within one (1) mile of the facility boundary;

(f) Site suitability: Any information known to the applicant that would limit the site's suitability as a sanitary landfill.

(g) Service area: The service area (source of wastes) and the type and quantity of waste (on a daily, weekly or monthly basis) that will be disposed at the facility;

(h) Capacity: Estimated site capacity in tons or cubic yards of waste and site life, including the calculations on which these estimates are based;

(i) 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;

(j) Intermediate reclamation: For renewal applications provide a summary description of intermediate reclamation activities conducted over the past permit term and anticipated during the next permit term.

(k) Access agreement: The application shall include the following access agreement:

(i) The owner of the facility authorizes Department representatives, upon the presentation of credentials and other documents as may be required by law, to access and enter upon the operator’s premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of a permit, authorization or exemption; have access to and copy, at reasonable times, any records that must be kept under the conditions of any permit, authorization or exemption; inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under the Act; and collect resource data, sample or monitor at reasonable times, for the purposes of ensuring compliance or as otherwise authorized by the appropriate rules and regulations of the Department, any substances or parameters at any location.

Section 4. Location Standards. All facilities shall meet the following standards:

(a) New facilities: New municipal solid waste landfills shall not be located in violation of W.S. 35-11-502(c) and the standards described in this section.

(i) Local zoning ordinances: Facility locations shall not be in 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 USC 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 USC 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 USC 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: Facilities shall not be located within critical winter ranges for big game unless after considering information from the Wyoming Game and Fish Department, the Administrator determines that facility development would not conflict with the conservation of Wyoming's wildlife resources.

(b) New units, existing units, and lateral expansions: New units, existing units and lateral expansions shall not be located in violation of the applicable standards below. Any supporting information needed to demonstrate compliance with these standards shall be provided in an appendix to the permit application.

(i) Airport safety.

(A) New MSWLF units, existing units, and lateral expansions located within 10,000 feet (3,048 meters) of any airport runway end used by turbojet

aircraft or within 5,000 feet (1,524 meters) of any airport runway end used by only piston-type aircraft must be designed and operated so that the MSWLF unit does not pose a bird hazard to aircraft.

(B) Owners or operators proposing to site new MSWLF units and lateral expansions within a five-mile radius of any airport runway end used by turbojet or piston-type aircraft shall notify the affected airport and the Federal Aviation Administration (FAA) and include documentation of the notification in the permit application.

(ii) Floodplains.

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

(iii) Wetlands.

(A) New MSWLF units and lateral expansions shall not be located in wetlands.

(iv) Fault areas.

(A) New MSWLF 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 owner or operator demonstrates that an alternative setback distance of less than 200 feet (60 meters) will prevent damage to the structural integrity of the MSWLF unit and will be protective of human health and the environment.

(v) Seismic impact zones: New MSWLF 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;

(vi) Unstable areas: New MSWLF 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) Access roads: The roads leading to MSWLFs shall not be subject to the location standards described in this section.

Section 5. Regional Geology. The application shall include a summary description of any available regional geologic or hydrologic information, including copies of all available well logs for wells located within one (1) mile of the proposed site. Supporting documentation such as well logs, cross-sections, and maps shall be supplied as an appendix.

Section 6. Site Specific Geology. The application shall provide site specific data describing the underlying soils, geology and groundwater, including:

(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: 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;

(e) Supporting documentation: Supporting documentation such as well completion logs, geologic cross-sections, soil boring lithologic logs, potentiometric surface maps and soil or groundwater testing data shall be supplied as an appendix.

Section 7. Design and Construction Standards. All facilities shall meet the following standards:

(a) Surveyed corners: All site 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 (20) feet wide within the facility perimeter fence.

(d) Cover Material Availability: Facilities shall be designed and constructed to ensure that sufficient cover material is 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;

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

(f) Performance based design: New units and lateral expansions shall comply with the requirements set out in W.S. 35-11-527. The administrator may approve replacement of the two (2) foot layer of compacted soil in a composite liner with an alternate component that performs at least as well as a two (2) foot layer of compacted soil, such as a geosynthetic clay liner (GCL).

(g) Design/construction of engineered containment system caps and liners:

(i) Compacted soil barrier layers shall be constructed in lifts which do not exceed six (6) inches in thickness, and uniform compaction of these lifts shall be assured through the use of appropriate equipment.

(ii) All engineered containment system components shall be supported by material of sufficient bearing strength to prevent subsidence and failure of any component. This bearing strength shall be documented through materials testing as approved by the Administrator.

(iii) Synthetic membranes used as part of any containment system shall be of a material and thickness which is suitable for the intended use, but in no case shall be less than 0.030 inches thick (30 mils) or 60 mils thick if the membrane consists of high density polyethylene (HDPE). All synthetic membranes shall be underlain by a suitable bedding material and when used with a compacted soil component, in direct and uniform contact with the compacted soil component.

(iv) Lateral drainage layers included in composite cap and liner system designs shall be composed of either granular material or a synthetic drain net of suitable lateral permeability to promote acceptable drainage, as approved by the Administrator. Lateral drainage layers shall be protected from soil clogging by either a synthetic filter fabric or a graded granular layer of a design approved by the Administrator.

(v) If required by the Administrator, leak detection systems shall be designed to efficiently identify failure of the overlying barrier layer

(h) Quality assurance/quality control (QA/QC):

(i) QA/QC plans shall ensure adequate construction and testing of the containment system components, including applicable observations, inspections, tests, and measurements. Applicable standards from the American Society for Testing and Materials (ASTM) and Geosynthetic Research Institute (GRI) shall be used. As applicable, the QA/QC Plans shall address:

(A) Foundations,
(B) Compacted soil layers,
(C) Flexible membrane liners,
(D) Leachate collection and removal systems including the operations/protective layer,
(E) Gas management systems,
(F) Final cover systems, and
(G) Other components as required by the Administrator.

(ii) For compacted soil layers describe how moisture content will be maintained or adjusted, the technique by which lift thickness will be maintained, the manner in which lifts will be compacted, the method used to measure moisture content and density in the field during construction, and the frequency of moisture content and density testing.

(iii) For synthetic membranes describe the method used to test 100% of all seams for leaks, the frequency of destructive testing for seam strength, the procedure to be followed for post-installation defect identification and repair, the results of testing or literature review which demonstrates the compatibility of the membrane material with the waste and/or waste leachate, and the procedures used to ensure each roll of membrane material meets the manufacturer's specifications for material properties.

(iv) For lateral drainage layers describe the method used to ensure achievement of the approved grain size uniformity and layer thickness for granular layers, the method by which drainage layers shall be installed without damaging any imbedded leachate collection system, leak detection system or membrane, and the installation procedure for the filter fabric or granular filter layer overlying the drainage layer.

(v) Identify key personnel, their qualifications, and their role in the development and implementation of the QA/QC Plan.

(vi) After construction is complete the owner or operator shall submit a certification, signed by an engineer licensed to practice in Wyoming, that the approved QA/QC plan has been carried out and that the unit meets the requirements of this section. Documentation supporting the engineer’s certification shall be submitted with the certification. Wastes shall not be accepted in the newly constructed unit without written authorization from the Administrator. Copies of the engineer’s certification and supporting documentation shall be maintained in the operating record.

(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 landfill facility will be designed to prevent the accumulation of methane such that the concentration of methane gas in facility structures does not exceed twenty-five percent (25%) of the lower explosive limit (LEL) for methane.

(k) Landfill gas management systems: If required, the permit application shall include landfill gas management system design and construction information.

Section 8. Operating Standards. All facilities shall meet the following 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 (3) months of such termination. For any facility which is constructed, operated and monitored in compliance, the solid waste manager's qualifications shall be presumed to be adequate. For any

facility which is not being constructed, operated, or monitored in compliance, the solid waste manager may be required to complete additional training and/or demonstrate his or her qualifications by written or oral examination. 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) Attend the classroom or field training program described in the approved permit application, which shall include training for the identification of PCB wastes and hazardous wastes regulated under Subtitle C of the Federal Resource Conservation and Recovery Act and the state hazardous wastes rules and regulations.

