Rules of
Department of Natural Resources
Division 80—Solid Waste Management
Chapter 2—General Provisions

Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 80—Solid Waste Management
Chapter 2—General Provisions

10 CSR 80-2.010 Definitions

PURPOSE: This rule defines terms used in 10 CSR 80.

PUBLISHER'S NOTE: The publication of the full text of the material that the adopting agency has incorporated by reference in this rule would be unduly cumbersome or expensive. Therefore, the full text of that material will be made available to any interested person at both the Office of the Secretary of State and the office of the adopting agency, pursuant to section 536.031.4, RSMo. Such material will be provided at the cost established by state law.

(1) Alkaline-manganese battery or alkaline battery means a battery having a manganese dioxide positive electrode, a zinc negative electrode, an alkaline electrolyte, including alkaline-manganese button cell batteries intended for use in watches, calculators, and other electronic products, and larger-sized alkaline-manganese batteries in general household use.

(2) Button cell battery or button cell means any small alkaline-manganese or mercuric-oxide battery having the size and shape of a button.

(3) Airport means a public-use airport open to the public without prior permission and without restrictions within the physical capacities of available facilities.

(4) Applicant means a person who applies for a solid waste permit from the department.

(5) Aquifer means a geologic unit or stratum capable of consistently yielding a sufficient amount of water to a monitoring well within twenty-four (24) hours of purging for sampling and analysis.

(6) Areas susceptible to mass movement means those areas of influence (for example, areas characterized as having an active or substantial possibility of mass movement) where the movement of earth material at, beneath or adjacent to the sanitary landfill, because of natural or man-induced events, results in the downslope transport of soil and rock material by means of gravitational influence. Areas of mass movement include, but are not limited to, landslides, avalanches, debris slides and flows, solifluction, block sliding and rock fall.

(7) Bedrock means the solid rock strata underlying solid and unconsolidated surface materials.

(8) Bird hazard means an increase in the likelihood of bird/aircraft collisions that may cause damage to the aircraft or injury to its occupants.

(9) Cell means compacted solid wastes that are enclosed on all sides by natural soil or cover in a solid waste disposal area.

(10) City means any incorporated city, town or village.

(11) Clean fill means uncontaminated soil, rock, sand, gravel, concrete, asphaltic concrete, cinderblocks, brick, minimal amounts of wood and metal, and inert solids as approved by rule or policy of the department for fill, reclamation or other beneficial use.

(12) Closure means the permanent cessation of active disposal operations, abandonment of the disposal area, revocation of the permit or filling with waste of all areas and volumes specified in the permit and preparing the area for long-term care.

(13) Closure plan means plans, designs and relevant data which specify the methods and schedule by which the operator will complete or cease disposal operations, prepare the area for long-term care and make the area suitable for other uses, to achieve the purposes of the Solid Waste Management Law and the corresponding rules.

(14) Commercial waste means all types of solid waste generated by stores, offices, restaurants, warehouses and other nonmanufacturing activities, excluding residential and industrial wastes.

(15) Commingled recyclables means more than one(1) source separated recyclable material that has been placed in a single container for collection.

(16) Competent bedrock means solid rock that underlies unconsolidated deposits (including residuum) which displays limited evidence of weathering throughout the rock mass.

(17) Compost facility means a solid waste processing facility using a controlled process of microbial degradation of organic material which was not source-separated into a stable, nuisance-free humus-like product.

(18) Confining bed means a body of low permeability material above or below one (1) or more aquifers.

(19) Cover means soil or other suitable material that is used to cover compacted solid waste in a solid waste disposal area.

(20) Demolition landfill means a solid waste disposal area used for the controlled disposal of demolition wastes, construction materials, brush, wood wastes, soil, rock, concrete and inert solids insoluble in water.

(21) Department means the Department of Natural Resources.

(22) Detailed site investigation means the process of conducting a detail surface and subsurface geologic and hydrologic investigation for a proposed solid waste disposal area.

(23) Detail site investigation report means a written report that is submitted to the Missouri Department of Natural Resources concerning the results of a detailed surface and subsurface geologic and hydrologic investigation for a proposed solid waste disposal area.

(24) Detailed site investigation workplan means a plan for conducting a detailed surface and subsurface geologic and hydrologic investigation for a proposed solid waste disposal area.

(25) Director means the director of the Department of Natural Resources.

(26) Displacement means the relative movement of any two (2) sides of a fault measured in any direction.

(27) Existing sanitary landfill means any sanitary landfill that continues to receive solid waste in contiguous areas after October 9, 1993.

(28) Fault means a fracture or a zone of fractures in any material along which strata on one side have been displaced with respect to that on the other side.

(29) Final closure means that a solid waste disposal area has ceased taking waste, has completed all closure activities applicable to the Solid Waste Management Program's law and rules and has obtained closure approval from the program.

(30) Financial assurance instrument means an instrument or instruments including, but not

limited to, cash or surety bond, letters of credit, corporate guarantee or secured trust fund, submitted by the applicant to ensure proper closure, post-closure care, or corrective action of a solid waste disposal area in the event that the operator fails to correctly perform closure, post-closure care, or corrective action except that the financial test for the corporate guarantee shall not exceed one and one-half (1 1/2) times the estimated cost of closure and post-closure. THe form and content of the financial assurance instrument shall meet or exceed the requirements of the department. The instrument shall be reviewed and approved or disapproved by the attorney general.

