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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET,
ATLANTA, GEORGIA 30303-8960

APR 17 2018

ACTION MEMORANDUM

SUBJECT: Action Memorandum for a Non-Time Critical Removal Action, Consistency Exemption Request and Ceiling Increase at the Mississippi Phosphates Corporation National Priorities List Site, Pascagoula, Jackson County, Mississippi.

FROM: Craig Zeller, P.E.
Remedial Project Manager
Region 4 Superfund Division

THRU: Franklin E. Hill, Director
Region 4 Superfund Division

Onis "Trey" Glenn, III
Region 4 Administrator

for Reggie Cheatham, Director
Office of Emergency Management

for James E. Woolford, Director
Office of Superfund Remediation and Technology Innovation

Barry N. Breen, Acting Assistant Administrator
Office of Land and Emergency Management

TO: E. Scott Pruitt, Administrator
U.S. Environmental Protection Agency

I. PURPOSE

The purpose of this Action Memorandum (Action Memo) is to request and document approval to conduct a Non-Time Critical Removal Action (NTCRA) as described herein at the Mississippi Phosphates Corporation (MPC) National Priorities List (NPL) Site in Pascagoula, Jackson County, Mississippi. In addition, this memorandum requests approval for a Ceiling Increase and Consistency Exemption to the $2 Million limitation and the 12-month time limitation for this NTCRA. The December 2017 Engineering Evaluation/Cost Analysis (EE/CA) for closure of the East Gypsum Stack (EGS) and North Ponds identified removal action alternatives and estimated costs for three phases of closure. This Action Memo selects Alternative 2B (Complete Linear Low-Density Polyethylene (LLDPE) Liner Across the EGS) for the Phase 1 action, Alternative 3B (Pond 5 Closure with North Ponds Capped in Place) for the Phase 2 action, and Alternative 4 (Pond 6 and Water Return Ditch (WRD) Closure) for the Phase 3 action. The total estimated cost to implement these three recommended alternatives is $71,602,917.

This Action Memo also includes on-going water treatment of contact storm water and stored wastewater on-site as well as site stability and maintenance activities. The EE/CA estimated the costs for on-going water treatment and maintenance activities (e.g. Alternative 1 – No Action) at $5.6 Million for an average precipitation year. However, the actual costs incurred in 2017 exceeded $13 Million. This Action Memo assumes three years of on-going water treatment costs during close out of the EGS at an estimated cost of $1 Million/month (e.g. $36 Million total). Treatment of contact storm water and stored wastewater must continue during the EGS closure work to prevent an uncontrolled release of untreated water to the environment. Full closure of the EGS will greatly reduce the quantity and improve the quality of water that requires treatment, and will eventually lead to the collection/treatment of leachate only from the East and West Gypsum Stack (WGS).

The last Action Memo (November 17, 2017) raised the total site ceiling to $25,023,606 and approved the on-going Time Critical Removal Action activities through June 30, 2018. This Action Memo raises the total site ceiling an additional $107,602,917 ($71.6 Million for EGS closure + $36 Million for water treatment) for a total of $132,626,523 for Time Critical Removal Action and NTCRA at the MPC Site. NTCRA work under this Action Memo is expected to be completed by December 31, 2020.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

Site Name:	Mississippi Phosphates Corporation
CERCLIS ID:	MSD077909133
Superfund Site ID:	B45U
Site Location:	Pascagoula, Jackson County, Mississippi
Lat/Long:	30°22'26.25"N, 88°29'25.21"W
NPL Status:	Proposed: August 3, 2017; Final: January 18, 2018
Removal Category:	Non-Time Critical Removal Action

1. Background

The former MPC facility produced diammonium phosphate (DAP) fertilizer. The company began operation in the late 1950s and was a subsidiary of Mississippi Chemical Corporation (MCC) from the early 1990s through 2004. On May 15, 2003, MCC filed for Chapter 11 bankruptcy protection in the United States Bankruptcy Court, Southern District of Mississippi. Pursuant to MCC's Joint Plan of Reorganization, MPC was spun off as a separate entity to be acquired by MCC's unsecured creditors. On December 21, 2004, MPC emerged from bankruptcy as an independent entity that was acquired by Phosphate Holdings, Inc. (PHI). On October 27, 2014, MPC and its subsidiaries filed for Chapter 11 bankruptcy protection in the United States Bankruptcy Court, Southern District of Mississippi. MPC ceased all fertilizer production in December 2014. Pursuant to a court-approved Stipulation and Settlement Agreement reached in July 2015, substantially all of the former MPC facility assets were separated into two

independent trusts: (1) a Liquidation Trust to market and sell the salable facility assets (e.g., the production plants, buildings and deep water docks), and (2) an Environmental Trust created to take title to the gypsum stacks and wastewater treatment system at the Site and fund environmental response actions and closure activities for the gypsum stacks to the extent of its assets.

On February 11, 2017, the EPA Region 4 Emergency Response, Removal and Prevention Branch (ERRPB) assumed operation and funding of wastewater treatment and stabilization operations at the Site under the first Action Memo signed on September 15, 2016, in anticipation of the MPC Environmental Trust insolvency. EPA has been operating the mechanical wastewater treatment plant (WWTP) and the in-situ WWTP, within the parameters of the National Pollutant Discharge Elimination System (NPDES) permit, under four subsequent Action Memoranda: April, 19 2017 (#2), May 26, 2017 (#3), September 22, 2017 (#4), and November 17, 2017 (#5). Contact storm water and stored wastewater on-site will continue to be treated and discharged from NPDES permitted Outfall 03 under this current Action Memo (#6).

2. Removal Site Evaluation

Gypsum ($CaSO_4 \cdot 2H_2O$) (also referred to as phosphogypsum) was formed as a byproduct of DAP production and this mineral precipitate was deposited as a waste product on the MPC Site, initially forming the WGS and subsequently the EGS. Other impurities present in the phosphate ore were also precipitated with the gypsum. These are expected to include various metals including radionuclides, and fluoride, phosphorous, and nitrogen compounds. The material contained residual acidity as a result of its formation during phosphoric acid production. Gypsum was sluiced to the disposal areas by pipeline where it settled out in ponds enclosed by berms of gypsum. Settled solids excavated from the ponds by draglines or other excavation equipment were placed on the perimeter berm, thereby raising the height of the pond and the gypsum stack itself. The outer slopes of the stacks were benched to improve stability as the stacks grew in height to about 100 feet (ft) above the surrounding terrain.

Gypsum was disposed of in the WGS, located north of the industrial production facilities, from the beginning of site operations in 1958 to 2002 (Figure 2). The teardrop-shaped WGS has a footprint of approximately 2,800 ft wide by 4,000 ft long and occupies an area of about 235 acres including the surrounding water ditch (referred to as the DAP ditch or cooling loop) but excluding the North Ponds. The facility was constructed atop a portion of Bayou Casotte; it's not known to be lined or enclosed by a slurry wall or other feature to limit groundwater exchange and it does not have an underdrain system. The facility was closed from 2002 to 2005 which involved grading the stack, capping the crest and benches with geomembrane liner, and then covering the crest, benches, and side slopes of the pile with a vegetated soil cover. Storm water run-off from the cap is routed through geomembrane-lined drainage swales to Bayou Casotte for disposal (treatment is not required). Since the pile was capped, leachate draining from the facility has caused the WGS to undergo differential compaction and consolidation. Elevation changes, which may locally

approach 30 ft created an uneven upper surface, permitting rainfall to form at least four small ponds atop the liner on the margins of the crest of the pile. The WGS presently discharges about 20,000 gallons per day of leachate that requires treatment prior to discharge.

The North Ponds comprise four ponds arranged in a large square at the north end of the WGS (Figure 1). Each is enclosed by a soil berm and is lined with clay. Together, the four ponds occupy an area of about 30 acres. Initially, the ponds served to aerate and clarify water discharged from the mechanical treatment plant and at times, the two southernmost ponds were connected to the cooling loop. Beginning in December 2015, the two northern ponds were repurposed as treatment ponds and were used to provide additional capacity to treat contaminated water at the site. Approximately 250 Million gallons (Mgal) of contaminated water from the WRD at the EGS was routed to the ponds and treated *in situ* by adding lime slurry to raise pH and precipitate metals. *In situ* treatment continued until July 2016 at which point the buildup of lime sludge within the ponds eliminated the capacity to treat water economically. At present, the ponds contain an estimated 15 feet of lime sludge; a thin water cover is maintained over the sludge to prevent dust formation. The two northern ponds presently receive only direct rainfall runoff; the two southern ponds are connected to the cooling loop as part of the DAP ditch which receives leachate from the WGS. The four ponds have a total estimated capacity of 24 Mgal (EPA, 2016).

The EGS was constructed beginning in the mid-1990s at the site of the former Jackson County Airport and began accepting gypsum upon completion in 2002, ultimately containing over 400 million cubic feet (≈ 15 Million cubic yards) of gypsum as estimated from 2015 Light Detection & Ranging (LiDAR) data obtained from the State of Mississippi. Figure 1 depicts significant features of the EGS. The EGS and associated ponds comprise an area of about 350 acres. The facility is surrounded by a 2.5 ft thick soil-bentonite slurry cut-off wall installed through surficial sands and into the underlying upper "fat" clay layer ranging from a depth of 15 to 20 ft below original grade. An underdrain system routes water from within stack limits to the surrounding WRD. Initial construction consisted of the gypsum stack and the WRD; Ponds 5 and 6 were added sometime between September 2010 and November 2012. During the early stages of its growth, the EGS was constructed with three ponds. Sometime between September 2010 and November 2012, the EGS was reconfigured to the present 2-pond system as the stack was built upward.

The EGS is shaped like a right triangle with rounded apices and is about 120 ft high at Pond 3 and 100 ft high at Pond 4 (Figure 2). The sides of the facility are approximately 3,000 ft long. The outer slopes of the EGS are terraced and eroded on a slope of approximately 7H:1V (Horizontal:Vertical) on the lower levels and approximately 4H:1V on the upper levels. Sparse volunteer vegetation is present across the pile. The stack is topped by Pond 3 (24.8 acres) and Pond 4 (14.5 acres) which retain rain water and excess water pumped from the WRD. The water elevation in Pond 3 is higher than in Pond 4 by about 20 ft. The two ponds are enclosed by berms of gypsum which have been eroded by wave action and have

near vertical faces on their inward (pond-facing) slopes. Water elevations vary in Ponds 3 and 4 and they are presently maintained at lowered levels due to concern about the stability of their containment berms. *In situ* treatment conducted periodically in Pond 4 created a layer of lime sludge which varies in thickness across the pond and is thought to approach seven feet in the eastern corner of the pond. Pond 3 has an estimated capacity of 100 Mgal; and Pond 4 has an estimated capacity of 25 Mgal (EPA, 2017).

The stack is surrounded on the west, south, and southeast sides by the WRD which collects leachate from the underdrain, process wastewater, rainfall runoff from the outer slopes of the EGS, and direct precipitation. The WRD occupies 48.1 acres and has an estimated capacity of 130 Mgal (EPA, 2017). Leachate discharges to the WRD at an average estimated rate of about 0.63 Mgal/day (EPA, 2016).

Pond 5, with an estimated capacity of 200 Mgal (EPA, 2017), borders the northern and northeastern margins of the EGS. It is bounded by the WRD along its eastern margin and by Pond 6 to the north. Pond 5 occupies 60.3 acres and is used to manage process wastewater left over from the time when the plant was still in operation, water pumped from the WRD, direct runoff from the northeastern slope of the EGS, and direct precipitation. Pond 5 has a maximum depth of about 15 ft based on the LiDAR data.

Pond 6 has an estimated capacity of 130 Mgal (EPA, 2017), but is only partly utilized for water storage, primarily on an emergency basis. The western portion of Pond 6 is presently used for disposal of lime sludge formed by water treatment at the *in situ* WWTP. Sludge removed from the WRD is tilled into the subgrade of Pond 6. Pond 6 received untreated water from Pond 5 during a one-time, controlled event (EPA, 2016). Pond 6 presently retains contaminated wastewater and precipitation that meets all NPDES discharge requirements except for phosphorus.

The portion of the Site managed by the Environmental Trust encompasses about 616 acres. Precipitation on about 225 acres of this area generates non-contact runoff which is discharged as storm water without treatment. Precipitation on the remaining 391 acres generates contact runoff which requires treatment before discharge. Excluding any water within the treatment plant itself, most of the contact water on-site is held in Pond 3, Pond 4, Pond 5, the WRD, the DAP ditch, and the Treatment Ponds (Table 1). Combined, these facilities hold an estimated 600 Million gallons of contact water requiring treatment. Including Pond 6 (57 acres), which is used for emergency storage, up to 732 Mgal of contaminated water can be stored on site.

Releases of untreated or partially treated wastewater from the MPC facility have resulted in fish kills to Bayou Casotte and Bangs Lake, which is a part of the Grand Bay National Estuarine Research Reserve. There have been several uncontrolled releases of untreated wastewater since 2002. These include:

- An estimated 17 Mgal of water was released to Bangs Lake and Grand Bay Estuary, Bayou Casotte, and Tillman Creek in April 2005 when a containment dike at the EGS failed as it was being raised (Weston, 2007; DOJ, 2015). The spill of acid water (pH 2.2 to 2.4) resulted in extensive loss of vegetation and wildlife and had a significant negative impact to fisheries in the estuary.

- In August 2005, storm surge from Hurricane Katrina breached cooling ditches holding contaminated water (EPA, 2007) and caused extensive damage throughout the Site (Weston, 2007).

- In August 2013, MPC released an estimated 38 Mgal of acidic water to Bayou Casotte killing an estimated 47,000 fish, resulting in closure of Bayou Casotte for an unspecified time and resulting in a criminal violation of the Clean Water Act (CWA) (DOJ, 2015).

- Three Mgal of untreated wastewater were released in June 2017 following formation of a sinkhole on the west slope of the WGS.

The estimated 600 Million gallons of wastewater contained within the ponds and other structures on-site has a pH of approximately 2.4, and there have been instances when the measured pH was less than 2.0, which would meet the corrosivity characteristic of D002 hazardous waste. The wastewater also contains high levels of fluoride, ammonia, and phosphorus. D002 hazardous waste, ammonia and phosphorus are hazardous substances per 40 Code of Federal Regulations (CFR) Section 302.4 (Table 2).

In 2015, the EPA Environmental Response Team (ERT) completed an independent assessment of MPC's water management strategy and the integrity of containment structures, including berms and dikes surrounding water storage ponds (EPA, 2016). ERT identified three potential risks at the Site:

- Dike crests, especially around Pond 3, were found to be eroded and deteriorated to a potentially unsafe condition for site workers.

- The deteriorated dike crests, especially around Pond 3, were determined to present an unacceptable risk of an overtopping failure which would result in an uncontrolled release of untreated process water.

- The throughput capacity of the existing WWTP was found to be insufficient to guarantee the ability to lower the pond water levels or to handle a major precipitation event.

MPC was required under its permit to maintain a Site-wide safety freeboard[1] measurement of 2.25 ft and a surge capacity[2] of 10.2 inches of rainfall. This required surge capacity is based on the rainfall generated by a 25-year storm event. Surge capacity fluctuates with variations in precipitation and wastewater treatment volumes. In response to recommendations from the ERT Optimization Report (EPA, 2016), the Environmental Trust focused on treating water to increase Site-wide freeboard and gain the required surge capacity to prevent catastrophic releases or emergency bypasses. Dikes around Ponds 3 and 4 were repaired following ERT's findings but require continuous maintenance to maintain their stability. Outfall discharge capacity and pH adjustment capacity has been expanded to accommodate additional *in-situ* treatment operations which were constructed to increase treatment capacity[3].

In August 2017, ERT began subsurface investigations of the WGS and EGS to repair a sinkhole which formed on the WGS in June 2017. While on-site, ERT observed that the EGS also was exhibiting signs of structural instability. ERT's recommendations to address this issue with the EGS included draining of Ponds 3 and 4, as well as closure of the stack.

On average, the MPC Site receives 66.3 inches of rainfall annually, with a standard deviation of about 14 inches per year (in/yr; data from MPC facility precipitation records). The average annual evapotranspiration rate is estimated at 31.9 in/yr (41.8 in/yr evaporation from open ponds), although water balance calculations suggest more modest rates (21.6 in/yr). This produces net annual precipitation of 44.7 in/yr (assuming evapotranspiration of 21.6 in annually). One inch of rain that falls on the footprint of the EGS (350.5 ac; includes the stack, WRD, Pond 5 and Pond 6) generates an estimated 9.1 Mgal of water that requires treatment (EPA, 2017). This is equivalent to slightly more than 425 Mgal/year (600 Mgal/year not including water loss to evaporation) that must be collected and treated.

2017 saw record rainfall at the site (112 inches) which necessitated emergency bypasses of partially treated water on five occasions totaling 393.7 Mgal (Table 3). Two of these releases were used to increase water storage in anticipation of hurricanes that struck the region. Under EPA's emergency bypass protocol, water is neutralized by injection of sodium hydroxide prior to discharge to Bayou Casotte but other treatment to remove nitrogen compounds and phosphorous is not conducted. The emergency bypasses were conducted to prevent overtopping of the berms and dikes that were identified by ERT as potential failure risks and thereby prevent the uncontrolled release of untreated water to the environment.

