

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

PART II - Environmental Resources Information

A. Fish, Wildlife and Related Environmental Values

1. Describe the measures to be taken, using the best technology currently available to minimize disturbances and adverse impacts to fish and wildlife and achieve enhancement of this resource where practicable within the proposed permit area. [780.18(b), 816.97(a)]

Sediment ponds will be used to prevent suspended solids and metals from entering nearby watersheds. Other siltation controls such as filter dams and silt fences will be used on occasion when necessary. The area will be promptly reclaimed with diverse species to provide a natural habitat for wildlife closely resembling the premining land use.

2. Describe in detail the measures to be taken to restore or enhance, or steps to be taken to avoid disturbance of habitats or unusually high value for fish and wildlife located within the proposed permit area. [780.18(b), 816.97(d)(2)]

See Attachment II.-A.-2. for Protected Species Habitat Assessment and correspondence from the United States Fish and Wildlife Service.

3. Are there any wetland areas such as streams, lakes, marshes, etc. located in or adjacent to the proposed permit area which will be disturbed by the mining activities? [780.18(b), 816.97 (d)(3 & 4)] ( ) Yes. ( X ) No.

If yes, briefly describe the feature(s), it's location and the extent of the proposed disturbance. Describe in detail measures to be taken to restore the area.

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Addendum to the Reclamation Plan  
Enhancement and Protection of Fish and Wildlife

(1) Areas of Special Concern

(a) Wetlands:

1. List any wetlands, ponds, lakes, streams, rivers, etc. that have been identified by the Department of Conservation and Natural resources (DCNR) or U.S. Fish and Wildlife Service (USFWS) as area of special concern.

See Attachment II.-A.-2. for Protected Species Habitat Assessment and correspondence from the United States Fish and Wildlife Service.

2. Identify any direct or indirect impacts which could occur as a result of the proposed mine.

If mining and reclamation operations are successfully completed, there should be no direct impacts on areas of special concern.

Indirect impacts as a result of this mining operation, will be limited to the temporary changes in the quantity of water entering the receiving streams during the construction of diversions and sediment basins, sediment load during the construction of incidental areas such as diversions, sediment basins, haul roads, etc. and the temporary destruction of small insignificant and undetected water holding depressions during mining operations.

3. List the measures to be taken to avoid, protect, or minimize impacts.

All required buffer zones or setbacks, as set forth in the regulations, will be maintained in order to avoid, protect, and minimize impacts of areas of special concern. Sediment basins will be utilized to maintain water quality standards entering the receiving stream. Diversion ditches will be constructed to control and direct all disturbed runoff through approved sediment basins. Hay dams, silt fences and rock check dams will be used to control minimal offsite drainage, such as haul roads, out slopes of sediment basins, etc., not entering sediment basins. Disturbed areas will be regraded and revegetated in a timely manner, as outlined in Part IV of the permit, to provide fish and wildlife habitat closely resembling premining conditions, where applicable.



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
1208-B Main Street  
Daphne, Alabama 36526

IN REPLY REFER TO:

2014-TA-0428

APR 30 2014

Mr. Jeff Selby  
AST Environmental  
98 Mark Selby Private Drive  
Decatur, AL 35603

Dear Mr. Selby:

Thank you for your February 26, 2014, letter (received on March 17, 2014) with which you transmitted a protected species habitat assessment for Red Mesa Energy, LLC's proposed Bledsoe Coal Mine in Jackson County, Alabama. The proposed project site is 17 acres and is located at approximately 34.960547N and -85.846106W. We have reviewed the information and are providing the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

### **Endangered, Threatened, Proposed and Candidate Species**

Our records indicate that the following federally listed, proposed, and candidate species may occur within the proposed project area:

Anthony's riversnail, *Athearnia anthonyi* - Endangered  
Gray bat, *Myotis grisescens* - Endangered  
Indiana bat, *Myotis sodalis* - Endangered  
Northern long-eared bat, *Myotis septentrionalis* - Proposed Endangered  
Price's potato bean, *Apios priceana* - Threatened  
White fringeless orchid, *Platanthera integrilabia* - Candidate<sup>1</sup>

According to your protected species habitat assessment, the project site contains several ephemeral drainage features, one wetland, and one previously constructed retention pond. No intermittent or perennial streams were noted on the site. Therefore, we concur with your assertion that there is no suitable habitat present on the project site for Anthony's riversnail, although this species could potentially exist in a stream that borders the site to the east through Lewis Hollow.

According to your protected species assessment, there are no caves on site and no large bodies of water within one mile of the property, but there are several karst features on the site. You, therefore, state that there is potentially suitable habitat for the gray bat within the project area. If these karst features will be

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<sup>1</sup> Candidate species are afforded no protection under the ESA. Surveys for this species in any appropriate habitat are recommended, but not required. This information is being provided to alert you that the species could be listed in the future. Therefore, if the proposed work is not carried out in the next year, it would be prudent to contact this office to determine if any changes have occurred to the status of this species.

affected by the proposed coal mining project, we recommend that these features be surveyed for the presence of bats, either by conducting emergence observations or acoustic surveys.

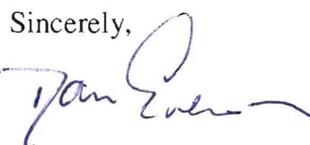
You also indicate that there may be suitable summer roosting habitat for the Indiana bat (and northern long-eared bat) on the site, as well as suitable habitat for Price's potato bean and the white fringeless orchid. We recommend that surveys for Price's potato bean be conducted by a qualified botanist when the plant is flowering (late June to mid-July). As indicated above, the white fringeless orchid is a candidate for listing under the ESA and, while surveys are recommended, they are not required at this time.

The northern long-eared bat is proposed as endangered and, unless projects are likely to jeopardize the continued existence of the species, conferencing under section 7 of the ESA is not required. In this case, your proposed project does not rise to the level of "likely to jeopardize"; therefore, no section 7 conferencing is recommended for the northern long-eared bat.

To avoid impacts to spring/summer roosting and maternity colonies of the Indiana bat in the State of Alabama, all proposed projects that may impact suitable Indiana bat habitat should follow the procedures outlined in the [Range-wide Indiana Bat Protection and Enhancement Plan Guidelines](#) (July 2009), which were developed by a team comprised of the U.S. Fish and Wildlife Service, Office of Surface Mining, and a group of Regulatory Authorities representing the Interstate Mining Compact Commission. In accordance with that guidance, when project areas contain potential summer habitat, tree clearing should occur from October 15 to March 31.

If all tree removal for this project occurs between October 15 and March 31, we will concur with your assertion that the proposed project is not likely to adversely affect the Indiana bat. If this timing is not achievable and no other measures to avoid adverse effects are possible, then we recommend that you proceed to acoustic and/or mist-netting surveys to determine presence or probable absence of Indiana bats at the project site in accordance with the 2014 Range-wide Indiana Bat Summer Survey Guidelines (January 2014) (<http://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2014IBatSummerSurveyGuidelines13Jan2014.pdf>).

If you have any questions or need additional information, please contact Ms. Karen Marlowe of my staff at (205) 726-2667. Please use the reference number located at the top of this letter in future phone calls or written correspondence.

Sincerely,  


Dan Everson  
Deputy Field Supervisor  
Alabama Ecological Services Field Office

cc: USACE, Birmingham, AL  
ASMC, Jasper, AL



STATE OF ALABAMA  
**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES**  
**WILDLIFE AND FRESHWATER FISHERIES DIVISION**



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**ROBERT BENTLEY**  
GOVERNOR

**N. GUNTER GUY, JR.**  
COMMISSIONER

**CURTIS JONES**  
DEPUTY COMMISSIONER

*The mission of the Wildlife and Freshwater Fisheries Division is to manage, protect, conserve, and enhance the wildlife and aquatic resources of Alabama for the sustainable benefit of the people of Alabama.*

**CHARLES F. "CHUCK" SYKES**  
DIRECTOR

**FRED R. HARDERS**  
ASSISTANT DIRECTOR

June 4, 2015

Mr. Jeff Selby  
Mr. Michael McConnell  
AST Environmental  
98 Mark Selby Private Drive  
Decatur, Alabama 35603

**RE: Protected Species Habitat Assessment  
17 Acre Site – Jackson County, Alabama**

Dear Mr. Selby and Mr. McConnell:

The Division of Wildlife and Freshwater Fisheries, Department of Conservation and Natural Resources has reviewed the above-referenced project and provides the following comments:

- Based on the information provided in your email dated April 25, 2015 and our own research, it does not appear that this project will adversely affect any state- or federally protected species. We note that you have coordinated with the U. S. Fish and Wildlife Service (USFWS) by letter dated March 27, 2015, and that you have conducted the suggested biological surveys suggested by the USFWS on March 16, 2015. If adverse impacts to state-protected species occur as a result of the project, further coordination with the Division of Wildlife and Freshwater Fisheries (334-353-7484) will be required.
- No net loss of stream or wetland function and habitat should occur as a result of the project. If flowing streams, ditches, or wetlands will be impacted by the proposed activity, the U.S. Army Corps of Engineers - Nashville District ("the Corps"; 615-369-7500), should be contacted to determine if the activity falls under a Corps regulation requiring mitigation for adverse ecological, morphological, or hydrological impacts. Be advised that the Corps advises that all wetlands on mine sites, whether on previously disturbed or pristine areas, fall within the category of jurisdictional wetlands; however, dredge and fill activities might be permitted under specified conditions. We have no objection to the use of a wetland mitigation protocol such as WRAP (the Wetland Rapid Assessment Procedure), provided it is properly applied and provided that temporal losses are correctly accounted for. We have no objection to the purchase of mitigation credits from a Corps-sanctioned wetland mitigation bank.
- The density or diversity of aquatic biota is not adversely impacted and that aquatic habitat quality in streams and wetlands is not diminished: excessive siltation resulting from uncontrolled erosion at a mine site can be as destructive to the aquatic ecosystem of a stream or wetland as acid mine

discharges. Sediment ponds should be temporary and subsequently removed post mining. The best way to protect aquatic habitat is to prevent sediment from entering a stream or wetland, not to contain the sediment within the stream or wetland once it has entered the aquatic ecosystem. We therefore recommend that spoil banks or other slopes be grassed as early as possible (well prior to reclamation), that silt barriers, terraces, and check dams be properly installed and maintained, that streamside buffer zones be 200 feet in width and well vegetated in order to function properly, that sedimentation ponds not be constructed in streams or wetlands, and that the mine owner/operator should be responsible for restoration or mitigation if streams or wetlands are adversely impacted by mining activities.

- Channel realignment, excavation, diversion or alteration of flow, impoundment, or excessive sedimentation of streams should not occur as a result of mining. If such impacts do occur, the mine owner/operator should provide corrective action through active restoration or stream mitigation for unresolved impacts.
- State water quality standards (particularly those related to erosion control, water turbidity, and dissolved oxygen) should be strictly adhered to.

We appreciate the opportunity to comment on this project. Please contact me if we may be of further assistance (334-353-7484).

Sincerely,



Taconya D. Goar  
Environmental Affairs Coordinator

cc: Pete Parrish, PERC Engineering Co., Inc.



February 26, 2014

JS13-121

United States Fish and Wildlife Service  
1208-B Main Street  
Daphne AL 36526

**To:** Mr. William Pearson, USFWS

**RE:** Protected Species Habitat Assessment  
17 Acre Site - Jackson County, Alabama

Mr. Pearson:

AST Environmental (AST) has performed an assessment in order to determine if suitable habitat for protected species listed for Jackson County is present or absent within the proposed project boundary. This assessment was conducted at the request of Mr. P.R. Rishi of Red Mesa Energy LLC. Mr. Rishi may be reached by mail at 100 Oxmoore Road, Suite 110, Birmingham, AL 35209 or by telephone at (415) 624-5113.

## **INTRODUCTION**

The subject property is a 17 acre tract located in Jackson County near Stevenson, Alabama. Portions of the site appear to have previously been mined for coal. The site is situated near the end of County Road 158. The site consists primarily of cutover, dense young pine, and mixed upland hardwoods. The subject property includes several ephemeral drainage features; however, only one was wet at the time of assessment. One previously constructed retention pond is present on site. One wetland, which appears to be a result of prior mining operations, is present on site. The wetland totals 0.157 acres in area.

This habitat assessment was completed in general accordance with the provisions of the Endangered Species Act of 1973.

## **PROTECTED SPECIES HABITAT ASSESSMENT**

AST obtained information from the USFWS database and other published documents, and also conducted a field investigation. The following species are listed by the USFWS for Jackson County:

Cumberland bean (pearlymussel) ( <i>Villosa trabalis</i> )	Endangered
Alabama lampmussel ( <i>Lampsilis virescens</i> )	Endangered
Pale lilliput (pearlymussel) ( <i>Toxolasma cylindrellus</i> )	Endangered
Pink mucket (pearlymussel) ( <i>Lampsilis abrupta</i> )	Endangered
Finerayed pigtoe ( <i>Fusconaia cuneolus</i> )	Endangered

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Shiny pigtoe ( <i>Fusconaia cor</i> )	Endangered
Slabside pearlymussel ( <i>Lexingtonia dolabelloides</i> )	Proposed Endangered
Dark pigtoe ( <i>Pleurobema furvum</i> )	Endangered
Snuffbox mussel ( <i>Epioblasma triquetra</i> )	Endangered
Rabbitsfoot ( <i>Quadrula cylindrica cylindrica</i> )	Proposed Threatened
Sheepnose Mussel ( <i>Plethobasus cyphus</i> )	Endangered
Anthony's riversnail ( <i>Athearnia anthonyi</i> )	Endangered
Snail darter ( <i>Percina tanasi</i> )	Threatened
Spotfin Chub ( <i>Erimonax monachus</i> )	Threatened
Palezone shiner ( <i>Notropis albizonatus</i> )	Endangered
American hart's-tongue fern ( <i>Asplenium scolopendrium</i> var. <i>americanum</i> )	Threatened
Green pitcher-plant ( <i>Sarracenia oreophila</i> )	Endangered
White fringeless orchid ( <i>Platanthera integrilabia</i> )	Candidate
Morefield's leather flower ( <i>Clematis morefieldii</i> )	Endangered
Indiana bat ( <i>Myotis sodalis</i> )	Endangered
Gray bat ( <i>Myotis grisescens</i> )	Endangered

## FIELD RECONNAISSANCE

Following the published information review, AST conducted a field reconnaissance of the subject property on September 30, 2013. The subject property appears to have been previously mined for coal. The majority of the property is prior clear-cut and upland standing timber (see attached photograph log). The United States Geological Survey (USGS) topographic map, dated 1974, illustrates a blue-line stream running through the subject property; however, this stream was probably rerouted easterly and off site during prior mining activities (See Photograph Location Map and Site Map).

Surveys with the intent to collect protected species were not conducted as part of this assessment; however documentation of incidental observations of individuals or populations of protected species was included in the scope of this assessment.

## SPECIES ASSESSMENT

### Mussels and Snails

#### Cumberland Bean Pearly Mussel

The Cumberland Bean (*Villosa trabalis*) is Federally listed as an endangered species. It is a freshwater mussel that attains an average adult size of 55 mm in length. The outer shell is dingy olive with many faint, wavy green rays.

The Cumberland Bean is endemic to the Tennessee River system from its headwaters downstream near Muscle Shoals, Alabama. This species has not been reported from Alabama since the impoundment of the Tennessee River. It inhabits swift riffles of small streams and rivers (Mirarchi *et al.* 2004).

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## **Alabama Lampmussel**

The Alabama Lampmussel (*Lampsilis virescens*) is a Federally endangered freshwater mussel which attains an average adult size of 60 mm (2.4 in.) in length. The shell has a low posterior ridge. The outer shell is smooth and shiny, greenish to straw colored and is sometimes faintly rayed (Mirarchi *et al.* 2004).

This species is found in sandy and gravelly shoals of small to medium streams. The *Nature Serve database* lists the habitat for this species as: CREEK, High gradient, MEDIUM RIVER, Pool, Riffle. The Alabama Lampmussel is believed to be extirpated from the state of Tennessee. It is now found only in the Paint Rock River in Alabama.

## **Pale Lilliput Pearly Mussel**

The Pale Lilliput (*Toxolasma cylindrellus*) is Federally listed as endangered. It is a relatively small sized freshwater mussel that reaches a maximum length of 35 mm. Females differ from males in that they are posteriorly swollen. The Pale Lilliput periostracum is yellowish green and without rays.

The Pale Lilliput inhabits large creeks and small rivers within moderate current and gravel substrates. It is believed that this species is only found in Alabama in the Paint Rock River (Mirarchi *et al.* 2004).

## **Pink Mucket Pearly Mussel**

The Pink Mucket (*Lampsilis abrupta*) is a Federally listed endangered mussel. It is a medium sized freshwater mussel that will reach approximately 100 mm in length. The life span of the Pink Mucket may exceed 50 years. The shell of the Pink Mucket is smooth with yellow or yellowish green coloring accompanied by faint green rays.

The Pink Mucket inhabits medium to large rivers with strong currents and impoundments with more lacustrine conditions. Sand, gravel, and pockets between rocky ledges are preferred substrates in areas with high velocity flows. Mud and sand is the more prevalent substrate type in areas with slower moving waters. The *Nature Serve database* lists the habitat for this species as: BIG RIVER, MEDIUM RIVER, and RIFFLE. The Pink Mucket Pearly Mussel is considered to be a big river species. Its distribution in Alabama is primarily limited to the Tennessee River Proper.

