



# STATE OF ALABAMA SURFACE MINING COMMISSION

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Permit Number:P- 3982-01-20-S

License Number:L- 839

## 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:

Alden Resources, LLC  
332 West Cumberland Gap Parkway  
Corbin, KY 40701  
(Kimberly Mine)

Such operations are restricted to 140\* acres as defined on the permit map and located in: (See Condition #3)

SE/SE, NE/SE, NW/SE, SW/SE, SE/SW, NE/SW, NW/SW, SW/SW of Section 27;  
NW/NW, SW/NW, NW/SW, SW/SW, SE/SW of Section 34, Township 14 South,  
Range 3 West; NE/NW, NW/NE of Section 3, Township 15 South, Range 3 West.  
all in Jefferson County, Alabama.

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-16~~ of any condition which threatens the environment or public health and safety.

CONDITIONS TO BE PLACED ON PERMIT P-3982-01-20-S

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) 6 consisting of 11 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 100-foot vegetated buffer zone between Kimberly Mine and the Locust Fork must be maintained for the life of the permit.

EFFECTIVE DATE: August 4, 2015  
DATE ISSUED: August 4, 2015  
EXPIRATION DATE: August 3, 2020

  
\_\_\_\_\_  
Randall C. Johnson, Director

/ml

## **FINDINGS**

### **PERMIT NO.: P-3982-01-20-S**

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.
9. The applicant has, if applicable, satisfied the requirements for approval of a long-term, intensive agricultural, postmining 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.).

## FINDINGS

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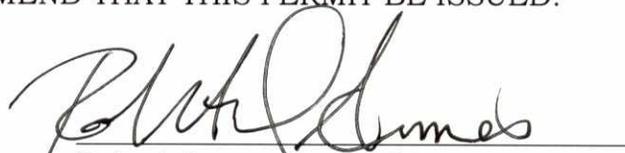
11. The Regulatory Authority has taken into account the effect of the proposed permitting action on properties listed or eligible for listing on the National Register of Historic Places. This finding is supported in part by inclusion of appropriate permit conditions or changes in the operation plan protecting historic resources, or a documented decision that the Regulatory Authority has determined that no additional protection measures are necessary.
12. For a proposed remining 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.
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. In a letter dated September 15, 2010 the University of Alabama, Office of Archaeological Research (OAR) conducted a Phase I Cultural Resource Survey in Jefferson County, Alabama, from August 26-27, 2010. As a result of the Phase 1 survey no new archaeological sites were added to the Alabama State Site File (ASSF), no isolated finds were encountered, and no previously recorded sites were revisited during the survey. Several modern structures are situated within the survey tract. Based on the absence of cultural resources and the lack of National Register of Historic Places (NRHP) eligibility of the structures, due to age and dilapidated conditions, it is the opinion of OAR that the proposed mine site will have no impact on any cultural resources. OAR recommends the survey area be cleared from a cultural resources perspective and the project may proceed as planned. MRS Consultants, LLC (MRS) conducted a Phase I Cultural Resource Survey for approximately 50 acres for an expansion area of the Kimberly Mine on December 12, 2013. No archaeological sites were discovered during the investigation of the proposed expansion area. By a letter dated January 2, 2014 MRS recommends the proposed expansion area be cleared in regards to cultural resources and no significant resources will be affected. By a letter dated February 6, 2014 the State Historical Preservation Office (SHPO), based on the cultural resource assessment conducted by the OAR and MRS, determined that the project activities will have no adverse effect on cultural resources eligible for or listed on

