

US EPA ARCHIVE DOCUMENT

U.S. EPA Site Visit Report  
Coal Combustion Waste Minefill Management Practices  
- Oklahoma -

Draft Final  
September 9, 2002

DISCLAIMER:

This document was prepared by SAIC for the U.S. Environmental Protection Agency (EPA) Office of Solid Waste. This draft is part of an information collection effort. This document has been reviewed by EPA and the State. The mention of company or product names is not to be considered an endorsement by the U.S. Government or by EPA.

## OBJECTIVE

From September 2001 to October 2002, EPA conducted visits to selected states to collect information on coal combustion waste (CCW) minefill management practices. On July 30-31, 2002, EPA staff conducted an information collection visit to Oklahoma. The purpose of this visit was to gather information regarding the regulation of CCW minefill practices within the State of Oklahoma. The visit consisted of two parts: a meeting with Oklahoma State regulators, and visits to four inactive coal mine sites where CCW is currently being placed. The CCW Minefill Management Practices Discussion Guide developed by EPA was used as a guide during the visit. A completed version of the Discussion Guide is attached to this report.

## PLACES AND DATES

### Oklahoma City, Oklahoma

Oklahoma Department of Mines, Minerals Division                      July 30, 2002

### Poteau, Oklahoma

July 31, 2002

Making Money Having Fun (MMHF) Reclamation Pit #2  
Mountain Minerals Panama Ash Disposal Site  
Brazil Creek Minerals Shady Point Surface Impoundment  
Making Money Having Fun (MMHF) Reclamation Pit #1

## SUMMARY OF MEETING WITH OKLAHOMA STATE REGULATORS

The meeting was conducted on July 30, 2002, at the Oklahoma Department of Mines, Minerals Division (ODM/MD) office in Oklahoma City, Oklahoma. In attendance at the meeting were:

- Bonnie Robinson, U.S. EPA
- Douglas Schooley, ODM/MD
- Bret Sholar, ODM/MD
- Michael Wolfrom, U.S. Department of Interior, Office of Surface Mining (OSM)
- Danielle Glitz, SAIC

It was evident that ODM/MD expended substantial effort in preparations for the meeting. ODM/MD prepared a binder for each participant. The binders included general information on the ODM/MD regulatory program, including pertinent laws, regulations, and operational guidance documents and specific information on one of the mine sites to be visited. Water monitoring results from one of the sites visited (the Brazil Creek Shady Point site) were included in the information provided at the meeting. Also, ODM/MD had reviewed EPA's discussion guide prior to the meetings and had provided preliminary responses to many of the questions.

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The ODM/MD representatives described the regulatory program for non-coal mine placement of CCW in Oklahoma. Under the State's program, non-coal mine placement means placement of CCW in any type of mine other than an active coal mine. There is no current placement or plans to place CCW in active coal mines in Oklahoma. Were such placement to occur, it would be handled in ODM's Coal Division. CCW placement in inactive/abandoned and reclaimed coal mines is considered non-coal mine placement. In Oklahoma, CCW is currently being placed in inactive and reclaimed coal mines, limestone quarries, and unmined sites.

The ODM/MD CCW program only addresses the disposal of CCWs. ODM has no jurisdiction over other uses of CCW. The Oklahoma Department of Environmental Quality (ODEQ) has jurisdiction to determine beneficial use for fill placement and works with the CCW producer in this regard. The disposal program is administered through the Minerals Division of ODM. There are currently four active and four inactive fly ash disposal sites and one site that is in reclamation stages. It is estimated, based on the four active sites, that 518,000 cubic yards of fly ash have been managed through mine placement. All of these sites are former surface mines. There are currently no sites where CCW is being placed in underground mines.

ODM is currently proposing new regulations referred to as fly ash rules. These regulations will formalize the current requirements that ODM applies to CCW disposed in sites under the jurisdiction of ODM and regulated under 45 O.S. Sec. 732 and 946.

#### **SUMMARY OF SITE VISITS**

On July 31, 2002, EPA visited four inactive mine sites utilizing different CCW management techniques near Poteau, Oklahoma. In attendance at the site visits were:

- Bonnie Robinson, U.S. EPA
- Bret Sholar, ODM/MD
- Michael Wolfrom, OSM
- Danielle Glitz, SAIC

#### **Making Money Having Fun (MMHF) Reclamation Pit #2**

The first site visited was the Making Money Having Fun (MMHF) Reclamation Pit #2. This site, previously surface and underground mined for coal, is now an ash disposal pond. It is permitted as a non-coal mine site for the purpose of disposing of CCWs, primarily fly ash. The pit, which is filled with water, is divided into two sections by a buttress constructed of dirt and ash. Water from the inactive section of the pond (below the buttress) is pumped through a line to a discharge point located at the edge of the active section (above the buttress). Ash trucks either belly or back-dump loads of ash over a steel grate that is located directly atop the water discharge point. When the ash falls through the grate, it is swept away by the water into the upper end of the active section of the pond. Once the upper section of the pond is full, ash placement will begin.

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in the lower section of the pond. This site only accepts CCW from the AES power plant. Approximately 500 to 1,500 cubic yards of ash per day are managed at the site, between the hours of 6:00 AM and 4:00 PM, five days per week.

The permit to dispose of ash at this site was issued in April 2001 and the estimated fill date is 2030. The permit authorizes an area of 105 acres on this site to receive a total permitted volume of 508,200 cubic yards of ash. The pond is approximately 270 yards wide and 1/4 mile long and, to date, has accepted 80 to 90,000 tons of ash. The resulting accumulation of ash in the pond is about 50 to 60 feet deep. When the pond is full, the ash will be approximately 90 feet thick.