[1] Freeboard is a measure of how full the pond/ditch system is at any given time. For instance, a 2-foot freeboard means that a pond is within 2 feet of being completely filled.
[2] Surge capacity is essentially the amount of rainfall that the pond/ditch system can contain at any given time without impeding into the safety freeboard.
[3] While MPC was in operation, the volume of wastewater requiring treatment was generally lower because water was consumed in the manufacturing process. Now that the facility is closed, the mechanical wastewater treatment plant is significantly undersized to handle daily water treatment needs.

EPA conducted an EE/CA for closure of the EGS and North Ponds in from October to December 2017. The EE/CA included a Streamlined Risk Assessment which concluded that the existing water treatment system and its current permitted effluent conditions are protective of aquatic life in Bayou Casotte. However, the large volumes of untreated water with Contaminant of Concern (COC) concentrations a few orders of magnitude greater than the acceptable benchmark levels, has a future potential to cause catastrophic harm (e.g. fish kills/eutrophication) to the environment should untreated water be released through an overflow of excess water or a pond breach, as has happened in the past. Large precipitation events such as tropical storms and hurricanes place undue stress on the existing treatment system. Reducing the volume of untreated water with its low pH and high levels of un-ionized ammonia, phosphate and fluoride is a prudent goal. The removal options considered in the EE/CA will substantially reduce the threat of overflow releases, and significantly reduce leaching of COCs through the EGS, thereby protecting the environment better than under current conditions.

3. Physical Location

The Site's physical address is 601 Industrial Road, Pascagoula, Jackson County, Mississippi 39581. The geographical location of the EGS is 30°22'26.25"N latitude, 88°29'25.21"W longitude. The MPC property occupies approximately 1,080 acres. The EGS is located on the northeastern portion of the property and occupies total area of about 350 acres (gypsum stack: 155 acres; Pond 5: 60 acres; Pond 6 + WRD; 135 acres). The North Ponds, located at the northern end of the WGS occupy 30 acres (combined for the four ponds).

The WGS, EGS and North Ponds site comprise a portion of the former DAP production facility operated by MPC from the 1950s to 2014 which are now owned by the Environmental Trust. These areas are located adjacent to the north and northeast of the Liquidation Trust property which comprises the industrial complex where DAP was produced. The Site is bordered to the south by the Port of Pascagoula, to the east by the Chevron Pascagoula Refinery and the Grand Bay National Estuarine Research Reserve/Grand Bay Savannah Coastal Preserve, to the west by Bayou Casotte and mixed commercial businesses, and to the north by mixed commercial businesses and undeveloped land. (Figure 3). Pascagoula's population was 22,240 at the time of the 2013 census.

4. Site Characteristics

The MPC Site is located on a coastal plain and has a moist temperate climate that is strongly influenced by the Gulf of Mexico. Regional topography is flat and elevations are low. Ground elevation for the MPC Site is typically 5 to 20 ft above mean sea level (MSL) across most of the industrial complex and near the base of the WGS and EGS. Maximum elevation of the EGS is about 115 ft MSL, and the maximum elevation of the WGS is about 120 ft MSL.

Geology under the MPC Site consists of unconsolidated sands and clays formed from marine and deltaic deposits on the Gulf coastal plain. The uppermost unit is an unconsolidated poorly graded sand that ranges in thickness from 4 to 10 ft beneath the EGS. The sand overlies a soft, fat clay unit which is typically 10 to 12 ft thick. The elevation of the top of the fat clay is about 0 ft (sea level). The groundwater table is very shallow, and is encountered 3 to 5 ft below ground surface. The main regional water supply aquifer occurs at depths of 100 to 500 ft below ground surface and drinking water for the area is provided by the local municipalities.

Surface water run-off from the MPC industrial complex, the WGS and EGS generally drains to Bayou Casotte. Although the EGS is adjacent to the west of Grand Bay estuary, runoff from the facility is routed west and south to Bayou Casotte. There is no runoff from the MPC site that is known to flow to the Grand Bay estuary. From the coast inland to the MPC industrial complex, Bayou Casotte has been dredged to create a deep water port for industrial use by numerous businesses.

5. Release or Threatened Release into the Environment of a Hazardous Substance or Pollutant or Contaminant

The majority of wastewater stored on-site has a pH of approximately 2.4 which is considered a pollutant or contaminant. There have been instances when the measured pH has dropped below 2.0, which would meet the corrosivity characteristic of D002 hazardous waste. This water also contains high levels of ammonia and phosphorus. Ammonia concentrations in water originating from the EGS range from 300 to 500 milligrams per liter (mg/L). Water treatment ponds associated with the EGS contain phosphorus concentrations ranging from 4,000 to 8,000 mg/L and fluoride concentrations of approximately 300 mg/L.

D002 hazardous waste, radium-226, ammonia and phosphorus are hazardous substances per 40 CFR Section 302.4; fluoride is considered a pollutant and contaminant. These hazardous substances and pollutants or contaminants pose a significant threat to the surrounding surface water bodies and ecosystems should they be discharged from the Site as uncontrolled releases. Potential impacts include pH shock and nutrient loading. Nutrient loading can spur blooms of algae that increase chemical and biochemical oxygen demand in the receiving waters.

Numerous releases have been documented from this Site which caused significant harm to surrounding Bayou Casotte and Grand Bay National Estuarine Research Reserve/Grand Bay Savannah Coastal Preserve. Effects have included negative impacts to vegetation, aquatic resources, and wildlife, fish kills, and impacts to shellfish.

As discussed in Section 2, Ponds 3, 4, 5, and 6, the WRD, and the DAP ditch are used to

store contaminated water for treatment. The storage capacity available to hold contaminated storm water runoff on-site fluctuates significantly as a function of precipitation and volume of wastewater awaiting treatment. During operations, MPC was required to maintain a Site-wide freeboard measurement of 2.25 ft and a surge capacity of 10.2 inches of rainfall (equivalent to the 25-year storm event). Available surge capacity fluctuates significantly insofar as a one-inch storm event generates approximately nine Mgal of water that requires treatment because it becomes contaminated through contact with wastewater or gypsum stack material. Rainfall in 2017, which exceeded average annual precipitation by more than 40 inches, filled available storage capacity which necessitated emergency bypasses of partly treated water on five occasions as shown in Table 3. The bypasses were conducted to create freeboard, prevent flooding of the *in situ* WWTP, and reduce the likelihood of uncontrolled releases of untreated contaminated water due to failure of the containment system.

ERT's 2015 assessment indicated that the EGS has become structurally compromised and is in a state of active failure with a catastrophic failure possible. This could potentially result in uncontrolled releases of contaminants from the Site. In response to ERT's recommendations, EPA completed an EE/CA in December 2017 to evaluate options to implement their recommendations to drain Ponds 3 and 4 and close the EGS. Closure of the EGS would reduce the volume of water requiring treatment, reduce the potential for catastrophic failure of the EGS, and lessen the potential for uncontrolled contaminated releases from the site.

6. NPL Status

The Site was placed on the NPL on January 18, 2018.

7. Maps, Pictures and Other Graphic Representations

Figures 1 through 3 show the overall Site layout and details of the WGS and EGS. Figures 4 through 6 present recent photographs of the North Ponds and EGS.

B. Other Actions to Date

1. Previous Actions

EPA issued an Administrative Order on Consent (AOC) to MPC in February 2012 which required that expedited corrective measures be taken at the facility to protect public health and the environment. EPA issued the AOC under Section 7003 of the Resource Conservation and Recovery Act (RCRA) which provides statutory authority to address an imminent and substantial endangerment to human health or the environment at certain facilities.

EPA believed that an imminent and substantial endangerment existed at the facility due to corrosive water discovered by the facility outside the WGS perimeter dike in January 2011 and

September 2011. This AOC further directed MPC to continue to perform the corrective actions included in a previous September 2009 Unilateral Administrative Order (UAO). The 2009 UAO was issued to MPC due to the EPA's discovery of uncontrolled leaks and spills of sulfuric acid and untreated discharges from sulfuric acid plants to the adjacent Bayou Casotte and uncontrolled spills and leaks of phosphoric acid to unlined ditches at the MPC facility in August 2009.

Some of the work required of MPC in the RCRA Section 7003 AOC included: the submission of a revised plan to repair and replace degraded containment around sulfuric acid plants (SAP); the continued implementation of the groundwater investigative and remediation work plan for the SAPs, DAP plant and construction area southwest of the SAPs; daily visual assessment of seepage from west stack perimeter dike; and the submission of a west gypsum stack system improvement plan. The work required under the AOC was not completed.

2. Current Actions

As described above, the Environmental Trust was created to take title to the gypsum stacks and the WWTP and to fund response actions and gypsum stack closure to the extent of its assets. The Environmental Trust managed the Environmental Trust assets for the benefit of the State of Mississippi and the EPA, on behalf of the United States. The Environmental Trust was tasked with operating the WWTP, operating the Site on a day-to-day basis, as well as manage water currently stored on-site. The Environmental Trust became insolvent on February 10, 2017, and was no longer able to fund operations of the WWTP. The EPA Region 4 ERRPB assumed operation and funding of wastewater treatment operations at the Site on February 11, 2017, under an Action Memo signed on September 15, 2016, which had been executed in anticipation of the MPC Environmental Trust insolvency. Additional Action Memoranda requesting a 12-month exemption and ceiling increases were signed on April 19, 2017, May 26, 2017, September 22, 2017 and November 17, 2017. As a result, funds were obligated from the Regional Removal Allowance and Headquarters for supplemental funding.

Daily water treatment and Site management operations under the current EPA time-critical removal action remain similar to activities conducted under the MPC Environmental Trust. To date, ERRPB has treated, discharged and or bypassed more than 1.2 Billion gallons of wastewater at the site. In addition, ERRPB worked to repair a sinkhole that formed on the WGS, rebuild berms enclosing water storage ponds at the EGS, and increase surge capacity.

Total costs incurred by EPA at MPC since February 2017 are approximately $17 Million.

C. State and Local Authorities' Roles

1. State and Local Actions to Date

On April 2, 2002, Mississippi Department of Environmental Quality (MDEQ) executed

Agreed Order 4399-02 to resolve violations discovered during a May 2001 inspection. MPC was found to be releasing D002 Characteristic Hazardous Waste (low pH) into an earthen ditch in violation of Mississippi Hazardous Waste Management Regulations.

On January 31, 2008, MDEQ executed Agreed Order 5357-08 to resolve numerous violations discovered during inspections and report reviews. MPC was found to be releasing pollutants in excess of limits established in the NPDES Permit MS0003115, discharging stormwater from unpermitted outfalls, failing to implement Best Management Practices and failing to comply with other narrative requirements of the permit. Furthermore, the Agreed Order resolved violations and environmental damage associated with a release that occurred in April 2005.

On February 27, 2008, MDEQ executed Agreed Order 5369-08 to resolve a violation discovered through records review. MPC was found to be late in submitting a renewal application for Solid Waste Management Permit SW0300040452.

On March 4, 2011, MDEQ executed Agreed Order 5921-11 to resolve violations discovered during inspection and report review. MPC was found to be releasing wastewater in violation of NPDES Permit MS0003115. Additional violations include, but were not limited to, failing to minimize the potential for spills, leaks and other releases. Furthermore, MPC was found to be in violation of New Source Performance Standards for Sulfuric Acid plants by having releases in excess of emission standards.

On August 23, 2013, MDEQ unilaterally executed Order 6302-13. MPC was found to have releases of Sulfur Dioxide, Sulfur Trioxide and/or Sulfuric Acid Mist from the Sulfuric Acid Plants in violation of Mississippi Title V Air operating Permit 1280-00044 and Commission Regulation APC-S-1 Section 3.3. MPC was ordered to cease and desist operating its sulfuric acid plants and to conduct a full evaluation and assessment of the acid plants to determine the cause of the releases.

2. Potential for Continued State and Local Response

MDEQ managed the funds directed to the Environmental Trust from the Financial Assurance Trust Fund established by MPC pursuant to RCRA. In December 2016, MDEQ provided $500,000 to the Environmental Trust in order to extend the Trust's solvency in anticipation of a signed purchase agreement. Before ERRPB assumed Site management, MDEQ indicated to the EPA that it would not have the resources necessary to continue funding the Environmental Trust.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at the Site continue to pose the following threats to public health or welfare or the environment based on the factors in 40 CFR § 300.415(b)(2):

Section 300.415(b)(2)(i): Actual or potential exposure to nearby human populations, animals or the food chain from hazardous substances, pollutants or contaminants;

The estimated 600 Mgal of wastewater contained in the on-site ponds is considered a pollutant and contaminant. There have been instances when the measured pH has dropped below 2.0, which meets the corrosivity characteristic of D002 hazardous waste. The wastewater also contains high levels of ammonia and phosphorus. D002 hazardous waste, ammonia, and phosphorus are hazardous substances per 40 CFR Section 302.4.

The Site is immediately adjacent to the Grand Bay National Estuarine Research Reserve/Grand Bay Savannah Coastal Preserve to the east and Bayou Casotte to the west. Depending on the location of the point of release within the Site, either of these water bodies could be impacted by a discharge of wastewater from the Site. It has been documented that releases of untreated or partially treated wastewater from the Site can result in massive fish kills.

During an uncontrolled release the immediate toxicity to the bayou is attributed to low pH (typically <2.5) which can result in an immediate fish kill. Nutrients (phosphorus and ammonia) exist in higher than average conditions within the pond water. Together, and separately, they can increase the risk of fish kills associated with eutrophication, particularly algal blooms, within and beyond Bayou Casotte.

In addition to eutrophication toxicity, ammonia (specifically unionized ammonia) has both an acute and chronic exposure toxicity limit established in water quality criteria literature. For example, an April 2005 discharge resulted in the release of an estimated 17 Mgal of wastewater into waterways adjacent to its facility, including Bayou Casotte and Bangs Lake of the Grand Bay National Estuarine Research Reserve. This release resulted in a fish kill numbered in the thousands of fish as well as decimation of large areas of aquatic vegetation. MPC pled guilty in 2015 to a criminal violation of the CWA by discharging more than 38 Mgal of wastewater from the Site in 2013, which resulted in the death of an estimated 47,000 fish[4]. This discharge also resulted in MDEQ issuing fishing and water contact closure for Bayou Casotte and the adjacent waters of the Mississippi Sound within 1,000 ft of the mouth of the bayou. The public was advised to avoid these waters and while seafood was not considered to be contaminated, fishermen were advised not to consume any seafood collected from these waters until further notice. This precautionary closure was issued to protect public health from potentially harmful

[4] https://www.justice.gov/opa/pr/mississippi-phosphates-corp-pleads-guilty-clean-water-act-violation-and-agrees-transfer-320

water conditions (dermal contact/incidental ingestion of acidic pH water) Numerous other fish kills have been documented due to releases and emergency bypasses while MPC was operational.

Section 300.415(b)(2)(ii): Actual or potential contamination to drinking water or sensitive ecosystems;

Bangs Lake of the Grand Bay National Estuarine Research Reserve/Grand Bay Savannah Coastal Preserve is adjacent to the Site on the eastern boundary and Bayou Casotte to the west. These water bodies are considered some of the most productive nurseries for aquatic species on the Gulf Coast[5] and are at significant risk of adverse impact should a release of a significant volume of wastewater were to occur. As noted previously, numerous fish kills to Bayou Casotte and Grand Bay National Estuarine Research Reserve have been documented due to uncontrolled releases and emergency bypasses while MPC was operational. The causes of these uncontrolled releases and emergency bypasses in the past have been the following: heavy rains exceeded surge capacities, forecasted heavy rains (tropical storms) estimated to exceed surge capacities, mechanical failures, overtopping of berms by wind or overflow and failure of the berm system.

Section 300.415(b)(2)(v): Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

Approximately nine Mgal of water are generated on-site for each inch of precipitation the Site receives. Large precipitation events have the potential to overwhelm water management systems on the Site. The Site is also located along the coastline of the Gulf of Mexico and is vulnerable to tropical cyclones. The Site has been impacted by multiple hurricanes in the past (e.g., Katrina and Isaac most recently) which led to uncontrolled releases and fish kills in Bayou Casotte and by two hurricanes in 2017 (Harvey and Nate) which required emergency bypasses of partly treated water to prevent uncontrolled releases. The Site averages 66 inches of precipitation yearly, but it received 112 inches in 2017.

Section 300.415(b)(2)(vii): The availability of other appropriate federal and state response mechanisms to respond to the release;

Given the potential size and scope of the action, state resources are insufficient to address threats in a timely manner. No other governmental entity has funds available to conduct the necessary removal activity.

[5] http://grandbaynerr.org/our-estuary/

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances and pollutants or contaminants from this Site, if not addressed by implementing the response action selected in this Action Memo, will continue to present an imminent and substantial endangerment to public health or welfare or the environment.