(31) Flood area means any area inundated by one hundred (100)-year flood event, or the flood event with a one percent (1%) chance of occurring in any given year.

(32) Floodplain means the lowland and relatively flat areas adjoining inland waters, that are inundated by the one hundred (100)-year flood.

(33) Gas condensate means the liquid generated as a result of gas recovery process(es) at the solid waste disposal area.

(34) Geologic structure means the post-depositional deformation of bedrock and surficial materials resulting from physical stresses, (e.g. faults, folds).

(35) Groundwater means water in the saturated zone beneath the land surface.

(36) Groundwater monitoring plan means a description of the strategy for effectively monitoring groundwater at a proposed or existing solid waste disposal area.

(37) Hazardous wastes means any waste or combination of wastes, as determined by the Hazardous Waste Commission by rules and regulations, which, because of quantity, concentration, or physical, chemical or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illnesses, or pose a present or potential threat to the health of humans or the environment.

(38) Holocene means the most recent epoch of the Quaternary Period, extending from the end of the Pleistocene Epoch to the present.

(39) Horizontal expansion means an expansion of a disposal area beyond current permitted disposal area limits through issuance of a new permit by the department.

(40) Household consumer means an individual who generates used motor oil through the maintenance of the individual's personal motor vehicle, vessel, airplane, or other machinery powered by an internal combustion engine.

(41) Household consumer used motor oil collection center means any site or facility that accepts or aggregates and stores used motor oil collected only from household consumers or farmers who generate an average of twenty-five (25) gallons per month or less of used motor oil in a calendar year. This section shall not preclude a commercial generator from operating a household consumer used motor oil collection center.

(42) Household consumer used motor oil collection system means any used motor oil collection center at publicly owned facilities of private locations, any curbside collection of household consumer used motor oil, or any other household consumer used motor oil collection program determined by the department to further the purposes of the Solid Waste Management Law.

(43) Household waste means any solid waste (including garbage, trash and sanitary waste in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas).

(44) Incinerator means a solid waste processing facility consisting of any device or structure resulting in weight or volume reduction of solid waste by combustion.

(45) Incinerator residue means all wastes that remain after combustion, including bottom ash, fly ash, slag and grate siftings.

(46) Infectious waste means waste in quantities and characteristics as determined by the department by rule that is capable of producing an infectious disease because it contains pathogens of sufficient virulence and quantity so that exposure to the waste by a susceptible human host could result in an infectious disease. These wastes include isolation wastes, cultures and stocks of etiologic agents, blood and blood products, pathological wastes, other contaminated wastes from surgery and autopsy; contaminated laboratory wastes, sharps, dialysis unit wastes, discarded biological materials known or suspected to be infectious; provided, however, that infectious waste does not mean waste treated to department specifications.

(47) Infectious waste processing facility means a solid waste processing facility permitted specifically for the treatment or other processing of infectious waste.

(48) Karst terranes means areas where karst, with its characteristic surface and subsurface features, is developed as the result of dissolution of limestone, dolomite or other soluble rock. Characteristic physiographic features present in karst terranes include, but are not limited to, sinkholes, losing streams, caves, solution channels or conduits, springs and solution valleys.

(49) Land surveyor means a land surveyor licensed to practice by the Missouri Board for Architects, Professional Engineers and Land Surveyors.

(50) Leachate means liquid that has percolated through solid waste or has come in contact with solid waste and has extracted, dissolved or suspended materials from it.

(51) Leachate collection system means any combination of landfill base slopes, liners, permeable zones, pipes, sumps, pumps or retention structures that is designed, constructed and maintained to monitor leachate generation in a solid waste disposal area and collect and remove leachate as necessary to reduce leachate depth over a landfill base.

(52) Lead acid battery means a battery designed to contain lead and sulfuric acid with a nominal voltage of a least six (6) volts and of the type intended for use in motor vehicles and watercraft.

(53) Liner means a continuous layer(s) of soil, man-made materials, or both, beneath and on the sides of a solid waste disposal area which controls and minimizes the downward or lateral escape of solid waste, solid waste constituents or leachate.

(54) Liquid waste means any waste material that is determined to contain free liquids as defined by Method 9095 (Paint Filter Liquids Test), as described in *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods* (EPA Pub. No. SW-846);

(55) Lithified earth material means all rock, including all naturally occurring and naturally formed aggregates or masses of minerals or small particles of older rock that formed by crystallization of magma or by induration of loose sediments. This term does not

include man-made materials, such as fill, concrete and asphalt or unconsolidated earth materials, soil or regolith lying at or near the earth surface.

(56) Major appliance means clothes washers and dryers, water heaters, trash compactors, dishwashers, microwave ovens, conventional ovens, ranges, stoves, woodstoves, air conditioners, refrigerator, and freezers.

(57) Maximum horizontal acceleration in lithified earth material means the maximum expected horizontal acceleration depicted on a seismic hazard map, with a ninety percent (90%) or greater probability that the acceleration will not be exceeded in two hundred fifty (250) years, or the maximum expected horizontal acceleration based on a site-specific seismic risk assessment.