(iii) Attend any training course sponsored by the Administrator, which the Administrator requires 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 ninety (90) days notice prior to the scheduled training course.

(iv) Comply with the requirements of this subsection:

(A) No later than six (6) months following assumption of responsibility for operating a facility, for a new solid waste manager; or

(B) No later than six (6) months following the date the facility is permitted under this chapter, for an existing solid waste manager.

(b) Copy of plan: A copy of the operating plan shall be available at the facility when landfill personnel are on-site.

(c) Access Restrictions:

(i) Public access shall be controlled and unauthorized vehicular traffic and illegal dumping of wastes shall be prevented by using artificial barriers, natural barriers, or both, as appropriate to protect human

health and the environment.

(ii) The working area of all facilities shall be fenced in such a manner as to discourage people and livestock from entering the facility and to contain litter within the facility. Additional fencing may be required to restrict access to reclaimed areas or other areas that may present public health and safety hazards.

(iii) All access roads shall be equipped with a gate which shall be locked when the facility is unattended.

(d) Liquid wastes: Bulk or noncontainerized liquid wastes may not be placed in a MSWLF disposal unit unless:

(i) The waste is household waste other than septic waste;

(ii) The waste is leachate or gas condensate derived from the landfill unit and the unit is designed and constructed with a composite liner and leachate collection system.

(e) Hazardous wastes:

(i) No MSWLF may accept hazardous wastes regulated under 40CFR, Part 261, except, hazardous waste excluded under 40CFR, Part 261 may be accepted 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) Dead animals: Dead animals shall be covered by the end of each operating day whenever carcasses are disposed. Dead animals may be disposed with municipal solid waste or in a separate area.

(g) Posting: Signs shall be posted at each point of access to identify the landfill and listing the

information in this subsection. Signs shall be easily readable and shall be maintained in good condition.

(i) The facility name;

(ii) The position title and phone number of the responsible person to contact in the event of emergencies;

(iii) The hours of operation;

(iv) Wastes that are prohibited from disposal at the facility;

(v) A requirement to notify the landfill operator of any asbestos wastes.

(h) Traffic: Signs shall be posted to direct traffic to the proper waste management area.

(i) Salvaging: Salvaging, if permitted, 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 infrequent burning of clean wood, tree trimmings, brush, agricultural wastes, silvicultural wastes, land clearing debris, diseased trees, or debris from emergency cleanup operations; this exception is valid only when the operator has obtained a permit from the Air Quality Division.

(k) Fire protection and other emergency protection measures: Facilities shall maintain, at a minimum, an unobstructed ten (10) foot firelane around all active solid waste management units or within the perimeter fence. Landfill personnel shall have access to portable fire extinguishers when on-site. Depending on the facility location, personnel may be required to have a communication system (radio, telephone, etc.) with which to alert the local fire department.

(l) Litter: Each facility shall maintain an effective routine litter collection program that shall take place both within the landfill perimeter, as well as off-site. Special operating practices may be required for use during high wind periods. Litter control structures shall control litter within the facility. The application

shall specify the frequency for litter collection for internal fences, perimeter roads, and off-site areas; and special operating procedures to be used during periods of high wind. The application shall note the average local wind speed and direction.

(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.

(o) 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 which will not be disturbed during facility operation. These stockpiles shall be identified by signs, and vegetated as required 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:

(i) All solid waste that has been received during the day shall be covered with an approved material at the end of each day that the facility is open for the receipt of wastes, except for:

(A) Brush, tree trimmings, and clean wood intended to be burned periodically;

(B) Scrap tires managed in compliance with the requirements of Chapter 8 of these rules;

(C) Inert construction/demolition debris, which is to be covered as described in the facility permit application and subject to any permit limitation;

(D) White goods, cars, or other metallic wastes being stored for shipment to a metal recycler, if

stored as described in the facility permit application;

(E) Petroleum contaminated soils being managed in compliance with the requirements of Chapter 8 of these rules;

(F) Friable asbestos wastes being managed in compliance with the requirements of Chapter 8 of these rules; and

(G) Any other solid wastes which the Administrator determines to be unlikely to cause, or to contribute to, disease vectors, fires, odors, blowing litter, and scavenging.

(ii) An approved cover material shall be:

(A) Any cover including no less than six (6) inches of compacted soil or any alternative material approved by the Administrator to adequately control disease vectors, fires, odors, blowing litter, and scavenging;

(B) For balefills, no less than six (6) inches of compacted soil, or any alternative material approved by the Administrator to adequately control disease vectors, fires, odors, blowing litter, and scavenging, applied to the top and sides of an active balefill disposal area; balefill operations shall not be required to cover the vertical working face of the balefill facility, unless required by the Administrator to control litter, fire, odor, disease vectors, or scavenging.

(iii) At any facility where an alternate daily routine cover material has been approved for use by the Administrator, the owner or operator shall adequately compact all wastes and apply no less than six (6) inches of compacted soil at least once every thirty (30) calendar days, as a fire control measure.

(r) Intermediate cover: For any area where wastes will not be disposed for a period of 180 days, that area shall be covered with the required six (6) inches of cover material and an additional twelve (12) inches of intermediate cover.

(s) 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/or alleviate ponding of water over filled areas. Surfaces shall be graded to promote lateral surface water run-off.

(t) Surface water discharges: Facilities shall be operated such that leachate, contaminated groundwater, and/or surface water run-off from the active portion of the facility is not allowed to enter any waters of the United States, either on-site or off-site, unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit issued pursuant to the Clean Water Act. Facilities shall not be operated to cause a violation of any requirement of the Clean Water Act, including Sections 402 pertaining to NPDES permits, and Sections 208 or 319 pertaining to area-wide or state-wide nonpoint source discharge water quality management plans.

(u) Groundwater contact: Wastes shall not be allowed to be placed in contact with groundwater.

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

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

Section 9. Monitoring Standards. All facilities shall meet the following 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) Except as provided in paragraph (b)(i)(A) of this section, landfill operators shall comply with the following groundwater monitoring requirements:

(A) Applicability:

(I) The Administrator may suspend the groundwater monitoring requirements of paragraph (B) of this section if the owner or operator demonstrates that there is no potential for migration of 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 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.

(II) Once established at a facility or unit, the groundwater monitoring program shall be conducted throughout the active life and post-closure care period.

(III) The Administrator may establish an alternate schedule for compliance with any deadline specified in paragraphs (b)(i)(B), (b)(i)(C), (b)(i)(D), (b)(i)(E), or (b)(i)(F) of this section.

(B) Groundwater monitoring systems:

(I) A groundwater system must be installed which consists of a sufficient number of wells to monitor water from the uppermost aquifer which may be affected by leakage from the facility or unit. The system must be capable of monitoring the quality of background groundwater and groundwater passing the relevant point of compliance pursuant to Section 7(f). Well locations must be approved by the Administrator, and downgradient wells shall be placed in locations within 150 meters (492 feet) of the 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 waste disposal units, if the system is determined to be capable of adequately detecting groundwater pollution. In approving a facility-wide groundwater monitor system, the Administrator shall consider:

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

(2.) Hydrologic setting;

(3.) Site history and design; and

(4.) Type of waste accepted at the individual 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), and on geologic information on the soils, 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 requirements:

(I) Each facility must have an approved groundwater sampling and analytical plan and maintain that plan as a part of the facility permit application. The plan must address:

(1.) Sample collection;

(2.) Sample preservation and shipment;

(3.) Analytical procedures;

(4.) Chain of custody control; and

(5.) Quality assurance and quality control.

(II) The groundwater sampling and analysis methods must be appropriate and accurate. Sample handling procedures shall be as required by the Administrator. Groundwater samples shall not be field filtered prior to laboratory analysis, although an

operator may choose to collect additional filtered samples. Water temperature, specific conductance, and pH shall also be measured in the field during each monitoring event.

