



# STATE OF ALABAMA SURFACE MINING COMMISSION

Page 1 of 27

Permit Number:P- 3996

License Number:L- 755

## PERMIT TO ENGAGE IN SURFACE COAL MINING OPERATIONS

Pursuant to **The Alabama Surface Mining Control and Reclamation Act of 1981**, as amended, **ALA. Code Section 9-16-70 et. seq. (1975)** a permit to engage in Surface Coal Mining Operations in the State of Alabama is hereby granted to:

Such operations are restricted to 357 acres as defined on the permit map and located in:

Cahaba Resources, LLC  
P.O. Box 122  
Vance, AL 35490

This permit is subject to suspension or revocation upon violation of any of the following conditions:

1. The permittee shall conduct Surface Coal Mining and Reclamation Operations in accordance with the plans, provisions and schedules in the permit application.
2. The permittee shall conduct operations in a manner to prevent damage or harm to the environment and public health and safety and shall notify ASMC and the public in accordance with ASMC Rule 880-X-8K-16 of any condition which threatens the environment or public health and safety.

See Attachment

**LEGAL DESCRIPTION**  
**P-3996-63-24-S**

**NW/NW, NE/NW, SW/NW, SE/NW, NE/NE, NW/NE, SW/NE, SE/NE,  
NE/SE, NW/SE, SE/SE, SW/SE of Section 27, NE/NE, NW/NE of Section 34,  
all in Township 20 South, Range 9 West, Tuscaloosa County, Alabama**

## CONDITIONS TO BE PLACED ON PERMIT P-3996-63-24-S PAGE #1

3. Surface coal mining operations are restricted to those areas for which sufficient bond has been posted with ASMC. On the date of issuance of this permit, bond was posted only for increment(s) 1 consisting of 79 acres as defined on the permit map.
4. No mining disturbance is to occur on any part of the permit on which legal "right of entry" has not been obtained. When such rights are "pending" the applicant shall submit acceptable evidence, to the Director, that such rights have been obtained according to ASMC Regulation 880-X-8D-.07.
5. No disturbance is to occur on any properties on which land use comments from legal owners of record are "pending" prior to the applicant providing acceptable comments.
6. No disturbance is to occur in the 300' setback area to any occupied dwelling prior to the applicant providing acceptable evidence to ASMC of its having secured a waiver of each subject area signed by the owner of the dwelling.
7. No mining disturbance shall occur within the 100' setback of any public road or the relocation of any public road prior to the applicant providing acceptable evidence, to the Director, of its having secured approval for a waiver from the appropriate jurisdictional authority and specific written waiver from ASMC.
8. The permittee shall notify the ASMC and seek consultation with the US Fish and Wildlife Service if:
  - a. The permit is modified in any way that causes an effect on species or Critical Habitat listed under the Endangered Species Act of 1973.
  - b. New information reveals the operation may affect Federally protected species or designated Critical Habitat in a manner or extent not previously considered or
  - c. A new species is listed or Critical Habitat is designated under the Endangered Species Act that may be affected by the operation
9. The permittee shall contact the ASMC and consult with the Alabama Historic Preservation Officer if the permit is modified or if previously unknown archaeological or historic resources are discovered on the permit area. Upon discovery of previously unknown artifacts or archaeological features the permittee shall cease operations until the Alabama Historic Preservation Officer approves resumption of operations.
10. The permittee must conduct all tree removal activities for the project prior to May 22, 2024. If tree removal is required after May 22, 2024 a new Threatened and Endangered/Critical Habitat survey must be conducted and FWS approval submitted to ASMC prior to tree removal.

**CONDITIONS TO BE PLACED ON PERMIT P-3996-63-24-S PAGE #2**


11. No mining activity will be conducted inside the city limits of Tuscaloosa, Alabama.

*SM 10/30/2019*

**DATE ISSUED: October 30, 2019**

**EFFECTIVE DATE: October 30, 2019**

**EXPIRATION DATE: October 29, 2024**

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**Kathy H. Love, Director**

**FINDINGS TO BE PLACED ON PERMIT NO.: P-3996-63-24-S PAGE #1**

The ASMC, acting by and through its Director, hereby finds, on the basis of information set forth in the application or from information otherwise available, that --

1. The permit application is complete and accurate and the applicant has complied with all requirements of the Act and the regulatory program.
2. The applicant has demonstrated that reclamation as required by the Act and the regulatory program can be accomplished under the reclamation plan contained in the permit application.
3. The proposed permit area is:
  - (a) Not within an area under study or administrative proceedings under a petition, filed pursuant to Chapter 880-X-7 to have an area designated as unsuitable for surface coal mining operations;
  - (b) Not within an area designated as unsuitable for mining pursuant to Chapter 880-X-7 or subject to the prohibitions or limitations of Section 880-X-7B-.06 and Section 880-X-7B-.07 of this chapter; or
4. For mining operations where the private mineral estate to be mined has been severed from the private surface estate, the applicant has submitted to the Regulatory Authority the documentation required under Section 880-X-8D.07 and Section 880-X-8G-.07 of this chapter.
5. The Regulatory Authority has made an assessment of the probable cumulative impacts of all anticipated coal mining on the hydrologic balance in the cumulative impact area and has determined that the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.
6. The applicant has demonstrated that any existing structure will comply with Section 880-X-2B-.01, and the applicable performance standards of Chapter 3 or 10.
7. The applicant has paid all reclamation fees from previous and existing operations as required by 30 C.F.R., Subchapter R.
8. The applicant has satisfied the applicable requirements of Subchapter 880-X-8J.

**FINDING TO BE PLACED ON PERMIT NO.: P-3996-63-24-S PAGE #2**

9. The applicant has, if applicable, satisfied the requirements for approval of a long-term, intensive agricultural, post-mining land use, in accordance with the requirements of 880-X-10C-.58(4) and 880-X-10D-.52(4).
10. The operation will not affect the continued existence of endangered or threatened species, or result in destruction or adverse modification of their critical habitats, as determined under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.).
11. The Regulatory Authority has taken into account the effect of the proposed permitting action on properties listed or eligible for listing on the National Register of Historic Places. This finding is supported in part by inclusion of appropriate permit conditions or changes in the operation plan protecting historic resources, or a documented decision that the Regulatory Authority has determined that no additional protection measures are necessary.
12. For a proposed remaining operation where the applicant intends to reclaim in accordance with the requirements of Section 880-X-10C-.56 or 880-X-10D-.49, the site of the operation is a previously mined area as defined in Section 880-X-2A-.06.
13. Surface coal mining and reclamation operations will not adversely affect a cemetery.
14. After application approval but prior to issue of permit, ASMC reconsidered its approval, based on the compliance review required by Section 880-X-8K-.10(2)(a) in light of any new information submitted under 880-X-8D-.05(8).
15. The applicant has submitted the performance bond or other equivalent guarantee required under Chapter 880-X-9 of the ASMC Rules prior to the issuance of the permit.
16. For mining operations where a waiver is granted from the 100' setback from a public road according to 880-X-7B-.07, the interests of the public and affected landowners have been protected.