V. EXEMPTION FROM THE STATUTORY LIMITS

Continued response actions at MPC are appropriate because it is necessary to avoid a foreseeable threat and will be consistent with the future remedial actions taken at the Site. The NTCRA proposed by this Action Memo is a key component of the Site remediation strategy and will not foreclose the remedial action. Closure of the EGS is essential to eliminate rainfall contact with acid generating material, thereby reducing the need (and cost) to treat precipitation and contact water. The MPC Site was placed on the NPL on January 18, 2018. The Remedial Program has initiated the process of scoping future remedial activities that will be conducted in support of the final remedy for the Site. A comprehensive Remedial Investigation/Feasibility Study (RI/FS) will be conducted at the approximate 106-acre Liquidation Trust property (former plant area) to determine the nature/extent of contamination and to select a site-wide remedy to address potential unacceptable risks posed to human health and the environment.

VI. PROPOSED ACTION AND ESTIMATED COSTS

A. Proposed Actions

This section briefly summarizes the NTCRA for the MPC site. EPA intends to close the EGS and North Ponds through an action to be completed in three phases (Figure 7; note figure does not depict the North Ponds to be addressed under Phase 2). Phase 1 would close the gypsum stack of the EGS including Pond 3 and Pond 4. Phase 2 would address Pond 5 at the EGS and the North Ponds. Under Phase 3, EPA would close Pond 6 and the WRD at the EGS. The intent of this phased action is to reduce the volume of contaminated water requiring treatment and to move the site toward a goal of long-term leachate management as soon as possible.

1. Proposed Action Description

Phase 1 – Alternative 2B: Alternative 2B would remove the 155-acre footprint of the EGS from the 380 acre site water balance, thereby reducing the volume of water requiring treatment by an estimated 41 percent. Under this alternative, Pond 3 and Pond 4 atop the EGS would be drained, subgrade would be prepared, LLDPE would be placed across the crest, side slopes and benches of the EGS and the entirety of the EGS would be covered with a layer of protective soil and vegetated topsoil. Non-contact storm water

would be collected from the benches of the facility and routed to Bayou Casotte. Leachate would continue to flow from the underdrain as the pile dewaters.

Phase 2 – Alternative 3B: Alternative 3B would remove 90 acres from the site water balance, thereby reducing the volume of water requiring treatment by another 24% percent (65% closed when combined with Phase 1). Under this alternative, Pond 5 would be drained and closed, with the area graded for drainage. The footprint of Pond 5 would be covered with LLDPE liner, a protective soil layer and vegetated topsoil. Lime sludge in the North Ponds would be covered in place with reinforced geotextile, covered with a protective soil layer, graded for drainage, and covered with vegetated topsoil. Storm water run-off from both areas would be routed to Bayou Casotte.

Phase 3 – Alternative 4: Alternative 4 would remove the remaining 135 acres of the EGS from the site water balance, resulting in full closure of the 380 acre EGS footprint. Under Alternative 4, Pond 6 and the WRD at the EGS would be drained and graded to promote drainage. The footprint of the WRD would be covered with LLDPE liner, a protective soil layer, and vegetated topsoil and the EGS underdrain would be connected to a perimeter collection system that would be connected to the mechanical wastewater treatment plant that is subject to an NPDES permit that includes effluent limitations and monitoring requirements. The footprint of Pond 6 would be covered with a protective soil layer and vegetated topsoil. Storm water run-off from both areas would be routed to Bayou Casotte.

Water Treatment: Treatment of contact storm water and stored wastewater on-site will continue under this Action Memo, in accordance with the NPDES permit, to prevent an uncontrolled release of untreated water to the environment. The EE/CA estimated the cost for water treatment during an average precipitation year at $5.6 Million per year. However, actual costs incurred since February 2017 have been running in the $1 Million per month range for water treatment and site stability/maintenance.

Post Removal Site Control: Full closure of the EGS will greatly reduce the quantity and improve the quality of water that requires treatment, and will eventually lead to the collection/treatment of leachate only from the EGS. Average water treatment rates since February 2017 have ranged from 2 to 4 Million Gallons/per day (MGD). Each phase of EGS closure will gradually reduce the volume of water requiring treatment. At the completion of Phase 3, the volume of leachate generated by the EGS is estimated to be 20,000 gallons per day (7.8 Mgal/year). The WGS is estimated to generate a similar quantity of leachate. Pursuant to 40 CFR Section 300.415(l), post removal site control will be transferred to MDEQ one year after the leachate collection/treatment system for the EGS and WGS is determined to be Operational and Functional (O&F). Phase 3 of EGS closure is scheduled for 2020, therefore the transition to MDEQ is anticipated in 2021.

2. Contribution to Remedial Performance

When fully implemented, the proposed phased removal action will address the threats discussed in Section III of this memorandum. The removal action is expected to decrease the volume of water requiring treatment by 98.4 percent, with the only contact water generated being that discharged from the underdrain of the EGS. Installing caps and covers over the EGS and North Ponds will permit storm runoff from these areas to be discharged to Bayou Casotte without treatment eliminating the need to store storm runoff water in bermed embankments from which it could be released to the environment in an uncontrolled manner. Consequently, the phased removal action will help EPA to achieve the goal of long-term leachate management at the Site.

The phased removal action contemplated in this Action Memo will be consistent with and contribute to any future remedial actions taken at the site. Baseline (pre-closure) groundwater conditions will be established in the EGS footprint so post-closure results can be properly monitored. A comprehensive RI/FS will be conducted at the approximate 106-acre Liquidation Trust property (former plant area) to determine the nature/extent of contamination and to select a site-wide remedy to address potential unacceptable risks posed to human health and the environment.

3. Description of Alternative Technologies

When applicable, on-site treatment, neutralization and disposal of selected wastes will be conducted. When on-site treatment is not applicable, off-site disposal of waste will occur in compliance with 40 CFR Section 300.440. No innovative technologies are planned for use during this response.

4. Engineering Evaluation/Cost Analysis

A EE/CA Report was prepared for closure of the EGS and North Ponds in December 2017. The Removal Action Objectives (RAOs) developed to guide the Removal Action process for closure of the EGS and North Ponds are:

- Reduce or eliminate contact of precipitation runoff and surface water with phosphogypsum solids and lime sludge solids comprising the EGS and North Ponds to prevent contamination of water to levels above applicable water quality criteria.

- Reduce or eliminate precipitation infiltration into the EGS to reduce the volume of leachate from the facility that requires treatment.

- Reduce or eliminate contact of precipitation with contaminated water contained in onsite storage ponds and facilities.

- Take additional actions on the EGS as needed to reduce the volume of water requiring treatment and achieve a goal of long-term leachate management at the Site.

The alternatives considered for each phase of the proposed removal action to meet the RAOs were:

1. No Action. Under Alternative 1, no action would be taken to attain the RAOs or overall Site goal.

2A. Phase 1 – Partial LLDPE Liner Across the EGS. Under Alternative 2A, Ponds 3 and 4 atop the EGS would be closed and graded, LLDPE would be placed across the crest and on the benches of the EGS, side slopes would be covered with compacted clay, and the entirety of the EGS would be covered with a layer of protective soil and vegetated topsoil. Storm water would be collected on the benches and routed to Bayou Casotte.

2B. Phase 1 – Complete LLDPE Liner Across the EGS. Under Alternative 2B, Ponds 3 and 4 atop the EGS would be closed and graded, LLDPE would be placed across the crest, side slopes and benches of the EGS, and the entirety of the EGS would be covered with a layer of protective soil and vegetated topsoil. Storm water would be collected on the benches and routed to Bayou Casotte.

3A. Phase 2 – Pond 5 Closure with North Ponds Excavation. Alternative 3A would drain and close Pond 5, grade the area for drainage, and cover the footprint of the pond with LLDPE liner, a protective soil layer, and vegetated topsoil. Lime sludge from the North Ponds would be excavated, transported to Pond 5 and incorporated into the soil cover, and the excavation would be backfilled, graded for drainage and covered with a protective soil layer and vegetated topsoil. Storm water run-off from both areas would be routed to Bayou Casotte.

3B. Phase 2 – Pond 5 Closure with North Ponds Capped in Place. Alternative 3B would drain and close Pond 5, grade the area for drainage, and cover the footprint of the pond with LLDPE liner, a protective soil layer, and vegetated topsoil. Lime sludge in the North Ponds would be covered in place with reinforced geotextile, covered with a protective soil layer graded for drainage, and covered with vegetated topsoil. Storm water run-off from both areas would be routed to Bayou Casotte.

4. Phase 3 – Pond 6 and Water Return Ditch Closure. Under Alternative 4, Pond 6 and the WRD at the EGS would be drained and graded to promote drainage. The footprint of the WRD would be covered with LLDPE liner, a protective soil layer, and vegetated topsoil, and the EGS underdrain would be connected to a perimeter collection system that would be connected to the mechanical wastewater treatment

plant. The footprint of Pond 6 would be covered with a protective soil layer and vegetated topsoil. Storm water shed run-off from both areas would be routed to Bayou Casotte.

The EE/CA developed a cost for each of the various alternatives including the capital cost to implement the alternative, associated post removal site control costs, and the present worth cost. Each alternative was then evaluated to assess its performance relative to effectiveness, implementability, and cost. The analysis examined how each alternative would reduce, control, or eliminate the quantity of water requiring treatment to achieve the RAOs and the overall site goal of long-term leachate management. The results of these analyses are shown in Table 4 and Table 5.

5. Applicable or Relevant and Appropriate Requirements (ARARs)

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 CFR § 300.415(j), on-site removal actions conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) are required to attain ARARs to the extent practicable considering the exigencies of the situation or provide grounds for invoking a CERCLA waiver under Section 121(d)(4). In determining whether compliance with ARARs is practicable, the lead agency may consider appropriate factors, including (1) the urgency of the situation; and (2) the scope of the removal action to be conducted. Additionally, under 40 CFR Section 300.400(g)(3), other advisories, criteria or guidance may also be considered (referred to as To-Be-Considered or TBC) when conducting the removal action. ARARs include only federal and state environmental or facility siting laws/regulations; they do not include occupational safety or worker protection requirements. Compliance with Occupational Safety and Health Administration (OSHA) standards is required by 40 CFR Section 300.150. EPA has created three categories of ARARs: Chemical-, Location-, and Action-specific. The proposed phased removal action is expected to comply with ARARs and TBC guidance as set forth in Table 6 of this Action Memo.

Applicable requirements as defined in 40 CFR Section 300.5 means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant or contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable. Relevant and appropriate requirements as defined in 40 CFR Section 300.5 means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant or contaminant, remedial action, location, or other

circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be relevant and appropriate.

Under CERCLA Section 121(e)(l), federal, state or local permits are not required for the portion of any removal or remedial action conducted entirely on-site as defined in 40 CFR Section 300.5. See also 40 CFR Section 300.400(e)(l) & (2). On-site CERCLA response actions must comply, to the extent practicable, with substantive but not administrative requirements of ARARs. Off-site activities such as transportation and disposal of wastes are required to comply with all applicable requirements, including the administrative portions. Administrative requirements include permit applications, reporting, record keeping, and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is recommended for determining compliance with certain requirements such as those typically identified as Location-specific ARARs.

The Federal and State ARARs as well as To-Be-Considered guidance are provided in Table 6. The proposed phased removal action is expected to comply with all identified ARARs and TBC guidance as set forth in the Table 6 and a waiver under CERCLA Section 121(d)(4) is not necessary. The Action-specific ARARs include relevant and appropriate RCRA and MDEQ solid waste landfill requirements for installation of a final cover when leaving hazardous waste or industrial waste in place as part of a containment remedy as well as post-closure care requirements to protect the cover and record a deed notice on the closed waste disposal units such as landfills, waste piles and surface impoundments. Due to the radium-226 content in the gypsum waste and natural decay of this radionuclide, radon-222 gas is generated and emitted into the atmosphere. The Clean Air Act National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations for radon emissions from inactive gypsum stacks apply to this facility and the regulation requires monitoring to ensure that radon gas is below the promulgated air flux standard.

Wastewater from drainage of the Ponds 3, 4, 5, 6, the North Pond and the WRD will be collected and treated, if necessary to ensure protection of the receiving water and then discharged into Bayou Casotte in accordance with EPA CWA regulations and MDEQ water quality standards that are identified as ARARs. Wastewater that is collected from leachate of the EGS underdrain would be connected to a perimeter collection system that feeds the mechanical WWTP that is subject to an NPDES permit that includes effluent limitations and monitoring requirements. Monitoring of the collected leachate will be performed to ensure that pollutants levels would not result in NPDES exceedances. EPA is currently operating the mechanical WWTP and the in-situ WWTP within the parameters of the NPDES permit.

6. Project Schedule

Pending receipt of funding, the Phase 1 Removal would be conducted in 2018 following preparation of Design/Build specifications in Spring 2018. Similarly, the Phase 2 action would be conducted in 2019 following completion of Design/Build specifications for this work while the Phase 3 action would be completed in 2020.

B. Estimated Costs

Extramural Costs	Current Ceiling	Requested Increase	New Project Ceiling
Wastewater Treatment Operations	$25,023,606	$36,000,000	$61,023,606
Construction			
Phase 1 – Complete LLDPE Liner Across the EGS (Alternative 2B)		$26,411,109	$26,411,109
Phase 2 – Pond 5 Closure with North Ponds Capped in Place (Alternative 3B)		$15,535,420	$15,535,420
Phase 3 – Pond 6 and Water Return Ditch Closure (Alternative 4)		$18,325,287	$18,325,287
Extramural Costs/Contingency		$11,331,001	$11,331,001
TOTAL REMOVAL ACTION PROJECT CEILING			**$132,626,423**

The estimated EGS closure costs above include dealing with and treating water that must be removed for each phase and section of the EGS to be closed out (e.g. draining Ponds 3, 4, 5, 6 and the WRD). However, the EGS closure costs above do not include day-to-day operations associated with treatment of contact storm water, stored water, and site stability/maintenance. The EE/CA estimated those costs at $5.6 Million/year (≈ $500,000/month) during an average rainfall year. However, actual costs incurred in 2017, which was a record rainfall year, trended more toward $1 Million/month. Therefore, 3 years of water treatment, site stability and maintenance work at $1 Million/month, for a total of $36 Million during the 3 phases of EGS closure, has been included in the total NTCRA cost. The water treatment burn rate should decrease as each phase of EGS closure is completed and the footprint of acid-generating material is reduced.

The current site ceiling is $25,023,606 and approved the on-going Time Critical Removal Action activities through June 30, 2018. This Action Memo raises the total site ceiling an additional $107,602,917 for a total of $132,626,523 for Time Critical and Non-Time Critical Removal Actions at the MPC Site. NTCRA work under this Action Memo is expected to be

completed by December 31, 2020. Total costs incurred by EPA at MPC since February 2017 are approximately $17 Million.

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Significant delay in implementing this removal action or a decision not to implement the action would require continued expenditures by EPA to collect and treat contaminated water and maintain the site to prevent uncontrolled releases of hazardous substance, pollutants or contaminants to adjacent sensitive habitats. In 2017, these costs exceeded $13 Million. If these expenditures are not made and no other funding source is established to maintain stabilization measures, conditions at the Site will deteriorate and result in a significant potential for uncontrolled releases from the Site.

VIII. OUTSTANDING POLICY ISSUES

While negotiations are underway with MDEQ, there is no formal arrangement with the State of Mississippi to conduct Post Removal Site Control of the EGS and WGS leachate at this time.

IX. ENFORCEMENT

Please see the attached Enforcement-Sensitive Addendum for information regarding enforcement activities.

X. RECOMMENDATION

This decision document represents the proposed Non Time-Critical Removal Action for closure of the East Gypsum Stack and North Ponds at the Mississippi Phosphates Corporation Site located in Pascagoula, Jackson County, Mississippi. This document was developed in accordance with CERCLA, as amended, and consistent with the NCP. This decision is based upon the administrative record established for the Site. Conditions at the Site meet the NCP Section 300.415(b) criteria for a removal action and the CERCLA section 104(c) consistency exemption from the $2 million limitations. I recommend your approval of the proposed NTCRA and the consistency exemption from the $2 million and 12-month statutory limits on removal actions. This NTCRA will be conducted by EPA with funding provided by the Remedial Action Priority Panel.

SIGNATURE:

APPROVAL: _____ DATE: Apr. 18, 2018

E. Scott Pruitt
Administrator
U.S. Environmental Protection Agency

DISAPPROVAL: _____ DATE: _____

E. Scott Pruitt
Administrator
U.S. Environmental Protection Agency

Attachments: Figure 1 – Features of the East Gypsum Stack
Figure 2 – West Gypsum Stack and North Ponds
Figure 3 – Site Location
Figure 4 – Photos of the North Ponds
Figure 5 – Oblique Aerial Views of the East Gypsum Stack
Figure 6 – Photos of Pond 3 at the East Gypsum Stack
Figure 7 – Removal Action Phases at the East Gypsum Stack

Table 1 – Estimated Wastewater Storage Capacity
Table 2 – Recent Monitoring Results for Wastewaters at the MPC Site
Table 3 – Emergency Bypasses of Wastewater in 2017
Table 4 – Comparative Analysis of Removal Alternatives
Table 5 – Summary of Relative Effectiveness, Implementability, and Cost
Table 6 – Applicable or Relevant and Appropriate Requirements

Enforcement Addendum
Responsiveness Summary

REFERENCES

Department of Justice (DOJ), 2015 (August 19). Mississippi Phosphates Corp. Pleads Guilty to Clean Water Act Violation and Agrees to Transfer 320 Acres to Grand Bay National Estuary. Office of Public Affairs, Press Release No. 15-1026. Viewed at: https://www.justice.gov/opa/pr/mississippi-phosphates-corp-pleads-guilty-clean-water-act-violation-and-agrees-transfer-320, November 29, 2017.