the NRHP and therefore concur with the project. 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. McGehee Engineering Corp (MEC) conducted a biological habitat assessment for Threatened and Endangered species/critical habitat (T&E) for approximately 470 acres in Jefferson County, Alabama in September, October, and November 2013. Possible habitat for the Georgia Aster was found during the survey. The possible habitat was explored and the species was not present. Possible summer roosting habitat for the Indiana bat, gray bat, and northern long-eared bat was not present within the project boundary but does exist just outside the project boundary along the Locust Fork. No habitat was found for the remaining listed, threatened and endangered species within the project boundary. Two additional T&E surveys have been conducted for the site in 2010 by Dr. Yokley and Dr. Daly, and in 2014 by Conservation Services of Alabama. There is potential habitat for some of the aquatic species within the nearest perennial water which is the Locus Fork. However, the 2012 Yokley survey of the Locust Fork in this area did not identify any listed species. MEC highly recommends the minimum vegetated buffer width from the project site to the Locust Fork. Alden Resources, LLC intends to leave at least a 100-foot vegetated buffer zone between nearest portion of Kimberly Mine and the Locust Fork to minimize impacts to the aquatic species and protect the possible summer roosting habitat for the Indiana, gray, and northern long-eared bats. By a letter dated May 1, 2014 the US Fish and Wildlife Service (FWS) concur with the conclusion that the proposed action is not likely to adversely affect endangered and threated species. The FWS by comments dated February 10, 2015, agreed with MEC that no federally listed species/habitats occur within the "Additional Area B" project area. In a letter dated August 7, 2014 the Alabama Department of Conservation and Natural Resources (ADCNR) suggested a biological survey be conducted by trained professionals for the project area. In a letter dated, November 7, 2014 the US Army Corps of Engineers (USACE) authorize the activities by Permit Number: SAM-2013-01467-CMS. Mitigation is not required because the impacts are considered minimal. The ASMC 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: August 4, 2015

  
Robert Armes, Permit Manager

/ml  
cc: I & E, Permit File

## CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

**Permit Number P-3982**  
**Alden Resources, LLC**  
**Kimberly Mine**

**NPDES AL0082465**  
**HUC 03160111-120**

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 Alden Resources, LLC (P-3982) Kimberly Mine is for a surface and highwall coal mining operation originally encompassing 140 acres in Jefferson County. The proposed mine site is located in parts of Sections 27 & 34, Township 14 South, Range 3 West, Jefferson County, Alabama as seen from the 1986 photo Warrior Quadrangle. Of the 140 acres, approximately 116 acres are mining acres and 24 acres are basins, diversions, haul roads, office and stockpile areas. The site is bound on the north, west and east by the Locust Fork of the Black Warrior River in an oxbow, and to the south by Pritchett Road and private property.

#### **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 320 million years ago), most of Alabama was still 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, the uplift of the region left the coal bearing ecosystem behind. 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 Coal Mines**

There are several historical coal mines located within the vicinity of the permit area. The term “historical” refers to mines that were in operation prior to the enactment of Alabama’s permanent program. The mines that would potentially impact the cumulative area are located east of the permit area. Parts of these disturbed areas have been permitted under the ASMC permanent program, which results in reclamation practices using Best Management Practices. There are several abandoned underground mines in the area as well, which included mining on the Black Creek seam and the Jefferson seams. See Map No. 1 for active and expired ASMC permits.

## **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.

The CIA for surface water for Permit P-3982 has been defined as the area that surrounds P-3982 as well as the Warrior 282, LLC Warrior Mine No. 1 P-3953, whose drainage enters Cane Creek, which empties into the Locust Fork at the Kimberly Mine Permit. See Map No. 2 for CIA.

The CIA for groundwater for this permit is limited to the permit area itself. The CIA has been selected based upon the Department's assessment of the possible hydrologic impacts, which may occur as a result of mining operations. The subsurface hydrologic components considered in this assessment include all significant water-bearing units in, and within the vicinity of, the proposed permit. No cumulative impacts to groundwater are expected due to the the lack of a widespread, regional aquifer system. (See Map No. 2).

### **Active or Proposed Mines**

Active mining in this watershed that would interact with activities of the proposed permit include the Warrior 282, LLC Warrior Mine No. 1 P-3953. At the time of this assessment, no other proposed mines are known within the vicinity.

### **A. Geologic/Hydrogeologic Information**

#### **i. Geology**

The proposed P-3982 permit area is located in the Warrior Coal Basin. According to the "Depositional Settings of the Pottsville Formation in the Black Warrior Basin", the Plateau Coal Field is a small, transitional basin which connects the Black Warrior Basin with smaller basins in southeastern Tennessee. The Pottsville Formation underlies and outcrops in this region, which is of Pennsylvanian Age.