Bret Sholar conducted pH tests on pond water samples during the site visit. Samples were taken from areas above and below the buttress and the pH of both was around 11. In comparison, the ground-water pH in the area is generally around 7. There are ground-water monitoring wells located on-site. The #3 well is located up-dip of the pond near the ash dumping area. It had a concrete collar and appeared to be well sealed.

Horses are kept on the land surrounding the pond and were observed grazing on the bank of the upper end of the pond. According to Bret Sholar, there have been no reports of the animals being affected by the ash placement into the pond. Significant amounts of fugitive ash were seen every time a load of ash was dumped into the recirculating water stream. The fugitive ash lingered in the air and did not disperse quickly. Oklahoma's requirements (Title 45 § 11.913.14) are that dust control measures shall be taken where dust significantly reduces visibility of equipment operators. Haulage roads shall be wet down as necessary unless dust is controlled adequately by other methods. Dust control measures are also specifically mentioned in the permit. ODEQ has jurisdiction over fugitive dust and issues Air Quality Permits in that regard.

#### **Mountain Minerals Panama Ash Disposal Site**

The second site visited was the Mountain Minerals Panama Ash Disposal Site. This site was previously surface mined for coal. Ground water and runoff water have since filled the inactive mine pit, creating a pond. The site is permitted for CCW disposal, but so far is inactive. The permit allows ash to be hauled to the site in tanker trucks to avoid loss of fugitive ash dust during transport. The entire permitted disposal area is 5,000 feet long and 400 feet wide, and is separated into three cells. Although the site is inactive, the owner must continue to conduct quarterly and annual water monitoring for the required parameters and keep the notice of disposal in plain view in order to keep the status of the disposal permit active.

#### **Brazil Creek Minerals Shady Point Surface Impoundment**

The third site visited was the Brazil Creek Minerals Shady Point surface impoundment. This site was previously surface mined for coal. CCW management operations at this site consist of end dumping fly ash into the mine pit, which is approximately 30 to 50 feet in depth, and then

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smoothing the surface of the ash with a scraper. Ash placement began at one end of the pit and has progressed to almost the other end of the pit. As each section of the pit was filled, it was covered and revegetated. Approximately 22 acres of this site remain to be reclaimed. CCW placement at this site ceased in October of 2001 due to the ash generator finding other uses for the ash, but there are plans to begin placing CCW on site again in the near future. Despite the suspension in ash management activities, the site is considered an active CCW mine placement area and continues the required quarterly water monitoring.

#### **Making Money Having Fun (MMHF) Reclamation Pit #1**

The fourth and final site visited was the MMHF Reclamation Pit #1. This site is an abandoned surface coal mine. CCW was brought in by trucks, unloaded at the site and pushed by dozer into the cell. At the time of the visit, it was estimated that 70% of the cell had been filled and covered with the required 3 feet of cover. There is another cell located next to the permitted placement area. At the present time, it is filled with water (presumably ground water and surface runoff). There are no plans for immediate reclamation of this cell. The owner, Mr. Jackson, was on-site during the visit and said that the cell will remain filled with water until it is needed for ash placement. Both the permitted area and the water-filled cell are located on land that is adjacent to an underground coal mine that is owned and permitted to another party.

According to Bret Sholar, ground-water monitoring wells are in place in the permitted area. One of the monitoring wells, located between the underground coal mine and permitted disposal area, is shared by the two owners.

## CCW MINEFILL MANAGEMENT PRACTICES DISCUSSION GUIDE<sup>1</sup>

### Outline

- I. General**  
*Regulating agencies, program structure*
- II. Planning/Permitting**  
*Permit requirements, type/source of CCW, number of permits, quantity of waste, acid/base balances, reclamation plans, operational plans, closure/post-closure plans, future uses*
- III. Waste Characterization**  
*Timing (before/during placement), testing methods, parameters, performance standards/waste characterization limits*
- IV. Site Characterization**  
*Types of data, hydrology, criteria for acceptability, liners*
- V. Risk Assessment**  
*Formal assessment/modeling, methods/criteria*
- VI. Ground Water Monitoring**  
*Monitoring system design, timing (during placement/post-closure), frequency, location, parameters, performance standards/enforceable limits*
- VII. Surface Water Monitoring**  
*Monitoring system design, timing (during placement/post-closure), frequency, location, parameters, performance standards/enforceable limits*
- VIII. Placement Practices**  
*Appropriate practices for: underground mines, surface mines, active mines, closed mines, proximity to water table, grouting, soil conditioning, mine sealing, subsidence control, spoil encapsulation*
- IX. Operational Requirements/Design Requirements**  
*Dust controls, erosion/flooding controls, runoff controls, leachate collection, re-vegetation, access controls, post-closure maintenance*
- X. Corrective Action**  
*Circumstances/triggers for action, action measures, existing damage cases*
- XI. Financial Assurance**  
*Mechanisms, liability, bond release*
- XII. Reporting**  
*Inspection frequency (pre-, during, and post-placement), monitoring data review, compliance evaluation*
- XIII. Public Participation**  
*Availability of data (pre-, during, and post-placement), compliance participation*

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<sup>1</sup> This document was prepared by the U.S. Environmental Protection Agency (EPA). It is being used to guide discussions with State and Tribal mining regulatory authorities on coal combustion waste (CCW) minefill management practices. This list of discussion items is part of an information collection effort. It is not a proposed model for CCW minefill regulation.