(58) Mercuric-oxide battery or mercury battery means a battery having a mercuric-oxide positive electrode, a zinc negative electrode, and an alkaline electrolyte, including mercuric-oxide button cell batteries generally intended for use in hearing aides and larger size mercuric-oxide batteries used primarily in medical equipment.

(59) Motor oil means any oil intended for use in a motor vehicle, as defined in section 301.010, RSMo, train, vessel, airplane, heavy equipment, or other machinery powered by an internal combustion engine.

(60) Municipal wastes means household waste, commercial, agricultural, governmental, industrial and institutional waste which have chemical and physical characteristics similar to those of household waste.

(61) New sanitary landfill means any sanitary landfill that has not received waste prior to October 9, 1993.

(62) On-site means the same or geographically contiguous property which may be divided by public or private right-of-way, provided the entrance and exit between the properties is at a crossroads intersection and access is by crossing, as opposed to going along, the right-of-way. Noncontiguous properties owned by the same person but connected by a right-of-way which s/he controls and to which the public does not have access is also considered on-site property.

(63) One hundred (100)-year flood means a flood that has a one percent (1%) or greater chance of recurring in any given year or a flood of a magnitude equalled or exceeded once in one hundred (100) years on the average over a significantly long period.

(64) Open burning means the combustion of solid waste without: 1) control of combustion air to maintain adequate temperature for efficient combustion, 2) containment of the combustion reaction in an enclosed device to provide sufficient residence time and mixing for complete combustion and 3) control of the emission of the combustion products.

(65) Open dump means an unpermitted solid waste disposal area at which solid wastes are disposed of in a manner that does not protect the environment, are susceptible to open-burning and are exposed to the elements, vectors and scavengers.

(66) Operator means a person who is responsible for the overall day-to-day operation and maintenance of a facility and along with the owner, obtains a solid waste permit from the department.

(67) Owner means any person holding a freehold interest in the land upon which the solid waste disposal area or solid waste processing facility is located.

(68) Owner/operator means owner and operator.

(69) Permit modification means any approval issued by the department which alters or modifies the provision of an existing permit previously issued by the department.

(70) Person means individual, partnership, corporation, association, institution, city, county, other political subdivision, authority, state agency or institution or federal agency or institution.

(71) Phase means a distinct area of a landfill, identifiable both in the plans and in the field by natural boundaries or permanent survey markers. A phase must include provisions for constructing and operating leachate collection systems, liners, gas collection systems and any other landfill structures independent of any other phase.

(72) Phased development means the division of the construction and operations of a solid waste disposal area permit into two (2) or more distinct phases in order to facilitate more orderly construction, operation, closure or post-closure care, or both, of the solid waste disposal area, with each phase being distinctly identifiable both in the plans and in the field by natural boundaries or permanent survey markers, or both.

(73) Plans mean reports and drawings, including a narrative operating description, prepared to describe the solid waste disposal area or solid waste processing facility design, its proposed operation and closure and post-closure care.

(74) Poor foundation conditions means those areas where features exist which indicate that a natural or man-induced event may result in inadequate foundation support for the structural components of a landfill.

(75) Post-closure care means all maintenance and monitoring performed at a solid waste disposal area after closure is complete to prevent or minimize existing or potential health hazards, public nuisance or environmental pollution and in accordance with the terms of the permit, the Solid Waste Management Law and the corresponding rules.

(76) Post-closure plan means plans, designs and relevant data which specify the methods and schedules by which the operator shall perform necessary monitoring and care for the area after closure to achieve the purposes of the Solid Waste Management Law and the corresponding rules.

(77) Preliminary site investigation means an investigation conducted by the Division of Geology and Land Survey to determine the geohydrologic suitability for further exploration at a proposed solid waste disposal area.

(78) Professional engineer means a professional engineer licensed to practice by the Missouri Board for Architects, Professional Engineers and Land Surveyors.

(79) Qualified groundwater scientist means a scientist or licensed professional engineer who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields as may be demonstrated by state registration, professional certifications or completion of accredited university programs that enable that individual to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action.

(80) Recovered materials means those material which have been diverted or removed from the solid waste stream for sale, use, reuse or recycling, whether or not they require subsequent separation and processing.

(81) Recycled content means the proportion of fiber or content in a product which is derived from postconsumer waste.

(82) Recycling means the separation and reuse or remanufacture of materials which might otherwise be disposed of as solid waste.

(83) Recycling center means any collection (not manufacturing) facility or system that accepts source-separated recyclable or commingled recyclable materials for processing and resale to markets for resource recovery for example: aluminum cans and scraps, tin, copper, glass, paper products, plastics, bimetal and steel containers, ferrous and nonferrous metals.

(84) Resource recovery means a process by which recyclable and recoverable material is removed from the waste stream to the greatest extent possible, as determined by the department and pursuant to department standards, for reuse or remanufacture.

(85) Resource recovery facility means any facility including a material recovery facility in which recyclable and recoverable material is removed from the waste stream to the greatest extent possible, as determined by the department and pursuant to department standards, for reuse or remanufacture.

(86) Runoff means any liquid that drains over land from any part of a facility.

(87) Run-on means any liquid that drains over land onto any part of a facility.