(III) Groundwater elevations must be measured in each well prior to purging for sample collection, each time groundwater is sampled. The owner or operator must determine groundwater flow direction at each sampling event. The owner or operator must measure or calculate groundwater flow rate(s) as appropriate to establish an adequate groundwater monitoring system, or when requested to do so by the Administrator.

(IV) The owner or operator must establish background water quality in a hydraulically upgradient or other background well approved by the Administrator.

(V) Prior to conducting the statistical analysis of groundwater data, the owner or operator shall collect a sufficient number of samples to meet the requirements of the statistical analysis procedure selected.

(VI) The owner or operator must include in the permit application a description of the statistical method(s) to be used to evaluate groundwater quality data. The statistical test shall be conducted separately for each constituent in each well. The owner or operator may select any of the following statistical analysis procedures:

(1.) A parametric analysis of variance followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent;

(2.) An analysis of variance based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent;

(3.) A tolerance or prediction interval procedure in which an interval for each distribution of the background data, and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit;

(4.) A control chart approach that gives control limits for each constituent; or

(5.) Another statistical method approved by the Administrator.

(VII) Any statistical method chosen under paragraph (b)(i)(C)(VI) of this section shall comply with the following performance standards:

(1.) The method shall be appropriate for the distribution of chemical parameters or constituents. If the distribution is not normal, then the data should be transformed or a distribution-free theory test should be used. If the distributions for different constituents differ, more than one statistical method may be needed;

(2.) If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level no less than 0.01 for each testing period. If a multiple comparisons procedure is used, the Type I experiment-wise error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. This performance standard does not apply to tolerance intervals, prediction intervals, or control charts;

(3.) If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values must be approved by the Administrator;

(4.) If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that

the interval must contain, shall be approved by the Administrator;

(5.) Any data reported as below detection limits shall be entered into the statistical analysis as a value equal to one-half the practical quantitation limit (PQL) for the constituent unless the Administrator approves alternate statistical procedures. The PQL shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility. A statistical evaluation is not necessary when all concentrations for a constituent are reported below the PQL. Samples reported with estimated concentrations shall be treated as valid measurements for statistical purposes; and

(6.) If approved by the Administrator, the statistical method may include procedures to adjust data to account for seasonal and spatial variability, as well as temporal correlation.

(VIII) The owner or operator must determine whether or not there is a statistically significant increase over background values as follows:

(1.) The owner or operator must compare the groundwater quality of each parameter or constituent at each monitoring well using the approved statistical method; and

(2.) Within thirty (30) days after completing sampling and analysis, unless an alternate time frame is approved by the administrator, the owner or operator must determine whether there has been a statistically significant increase over background at each monitoring well.

(D) Detection monitoring:

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

(1.) Deletes a constituent because the owner or operator shows that it is not likely to be contained in or derived from the waste disposed at the facility or unit;

(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 wastes managed at the facility or unit;

b. The mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the facility or unit;

c. The detectability of indicator parameters, 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 waste boundary at the facility or unit and the downgradient monitor well(s); and

e. The classification of

the aquifer.

(II) A minimum of four (4) individual samples is required to be collected and analyzed from each well (background and downgradient) during the first year of sampling. At least one (1) sample must be collected and analyzed from each well during subsequent sampling events.

(III) If there is a statistically significant increase over background for one or more Appendix A constituents in any well at the relevant point of compliance established by the Administrator pursuant to Section 7(f), 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 (14) days and start assessment monitoring within ninety (90) days; or

(2.) Demonstrate to the Administrator in writing 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 owner or 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 owner or operator shall continue detection monitoring. If, after ninety (90) days, a successful demonstration is not made, the owner or operator must initiate an assessment monitoring program.

(E) Assessment monitoring for Appendix B constituents:

(I) Assessment monitoring is required whenever a statistically significant increase over background water quality has been detected for an Appendix A constituent.

(II) Within ninety (90) days of triggering an assessment monitoring requirement, and annually thereafter, the owner or operator must sample and

analyze all downgradient monitor wells for all Appendix B constituents. A minimum of one (1) sample from each downgradient well must be collected during each annual sampling event. If any Appendix B constituent is detected for the first time in any downgradient well, the owner or operator must promptly collect a minimum of four (4) 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 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 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 or unit and the downgradient monitor well(s);

(5.) Classification of the aquifer under Chapter 8 of the Water Quality Rules and Regulations; 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 owner or operator must:

(1.) Within fourteen (14) 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 (90) days, and on at least a semiannual basis thereafter, resample all wells, conduct analyses for all constituents required under detection monitoring of this section), and for all Appendix B constituents which have been detected under assessment monitoring , and record their concentrations in the operating record. At least one (1) sample must be collected from each 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 (30) days after completing sampling and analysis, unless an alternate time frame is approved by the administrator, the owner or operator must determine whether there has been a statistically significant increase over established groundwater protection standards at each monitoring well specified by the Administrator.

(VI) If the concentrations of all Appendix B constituents are at or below background values using the approved statistical procedures, for two (2) consecutive sampling events, the owner or operator must notify the Administrator in writing and may return to detection monitoring.

(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 owner or operator must continue assessment monitoring.

(VIII) If one (1) or more Appendix B constituents are detected at statistically significant levels above the groundwater protection standard in any

sampling event, the owner or operator must, within fourteen (14) days of this finding notify the Administrator of the constituents detected above the groundwater protection standard in a written report with supporting documentation, place a copy of the report in the operating record, and notify all appropriate, as determined by the administrator, local government officials in writing, and:

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

(2.) Install at least one (1) additional monitor well at the facility boundary downgradient of the release and sample the well in accord 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 the plume of contamination, if that plume has migrated off-site; and

(4.) Initiate an assessment of corrective measures within ninety (90) days; or

(5.) Demonstrate to the Administrator in writing that the contamination was caused by another source, resulted from an error in sampling, analysis or statistical evaluation, or from natural variation in groundwater quality. The owner or 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 owner or 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 owner or operator must comply with paragraph (b)(i)(E)(VII) of this section including initiating an assessment of corrective measures under Section 14 of this chapter.

(IX) The owner or 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, 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 levels, 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 meeting the requirements of Chapter 8 of the Water Quality Rules and Regulations.

(F) Assessment monitoring for Appendix C constituents:

(I) Whenever there is a statistically significant increase over background for an Appendix C constituent with an MCL or a class of use based limit in the Wyoming Water Quality Rules and Regulations, the owner or operator shall:

(1.) Notify the Administrator in a written report with supporting documentation and place a copy of the report in the operating record within fourteen (14) days of the finding of statistical significance.

(2.) Request that the Administrator classify groundwater according to Wyoming Water Quality Rules and Regulations and establish groundwater protection standards for applicable Appendix C constituents.

(II) After groundwater protection standards have been established, within thirty (30) days after completing sampling and analysis, unless an alternate time frame is approved by the administrator, the owner or operator shall determine if there has been a

statistically significant increase over a groundwater protection standard in each downgradient well specified by the Administrator using a statistical method approved by the Administrator.

(III) If one or more Appendix C constituents are detected at statistically significant levels above the groundwater protection standard, the owner or operator shall within fourteen (14) days notify the Administrator of the constituents detected above the groundwater protection standard in a written report with supporting documentation.

(1.) Unless the owner or operator demonstrates that the statistically significant increase was caused by another source, resulted from an error in sampling, analysis, or statistical evaluation, or from natural variation in groundwater quality, the Administrator may require the owner or operator to characterize the nature and extent of the release.

(2.) The owner or operator may be required to conduct an assessment of corrective measures and institute corrective actions approved by the Administrator.

(ii) Groundwater monitoring data shall be provided to the administrator as follows:

(A) Operators of all facilities shall submit paper copies of all groundwater monitoring data;

(B) Operators shall also 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 lower explosive limit (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 (7) days of detection, place a copy of the methane test data in the operating record, and a written description of the steps taken to protect human health; and

(C) Within sixty (60) days of detection, implement a remediation plan which 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)(i)(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 as approved by the Administrator.