### FINDINGS TO BE PLACED ON PERMIT NO.: P-3996-63-24-S PAGE #3

17. The Regulatory Authority has taken into account the effect of the proposed permitting action on properties listed or eligible for listing on the National Register of Historic Places (NRHP). MRS Consultants, LLC conducted a Phase I Cultural Resource Survey on March 27-30, 2018 for approximately 355 acres in Tuscaloosa County, Alabama. As a result of these investigations, no archaeological sites were recorded within the survey area. No cultural materials were identified during the field investigations. The architectural survey of the Area of Potential Effect (APE) did not identify any historic resources within the survey area or APE. Based on these findings, the proposed mining project will have no effect upon any significant historic properties. MRS recommends the project area be cleared regarding cultural resources. By a letter dated November 2, 2018 the Alabama Historic Commission (AHC), Re: AHC 05-0821, upon review of the cultural resource assessment conducted for the above referenced project, determined that the project activities will have no effect on cultural resources eligible for or listed on the NRHP. Therefore AHC concurs with the proposed project activities. This finding is supported in part by inclusion of appropriate permit conditions or changes in the operation plan protecting historic resources or a documented decision that the Regulatory Authority has determined that no additional protection measures are necessary. Concerns for unknown resources, which might be discovered during mining, have been made conditions of the permit.
  
18. In a letter dated May 17, 2018 the Alabama Department of Conservation and Natural Resources (ADCNR) states that a biological survey be conducted by trained professionals to ensure that no sensitive species are jeopardized by the development activities. The closest sensitive species are recorded as occurring approximately 1.8 miles from the subject site. In a habitat assessment performed by Dan Spaulding Environmental Consultant (Spaulding) on March 17-18, 2018, no potential habitat for any federally listed Threatened & Endangered species was located on site, except for summer roosting habitat for the Indiana and Northern Long-eared (NLEB) bats. Spaulding recommended that tree removal activities be limited to October 15 – March 31. By comments dated November 6, 2018 the US Fish and Wildlife Service (FWS) acknowledges the permittee has stated that tree removal is only to occur between October 15 and March 31, therefore FWS concurs that no impacts to the Indiana bat and/or NLEB are anticipated as a result of your proposed project. No other federally listed species/critical habitat are known to occur in the project area. Blackland Environmental, LLC (BLE) conducted an Acoustic Presence/Absence Survey for the Indiana and Northern Long-eared bats from May 22 – 28, 2019 and June 11 and 16, 2019. As a result of the BLE acoustic survey the Indiana and NLEB are not likely to occur within the study area. By letter dated July 3, 2019 FWS concurred with the determination of probable absence of the Indiana and NLEB and acknowledge the survey is valid for five years from the date of completion of the survey unless new information suggests otherwise. By letter dated August 23, 2019, the US Army Corps of Engineers (USACE) Nationwide Permit 49- Project Number SAM-2018-00312-CMS states the project will involve the placement of fill into 10,732 linear feet (lf) of stream, 1.47 acres of wetlands and 0.54 acre of pond, in association with coal re-

**FINDINGS TO BE PLACED ON PERMIT NO.: P-3996-63-24-S PAGE #4**

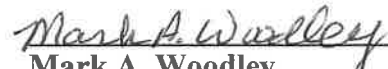
mining activities. Based upon the Pre- Construction Notification (PCN) the USACE has issued the following special conditions: 1) Provide a net increase in aquatic resource functions when mining is complete in accordance with the "Aquatic

Resource Improvement" Plan dated April 10, 2019. 2) To avoid adverse effects to the Indiana bat and NLEB all tree removal activities for the project must occur within five years of the acoustic survey date of May 22, 2019. The Alabama Surface Mining Commission finds that the proposed operation will not jeopardize the continued existence of endangered or threatened species or critical habitat thereof.

19. The proposed permit area is:
  - a. Not within an area under study or administrative proceedings under a petition, filed pursuant to Chapter 880-X-7 to have an area designated as unsuitable for surface coal mining operations.
  - b. Not within an area designated as unsuitable for mining pursuant to Chapter 880-X-7 or subject to the prohibitions or limitations of Section 880-X-7B-.06 and Section 880-X-7B.-07 of this chapter.

BASED ON THESE FINDINGS, I RECOMMEND THAT THIS PERMIT BE ISSUED.

**DATE: October 30, 2019**

  
**Mark A. Woodley**  
**Permit Manager**

/mw

cc: I & E, Permit File



MEMORANDUM

TO: Office of Surface Mining Reclamation and Enforcement

Alabama Department of Environmental Management

Alabama Historic Preservation Officer

The District Engineer  
U.S. Corps of Engineers

Alabama Department of Labor  
Division of Safety & Inspection

BLM - District Office

State of Alabama  
Abandoned Mine Land Reclamation

Tuscaloosa County Commission

U.S. Fish & Wildlife Service

Mr. Keith Guyse, Fish & Game Division

FROM: KATHY H. LOVE, DIRECTOR

RE: **PERMANENT PROGRAM PERMIT FOR:**

**Permit P-3996-63-24-S (Deerlick West Mine) Cahaba Resources, LLC**

Pursuant to the Alabama Surface Mining Commission Regulation 880-X-8K-.12(2), we are hereby notifying you of the issuance of the above permit.

You may also view a copy of this permit at our web address of:

<http://surface-mining.alabama.gov/PermitDecisions.html>

Enclosed for your information and file is a copy of the permit which shows the legal description of the mine site.

/mw

# CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

**Cahaba Resources, LLC  
Deerlick West Mine  
ASMC: P-3996**

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## **CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT**

**Cahaba Resources, LLC**  
**Deerlick West Mine**  
**ASMC: P-3996**

**HUC: 031601120501**  
**NPDES: AL0083551**

As required under Federal Public Law 95-87, Section 510(b)(3), the Alabama Surface Mining Commission (ASMC) must find in writing the following proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The applicant must submit a determination of probable hydrologic consequences of mining and reclamation operations in Part II.H of the permit application for areas both on and off the mine site. This determination will allow the ASMC to assess probable cumulative impacts of all anticipated mining activities on the surface and ground water hydrology of the permit and adjacent areas as stated in Federal Public Law 95-87, Section 507(b)(11) and ASMC Rule 880-X-8E-.06(1)(g). The following assessment and findings are intended to fulfill the above.