Locally, the strata which outcrops in the immediate vicinity of the Kimberly Mine site includes sandstones, shales, underclays and coal seams associated with the Black Creek Coal group. The target seams at this site include the Upper Jefferson, Lower Jefferson and Black Creek Coal seams.

The Jefferson seam splits into the Lower and Upper Jefferson seams with the Upper Jefferson bench averaging 1.4 ft. thick with 75 feet of overburden and the Lower Jefferson seam averaging 2.9 ft. with 105 feet of innerburden. The Black Creek seam averages 1.8 ft. thick, with an innerburden for the Lower Jefferson to the Black Creek averaging 135 ft. thick.

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

Overburden analysis was conducted on three overburden samples adjacent to and inside of the permit area. The analysis was run to determine the potential for acid- and toxic-forming properties. 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 0.0 tons per 1,000 tons of material (T/KT). Samples were collected every 5 feet or change in lithology and analyzed for pH (paste), total sulfur, potential acidity, neutralization potential and fizz rating. Results of analysis show that the overburden at the Kimberly Mine contains +3866 tons CaCO<sub>3</sub>/1000 tons overburden excess neutralization potential,

with an acid-base account of +9.62 (tons CaCO<sub>3</sub>/1000 tons overburden).

### **iii. Surface Water**

The permit area is located in the Warrior Basin and is drained by the Locust Fork of the Black Warrior River. It is located in sub watershed 120 of HUC 03160111. Eight basins are proposed for this site, all are proposed as temporary structures. Two surface water monitoring sites have been established for this permit. One upstream and one downstream on the Locust Fork of the Black Warrior River.

To characterize the existing quality and quantity of water within the above-mentioned stream, baseline data was obtained and submitted in the permit application. Baseline water quality was characterized from a downstream site on Locust Fork and an upstream site on Locust Fork. Locust Fork shows little to no impact from previous mining of the watershed at this location. This is most likely due to the size of the watershed.

Post-Mining water quality and quantity estimates are based on several factors:

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

Table 2 at the end of this assessment shows the post mining water quality projections for surface water site SW-2 downstream on the Locust Fork.

### **iv. Ground Water**

Groundwater in the Warrior Basin occurs in fractures and along bedding planes in the Pottsville Formation. The sandstone beds within 250 to 350 ft. of the surface generally contain the most productive water-bearing openings. Regionally, the primary source of recharge to groundwater is rainfall, which averages 54 inches per year. According to the U.S. Geological Survey Report: Geohydrology and Susceptibility of Major Aquifers to Surface Contamination in Alabama; Area 3 Water-Resources Investigations Report 88-4120, the Pottsville aquifer is tightly cemented and has small primary porosity and permeability, and the yields of public water for wells completed in this aquifer are less than 0.15 Mgal/d (million gallons per day). This aquifer is also commonly high in iron.

### **Domestic Wells**

A well inventory conducted in January 2014 showed 17 residences within a ½ mile radius of the mine site. Two residences utilize local groundwater as their only domestic source. All other residences utilize municipal water from the Birmingham Water Authority, either as their only water source, or in conjunction with a groundwater well for outdoor use.

### **Company Installed Wells**

To characterize existing groundwater conditions at the site, three groundwater monitoring sites were utilized for information. These include monitoring wells MW-1, MW-2 and MW-3. MW-2 and MW-3 are located within the permit area, and MW-1 is located south of the permit area close to the residences in order to see if there is any impact from mining on the local water system.

MW-1 is drilled to a total depth of 220 feet, through all three coal seams into a sandy clay unit. It is cased to approximately 20 feet deep at a sandstone/shale with sandstone contact, and open-hole the rest of the depth. This well would intercept any water interval local citizens might use for domestic purposes. MW-2 is drilled to a total depth of 220 feet, into a sandstone with shale unit, below the Black Creek seam. It is cased to a depth of approximately 20 feet and open-hole the rest of the depth. MW-3 is drilled to a total depth of 265 feet, 60 feet below the Black Creek seam. It is cased to approximately 20 feet, and open-hole the remainder of the depth.