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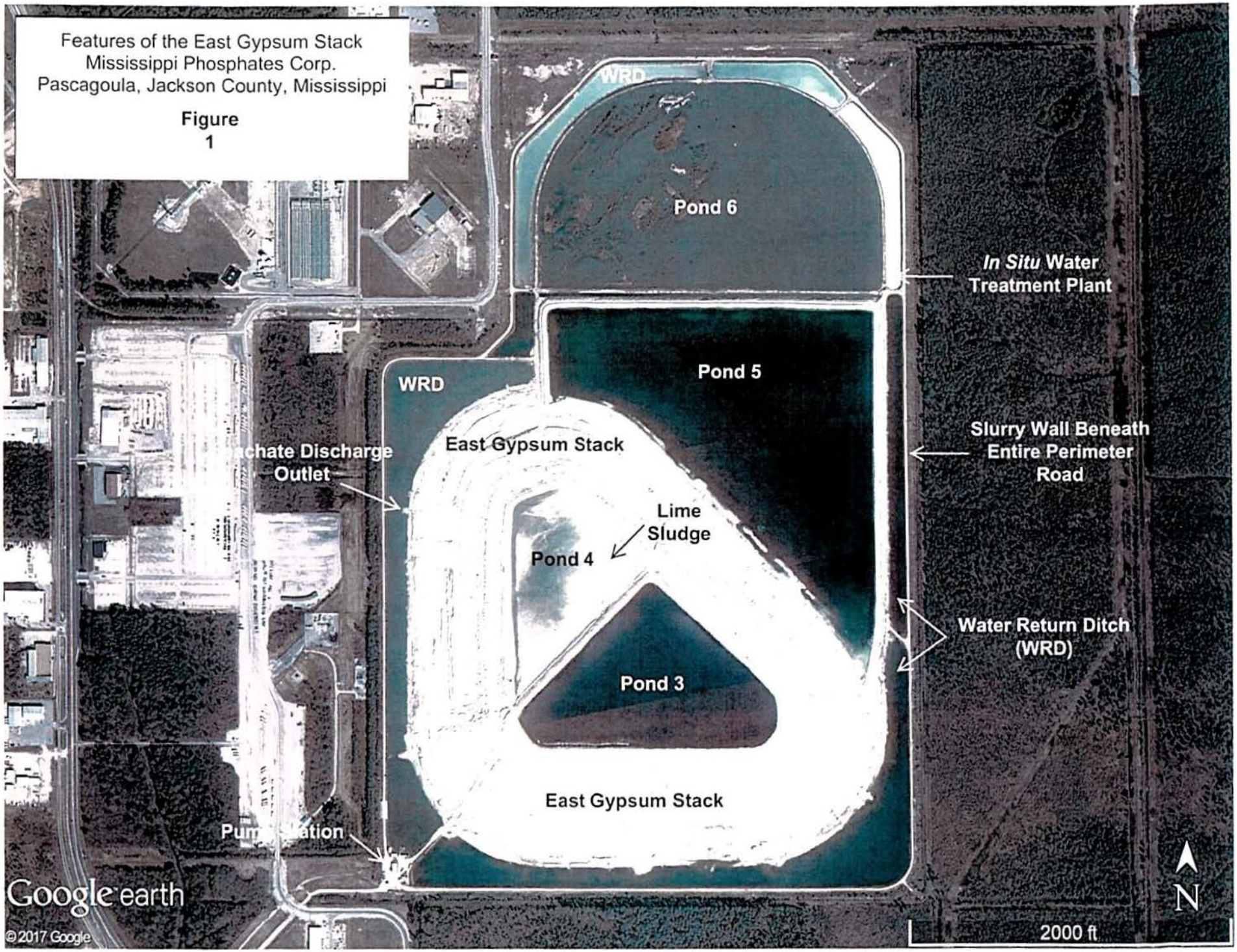
U.S. Environmental Protection Agency, 2016. EPA Optimization Recommendations for Mississippi Phosphates Corporation. September 15, 2016.

U.S. Environmental Protection Agency (EPA), 2017. *Mississippi Phosphates Corporation.* MS PowerPoint presentation prepared by Jordan Garrard, On-Scene Coordinator, EPA Region 4 and Craig Zeller, Remedial Project Manager, EPA Region 4, October 2017.

Weston Solutions, Inc., 2007 (August 29). Final Site Inspection Report, Phosphate ESI Initiative, Mississippi Phosphates Corporation, Pascagoula, Jackson County, Mississippi, CERCLIS ID No. MSD077909133. Prepared for U.S. EPA Region 4.

MISSISSIPPI PHOSPHATES CORP.
NON-TIME CRITICAL REMOVAL ACTION
ACTION MEMORANDUM

FIGURES


Features of the East Gypsum Stack
Mississippi Phosphates Corp.
Pascagoula, Jackson County, Mississippi
Figure
1
WRD
Pond 6
In Situ Water
Treatment Plant
Pond 5
WRD
East Gypsum Stack
Slurry Wall Beneath
Entire Perimeter
Road
chate Discharge
Outlet
Lime
Sludge
Pond 4
Water Return Ditch
(WRD)
Pond 3
East Gypsum Stack
Pum ation
Google earth
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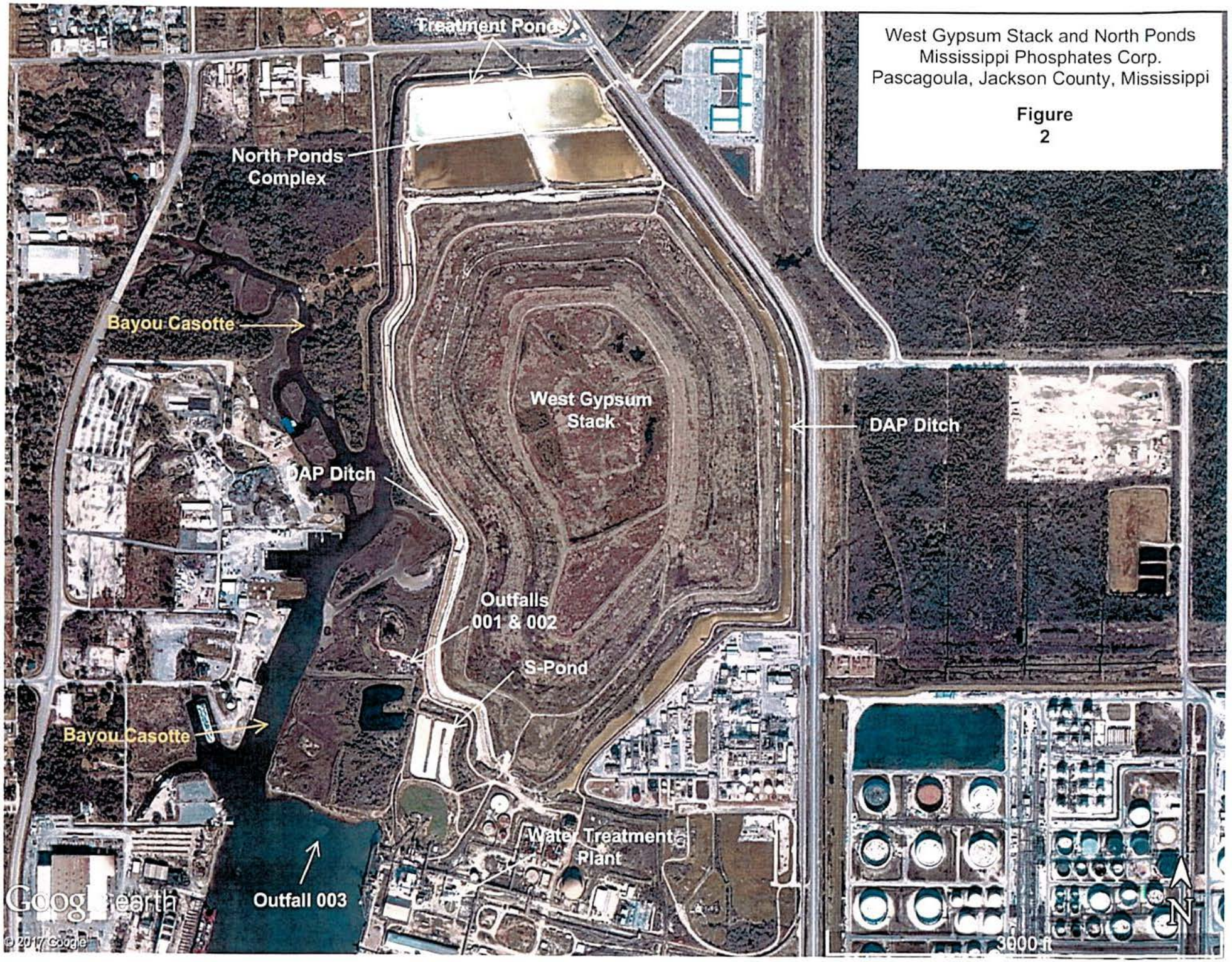

West Gypsum Stack and North Ponds
Mississippi Phosphates Corp.
Pascagoula, Jackson County, Mississippi
Figure
2
Treatment Ponds
North Ponds Complex
Bayou Casotte
West Gypsum Stack
DAP Ditch
DAP Ditch
Outfalls 001 & 002
S-Pond
Bayou Casotte
Water Treatment Plant
Outfall 003
Google Earth
© 2017 Google
3000 ft
N

Site Location Map
Mississippi Phosphates Corp.
Pascagoula, Jackson County, Mississippi

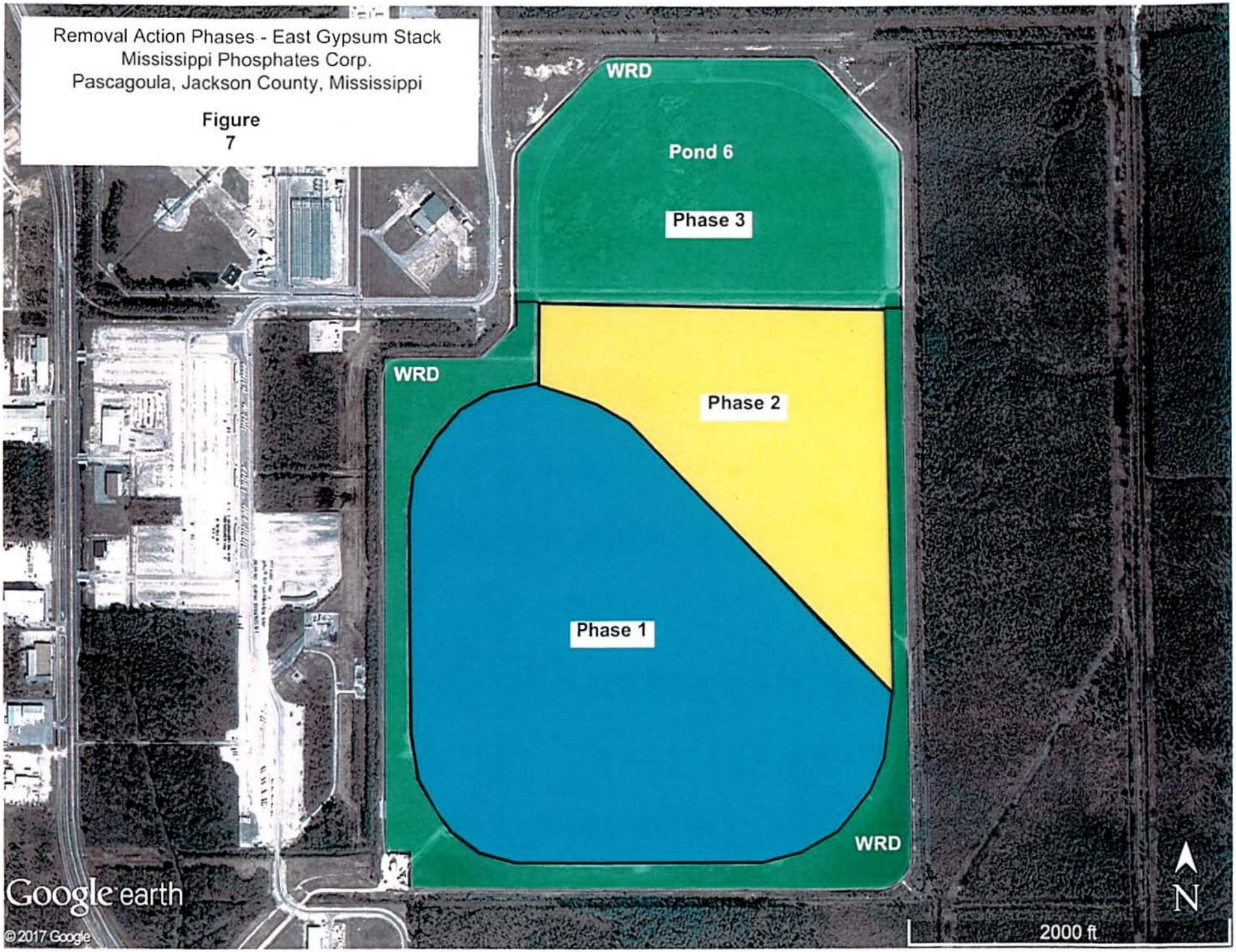
Figure 3

Figure 4. Photos of the North Ponds at the West Gypsum Stack in October 2017. Top: Northeastern pond, looking southeast. Bottom: Northwestern pond looking southwest.

Top: Looking NW from SE corner. Bottom: Looking S from N end of EGS.

Oblique Aerial Views of East Gypsum Stack Mississippi Phosphates Corp. Pascagoula, Jackson County, Mississippi	Figure 5

Figure 6. Photos of Pond 3 at the EGS showing wave cut steepening and erosion of the containment dike taken on October 5, 2017. Top: Looking east at northeast dike wall; Bottom: Looking southwest at southwest dike wall.


Removal Action Phases - East Gypsum Stack
Mississippi Phosphates Corp.
Pascagoula, Jackson County, Mississippi
Figure
7
WRD
Pond 6
Phase 3
WRD
Phase 2
Phase 1
WRD
Google earth
© 2017 Google
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2000 ft

TABLES

Table 1. Estimated Wastewater Storage Capacity at the Mississippi Phosphates Corp. Site		
Location	**Storage Unit**	**Estimated Storage Capacity (Mgal) [1]**
East Gypsum Stack	Pond 3	100
	Pond 4	25
	Pond 5	200
	Pond 6	130
	Water Return Ditch	130
West Gypsum Stack	North Ponds	52
	DAP Ditch	91
	S-Pond	4
Total		**732**

1 Volume Estimates from EPA (2017)

Table 2. Recent Monitoring Results for Wastewaters at the Mississippi Phosphates Corp. Site

Date	WRD		Pond 4			
	pH	Total Phosphorus (mg/L)	pH	Nitrogen (mg/L)	Fluoride (mg/L)	Total Phosphorus (mg/L)
10/2/2017			2.67	0.03	27	223.1
10/24/2017						
10/26/2017						
10/27/2017	2.68	2,052				
10/29/2017	2.90	2,175				
10/30/2017						
11/3/2017	2.53	3,338				
11/4/2017	2.53	3,338				

Date	Pond 5		Pond 6	
	pH	Total Phosphorus (mg/L)	pH	Total Phosphorus (mg/L)
10/2/2017				
10/24/2017			2.96	1,180
10/26/2017	2.45	2,693	2.84	1,450
10/27/2017	2.51	2,208	3.05	1,494
10/29/2017			3.02	1,150
10/30/2017	2.75	2,938	3.41	1,392
11/3/2017			3.42	1,417
11/4/2017			3.42	1,417

Table 3. Emergency Bypasses of Wastewater in 2017, Mississippi Phosphates Corp. Site		
Date of Bypass	**Approximate Discharge Volume (Mgal)**	**Cause**
July, 2017	63.3	Excessive rainfall (2 separate discharge events)
August, 2017	121.5	Hurricane Harvey; Lower Ponds 3 and 4
September, 2017	43.6	Hurricane Nate
October, 2017*	165.3	Excessive rainfall
Total	**393.7**	

Through November 1, 2017
Data from EPA (2017c)
* Two closely spaced events

Table 4. Comparative Analysis of Removal Alternatives for Closure of the East Gypsum Stack, Mississippi Phosphates Corp. Site