### **I. GENERAL INFORMATION**

The proposed Cahaba Resources, LLC P-3996 is for a surface coal mining operation encompassing 357.0 acres including mining acres and haul/access roads, impoundments, stockpiles, equipment storage areas and diversion ditches. Approximately 238.0 acres of the proposed permit area have been previously disturbed by mining.

The proposed mine site is located in part of Sections 27 and 34, Township 20 South, Range 9 West, Tuscaloosa County, Alabama as seen from the Lake Nicol Alabama USGS 7.5 minute Quadrangles. It is stated in the permit application that one of the main objectives of mining this permit, aside from coal recovery, is to reclaim the previously disturbed portions for the surface owners.

This permit area is located in the Lake Nicol - Yellow Creek sub-watershed area. It is located between Yellow Creek (Lake Harris) and Cypress Creek, which enters the Black Warrior River at the Holt Lock and Dam. See Map No. 1 for the general area.

#### **A. Geology of the Warrior Coal Basin**

The Pottsville Formation of Early and Middle Pennsylvanian age in Alabama is divided into four fields: the Warrior, Cahaba, Coosa and Plateau fields. All fields were once connected by an unbroken area of coal measures, however separation occurred as a result of folding, faulting and erosion of uplifted areas.

The Warrior coal field is a gently folded or flat-lying area classified as the Cumberland Plateau. It lies in a large, gentle monoclinial structure that extends west into central Mississippi. The regional dip is towards the southwest. This regional southwest dip is interrupted by 2 anticlines (the Blue Creek anticline and the Sequatchie anticline) and three synclines or basins (the Blue Creek basin, Coalburg syncline and Warrior syncline).

The Warrior field has numerous normal faults that trend north and northwest up to 4 miles in length with up to 200 feet of displacement (“Geology of Coal Resources of the Coal-Bearing Rocks of Alabama, Alabama Geological Survey Bulletin 1182-B”).

During the beginning of the Pennsylvanian age (approximately 323 million years ago), most of Alabama was part of a shallow, warm ocean basin. The transgressions and regressions of the seas lead to the rhythmic cycle of sandstone, underclay, coal beds, and shale with zones of marine and brackish water fossils that rest on the basal resistant conglomerate orthoquartzite of the Boyles sandstone formation. This sequence immediately repeats itself with similar rocks (marine shale, sandstone or clay, coal seam, freshwater shale and sandstone). This appears to show the rise of sea level, depositing marine sediments, then the falling of sea level allowing the coal producing forests to grow. This was followed by an influx of river deposited sands and muds, which would rapidly accumulate plant material. Then, the sea would rise again repeating the process.

At the end of the Pennsylvanian (approximately 299 million years ago), the uplift of the region and a dry climate marked the disappearance of the coastal coal swamps. During this period of uplift, no new sediments could be deposited for at least 200 million years. The gap in time between the Pennsylvanian deposition and the Cretaceous deposition resulted in an unconformity that allows for surface coal mining to exist in the Alabama coal fields.

## **B. Historical and Active Coal Mines**

There are no currently active, expired or anticipated mines within the Lake Nicol- Yellow Creek sub watershed.

## **II. CUMULATIVE IMPACT AREA (CIA)**

The Cumulative Impact Area (CIA) is that area, including the permit area, within which impacts resulting from the proposed operation may interact with the hydrologic impacts of all other past, current and anticipated coal mining on the surface and groundwater systems.

A CIA cannot be defined for the Cahaba Resources, LLC P-3996 as there are no expired, current or anticipated coal mines within the Lake Nicol – Yellow Creek sub-watershed. As such, the CIA is the permit area itself.

The CIA for groundwater also cannot be defined due to no other permits within the watershed. The subsurface hydrologic components considered in this assessment include all significant water-bearing units in, and within the vicinity of, the proposed permit and adjacent areas. Other areas of proposed, future mining are not known at this time. Groundwater occurs in openings along fractures and bedding planes generally in a sandstone unit within 250 to 350 ft. of the surface.

## **A. Geologic/Hydrogeological Information**

### **i. Geology**

The proposed P-3996 permit area is located in the Warrior Basin of the Appalachian Plateaus Physiographic Province. The area is underlain by the Coker and Pottsville Formation, and pre-Pennsylvanian rocks. The Pottsville Formation contains coal beds and is overlain by the Coker Formation. The Pottsville Formation consists of alternating beds of gray sandstone, conglomerate, siltstone, and shale with beds of coal and underclay. The formation is thick in this area, approximately 4,500 feet. Except for the conglomeritic sandstone at the base of the formation, few lithologic horizons can be correlated regionally. (Hydrologic Assessment, Eastern Coal Province Area 23, Alabama USGS Water-Resources Investigations Open-File Report 80-683).

The Coker Formation unconformably overlies the Pottsville Formation in the area. The Coker consists of unconsolidated sand, gravel and clay with prominent sand and gravel beds at or near the base of the formation. Strata generally trend northwest and generally dip southwest 30 to 40 ft/mi. The maximum thickness of the Coker is 475 feet, however most surface coal mining that requires the removal of the Coker Formation has occurred where the thickness of the Coker is considerably less than 100 feet. (Hydrologic Assessment, Eastern Coal Province Area 23, Alabama).

This mine site will remove the Carter coal seam of the Brookwood Group. The Brookwood Group is generally known to include the Guide, Brookwood and Milldale seams above the Carter seam. Overburden thickness above the Carter coal seam ranges from 0 ft. at the cropline to approximately 98 ft. at the deepest point. Cretaceous material within the proposed permit ranges from approximately 24 feet to 65 feet in thickness.

Approximately two thirds of the permit area has been previously disturbed by pre-law mining of the Brookwood Group which makes one of the primary objectives of this mine permit to reclaim the un-reclaimed previously mined area.

### **ii. Potentially Acid- and Toxic-Forming Materials**

Nine drill holes were used to describe the lithology for the area, with three being used for overburden analysis (CRDWMOB-6, CRDWMOB-9 and CRDWMOB-20). Drill cuttings were taken every 5 ft. or change in lithology to at least 5 feet below the coal seam for analysis of potentially acid- and toxic forming properties. For these samples overburden analyses were conducted including paste pH, total sulfur, maximum potential acidity and neutralization potential in order to obtain the acid base account of the overburden. Potentially acid- and toxic-forming materials are those that exhibit a pH of less than 4.0 s.u. or a deficiency in calcium carbonate equivalent of at least 0 tons per 1,000 tons of material (T/KT).