A summary of the baseline data is at the end of this assessment in Table 3. Well locations that will be used for performance monitoring can be seen in Map No. 2.

There are no known wellhead protection zones or public water supply wells in or within 1,000 feet of the proposed permit area.

### **B. Coal Processing Waste**

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

### **C. Material Damages**

“Material Damage” is not defined in SMCRA or at 30 CFR §701.5. The intent of not defining “material damage to the hydrologic balance” is for regulatory authorities to develop a definition based on regional environmental and regulatory conditions. It can be considered a long term effect on the hydrologic balance by the mining operation that prevents the reasonable foreseeable future use of surface or ground water from supporting its current, potential or existing use outside of the permit area.

With respect to the CHIA, material damage to the hydrologic balance means quantifiable changes to the hydrologic balance caused by surface mining and reclamation operations to the extent that these changes would significantly affect present or potential uses as designated by the regulatory authority and that cannot be mitigated by reclamation or provision of alternate water supplies. 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**

With regard to the historical surface mines in, and within the vicinity of, the proposed site, the possible cumulative effect of the previous mining along with the proposed operations on surface and ground water quality/quantity will be discussed in detail in the following Surface Water and Ground Water sections.

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

Laboratory analyses of the bedrock overlying, and immediately below, the Black Creek Seam reveals favorable overburden with an average of +3866 tons/acre excess  $\text{CaCO}_3$ . Because of the excess neutralization potential adverse effects to the hydrologic balance of the area are not anticipated if the overburden is mixed thoroughly prior to reclamation.

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.

#### **C. Surface Water**

Laboratory analyses of the samples collected from the waterways reveal low conductivity levels and sulfate values. According to the Alabama Department of Environmental Management (ADEM) the receiving streams' use classification is 'Fish and Wildlife'. Locust Fork is on the ADEM 303d list for siltation (habitat alteration) due to agriculture and abandoned surface mining, with a draft TMDL date set for 2016. See Map No. 3 and No. 4 at the end of this assessment. Current surface mining regulations include Best Management Practices and mining techniques that have greatly improved environmental protection since pre-law mining days.

Water quality within Locust Fork show near neutral pH, low iron, low manganese and low to moderate suspended solids, varying on the discharge at the time of sample. 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. During mining, runoff from the disturbed areas will be diverted into sediment basins. Effluent from the sediment basins will be monitored by the permittee in accordance with National Pollution Discharge Elimination System (NPDES) permit requirements issued by the Alabama Department of Environmental Management. The effluent will be chemically treated, if necessary, in accordance with the NPDES permit. The basins will be monitored twice monthly (or as stated in the NPDES permit) through final bond release in order to characterize and document any effects the mining may have on the surface-water hydrologic balance. The basins are all proposed as temporary water impoundments.

Once mining has begun, the applicant will continue to sample and monitor Locust Fork at two locations. Surface Water monitoring site SW-1 is located upstream on the Locust Fork and monitoring site SW-2 is located downstream on the Locust Fork. These surface water monitoring sites will be used to characterize and document any effects the mining may have on the surface-water hydrologic balance.

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

Laboratory analyses of samples collected from the installed wells reveal the ground water within the bedrock strata below the Black Creek seam ranges from slightly acidic to neutral. The water is mineralized with elevated levels of (at a minimum) iron and manganese resulting in high conductivity measurements. Several sample periods show exceptionally high iron and manganese concentrations on the same dates. For a summary of the baseline data collected from the bedrock wells, please refer to Table 3 presented at the end of this assessment.

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. No long term impact is anticipated to the ground water quality for the aquifer below the Black Creek Seam due to the inability of infiltrated water to migrate downwards into an insitu hydrostratigraphic unit. The groundwater above the bedrock strata is generally mineralized resulting in marginal quality, and show indications of coal related impact.

The historical underground mines act as an unconfined aquifer system (due to them being daylighted in several places). The Kimberly Mine will intercept several of these old works, however groundwater will most likely stay confined to the old underground works area, as will not pass from less a permeable to more permeable system without pressure exertion. Local groundwater users should see no change in water quality due to this operation. Monitoring wells MW-1, MW-2 and MW-3 will be monitored quarterly through final bond release for pH, iron, manganese, water level and specific conductance. If it is indicated that

further parameters need to be monitored, they will be added to the Hydrologic Monitoring Plan as needed.