## **Fine-rayed Pigtoe Mussel**

The Fine-rayed Pigtoe Mussel (*Fusconaia cuneolus*) is a Federally listed endangered species. This freshwater mussel with a yellow to brown shell and fine green rays is medium sized (reaching 90 mm in length). Host fish include the Fathead Minnow, River Chub, Stoneroller, Telescope Chub, Tennessee Shiner, White Shiner, Whitetail Shiner, and Mottled Sculpin.

The Fine-rayed Pigtoe is endemic to the Tennessee River system. It has historically been known to occur from the Tennessee River headwaters in Virginia, downstream to Muscle Shoals, Alabama and in some tributaries of the Tennessee. Currently, it is believed to be extirpated from the Tennessee River Proper. The largest known population of this species is in the Clinch River (Tennessee / Virginia). The Fine-rayed Pigtoe is known to inhabit riffles within

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clear, high gradient streams with firm cobble and gravel substrates. The *Nature Serve data base* lists the habitat for this species as: High gradient, Moderate gradient, Riffle

## **Shiny Pigtoe Pearly Mussel**

The Shiny Pigtoe (*Fusconaia cor (edgariana)*) is a Federally listed endangered medium sized (60 mm in length) freshwater mussel. This mussel has a smooth surface with coloring that is shiny yellowish-brown and dark green blackish rays. Host fish may be the whitetail shiner, common shiner, warpaint shiner, and telescope shiner. The life span of the Shiny Pigtoe has been reported to 25 years.

The Shiny Pigtoe is a riffle species that prefers moderate to swiftly flowing streams or rivers with stable substrates that consist of sand, gravel, and cobble. This species is not found in deep water or impounded areas. It has been collected from shoals and riffles with sand and cobble substrates in clear streams with moderate to fast currents. The *Nature Serve data base* lists the habitat for this species as: Moderate gradient, Riffle. The Shiny Pigtoe historically occurred throughout the Tennessee River drainage as far south as Mussel Shoals, Alabama. Its current distribution is scattered over five rivers in Tennessee, Virginia and Alabama.

## **Slabside Pearly Mussel**

The Slabside Pearly Mussel (*Lexingtonia dolabelloides*) is a moderately-sized freshwater mussel that is Federally proposed endangered. It reaches about 90 mm in length. The shape of the shell is subtriangular, and the very solid, heavy valves are moderately inflated. Shell texture is smooth and somewhat shiny in young specimens, becoming duller with age. Shell color is greenish yellow, becoming brownish with age, with a few broken green rays or blotches, particularly in young individuals.

The Slabside Pearly Mussel is primarily a large creek to medium-sized river species. It inhabits sand, fine gravel, and cobble substrates in relatively shallow riffles and shoals with moderate current. This species requires flowing, well-oxygenated waters to thrive.

## **Dark Pigtoe Mussel**

The Dark Pigtoe (*Pleurobema furvum*) is Federally listed as endangered. It has a solid shell and can reach a maximum of 60 mm in length as an adult. The periostracum can be reddish brown to dark brown or nearly black.

This species is believed to be extirpated from most of its former distributions except in the North River and the headwaters of the Sipsey River in Alabama. Its primary host fish may include the Creek Chub, Alabama Shiner, and Blacktail Shiner (Mirarchi *et al.* 2004)

## **Snuffbox Mussel**

The Snuffbox mussel (*Epioblasma triquetra*) is a Federally listed endangered mussel. It has a relatively thick triangular-shaped, shell. The periostracum is yellow or yellowish green with green rays, blotches, or chevron markings. The dorsal and ventral margins are straight to slightly curved with a sharply angled posterior ridge and wide posterior slope. The nacre is pearly white, becoming iridescent posteriorly.

This species was historically widespread in the upper Mississippi and Ohio River drainages. It was widespread but never considered to be abundant in the Tennessee River system. Extant

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populations are currently present in parts of Wisconsin, Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, Tennessee, and West Virginia.

This species typically inhabits riffles of medium and large rivers with rocky to sandy substrates. This species is known to burrow deeply, if inhabiting reaches with swift currents. The Nature Serve database lists the habitat for this species as: BIG RIVER, MEDIUM RIVER, Riffle.

## **Rabbitsfoot**

The Rabbitsfoot mussel (*Quadrula cylindrica cylindrica*) is Federally listed as proposed threatened. This species has a conspicuously rectangular shaped shell with pustules and chevron markings.

Historically, the rabbitsfoot has been reported from 15 states ranging throughout the Ohio, Cumberland, Tennessee, lower Mississippi, White, Arkansas and Red River systems. Typical habitat for this species is small to medium rivers with moderate to swift currents. In smaller streams it inhabits gravel and cobble laden reaches near swift currents. The Nature Serve database lists the habitat for this species as: BIG RIVER, CREEK, MEDIUM RIVER, Moderate gradient, Riffle.

## **Sheepnose**

The Sheepnose mussel (*Plethobasus cyphus*) is Federally listed as endangered. It has an oval or oblong shell with a smooth surface except for a single row tubercles running from the umbo to the ventral margin. The anterior margin is rounded and the posterior end is bluntly pointed. The dorsal margin is straight and the ventral margin is curved anteriorly becoming straight posteriorly. A shallow sulcus is often present between the row of tubercles and the posterior ridge. The periostracum is yellow or light brown in juveniles, becoming chestnut to dark brown in adults. The nacre is white, and is occasionally tinged with pink or salmon.

The sheepnose is generally considered to be a large-river species but may occur in medium sized rivers. It occurs in riffles or runs with swift currents and inhabits firm mud / sand to gravel / cobble substrates. This species is typically reported from deep water runs (>2 m) with slight to swift currents and in reservoirs, immediately below dams. The Nature Serve database lists the habitat for this species as: BIG RIVER, Low gradient, MEDIUM RIVER, Moderate gradient, Riffle.

## **Anthony's Riversnail**

Anthony's riversnail (*Athearnia anthonyi*) is a Federally listed endangered freshwater snail. It has a thick shell that can reach up to 25 mm in length and a yellowish green to dark brown periostracum that typically darkens with age.

This species was known historically in the Tennessee River and some large and medium tributaries from Knoxville, Tennessee to Muscle Shoals, Alabama. Anthony's Riversnail can inhabit lotic areas and is occasionally found in pools near shoals. This species can also inhabit deeper riverine habitats within gravel, boulders, aquatic vegetation and woody debris (Mirarchi *et al.* 2004).

## **Mollusk Results**

Suitable freshwater mussel and snail habitat is not present within the project boundary. No streams large enough to provide suitable habitat for these species exist within the subject

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property boundary; however, a stream does border the site to the east through Lewis Hollow. Freshwater mussel and snail populations or individuals are not expected to be present on site and are not expected to be affected by the proposed activities.

## Fish

### Snail Darter

The Snail darter (*Percina tanasi*) is Federally listed as a threatened species. It is a medium sized darter reaching a length of approximately 75 mm (3 in). The Snail darter has a life span of three to four years and feeds on immature aquatic snails.

Historically, this species is thought to have been found in the mainstem of the Tennessee River in northeastern Alabama. The Snail darter inhabits large, free-flowing rivers with extensive areas of clean-swept sand and gravel shoals (Mirarchi *et al.* 2004).

### Spotfin Chub

The Spotfin Chub (*Erimonax monachus*) is Federally listed as a threatened species. Adults can reach 90 mm (3.5 in) in length. The Spotfin chub inhabits medium to large streams with moderate to moderately high gradient and moderate current, low turbidity and high water quality.

This species is believed to have occurred in streams and rivers throughout the Tennessee River system. In Alabama, the Spotfin Chub has historically been found in Little Bear Creek and Shoal Creek (Mirarchi *et al.* 2004).

### Palezone Shiner

The Palezone shiner (*Notropis albizonatus*) is a Federally listed endangered species. It is a slender minnow and reaches a maximum size of 65 mm (2.4 in). The Palezone Shiner has a life span of two to three years.

In Alabama, the Palezone Shiner is historically known only from the Paint Rock River system. Nationally, this species occurs in only two tributary systems. This species usually inhabits silt-free runs and flowing pools with sand, gravel, and bedrock substrates (Mirarchie *et al.* 2004).

## Fish Results

Suitable habitat for Snail Darter, Spotfin Chub, and Palezone Shiner is absent within the project boundary. No streams large enough to provide suitable habitat are present on site; however, a stream does border the site to the east through Lewis Hollow. Snail Darter, Spotfin Chub, and Palezone Shiner populations or individuals are not expected to be present on site and are not expected to be affected by the proposed activities.

## Vegetation

### Price's Potato-bean

Price's Potato-bean (*Apios priceana*) is Federally listed as threatened. It is a rare species in the legume family. It is a flowering, yellow-green vine growing from a stout tuber. It is native to Alabama, Mississippi, Tennessee, and Kentucky and occurs in approximately 13 locations total. Price's Potato-bean inhabits forest canopy openings in mixed hardwood stands along ravine slopes and creek bottoms (USFWS).

