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Policy No. 2.05
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Subject: Permits to Install; Procedures for Submittal of Plans for Coal Preparation Plants

Applicable Regulations: OAC 3745-31 and 3745-35, ORC Chapter 6111

This policy details guidelines for submittal of coal preparation plant permits to install with regard to protection of surface water, ground water, and air of the state. The purpose of the policy is to provide guidance for consistent criteria for evaluation permit to install applications.

1211 or 1221 or 1222 ?

Ohio coal preparation (crushing, sizing, washing, stockpiling) plants are industrial operations (standard industrial code 1211) whose discharges to the environment are regulated by Ohio EPA. The air, surface water, and ground water Ohio EPA program divisions are responsible for reviewing permit to install applications for waste stream treatment associated with coal preparation operations. The following procedures are those used by Ohio EPA in assessing the adequacy of proposed treatment systems, and are meant to guide operators and their consultants in developing permit to install applications which are protective of environmental quality. These guidelines are not meant to replace consultation with Ohio EPA district representatives, but rather outline the requirements for approvable permit to install applications.

WATER POLLUTION CONTROL REQUIREMENTS

Ground Water Protection

Coal piles, refuse disposal areas, slurry ponds, treatment ponds, ditches conveying contaminated waters to treatment, and processing areas where coal or refuse may be stored or spilled must be sited on soils which provide the equivalent of 1.0×10^{-7} centimeters/second (or less) permeability throughout a minimum thickness of three feet. This minimum acceptable permeability is required by Ohio EPA to provide adequate ground water protection. If tests of in situ soils (please refer to "Soil Testing" elsewhere) indicate that these criteria for minimum permeability and soil thickness are present, then the site may be used without additional ground water protection measures. It is always preferable to site coal preparation facilities in areas which are naturally protective of ground water.

In many cases, however, a compacted clay liner, from three to five feet thick, with a permeability of less than or equal to 1.0×10^{-7} centimeters/second must be installed under coal storage piles, refuse disposal sites, slurry ponds, drainage channels which transport contaminated runoff, treatment ponds, and handling areas. If a tipple or wash plant is proposed, the protective liner must also underlie the actual plant structure. Please note that all water that contacts coal or refuse is deemed contaminated.

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Liner material should be deposited in six inch thick lifts and compacted with a sheepsfoot roller or equivalent. Before use, the liner should again be tested to verify the minimum acceptable permeability, density, and moisture content. Synthetic liners should not be considered except in unusual circumstances.

If a synthetic liner is to be used, it must be compatible with the proposed wastewater and pond design. An unreinforced liner must be at least thirty mils thick; a reinforced liner must have thirty mils of membrane plus the thickness of the reinforcing. The installation must be performed or supervised by the manufacturer, factory, or qualified agent, who must certify its installation in accordance with the permit to install, plans, and manufacturer's standards. If the synthetic liner is to be used as a pond liner, adequate provisions must be made to remove sediments or slurry without damaging the liner.

If a recompacted liner is to be used, the application shall include calculations showing the amount of liner material needed, the location of the borrow area, and calculations showing the amount of borrow material is adequate.

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Dedicated refuse disposal areas must be lined to protect ground water. When the fill area is full and the refuse is dewatered, the surface must be covered with a clay cap at least two inches thick, compacted to provide a permeability of 1.0×10^{-7} centimeters/second or less, one and one-half feet of non-toxic soil material, and at least six inches of topsoil in order to support a dense vegetative cover. Plans must explain how much cover will be needed and where it will be obtained.

Surface Water Protection

Process wash, dust suppression, and storm water runoff that have been in contact with coal or refuse are the usual sources of coal-contaminated runoff, which (in Ohio) tends to be low in pH (acidic) and high in dissolved solids and metals, especially iron and manganese. Large preparation plants dedicated to a specific underground mine will have water to treat from the underground workings as well. In all cases, a central wastewater treatment system with no discharge (one hundred percent recycle) is the preferred option.

Some plants may achieve total recycle with only additional makeup water required. Others will need to discharge water after treatment due to design. The treatment technology required (neutralization, aeration, and settling) is essentially the same in either case. Ohio EPA requires that all proposed treatment systems reflect best available technology to achieve federally mandated effluent limitations. Proposals should include best available technology most suited to local (site) conditions.

A process flow diagram for the proposed preparation plant which shows all process streams and wastewater treatment (including a water balance) is an essential part of the permit to install application. All wastewater flows

should be shown in gallons per minute, including fine coal slurry. Flows which transport slurry should include the solids percentage within each pipe. The raw coal input, either by mass or weight, should balance with the sum of cleaned coal and coarse and fine refuse.