As discussed previously, the bedrock strata that will be excavated during the mining operations are predominantly non-acid and non-toxic. Although the strata are the same units that were disturbed during the previous mining, improved mining and management practices/techniques and contemporaneous reclamation should result in less water quality issues as compared to the historical mining. Should any increase in mineralization occur in the ground water as a result of the proposed activities, it is anticipated the levels will diminish and return to pre-mining concentrations once mining and reclamation activities are complete. Ground water will be further protected by properly sealing and abandoning all drill holes completed at the site (with the exception of blast holes) that will not be used for monitoring purposes. With regard to the availability of ground water after mining and reclamation is complete as compared to existing quantities, the backfilled spoil material will have a greater recharge capacity as compared to the undisturbed strata.

#### **IV. CONCLUSION**

The assessment of probable cumulative impacts of the Alden Resources, LLC Kimberly Mine (P-3982) 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-3982**

<b>Parameter</b>	<b>SW-1</b> DS Locust Fork	<b>SW-2</b> US Locust Fork
Discharge Rate (cfs)	255.00 – 1958.92 (710)	244.79 – 960.89 (534.04)
Field pH (S. U.)	6.47 – 8.53 (6.96)	6.48 - 8.60 (7.09)
Acidity (mg/L)	0 - 22 (11)	0 - 21 (11)
Alkalinity (mg/L)	27 - 61 (44)	5 - 39 (45)
Total Suspended Solids (mg/L)	3 - 39 (16)	3 - 46 (12)
Total Iron (mg/L)	0.17 – 0.45 (0.26)	0.23 – 1.32 (0.39)
Total Manganese (mg/L)	BML – 0.08 (0.05)	BML – 0.9 (0.14)
Sulfates (mg/L)	2 - 39 (19)	2 - 30 (19)
Specific Conductance (u-mhos/cm)	115 - 192 (156)	118 - 197 (157)

Average values are set in parentheses.  
 Averages calculated as geometric means.  
 pH averaged in logarithmic form  
 MBL = Below Measurable Limits  
 US – upstream  
 DS - downstream

**Table 2**  
**Post Mining Water Quality Estimates for SW-1**  
**Average Event, Post Mining**  
**P-3982**

<b>Parameter</b>	<b>SW-1</b>
pH (S. U.)	7.22
Total Suspended Solids (mg/L)	19
Total Iron (mg/L)	0.37
Total Manganese (mg/L)	0.01
Specific Conductance (u-mhos/cm)	122