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Suitable habitat for Price's Potato-bean is marginally present on site. Several ephemeral drainage features are present on site but only one was wet during the time of the survey. One large creek bottom borders the subject property to the east within Lewis Hollow, but is off site. Mixed hardwood ravine slopes are present on site, but miniscule, and contained to the northern unaltered portions of the site. Prior mining operations have significantly altered the natural topography and stream features. No incidental sightings of Price's Potato-bean occurred during the assessment; however, individuals or populations were not in bloom at the time of the survey.

## **Green Pitcher-plant**

The Green Pitcher-plant (*Sarracenia oreophila*) is a Federally listed endangered species. It is a carnivorous perennial herb growing up to 28 inches tall with hollow yellow-green leaves. It has an unusual yellow flower that blooms from April through June. The Green Pitcher-plant inhabits seepage bogs and stream banks, and moist upland areas (USFWS 2012).

Suitable habitat for Green Pitcher-plant is marginally present on site. Several ephemeral drainage features are present on site but only one was wet during the time of the survey. One large creek bottom borders the subject property to the east within Lewis Hollow, but is off site. One seepage bog (Wetland W-1) is present on site, but miniscule. Prior mining operations have significantly altered the natural topography and stream features. No incidental sightings of Green Pitcher-plant occurred during the assessment; however, individuals or populations were not in bloom at the time of the survey.

## **White Fringeless Orchid**

The White Fringeless Orchid (*Platanthera integrilabia*) is Federally listed as a candidate species. It is a perennial herb that blooms from July through September. It inhabits partially shaded, flat, boggy areas at stream headwaters and seepage slopes. It is native but rare to the southeastern United States and south central United States (USFWS 2010).

Suitable habitat for White Fringeless Orchid is marginally present on site. Several ephemeral drainage features are present on site but only one was wet during the time of the survey. One large creek bottom borders the subject property to the east within Lewis Hollow, but is off site. Mixed hardwood ravine slopes are present on site, but miniscule, and contained to the northern unaltered portions of the site. Prior mining operations have significantly altered the natural topography and stream features. No incidental sightings of White Fringeless Orchid occurred during the assessment.

## **Morefield's Leather Flower**

Morefield's Leather Flower (*Clematis morefieldii*) is Federally listed as endangered. It is a vine that can grow up to of 16 feet in length. The flower is urn shaped and pinkish, and blooms from May through July. It inhabits mixed hardwoods near seeps on rocky south and southwest facing mountain slopes. Morefield's Leather Flower may be found near smoketree and chinquapin oak trees. It is believed to only be located in Madison County, Alabama (USFWS).

Suitable habitat for Morefield's Leather Flower is marginally present on site. Several ephemeral drainage features are present on site but only one was wet during the time of the survey. One large creek bottom borders the subject property to the east within Lewis Hollow, but is off site. Southerly facing ravine slopes are present on site, but miniscule, and contained to the

# AST Environmental

northeastern unaltered portions of the site. Prior mining operations have significantly altered the natural topography and stream features. No incidental sightings of Morefield's Leather Flower occurred during the assessment; however, individuals or populations were not in bloom at the time of the survey.

## **American Hart's-tongue Fern**

American Hart's-tongue Fern (*Asplenium scolopendrium var. americanum*) is Federally listed as threatened. It is a large glossy fern with unserrated fronds that reach a maximum of 40 cm. It discretely inhabits very few shaded, moist, intensely green northern deciduous forests and grows within small cracks and fissures in large limestone rocks. It is only found in a few isolated tiny colonies near cave entrances in Alabama (USDA).

Suitable habitat for American Hart's-tongue Fern is marginally present on site. Several ephemeral drainage features are present on site but only one was wet during the time of the survey. One large creek bottom borders the subject property to the east within Lewis Hollow, but is off site. Mixed hardwood ravine slopes are present on site, but miniscule, and contained to the northern unaltered portions of the site. Prior mining operations have significantly altered the natural topography and stream feature. No incidental sightings of American Hart's-tongue Fern occurred during the assessment; however, individuals or populations may not yet been in bloom at the time of the survey.

## **Bats**

### **Gray Bat**

The Gray Bat (*Myotis grisescens*) is a Federally listed endangered species and year-round cave resident, normally inhabiting caves located within one mile of a major river or reservoir. They roost in warm caves scattered along rivers in the summer to establish colonies. In the winter they relocate and hibernate deep within caves. Gray Bats are insect eaters and usually hunt and feed over water.

No caves were observed during the survey and no large bodies of water exist within one mile of the subject property. A large bluff, constructed from prior mining activities, exists on site. Several karst features such as ephemeral drainage features exist on site but only one was wet at the time of the survey. Potentially suitable habitat for the Gray Bat is minimally present within the survey area. No incidental observations of the Gray Bat were made during the habitat assessment.

Based upon lack of habitat, the Gray Bat is not expected to be present within the proposed project area; however potentially suitable summer forage habitat may be present. Gray Bat populations or individuals are not expected to be affected by the proposed project.

### **Indiana Bat**

The Indiana Bat (*Myotis sodalis*) is Federally listed as endangered and closely associated with caves, although the Indiana bat is suspected to dwell within floodplain and upland forests during the warmer months. Indiana Bats have been known to roost in trees smaller than 10 inches *dbh*. Indiana Bats usually breed in early October. Breeding typically takes place at night and occurs in large subterranean rooms near cave entrances. According to Harvey, et al., 85 percent of Indiana Bats hibernate in nine caves located in the eastern United States.

# AST Environmental

No caves were observed throughout the survey area; however, a high-wall from prior mining operations is present on site. Forested areas are common throughout the survey area, primarily on the northern unaltered portion of the subject property. Potential breeding or hibernating habitat for the Indiana Bat is not present due to the lack of caves. Transient Indiana Bats could potentially find summer roosting habitat within the upland forested areas on site. No incidental observations of the Indiana Bat were made during the habitat assessment.

Based upon lack of habitat, the Indiana Bat is not expected to be present within the proposed project area. Although the survey includes areas with potential summer roosting and forage habitat; Indiana Bat populations or individuals are not expected to be affected by the proposed project if tree removal is done between October 15 and March 31.

## RESULTS

The subject property is a prior coal mine site and has been significantly altered. USGS topographic maps illustrate a blue-line stream on site; however, it appears to have been rerouted in years past. Several ephemeral drainage features are present on site but only one was wet during the time of the survey. One wetland (0.157 ac) and one constructed retention pond is present on site. Suitable habitat for listed freshwater mussels and snails is not present on site. Suitable habitat for listed fish is not present on site. Suitable habitat for listed plants is present on site. A protected species survey should be done to identify the presence or absence of listed plant species while in bloom if potentially suitable habitat is to be impacted.

AST is requesting written concurrence of this assessment. A series of maps and site photographs are included for your review and aid. Should you need additional information or have questions, please feel free to contact me at (256) 476-7355 or Mike McConnell at (256) 303-7054.

Sincerely,



Jeff Selby, M.S.  
Member / Senior Biologist  
AST Environmental



Michael McConnell  
Environmental Scientist  
AST Environmental

Attachments:

Site Maps  
Site Photographs

**Selected References:**

Harvey, Altenbach and Best. 1999. Bats of the Eastern United States. Arkansas Game and Fish Commission.

Mirarchi, Ralph E. 2004. Alabama Wildlife Volume 1 – A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds, and Mammals. University of Alabama Press. Tuscaloosa, AL.