## CCW MINEFILL MANAGEMENT PRACTICES DISCUSSION GUIDE

July 30, 2002 – Oklahoma

<b>Interviewee Names:</b>	Doug Schooley, Administrator of Minerals Division Bret Sholar, Environmental Analyst
<b>Interviewee Agency:</b>	Oklahoma Department of Mines, Minerals Division
<b>Interview Date:</b>	July 30, 2002

### I General

1. Is there a distinction between disposal and beneficial use? **Yes.**
  - 1.1 How is the distinction made (e.g., waste quantity, placement type)? **The Oklahoma Department of Mines' (ODM) CCW program only addresses the disposal of CCWs. ODM has no jurisdiction over other uses of CCW. The Oklahoma Department of Environmental Quality (ODEQ) has jurisdiction to determine beneficial use for fill placement and works with the CCW producer in this regard.**

**Note regarding beneficial use: Because ODM has no jurisdiction over the beneficial use of CCW, the responses in this document pertain only to Oklahoma's program for CCW disposal. ODM was unable to determine if there are currently any beneficial use projects in Oklahoma involving placement of CCW in a mine, because beneficial use in Oklahoma falls under the jurisdiction of the ODEQ.**
2. Under what program(s) does the State regulate mine placement (e.g., SMCRA implementing regulations, State solid waste program)? **The program is administered through the Minerals Division of ODM under the State's surface mining and reclamation regulations. ODM is in the process of composing specific regulations for fly ash disposal in mines. (Note: these regulations will cover mine placement of cement kiln dust, as well as CCW.)**
3. Are there differing requirements/policies applicable to different types of CCW (e.g., fly ash vs. FGD wastes)? **No, ODM currently applies its requirements uniformly to all CCW.**
4. Are there differing requirements/policies applicable for different types of placement? **No, whether the CCW is placed into ash disposal pits in a dry state or slurried into pits the requirements/policies are uniform.**
5. Are there differing requirements/policies applicable for different kinds of mines (e.g., coal vs. non-coal mines such as quarries)? **No, generally speaking, the same requirements/policies are the same for all types of mines. Any site-specific**



requirements, such as hydrological and/or geological issues, are addressed in the permitting process.

## **II Planning/Permitting**

1. Are mine facilities required to obtain permits for CCW placement? **Yes, any entity, whether at an existing/abandoned mine site or a site with no mining history, is required to apply for a CCW disposal permit with ODM prior to disposal.**
2. Who issues the appropriate permits? **The Minerals Division of the Oklahoma Department of Mines issues permits for CCW placement in Oklahoma, which, to date, has not include disposal at an active coal mine. Any disposal of ash on a current coal permit area would require the applicant to file for approval through ODM's Coal Division.**
3. Do the permits contain project-specific conditions or requirements? **Yes. Even though each permit contains general requirements standard to all permits, site-specific requirements are included in the individual permits based on discoveries in the application review process.**
4. Are there environmental justice considerations in the permitting process? **As based on EPA's definition of environmental justice, all stakeholders, including the general public, have meaningful involvement in the permitting process.**
5. Is the operator required to identify:
  - 5.1 The type of CCW to be minefilled? **Yes.**
  - 5.2 The source of the CCW? **Yes.**
  - 5.3 The quantity of CCW to be minefilled? **Yes.**
6. How many permits have been authorized in the State for CCW mine placement?  
**9 permits have been authorized to date. 4 permitted sites are active, 4 permitted sites are non-active, and 1 site is almost completed (in reclamation stages).**
7. What is the total quantity of CCW minefilled in the State per year? **Estimated (based on 4 active sites): 518,000 cubic yards/year of fly ash.**
8. Are operators required to address acid/base balances prior to placement? **This is not applicable because there are not currently any permits that place CCW in active coal mines.**
9. Is a reclamation plan required? **Yes, reclamation plans are required for all sites under ODM Minerals Division permits.**
  - 9.1 Is the plan required to specifically address the use of CCW? **Yes, all CCW permits include reclamation plans.**

- 9.2 What must the plan include? **OAC 460:10-15-3** (see below) sets forth what is **included in reclamation plans submitted to ODM for non-coal mining operations generally. These same requirements are applied to CCW disposal permits.**

***OAC 460:10 -15-3 Reclamation Plan***

- (a) *The reclamation plan shall, to the extent applicable, include:*
- (1) *The planned land use or uses to which the affected lands will be rehabilitated.*
  - (2) *The methods to prevent or eliminate conditions that will be hazardous to animal or fish life in or adjacent to the affected land.*
  - (3) *The methods for rehabilitating settling ponds.*
  - (4) *the method for the control of contaminants and disposal of the refuse including tailings.*
  - (5) *The measure to provide safety to persons and adjoining property in all excavations.*
  - (6) *A plan for the permanent revegetation, reforestation or other surface treatment of the affected land using accepted and recommended practices. The revegetation plan shall include but not be limited to the following:*
    - (A) *Planned soil tests*
    - (B) *Site preparation and fertilization*
    - (C) *Seed or plant selection*
    - (D) *Rate of seeding or amount of planting per acre.*
  - (7) *A time schedule of reclamation activities*
  - (8) *A reclamation map outlining the final limits of the excavation, the tailing disposal area, the disposal area for the spoil and refuse area, the approximate location of any impoundment or water body which will remain upon final reclamation, locations of access roads which will remain, location of drainage ditches, the boundary of the permitted area, the boundaries of the affected area for the anticipated life of the mine, and the boundaries of the 100-year floodplain, where appropriate.*

- 9.3 What are the standards for reclamation (i.e., how is the end-point of reclamation defined)? **The general standards for reclamation can be found in OAC 460:10-15 (see below) and Title 45 § Sections 721-738 (Mining Lands Reclamation Act). Under ODM's proposed fly ash rules, reclamation will be defined as the conditioning of land under permit after disposal of ash to render it useful for purposes consistent with Title 45 § Section 725.**

***OAC 460:10-15-2 Simultaneous Reclamation***

*Reclamation shall be conducted simultaneously with the mining whenever feasible and in any event shall be initiated at the earliest practicable time. Grading shall be completed within one year after completion or termination of mining on any segment of the mine.*