**Table 3**  
**Ground Water Data**  
**P-3982**

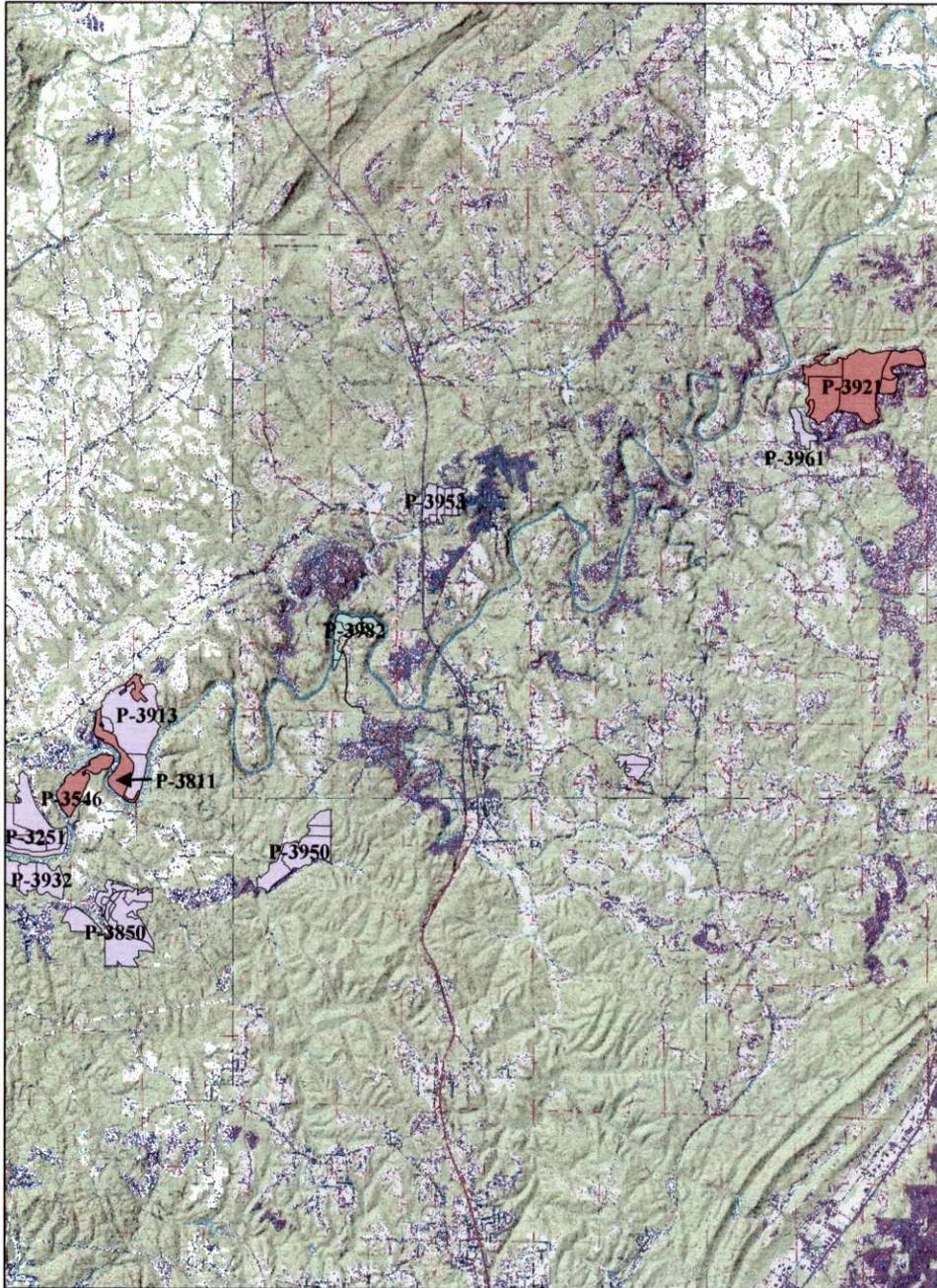
<b>Parameter</b>	<b>MW-1</b>	<b>MW-2</b>	<b>MW-3</b>
Water Level (feet below surface)	13 - 28 (19.3)	174.0 - 184.0 (178.6)	114.0 - 208.0 (163)
Acidity (mg/L)	10 - 80 (56)	4 - 25 (12)	7 - 58 (25)
Alkalinity (mg/L)	12 - 40 (25)	26 - 352 (189)	0 - 118 (25)
Field pH (S. U.)	5.52 - 7.00 (6.43)	6.29 - 8.34 (6.43)	5.87 - 8.29 (6.43)
Total Iron (mg/L)	0.18 - 85.09 (28.22)	0.37 - 85.09 (12.41)	0.22 - 42.44 (9.20)
Total Manganese (mg/L)	0.05 - 9.52 (1.1)	0.10 - 3.89 (1.1)	0.05 - 5.00 (0.3)
Specific Conductivity 25 °C (µmhos/cm)	81 - 1333 (127)	70 - 898 (124)	27 - 149 (124)
Sulfates (mg/L)	3 - 17 (12)	12 - 178 (22)	2 - 154 (22)