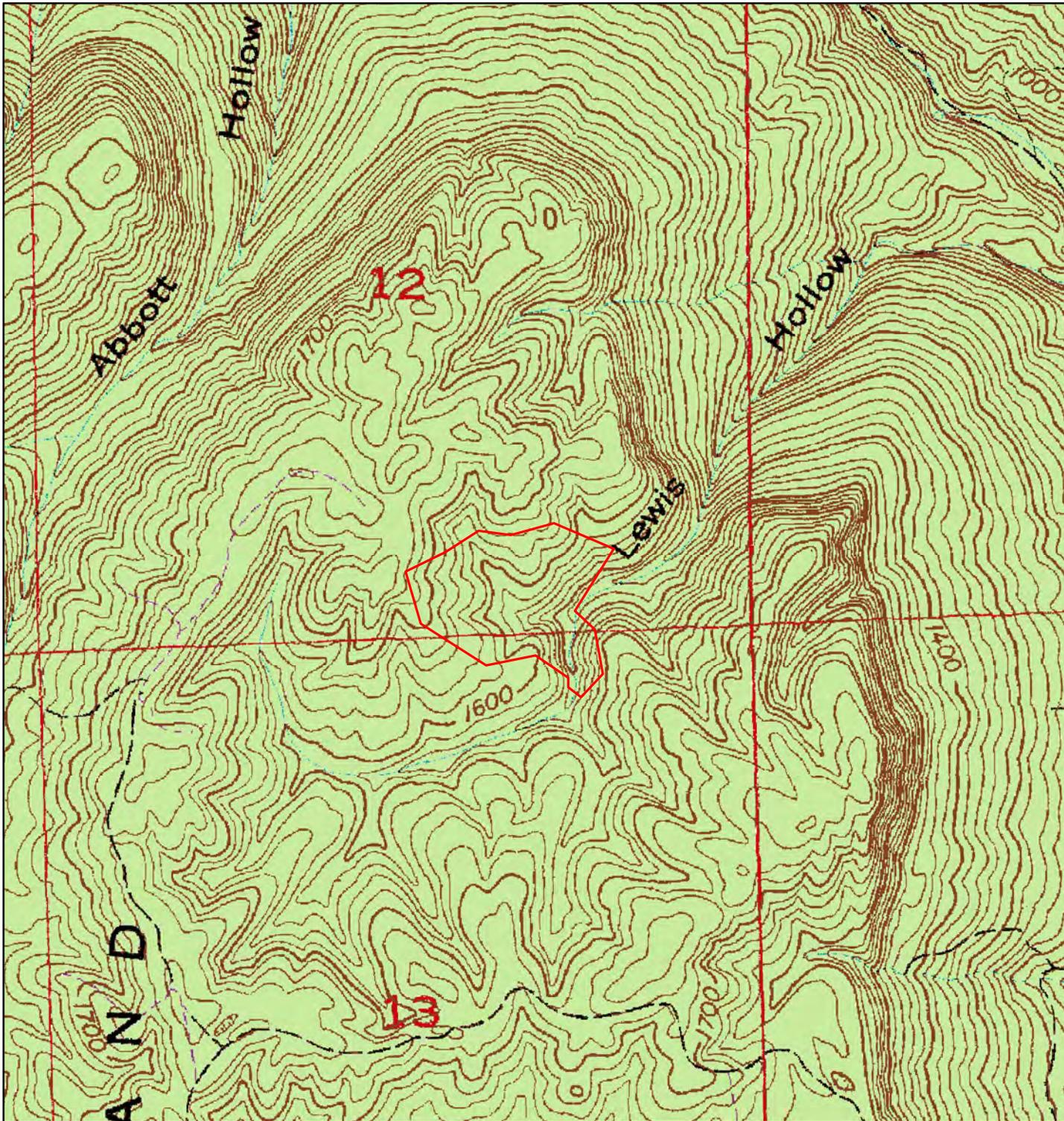
Mirarchi, Garner, Mettee and O'neil. 2004. Alabama Wildlife Volume 2 - Imperiled Aquatic Mollusks and Fishes. University of Alabama Press. Tuscaloosa, AL.

NatureServe Online Encyclopedia of Life  
<http://www.natureserve.org/explorer/>

United State Fish and Wildlife Service, Endangered Species.  
<http://fws.gov/>

A Guide to Assist with Forestry Activities, Second Edition, USFS.

USDA Forest Service Celebrating Wildflowers.  
<http://www.fs.fed.us/wildflowers>



0 2,500 5,000 Feet

SCALE = 1 : 12,000

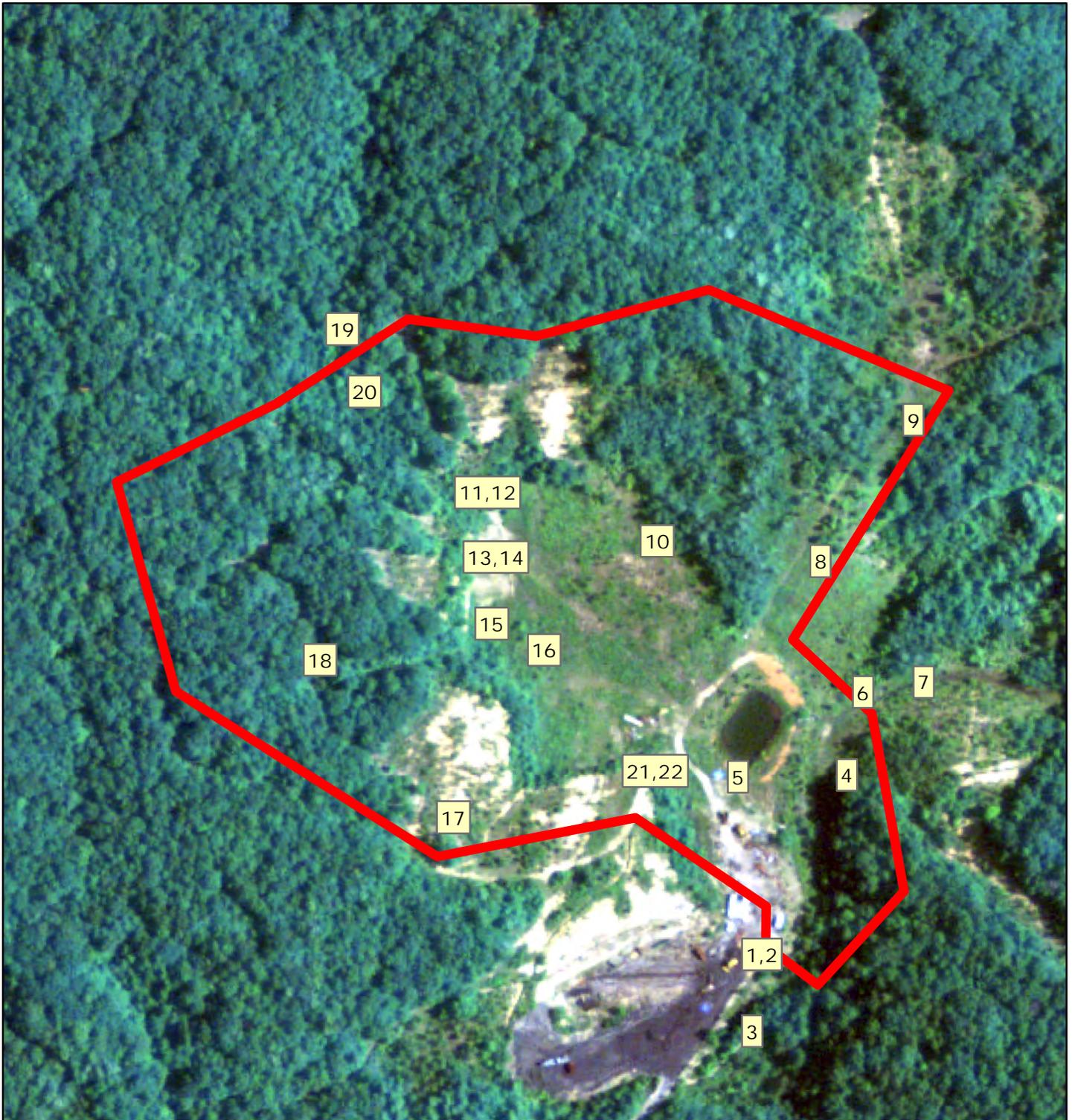
 Approximate Property Boundary



SITE MAP  
JS13-121  
Jackson County, AL

SOURCE: USGS Topographic Quadrangle  
Doran Cove [NW] Alabama. DOQQ: 2006

**AST** Environmental



0 500 1,000 Feet

 Approximate Property Boundary

 Photograph Location



SCALE = 1 : 3,000

PHOTOGRAPH LOCATION MAP  
JS13-121  
Jackson County, AL

SOURCE: USGS Topographic Quadrangle  
Doran Cove [NW] Alabama. DOQQ: 2006

**AST** Environmental

**PHOTOGRAPH 1**



Equipment travel corridor. Facing north near the southern property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 2**



Bluff feature resulting from prior mining operation. Facing northwest near the southern property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 3**



Ephemeral drainage feature. Facing downslope / north near the southeastern property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 4**



Ephemeral drainage feature. Facing downslope / north near the eastern property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 5**



Retention pond located near the eastern central portion of the subject property. Facing north. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 6**



Retention pond outfall culvert and associated ephemeral drainage feature. Facing upslope / west. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 7**



Ephemeral drainage feature. Facing downslope / northeast near the eastern property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 8**



Lewis Hollow. Facing east near the eastern property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 9**



Hillslope near the northeastern property boundary. Facing downslope / east.  
Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 10**



Dense clear-cut area near the central portion of the subject property.  
Facing north. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 11**



Ephemeral drainage feature near the central portion of the subject property. Facing upslope / northwest. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 12**



Ephemeral drainage feature near the central portion of the subject property. Facing downslope / southeast. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 13**



Ephemeral drainage feature near the central portion of the subject property. Facing downslope / southeast. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 14**



Bluff feature located near the central portion of the subject property. Facing west. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 15**



Bluff feature and prior coal mine entrance located near the central portion of the subject property. Facing west. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 16**



Wetland area located near the central portion of the subject property. Facing west. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 17**



Ephemeral drainage feature located near the central southern property boundary. Facing upslope / west. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 18**



Ephemeral drainage feature within clear-cut area. Facing upslope / west near the western property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 19**



Upland forest and ephemeral drainage feature. Facing downslope / southeast near the northern property boundary. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 20**



Ephemeral drainage feature within an upland forested area. Facing south near the northern property boundary. Taken by Mike McConnell, 9-30-13.