### **iii. Surface Water**

The proposed permit area is located in the Warrior River Basin and is drained by Yellow Creek, an unnamed tributary to Yellow Creek and Cypress Creek. All of these streams are classified as "Fish and Wildlife" where the sediment basins discharge into them. Yellow Creek is classified as "Public Water Supply" beginning upstream of the permit area and ending at Lake Harris dam, however none of the permit area outfalls discharge directly into this segment of Yellow Creek, they all will discharge into unnamed tributaries. According to the Alabama Department of Environmental Management's (ADEM) *Black Warrior River Basin Classified Waters Water Use Classifications for Interstate and Intrastate Waters* Map, Yellow Creek is classified as "Fish and Wildlife" on Yellow Creek from the Warrior River to the city of Tuscaloosa's water supply reservoir dam and as "Public Water Supply" from the city of Tuscaloosa's water supply reservoir dam to its source (Yellow Creek). See Map No. 2 for the location of the permit, the "Fish and Wildlife" and the "Public Water Supply" areas. Surface water from the permit area will be routed through fourteen sediment basins, in accordance with the (ADEM) National Pollution Discharge Elimination System (NPDES) permit AL0083551.

According to 335-6-11-.02, "use classifications apply water quality criteria adopted for particular uses based on existing utilizations, uses reasonably expected in the future, and those uses not now possible because of correctable pollution but which could be made if the effects of pollution were controlled or eliminated. Of necessity, the assignment of use classifications must take into consideration the physical capability of waters to meet certain uses."

To characterize the existing quality and quantity of water within Yellow Creek and Cypress Creek, baseline data were obtained and submitted in the permit application. Surface water monitoring site CRDWMSW-1A was upstream on Yellow Creek, site CRDWMSW-6 is located upstream on Cypress Creek and CRDWMSW-3A was located downstream of both Yellow Creek and Cypress Creek. Surface water monitoring sites CRDWMSW-1A and CRDWMSW-3A were replaced with monitoring sites CRDWMSW-2, CRDWMSW-3, CRDWMSW-4 and CRDWMSW-5. Surface water monitoring site CRCMSW-1 is located up stream on an unnamed tributary to Yellow Creek and monitoring site CRCMSW-6 is located upstream on Cypress Creek. Table 1 included at the end of this assessment presents the baseline data. The surface water monitoring sites are shown on Map No 1.

### **iv. Ground Water**

According to the "Geohydrology and Susceptibility of Major Aquifers to Surface Contamination in Alabama, Area 6" by the U.S. Geological Survey, Water-Resources Investigations Report 87-4113, "the Pottsville Formation consists chiefly of sandstone, conglomerate, siltstone, and shale with beds of coal and underclay. Water in the Pottsville aquifer occurs under confined conditions due to sharp contrast in permeability within the aquifer. Groundwater usually occurs at depths of less than 200 feet in secondary features such as openings along fractures and bedding planes. Only small

amounts of groundwater suitable for domestic use are available in the weathered deposits. The quantity of water available to wells throughout the aquifer depends on the size and extent of the water-bearing openings.” Large water supplies are generally not available from the Pottsville Formation and no municipal wells tap the Pottsville Formation within the study area.

Rocks in the aquifer are tightly cemented and have little primary porosity and permeability. They contain water in secondary features and solutioning is not an effective agent for the enhancement of secondary features due to its silicic lithology (as compared to carbonate aquifers in the area). Due to the folded and faulted geologic structure, the Pottsville Formation is not continuous from one area to another. Groundwater movement between aquifers is restricted due to the confining beds, and movement within the aquifer generally is from hills and highland areas to streams and other areas of natural discharge.

The Coker Formation consists of a basal nonmarine zone of gravel, marine sand and clay. A clay zone is usually present at the top of the Coker. In areas where the Coker is less than 100 feet thick, only the basal beds remain. Also, the Coker is not used extensively downdip where shallower aquifers are available.

According to the Hydrologic Assessment, Eastern Coal Province Area 23, Alabama by the US Geological Survey Water-Resources Investigations Open-File Report 80-683, rain is the source of groundwater in the area. Annual rainfall averages 54 inches per year, which nearly 5 percent of recharges the ground water reservoirs. According to the “Hydrologic Assessment, Eastern Coal Province Area 23”, ground water movement generally is to the southwest. The Coker Formation dips toward the southwest about 30 feet per mile and the water moves through the more permeable lower part which contains sand and gravel beds and overlies the Pottsville Formation.

Little is known about recharge and ground water movement in the Pottsville Formation; however, according to the permit application, the main direction of water is reliant on the contact between the Pottsville and Coker Formations and towards streams. Water may move in other directions based on topographic features of the area or fracture systems in the formation. It is also mentioned that because of the perched water tables and irregular lensing properties of the Pottsville Formation that water levels are unpredictable and areal correlations are only possible within short distances.

Ground water in the Pottsville occurs in sandstone beds and in fractures and bedding planes. The openings are small, and yield to wells range from less than 10 gal/min to as much as 50 gal/min. The depth to water is generally less than 30 feet in stream valleys and more than 50 feet in hills and ridges.

### **Domestic Wells**

A well inventory of the proposed permit area revealed no residences within a ½ mile radius of the proposed permit site.

## **Company Installed Wells**

Three groundwater monitoring sites were used for describing the local characteristics within and adjacent to the Deerlick West Mine. These include groundwater monitoring well CRDWMMW-1 located on the north end of the permit with a surface elevation of 411.1 ft. msl (mean sea level) and average depth to water of 37.8 ft., groundwater monitoring site CRDWMMW-2 located on the east side of the permit with a surface elevation of 385.9 ft. msl and an average depth to water of 34.8 ft., and groundwater monitoring site CRDWMMW-3 located on the southern side of the permit area with a surface elevation of 377.0 ft. msl and an average depth to water of 38.0 ft.

Baseline data was submitted for the monitoring well. This data is summarized in Table 2 at the end of this assessment. Groundwater characteristics show neutral to slightly acidic pH conditions and unusually low iron concentrations. This water is more characteristic of the Pottsville Formation aquifer. The locations of the monitoring wells can be seen on Map No. 1.

## **B. Coal Processing Waste**

Coal processing waste (gob and slurry) will not be generated or disposed of at the site.