Average values are set in parentheses.  
 Averages calculated as geometric means

# Map No. 1

## P-3982

1



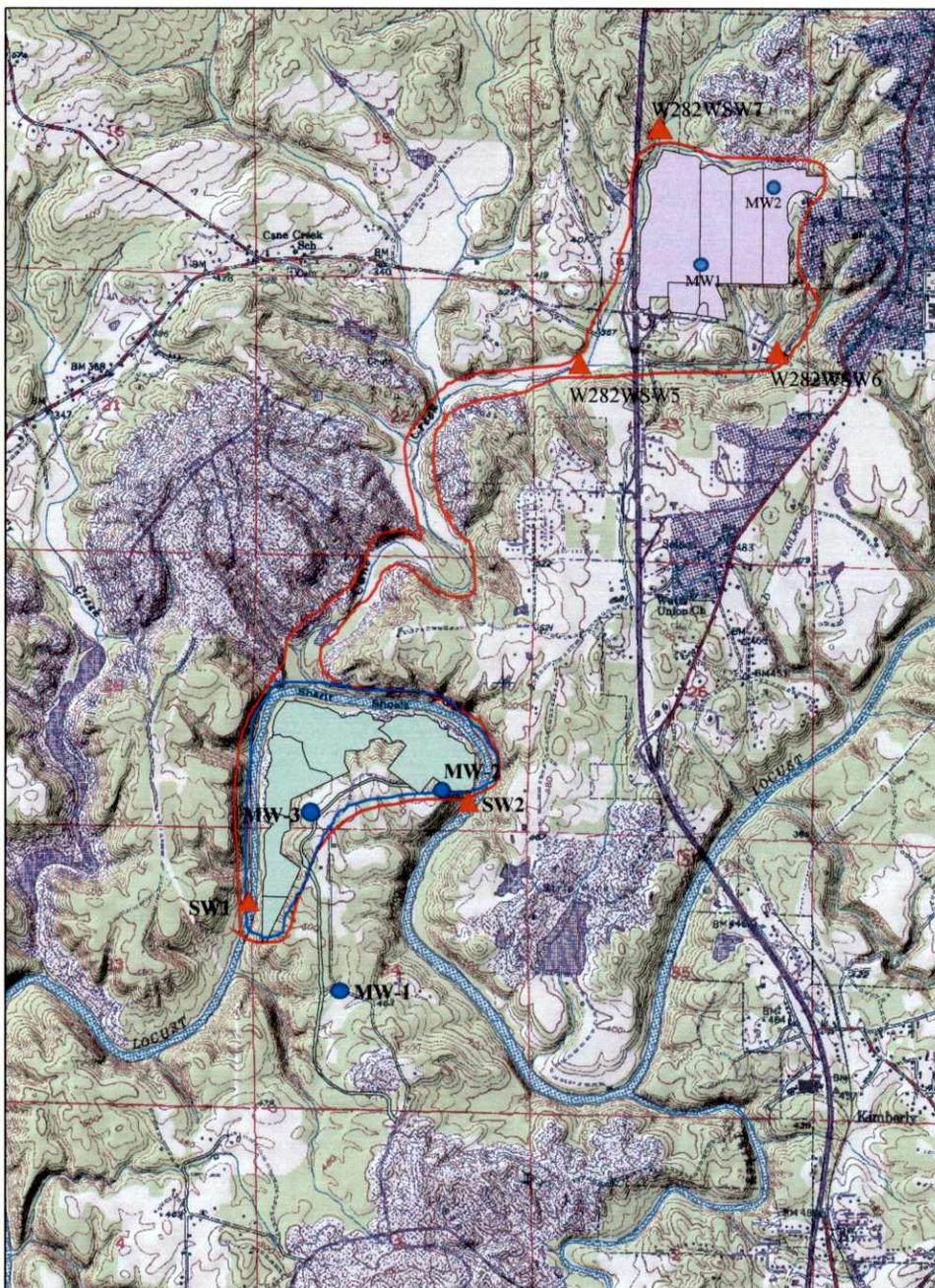
USGS Shaded Relief Mosaic Map

0 0.5 1 2 3 4 Miles

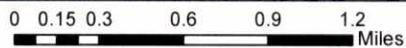
-  Active Permits
-  Expired Permits
-  P-3982

Map No. 2  
CIA  
P-3982

1



USGS Shaded Relief Mosaic Map



- |   |  |
|---|--|
|  P-3982            |  Groundwater CIA    |
|  P-3953            |  Surface Water Site |
|  Surface Water CIA |  Surface Water Site |