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

(d) Air monitoring: Air monitoring, if required, shall be conducted in accord with Air Quality Division regulations.

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

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

Section 10. Recordkeeping Standards. All facilities shall meet the following standards:

(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 (3) 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 waste;

(iii) Records of waste sold or otherwise salvaged;

(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 which 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) If not contained in the permit application, any performance based design demonstration;

(xi) Dates when reclamation activities take place.

(xii) Copies of written correspondence with the Department.

Section 11. Reporting standards. All facilities shall meet the following standards:

(a) Annual reports for MSWLFs with lifetime permits: Annual reports for MSWLFS with lifetime permits shall be submitted and facility inspections conducted as specified in W.S. 35-11-523. Unless an alternative is approved by the Administrator, operators shall submit two (2) complete paper copies and one (1) complete electronic copy of the reports.

(b) Landfill gas reporting: Until facility closure is completed, the following information related to landfill gas emissions shall be reported annually in a format specified by the Administrator:

(i) The maximum design capacity of the landfill in megagrams (Mg) and cubic meters (m^3) of waste, including any modifications or expansions in the last year which have increased or decreased the maximum design capacity in megagrams (Mg) and cubic meters (m^3) of waste. If the design capacity is converted from mass to volume or volume to mass, the calculations must be provided. Information regarding the site-specific waste density and how it was estimated must also be provided.

(c) Reporting of environmental monitoring data: On an annual basis, operators of all facilities shall provide the administrator with copies of all required

environmental monitoring data not previously submitted. An analysis of environmental monitoring data shall also be submitted as follows:

(i) Operators of all facilities may be required to submit supporting charts and/or maps which represent the data.

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

Section 12. Closure and Post-Closure Standards. All facilities shall meet the following standards:

(a) Commencement of closure: Approved closure activities shall commence no later than thirty (30) days after the date on which each unit receives the known final receipt of wastes and shall be completed within one hundred eighty (180) days following commencement of closure. 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 closure activities, the operator shall notify the Administrator in writing and place a notice of closure in the operating record. Following closure of each unit and facility, the operator shall submit a certification with supporting documentation signed by an engineer licensed to practice in Wyoming that closure has been completed in accordance with the approved closure plan and place a copy of the certification in the facility operating record.

(i) Notice on deed: At facility closure, an instrument which 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. 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/operator, or its successors, shall ensure that post-closure use of the property will be 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 wastes are removed from the facility.

(c) Closure permit applications: Closure permit applications shall include the information in this section. A copy of the pertinent materials from the approved permit application or approved renewal permit application, revised and updated as necessary, may be used to fulfill these requirements.

(i) Permit application form: Each closure permit application shall contain a permit application form signed in the manner described in Sections 2(b)(ii) and 2(b)(iii) of this chapter.

(ii) General information:

(A) General site information specified in Sections 3(a) through 3(e) and Section 3(k) of this chapter.

(B) A detailed descriptive statement of the closure/post-closure stage of landfill development, including the following information:

(I) A description of the land use anticipated after closure;

(II) The wording of the deed notice;

(C) A narrative describing the site operating history including the dates of operation, the disposal methods used and the types and amounts of waste accepted.

(iii) Regional geology information: The

application shall include the information required by Section 5.

(iv) Site specific geology information: The application shall include the information required by Section 6.

(v) Design and construction information: The application shall demonstrate compliance with the standards in this section.

(A) Prevention of erosion or ponding problems: Facilities shall be engineered to inhibit future problems with erosion or ponding of surface water over filled areas. This may be done via 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 corrected.

(B) 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, consistent with the post-closure land use. Vegetation shall be a diverse mix selected to be compatible with the climatic conditions and require little maintenance.

(C) Final cover shall be designed and constructed to:

(I) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present or a permeability no greater than 1×10^{-5} cm/sec, whichever is less; and

(II) Minimize infiltration through the MSWLF by the use of an infiltration layer that contains a minimum of 18 inches of earthen material, and

(III) Minimize erosion of the final cover by the use of an erosion layer that contains a minimum of 6 inches of earthen material revegetated to sustain native plant growth or an erosion layer that provides equivalent protection from wind and water erosion as approved by the Administrator.

(IV) The Administrator may approve an alternative final cover system design that includes an infiltration layer that achieves an equivalent reduction in infiltration as the layer specified in (C)(I) and (C)(II) above. The Administrator may require monitoring of alternative final cover designs to demonstrate the performance of the designs.

(V) Compacted soil barrier layers forming a cap shall be overlain by a layer of soil which is of suitable thickness to protect the compacted soil barrier layer from frost penetration.

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

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

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

(G) The frequency of planned inspections to discover problems such as surface erosion and water ponding during the post-closure period.

(vi) Monitoring information: The application shall demonstrate compliance with Section 9 and describe the method by which any environmental monitoring systems and corrective action systems will be maintained, including the time period over which this will occur.

(vii) Recordkeeping information: The application shall demonstrate compliance with the applicable requirements of Section 10.

(viii) Reporting information: The application shall demonstrate compliance with the applicable

requirements of Section 11.

(ix) Financial assurance information: The application shall demonstrate compliance with Chapter 7.

(x) Corrective action information: The application shall demonstrate compliance with Section 14 if applicable.

(xi) Transfer, treatment and storage facility information: The application shall demonstrate compliance with applicable closure and post-closure standards of Chapter 6.

(xii) Special waste information: The application shall demonstrate compliance with applicable closure and post-closure standards of Chapter 8.

(xiii) Supporting documentation: The application shall include any supporting documentation listed in Section 18 of this chapter that is pertinent to the closure/post-closure phase, including but not limited to:

(A) A general facility plot plan at a scale approved by the Administrator illustrating past areas of waste deposition, estimated dates of fill and any other pertinent features;

(B) A map of the site area showing land ownership, land use and zoning within one (1) mile of the disposal site. The map or photograph shall be of sufficient scale to show all city boundaries, each occupied dwelling house, schools, hospitals, industrial buildings, water wells, water courses, roads and other applicable details and shall indicate the general topography;

(C) A final contour map showing proposed final contours prepared with a scale and contour intervals approved by the Administrator.

(d) Post-closure land use: Each facility shall be returned to the post-closure land use specified in the permit, unless an alternative use is approved by the Administrator.

(e) Post-closure period:

(i) The post-closure period for MSWLFs which continued to receive wastes on or after October 9, 1997 shall extend for a period of not less than thirty (30) years after certification of all facility 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 act.

(ii) The post-closure period for municipal solid waste landfills that ceased receipt of waste prior to October 9, 1997 shall extend for the period specified in rules in place May 28, 2013 and any closure permit issued for the facility.

(f) Post-closure period extension: Following the initial minimum post-closure period, 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.

(g) Petitions to terminate post-closure care: Petitions to terminate the post-closure period shall include certification from a Wyoming registered professional engineer that post-closure care has been completed in compliance with the post-closure plan and in a manner protective of human health and the environment.

Section 13. Financial Assurance Standards. All facilities shall meet the following standards:

Any operator of a MSWLF subject to the financial assurance requirements of Chapter 7 shall demonstrate compliance with the requirements of Chapter 7.

Section 14. Corrective Action Standards. All facilities shall meet the following standards:

(a) Assessment of corrective measures: All facilities required to start a corrective measures assessment shall initiate an assessment of corrective measures within ninety (90) 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 which 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 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 wastes;

(V) Time until full protection is achieved;

(VI) Potential for exposure to humans and the environment from remaining 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 owner or 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 which 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 and Regulations, plus a consideration of the following factors:

(I) Current and future uses;

(II) Proximity and withdrawal rate of users;

(III) Groundwater quantity and quality;

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

(B) The constituent(s) is present in groundwater that:

(I) Is not currently or reasonably expected to be a source of drinking water; and

(II) Is not hydraulically connected with waters to which the hazardous constituents are migrating or are likely to migrate in a concentration(s) that would exceed groundwater protection standards ; or

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

(D) Remediation results 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 owner or 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 owner or operator shall implement other methods or techniques which have been approved by the Administrator that could practicably achieve compliance with the requirements, unless there is no practicable alternative and the owner or 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 owner or 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 or for removal or decontamination of equipment, units, devices, or structures, 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.