Criterion	Alternative 1 *No Action*	Alternative 2A *Partial LLDPE Liner Across EGS*	Alternative 2B *Complete LLDPE Liner Across EGS*	Alternative 3A *Close Pond 5, Excavate North Ponds*	Alternative 3B *Close Pond 5, Cap North Ponds In Situ*	Alternative 4 *Close Pond 6 and WRD*
Effectiveness Score						
Overall Protection of Public Health and Environment	Not protective. Would not meet RAOs.	Would meet RAO for reducing volume of water requiring treatment. Would leave phosphogypsum materials in place and rely on existing slurry wall and underdrain to limit leachate impacts to groundwater.	Would meet RAO for reducing volume of water requiring treatment. Would leave phosphogypsum materials in place and rely on existing slurry wall and underdrain to limit leachate impacts to groundwater.	Would meet RAO for reducing volume of water requiring treatment. Would disperse lime sludge from water treatment by incorporating into soil cap.	Would meet RAO for reducing volume of water requiring treatment. Would leave lime sludge from water treatment in place.	Would meet RAO for reducing volume of water requiring treatment. Combined with other alternatives would eliminate storage of contaminated water at the EGS.
Compliance with ARARs	May not comply with ARARs for storage of wastewater	Expected to comply with all chemical-, action, and location-specific ARARs	Expected to comply with all chemical-, action, and location-specific ARARs	Expected to comply with all chemical-, action, and location-specific ARARs	Expected to comply with all chemical-, action, and location-specific ARARs	Expected to comply with all chemical-, action, and location-specific ARARs
Long-Term Effectiveness and Permanence	No reduction in residual risk; not permanent.	Effective. Will increase physical stability of the EGS and decrease the volume of water requiring treatment.	Effective. Will increase physical stability of the EGS and decrease the volume of water requiring treatment.	Effective. Will decrease the volume of water requiring treatment by a greater amount than Alternative 2A. Would incorporate lime sludge into soil cap at Pond 5.	Effective. Will decrease the volume of water requiring treatment. Would leave lime sludge in place protected by geotextile liner and soil cap.	Effective. Will decrease the volume of water requiring treatment. Would incorporate lime sludge from *in situ* treatment into soil cap at Pond 6.
Reduction of Toxicity, Mobility, and Volume through Treatment	No reduction in the volume of water requiring treatment.	Will reduce the volume of water requiring treatment by 39% over Alternative 1 assuming an average precipitation year.	Will reduce the volume of water requiring treatment by 39% over Alternative 1 assuming an average precipitation year.	Will reduce the volume of water requiring treatment by about 110 Mgal over Phase 1 construction and when combined with Phase 1 by 63% over Alternative 1 assuming an average precipitation year.	Will reduce the volume of water requiring treatment by about 110 Mgal over Phase 1 construction and when combined with Phase 1 by 63% over Alternative 1 assuming an average precipitation year.	Will reduce the volume of water requiring treatment by about 164 Mgal over Phases 1 and 2 construction and when combined with Phases 1 and 2 by more than 98% over Alternative 1 assuming an average precipitation year.
Short-Term Effectiveness	None.	Construction will increase truck traffic in the area and would require dust control to limit emissions during construction. Could potentially require discharge of partly treated water from Ponds 3 and 4 to facilitate construction. Could potentially increase employment in the area.	Construction will increase truck traffic in the area and would require dust control to limit emissions during construction. Could potentially require discharge of partly treated water from Ponds 3 and 4 to facilitate construction. Csould potentially increase employment in the area.	Construction will increase truck traffic in the area and would require dust control to limit emissions during construction. An estimated 72,800 truck trips are required to remove lime sludge and bring soil backfill. Could potentially require discharge of partly treated water from Pond 5 to facilitate construction. Could potentially increase employment in the area.	Construction will increase truck traffic in the area and would require dust control to limit emissions during construction. Could potentially require discharge of partly treated water from Pond 5 to facilitate construction. Could potentially increase employment in the area.	Construction will increase truck traffic in the area and would require dust control to limit emissions during construction. Could potentially require discharge of partly treated water from Pond 6 to facilitate construction. Could potentially increase employment in the area.
Implementability Score	**3.7**	**4.7**	**5.0**	**5.0**	**5.0**	**5.0**
Technical and Administrative Feasibility	Easily implemented.	Technically and administratively implementable.	Technically and administratively implementable.	Technically and administratively implementable.	Technically and administratively implementable.	Technically and administratively implementable.

Table 4. Comparative Analysis of Removal Alternatives for Closure of the East Gypsum Stack, Mississippi Phosphates Corp. Site

Criterion	Alternative 1 *No Action*	Alternative 2A *Partial LLDPE Liner Across EGS*	Alternative 2B *Complete LLDPE Liner Across EGS*	Alternative 3A *Close Pond 5, Excavate North Ponds*	Alternative 3B *Close Pond 5, Cap North Ponds* In Situ	Alternative 4 *Close Pond 6 and WRD*
Availability of Technology	None.	Relies on commonly used construction equipment and techniques. Identifying a sufficient quantity of clay borrow soil could be a limitation.	Relies on commonly used construction equipment and techniques. Identifying a sufficient quantity of borrow soil could be a limitation.	Relies on commonly used construction equipment and techniques. Identifying a sufficient quantity of borrow soil could be a limitation.	Relies on commonly used construction equipment and techniques. Identifying a sufficient quantity of borrow soil could be a limitation.	Relies on commonly used construction equipment and techniques. Identifying a sufficient quantity of borrow soil could be a limitation.
State and Community Acceptance	Will be determined following public meeting and comment period. Not expected to be acceptable.	Will be determined following public meeting and comment period. Expected to be acceptable.	Will be determined following public meeting and comment period. Expected to be acceptable.	Will be determined following public meeting and comment period. Expected to be acceptable.	Will be determined following public meeting and comment period. Expected to be acceptable.	Will be determined following public meeting and comment period. Expected to be acceptable.
Cost						
Construction Cost	**$0**	**$26,741,887**	**$26,411,109**	**$39,572,349**	**$15,535,420**	**$18,325,287**
Total Cost	**$0**	**$31,769,362**	**$31,376,398**	**$47,011,950**	**$18,456,080**	**$21,770,441**

Table 5. Summary of Relative Effectiveness, Implementability, and Cost for Removal Action Alternatives

Criterion and Sub-Criterion	Alternative 1 No Action	Phase 1		Phase 2		Phase 3
		Alternative 2A Partial Liner	Alternative 2B Complete Liner	Alternative 3A Close Pond 5; Excavate North Ponds	Alternative 3B Close Pond 5; Cap North Ponds in Place	Alternative 4 Close Pond 6 & WRD
Effectiveness (average of sub-criteria)	**2.2**	**4.0**	**4.0**	**4.4**	**4.6**	**4.6**
Overall Protection	1	4	4	5	4	5
Compliance with ARARs	3	5	5	5	5	5
Long-Term Permanence	1	4	4	5	5	5
Reduction in Toxicity, Mobility, & Volume	1	4	4	5	5	5
Short-Term Effectiveness	5	3	3	2	4	3
Implementability (average of sub-criteria)	**3.7**	**4.7**	**5.0**	**5.0**	**5.0**	**5.0**
Technical and Administrative Feasibility	5	5	5	5	5	5
Availability of Technology	5	4	5	5	5	5
State and Community Acceptance	1	5	5	5	5	5
Total Cost[1]	**$5,341,000 [2]**	**$31,769,362**	**$31,376,398**	**$47,011,950**	**$18,456,080**	**$21,770,441**

Criterion Scores: 1 = poor; 2 = fair; 3 = average; 4 = good; 5 = very good

1 - Total cost is the construction cost plus 8% contractor fee and 10% contingency

2 - Cost for Alternative 1 is $0; cost shown is the current cost of annual water treatment assuming average rainfall (net precipitation of 44.7 inches)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	General Construction Standards – All Land Disturbing Activities		
Activities causing storm water runoff (e.g., clearing, grading, excavation)	Implement good construction management techniques in accordance with the substantive requirements for permits issued pursuant to 40 CFR § 122.26(c) – storm water discharges associated with industrial activity or under a General Permit. *NOTE*: Site has NPDES permit that includes requirements for discharges of storm water associated with industrial activity. EPA is currently operating the wastewater treatment system and monitoring discharges of effluent (including contaminated storm water) within the parameters of the permit.	Dewatering or storm water discharges associated with construction activity disturbing one or more acres as defined in 40 CFR 122.26(b)(15) – **applicable**	40 CFR Part § 122.26(c)(1)
	Shall provide a narrative description of: (A) The location (including a map) and the nature of the construction activity; (B) The total area of the site and the area of the site that is expected to undergo excavation; (C) Proposed measures, including BMPs to control stormwater discharges during construction, including a brief description of applicable State and local erosion and sediment control requirements; (D) Proposed measures to control pollutants in storm water discharges that will occur after construction operations have been completed, including a brief description of applicable State or local erosion and sediment control requirements; (E) Estimate of the runoff coefficient of the site and the increase in impervious area after the construction is completed, the nature of fill material and existing data describing the soil or the quality of the discharge; and (F) The name of the receiving water.		40 CFR Part § 122.26(c)(1)(ii)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Activities causing storm water runoff (e.g., clearing, grading, excavation) *cont.*	You must design, install, and maintain stormwater controls required in Parts 2.2 and 2.3 to minimize the discharge of pollutants in stormwater from construction activities. Must develop a Storm Water Pollution Prevention Plan (SWPPP) consistent with the requirements in Part 7 in the EPA 2017 Construction General Permit. *NOTE*: Under CERCLA 121(e)(1) permits are not required for on-site response actions. However, compliance with the substantive requirements in the EPA 2107 Construction General Permit (determined to be TBC) is recommended to ensure management of stormwater in order to prevent erosion or unauthorized discharges.	Dewatering or storm water discharges associated with construction activity disturbing one or more acres as defined in 40 CFR 122.26(b)(15) – **TBC**	2017 EPA NPDES General Permit for Discharges from Construction Activities https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents
Activities causing fugitive dust emissions	Shall not cause, allow, or permit the emission of particles, or any contaminants in sufficient amounts or of such duration from any process as to be injurious to humans, animals, plants, or property, or to create a condition of air pollution.	Fugitive emissions from construction operations, grading, or the clearing of land – **applicable**	MDEQ Regulation APC-S-1, Section 3, Paragraph 3

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Control of Radon -222 Gas from Closed Waste Pile (East Gypsum Stack and Dewatered Ponds)			
Control of radon gas emissions	After a phosphogypsum stack has become an inactive stack, the owner or operator shall assure that the stack does not emit more than 20 pCi/(m^2-sec) (1.9 pCi/(ft^2-sec)) of radon-222 into the air.	Inactive phosphogypsum stack[1] as defined in 40 CFR 61.201(a) – **applicable**	40 CFR 61.202 Subpart R – NESHAP for Radon Emissions
Monitoring of radon-222 gas from closed waste pile	Within sixty days following the date on which a stack becomes an inactive stack, or within ninety days after the date on which this subpart first took effect if a stack was already inactive on that date, each owner or operator of an inactive phosphogypsum stack shall test the stack for radon-222 flux in accordance with the procedures described in 40 CFR part 61, appendix B, Method 115. EPA shall be notified at least 30 days prior to each such emissions test so that EPA may, at its option, observe the test. If meteorological conditions are such that a test cannot be properly conducted, then the owner or operator shall notify EPA and test as soon as conditions permit. *NOTE*: Although monitoring or testing are 'substantive' requirements, notifications and reporting are considered 'administrative' requirements and therefore not ARAR. Testing will be performed as part of the CERCLA response action and results reported to the EPA Region 4 Division of Air in accordance with this rule.		40 CFR 61.203(a) Radon monitoring and compliance procedures

[1] *Phosphogypsum stacks* or *stacks* are piles of waste resulting from wet acid phosphorus production, including phosphate mines or other sites that are used for the disposal of phosphogypsum.

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Monitoring of radon-222 gas from closed waste pile *Con't*	Within ninety days after the testing is required, the owner or operator shall provide EPA with a report detailing the actions taken and the results of the radon-222 flux testing. Each report shall also include the following information: (i) The name and location of the facility; (ii) A list of the stacks at the facility including the size and dimensions of each stack; (iii) The name of the person responsible for the operation of the facility and the name of the person preparing the report (if different); (iv) A description of the control measures taken to decrease the radon flux from the source and any actions taken to insure the long term effectiveness of the control measures; and (v) The results of the testing conducted, including the results of each measurement. *NOTE*: Although monitoring is a 'substantive' requirement; reporting is considered an 'administrative' requirement and therefore not an ARAR. Reporting of monitoring results will be done in accordance with the CERCLA response action process and reported to EPA Region 4 Division of Air.	Inactive phosphogypsum stack as defined in 40 CFR 61.201(a) – **applicable**	40 CFR 61.203(b)(1)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Control of radon-222 gas from inactive phosphogypsum stack (East Gypsum Stack)	Shall limit releases of radon-222 by emplacing a permanent radon barrier. This permanent radon barrier shall be constructed as expeditiously as practicable considering technological feasibility (including factors beyond the control of the licensee) after the pile or impoundment ceases to be operational. Such control shall be carried out in accordance with a written tailings closure plan (radon) to be incorporated by the Nuclear Regulatory Commission (NRC) or Agreement State into individual site licenses. *NOTE*: The MS Phosphate facility is not subject to an NRC license. Installation of radon barrier will be addressed in the final cover design as part of the Removal Action Work plan and in consideration of other ARARs such as the MDEQ solid waste landfill final cover requirements.	Uranium mill tailings piles or impoundments that are nonoperational and subject to a license by the NRC or an Agreement – **relevant and appropriate**	40 CFR 192.32(a)(3) Radon barrier
Monitoring of radon-222 gas from closed waste pile	Upon emplacement of the permanent radon barrier pursuant to 40 CFR 192.32(a)(3), the licensee shall conduct appropriate monitoring and analysis of the radon-222 releases to demonstrate that the design of the permanent radon barrier is effective in limiting releases of radon-222 to a level not exceeding 20 pCi/m^2-s as required by 40 CFR 192.32(b)(1)(ii). This monitoring shall be conducted using the procedures described in 40 CFR part 61, Appendix B, Method 115, or any other measurement method proposed by a licensee that the NRC or Agreement State approves as being at least as effective as EPA Method 115 in demonstrating the effectiveness of the permanent radon barrier in achieving compliance with the 20 pCi/m^2-s flux standard.		40 CFR 192.32(a)(4)(i)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Control of radon-222 gas from inactive waste pile or closed surface impoundment (East Gypsum Stack)	Disposal areas shall each comply with the closure performance standard in § 264.111 of this chapter with respect to nonradiological hazards and shall be designed[2] to provide reasonable assurance of control of radiological hazards to: (i) Be effective for one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years, and, (ii) Limit releases of radon-222 from uranium byproduct materials to the atmosphere so as to not exceed an average 2 release rate of 20 picocuries per square meter per second (pCi/m2s).	Uranium mill tailings piles or impoundments that are nonoperational and at the end of the closure period – **relevant and appropriate**	40 CFR 192.32(b)(1) Standards for application after the closure period
	The requirements of § 192.32(b)(1) shall not apply to any portion of a licensed and/or disposal site which contains a concentration of radium-226 in land, averaged over areas of 100 square meters, which, as a result of uranium byproduct material, does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g), averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g, averaged over 15 cm thick layers more than 15 cm below the surface.		40 CFR 192.32(b)(2) Standards for application after the closure period

[2] The standard applies to design with a monitoring requirement as specified in § 192.32(a)(4).

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Waste Generation, Characterization–Primary waste (excavated soils, sludge, wastewater) and Secondary wastes (treatment residuals)[3]			
Characterization of ***solid waste*** (all primary and secondary wastes)	Must determine if solid waste is hazardous waste or if waste is excluded under 40 CFR § 261.4; and Must determine if waste is listed as a hazardous waste under 40 CFR Part 261.	Generation of solid waste as defined in 40 CFR § 261.2 – **applicable**	40 CFR § 262.11(a) and (b)
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR part 261by either: • Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or • Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.		40 CFR § 262.11(c)(1) and (2)
	Must refer to 40 CFR Parts 261, 262, 264, 265, 266, 268, and 273 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste that is determined to be hazardous – **applicable**	40 CFR § 262.11(d)
Characterization of ***hazardous waste*** (all primary and secondary wastes)	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 CFR §§ 264 and 268	Generation of RCRA hazardous waste for storage, treatment, or disposal – **applicable**	40 CFR § 264.13(a)(1)

[3] The State of Mississippi incorporates by reference the federal regulations governing hazardous waste generation, characterization, segregation, and storage. See MDEQ Regulations HW-1 (Sept. 29, 2008). Accordingly, only the federal regulations are cited in this table.