10. Is an operational plan required? **Yes.**
- 10.1 Is the plan required to specifically address the use of CCW? **Yes, any permit that includes the use of CCW is required to address such in its operational plan.**
- 10.2 What must the plan include? **Specific requirements will be addressed in the proposed fly ash rules (see below).**

*Proposed Fly Ash Rules*

*Sec. 12-5.36*

*The application shall contain a detailed narrative description of the CCB disposal operations to be conducted, including , but not limited to the following:*

- (1) The method of CCB placement, including equipment dedicated to the operation.*
- (2) A description of the life expectancy of the operation, and the daily and annual quantities of CCB to be disposed on the permit area, as well as the total quantity to be disposed over the life of the operation.*
- (3) Sources of CCB to be disposed on the permit area.*
- (4) A description of measures taken to ensure employee safety and the safety of the general public during CCB disposal activities. This includes a plan to provide emergency services in case of injury or accident.*

*Sec. 12-5.44*

*Operations and reclamation maps are also required.*

11. Is a closure plan and/or post-closure plan required? **Yes.**
- 11.1 Is the plan required to specifically address the use of CCW? **All plans specifically address the use of CCW on site. This will also be addressed in the proposed rules.**
- 11.2 What must the plan include? **The plan includes completion of reclamation requirements (see below) as described in the attached proposed rules.**

*OAC 460:10-13-4 (d)*

*A closure plan shall be submitted for review and approval at least 90 days prior to commencing closure operation of the site. The plan shall include the following information:*

- (1) Name and forwarding address of the operating authority completing the closure procedures*
- (2) A schedule of closure activities*
- (3) Site Plan*
- (4) Disposition of any waste materials*

- (5) *Schedule of steps taken to achieve vegetative stabilization of the site*
- (6) *Any approved reclamation plan requirements*

12. Are there procedures and criteria for determining what future uses are acceptable following closure? **Yes, this is set out in the permit. However, once a permit is released ODM has no jurisdiction over the site.**
- 12.1 How is the public involved in this determination? **The public has the right to protest permit issuance and bond release approvals. The public is also invited to participate in the release inspections.**
- 12.2 If use is restricted, what protects against inappropriate uses? **The intended post-mining land use is included in the reclamation portion of the permit. Once the permit is released, ODM has no control over land use issues.**

### III Waste Characterization

1. Is characterization of the CCW conducted prior to placement? **Yes. This is required under current permits and under the proposed rules.**
- 1.1 What analytes are measured? **This is addressed in the proposed fly ash rules (see below).**
- 1.2 What is the testing method used? **This is addressed in the proposed fly ash rules (see below).**

#### *Proposed Fly Ash Rules*

##### *Sec 12-5.38*

*Each applicant shall contain a complete analysis of the CCB to be disposed in the permit area. An additional analysis of CCB disposed in the permit will be submitted to the Department annually. Specific parameters to be analyzed shall be:*

#### *Initial parameters and annually thereafter:*

- (1) *TCLP analysis: arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, copper, molybdenum, nickel, zinc.*
- (2) *Chemical analysis: silicon dioxide, aluminum oxide, iron oxide, sum of SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, and Fe<sub>2</sub>O<sub>3</sub>, calcium oxide, magnesium oxide, sodium oxide, potassium oxide, sulfur trioxide, moisture content, loss on ignition, available lime index - CaO, calcium carbonate equivalent - CaCO<sub>3</sub>, effective calcium carbonate equivalent - CaCO<sub>3</sub>, (all %), and pH.*
- (3) *Physical analysis:*
  - (1) *Amount retained on a No. 325 sieve, %*
  - (2) *C-109 cubes w/o cement, psi*
    - (1) *3 - day*
    - (2) *7 - day*
    - (3) *28 - day*
  - (3) *Density*

- 1.3 Are there numerical waste acceptance/rejection criteria? **No universal criteria, but all submissions are reviewed with guidelines based on the acceptable hydrological limits.**
  - 1.3.1 If so, what are they? **Question not applicable.**
  - 1.3.2 If not, how are waste characteristics considered in pre-placement and planning? **All submissions are reviewed with guidelines based on the acceptable hydrological limits.**
2. Is ongoing waste characterization required during placement? **Yes. This is required under current permits and under the proposed rules.**
  - 2.1 How do the analytes, testing methods, or waste acceptance/rejection criteria differ from those used prior to placement? **No difference.**
  - 2.2 What is the required frequency of characterization? **CCW is tested prior to disposal, annually and if the source of the CCW changes.**
  - 2.3 How often is the waste characterization data reviewed by the appropriate regulatory agency? **Same as 2.2.**
3. What is the basis for any numerical acceptance/rejection criteria? **Not applicable, each submission is reviewed based on the acceptable hydrological limits and for any changes that have occurred in the CCW parameters.**

#### **IV Site Characterization**

1. Is characterization of the site required prior to placement? **Yes.**
  - 1.1 What factors are examined in characterizing a site? **Specific requirements will be addressed in the proposed fly ash rules (see below).**

##### ***Proposed Fly Ash Rules***

##### ***Sec. 12-5.32 - Geologic Information***

- (a) ***Each application shall contain a narrative description of the surficial and subsurface geology under and adjacent to the proposed permit area down to the first stratigraphic unit below the level where CCB would be disposed. This description shall include structural geology of the permit and adjacent areas that would influence the movement of surface and ground water.***
- (b) ***The description shall include information on permeability of the sides and bottom of proposed CCB disposal sites in the permit area, obtained from visual inspection and laboratory testing of rock strata or other earthen materials that would be in direct contact with the disposed CCB. The permeability of the in situ material on the sides and bottom of the proposed CCB disposal site must not exceed 10<sup>-7</sup> cm/hr.***
- (c) ***Logs of holes drilled to obtain geologic information shall be provided.***
- (d) ***If required, the Department may require the collection of additional geologic information and analyses in addition to that required by these Paragraphs (a) and (b) of the Section.***