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**PHOTOGRAPH 21**



Clear-cut area near the central portion of the subject property. Facing north. Taken by Mike McConnell, 9-30-13.

---

**PHOTOGRAPH 22**

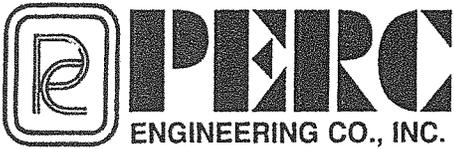


Clear-cut area and equipment travel corridor. Facing south near the central portion of the subject property. Taken by Mike McConnell, 9-30-13.

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Red Mesa Energy, LLC Bledsoe Mine, Attachment II-A-2

2014-TA-0428



Telephone: (205) 384-5553
Facsimile: (205) 295-3114 - Main Building
(205) 295-3115 - Water Lab
Web Address: www.percengineering.com
Pete Parrish Direct Dial: 205-295-3100
Direct Fax: 205-295-3138
E-mail: pparrish@percengineering.com

RECEIVED
MAR 30 2015
BY: .....

March 27, 2015

Mr. Dan Everson, Deputy Field Supervisor
Alabama Ecological Services Field Office
United States Department of the Interior
Fish and Wildlife Service
1208-B Main Street
Daphne, Alabama 36526

Post-It® Fax Note 7671
Date 4-23-15 # of pages
From USFWS
Co./Dept. Co.
Phone # Phone #
Fax # 205-295-3114 Fax #

Subject: 2014-TA-0428 - KM Red Mesa Energy, LLC, Bledsoe Mine, Jackson County, Alabama

Dear Mr. Everson:

In response to your April 30, 2014 letter concerning the referenced proposed operation, a copy of which is attached for your ready reference, I have enclosed a copy of a report on a Biological Survey for Price's Potato-bean which was conducted by Mr. Tom Counts.

We request your concurrence on the Bledsoe Project with regard to Price's Potato-bean based on Mr. Counts' report.

Please contact me should you have questions.

Sincerely,
PERC Engineering Co., Inc.
R. Evan "Pete" Parrish
R. Evan "Pete" Parrish

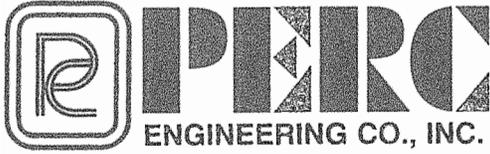


U.S. Fish and Wildlife Service
1208-B - Daphne, Alabama 36526
Phone: 251-441-5181 Fax: 251-441-6222

Based upon our records and the information provided in your letter, we agree with your findings that no federally listed species/critical habitat occur in the project area. If project design changes are made, please submit new plans for review.

William J. Pearson, Field Supervisor
Date 4/23/2015 # 6

REP



Telephone: (205) 384-5553  
Facsimile: (205) 295-3114 - Main Building  
(205) 295-3115 - Water Lab  
Web Address: [www.percengineering.com](http://www.percengineering.com)  
Pete Parrish Direct Dial: 205-295-3100  
Direct Fax: 205-295-3138  
E-mail: [pparrish@percengineering.com](mailto:pparrish@percengineering.com)

March 27, 2015

Mr. Dan Everson, Deputy Field Supervisor  
Alabama Ecological Services Field Office  
United States Department of the Interior  
Fish and Wildlife Service  
1208-B Main Street  
Daphne, Alabama 36526

Subject: 2014-TA-0428 Red Mesa Energy, LLC, Bledsoe Mine, Jackson County,  
Alabama

Dear Mr. Everson:

In response to your April 30, 2014 letter concerning the referenced proposed operation, a copy of which is attached for your ready reference, I have enclosed a copy of a report on a Biological Survey for Price's Potato-bean which was conducted by Mr. Tom Counts.

We request your concurrence on the Bledsoe Project with regard to Price's Potato-bean based on Mr. Counts' report.

Please contact me should you have questions.

Sincerely,  
PERC Engineering Co., Inc.

A handwritten signature in black ink that reads "R. Evan 'Pete' Parrish".

R. Evan "Pete" Parrish

REP



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
1208-B Main Street  
Daphne, Alabama 36526

IN REPLY REFER TO:

2014-TA-0428

APR 30 2014

Mr. Jeff Selby  
AST Environmental  
98 Mark Selby Private Drive  
Decatur, AL 35603

Dear Mr. Selby:

Thank you for your February 26, 2014, letter (received on March 17, 2014) with which you transmitted a protected species habitat assessment for Red Mesa Energy, LLC's proposed Bledsoe Coal Mine in Jackson County, Alabama. The proposed project site is 17 acres and is located at approximately 34.960547N and -85.846106W. We have reviewed the information and are providing the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

### **Endangered, Threatened, Proposed and Candidate Species**

Our records indicate that the following federally listed, proposed, and candidate species may occur within the proposed project area:

Anthony's riversnail, *Athearnia anthonyi* - Endangered  
Gray bat, *Myotis grisescens* - Endangered  
Indiana bat, *Myotis sodalis* - Endangered  
Northern long-eared bat, *Myotis septentrionalis* - Proposed Endangered  
Price's potato bean, *Apios priceana* - Threatened  
White fringeless orchid, *Platanthera integrilabia* - Candidate<sup>1</sup>

According to your protected species habitat assessment, the project site contains several ephemeral drainage features, one wetland, and one previously constructed retention pond. No intermittent or perennial streams were noted on the site. Therefore, we concur with your assertion that there is no suitable habitat present on the project site for Anthony's riversnail, although this species could potentially exist in a stream that borders the site to the east through Lewis Hollow.

According to your protected species assessment, there are no caves on site and no large bodies of water within one mile of the property, but there are several karst features on the site. You, therefore, state that there is potentially suitable habitat for the gray bat within the project area. If these karst features will be

---

<sup>1</sup> Candidate species are afforded no protection under the ESA. Surveys for this species in any appropriate habitat are recommended, but not required. This information is being provided to alert you that the species could be listed in the future. Therefore, if the proposed work is not carried out in the next year, it would be prudent to contact this office to determine if any changes have occurred to the status of this species.

affected by the proposed coal mining project, we recommend that these features be surveyed for the presence of bats, either by conducting emergence observations or acoustic surveys.

You also indicate that there may be suitable summer roosting habitat for the Indiana bat (and northern long-eared bat) on the site, as well as suitable habitat for Price's potato bean and the white fringeless orchid. We recommend that surveys for Price's potato bean be conducted by a qualified botanist when the plant is flowering (late June to mid-July). As indicated above, the white fringeless orchid is a candidate for listing under the ESA and, while surveys are recommended, they are not required at this time.

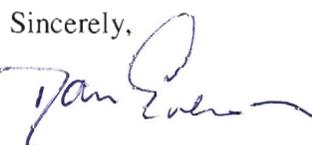
The northern long-eared bat is proposed as endangered and, unless projects are likely to jeopardize the continued existence of the species, conferencing under section 7 of the ESA is not required. In this case, your proposed project does not rise to the level of "likely to jeopardize"; therefore, no section 7 conferencing is recommended for the northern long-eared bat.

To avoid impacts to spring/summer roosting and maternity colonies of the Indiana bat in the State of Alabama, all proposed projects that may impact suitable Indiana bat habitat should follow the procedures outlined in the [Range-wide Indiana Bat Protection and Enhancement Plan Guidelines](#) (July 2009), which were developed by a team comprised of the U.S. Fish and Wildlife Service, Office of Surface Mining, and a group of Regulatory Authorities representing the Interstate Mining Compact Commission. In accordance with that guidance, when project areas contain potential summer habitat, tree clearing should occur from October 15 to March 31.

If all tree removal for this project occurs between October 15 and March 31, we will concur with your assertion that the proposed project is not likely to adversely affect the Indiana bat. If this timing is not achievable and no other measures to avoid adverse effects are possible, then we recommend that you proceed to acoustic and/or mist-netting surveys to determine presence or probable absence of Indiana bats at the project site in accordance with the 2014 Range-wide Indiana Bat Summer Survey Guidelines (January 2014)

<http://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2014IBatSummerSurveyGuidelines13Jan2014.pdf>.

If you have any questions or need additional information, please contact Ms. Karen Marlowe of my staff at (205) 726-2667. Please use the reference number located at the top of this letter in future phone calls or written correspondence.