(88) Salvaging means the controlled removal of solid waste materials for utilization.

(89) Sanitary landfill means a permitted solid waste disposal area employing an engineered method of disposing of solid wastes on land in a manner that minimizes environmental hazards by spreading the solid wastes in thin layers, compacting the solid wastes to the smallest practical volume and applying cover at the end of each operating day. Sanitary landfills include all disposal area that accept all types of solid waste including, but not limited to, commercial and residential solid waste.

(90) Scavenging means uncontrolled or unauthorized removal of solid waste from a solid waste disposal area or solid waste processing facility.

(91) Seismic impact zone means an area with a ten percent (10%) or greater probability that the maximum horizontal acceleration in lithified earth material, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10g in two hundred fifty (250) years.

(92) Sludge means the accumulated semisolid suspension of settled solids deposited from wastewaters or other fluids in tanks or basins.

(93) Soil means sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks and which may or may not contain organic matter.

(94) Solid waste means garbage, refuse and other discarded materials including, but not limited to, solid and semisolid waste materials resulting from industrial, commercial, agricultural, governmental and domestic activities, but does not include hazardous waste as defined in sections 260.360 to 260.434, RSMo recovered materials, overburden, rock, tailings, matte, slag or other waste material resulting from mining, milling or smelting.

(95) Solid waste disposal area means any area used for the disposal of solid waste from more than one (1) residential premises, or one (1) or more commercial, industrial, manufacturing, recreational or governmental operation.

(96) Solid waste management plan means a set of documents legally adopted by a state recognized governing body of a local or regional solid waste management program to administer the solid waste management system(s) for a minimum of ten (10) years.

(97) Solid waste management system means the entire process of managing solid waste in a manner which minimizes the generation and subsequent disposal of solid waste, including waste reduction, source separation, storage, collection, transportation, recycling, resource recovery, volume minimization, processing market development and disposal of solid wastes.

(98) Solid waste processing facility means any facility where solid wastes are salvaged and processed, including:

(A) A transfer station; or

(B) An incinerator which operates with or without energy recovery but excluding waste tire end-user facilities; or

(C) A material recovery facility which operates with or without composting.

(99) Solid waste technician means an individual who has successfully completed training in the practical aspects of the design, operation and maintenance of a permitted solid waste processing facility or solid waste disposal area in accordance with the Solid Waste Management Law and rules.

(100) Source reduction means practices which avoid, eliminate or minimize the generation of solid waste.

(101) Source-separated recyclable material means a waste material, for which a market exists, which has not been commingled with other solid waste but has been kept separate at the point of generation.

(102) Special waste means waste which is not regulated hazardous waste, which has physical or chemical characteristics, or both, that are different from municipal, demolition, construction and wood wastes, and which potentially require special handling.

(103) Special waste landfill means a solid waste disposal area permitted specifically for the disposal of one (1) or more special waste(s).

(104) Special waste processing facility means a solid waste processing facility permitted specifically for the processing of one (1) or more special waste(s).

(105) Structural components means liners, leachate collection systems, final covers, run-on/runoff systems and any other component used in the construction and operation of the solid waste disposal area that is necessary for protection of human health and the environment.

(106) Tire means a continuous solid or pneumatic rubber covering encircling the wheel of any self-propelled vehicle not operated exclusively upon tracks, or a trailer as defined in Chapter 301, RSMo, except farm tractors and farm implements owned and operated by a family farm or family farm corporation as defined in section 350.010, RSMo.

(107) Transfer station means a site or facility which accepts solid waste for temporary storage, or consolidation and further transfer to a waste disposal, processing or storage facility. Transfer station includes, but is not limited to, a site or facility where waste is transferred from: a rail carrier, motor vehicle or water carrier to another carrier, if the waste is removed from the container or vessel.

(108) Unstable area means a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill. Unstable areas can include poor foundation conditions, areas, susceptible to mass movements and karst terranes.

(109) Uppermost aquifer means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the property boundary.

(110) Used motor oil means any motor oil which as a result of use, becomes unsuitable for its original purpose due to loss of original properties or the presence of impurities, but used motor oil shall not include ethylene glycol oils used for solvent purposes, oil fibers that have been drained of free-flowing used oil, oily waste, oil recovered from oil tank cleaning operation, oil spilled to land or water, or industrial nonlube oils such as hydraulic oils, transmission oils, quenching oils, and transformer oils.

(111) Utility waste means fly ash waste, bottom ash waste, slag waste and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels.

(112) Utility waste landfill means a solid waste disposal area used for fly ash waste, bottom ash waste, slag waste and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels.

(113) Vector means a carrier including, but not limited to, arthropod, birds and rodents capable of transmitting a pathogen from one organism to another.

(114) Vegetation means plant materials that have been specified in the closure/post-closure plans and have been specifically cultivated for cover on the landfill and borrow area. Vegetation should provide at least eighty percent (80%) coverage in order to control erosion and limit water infiltration.

(115) Washout means the carrying away of solid waste by waters of the one hundred (100)-year flood.

(116) Waste tire means a tire that is no longer suitable for its original intended purpose because of wear, damage, or defect.