(d) Remedy completion: Remedies shall be considered complete when:

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

(ii) Compliance with the groundwater protection standards shall be considered complete when concentrations of constituents have not exceeded the groundwater protection standard(s) for a period of three (3) consecutive years using the approved statistical procedures. The Administrator may approve an alternate length of time during which the owner or operator must demonstrate compliance with the standard(s), considering:

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

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

(C) Accuracy of the monitoring or modeling techniques, including any seasonal, meteorological, or

other environmental variables that may affect the accuracy; and

(D) Characteristics of the groundwater; and

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

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

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

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

(C) When, upon completion of the certification, the Administrator determines that the corrective action remedy has been completed, the owner or operator shall be released from the requirements of financial assurance for corrective action.

Section 15. Transfer, Treatment and Storage Facility Standards: The permit application shall demonstrate compliance with the requirements of Chapter 6.

Section 16. Special Waste Standards: The permit application shall demonstrate compliance with the requirements of Chapter 8.

Section 17. Commercial Solid Waste Facility Standards: The permit application shall demonstrate compliance with the requirements of Chapter 10 and W.S. 35-11-514.

Section 18. Supporting Documentation/Appendices: At a minimum, appendices shall include the information in this section.

(a) Maps and plans:

(i) An original USGS topographic map with a scale of 1:24,000 with the proposed facility location shown; an original USGS topographic map with a scale of 1:62,500 or other suitable topographic map may be submitted if a 1:24,000 map is unavailable.

(ii) A map or aerial photograph of the area shall be submitted showing land ownership, land use and zoning within one (1) mile of the permitted facility boundary. The map or photograph shall be of sufficient scale to show all city boundaries, each occupied dwelling house, schools, hospitals, industrial buildings, water wells, water courses, roads and other applicable details and shall indicate the general topography.

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

(A) Facility boundaries, including any buffer zones proposed between the solid waste boundary and the property boundary;

(B) Points of access;

(C) Location of soil borings, groundwater monitor wells, and methane monitor wells;

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

(E) Working area/perimeter fire lane;

(F) Locations of any facility buildings to house equipment or for other uses;

(G) Working area/perimeter fence location;

(iv) Additional facility plot plans at a scale approved by the Administrator, shall be submitted as necessary to show orderly development and use of the facility through the life of the site. These plot plans shall contain the following information:

(A) Excavation plans for development of trenches or preparation of area fill locations.

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

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

(D) Daily cover stockpile locations;

(E) Topsoil storage pile locations;

(F) Litter screen placement information;

(G) Location of special waste management or disposal areas;

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

(v) Detailed design plans, including but not limited to plans for liners, leachate collection and management systems, caps and associated QA/QC plans shall be submitted as part of the lifetime permit or renewal as applicable. Additional or modified detailed design plans for engineered containment systems shall be submitted as a minor change unless a design change is proposed that constitutes a major change.

(vi) A map showing proposed final contours prepared with a scale and contour intervals approved by the Administrator, shall be submitted.

(vii) Cross sections and/or drawing details shall be submitted with sufficient specifications to describe:

(A) Internal litter catch screens or fences;

(B) Working area/perimeter fencing;

(C) Access roads;

(D) Trench or area fill method;

(E) Special waste areas, where appropriate;

(F) Systems used for monitoring, collection, treatment and disposal of leachate, if required;

(G) Groundwater monitoring well design;

(H) Methane gas venting and monitoring system;

(I) Surface and subsurface drain systems to control run-on and run-off and/or inflow;

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

(K) Construction quality assurance/quality control (QA/QC) plans for engineered containment systems.

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

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

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Appendix A - Constituents for Detection Monitoring[1]

Common name[2]	CAS RN[3]	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
Inorganics (15)				
Antimony	(Total)	Antimony	6010 7040 7041	300 2000 30
Arsenic	(Total)	Arsenic	6010 7060 7061	500 10 20
Barium	(Total)	Barium	6010 7080	20 1000
Beryllium	(Total)	Beryllium	6010 7090 7091	3 50 2
Cadmium	(Total)	Cadmium	6010 7130 7131	40 50 1
Chromium	(Total)	Chromium	6010 7190 7191	70 500 10
Cobalt	(Total)	Cobalt	6010 7200 7201	70 500 10
Copper	(Total)	Copper	6010 7210 7211	60 200 10
Lead	(Total)	Lead	6010 7420 7421	400 1000 10
Nickel	(Total)	Nickel	6010 7520	150 400
Selenium	(Total)	Selenium	6010 7740 7741	750 20 20
Silver	(Total)	Silver	6010 7760	70 100
Thallium	(Total)	Thallium	6010 7840 7841	400 1000 10
Vanadium	(Total)	Vanadium	6010 7910 7911	80 2000 40
Zinc	(Total)	Zinc	6010 7950 7951	20 50 0.5
Volatiles (47)				

Acetone	67-64-1	2-Propanone	8260	100
Acrylonitrile	107-13-1	2-Propenenitrile	8030 8260	5 200
Benzene	71-43-2	Benzene	8020 8021 8260	2 0.1 5
Bromochloromethane; Chlorobromomethane	74-97-5	Methane, bromochloro-	8021 8260	0.1 5
Bromodichloromethane; Dibromochloromethane	75-27-4	Methane, bromodichloro-	8010 8021 8260	1 0.2 5
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8010 8021 8260	2 15 5
Carbon disulfide	75-15-0	Carbon disulfide	8260	100
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8010 8021 8260	1 0.1 10
Chlorobenzene	108-90-7	Benzene, chloro-	8010 8020 8021 8260	2 2 0.1 5
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8010 8021 8060	5 1 10
Chloroform; Trichloromethane	67-66-3	Methane, trichloro-	8010 8021 8260	0.5 0.2 5
Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8010 8021 8260	1 0.3 5
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8011 8021 8260	0.1 30 25
1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4	Ethane, 1,2-dibromo-	8011 8021	0.1 10
o-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8010 8020 8021 8120 8260 8270	2 5 0.5 10 5 10
p-Dichlorobenzene; 1,4 Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8010	2
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	8260	100
1,1-Dichloroethane; Ethylidene chloride	75-34-3	Ethane, 1,1-dichloro-	8010 8021 8260	1 0.5 5
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,1-dichloro-	8010 8021 8260	0.5 0.3 5
1,1-Dichloroethylene; 1,1- Dichlorothene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8010 8021 8260	1 0.5 5
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2	Ethene, 1,2-dichloro-, (Z)-	8021 8260	0.2 5
trans-1,2-Dichloroethylene trans-1,2-Dichloroethene	156-60-5	Ethene, 1,2-dichloro-, (E)-	8010 8021 8260	1 0.5 5
1,2-Dichloropropane; Propylene dichloride	78-87-5	Propane, 1,2-dichloro-	8010 8021 8260	0.5 0.05 5
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8010 8260	20 10
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8010	5

			8260	5
Ethylbenzene	100-41-4	Benzene, ethyl-	8020 8221 8260	2 0.05 5
2-Hexanone; Methyl butyl ketone	591-78-6	2-Hexanone	8260	50
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010 8021	20 10
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8010 8021	1 0.3
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8010 8021 8260	15 20 10
Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8010 8021 8260	5 0.2 10
Methyl ethyl ketone; MEK; 2-Butanone	78-93-3	2-Butanone	8015 8260	10 100
Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8010 8260	40 10
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl-	8015 8260	5 100
Styrene	100-42-5	Benzene, ethenyl-	8020 8021 8260	1 0.1 10
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8010 8021 8260	5 0.05 5
1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8010 8021 8260	0.5 0.1 5
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4	Ethene, tetrachloro-	8010 8021 8260	0.5 0.5 5
Toluene	108-88-3	Benzene, methyl-	8020 8021 8260	2 0.1 5
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8010 8021 8260	0.3 0.3 5
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8010 8260	0.2 5
Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro-	8010 8021 8260	1 0.2 5
Trichlorofluoromethane; CFC-11	75-69-4	Methane, trichlorofluoro-	8010 8021 8260	10 0.3 5
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8010 8021 8260	10 5 15
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8260	50
Vinyl chloride; Chloroethene	75-01-4	Ethene, chloro-	8010 8021 8260	2 0.4 10
Xylene (total)	See Note 11	Benzene, dimethyl-	8020 8021 8260	5 0.2 5

[1]The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.