## **C. Material Damages**

With respect to the CHIA, material damage to the hydrologic balance means the changes to the hydrologic balance caused by surface mining and reclamation operations to the extent that these changes would significantly affect present and potential uses as designated by the regulatory authority. This includes the hydrologic impact that results from the cumulation of flows from all coal mining sites in a cumulative impact area. Examples of material damage are: permanent destruction of a major regional aquifer; temporary contamination of an aquifer in use that cannot be mitigated; and solute contributions to streams above receiving stream standards.

A CHIA is based on the best currently available data and is a prediction of mining-related impacts to the hydrologic balance. Permittees (and permit applicants) are required to monitor water quality and quantity. Exceeding material damage thresholds might also cause significant reduction of the capability of an area to support aquatic life, livestock and wildlife communities.

## **III. FINDINGS**

Based on the information presented above, the following findings have been made relative to the proposed permit area.

### **A. Historical Coal Mines**

There are no currently active, expired or anticipated mines within the Lake Nicol- Yellow Creek sub watershed, which is the CIA for this permit.



## **B. Potentially Acid- and Toxic-Forming Materials**

Laboratory analyses of the bedrock overlying the Carter coal seam show that the overburden at the Carter Mine contains excess tons/acre of neutralization potential; a range of neutralization potential of +4768 – +139975 (tons CaCO<sub>3</sub>/1000 tons overburden) , and an acid-base account average of +2.25. It should be noted that an acid base account is not a water quality prediction tool, but instead is used to support the ability of vegetation to be established and supported. According to the “Coal Mine Drainage Prediction and Pollution Prevention in Pennsylvania” publication by the Pennsylvania Department of Environmental Protection, excess neutralization potential most likely produces alkaline drainage.

The materials handling plan included in the permit application will require any potentially acid- and toxic-forming strata encountered (such as spoiled coal) to be covered with a minimum of four feet of non-toxic, non-combustible earthen material. Also, this material may not be placed within the root zone. The material will undergo relatively quick burial that will restrict the development of acid-forming conditions.

The sulfur percentages are very low in the overburden analysis, which is a major constituent in the acid-forming process. Such low sulfur values are a good indicator of inability for the acid forming process to begin.

## **C. Surface Water**

Based on laboratory analysis of the samples collected at surface the six surface water monitoring sites on the unnamed tributary to Yellow Creek, Yellow Creek and Cypress Creek, the water contains low TSS, near neutral pH, low concentrations of iron and low concentrations of manganese.

Additional water quality analysis was performed to determine a baseline for metals. A high flow and low flow sample was taken at each surface water monitoring site to analyze for Al, Sb, As, As<sup>+++</sup>, Be, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Th, and Zn. The results of this analyses are shown in Table 3 and 3a.

A portion of this area has been previously disturbed by pre-law mining. Baseline water quality shows fluctuating, but near neutral pH values and low metals values which indicates that the overburden has sufficient alkaline material to neutralize any potential acidic conditions that could exist.

Of the fourteen proposed ASMC sediments basins for this permit, five will discharge into an unnamed tributary to Yellow Creek that flow into the portion of Yellow Creek known as Lake Harris that is designated as a “Public Water Supply”. Sediment basins 003, 004, 008 and 009 will discharge into an unnamed tributary to Yellow Creek on the northern end of Lake Harris. Surface water monitoring site CRDWMSW-2, a downstream monitoring site, is located where the unnamed tributary to Yellow Creek enters this portion of Lake Harris. Surface water monitoring site CRDWMSW-3, while designated as an upstream

surface water monitoring site for sediment basins 037 and 038, is located on a lower end of Lake Harris. These basins and surface water monitoring sites are shown on Map No. 3.

Changes in the quantity and quality of the waters in the streams draining the site are expected to be minimal due to the proposed mining activities as well as the acres of mining versus the acres of the watershed (329 acres mining in 21298 acres of the Lake Nicol – Yellow Creek watershed). The ratio of mining acres to watershed acres will be approximately 0.015%. During mining, runoff from the disturbed areas will be diverted into sediment basins that are designed to retain all settleable solids, skim and retain all floating solids, and provide adequate detention volume and time to minimize the contribution of suspended solids and dissolved solids into the receiving streams. Effluent from the sediment basins will be monitored by the permittee in accordance with NPDES permit requirements issued by ADEM. The effluent will be chemically treated, if necessary, in accordance with the NPDES permit. The basins will be monitored quarterly through final bond release in order to characterize and document any effects the mining may have on the surface-water hydrologic balance.

Post-Mining water quality and quantity estimates provided by the applicant are based on several factors:

1. Baseline surface water quality
2. Estimated impact during mining
3. Size of the permit area compared to the size of the watershed
4. Amount of previous mining within the watershed

According to the permit application, this mine site is expected to have a negligible increase in base flow, average flows, and peak flow rates relative to the baseline conditions. The NPDES maximum and average limitations set forth by ADEM for this mine site are as follows: pH limit is between 6.0 – 9.0 s.u., TSS maximum limit is 70 mg/L and the average is 35 mg/L, Fe maximum limit is 6.0 mg/L and the average is 3.0 mg/L and the Mn maximum limit is 4.0 with the average being 2.0 mg/L. Limits and monitoring requirements for these parameters can be found in both the Hydrologic Monitoring Plan for this permit, as well as the ADEM NPDES permit (AL0083551).

Any potentially acid- and toxic-forming materials will undergo relatively quick burial that will minimize exposure of the materials with the atmosphere; thus lessening the potential for Acid Mine Drainage to develop. This, along with the sediment basins, vegetation of the disturbed areas and erosion control practices should serve to lessen impacts to the streams and surface water bodies. Should any increase in mineralization occur in the surface waters as a result of the mining operations, it is anticipated the levels will diminish and return to pre-mining concentrations once mining and reclamation activities are complete. Table 4 shows the post-mining water quality projections based on the downstream sites on the unnamed tributary to Yellow Creek, Yellow Creek and Cypress Creek.

#### **D. Ground Water**

The proposed operations are not expected to have a permanent adverse impact on the overall quality of the ground water at the site or surroundings. The main aquifer in this area is a sandstone unit located below the Carter Coal Seam. Also, area has been pre-law mined, and due to the size of the proposed permit with respect to the watershed area any effects to the groundwater system would be considered negligible in comparison. According to published reports, deeper groundwater movement is in the south and west directions, however groundwater movement in this area is influenced by streams, as well as local surface topography.

#### **IV. CONCLUSION**

The assessment of probable cumulative impacts of the Cahaba Resources, LLC P-3996 Deerlick West Mine finds the proposed operations have been designed to prevent material damage to the hydrologic balance outside the proposed permit area.