Sincerely,  


Dan Everson  
Deputy Field Supervisor  
Alabama Ecological Services Field Office

cc: USACE, Birmingham, AL  
ASMC, Jasper, AL

Biological Survey for Bledsoe Mine  
Jackson, County, Alabama  
Conducted for Perc Engineering

**Biological Survey for Price's Potato-bean  
*Apios priceana***

**For PERC Engineering  
1606 Highway 78 West  
Jasper, Alabama 35501**

**Bledsoe Mine  
March 16, 2015**



**Conducted by Conservation Services of Alabama, LLC  
Tom Counts, Wildlife Biologist  
2724 Hawk Pride Mountain Road  
Tuscumbia, Alabama 35674**



Biological Survey for Bledsoe Mine  
Jackson, County, Alabama  
Conducted for Perc Engineering

### **Narrative**

Perc Engineering Inc. requested a plant survey of the Bledsoe Mine site for the presence or absence of the federally listed (Threatened) plant *Apios priceana*, Price's Potato-bean. A typical, botanical survey is conducted during the growing season, a period when the vegetative material is present or preferably when the plant is in flower or fruit to allow for visual identification or keying a plant to make a positive determination of the genus and species.

On March 16, 2015, a site visit was conducted to survey the area for potential habitat for this species. Price's Potato-bean flowers and fruits during the summer and early fall months and could be more readily identified during this time period. However, this trip was planned in order to survey habitats where the plant might potentially be found. Specifically it was a survey of the designated site for places with somewhat more alkaline soils, limestone outcrops or the habitats and potentially known vegetative associates of the plant.

### **General Description of Area**

The Bledsoe #1 Mine site in Jackson County is located in the northeastern corner of the state and is approximately six miles north of Stevenson, Alabama. The site is currently abandoned but has been operated as a single pit underground coal mine in the past and there appears to be evidence of some surface mining disturbance in the more distant past. Evidence of the past mining operations can be observed on the site in the form of water filled pits, a settling pond, portions of a highwall, the presence of excavated areas, coal fines, old heavy equipment, old equipment parts and tires and discarded equipment maintenance buckets.

The area can be located on the Doran Cove USGS topographic map. It is located primarily within section 12 of township 1 south and range 7 east. The site is situated above an un-named tributary that drains Lewis Hollow. Elevations for the site are between 1500 and 1800 feet above sea level and are steeply sloping.

### **Price's Potato-bean (*Apios priceana*)**

#### **Background**

This plant was listed by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973, as amended, as Threatened in 1989 with the Final Rule being effective on February 5, 1990. At listing the plant was only known from three sites within Alabama. It was described as a native of forest openings with populations in open woods and along wood edges in limestone areas, often where the bluffs grade to creek or river bottoms. Soils where it was found, were considered to be well drained, occurring on old alluvium or over limestone. The common vegetative associates were described as *Quercus muhlenbergii* (Chinkapin oak), *Lindera benzoin* (Northern spicebush, a shrub),

Biological Survey for Bledsoe Mine  
Jackson, County, Alabama  
Conducted for Perc Engineering

*Campanula americana* (American bellflower, a herbaceous plant), *Arundinaria gigantea* (giant cane), *Tilia americana* (basswood), *Fraxinus americana* (white ash), *Acer saccharum* (sugar maple), *Ulmus rubra* (slippery elm) and *Cercis canadensis* (eastern redbud). It was found in mixed hardwood stands.

In the 1993 Recovery Plan for Price's Potato-bean (*Apios priceana*) it was noted that there are likely undiscovered populations in existence growing in open woods, forest edges, road edges (in low areas near a creek) and stream banks. The species is somewhat difficult to identify without flowers and the plant does not produce flowers every year.

Price's Potato-bean has been documented on at least two known sites within Jackson County as plants have been collected and identified by botanists and the specimens have been preserved in one of the state herbariums. Collections have been made in five other counties within Alabama and at least two adjacent counties in Tennessee. In Tennessee, all are found to occur in soils, which are overlying limestone parent material. The associated vegetation will vary but all sites are found close to rivers or streams.

Specimen Collections in Alabama <u>1/</u>	Specimen Collections in adjacent Tennessee Counties <u>2/</u>
Jackson County (2 locations)	Marion County
Madison County (3 locations)	Franklin County
Lawrence County (1 location)	(These counties are north of Jackson County)
Autauga County (1 location)	
Dallas County (4 locations)	
Butler County (1 location)	

1/ - Based upon vouchered plant specimens only.      2/ - From Tennessee Rare Plant list

### Site Findings - Soils

On the site, I conducted the survey of biological resources and their habitat by walking through the designated area. I searched for visual evidence and botanical evidence of potential areas that had a probability to provide habitat for this species.

Forest cover on the site varies from being clear-cut with planted loblolly pines, a few stands of hardwood remain and other sites have a mixture of successional cover which apparently developed from past disturbances, which includes loblolly pine, Virginia pine, scattered Eastern red cedar and a mixture of hardwoods. The hardwoods stands were primarily composed of red oak and red maple.

Herbaceous vegetation on the site also varies greatly, mostly due to man induced disturbance. There is a thick stand of native grasses at the herbaceous layer in the clearcut areas. This consists of perennials such as broomsedge, native blackberry and a scattering of native bluestems and forbs such as the goldenrod. Understory and mid-

Biological Survey for Bledsoe Mine  
 Jackson, County, Alabama  
 Conducted for Perc Engineering

story within the small patches of hardwood was minimal consisting mostly of small oak and maple reproduction, muscadine and greenbriar. The previously disturbed areas from past mining had mixed coverage of serecia, weeping love grass and native blackberry.

As part of the survey, I conducted simple soil pH tests in order to determine if any of the soils of the area had a more alkaline nature. This could be indicative of the conditions in which the plant would occur. I used a standard hand held device, the "Rapitest Soil pH meter" to make the on-site test. To conduct the test, I followed standard protocols by removing the top 2" of surface soil. A soil sample was taken between 2-5 inches in depth. Any rocks, roots or organic matter was removed. The soil sample was wet thoroughly with distilled water and stirred to thoroughly mix the sample to a muddy consistency. The sample was slightly compacted and any excess water removed. Then the probe was cleaned prior to insertion into the mixture. This procedure of cleaning and re-inserting the probe was repeated 2-3 times to insure proper readings were made. Readings were made after 60 seconds of probe insertion into the sample.

Table TT. Results of the pH tests.

Feature	GPS Coordinates	Comments
Site Name PE 01	N 34°57.625' W 085°50.739' El. 1597'	pH - 6.8 Soil
PE 02	N 34°57.692' W085°50.683' El. 1588'	pH - 6.9 Soil
PE 03	N 34°57.804' W 085°50.676 El. 1686'	pH - 6.7 Soil
PE 04	N 34°57.836' W 085°50.865' El. 1749'	pH - 6.9 Soil
PE 05	N 34°57.687' W 085°51.013' El. 1752'	pH - 6.7 Soil
PE 07	N 34°57.510' W 085°50.755' El. 1568'	pH - 4.0 Coal Fines
PE 09	N 34°57.653' W 085°50.755' El. 1581'	pH - 6.8 Soil
PE 010	N 34°57.657' W 085°50.733' El. 1582'	pH - 6.7 Soil
PE 011	N 34°57.730' W 085°50.690' El. 1591'	pH 6.7 Soil

Biological Survey for Bledsoe Mine  
Jackson County, Alabama  
Conducted for Perc Engineering

USDA Soil Survey

The United States Department of Agriculture, Natural Resources Conservation Service Soil Survey for Jackson County, Alabama shows a portion of the area surveyed as being disturbed in the past for mining and strip mining. The natural and undisturbed areas of the site are made up of Hartsells (Hfg), Muskingum (Gorgas) Mfi), (Msl), Msz), and Gorgas (Rsm)soils.

Figure 1. Jackson County Soil Survey Map - area around Bledsoe Mine.



Biological Survey for Bledsoe Mine  
 Jackson, County, Alabama  
 Conducted for Perc Engineering

Figure 2. Map unit description from Jackson County Soil Survey.

### Map Unit Description (Brief, Generated)

Jackson County, Alabama

[Minor map unit components are excluded from this report]

**Map unit:** Hfg - Hartsells fine sandy loam, rolling, shallow phase

**Component:** Hartsells (85%)

*The Hartsells component makes up 85 percent of the map unit. Slopes are 5 to 10 percent. This component is on hillslopes. The parent material consists of loamy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, lithic, is 39 to 51 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.*

**Map unit:** Mfl - Muskingum fine sandy loam, hilly phase

**Component:** Muskingum, (Gorgas) (85%)

*The Muskingum, (Gorgas) component makes up 85 percent of the map unit. Slopes are 10 to 20 percent. This component is on hillslopes. The parent material consists of loamy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7e. This soil does not meet hydric criteria.*

**Map unit:** Msl - Muskingum stony fine sandy loam, hilly phase

**Component:** Muskingum, (Gorgas) (85%)

*The Muskingum, (Gorgas) component makes up 85 percent of the map unit. Slopes are 10 to 20 percent. This component is on hillslopes. The parent material consists of loamy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.*

**Map unit:** Msz - Muskingum stony fine sandy loam, steep phase

**Component:** Muskingum, (Gorgas) (85%)

*The Muskingum, (Gorgas) component makes up 85 percent of the map unit. Slopes are 20 to 45 percent. This component is on hillslopes. The parent material consists of loamy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.*

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**USDA** Natural Resources  
Conservation Service

Survey Area Version: 6  
 Survey Area Version Date: 09/16/2014

Page 1

Biological Survey for Bledsoe Mine  
Jackson County, Alabama  
Conducted for Perc Engineering

Figure 3. Map unit description from Jackson County Soil Survey.