***Sec. 12-5.33 - Soils Information***

- (a) A description of the soil types under the proposed permit area from the United States Department of Agriculture Natural Resource Conservation Service county soil surveys, or equivalent permit area soil survey. Such description shall contain the following at a minimum; lateral extent of each soil type under permit area, thickness, color, composition, slopes, land use suitability and engineering properties.***
- (b) Additional soils description, including, but not limited to permeability tests as specified by the Department.***

- 1.2 What are the criteria for accepting/rejecting a site? **A site must meet all criteria addressed in the proposed fly ash rules.**
- 2. Is consideration of the site hydrology (e.g., a probable hydrologic consequences determination under SMCRA) required? **Yes, ODM considers the hydrology of a site in its permitting process.**
  - 2.1 Does this consideration specifically address the use of CCW? **Yes, this is taken into consideration.**
  - 2.2 What are the hydrologic criteria for site acceptance/rejection? **A site must meet all criteria addressed in the proposed fly ash rules.**
  - 2.3 Does consideration of site hydrology specifically address both ground water and surface water? **Yes.**
  - 2.4 What time period does PHC determination or other consideration of site hydrology address? **Set time periods will be addressed in the fly ash rules and all permits will be reviewed on their individual merits.**
- 3. Is background groundwater monitoring data required prior to placement? **Yes. This is required under current permits and under the proposed rules.**
  - 3.1 What analytes are measured? **This is addressed in ODM's proposed fly ash rules (see below).**

***Proposed Fly Ash Rules***

***Sec. 12-5.31 (b) - Ground Water Information***

- (1) Each application shall contain information on the depth, lateral extent, chemical composition, use and movement of ground water into and out of the permit area. The physical and chemical composition shall include the following information:***

***Testing parameters - Initial: TDS, specific conductance, TSS, pH, total iron, total manganese, alkalinity, sulfate, arsenic, barium, cadmium, chromium, lead, mercury, color, dissolved oxygen, fluoride, nitrogen, nitrate, selenium, temperature, depth to water.***

- 3.2 How are the sampling locations selected? **This is addressed in ODM's proposed fly ash rules (see below).**

*Proposed Fly Ash Rules*

*Sec. 12-5.31 (b) - Ground Water Information*

- (2) *Logs and cross sections of wells drilled for collection of ground water information and as monitor wells shall be included in the application.*
- (3) *Chemical composition and completion data for private wells adjacent to the permit area shall be included in the application.*

- 3.3 How much data is required before placement? **No set quantity, but a hydrological assessment is required of the operator prior to permit approval and CCW placement.**

4. Is background surface water monitoring data required prior to placement? **Yes. This is required under current permits and under the proposed rules.**

- 4.1 What analytes are measured? **This is addressed in ODM's proposed fly ash rules (see below).**

*Proposed Fly Ash Rules*

*Sec. 12-5.31 (a) Surface Water Information*

- (3) *The physical and chemical composition shall include the following information:*

*Testing parameters - Initial: TDS, specific conductance, TSS, pH, total iron, total manganese, alkalinity, sulfate, arsenic, barium, cadmium, chromium, lead, mercury, color, dissolved oxygen, fluoride, nitrogen, nitrate, selenium, temperature, flow in streams, flow rate of discharges of impoundments, impoundment freeboard, impoundment depth.*

- 4.2 How are the sampling locations selected? **This is addressed in ODM's proposed fly ash rules (see below).**

*Proposed Fly Ash Rules*

*Sec. 12-5.31 (a) Surface Water Information*

- (1) *Each application shall contain information on location, chemical composition, sources, and use of surface water resources within and adjacent to the proposed permit area, including, but not limited to ponds, impoundments, and open pits.*
- (2) *Stream channels within the permit area shall be described according to classification, flow rate, source of discharge, and chemical analysis.*

- 4.3 How much data is required before placement? **No set quantity, but a hydrological assessment is required of the operator prior to permit approval and CCW placement.**

5. Is the use of liners considered in site characterization? **Yes, the need for liners is addressed in the geological/hydrological assessments in the permit application.**
- 5.1 If a site is determined to be unacceptable for CCW placement, can it be made acceptable through the use of liners? **No current CCW sites have had the need for liners due to the geological assessment. However, if this need occurs, it would be investigated.**
6. Are there any restrictions on the type of sites that can accept CCW? **Each site is evaluated on its own merits. In addition, the proposed fly ash rules include the following:**

***Proposed Fly Ash Rules***

***Sec. 12-7.20***

***(b) CCB shall not be disposed in artesian basins, over springs, or over recharge areas of aquifers.***

***Sec. 12-7.21 - Flood Prone Areas***

***CCB shall not be disposed in areas identified within the 100-year flood plain areas as described in maps published by the United States Geological Survey in cooperation with the U.S. Department of Housing and Urban Development.***

**V Risk Assessment**

1. Is a formal risk assessment performed? **No formal risk assessment, but the permit review process by ODM staff can be viewed as a form of risk assessment.**
- 1.1 Is it based on site-specific, regional or other (please specify) data? **Permit-specific review.**
- 1.2 Describe the steps taken in this assessment. **Question not applicable; there is no formal assessment.**
- 1.3 Who conducts the assessment? **ODM staff.**
2. Are specific air, surface water, and ground water models, equations, etc., used to assess risk or impacts? **No.**
3. How are the risk assessment results expressed? {e.g., monetization of potential damages, calculated incremental health risks (illness, deaths), negative risk (i.e., benefits outweigh negative impacts), rationalization (e.g., aquifer is not potable anyway), comparative (current/future use of the resource)} **Results are expressed in findings issued after review of the permit application.**
4. How are the results interpreted to determine the level and acceptability of impacts to receptors? **Question not applicable; there is no formal assessment.**
- 4.1 Who is responsible for interpreting the results? **NA**