(117) Waste tire collection center means a site where waste tires are collected prior to being offered for recycling or processing and where fewer than five hundred (500) tires are kept on-site on any given day.

(118) Waste tire end-user facility means a site where waste tires are used as a fuel or fuel supplement or converted into a useable product. Baled or compressed tires used in structures, or used at recreational facilities, or used for flood or erosion control shall be considered an end use.

(119) Waste tire generator means a person who sells tires at retail or any other person, firm, corporation, or government entity that generates waste tires.

(120) Waste tire processing facility means a site where tires are reduced in volume by shredding, cutting, chipping or otherwise altered to facilitate recycling, resource recovery or disposal.

(121) Waste tire site means a site at which five hundred (500) or more waste tires are accumulated, but not including a site owned or operated by a waste tire end-user that burns waste tires for the generation of energy or converts waste tires to a useful product.

(122) Waters of the state mean all rivers, streams, lakes and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state which are not entirely confined and located completely upon lands owned, leased or otherwise controlled by a single person or by two (2) or more persons jointly or as tenants in common and includes waters of the United States lying within the state.

(123) Water table means the upper surface of a zone of saturation where the fluid pressure of the body of groundwater is equal to atmospheric pressure.

(124) Well means any hole drilled in the earth for or in connection with the discovery or recovery of water, minerals, oil, gas or for or in connection with the underground storage of gas in natural formations.

(125) Wetlands means those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include, but are not limited to, swamps, marshes, bogs and similar areas.

(126) Working face means that portion of the solid waste disposal area where solid wastes are discharged and are spread and compacted prior to the placement of cover.

(127) Yard waste means leaves, grass clippings, yard and garden vegation and Christmas trees. This term does not include stumps, roots or shrubs with intact root balls.

AUTHORITY: sections 260.200 and 260.225, RSMo (Cum. Supp. 1996). Original rule filed Dec. 11, 1973, effective Dec. 21, 1973. Amended: Filed July 14, 1986, effective Jan. 1, 1987. Amended: Filed Jan. 5, 1987, effective June 1, 1987. Amended: Filed Jan. 29, 1988, effective Aug. 1, 1988. Amended: Filed Aug. 15, 1988, effective Dec. 29, 1988. Emergency amendment Sept. 29, 1993, effective Oct. 9, 1993, expired Feb. 5, 1994. Amended: Filed May 3, 1993, effective Jan. 13, 1994. Amended: Filed March 17, 1992.** Emergency rescission of the 1992 amendment filed March 19, 1997, effective April 1, 1997, expired Sept. 27, 1997. Amended: Filed Oct. 10, 1996, effective July 30, 1997. Rescission of the 1992 amendment filed April 3, 1997, effective Aug. 30, 1997.*

**Original authority: 260.200 and 260.225, RSMo (1972), amended 1975, 1986, 1988, 1990, 1993, 1995.*

***The Missouri Supreme Court in **Missouri Coalition for the Environment, et al., v. Joint Committee on Administrative Rules, et al.**, Case No. 78628, dated February 25, 1997, ordered the secretary of state to publish this amendment. The Missouri Department of Natural Resources subsequently filed an emergency rescission of this amendment as well as a proposed rescission of this amendment which became effective August 30, 1997. See the above authority section for filing dates.*

10 CSR 80-2.011 Definitions

Emergency rule filed Sept. 29, 1993, effective Oct. 9, 1993, expired Feb 5, 1994. Emergency rule filed Jan. 28, 1994, effective Feb. 7, 1994, expired June 6, 1994.

10 CSR 80-2.015 Preliminary Site Investigation, Detailed Site Investigation Workplan, and Detailed Site Investigation and Characterization Report

PURPOSE: This rule describes the steps required to characterize the geologic and hydrologic conditions at a proposed solid waste disposal area prior to submittal of a

construction permit application in compliance with section 260.205, RSMo (Cum. Supp. 1996).

(1) On and after January 1, 1996, no applicant may apply for, or obtain, a permit to construct a solid waste disposal area unless the person has obtained geologic and hydrologic site approval from the department. Geologic and hydrologic approval indicates that the site has been found to be suitable for development of a solid waste disposal area, provided the required plans and engineering reports detailing the construction and operation of the site are prepared and approved by the department. In order to obtain geologic and hydrologic site approval from the department, the following procedures must be followed:

(A) The potential disposal area construction permit applicant must obtain preliminary site approval from the department. The Division of Geology and Land Survey (DGLS) Geologic Survey Program (GSP) will conduct a preliminary site investigation and approve or disapprove the site for further investigation within sixty (60) days of receipt of a request. Preliminary site approval is provisional, as required additional investigations may reveal conditions that may lead to site disapproval. Disapproval may be appealed to the DGLS division director. Preliminary site investigation requests shall be submitted to the GSP on the form included in Appendix 1 which is incorporated herein;

(B) Prior to conducting further investigation of the proposed site, the potential disposal area construction permit applicant must retain a qualified groundwater scientist who is a registered geologist per section 256.453, RSMo who shall request and attend a workplan development meeting with the GSP. This meeting shall include, at a minimum, discussion of the geology and hydrology of the proposed site and specific elements to be included in the workplan, time frames for completion of work and a discussion of the GSP's regulations and requirements;

(C) The qualified groundwater scientist who is a registered geologist per section 256.453, RSMo shall then prepare and submit to the department a workplan for conducting a detailed surface and subsurface geologic and hydrologic investigation. The elements and format of the workplan are listed in Appendix 1 which is incorporated herein. The GSP will review and approve or disapprove the detailed site investigation workplan within thirty (30) days of receipt; and

(D) After the workplan is approved, a qualified groundwater scientist shall investigate and characterize the geology and hydrology of the site in accordance with: the approved workplan, applicable rules and department guidance. All geologic and hydrologic data collection and interpretation shall be under the direction of a geologist registered in the state of Missouri. The applicant or a representative shall notify the GSP when drilling, testing, or field investigations are to take place so that department personnel may be present on-site during the investigations.