**Table 1**  
**Ranges/Averages of Surface-Water Quality/Quantity**  
**Stream Points**  
**P-3996**

Parameter	CRDWMSW-1 Upstream UT Yellow Creek	CRDWMSW-2 Downstream UT Yellow Creek	CRDWMSW-3 Upstream Basins 038, 037 Yellow Creek	CRDWMSW-4 Downstream Yellow Creek	CRDWMSW-5 Downstream Cypress Creek	CRDWMSW-6 Upstream Cypress Creek
Drainage Area	0.756 mi <sup>2</sup> (1.80)	1.515 mi <sup>2</sup> 0.26 - 0.43 (0.35)	30.177 mi <sup>2</sup> 16.42 - 28.51 (21.2)	30.421 mi <sup>2</sup> 17.1 - 29.7 (21.9)	2.534 mi <sup>2</sup> 0.4 - 2.88 (0.86)	0.831 mi <sup>2</sup> 0.18 - 2.86 (1.53)
Discharge Rate (cfs)	6.72 - 8.83	5.75 - 9.01	5.94 - 8.79	5.95 - 8.43	5.81 - 8.63	6.2 - 9.22
Field pH (S. U.)						
Total Suspended Solids (mg/L)	0.1 - 23 (14.0)	9 - 53 (21.7)	9 - 72 (30.0)	BDL - 41 (15.0)	6 - 42 (20.1)	0.01 - 26 (14.3)
Total Iron (mg/L)	0.13 - 2.75 (0.57)	0.09 - 0.38 (0.26)	0.08 - 1.41 (0.58)	0.12 - 0.44 (0.31)	0.12 - 0.47 (0.29)	0.06 - 1.27 (0.49)
Total Manganese (mg/L)	BDL - 0.03 (0.01)	BDL - 0.27 (0.06)	BDL - 3.69 (0.87)	BDL - 0.39 (0.18)	0.12 - 0.69 (0.45)	BDL - 0.53 (0.07)
Specific Conductivity 25 °C (µmhos/cm)	18 - 68.2 (29.7)	20.2 - 34.8 (30.7)	48.8 - 69.9 (59.3)	31.1 - 65 (44.1)	18.5 - 165 (71.2)	9.8 - 231.3 (60.7)
Total Suspended Solids (mg/L)	13.6 - 51.35 (22.7)	16.9 - 41.7 (24.5)	35.1 - 58.5 (47.8)	26.65 - 35.1 (32.9)	15.6 - 117 (56.7)	9.7 - 99 (28.4)
Acidity (mg/L)	BDL - 20 (2.9)*	BDL - 8 (1.2)*	BDL - 18 (5.15)	BDL - 12 (1.7)*	BDL - 14 (2.0)*	BDL-12 (1.2)*
Alkalinity (mg/L)	0.01 - 14 (13.1)	0.01 - 34 (18.6)	0.01 - 30 (16.3)	0.01 - 18 (12.3)	0.01 - 38 (14.6)	4 - 32 (21)
Sulfates (mg/L)	0.33 - 8.46 (1.79)	0.73 - 8.46 (4.6)	2.92 - 21.7 (9.7)	0.53 - 9.82 (6.9)	0.95 - 24.3 (15.8)	0.01-23 (3.3)

Average values are set in parentheses.

Averages calculated as geometric means.

UT = unnamed tributary

\* 6 samples produced Below Detection Limits, one sample produced the high value of Acidity in mg/l acidity

**Table 2**  
**Ranges/Averages of Groundwater Quality/Quantity**  
**Groundwater Monitoring Wells**  
**P-3996**

Parameter	CRDWMMW-1	CRDWMMW-2	CRDWMMW-3
Ground Elevation	411.1 ft. msl	385.9 ft. msl	377.0 ft. msl
Depth to Water	34.3 – 38.5 (37.5)	32.5 – 37.3 (35.1)	35.5 - 40.8 (37.9)
Field pH (s.u.)	6.3 – 7.9	6.23 – 7.53	5.33-6.58
Specific Conductivity 25 °C ( $\mu$ mhos/cm)	29.6 – 73.9 (45.8)	96.4 – 1128.6 (216.2)	35.3 – 116.2 (59.9)
Total Iron (mg/L)	BDL – 0.8 (0.20)	0.06 – 3.01 (0.72)	0.05 – 1.62 (0.33)
Total Manganese (mg/L)	BDL – 0.45 (0.11)	BDL – 0.67 (0.31)	0.14 – 3.15 (1.1)
Sulfates (mg/L)	0.33 – 1.4 (0.83)	3.19 – 9.45 (5.5)	0.41 – 53.4 (14.2)
Acidity (mg/L)	BDL – 26 (7.78)	BDL*	BDL – 18** (1.8)
Alkalinity (mg/L)	BDL – 36 (12.4)	6 – 60 (32.2)	BDL – 40 (18.36)
Total Dissolved Solids (mg/L)	21.5 – 56.3 (33.8)	69.5 – 89.7 (84.6)	41.6 – 84.5 (44.6)

Average values are set in parentheses.

Averages calculated as geometric means

BDL = below detection limit

\* All samples BDL

\*\* 9 of 10 samples were BDL

**Table 3**  
**Low-Flow Metals Analysis**  
**P-3996**  
**9-28-2018**

Parameter	CRDWMSW-1	CRDWMSW-2	CRDWMSW-3	CRDWMSW-4	CRDWMSW-5	CRDWMSW-6
Flow	1.64 CFS	0.26 CFS	1.68 CFS	1.76 CFS	0.41 CFS	1.69 CFS
Al (µg/L)	BDL	0.1	BDL	BDL	0.2	0.2
Sb (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
As (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
As <sup>+++</sup> (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Be (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Cd (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Cr (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Cu (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Pb (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Hg (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Ni (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Ag (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Tl (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Zn (µg/L)	BDL	BDL	0.03	BDL	BDL	BDL

BDL – Below Detection Limit

**Table 3a.**  
**High-Flow Metals Analysis**  
**P-3996**  
**6-27-2018**

Parameter	CRDWMSW-1	CRDWMSW-2	CRDWMSW-3	CRDWMSW-4	CRDWMSW-5	CRDWMSW-6
<b>Flow</b>	<b>1.64 CFS</b>	<b>0.26 CFS</b>	<b>1.68 CFS</b>	<b>1.76 CFS</b>	<b>0.41 CFS</b>	<b>1.69 CFS</b>
Al (µg/L)	BDL	0.1	BDL	BDL	0.3	BDL
Sb (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
As (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
As <sup>+++</sup> (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Be (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Cd (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Cr (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Cu (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Pb (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Hg (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Ni (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Ag (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Tl (µg/L)	BDL	BDL	BDL	BDL	BDL	BDL
Zn (µg/L)	BDL	BDL	0.14	0.07	0.02	BDL