Dual pumps are required at all pump stations, preferably installed to alternate duty cycles. Pump interiors should be of appropriate materials (stainless steel, synthetics) resistant to the corrosive and abrasive conditions encountered. Pump stations should be readily accessible for pump service or replacement. Spare parts should be maintained against unexpected breakdowns.

Pipe and pipe joint materials specifications for significant wastewater flows should be included on detail drawings. Installation procedures for lengthy slurry lines should be explained.

Ponds which are used as aeration or settling basins must be designed to contain runoff from a ten year, 24-hour storm event over their drainage areas in addition to projected process wastewater volumes. Both pond volume and watershed area must be provided on plan sheets. Where physical considerations limit available pond volumes, diversion ditches should be added to keep uncontaminated runoff out of the pond. Provisions for sediment cleaning should be explained, and final sediment disposal addressed. Discharge structures consisting of standpipes with trash racks are recommended. Emergency spillways are recommended. These requirements, including ground water protection (liners), are in addition to Ohio Department of Natural Resources, Office of Surface Mining of the Department of the Interior, and MSHA? requirements for sediment structures.

Small crushing-only operations without coal washing facilities may require one or two settling ponds to contain runoff and a soda-ash hopper to provide neutralization. Where the treatment ponds are located in steep hilly terrain, routing flow through a rip-rapped cascade can provide a substantial amount of reaeration after neutralization.

Coal washing operations are usually served best by a central wastewater treatment plant. Important considerations which should be covered in the permit to install application include: methods of neutralization, solids settling, removal of solids, method of aeration, quantity and quality of water to be discharged.

If the plant will have a fine coal washing circuit, refuse dewatered must be addressed as to the method of dewatering, amount of fine refuse produced, and its final moisture retained.

Refuse Disposal

Ultimate disposal of the non-coal fraction (refuse) must be provided. Currently, coal refuse from coal washing operations at surface mines may be disposed in active strip cuts under effective permits through the Department of Natural Resources. This is the least desirable means of disposal.

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Coarse or combined coarse and fine refuse from preparation plants not subject to the above procedure must be placed in designated disposal areas which are protective of ground water by virtue of existing or modified soil conditions. Disposal sites should be engineered to provide stability for the disposed refuse by means of refuse placement and compaction (ten inch lifts are recommended), drainage control, and runoff treatment. Effective lifespan should be calculated and a closure plan described. The Department of Natural Resources, Division of Reclamation, requirements specify a four feet thick cover of non-toxic material. Closure plans submitted to Ohio EPA must specify that of four feet thick cover, a clay cap at least two feet thick of low permeability (1×10^{-7} centimeters/second or less) soil must overlie the refuse, prior to the additional one and one-half feet of other soils, one-half foot of topsoil, and seeding to provide a dense vegetative cover. This cap, often placed over a geotextile material to enhance stability, must be mated at the edges to lining soils or materials which underlie refuse. Wastewater treatment which reflects best available technology must be provided for surface runoff and leachate from refuse disposal discharged to state waters.

Slurry Impoundments

Slurry impoundments provide preparation plants with a combination of all-season process water storage, clarification, and fine refuse disposal in one structure. As such, these lagoons must meet regular treatment pond criteria. Slurry impoundment proposals should include: site geological and stability analysis, provisions for a clay liner at least three feet thick with a minimum permeability of 1×10^{-7} centimeters/second (or less) at design compaction rates and moisture content, minimum surface drainage achieved by diversion ditches, runoff capacity for a ten year, 24-hour storm, in addition to maximum process flow.

Embankments must be designed to provide for collection and treatment of seeps from both the downstream face and toe of the dam. All embankments over ten feet high must be permitted through the Department of Natural Resources, Division of Water.

Discharge structures whose flow-through pipes pass through constructed embankments must have anti-seep collars to lessen seepage around the discharge line. Discharge structures consisting of standpipe with trash rack are recommended, as are emergency spillways.

Slurry dewatering within the impoundment prior to closure must be explained.

Closure plans for slurry impoundments must address surface stability, propose an infiltration barrier (two feet of compacted clay at minimum 1×10^{-7} centimeters/second or less permeability), one and one-half feet of non-toxic cover, and six inches of topsoil seeded to provide a dense vegetative cover. Provisions for regrading and/or filling to provide a minimum slope of one to three degrees must be made.