[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", third edition, November 1986, as revised, December 1987. Analytical details can be found in SW-846 and in documentation on file at the Department. 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]Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwaters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 mL samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

Appendix B - Constituents for Assessment Monitoring[1]

Common name[2]	CAS RN[3] 10061-02-6	Chemical abstracts service index name[4]	Suggested methods[5]	PQL (μg/L)[6]
Inorganics (19)				
Antimony	(Total)	Antimony	6010 7040 7041	300 2000 30
Arsenic	(Total)	Arsenic	6010 7060 7061	500 10 20
Barium	(Total)	Barium	6010 7080	20 1000
Beryllium	(Total)	Beryllium	6010 7090 7091	3 50 2
Cadmium	(Total)	Cadmium	6010 7130 7131	40 50 1
Chromium	(Total)	Chromium	6010 7190 7191	70 500 10
Cobalt	(Total)	Cobalt	6010 7200 7201	70 500 10
Copper	(Total)	Copper	6010 7210 7211	60 200 10
Cyanide	57-12-5	Cyanide	9010	200
Lead	(Total)	Lead	6010 7420 7421	400 1000 10
Mercury	(Total)	Mercury	7470	2
Nickel	(Total)	Nickel	6010 7520	150 400
Selenium	(Total)	Selenium	6010 7740 7741	750 20 20
Silver	(Total)	Silver	6010 7760	70 100
Sulfide	18496-25-8	Sulfide	9030	4000

Thallium	(Total)	Thallium	6010 7840 7841	400 1000 10
Tin	(Total)	Tin	6010	40
Vanadium	(Total)	Vanadium	6010 7910 7911	80 2000 40
Zinc	(Total)	Zinc	6010 7950 7951	20 50 0.5

Volatiles (64)

Acetone	67-64-1	2-Propanone	8260	100
Acetonitrile; Methyl cyanide	75-05-8	Acetonitrile	8015	100
Acrolein	107-02-8	2-Propenal	8030 8260	5 100
Acrylonitrile	107-13-1	2-Propenenitrile	8030 8260	5 200
Allyl chloride	107-05-1	1-Propene, 3-chloro-	8010 8260	5 10
Benzene	71-43-2	Benzene	8020 8021 8260	2 0.1 5
Bromochloromethane; Chlorobromomethane	74-97-5	Methane, bromochloro-	8021 8260	0.1 5
Bromodichloromethane; Dibromochloromethane	75-27-4	Methane, bromodichloro-	8010 8021 8260	1 0.2 5
Bromoform; Tribromomethane	75-25-2	Methane, tribromo-	8010 8021 8260	2 15 5
Carbon disulfide	75-15-0	Carbon disulfide	8260	100
Carbon tetrachloride	56-23-5	Methane, tetrachloro-	8010 8021 8260	1 0.1 10
Chlorobenzene	108-90-7	Benzene, chloro-	8010 8020 8021 8260	2 2 0.1 5
Chloroethane; Ethyl chloride	75-00-3	Ethane, chloro-	8010 8021 8060	5 1 10
Chloroform; Trichloromethane	67-66-3	Methane, trichloro-	8010 8021 8260	0.5 0.2 5
Chloroprene	126-99-8	1,3-Butadiene, 2-chloro-	8010 8260	50 20

Dibromochloromethane; Chlorodibromomethane	124-48-1	Methane, dibromochloro-	8010 8021 8260	1 0.3 5
1,2-Dibromo-3-chloropropane; DBCP	96-12-8	Propane, 1,2-dibromo-3-chloro-	8011 8021 8260	0.1 30 25
1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4	Ethane, 1,2-dibromo-	8011 8021	0.1 10
o-Dichlorobenzene	95-50-1	Benzene, 1,2-dichloro-	8010 8020 8021 8120 8260 8270	2 5 0.5 10 5 10
m-Dichlorobenzene; 1,3-Dichlorobenzene	541-73-1	Benzene, 1,3-dichloro-	8010 8020 8021 8120 8260 8270	5 5 0.2 10 5 10
p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8020 8021 8120 8260 8270	5 0.2 10 5 10
p-Dichlorobenzene; 1,4 Dichlorobenzene	106-46-7	Benzene, 1,4-dichloro-	8010	2
trans-1,4-Dichloro-2-butene	110-57-6	2-Butene, 1,4-dichloro-, (E)-	8260	100
Dichlorodifluoromethane	75-71-8	Methane, dichlorodifluoro-	8021 8260	0.5 5
1,1-Dichloroethane; Ethylidene chloride	75-34-3	Ethane, 1,1-dichloro-	8010 8021 8260	1 0.5 5
1,2-Dichloroethane; Ethylene dichloride	107-06-2	Ethane, 1,1-dichloro-	8010 8021 8260	0.5 0.3 5
1,1-Dichloroethylene; 1,1-Dichlorothene; Vinylidene chloride	75-35-4	Ethene, 1,1-dichloro-	8010 8021 8260	1 0.5 5
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2	Ethene, 1,2-dichloro-, (Z)-	8021 8260	0.2 5
trans-1,2-Dichloroethylene trans-1,2-Dichloroethene	156-60-5	Ethene, 1,2-dichloro-, (E)-	8010 8021 8260	1 0.5 5
1,2-Dichloropropane; Propylene dichloride	78-87-5	Propane, 1,2-dichloro-	8010 8021 8260	0.5 0.05 5
1,3-Dichloropropane; Trimethylene dichloride	142-28-9	Propane, 1,3-dichloro-	8021 8260	0.3 15
2,2-Dichloropropane; Isopropylidene chloride	594-20-7	Propane, 2,2-dichloro-	8021 8260	0.5 5

1,1-Dichloropropene;	563-58-6	1-Propene, 1,1-dichloro-	8021 8260	0.2 5
cis-1,3-Dichloropropene	10061-01-5	1-Propene, 1,3-dichloro-, (Z)-	8010 8260	20 10
trans-1,3-Dichloropropene	10061-02-6	1-Propene, 1,3-dichloro-, (E)-	8010 8260	5 5
Ethylbenzene	100-41-4	Benzene, ethyl-	8020 8221 8260	2 0.05 5
Ethyl methacrylate	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester	8015 8260 8270	5 10 10
2-Hexanone; Methyl butyl ketone	591-78-6	2-Hexanone	8260	50
Isobutyl alcohol	78-83-1	1-Propanol, 2-methyl-	8015 8240	50 100
Methacrylonitrile	126-98-7	2-Propenenitrile, 2-methyl-	8015 8260	5 100
Methyl bromide; Bromomethane	74-83-9	Methane, bromo-	8010 8021	20 10
Methyl chloride; Chloromethane	74-87-3	Methane, chloro-	8010 8021	1 0.3
Methylene bromide; Dibromomethane	74-95-3	Methane, dibromo-	8010 8021 8260	15 20 10
Methylene chloride; Dichloromethane	75-09-2	Methane, dichloro-	8010 8021 8260	5 0.2 10
Methyl ethyl ketone; MEK; 2-Butanone	78-93-3	2-Butanone	8015 8260	10 100
Methyl iodide; Iodomethane	74-88-4	Methane, iodo-	8010 8260	40 10
Methyl methacrylate	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester	8015 8260	2 30
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1	2-Pentanone, 4-methyl-	8015 8260	5 100
Naphthalene	91-20-3	Naphthalene	8021 8100 8260 8270	0.5 200 5 10
Propionitrile; Ethyl cyanide	107-12-0	Propanenitrile	8015 8260	60 150
Styrene	100-42-5	Benzene, ethenyl-	8020 8021 8260	1 0.1 10
1,1,1,2-Tetrachloroethane	630-20-6	Ethane, 1,1,1,2-tetrachloro-	8010 8021 8260	5 0.05 5