1. The approved workplan will provide site-specific guidance for the applicant to complete the detailed site investigation. The workplan may be amended and changed with the approval of the GSP, as the investigation proceeds.

2. The qualified groundwater scientist shall interpret and summarize the geologic and hydrologic characteristics of the site in a detailed site investigation and characterization report which is to be submitted to the GSP. Guidance for conducting and reporting a detailed site investigation is included as Appendix 1 of this rule which is incorporated herein. The report shall be signed and sealed by a geologist registered in the state of Missouri. The report shall be submitted to the GSP for review.

(2) The GSP will review the report within sixty (60) days of receipt and approve or disapprove the site.

(A) Approval will indicate that the site has been found to have suitable geologic and hydrologic characteristics for the development of an environmentally sound solid waste disposal area. The potential disposal area construction permit applicant may then apply for a permit by submitting the required documents, plans, and engineering reports to the department.

(B) Disapproval will indicate one (1) or more of the following:

1. The site has been found to have unsuitable geologic and hydrologic conditions for the development of an environmentally sound solid waste disposal area; or

2. The characterization of the site is not adequate to show that the site has suitable geologic and hydrologic conditions for the development of an environmentally sound solid waste disposal area; or

3. The characterization report is not adequate to show that the site has suitable geologic and hydrologic conditions for the development of an environmentally sound solid waste disposal area.

(C) The GSP will specify the inadequacies of the site, characterization of the site, or site characterization report in the written disapproval of the site. Disapprovals may be appealed to the DGLS division director.

AUTHORITY: sections 260.205 and 260.225 (Cum. Supp. 1996). Original rule filed Oct. 10, 1996, effective July 30, 1997.*

**Original authority: 260.205, RSMo (1972), amended 1975, 1986, 1988, 1990, 1991, 1995 and 260.225, RSMo (1972), amended 1975, 1986, 1988, 1990, 1993, 1995.*

APPENDIX 1

GUIDANCE FOR CONDUCTING AND REPORTING DETAILED GEOLOGIC AND HYDROLOGIC INVESTIGATIONS AT A PROPOSED SOLID-WASTE DISPOSAL AREA

Missouri Department of Natural Resources
Division of Environmental Quality
Division of Geology and Land Survey

This appendix contains the following:

- Elements and format of a workplan for conducting the Detailed Site Investigation.
- Guidance for conducting an acceptable detailed geologic and hydrologic investigation of a proposed solid-waste disposal area.
- Guidance for the acceptable presentation of site characterization data.
- Form for requesting a preliminary investigation for a proposed solid-waste disposal area.

ELEMENTS AND FORMAT OF A DETAILED SITE INVESTIGATION WORKPLAN

The detailed site investigation workplan must contain the following elements plus any additional site-specific elements which may be requested by the Geological Survey Program (GSP).

1. Topographic map at scale of 1:24000 showing the pertinent property boundaries, as well as the location of the proposed solid-waste disposal area, and potential borrow areas
2. Site map at a suitable scale to display proposed locations for pits, borings, and piezometers
3. A general description of the proposed facility to include:
   a. Maximum depth of excavation
   b. Total acreage to be developed as a solid-waste disposal area

4. Description of proposed methods for site exploration to include:
    a. Drilling methods
    b. Sampling methods
    c. Piezometer and monitoring well construction methods (must comply with 10 CSR 23-4):
        (1) Approximate depth intervals to be screened
        (2) Specific grout mixtures and emplacement methods to be used
    d. Aquifer test methods
    e. Alternative exploration methods (such as geophysical methods)

5. Record keeping procedures for:
    a. Well logs, boring logs, drilling logs, pit logs
    b. On-site precipitation data

DETAILED SITE INVESTIGATION

General Procedures for Detailed Site Investigations

The potential disposal area construction permit applicant is responsible for retaining a qualified groundwater scientist to provide the GSP with a complete and accurate evaluation of the geologic and hydrologic conditions of the proposed solid-waste disposal area. All geologic and geohydrologic work must be completed under the direction of a geologist registered in the State of Missouri per RSMo 256.450 through 256.483 and the rules promulgated pursuant thereto. A consultant who subcontracts the drilling of piezometers or monitoring wells must hold a restricted or a nonrestricted monitoring well installation contractor's permit. Drilling must be done by a driller holding a nonrestricted monitoring well installation contractor's permit and appropriate permit numbers must be prominently displayed on all drill rigs used for site characterization, as required by 10 CSR 23 Chapters 1, 2 and 4.