5. If no risk assessment is completed, is there a presumption that placement is acceptable if certain criteria are met? (e.g., leachate characteristics, distance to ground water, liner placement, historical experience of the regulatory authority). **The proposed fly ash rules as a whole are the criteria for determining if placement is acceptable.**

5.1 Please list the pass/fail criteria below.

## **VI Ground Water Monitoring**

1. Is a ground water sampling and analysis plan required? **Yes.**
2. Is groundwater monitoring required during placement? **Yes. This is required under current permits and under the proposed rules?**
- 2.1 What analytes are measured? **This is addressed in the proposed fly ash rules (see below).**

### ***Proposed Fly Ash Rules***

#### ***Sec. 12-5.38 CCB Disposal: Hydrologic balance protection***

##### ***(c) Ground Water Monitoring Plan***

***Testing parameters - annually: TDS, specific conductance, TSS, pH, total iron, total manganese, alkalinity, sulfate, arsenic, barium, cadmium, chromium, lead, mercury, color, dissolved oxygen, fluoride, nitrogen, nitrate, selenium, temperature, and depth to water.***

***Testing parameters - quarterly: pH, TDS, sulfates, specific conductance, temperature, and depth to water.***

- 2.2 How are the number of wells, well locations, and screening zones selected? **Hydrological assessments aid in the determination of wells and well locations. At least one (1) up-dip and two (2) down-dip wells are required based on the proposed fly ash rules.**
- 2.3 What is the frequency of monitoring? **Limited quarterly, expanded annually (See proposed rules, above).**
3. Is post-closure ground water monitoring required? **No.**
4. Can ground water monitoring be discontinued? **Yes, but revisions must be submitted and approved by ODM in order to change permitted water monitoring requirements. All revision requests must be accompanied by justifying data.**
- 4.1 What are the criteria for discontinuing ground water monitoring? **This is addressed in the proposed fly ash rules (see below).**

### ***Proposed Fly Ash Rules***

#### ***Sec. 12-7.26 (a)(3)***

***The permittee may apply to the Department for a reduction of water monitoring requirements if the permittee can affirmatively demonstrate that CCB disposal***

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*operations are not causing adverse impact on the quantity or quality of surface and ground water resources.*

5. How is ground water monitoring designed to specifically detect/distinguish the effects of CCW placement? **The monitoring parameters included in the proposed fly ash rules were chosen for monitoring CCW placement.**
6. How are large expanses dealt with? **All ground and surface water is taken into consideration and specific monitoring points are reviewed by ODM staff and approved on a case by case basis.**
7. How is existing ground water contamination dealt with as part of the monitoring program? **Existing conditions are taken into consideration when reviewing water monitoring reports.**
8. What water quality standards/criteria must be met? **ODM is not the regulatory agency that has jurisdiction over water quality standards. As a permit condition, ODM requires permittees to adhere to the appropriate water quality standards.**
9. Are alternative monitoring methods allowed? **Yes.**
  - 9.1 What alternative monitoring methods are allowed? **Alternative monitoring methods are dependant on the data presented and the justification for the requested alternative before a permit revision is approved.**

## **VII Surface Water Monitoring**

1. Is a surface water sampling and analysis plan required? **Yes.**
2. Is surface water monitoring required during placement? **Yes. This is required under current permits and under the proposed rules.**
  - 2.1 What analytes are measured? **This is addressed in the proposed fly ash rules (see below).**

### ***Proposed Fly Ash Rules***

#### ***Sec. 12-5.38 CCB Disposal: Hydrologic balance protection***

##### ***(b) Surface Water Monitoring Plan***

***Testing parameters - annually: TDS, specific conductance, TSS, pH, total iron, total manganese, alkalinity, sulfate, arsenic, barium, cadmium, chromium, lead, mercury, color, dissolved oxygen, fluoride, nitrogen, nitrate, selenium, temperature, flow in streams, flow rate of discharges of impoundments, impoundment freeboard, and impoundment depth.***

*Testing parameters - quarterly: pH, TDS, sulfates, specific conductance, dissolved oxygen, temperature, flow in streams, flow rate of discharges of impoundments, impoundment freeboard, and impoundment depth.*

- 2.2 How are sampling locations selected? **Hydrological assessments aid in the determination of monitoring locations.**
- 2.3 What is the frequency of monitoring? **Limited quarterly, expanded annually (See guidelines and proposed rules, above).**
- 3. Is post-closure surface water monitoring required? **No.**
- 4. Can surface water monitoring be discontinued? **Yes, but revisions must be submitted and approved by ODM in order to change permitted water monitoring requirements. All revision requests must be accompanied by justifying data.**
  - 4.1 What are the criteria for discontinuing surface water monitoring? **This is addressed in the proposed fly ash rules (see below).**

***Proposed Fly Ash Rules***

***Sec. 12-7.26 (a)(3)***

***The permittee may apply to the Department for a reduction of water monitoring requirements if the permittee can affirmatively demonstrate that CCB disposal operations are not causing adverse impact on the quantity or quality of surface and ground water resources.***

- 5. How is surface water monitoring designed to specifically detect/distinguish the effects of CCW placement? **The monitoring parameters included in the proposed fly ash rules were chosen for monitoring CCW placement.**
- 6. How is background surface water quality assessed? **As part of the site characteristic assessments of each applicant reviewed in the permitting process (see Section IV, above).**
- 7. What water quality standards/criteria must be met? **ODM is not the regulatory agency that has jurisdiction over water quality standards. As a permit condition, ODM requires permittees to adhere to the appropriate water quality standards.**