1,1,2,2-Tetrachloroethane	79-34-5	Ethane, 1,1,2,2-tetrachloro-	8010 8021 8260	0.5 0.1 5
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4	Ethene, tetrachloro-	8010 8021 8260	0.5 0.5 5
Toluene	108-88-3	Benzene, methyl-	8020 8021 8260	2 0.1 5
1,2,4-Trichlorobenzene	120-82-1	Benzene, 1,2,4-trichloro-	8021 8120 8260 8270	0.3 0.5 10 10
1,1,1-Trichloroethane; Methylchloroform	71-55-6	Ethane, 1,1,1-trichloro-	8010 8021 8260	0.3 0.3 5
1,1,2-Trichloroethane	79-00-5	Ethane, 1,1,2-trichloro-	8010 8260	0.2 5
Trichloroethylene; Trichloroethene	79-01-6	Ethene, trichloro-	8010 8021 8260	1 0.2 5
Trichlorofluoromethane; CFC-11	75-69-4	Methane, trichlorofluoro-	8010 8021 8260	10 0.3 5
1,2,3-Trichloropropane	96-18-4	Propane, 1,2,3-trichloro-	8010 8021 8260	10 5 15
Vinyl acetate	108-05-4	Acetic acid, ethenyl ester	8260	50
Vinyl chloride; Chloroethene	75-01-4	Ethene, chloro-	8010 8021 8260	2 0.4 10
Xylene (total)	See Note 11	Benzene, dimethyl-	8020 8021 8260	5 0.2 5

Semi-Volatiles (108)

Acenaphthene	83-32-9	Acenaphthylene, 1,2-dihydro-	8100 8270	200 10
Acenaphthylene	208-96-8	Acenaphthylene	8100 8270	200 10
Acetophenone	98-86-2	Ethanone, 1-phenyl-	8270	10
2-Acetylaminofluorene; 2-AAF	53-96-3	Acetamide, N-9H-fluoren-2-yl-	8270	20
4-Aminobiphenyl	92-67-1	[1,1'-Biphenyl]-4-amine	8270	20
Anthracene	120-12-7	Anthracene	8100 8270	200 10

Benzo[a]anthracene; Benzanthracene	56-55-3	Benz[a]anthracene	8100 8270	200 10
Benzo[b]fluoranthene	205-99-2	Benz[e]acephenanthrylene	8100 8270	200 10
Benzo[k]fluoranthene	207-08-9	Benzo[k]fluoranthene	8100 8270	200 10
Benzo[ghi]perylene	191-24-2	Benzo[ghi]perylene	8100 8270	200 10
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene	8100 8270	200 10
Benzyl alcohol	100-51-6	Benzenemethanol	8270	20
Bis(2-chloroethoxy)methane	111-91-1	Ethane, 1,1'-[methylenebis (oxy)]bis[2-chloro-	8110 8270	5 10
Bis(2-chloroethyl)ether; Dichloroethhyl ether	111-44-4	Ethane, 1,1'-oxybis[2-chloro-	8110 8270	3 10
Bis(2-chloro-1-methylethyl) ether; 2,2'-Dichlorodiisopropyl ether; DCIP, See note 7	108-60-1	Propane, 2,2'-oxybis[1-chloro-	8110 8270	10 10
Bis(2-ethylhexyl) phthalate	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl)ester	8060	20
4-Bromophenyl phenyl ether	101-55-3	Benzene, 1-bromo-4-phenoxy-	8110 8270	25 10
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	8060 8270	5 10
p-Chloroaniline	106-47-8	Benzenamine, 4-chloro-	8270	20
Chlorobenzilate	510-15-6	Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl)-α-hydroxy-, ethyl ester	8270	10
p-Chloro-m-cresol; 4-Chloro-3-methylphenol	59-50-7	Phenol, 4-chloro-3-methyl-	8040 8270	5 20
2-Chloronaphthalene	91-58-7	Naphthalene, 2-chloro-	8120 8270	10 10
2-Chlorophenol	95-57-8	Phenol, 2-chloro-	8040 8270	5 10
4-Chlorophenyl phenyl ether	7005-72-3	Benzene, 1-chloro-4-phenoxy-	8110 8270	40 10
Chrysene	218-01-9	Chrysene	8100 8270	200 10
m-Cresol; 3-methylphenol	108-39-4	Phenol, 3-methyl-	8270	10
o-Cresol; 2-methylphenol	95-48-7	Phenol, 2-methyl-	8270	10
p-Cresol; 4-methylphenol	106-44-5	Phenol, 4-methyl-	8270	10
Diallate	2303-16-4	Carbamothioic acid, bis(1-methylethyl)- , S- (2,3-dichloro-2-propenyl) ester	8270	10

Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene	8100 8270	200 10
Dibenzofuran	132-64-9	Dibenzofuran	8270	10
3,3'-Dichlorobenzidine	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	8270	20
2,4-Dichlorophenol	120-83-2	Phenol, 2,4-dichloro-	8040 8270	5 10
2,6-Dichlorophenol	87-65-0	Phenol, 2,6-dichloro-	8270	10
Diethyl phthalate	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester	8060 8270	5 10
O,O-Diethyl O-2-pyrazinyl phosphorothioate;Thionazin	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	8141 8270	5 20
Dimethoate	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester	8141 8270	3 20
p-(Dimethylamino)azobenzene	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-	8270	10
7,12-Dimethylbenz[a]anthracene	57-97-6	Benz[a]anthracene, 7,12-dimethyl-	8270	10
3,3'-Dimethylbenzidine	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	8270	10
2,4-Dimethylphenol; m-Xylenol	105-67-9	Phenol, 2,4-dimethyl-	8040 8270	5 10
Dimethyl phthalate	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester	8060 8270	5 10
m-Dinitrobenzene	99-65-0	Benzene, 1,3-dinitro-	8270	20
4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	534-52-1	Phenol, 2-methyl-4,6-dinitro-	8040 8270	150 50
2,4-Dinitrophenol	51-28-5	Phenol, 2,4-dinitro-	8040 8270	150 50
2,4-Dinitrotoluene	121-14-2	Benzene, 1-methyl-2,4-dinitro-	8090 8270	0.2 10
Di-n-butyl phthalate	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester	8060 8270	5 10
2,6-Dinitrotoluene	606-20-2	Benzene, 2-methyl-1,3-dinitro-	8090 8270	0.1 10
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-	8150 8270	1 20
Di-n-octyl phthalate	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester	8060 8270	30 10
Diphenylamine	122-39-4	Benzenamine, N-phenyl-	8270	10
Disulfoton	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl]ester	8140 8141 8270	2 0.5 10

Ethyl methanesulfonate	62-50-0	Methanesulfonic acid, ethyl ester	8270	20
Famphur	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl]-O,O-dimethyl ester	8270	20
Fluoranthene	206-44-0	Fluoranthene	8100 8270	200 10
Fluorene	86-73-7	9H-Fluorene	8100 8270	200 10
Hexachlorobenzene	118-74-1	Benzene, hexachloro-	8120 8270	0.5 10
Hexachlorobutadiene	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	8021 8120 8260 8270	0.5 5 10 10
Hexachlorocyclopentadiene	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	8120 8270	5 10
Hexachloroethane	67-72-1	Ethane, hexachloro-	8120 8260 8270	0.5 10 10
Hexachloropropene	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-	8270	10
Indeno(1,2,3-cd)pyrene	193-39-5	Indeno[1,2,3-cd]pyrene	8100 8270	200 10
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)-	8270 8260	20 10
Isophorone	78-59-1	2-Cyclohexen-1-one, 3,5,5-trimethyl-	8090 8270	60 10
Isosafrole	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-	8270	10
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	20
Methapyrilene	91-80-5	1,2,Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	8270	100
3-Methylcholanthrene	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	8270	10
Methyl methanesulfonate	66-27-3	Methanesulfonic acid, methyl ester	8270	10
2-Methylnaphthalene	91-57-6	Naphthalene, 2-methyl-	8270	10
Methyl parathion; Parathion methyl	298-00-0	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	8140 8141 8270	0.5 1 10
1,4-Naphthoquinone	130-15-4	1,4-Naphthalenedione	8270	10