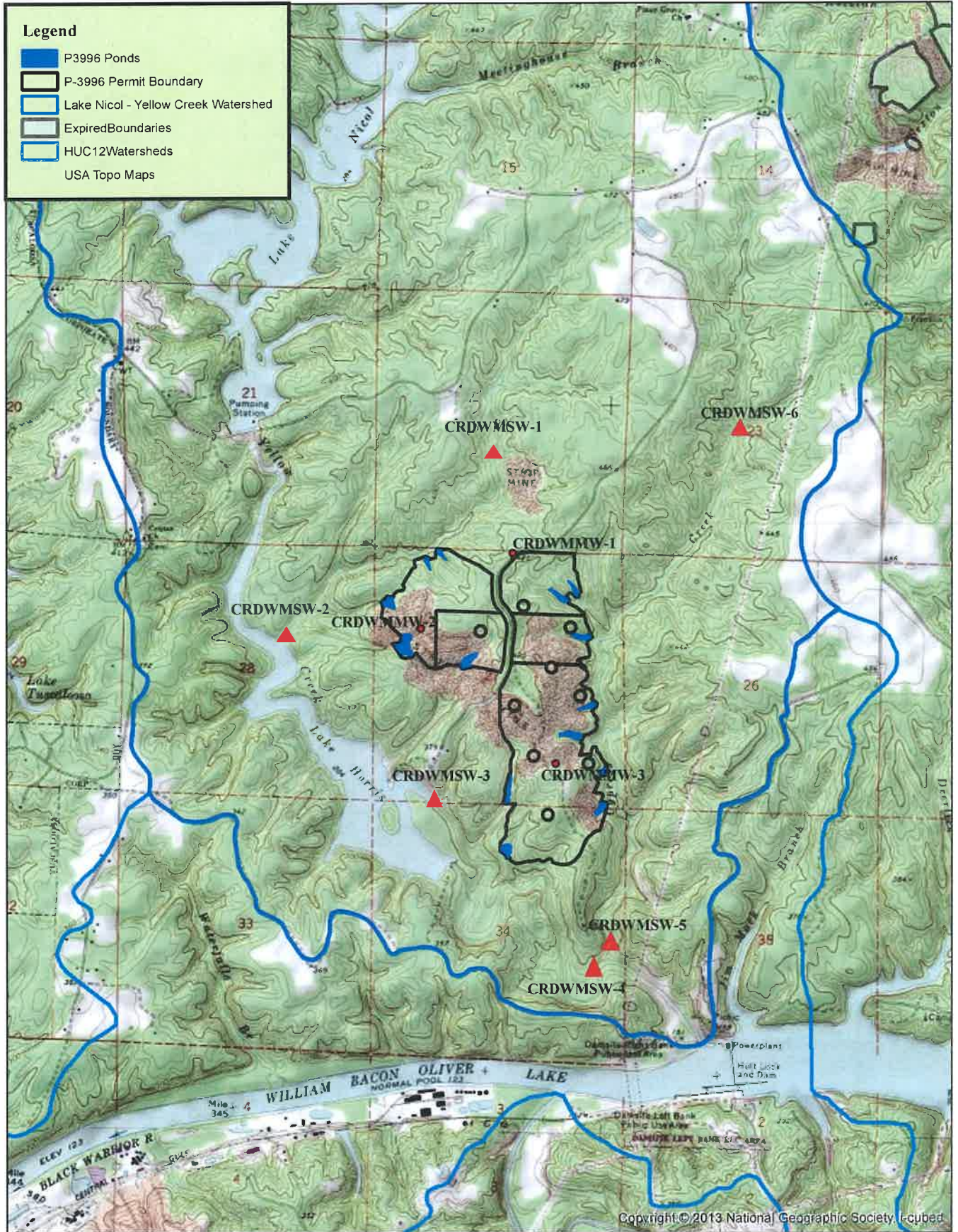
BDL – Below Detection Limit

**Table 4**  
**Estimate of Post-Mining, Average Event**  
**Cahaba Resources, LLC**  
**P-3996**

<b>Parameter</b>	<b>Estimated Value CRDWMSW-2</b>	<b>Estimated Value CRDWMSW-4</b>	<b>Estimated Value CRDWMSW-5</b>
Flow (cfsm)	0.23	0.72	0.34
pH (s.u.)	7.19	7.46	7.17
Iron (mg/L)	0.22	0.25	0.23
Manganese (mg/L)	0.04	0.1	0.34
Specific Conductivity 25 °C (μmhos)	29.3	42.9	72.2
TSS (mg/L)	19.2	10.8	17.6