**VIII Placement Practices**

- 1. What types of CCW placement are allowed (i.e., into active mines, closed mines, surface mines, underground mines, etc)? **No guidelines have been established on types of placement. Permit applications will be reviewed for any type of placement, as long as meets the other criteria established in the proposed fly ash rules.**
- 2. Is placement into the water table allowed? **To date, no such application has been made. This will be evaluated on a case-by-case basis.**

- 2.2 If not, how close to the water table is placement allowed? **Placement is required to be at least five (5) feet above the seasonal high of the water table.**
- 2.3 If a liner is required beneath the CCW, what are the design/performance standards for the liner? **All current permitted sites have in-situ liners. The proposed fly ash rules state liner material should have a permeability of  $10^{-7}$  cm/sec and be a minimum of 12 inches thick.**
- 3. Is placement into mine pools allowed? **Yes, current permitted non-coal sites include placement into areas of standing water within mine pits. By EPA's definition, this would be placement in mine pools.**
  - 3.1 What placement techniques are used? **Placement techniques include direct truck dumping and slurring.**
  - 3.2 Are there additional/special monitoring requirements after placement into a mine pool? **Quarterly water monitoring is required throughout the life of the permit.**
- 4. Are there specific design/operational requirements for the following types of projects and, if so, what are they? **No, not currently.**
  - 4.1 Placement into underground mines? **Question not applicable**
  - 4.2 Placement into surface mines? **Question not applicable**
  - 4.3 Grouting? **Question not applicable**
  - 4.4 Acid mine drainage remediation? **Question not applicable**
  - 4.5 Soil conditioning? **Question not applicable**
  - 4.6 Mine sealing? **Question not applicable**
  - 4.7 Subsidence control? **Question not applicable**
  - 4.8 Spoil encapsulation? **Question not applicable**

#### **IX Operational Requirements/Design Requirements**

- 1. How is the potential for flooding/washout addressed? **Permittees are required to submit a Notice of Intent (NOI) for a storm water drainage permit with the Oklahoma Department of Environmental Quality (ODEQ). ODM is given a copy of the NOI and any other documentation associated with the ODEQ enforced storm water permit. In addition, the proposed fly ash rules include the following:**

##### ***Proposed Fly Ash Rules***

###### ***Sec. 12-7.21 Flood-prone areas***

***CCB shall not be disposed in areas identified within 100-year flood plain areas as described in maps published by the United States Geological Survey in cooperation with the U.S. Department of Housing and Urban Development.***

###### ***Sec. 12-7.24 Hydrologic Balance: Sediment Control Measures***

***CCB disposal and reclamation operations shall be conducted in a manner that minimizes erosion and retains sediment on the permit area, using the best available control technology. Sediment control measures may include, but not be limited to***

*construction of diversions, sedimentation ponds, and vegetative buffer zones around affected areas.*

2. Are runoff controls used/required? **Yes, this is addressed in the design criteria of ODM's proposed fly ash rules (see below). Storm water runoff would be addressed under ODEQ's storm water permit.**

***Proposed Fly Ash Rules***

***Sec. 12-7.25 Hydrologic Balance: Diversions***

***Diversions shall be constructed in a workmanlike manner that minimizes contribution of suspended solids to surface water flow outside the permit area. Permanent diversions shall be constructed with a permanent and stable vegetative cover.***

***Runoff diversions must handle 10 year 6 hour storm event.***

3. Are leachate collection systems used or required? **This is addressed in ODM's proposed fly ash rules. Leachate control is addressed in ODM's "Permit Submission and Review Guidelines" and will be included in the proposed fly ash rules and applied on a case-by-case basis.**
  - 3.1 Under what conditions? **On-site leachate control is and will be required to be collected and treated prior to leaving the site.**
  - 3.2 What are the design criteria? **Liner material should have a permeability of  $10^{-7}$  cm/sec. Minimum thickness of liner should be 12 inches. Monitoring wells above and below the site (two required down-dip)**
4. Is waste conditioning required? **No.**
5. What fugitive dust controls are used or required? **ODEQ has jurisdiction over fugitive dust. Currently, ODM monitors dust during on-site transport and discharge from vehicles and following placement in its health and safety inspections. Title 45 § Section 913.14 of the Surface Mine Safety Standards addresses dust control. In addition, the proposed fly ash rules include the following:**

***Proposed Fly Ash Rules***

***Sec. 12-7.31 CCB Disposal: Fugitive Dust Control***

- (a) ***CCB disposal shall be conducted that minimizes fugitive dust production, using the best available control technology. This may include, but not be limited to use of water sprays, limiting amount disposed at any one time, limiting disposing during windy conditions, and use of surfactant, if approved by the Department.***
- (b) ***The requirements of this Chapter notwithstanding, the permittee shall conduct CCB disposal operations in a manner consistent with any air quality permit required under the Oklahoma Clean Air Act (63 O.S. Sec. 1-1801).***

***Sec. 12-7.65 Roads***

*Access roads utilized within the permit area shall be maintained in a manner that:*

*(a) minimizes production of fugitive dust*

5.1 During transport and discharge from transport vehicles? **See above**

5.2 During/following placement? **See above**

6. Is a cover or cap required over the CCW? **Yes, the standards and design criteria for grading, slope, erosion control, cover material and cover thickness are addressed in the proposed fly ash rules (see below). This is required under current permits and under the proposed rules?**

*Proposed Fly Ash Rules*

*Sec. 12-7.33 CCB Disposal: Intermediate Cover*

*The exposed CCB surface on the permit area shall be stabilized during disposal operations to prevent wind and water erosion, and subsequent transport off the permit area. This may be accomplished through application of water or earthen materials. Chemical stabilizers or other substances may be used, if approved by the Department.*