1-Naphthylamine	134-32-7	1-Naphthalenamine	8270	10
2-Naphthylamine	91-59-8	2-Naphthalenamine	8270	10
o-Nitroaniline; 2-Nitroaniline	88-74-4	Benzenamine, 2-nitro-	8270	50
m-Nitroaniline; 3-Nitroaniline	99-09-2	Benzenamine, 3-nitro-	8270	50
p-Nitroaniline;4-Nitroaniline	100-01-6	Benzenamine, 4-nitro-	8270	50
Nitrobenzene	98-95-3	Benzene, nitro-	8090 8270	40 10
o-Nitrophenol; 2-Nitrophenol	88-75-5	Phenol, 2-nitro-	8040 8270	5 10
p-Nitrophenol; 4-Nitrophenol	100-02-7	Phenol, 4-nitro-	8040 8270	10 50
N-Nitrosodiethylamine	55-18-5	Ethanamine, N-ethyl-N-nitroso-	8270	20
N-Nitrosodimethylamine	62-75-9	Methanamine, N-methyl-N-nitroso-	8070	2
N-Nitrosodi-n-butylamine	924-16-3	1-Butanamine, N-butyl-N-nitroso-	8270	10
N-Nitrosodiphenylamine	86-30-6	Benzenamine, N-nitroso-N-phenyl-	8070	5
N-Nitrosodipropylamine; N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine	621-64-7	1-Propanamine, N-nitroso-N-propyl-	8070	10
N-Nitrosomethylethylamine	10595-95-6	Ethanamine, N-methyl-N-nitroso-	8270	10
N-Nitrosomorpholine	59-89-2	Morpholine, 4-nitroso-	8270	10
N-Nitrosopiperidine	100-75-4	Piperidine, 1-nitroso-	8270	20
N-Nitrosopyrrolidine	930-55-2	Pyrrolidine, 1-nitroso-	8270	40
5-Nitro-o-toluidine	99-55-8	Benzenamine, 2-methyl-5-nitro-	8270	10
Pentachlorophenol	87-86-5	Phenol, pentachloro-	8040 8270	5 50
Phenanthrene	85-01-8	Phenanthrene	8100 8270	200 10
Phenol	108-95-2	Phenol	8040	1
p-Phenylenediamine	106-50-3	1,4-Benzenediamine	8270	10
Pentachlorobenzene	608-93-5	Benzene, pentachloro-	8270	10
Pentachloronitrobenzene	82-68-8	Benzene, pentachloronitro-	8270	20
Phenacetin	62-44-2	Acetamide, N-(4-ethoxyphenyl)	8270	20

Phorate	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	8140 8141 8270	2 0.5 10
Pronamide	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	8270	10
Pyrene	129-00-0	Pyrene	8100 8270	200 10
Safrole	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-	8270	10
1,2,4,5-Tetrachloro-benzene	95-94-3	Benzene, 1,2,4,5-tetrachloro-	8270	10
2,3,4,6-Tetrachlorophenol	58-90-2	Phenol, 2,3,4,6-tetrachloro-	8270	10
o-Toluidine	95-53-4	Benzenamine, 2-methyl-	8270	10
2,4,5-Trichlorophenol	95-95-4	Phenol, 2,4,5-trichloro-	8270	10
2,4,6-Trichlorophenol	88-06-2	Phenol, 2,4,6-trichloro-	8040 8270	5 10
O,O,O-Triethyl phosphorothioate	126-68-1	Phosphorothioic acid, O,O,O-triethyl ester	8270	10
sym-Trinitrobenzene	99-35-4	Benzene, 1,3,5-trinitro-	8270	10

Pesticides (20)

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)-	8080 8270	0.05 10
alpha-BHC	319-84-6	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α,2α,3ß,4α,5ß,6ß)-	8080 8270	0.05 10
beta-BHC	319-85-7	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α,2ß,3α,4ß,5α,6ß)-	8080 8270	0.05 20
delta-BHC	319-86-8	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α,2α,3α,4ß,5α,6ß)-	8080 8270	0.1 20
gamma-BHC; Lindane	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1α,2α,3ß,4α,5α,6ß)-	8080 8270	0.05 20
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-	8080 8270	0.1 50
4,4'-DDD	72-54-8	Benzene 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	8080 8270	0.1 10

4,4'-DDE	72-55-9	Benzene, 1,1'-(dichloroethenylidene)bis[4-chloro-	8080 8270	0.05 10
4,4'-DDT	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	8080 8270	0.1 10
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)-	8080 8270	0.05 10
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	0.1 10
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)-	8080 8270	0.05 20
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	8080 8270	0.5 10
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)-	8080 8270	0.1 20
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*)-	8080 8270	0.2 10
Heptachlor	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	8080 8270	0.05 10
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)	8080 8270	1 10
Methoxychlor	72-43-5	Benzene, 1,1'-(2,2,2,trichloroethylidene)bis[4-methoxy-	8080 8270	2 10
Parathion	56-38-2	Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester	8141 8270	0.5 10
Toxaphene	See Note 10	Toxaphene	8080	2

Herbicides (3)

2,4-D; 2,4-Dichlorophenoxy-acetic acid	94-75-7	Acetic acid, (2,4-dichlorophenoxy)-	8150	10
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-	8150	2
Silvex; 2,4,5-TP	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	8150	2

PCBs (7)

Polychlorinated biphenyls; PCBs; Aroclors	See Note 9	1,1'-Biphenyl, chloro derivatives	8080 8270	50 200

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[1]The regulatory requirements pertain only to the list of substances; the right hand columns (Methods and PQL) are given for informational purposes only. See also footnotes 5 and 6.

[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", third edition, November 1986, as revised, December 1987. Analytical details can be found in SW-846 and in documentation on file at the Department. 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]Practical Quantitation Limits (PQLs) are the lowest concentrations of analytes in groundwaters that can be reliably determined within specified limits of precision and accuracy by the indicated methods under routine laboratory operating conditions. The PQLs listed are generally stated to one significant figure. PQLs are based on 5 mL samples for volatile organics and 1 L samples for semivolatile organics. CAUTION: The PQL values in many cases are based only on a general estimate for the method and not on a determination for individual compounds; PQLs are not a part of the regulation.

[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). PQL shown is for technical chlordane. PQLs of specific isomers are about 20 μg/L by method 8270.

[9]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). The PQL shown is an average value for PCB congeners.

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

[11]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). PQLs for method 8021 are 0.2 for o-xylene, and 0.1 for m- or p-xylene. The PQL for m-xylene is 2.0 μg/L by method 8020 or 8260.

Appendix C - Constituents for Detection Monitoring

pH[1]	Total Dissolved Solids (TDS)[1]	Chemical Oxygen Demand (COD)[2]	Total Organic Carbon (TOC)[2]
Ammonia as N[1]	Bicarbonate[2]	Calcium[2]	Carbonate[2]
Chloride[1]	Fluoride[1]	Iron[1]	Magnesium[2]
Manganese[1]	Nitrate as N[1]	Potassium[2]	Sodium[2]
Sulfate[1]			

Notes:

1. Constituents that may have a class of use based limit in Chapter 8 of the Wyoming Water Quality Rules and Regulations and/or an MCL.

2. Constituents that may be used to characterize and compare groundwater quality. These constituents are useful in determining the similarities and/or differences in the composition of water from specific hydrogeologic units and may help show whether particular units are hydraulically separate or connected. These constituents may be used to classify natural waters and help differentiate between natural variability and a release from a landfill.