Map No. 1  
 Cahaba Resources, LLC  
 Deerlick West Mine P-3996



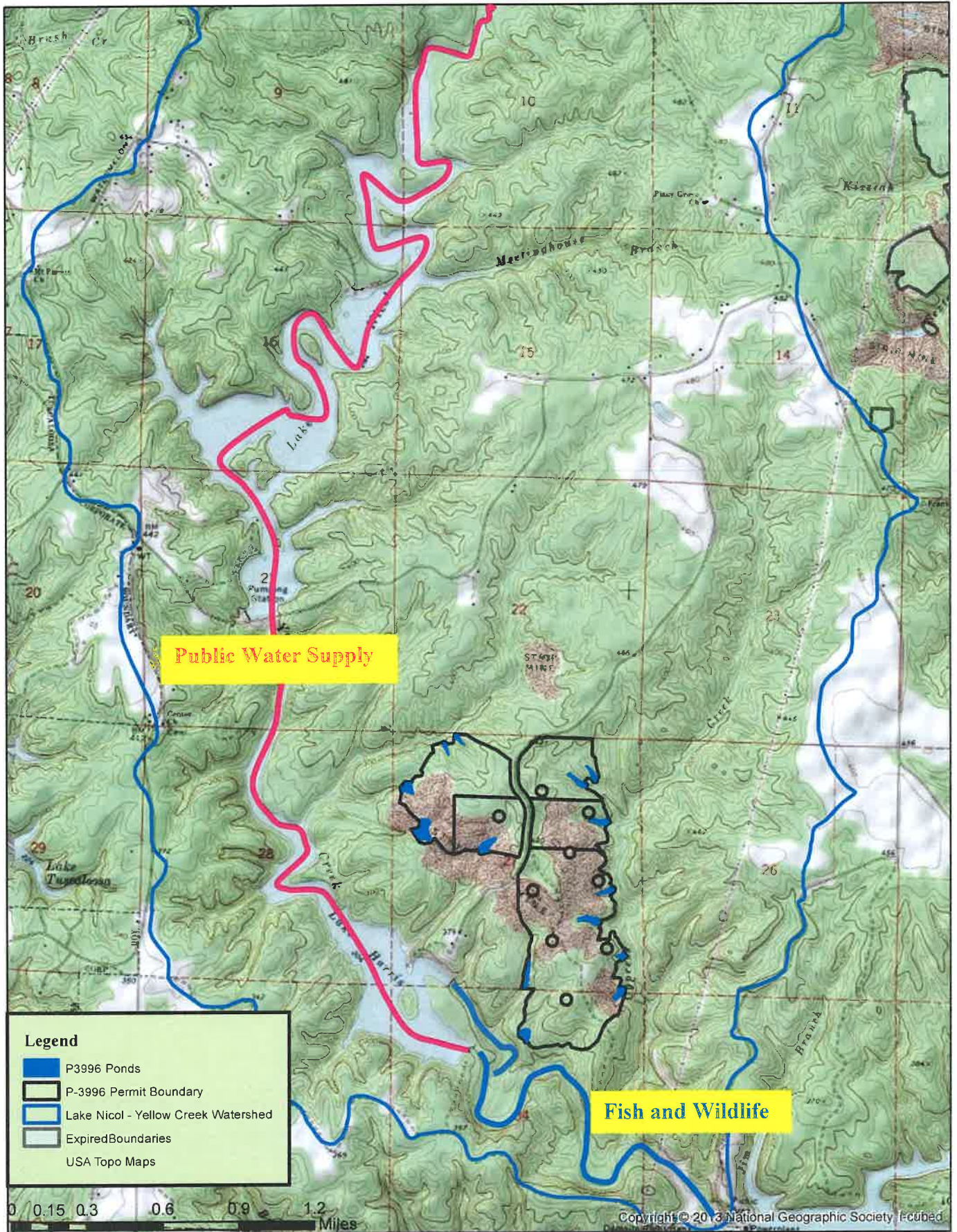
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0 0.15 0.3 0.6 0.9 1.2 Miles



**Map No. 2**  
**Cahaba Resources, LLC**  
**Deerlick West Mine P-3996**  
**Water Classifications**

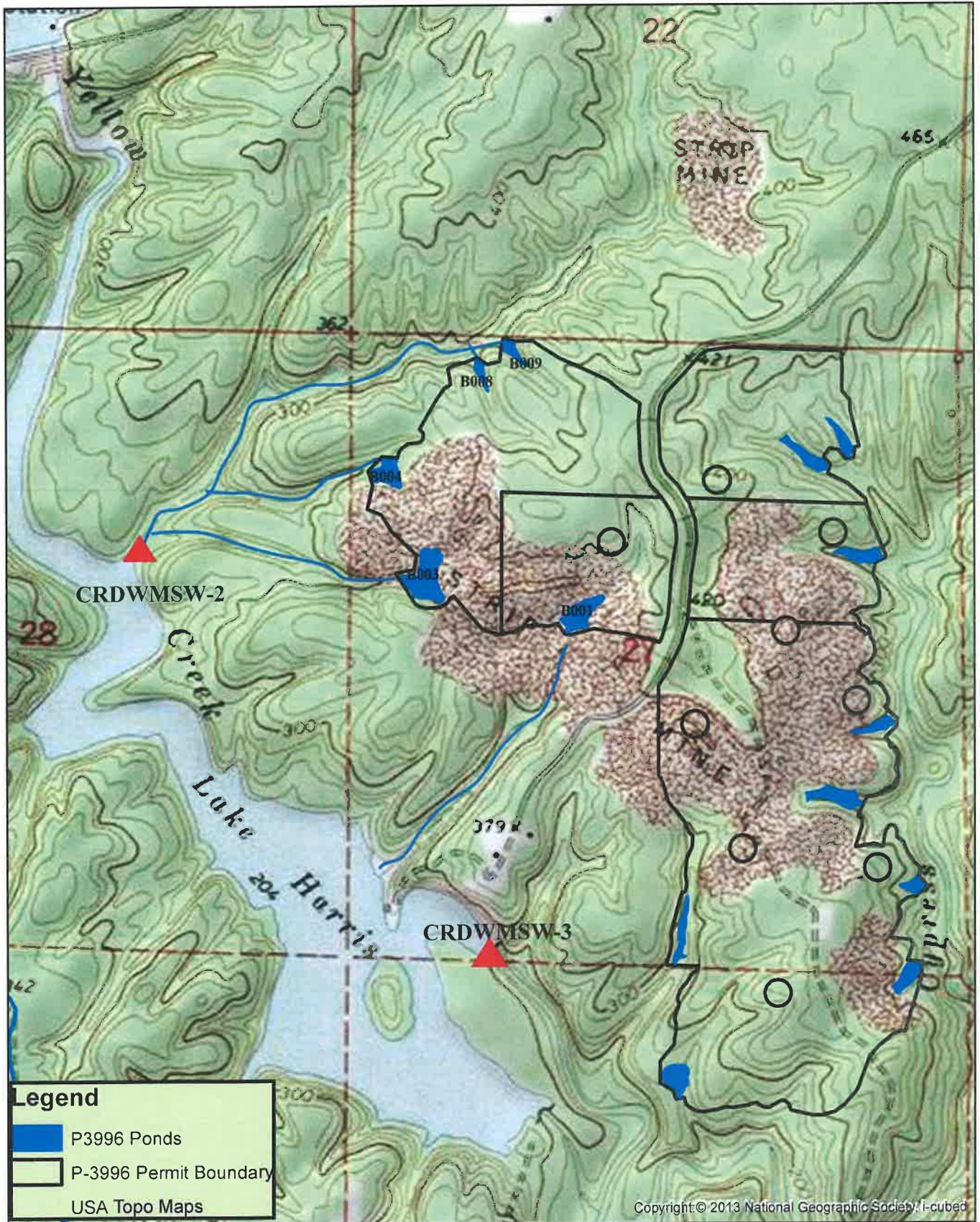
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Map No. 3  
Cahaba Resources, LLC  
Deerlick West Mine P-3996  
Discharges to UT to Yellow Creek Above Reservoir

1



0 0.05 0.1 0.2 0.3 0.4  
Miles

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