The minimum standards for a detailed site investigation are partially dependent on site-specific geologic conditions. As a result of data gathered during the detailed site investigation, the GSP may require additional investigations to adequately define the geology and hydrology of the site.

Geophysical methods may be used to help characterize the site; however borings or pits must be located and drilled to verify the results of the geophysical survey(s). Where geologic structures or solution features which negatively impact groundwater monitoring or the structural integrity of a disposal area are present or suspected, additional borings or pits will be required to adequately define the extent and distribution of these features across the site, and to determine the relationships between these features and geologic units.

Sinkholes, solution-enlarged fractures and caves may have very small, near-surface expressions that a boring program would not be expected to detect. Sites will routinely be rejected during

preliminary site investigations where the site is characterized by solution features which may negatively impact groundwater monitoring or the structural integrity of a disposal area.

Field Direction

A qualified groundwater scientist must direct the excavation of all pits, the drilling of all borings, the performance of any geophysical surveys, and the installation, development and abandonment of all exploratory wells or piezometers. Interpretations of geological data must be conducted under the direction of a geologist registered in the State of Missouri per RSMo 256.450 through 256.483.

A qualified groundwater scientist must supervise all field testing to determine the geologic and hydrologic characteristics of the material encountered or intended for use at the proposed site. A qualified groundwater scientist must maintain accurate and complete field notes of the investigation activities.

A land surveyor registered in the state of Missouri must determine the location and elevation of all wells and piezometers. Borings, excavation pits and all transects performed as part of a geophysical exploration will be located to the nearest one-tenth (0.1) foot by a land surveyor registered in the State of Missouri. All elevation measurements, grid patterns, and coordinates must be established and used consistently throughout the investigation and referenced to North American Datum (NAD) 1983 and National Geodetic Vertical Datum (NGVD) 1929 or North American Vertical Datum (NAVD) 1988. Monitoring well and piezometer measuring-point elevations must be accurate to the nearest one-hundredth (0.01) foot.

Field Investigations

The minimum requirements for conducting a detailed subsurface investigation are listed below. Alternative investigation techniques and procedures may be approved at the discretion of the GSP. Additional borings or pits may be required, subject to site-specific conditions, to fully characterize the geology of the area. The number of borings, pits, and piezometers required is dependent upon the anticipated size of the proposed disposal area and the existence of structural or solution features which may negatively impact groundwater monitoring or the structural integrity of the disposal area. Borings that are not used as monitoring wells or piezometers must be permanently abandoned and reported as per 10 CSR 23-4. Exploration pits must be backfilled using native material, compacted to natural density condition, and their locations clearly marked on site maps.

1. Surficial Materials
   A qualified groundwater scientist must determine the thickness, and geotechnical characteristics of significant geologic units above competent bedrock. At least one boring must be drilled per two acres of the proposed disposal area. All borings must be extended to

at least 25 feet below the anticipated disposal area sub-base grade or to competent bedrock, whichever is less. All borings must be continuously sampled. Exploration pits may be substituted for borings in areas where the surficial materials can be fully penetrated by the pits.

If geologic structures or solution features which negatively impact groundwater monitoring or the structural integrity of a disposal area are present or suspected, at least one boring must be completed per acre of the proposed disposal area. All of these borings will be drilled to competent bedrock. Exploration pits may be substituted.

The borings or pits must be distributed in a grid pattern across the site or located in a manner that will optimize characterization of the site. Deviations from a regular grid pattern must be approved by the GSP. Location and elevation of borings or pits must be recorded by a registered land surveyor.

2. Aquifers
A qualified groundwater scientist must determine the depth, thickness and lateral extent of the uppermost aquifer(s) beneath the proposed site and additional aquifers which are potentially at risk (as determined by the GSP).

Piezometers are required to adequately characterize the groundwater at the proposed site. There must be at least five piezometers, or one piezometer per four acres of disposal area, whichever is greater, installed in each aquifer to be characterized. Piezometer construction and development standards must be in accordance with 10 CSR 23-4.

All piezometers must be distributed in a grid pattern across the proposed site or located in a manner that will optimize characterization of the site. Deviations from a regular grid pattern must be approved by the GSP. An adequate number of piezometers must be located outside the anticipated fill area to sufficiently characterize each aquifer. The measuring-point elevation of the piezometers must be determined by survey. Additional piezometers may be required to demonstrate the effectiveness of confining beds and extent of aquifers. If geophysical methods are used, piezometers must be installed to verify the results of the geophysical survey(s).

A continuously recording precipitation gauge, capable of measuring precipitation events greater than one-tenth (0.1) inch, must be installed at the site concurrent with, or prior to, installation of piezometers. Data from the gauge will be used to interpret any fluctuations in potentiometric level(s) throughout the site characterization period and may be used for other purposes later, at the discretion of the department.

The hydraulic conductivity of the uppermost aquifer(s) beneath the proposed disposal area must be determined. The hydraulic conductivity must be determined in one out of every four borings (25% of the borings drilled on-site) for each aquifer tested. The hydraulic conductivity must be determined in the field. Accepted field tests are *in situ* slug and/or pump tests which isolate the geologic unit of interest. Accepted laboratory tests to determine

hydraulic conductivity include a flexible wall permeameter test or other procedure approved by the department.