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 *et seq.*. This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter. *NOTE:* For purposes of part 268, the waste will carry the code any applicable listed waste (40 CFR 261, subpart D). In addition, where the waste exhibits a characteristic, the wastes will carry one or more characteristic codes (40 CFR 261, subpart C).	Generation of RCRA hazardous waste for storage, treatment, or disposal – **applicable**	40 CFR § 268.9(a)
	Must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal –**applicable**	40 CFR § 268.9(a)
	A generator of hazardous waste must determine if the waste has to be treated before it can be disposed. This is done by determining if the hazardous waste meets the treatment standards in 40 *CFR* 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. *NOTE:* This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.	Generation of hazardous waste for storage, treatment or disposal – **applicable**	40 CFR § 268.7(a)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Characterization of remediation wastes	Obtain a detailed chemical and physical analysis of a representative sample of the hazardous remediation wastes to be managed at the site. At a minimum, the analysis must contain all of the information which must be known to treat, store or dispose of the waste according to this part and part 268 of this chapter and must be kept up to date.	Management of remediation wastes at facility that does not have a RCRA permit – **applicable**	40 CFR § 264.1(j)(2)
Waste Storage – Primary waste (excavated soils/sludge/debris) and Secondary wastes (treatment residuals)[4]			
Temporary on-site storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that: • waste is placed in containers that comply with 40 CFR §§ 265.171-173; and • the date upon which accumulation begins is clearly marked and visible for inspection on each container; • container is marked with the words "hazardous waste" or	Accumulation of RCRA hazardous waste on-site as defined in 40 CFR § 260.10 – **applicable**	40 CFR § 262.34(a); 40 CFR § 262.34(a)(1)(i) 40 CFR § 262.34(a)(2) and (3)
	• container may be marked with other words that identify contents	Accumulation of 55 gals. or less of RCRA hazardous waste or 1 qrt. Of acutely hazardous waste at or near any point of generation – **applicable**	40 CFR § 262.34(c)(1)
Use and management of hazardous waste in containers	If container is not in good condition or if it begins to leak, must transfer waste into container in good condition	Storage of RCRA hazardous waste in containers – **applicable**	40 CFR § 265.171
	Use container made with lined materials compatible with waste to be stored so that the ability of the container is not impaired		40 CFR § 265.172

[4] The State of Mississippi incorporates by reference the federal regulations governing waste generation, characterization, segregation, and storage. See MDEQ Regulations HW-1 (Sept. 29, 2008). Accordingly, only the federal regulations are cited in this table.

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	Keep containers closed during storage, except to add/remove waste		40 CFR § 265.173(a)
	Open, handle, and store containers in a manner that will not cause containers to rupture or leak		40 CFR § 265.173(b)
Storage of hazardous waste in a container area	Area must have a containment system designed and operated in accordance with 40 CFR § 264.175(b)	Storage of RCRA hazardous waste in containers *with free liquids* – **applicable**	40 CFR § 264.175(a)
	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid	Storage of RCRA hazardous waste in containers that do not contain free liquids (other than F021, F022, F023, F026 and F027) – **applicable**	40 CFR § 264.175(c)
Closure performance standard for RCRA container storage unit	Must close the facility (e.g., container storage unit) in a manner that: • minimizes the need for further maintenance; • controls, minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere; and • complies with the closure requirements of subpart, but not limited to, the requirements of 40 CFR § 264.178 for containers.	Storage of RCRA hazardous waste in containers – **applicable**	40 CFR §264.111

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Closure of RCRA container storage unit	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed. [Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 CFR § 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].	Storage of RCRA hazardous waste in containers in a unit with a containment system – **applicable**	40 CFR §264.178
Temporary on-site storage of remediation waste in staging piles (e.g., excavated soils, sludges/debris)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated.	Accumulation of *non-flowing hazardous remediation waste* (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR § 260.10 – **applicable**	40 CFR § 264.554(a)(1)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Temporary on-site storage of remediation waste in staging piles (e.g., excavated soils, sludges/debris)	May be temporarily stored (including mixing, sizing, blending, or other similar physical operations intended to prepare the wastes for subsequent management or treatment) at a facility if used only during remedial operations provided that the staging pile: • must facilitate a reliable, effective, and protective remedy; • must be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, and minimize or adequately control cross-media transfer as necessary to protect human health and the environment (e.g., use of liners, covers, run-off/run-on controls)		40 CFR § 264.554(a)(1)(i) and (ii)
Operation of a staging pile	The staging pile must not operate for more than two years, except when the Director grants an operating term extension under 40 *CFR* § 264.554(i). *NOTE:* Must measure the 2-year limit (or other operating term specified) from first time remediation waste placed in staging pile.	Accumulation of *non-flowing hazardous remediation waste* (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR § 260.10 – **applicable**	40 CFR §§ 264.554(d)(1)(iii)
	The Director may allow a staging pile to operate for up to two years after the hazardous waste is first placed into the pile. Must not use staging pile longer than the length of time designated by the Director in the permit, closure plan, or order ("operating term"), except as provided in paragraph (i) of this section. *NOTE:* Additional time limits for storage will be justified and documented in an ESD, ROD Amendment or Actin Memorandum Addendum issued by EPA.	Accumulation of *non-flowing hazardous remediation waste* (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR § 260.10 – **applicable**	40 CFR §264.554(h)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	The Director may grant one operating term extension of up to 180 days beyond the operating term limit contained in the permit, closure plan, or order. To justify to the Director the need for the extension, you must provide sufficient and accurate information to enable the Director to determine that continued use of the staging plie: (i) Will not pose a threat to human health and the environment; and (ii) Is necessary to ensure timely and efficient implementation of the remedial actions at the facility.		40 CFR §264.554(h)(i)(1)
Temporary on-site storage of remediation waste in staging piles (e.g., excavated soils, sludges, debris)	In setting standards and design criteria, must consider the following factors: • length of time pile will be in operation; • volumes of waste intended to store in pile; • physical and chemical characteristics of waste to be stored in unit • potential for releases from the unit hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • potential for human and environmental exposure to potential releases from the unit	Accumulation of *non-flowing hazardous remediation waste* (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR § 260.10 – **applicable**	40 CFR § 264.554(d)(2)(i)-(vi)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Temporary on-site storage of remediation waste in staging piles (e.g., excavated soils, sludges, debris)	Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that: • the remediation waste no longer meets the definition of ignitable or reactive under 40 CFR 261.21 or 40 CFR 261.23; and • you have complied with 40 CFR 264.17(b); or Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.	Storage of "ignitable" or "reactive" remediation waste in staging pile – **applicable**.	40 CFR § 264.554(e) 40 CFR § 264.554(e)(1)(i) 40 CFR § 264.554(e)(1)(ii) 40 CFR § 264.554(e)(2)
	Must not place in the same staging pile unless you have complied with 40 CFR 264.17(b).	Storage of "incompatible" remediation waste (as defined in 40 CFR 260.10) in staging pile – **applicable**	40 CFR § 264.554(f)(1)
	Must separate the incompatible waste of materials, or protect them from one another using a dike, berm, wall, or other device.	Staging pile of remediation waste stored nearby to incompatible wastes or materials in containers, other piles, open tanks or land disposal units – **applicable**.	40 CFR § 264.554(f)(2)
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless the base has been sufficiently decontaminated in compliance with 40 CFR § 264.17(b)		40 CFR § 264.554(f)(3)
Closure of staging pile of remediation waste	Must be closed within 180 days after the operating term by removing or decontaminating all remediation waste, contaminated containment system components, and structures and equipment contaminated with waste and leachate.	Storage of remediation waste in staging pile in *previously contaminated area* – **applicable**	40 CFR § 264.554(j)(1)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	Must decontaminate contaminated sub-soils in a manner that EPA determines will protect human health and the environment.		40 CFR § 264.554(j)(2)
	Must be closed within 180 days after the operating term according to 40 CFR §§ 264.258(a) and 264.111 or 265.258(a) and 265.111.	Storage of remediation waste in staging pile *in uncontaminated area* – **applicable**	40 CFR § 264.554(k)
Waste Treatment and Disposal – Primary waste (e.g., excavated soils, sludges, debris) and Secondary wastes (treatment residuals)[5]			
Disposal of RCRA hazardous waste in land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR § 268.40 before land disposal.	Land disposal, as defined in 40 CFR § 268.2, of restricted RCRA waste – **applicable**	40 CFR § 268.40(a)
	All underlying hazardous constituents [as defined in 40 CFR § 268.2(i)] must meet the Universal Treatment Standards, found in 40 CFR § 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **applicable**	40 CFR § 268.40(e)

[5] The State of Mississippi incorporates by reference the federal regulations governing land disposal restrictions. See MDEQ Regulations HW-1 (Sept. 29, 2008). Accordingly, only the federal regulations are cited in this table.

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Disposal of RCRA characteristic wastewaters in a CWA wastewater treatment unit	Are not prohibited, if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. pursuant to a permit issued under 402 the CWA (i.e., NPDES permitted), unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR §268.40, or are D003 reactive cyanide. *NOTE:* For purposes of this exclusion, a CERCLA on-site wastewater treatment unit that meets all of the identified CWA ARARs for point source discharges from such a system, is considered a wastewater treatment system that is NPDES permitted.	Land disposal of RCRA restricted hazardous wastewaters that hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 CFR §268 – **applicable**	40 CFR § 268.1(c)(4)(i)
Transport and conveyance of collected RCRA wastewater to WWTU located on the facility	Any dedicated tank systems, conveyance systems, and ancillary equipment used to treat, store or convey wastewater to an on-site NPDES-permitted wastewater treatment facility are exempt from the requirements of RCRA Subtitle C standards. *NOTE:* For purposes of this exclusion, any dedicated tank systems, conveyance systems, and ancillary equipment used to treat, store or convey CERCLA remediation wastewater to a CERCLA on-site wastewater treatment unit that meets all of the identified CWA ARARs for point source discharges from such a facility, are exempt from the requirements of RCRA Subtitle C standards.	On-site wastewater treatment unit (as defined in 40 CFR 260.10) subject to regulation under § 402 or § 307(b) of the CWA (i.e., NPDES-permitted) that manages hazardous wastewaters – **applicable**	40 CFR 264.1(g)(6)
Air Emissions from RCRA waste storage units	The requirements of RCRA Subpart CC – Air Emission Standards for Tanks, Surface Impoundments, and Containers do not apply to a waste management unit that is solely used for on-site treatment or storage of hazardous waste that is placed in the unit as result of implementing remedial activities required under RCRA 3004(u) and (v), or 3008(h), or CERCLA authorities.	Air pollutant emissions with volatile organics from a hazardous waste tank, surface impoundment, or container – **relevant and appropriate**	40 CFR § 264.1080(a)(5)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Discharge of Wastewater from Treatment Unit or from Dewatering			
General duty to mitigate for discharge of wastewater treatment unit	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Discharge of pollutants to surface waters – **applicable**.	40 CFR §122.41(d)
Operation and maintenance of treatment unit	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters – **applicable**.	40 CFR §122.41(e)
Technology-based treatment requirements for wastewater discharge	To the extent that EPA promulgated effluent limitations are inapplicable, shall develop on a case-by-case Best Professional Judgment (BPJ) basis under § 402(a)(1)(B) of the CWA, technology based effluent limitations by applying the factors listed in 40 *CFR* §125.3(d) and shall consider: • The appropriate technology for this category or class of point sources, based upon all available information; and • Any unique factors relating to the discharger. *NOTE*: Facility is subject to NPDES permit that has effluent limits based on EPA Effluent Guidelines Phosphate production facility. Technology is application of lime that adjusts ph levels as well as precipitates pollutants including radium 226 present in waste water.	Discharge of pollutants to surface waters from other than a POTW – **applicable**.	40 CFR §125.3(c)(2)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Water quality-based effluent limits for wastewater discharge	Must develop water quality based effluent limits that ensure that: • The level of water quality to be achieved by limits on point source(s) established under this paragraph is derived from, and complies with all applicable water quality standards; and • Effluent limits developed to protect narrative or numeric water quality criteria are consistent with the assumptions and any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 CFR §130.7.	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard established under § 303 of the CWA – **applicable**.	40 CFR §122.44(d)(1)(vii)
	Must attain or maintain a specified water quality through water quality related effluent limits established under § 302 of the CWA.	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard – **applicable**.	40 CFR §122.44(d)(2)
Protection of water quality for Bayou Casotte	Waters shall be free from substances attributable to municipal, industrial, agricultural, or other discharges that will settle to form putrescent or otherwise objectionable sludge deposits.	Discharge of waste or other source of water pollution into surface water classified as *Fish and Wildlife* – **relevant and appropriate**	11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* A. Narrative standards (1)
	Waters shall be free from floating debris, oil, scum, and other floating materials attributable to municipal, industrial, agricultural, or other discharges in amounts sufficient to be unsightly or deleterious.		11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* A. Narrative standards (2)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	Waters shall be free from materials attributable to municipal, industrial, agricultural, or other discharges producing color, odor, taste, total suspended or dissolved solids, sediment, turbidity, or other conditions in such degree as to create a nuisance, render the waters injurious to public health, recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated use. Except as prohibited in Rule 2.1.H. above, the turbidity outside the limits of a 750-foot mixing zone shall not exceed the background turbidity at the time of discharge by more than 50 Nephelometric Turbidity Units (NTU).	Discharge of waste or other source of water pollution into surface water classified as *Fish and Wildlife* – **relevant and appropriate**	11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* A. Narrative Standards (3)
Protection of water quality for Bayou Casotte *Con't*	Exemptions to the turbidity standard may be granted under the following circumstances: (a) in cases of emergency to protect the public health and welfare (b) for environmental restoration projects which will result in reasonable and temporary deviations and which have been reviewed and approved by the Department of Environmental Quality. *NOTE*: Any deviation will be determined by EPA in consultation with MDEQ as part of the CERCLA removal action.		11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* A. Narrative Standards (3)
	Waters shall be free from substances attributable to municipal, industrial, agricultural, or other discharges in concentrations or combinations that are toxic or harmful to humans, animals, or aquatic life. Specific requirements for toxicity are found in Rule 2.2.F.	Discharge of waste or other source of water pollution into surface water classified as *Fish and Wildlife* – **relevant and appropriate**	11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* A. Narrative standards (4)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	Municipal wastes, industrial wastes, or other wastes shall receive effective treatment or control in accordance with Section 301, 306, and 307 of the Federal Clean Water Act. A degree of treatment greater than defined in these sections may be required when necessary to protect legitimate water uses.		11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* A. Narrative Standards (5)
Protection of water quality for Bayou Casotte *Con't*	The concentration of toxic substances in State waters shall not result in chronic or acute toxicity or impairment of the uses of aquatic life. Toxicity concentrations in State waters in excess of these values shown in Table 2 will be assessed to determine chronic or acute toxicity, and/or the impairment of the uses of aquatic life. Chronic and/or acute toxicity will be determined in accordance with the *Water Quality Standards Handbook: Second Edition* (EPA-823-B-94-005a, August 1994) *and Technical Support Document for Water Quality-Based Toxics Control* (EPA-505/2-90-001, March 1991). Regardless of the results of chronic or acute toxicity bioassay surveys, the concentrations of toxic substances shall not exceed the chronic or acute values, except as provided for in Rules 2.2.F.5(a) and 2.2.F.5(b).	Discharge of waste or other source of water pollution into surface water classified as *Fish and Wildlife* – **relevant and appropriate**	11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* F. Toxic substances (1) Aquatic Life and Human Health Standards (a) Aquatic life
	The concentration of toxic substances shall not exceed the level necessary to protect human health through exposure routes of fish (and shellfish) tissue consumption, water consumption, or other routes identified as appropriate for the water body.		11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.2 *Minimum Conditions Applicable to All Waters* F. Toxic substances (1) Aquatic Life and Human Health Standards (b) Human Health

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Water Quality Criteria for *Fish and Wildlife*	Specific Conductance: There shall be no substances added to increase the conductivity above 1000 micromhos/cm for freshwater streams. Dissolved Solids: There shall be no substances added to the waters to cause the dissolved solids to exceed 750 mg/l as a monthly average value, nor exceed 1500 mg/l at any time for freshwater streams.	Discharge of waste or other source of water pollution into surface water classified as *Fish and Wildlife* – **relevant and appropriate**	11 Miss. Admin. Code. Part 6 Ch.2 Rule 2.*3 Specific Water Quality Criteria* (D) Fish and Wildlife Classification (2) and (3)
Discharge of wastewaters from closed industrial solid waste landfill	Landfills shall not cause: (1) a discharge of pollutants into waters of the State, including wetlands, that violates any requirements of the CWA or the Mississippi Air and Water Pollution Control Act, including but not limited to the NPDES requirements. (2) the discharge of a non-point source of pollution to waters of the State, including wetlands, that violates any requirement of an area-wide or state-wide water quality management plan that has been approved under Section 208 or 319 of the CWA, as amended.	Discharge of waste or other source of water pollution into surface water from closed landfill with industrial waste – **relevant and appropriate**	MDEQ Rule 1.4 Landfill Requirements B. (9) (a) Surface Water Requirements
Monitoring requirements for treatment unit discharges	In addition to 40 CFR §122.48(a) and (b) and to assure compliance with effluent limitations, one must monitor, as provided in subsections (i) thru (iv) of § 122.44(i)(1). *NOTE:* Monitoring parameters, including frequency of sampling, that are not otherwise covered in the NPDES permit will be developed as part of the CERCLA process and included in a Removal Action Work Plan, or other appropriate CERCLA document.	Discharge of pollutants to surface waters – **applicable**.	40 CFR §122.44(i)(1)
	All effluent limitations, standards and prohibitions shall be established for each outfall or discharge point, except as provided under § 122.44(k)		40 CFR §122.45(a)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	All effluent limitations, standards and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as: • Maximum daily and average monthly discharge limitations for all discharges.	Continuous discharge of pollutants to surface waters –**applicable**.	40 CFR §122.45(d)(1)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Capping Waste-In-Place (Landfill and Surface Impoundment Closure and Post-closure) (East Gypsum Stack and Ponds 5 &6 and WRD)			
Installation of low-permeability cover	Must cover the landfill (or cell) with a final cover designed and constructed to: (1) provide long-term minimization of migration of liquids through the closed landfill; (2) function with minimum maintenance; (3) promote drainage and minimize erosion or abrasion of the cover; (4) accommodate settling and subsidence so that the cover's integrity is maintained; and (5) have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	Closure of RCRA hazardous waste landfill – **relevant and appropriate**	40 CFR § 264.310(a)
Installation of final landfill cover (East Gypsum Stack)	Owners must install a final cover system that is designed to minimized infiltration and erosion. The final cover system must be comprised of an erosion layer underlain by an infiltration layer as follows: (1) The infiltration layer must be comprised of a minimum of 18 inches of earthen material that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 x 10-5 cm/sec, whichever is less, and (2) The erosion layer must consist of a minimum of 6 inches of earthen material that is capable of sustaining native plant growth.	Closure of MSWLF units and all other landfills with industrial solid waste – **relevant and appropriate**	MDEQ Rule 1.4 Landfill Requirements E. (2) (a) Closure Requirements