*Sec. 12-7.52 Reclamation: Final Cover*

- (a) Upon completion of CCB disposal, a final capping of natural, non-toxic, and non-acidic earthen material shall be placed over the final graded CCB surface. The final capping shall be a minimum of two and half (2.5) feet thick, not including topsoil cover above the capping material. The Department may require a thicker final capping prior to distribution of topsoil, depending upon its review of the permit application.*
- (b) A minimum of six inches of topsoil shall be placed over the final capping material to support a permanent vegetative cover over the area affected by CCB disposal.*

6.1 What are the design/performance criteria? **3 ft of cover containing at least 6 inches of top soil.**

6.2 What kind of cover materials are required? **Overburden and topsoil**

6.3 What minimum/maximum slopes are allowed for final cover? **This is addressed in the proposed fly ash rules (see below).**

*Proposed Fly Ash Rules*

*Sec. 12-7.53 Reclamation: Slope Stability*

*CCB disposal areas shall be graded to slopes not exceeding twenty percent, or a lesser slope after review of existing and proposed conditions at the proposed permit area.*

6.4 What compaction criteria/standards apply to the cover/cap? **No compaction criteria/standards are specified for the cover/cap.**

6.5 What are the maintenance standards for covers/caps? **Vegetation must be established and erosion controlled.**



7. Is re-establishment of surface streams required? **This has not been encountered at any fly ash sites to date.**
8. Is contouring of waste so water drains away from the fill required? **Yes.**
  - 8.1 When is it appropriate to contour wastes? **This is addressed in each permitted site's reclamation plan.**
  - 8.2 What are the minimum slope and compaction criteria? **This is addressed in each permitted site's reclamation plan.**
9. Is re-vegetation required? **Yes, design criteria, vegetation, and topsoil are addressed in the proposed fly ash rules (see below).**

***Proposed Fly Ash Rules***

***Sec. 12-7.58 Reclamation: Revegetation***

***The permittee shall establish a permanent vegetative cover capable of resisting erosion without subsequent irrigation, fertilization, or other maintenance. Species planted shall be consistent with climatic, soil, and land uses in the area immediately surrounding the permit area.***

- 9.1 What are the design criteria? **See above.**
- 9.2 What kinds of plants are used? **See above.**
- 9.3 What kinds of topsoil/compost are required? **See above.**
10. Is the operator required to restrict public access to the waste and facility? **The operator is required to control access to the permitted area at all times for health and safety reasons.**
  - 10.1 What design/performance standards or criteria apply? **No explicit standards.**
11. What are the post-closure maintenance requirements (e.g., maintaining cover integrity and effectiveness, slopes, vegetation, etc.)? **Once a site has met all of the reclamation requirements of their permit as described in the proposed fly ash rules and the permit is released, ODM has no jurisdiction over the site.**
12. How long is the owner/operator responsible for post-closure maintenance? **See response to Question 11, above.**
13. What other operational requirements exist? **None.**

**X Corrective Action**

1. Under what circumstances are corrective actions required/what is the trigger for a corrective action? **Inspections are conducted at each permitted site twelve times per year. Inspectors conduct health and safety and environmental inspections at the permit areas. Any need for corrective action is addressed when found in the inspection.**

2. What types of corrective action measures are appropriate? **Notice of Violations can be issued to correct situations and bond adjustments can be made if needed.**

3. Does the State have any damage cases? **No.**

## **XI Financial Assurance**

1. Is financial assurance required? **Yes.**

1.1 What types of financial assurance mechanisms are allowed? **Reclamation bonds are required to be posted for all permits.**

2. What is the period of liability? **The reclamation bond remains until the site is released.**

3. What is the amount of financial assurance required? **The bond amount varies depending on conditions specific to the site. The average cost/acre on bonds for active CCW placement sites is: \$2,645.49/bonded acre.**

4. What are the conditions for bond release? **All reclamations requirements of the permit must first be met.**

5. Is there a separate State liability fund? **No.**

## **II Reporting**

1. How frequently is monitoring data on wastes, ground and surface water reported to the government? **Waste characterization: annual or when source of CCW changes. Water quality: quarterly and expanded annual.**

2. Is the data maintained at the facility? **No, data pertaining to the permit is available by contacting ODM.**

3. How often are sites inspected? **12 times per year.**

4. How often is compliance with permit requirements, performance standards, enforceable limits, etc., evaluated? **Compliance is evaluated during each inspection by ODM staff.**

5. What are the post-closure reporting requirements? **Once a site has met all of the reclamation requirements of their permit as described in the proposed fly ash rules and the permit is released, ODM has no jurisdiction over the site.**

6. How frequently does the regulatory authority inspect the closed facility, and what are the criteria for terminating inspection? **Inspections are conducted 12 times per year until the site is released. Sites that are still permitted, but no longer accepting CCW are inspected at the same rate until closure. When all reclamation requirements have been met, ODM will conduct a final closure inspection before the site is released.**



### **XIII Public Participation**

1. Prior to permit issuance, does the public have an opportunity to review and comment on monitoring (surface and ground water) and/or modeling data and Probable Hydrologic Consequences determination? **Yes.**
  - 1.1 What other opportunities for public involvement are there in the permitting process? **The public can get involved in the permitting process by filing protests/comments and attending public hearings.**
2. Is monitoring data available to the public? **Yes.**
3. What opportunity does the public have to participate in overseeing compliance at the site? **The public can review data, attend bond release inspections and send in complaints on the continuous operation.**
4. How does the public have access to post-closure reports? **Not applicable.**
5. Are citizen actions allowed? **Yes.**
  - 5.1 What types of actions are allowed (e.g., petitions, suits)? **Informal hearings are adjudicated by ODM and an administrative law judge adjudicates formal hearings. All hearings can be appealed to District Court.**
  - 5.2 Who adjudicates citizen actions (e.g., permitting agency, administrative law judge, State court, federal court)? **See response to 5.1, above.**