3. Other Bedrock Units
   A qualified groundwater scientist must determine the thickness, depth and lateral extent of the uppermost confining bedrock unit as it pertains to the proposed solid-waste disposal area. If the uppermost confining unit is more than 150 feet below the lowest anticipated sub-base grade, the GSP will determine the need for characterization of the unit. At least one boring per four acres of the proposed disposal area or five borings, whichever is greater, must be drilled to characterize soil and bedrock units below the anticipated sub-base grade of the disposal area. At least three of these borings per soil/bedrock unit must be continuously sampled, unless otherwise approved by the GSP. The depth of these borings will be determined based on geohydrologic conditions at the site.

For investigation of horizontal expansions and investigations near previously existing disposal areas, piezometers and borings must be located within 500 feet of the limits of the existing filled area such that there is a minimum of one piezometer per 400 lineal feet extending along the periphery of the existing filled area. As determined by the GSP, if geologic structures or features which negatively impact groundwater monitoring or the structural integrity of a disposal area are present or suspected, one piezometer/boring must be installed per 200 lineal feet along the periphery of the existing filled area. Piezometers will not be installed within the boundary of the pre-existing waste.

Records (Field Notes)

The geologic materials in each boring, exploration pit, piezometer or well must be logged in detail during drilling or excavation by a qualified groundwater scientist. The qualified groundwater scientist must describe and record the physical and lithologic characteristics of each geologic material encountered as well as other information pertaining to drilling or excavation. Field logs and notes pertaining to the field investigated shall be retained by the applicant until closure.

At a minimum, a qualified groundwater scientist must, in the field, note on a descriptive log the following:

1. Texture of geologic material
2. Color (qualitative descriptions - include mottling) of geologic material
3. Relative degree of saturation (description)
4. Voids
5. Geologic origin
6. Secondary permeability features
7. Zones of incomplete sample recovery
8. Depth at which water is encountered
9. Depth and rate of drilling fluid gain or loss
10. Type and size of drilling/excavation equipment

11. Drilling rate (blow counts)
12. Packer tests (intervals tested and results)
13. Start and stop times for drilling/excavation
14. Names of field personnel
15. Date, time, weather conditions
16. Depth to water upon completion

All borings or pits must be observed until the water level has stabilized or for at least 24 hours following completion. This observation must determine if groundwater has entered the hole, the depth to water, and if possible, the water bearing zones. During observation all borings and pits must be protected from rainfall and runoff.

Laboratory Analysis

All samples collected for laboratory analyses must be clearly labeled (sampling location - boring/pit number, depth, date of sample) and preserved. Soil samples not destroyed by testing and rock core must be stored, protected from the weather, and available for the GSP's inspection in Missouri until closure.

Laboratory Testing

A laboratory must be retained to conduct geotechnical analyses for each unconsolidated material encountered to verify field observations. The following must be recorded for each sample tested.

1. Texture
2. Color (based on a Munsell color chart - include mottling)
3. Grain size distribution (reported in percent)
4. Soil classification (reported in Unified Soil Classification System)
5. Moisture content (reported in percent)
6. Liquid Limit
7. Plasticity Index
8. Standard Proctor density
9. Names of lab personnel
10. Date

Monitoring Wells

While monitoring wells are not normally required as part of the detailed site investigation, background water quality data will be required prior to operation of a solid-waste disposal facility. The number of monitoring wells required will be dependent upon the presence and number of aquifers monitored and the presence and number of confining beds. Well construction standards and development must be in accordance with 10 CSR 23-4.

A minimum of one monitoring well must be located hydraulically upgradient and three monitoring wells located hydraulically downgradient for each aquifer monitored. These wells must be located outside of but not greater than 500 feet from the anticipated limit of the area. A minimum of four wells must be screened or open to each aquifer monitored. The screen and/or filter-pack must not extend through confining units.

For sites characterized by the GSP as having geologic structures or solution features which negatively impact groundwater monitoring or the structural integrity of a disposal area, additional monitoring wells must be installed to adequately collect groundwater data.

Water Level Data Collection

Measurements of water level, to the nearest hundredth (0.01) of a foot must be made every month for one year for all wells and piezometers. Water-level measurements in all wells and piezometers should be made within a 48-hour time period, if possible. Additional measurements may be necessary as determined by the GSP.

PRESENTATION OF DATA AND INTERPRETATIONS

The following information must be provided in the order specified below. The report must be prepared under the direction of a qualified groundwater scientist who is a geologist registered in the State of Missouri per RSMo 256.450 through 256.483 and the rules promulgated pursuant thereto. This person must sign and seal the report.

1. Table of Contents

2. Introduction (general information about the study area and the study)
   A. Location:
      A written narrative of the geographic setting with legal description (section, township, and range)

   B. Regional Geology:
      A written narrative describing the regional lithologic, stratigraphic, structural, and hydrologic settings of the area

   C. Historic Land Uses:
      A written narrative describing previous land use such as mining or mineral exploration

   The above sections must address the siting restrictions listed in 10 CSR 80-3.010(4)(B) pertaining to sites adjacent to or in the vicinity of airports, floodplains, wetlands, faults and seismic impact zones.