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Installation of final landfill cover (East Gypsum Stack)	The Department may approve an alternative final cover design that includes: (1) an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in paragraph E.2.a.(1) of this rule, and (2) an erosion layer that provides equivalent protection from wind and water erosion as the erosion layer specified in paragraph E.2.a.(2) of this rule. *NOTE*: Any approval of an alternative cover will be made by EPA in CERCLA Removal Action Work Plan.	Closure of MSWLF units and all other landfills with industrial solid waste – **relevant and appropriate**	MDEQ Rule 1.4 Landfill Requirements E. (2) (b) Closure Requirements Alternative Cover
	The final cover gradient on landfills that receive waste on or after the effective date of these regulations shall be a minimum of four percent (4%) and a maximum of twenty-five percent (25%), unless otherwise approved by the Department. The final cover gradient on MSWLF units that stop receiving waste before the effective date of these regulations shall not exceed twenty-five percent (25%), unless otherwise approved by the Department. *NOTE*: Any approval of an alternative final cover gradient will be made by EPA in CERCLA Removal Action Work Plan.	Closure of MSWLF units and all other landfills with industrial solid waste – **relevant and appropriate**	MDEQ Rule 1.4 Landfill Requirements E. (2)(c) and (d)
	A native grass seed or other shallow-rooted vegetation suitable to minimize soil erosion, as approved by the Department, must be planted and maintained over each closed unit. Trees may not be used in lieu of or in addition to the grass cover.		MDEQ Rule 1.4 Landfill Requirements E. (2)(e)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Post-closure Deed Notice for closed landfill (East Gypsum Stack)	Within ninety (90) days after all landfill units are closed, the owner must record on the deed to the landfill facility property, or some other instrument that is normally examined during title search, a notation and survey plat, prepared by a registered land surveyor, indicating the location and dimensions of the actual filled area with respect to permanently surveyed benchmarks or Section corners, and notify the Department that the notation and survey plat have been recorded and a copy of each has been placed in the operating record.	Closure of MSWLF units and all other landfills with industrial solid waste – **relevant and appropriate**	MDEQ Rule 1.4 Landfill Requirements E. (2)(g)(1)
	The notation on the deed must in perpetuity notify any potential purchaser of the property of the following information: (i) the land has been used as a landfill facility; (ii) the name of the landfill owner(s); (iii) the year the landfill started and ended disposal operations; and (iv) its use is restricted under paragraph E.1.a.(7) of this rule.		MDEQ Rule 1.4 Landfill Requirements E. (2)(g)(2)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Post-closure care of landfill with industrial solid waste (East Gypsum Stack)	The owner must conduct post-closure care. Post-closure care must be conducted for 30 years, except as provided under paragraph E.3.b of this rule. The length of the post-closure care period may be: (1) decreased by the Department if the owner demonstrates that the reduced period is sufficient to protect human health and the environment and this demonstration is approved by the Department; or (2) increased by the Department if the Department determines that the lengthened period is necessary to protect human health and the environment. *NOTE*: Any adjustment to the length for post-closure care will be determined by EPA as part of the CERCLA Removal Action.	Closure of MSWLF units and all other landfills with industrial solid waste – **relevant and appropriate**	MDEQ Rule 1.4 Landfill Requirements E. (3) Post-closure Requirements (a) and (b)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Post-closure care of landfill with industrial solid waste (East Gypsum Stack)	Post-closure care must consist of at least the following: (1) maintaining the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, preventing run-on and run-off from eroding or otherwise damaging the final cover, and preventing the growth of trees on the landfill cover. (2) maintaining and operating any required leachate collection system in accordance with paragraph C of this rule. The Department may allow the owner to stop managing leachate if the owner demonstrates that leachate no longer poses a threat to human health and the environment; (3) monitoring the groundwater in accordance with paragraph D of this rule and maintaining the groundwater monitoring system, if applicable; (4) maintaining and operating any required gas monitoring system in accordance with paragraph B.4 of this rule. *NOTE*: Any groundwater monitoring will be determined and implemented in accordance with a CERCLA remedial action decision document issued by EPA.	Closure of MSWLF units and all other landfills with industrial solid waste – **relevant and appropriate**	MDEQ Rule 1.4 Landfill Requirements E. (3) Post-closure Requirements (c)(1)-(4)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Closure of surface impoundment with waste-in-place (Ponds 5 and 6, WRD)	At closure, the owner or operator must: (i) Eliminate free liquids by removing liquid wastes or solidifying the remaining wastes and waste residues; (ii) Stabilize remaining wastes to a bearing capacity sufficient to support final cover; and (iii) Cover the surface impoundment with a final cover designed and constructed to: (A) provide long-term minimization of migration of liquids through the closed landfill; (B) function with minimum maintenance; (C) promote drainage and minimize erosion or abrasion of the cover; (D) accommodate settling and subsidence so that the cover's integrity is maintained; and (E) have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	Closure of RCRA hazardous waste surface impoundment – **relevant and appropriate**	40 CFR § 264.228(a)(2)
Installation of low-permeability cover on landfill	EPA guidance provides technical recommendations on the design parameters for a multi-layer low permeability cover including a two component low permeability layer, a soil drainage layer, and a two component top layer. The guidance acknowledges that other final cover designs may be acceptable.	Design and construction of landfill cover with RCRA hazardous waste remaining in place – **TBC**	EPA Technical Guidance Document *Final Covers on Hazardous Waste Landfills and Surface Impoundments*, EPA OSWER 530- SW-89-047, (July 1989)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
	This guidance provides an overview on design, construction and evaluation requirements for various components of and materials used in a final cover (e.g., geomembrane, drainage layer, soil cover, material quality for base layer, etc.) for a several types of landfills including RCRA Subtitle C land disposal facilities. This information can be considered in designing and constructing a final cover that meets the regulatory requirements specified in the RCRA regulations for design, construction and performance of a final landfill cover.	Design and construction of a cover for disposal units with RCRA hazardous waste remaining in place – **TBC**	EPA Seminar Publication *Design and Construction of RCRA/CERCLA Final Covers*, EPA 625 4-91/025 (May 1991)
Post-closure care of surface impoundment (Ponds 5 and 6, WRD)	The owner or operator must comply with all post-closure requirements contained in §§264.117 through 264.120, including maintenance and monitoring throughout the post-closure care period. *NOTE*: EPA will determine extent of post-closure care requirements and specify in a CERCLA removal action or remedial action document.	Closure of RCRA hazardous waste surface impoundment with some waste residues or contaminated materials left in place – **relevant and appropriate**	40 CFR § 264.228(b)
	The owner and operator must: • Maintain the integrity and effectiveness making repairs to the cap as necessary to correct the effects of settling, subsidence erosion, or other events; • Maintain and monitor the ground-water monitoring systems and comply with all other applicable requirements of subpart F of this part; and • Prevent run-on and run-off form eroding or otherwise damaging the final cover.		40 CFR § 264.228(b)(1), (3) and (4)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Post-closure care and use of property (Ponds 5 and 6, WRD)	Must begin after completion of the closure of the unit and continue for 30 years after that date and must consist of: • Monitoring and reporting; and • Maintenance and monitoring of waste containment systems. *NOTE:* Monitoring of final cover will be performed in accordance with a CERCLA Removal Action Work Plan. Reporting is considered an 'administrative' requirement and therefore not ARAR. Monitoring results will be included in CERCLA documents.	Closure of RCRA hazardous waste management unit – **relevant and appropriate**	40 CFR § 264.117(a)(1)
Disturbance of integrity of low-permeability cover (Ponds 5 and 6, WRD)	Must never allow disturbance of the integrity of the cover, or any other components of the containment system, or the function of the facility's monitoring systems, unless the disturbance: • Is necessary to the proposed use of the property, and will not increase the potential hazard to human health or the environment; or • Is necessary to reduce a threat to human health or the environment.	Closure of RCRA hazardous waste management unit – **relevant and appropriate**	40 CFR § 264.117(c)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Post-closure notices (former RCRA surface impoundments closed as landfill) (Ponds 5 and 6, WRD)	Must record, in accordance with State law, a notation on the deed to the facility property, or on some other instrument which is normally examined during a title search, that will in perpetuity notify any potential purchaser of the property that: • Land has been used to manage hazardous wastes; • Its use is restricted under 40 *C.F.R.* Part 264 Subpart G regulations; and • The survey plat and record of the type, location, and quantity of hazardous wastes disposed within each cell or other hazardous waste disposal unit of the facility required by Sections 264.116 and 264.119(a) have been filed with the local zoning authority and with the EPA Regional Administrator.	Closure of a RCRA hazardous waste surface impoundment or landfill with some waste residues or contaminated materials left in place – **relevant and appropriate**	40 CFR § 264.119(b)(1)(i)-(iii)
Waste Transportation			
Transportation of hazardous waste *on-site*	The generator manifesting requirements of 40 CFR § 262.20-262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 CFR § 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way – **applicable**	40 CFR § 262.20(f)
Transportation of hazardous waste *off-site*	Must comply with the generator requirements of 40 CFR § 262.20-262.23 for manifesting, § 262.30 for packaging, § 262.31 for labeling, § 262.32 for marking, § 262.33 for placarding, §§ 262.40 and 262.41(a) for record keeping requirements, and § 262.12 to obtain EPA ID number.	Preparation and initiation of shipment of RCRA hazardous waste off-site – **applicable**	40 CFR § 262.10(h)

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

Action	Requirements	Prerequisite	Citation
Transportation of waste samples	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: • the sample is being transported to a laboratory for the purpose of testing; or • the sample is being transported back to the sample collector after testing.	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition – **applicable**	40 CFR §261.4(d)(1) 40 CFR §261.4(d)(1)((i) 40 CFR §261.4(d)(1)(ii)
	In order to qualify for the exemption in paragraphs (d)(1)(i) and (ii), a sample collector shipping samples to a laboratory must: • Comply with U.S. DOT, U.S. Postal Service, or any other applicable shipping requirements. • Assure that the information provided in (1) thru (5) of this section accompanies the sample. • Package the sample so that it does not leak, spill, or vaporize from its packaging.		40 CFR §261.4(d)(2)(i) 40 CFR §261.4(d)(2)(i)(A) 40 CFR §261.4(d)(2)(i)(B)
Transportation of *hazardous materials*	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 CFR §§ 171-180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material – **applicable**	49 CFR § 171.1(c)

ARAR = applicable or relevant and appropriate requirement
EPA = Environmental Protection Agency
CFR = Code of Federal Regulations
CWA = Clean Water Act of 1972
DEACT = deactivation
DOT = U.S. Department of Transportation
EPA = U.S. Environmental Protection Agency
HMR = Hazardous Materials Regulations
HMTA = Hazardous Materials Transportation Act
MDEQ = Mississippi Department of Environmental Quality
NPDES = National Pollution Discharge Elimination System
NRC = Nuclear Regulatory Commission

Table 6 – Action-specific ARARs and TBCs
Mississippi Phosphates Corporation Superfund Site - Pascagoula, Mississippi

POTW = publicly owned treatment works
RCRA = Resource Conservation and Recovery Act of 1976
TBC = to be considered
UTS = Universal Treatment Standard
WRD = Water Return Ditch

MISSISSIPPI PHOSPHATES CORP.
NON-TIME CRITICAL REMOVAL ACTION
ACTION MEMORANDUM

ENFORECEMENT
ADDENDUM

(b) (5)

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MISSISSIPPI PHOSPHATES CORP.
NON-TIME CRITICAL REMOVAL ACTION
ACTION MEMORANDUM

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
Action Memorandum for Non-Time Critical Removal Action
Mississippi Phosphates Corporation
Pascagoula, Jackson County, Mississippi

This Responsiveness Summary provides an overview of community involvement activities and a summary of comments received from the public during the 30-day comment period on the Environmental Engineering/Cost Analysis (EE/CA) for the Mississippi Phosphates Corporation (MPC) Site. It also documents for the record how public comments were integrated into the remedy decision and implementation process for closure of the 350-acre East Gypsum Stack (EGS) and the 30-acre North Ponds at the West Gypsum Stack (commonly called the "EGS closure plan").

EPA issued a press release on December 21, 2017, to provide advance notice of the public meeting and of the upcoming opportunity to provide input on the closure plan for the EGS. A Fact Sheet was distributed to the MPC Site mailing list on January 11, 2018, which provided a description of the three-phase closure plan for the EGS together with instructions for submitting pubic comments. A follow-up press release was issued on January 11, 2018, as a reminder of the public meeting and to announce the complete closure plan and associated public comment period.

EPA sponsored a public meeting on January 11, 2018, at the Pascagoula Senior Center from 6 to 8 p.m. to present the details of the EE/CA report. About 50 people attended the public meeting. In general, the meeting attendees were supportive and understood that EGS closure was necessary to reduce the quantity and improve the quality of wastewater that must be treated in the future.

A 30-day public comment period on the preferred EGS closure strategy was held from January 11 to February 10, 2018. Only two public comments were submitted to Craig Zeller, EPA's Remedial Project Manager (RPM) in the Region 4 Superfund Division. Redacted copies of those public comments are attached. One comment was from a resident of the nearby Cherokee neighborhood that expressed concern over outdoor dust. This resident paid for testing of the dust material that had accumulated on a chair in the carport, and those analytical results were provided to EPA's RPM. The analytical report stated "*One main component is a dark brown/black vitreous material; the morphology and elemental composition are consistent with abrasive particles typically used in sandblasting.*" Therefore, EPA concludes that the likely source of the dust material is sandblasting from the nearby shipbuilding business, and not the MPC site.

The other comment was from a Mississippi resident who stated that a conventional landfill closure with 2 feet of soil cover would not be ideal for the MPC site. This commenter urged EPA to evaluate a "Closure Turf" product that could significantly reduce construction and long-term maintenance costs for the taxpayers, and referenced a completed 120-acre project in nearby Gulfport that has exceeded the expectations of the owner and the Mississippi Department of Environmental Quality (MDEQ). EPA concurs with this suggestion, and is evaluating the use of engineered geosynthetic turf products as an alternative cap/cover system. A Value Engineering

(VE) study is underway that will compare the full life cycle costs of a traditional landfill closure (i.e.; 2 feet of soil cover) with a geosynthetic turf/liner system (only). The VE study will consider installation logistics, protection of human health and the environment, long-term performance and maintenance, and cost (among other items). The most advantageous cap/cover system will be selected before the detailed design phase for construction plans and specifications is started later in 2018.

From: (b)(6)
To: Zeller, Craig
Subject: Mississippi Phosphates Corporation
Date: Thursday, February 8, 2018 8:34:27 PM

Dear Mr. Zeller:

I am writing in response to the Mississippi Phosphates Corporation, Pascagoula, MS Superfund Site. I understand that this site is currently under the public comment period in relation to reviewing the site plans for closure. As a resident of Mississippi it seems that a conventional traditional closure method would not be ideal for the site.

I am familiar with a product called ClosureTurf used on other projects in Mississippi that meet all the regulatory closure requirements for infiltration, erosion, and longevity. I would like the EPA to evaluate this system because it has less impact on the environment and performs better than the traditional prescriptive cover as described in the plan. There are proven significant savings in long-term maintenance for the taxpayers too.

Some points that should be considered after reviewing the company's website:

- It appears that over 50,000 to 100,000 truck trips would be avoided versus the traditional closure method you have outlined
- Water runoff will be much cleaner. Sites have shown a drop of approximatley 300 NTU's
- Over $1,000 per acre per year in maintenance savings
- There is a nearby project near Gulfport, MS of approximately 120 acres of ClosureTurf that is well exceeding the owners and State of MDEQ expectations
- There are over 1,000 acres of ClosureTurf installed in 18 States in the US
- Beneficial reuse advantages for a solar array by using ClosureTurf

Some questions I have:

- How much borrow land will be required to close under this current prescriptive cover?
- Where is the soil going to come from?
- Who is responsible for the maintenance of the site to keep it up to post-closure standards?
- How long does the site have to be maintained?
- Who pays for the maintenance of the site after it is installed?
- Wouldn't ClosureTurf be cheaper and better for the environment and the State of Mississippi residents than the current closure method?

Thank you for reviewing and I look forward to your reply.

(b)(6) Personal Privacy

EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077
Phone: (856) 858-4800

Attn.: *Harry Howell*
Micro-Methods Labs, Inc.
6500 Sunplex Drive
Ocean Springs, MS 39564

Phone: 228-875-6420 Fax: 228-875-6423

EMSL Order ID:	361701058
Sample(s) Received:	5/2/2017
Date of Reporting:	5/16/2017
Date Printed:	5/16/2017
Reported By:	V. Dow
Email:	hhowell@micromethodslab.com

- Laboratory Report -

Full Particle Identification

Project: (b)(6) Personal Privacy Outdoor Dust

Conclusions:

- The material in sample "01" is composed of a mixture of components.
- One main component is a dark brown/black vitreous material; the morphology and elemental composition are consistent with abrasives particles typically used in sandblasting.
- The sample also contains pollen, quartz, and calcite/dolomite.
- Gypsum/anhydrite, clays/feldspars, rust/iron oxides, titanium dioxide/paint, processed cellulose, natural cellulose, and wood were identified in lesser amounts.
- Zinc oxide, fibrous glass, paper pulp, starch, and skin fragments were identified as minor components.

Procurement of Samples and Analytical Overview:

The material for analysis (one wipe sample total) arrived at EMSL Analytical (Cinnaminson, NJ) on May 2, 2017. The package arrived in satisfactory condition with no evidence of damage to the contents. The purpose of the analysis is to determine the identification of the individual components. The data reported herein has been obtained using the following equipment and methodologies.

Methods & Equipment:
Polarized Light Microscopy (PLM)
Stereo Microscopy
Scanning Electron Microscopy (SEM)
Energy-dispersive X-Ray Spectrometry (EDX)

Analyzed by: Virginia Dow — May 16, 2017

Virginia Dow
Laboratory Analyst

Date

Reviewed/Approved: — May 16, 2017

Eugenia Mirica, Ph.D.
Laboratory Manager

Date

EMSL Analytical, Inc.

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Email: hhowell@micromethodslab.com

Results:

EMSL Sample Identification: 361701058-0001
Sample Identification: 01
Sample Description: Patio Chair Dust Wipe

Common Minerals/Construction Dust:	**(%)**	**Fibrous Particulate:**		**(%)**
Quartz	20	Asbestos:	(Total)	ND
Calcite/Dolomite	15	MMVF's:	Fibrous Glass	<1
Gypsum/Anhydrite	2		Mineral Wool	ND
Clays/Feldspars	2		RCF's	ND
Mica	ND	Cellulosic:	Processed/Cotton	1
Rust/Iron Oxides	5		Natural	1
Titanium Dioxide/Paint	2		Wood	1
Aluminum Oxide/Hydroxides	ND		Paper Pulp	<1
Zinc Oxide	<1		Starch	<1
		Synthetic:	(Total)	ND
		Hair:	Human	ND
			Animal	ND

Biological:	**(%)**	**Additional Particulate:**		**(%)**
Mold	ND	(sample specific)	Vitreous Material*	25
Pollen	20			
Diatoms	ND			
Insect Fragments	ND			
Dust Mites	ND			
Skin Fragments	<1			
Unidentified Inert Organics:	1	**Unidentified Inorganics:**		ND

LOQ: 1%

*- This vitreous material shows chemical composition and morphology that suggests it could be an abrasive sandblasting material. See Figure 3 for elemental composition.

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Definitions:

Quartz: Crystalline form of silicon dioxide/silica (SiO_2), the second most common mineral in Earth's crust; commonly found in sand/soils, various rocks, concrete and mortar.

Calcite/Dolomite: A mineral which contains calcium carbonate ($CaCO_3$). This is an abundant mineral on the earth surface. Dolomite is a mineral which contains calcium magnesium carbonate $CaMg(CO_3)_2$. Calcite and dolomite are very similar minerals, used for ornamental stones, in concrete mixes, in soil remediation projects.

Gypsum: Calcium sulfate dehydrate mineral ($CaSO_4 \bullet 2H_2O$) commonly used for wallboard in buildings; concrete for highways, bridges, soil conditioner.

Clays: Large group of hydrous silicates composed mainly of silica, alumina, and water with varying amount of iron, alkaline, and alkaline earth elements; used commonly in construction materials, manufacturing of paper, refractories, rubber, dinnerware and pottery, floor and wall tile, sanitary wear, absorbent and filtering materials, and cosmetics.

Rust/Iron Oxides: A mixture of iron oxides formed by the redox reaction of iron (from metal surfaces) and oxygen (from air) in the presence of water or air moisture.

MMVF's (Man Made Vitreous fibers): Synthetic vitreous/amorphous inorganic fibrous materials, primarily silica-based containing various amounts of other oxides (e.g., aluminum, boron, calcium, or iron oxides). Fibrous glass and mineral wool are typically used as insulating materials.

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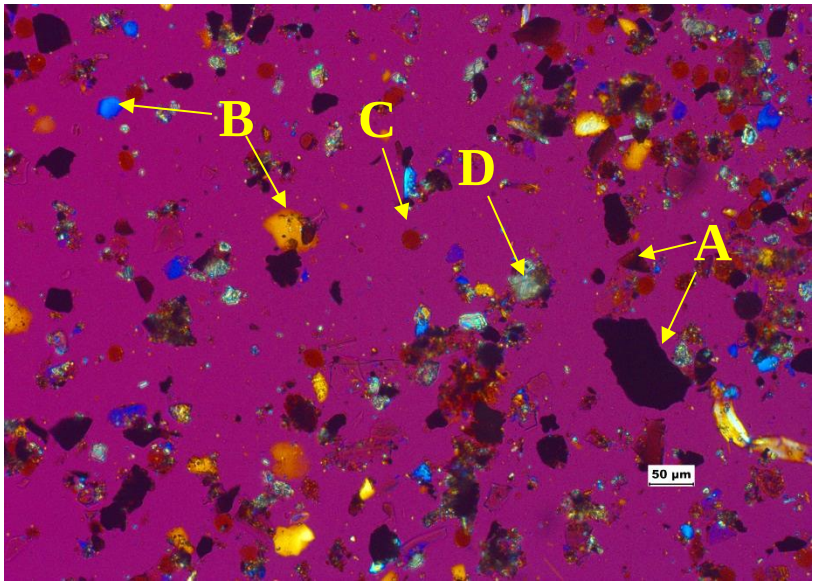

Figure 1: PLM image of particles in sample "01"
A: Vitreous Material (See Figure 3 for elemental composition)
B: Quartz
C: Pollen
D: Calcite/Dolomite

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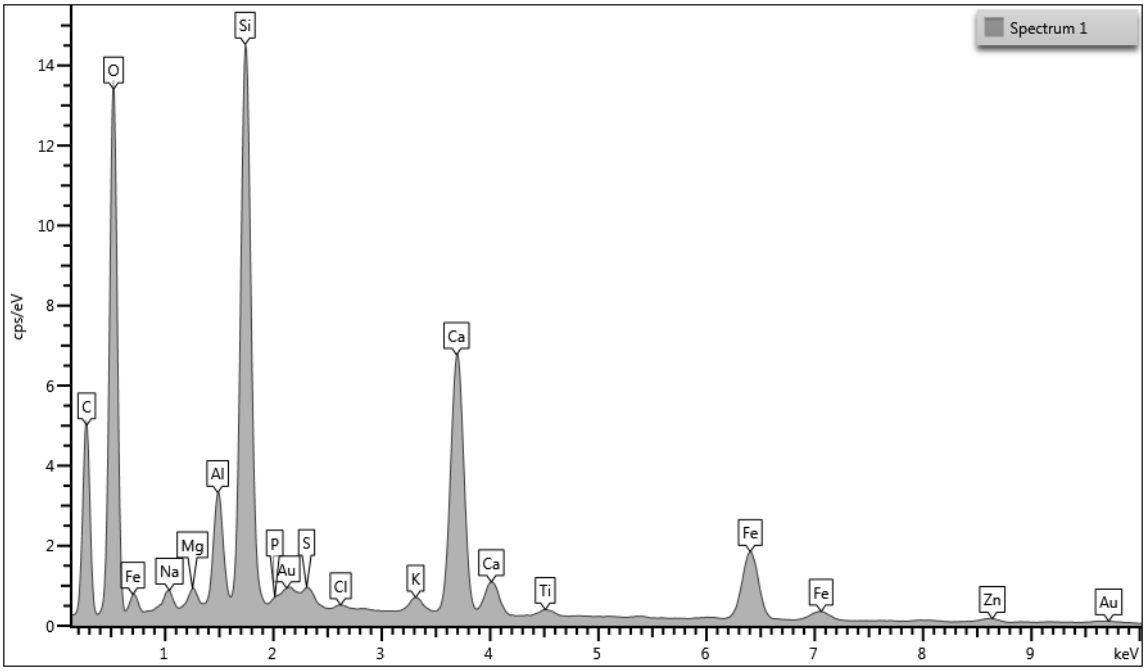

Figure 2: Overall SEM/EDX elemental spectrum of material from sample "01" showing silicon (Si) and oxygen (O) as the main components. Carbon (C), sodium (Na), magnesium (Mg), aluminum (Al), phosphorus (P), sulfur (S), chlorine (Cl), potassium (K), calcium (Ca), titanium (Ti), iron (Fe), and zinc (Zn) are also present. The sample was coated with gold (Au) to minimize electron charging.

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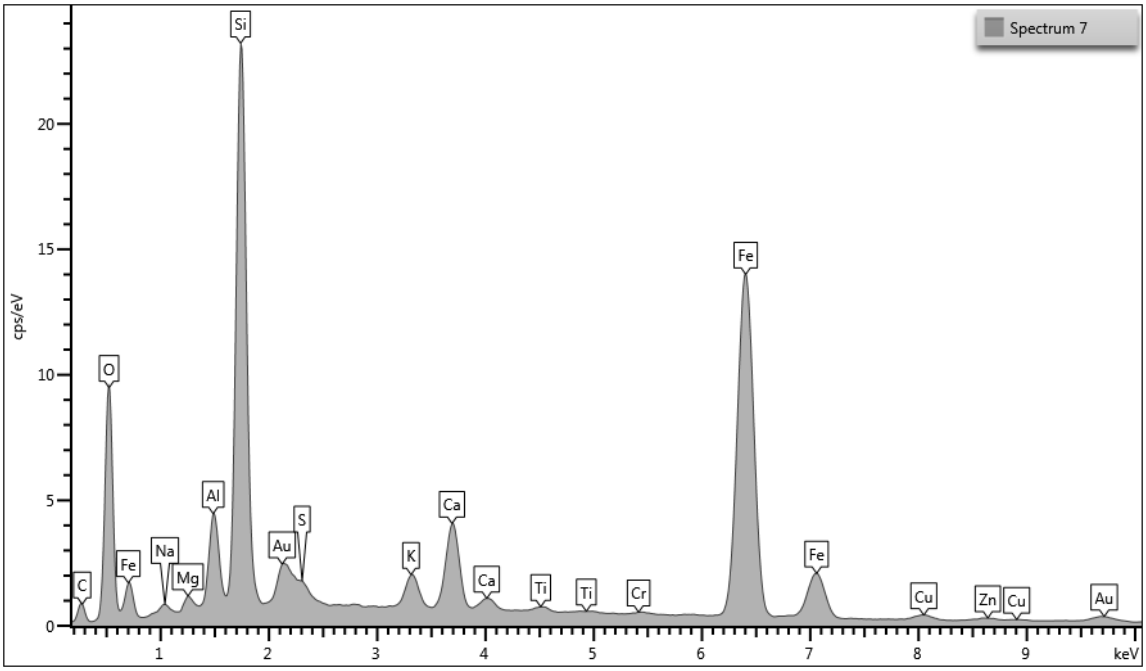

Figure 3: SEM/EDX elemental spectrum of vitreous material from sample "01" showing silicon (Si) and iron (Fe) as the main components, most likely as oxides. Carbon (C), sodium (Na), magnesium (Mg), aluminum (Al), sulfur (S), potassium (K), calcium (Ca), are also present, along with very low amounts of titanium (Ti), chromium (Cr), copper (Cu), and zinc (Zn). The sample was coated with gold (Au) to minimize electron charging.

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Descriptions & Definitions:

None Detected (ND) denotes the absence of analyte in the subsample analyzed.

Limit of Detection (LOD): The minimum concentration that can be theoretically achieved for a given analytical procedure in the absence of matrix or sample processing effects. Particle analysis is limited to a single occurrence of an analyte particle in the sub-sample analyzed.

Limit of Quantitation (LOQ): The minimum concentration of an analyte that can be measured within specified limits of precision and accuracy during routine laboratory operating conditions

Trace concentration: denotes the presence of an analyte above LOD but below LOQ. When results are reported as Trace Concentration, at least one particle was detected in the collection of particles that represents the sample.

Concentrations for bulk samples are derived from Visual Area Estimation (VAE) unless otherwise noted. Air sample concentrations are calculated to particles per unit volume.

VAE technique estimates the relative projected area of a certain type of particulate from a mixture of particulate by comparison to data derived from analysis of calibration materials having similar texture and particulate content. Due to bi-dimensional nature of the measurements, in some cases the particle thickness could affect the results.

Important Terms, Conditions, and Limitations:

Sample Retention: Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling may be returned to the client immediately. EMSL reserves the right to charge a sample disposal or return shipping fee.

Change Orders and Cancellation: All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

Warranty: EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures, when available. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

Limits of Liability: In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable value of the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client or any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

The data and other information contained in this report, as well as any accompanying documents, represent only the samples analyzed. They are reported upon the condition that they are not to be reproduced wholly or in part for advertising or other purposes without the written approval from the laboratory.

OrderID: 361701058

EMSL ANALYTICAL, INC.
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Materials Science Chain of Custody

EMSL Order Number *(Lab Use Only)*: 361701058

PHONE:
FAX:

Company : Micro Methods Laboratory		**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note Instructions in Comments** *Third Party Billing requires written authorization from third party*	
Street: 6500 Sunplex Dr.			
City: Ocean Springs	**State/Province:** MS	**Zip/Postal Code:**	**Country:**
Report To (Name): Harry Howell		**Fax #:**	
Telephone #: 228-875-6420		**Email Address:** hhowell@micromethodslab.com	
Project Name/Number: (b)(6) Personal Privacy			
Please Provide Results: ☐ Fax ☑ Email	**Purchase Order:**	**U.S. State Samples Taken In:**	

Turnaround Time (TAT) Options – Please Check

☑ 2 Week ☐ Expedited (Please call for information) TAT: _____

Test Type

☐ Common Particle ID (large particles)	☐ Physical Testing (Tensile, Compression, etc.)	☐ MMVF's (fibrous glass, mineral wool, RCF's)
☑ Full Particle ID (environmental dust)	☐ FTIR/NIR (Polymers, Lubricants)	☐ Particle Size (Sieve, Microscopy, or Laser-select one)
☐ Basic Material ID (solids)	☐ X-Ray Fluorescence (elemental analysis)	☐ Combustible Dust (Core Module, MIE, MEC, Kst, etc.)
☐ Advanced Material ID (liquids and solids, Industrial residues)	☐ X-Ray Diffraction (Crystalline Particles)	☐ Petrographic Examination of Concrete, Soil, Stone

Combustion-by-products (soot, char, ash, carbon black)

☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

☐ **Other (Please Explain):**

All orders for clients who do not have established accounts with EMSL Analytical must be accompanied by payment in form of a check or credit card. After your first order, EMSL reserves the right to establish an account and assign credit terms of Net 30 or COD based on credit evaluation and or frequency of sample submittal. To establish a permanent account, you must be able to submit samples on a regular basis at a minimum of five times per year. EMSL reserves the right to make adjustments or changes to this policy as deemed necessary by business requirements.

2017 MAY -2 A 11:17 EMSL CINNAMINSON, N.J.

Samplers Name: **Samplers Signature:**

Sample #	Sample Description	Volume	Date/Time Sampled
01	Patio Chair Dust Wipe		4/14/17

Client Sample # (s): - **Total # of Samples:** 1

Relinquished (Client): Harry Howell **Date:** 4/26/17 **Time:** 1300

Received (Lab): **Date:** 5/2/17 **Time:** 9:30a

Comments:

Page 1 of ____ pages

Controlled Document – Material Science COC – R4 – 9/16/2014

From: (b)(6)
To: Zeller, Craig
Subject: Comments MS PHOSPHATE clean up
Date: Monday, January 29, 2018 11:36:48 AM

(b)(6) Personal Privacy . MS Phosphate while in operation and up and running has sent their pollution on to us. Industries came to my property when it was covered in dust and rock a few years back I was told by one industry no way came from any of them law of gravity next day after taking the rock back to MS Phosphate (b)(6) verified it came from them. I have tested recently a chair on my carport it test positive for lots of toxins from industries I will forward you a copy. This is why during this clean up you do not only have the MS Phosphate site, but more than likely all of East Pascagoula. Testing is the number one thing for our neighborhood asap first thing in your clean up process not last on the list. Our neighborhood was built about same time MS Phosphate started there are lots of people who past with cancer then the number decreased in the eighty's about that clean air went into effect. The cancer rate is on the rise again as the industries have not been in compliance with their permit, what permit? You spoke about bringing in the clay, using plastic, so on and so on. Will this be a patch like the other one that is now leaking? The answer to all this is not easy fix, lets start by not adding to the problem get the residents out first that have been effected. This industry did not have a renewed permit for years didn't pay taxes, one citation after another now we want to band aid the problem without even testing the neighborhood most effected by all these industries.

Sincerely,

(b)(6) Personal Privacy