**Map Unit Description (Brief, Generated)**  
Jackson County, Alabama

**Map unit:** RsM - Rough stony land, Muskingum soil material

**Component:** Gorgas (85%)

*The Gorgas component makes up 85 percent of the map unit. Slopes are 20 to 45 percent. This component is on hillslopes. The parent material consists of sandy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.*

---

 **Natural Resources Conservation Service**

Survey Area Version: 6  
Survey Area Version Date: 09/16/2014

 Page 2

Biological Survey for Bledsoe Mine  
 Jackson, County, Alabama  
 Conducted for Perc Engineering

**Figure 5.** Map unit description from Jackson County Soil Survey.

Chemical Soil Properties								
Jackson County, Alabama								
[Absence of an entry indicates that data were not estimated. This report shows only the major soils in each map unit]								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
		<i>in</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>
<b>Hfg:</b>								
Hartsells	0-9	---	0.5-3.2	3.6 - 5.5	0	0	0.0	0
	9-30	---	1.5-6.0	3.6 - 5.5	0	0	0.0	0
	30-36	---	1.0-5.0	3.6 - 5.5	0	0	0.0	0
	36-80	---	---	---	0	0	0.0	0
<b>Mfi:</b>								
Muskingum, (Gorgas)	0-4	1.0-4.0	---	4.5 - 6.5	0	0	0.0	0
	4-16	---	0.9-3.5	4.5 - 5.5	0	0	0.0	0
	16-80	---	---	---	0	0	0.0	0
<b>Msl:</b>								
Muskingum, (Gorgas)	0-4	1.0-4.0	---	4.5 - 6.5	0	0	0.0	0
	4-16	---	0.9-3.5	4.5 - 5.5	0	0	0.0	0
	16-80	---	---	---	0	0	0.0	0
<b>Msz:</b>								
Muskingum, (Gorgas)	0-4	1.0-4.0	---	4.5 - 6.5	0	0	0.0	0
	4-16	---	0.9-3.5	4.5 - 5.5	0	0	0.0	0
	16-80	---	---	---	0	0	0.0	0
<b>RsM:</b>								
Gorgas	0-4	1.0-4.0	---	4.5 - 6.5	0	0	0.0	0
	4-16	---	0.9-3.5	4.5 - 5.5	0	0	0.0	0
	16-80	---	---	---	0	0	0.0	0

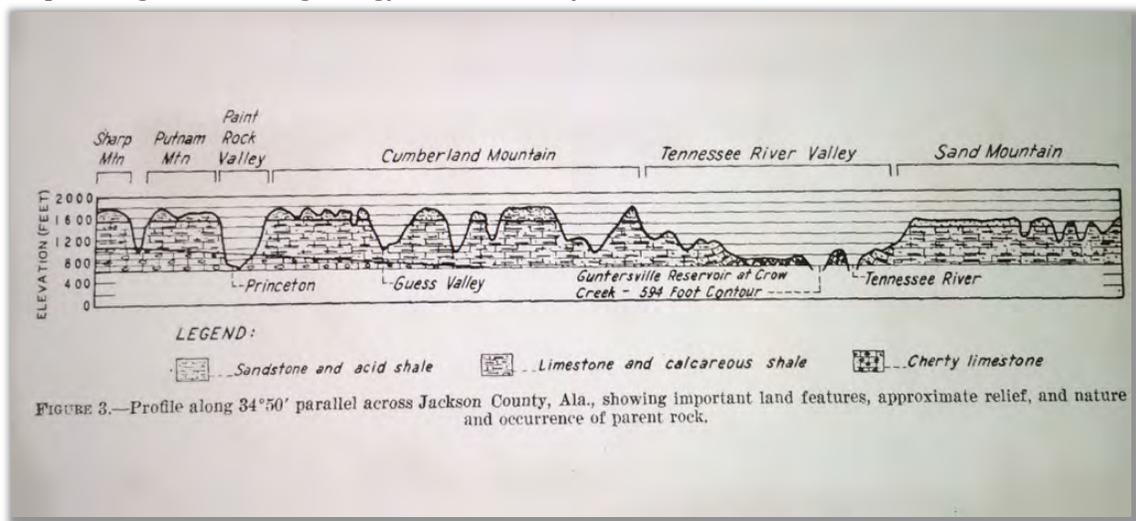
Biological Survey for Bledsoe Mine  
Jackson County, Alabama  
Conducted for Perc Engineering

### Site Findings – Geological

Jackson County Soil Survey of 1954 describes the rocks of the county as sedimentary in origin, being sandstone, shale and limestone. The high plateaus are capped with sandstone about 100-200 feet thick. Underlying the sandstone is a layer of shale about 30 feet thick which is underlain by layers of limestone to a depth of about 600 feet with some inter-bedded clay shale. Sandstone of the Pottsville formation is largely the parent material for the Hartsells, and Muskingum soils. The Bangor limestone formation underlies the Pottsville. When its limestone rocks are exposed on the surface, the weathered material is rapidly removed due to steep slopes and erosion, where it is eventually deposited as a limestone (alkaline) component in the alluvium of the valleys.

Figure 2.

Jackson County Soil Survey, 1954. This illustration from the USDA soil survey gives a simple diagram of the geology of the county.



The Jackson County Soil Survey of 1954, is an official government publication which describes the geology of the county in a general manner by showing a cross section of sandstone and acid shale layer on the higher elevations 1500' – 2000'; below that is limestone and calcareous shale from 1500' sloping down to 500' to 600'; below that is cherty limestone being from 1100' sloping down to 500'.

During the site visit, I also conducted a simple test on some of the rocks selected from the area in order to determine if they were of limestone or other material. The test consisted of pouring a small amount of 5% acetic acid on the rocks collected. This is a standard field test to determine the presence of limestone. Limestone will react with a bubbling or fizzing on the surface when in contact with the weak to mild acid.

Biological Survey for Bledsoe Mine  
 Jackson, County, Alabama  
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The fact that there was absolutely no reaction of the local rocks to the acid test, indicates that they are not limestone based rocks. All samples were collected above 1500 feet in elevation. With this evidence of no limestone being present on the site and the simple geological diagram showing that limestone rock material is located at a somewhat lower level on the landscape and lower in the geological setting, than the Bledsoe mine, this appears to be evidence that the site is situated above limestone parent rock material.

### Discussion

There is certainly a potential for Price's Potato-bean to be found in Jackson County, as areas of limestone rock exist at certain levels in the geological formations, which weather through the geological process to produce alkaline soils and alkaline deposits at lower levels from the natural erosion process. The Alabama Plant Atlas – Alabama Herbarium Consortium & The University of West Alabama describes the habitat for this plant as calcareous and prairie woods. *Apios priceana* has been documented on at least two locations within Jackson County. At these documented sites, plants have been collected, identified and preserved in a herbarium by trained botanists. One of the sites where it was found was listed as along Little Coon Creek. Another site was only generally described as a rocky limestone forest along with *Quercus muehlenbergii* (Chinkapin oak), which is often found on dry limestone ridges, *Ulmus rubra* (Red elm) which is found in limestone hills and riverbanks. There are also sites where the plant has been documented, such as by a photograph, although the plants have not been collected and vouchered in a herbarium. With the description from one such individual, who has made photos of the plant in flower, I was able to determine its location and thus its habitat. A review of the conditions and locations along with an analysis of the sites of record for Price's Potato-bean in Jackson County is made below.

#### #1. Little Coon Creek

One specimen from Jackson County, is described as being from Little Coon Creek. Little Coon creek is located approximately 7 miles west of the Bledsoe Mine site. It runs through the deeply excised valley below Little Coon Mountain to the west - southwest and an un-named series of ridges to the east – northeast at about 610 – 600 feet in elevation. This area is described in the 1954 USDA Soil Survey (archived at web soil survey.com), as a limestone valley soil. The parent rock in these lower elevations is limestone.

- The Little Coon creek collection was located in an area along the stream (+/- 600' in elevation) with soils developed from weathered rocks above the valley. These limestone and other rocks have weathered and resulted in the stream alluvium being somewhat alkaline. The Bledsoe Mine site is much higher in elevation (1566' and higher) and the limestone rock layer is geologically situated somewhere below the site in elevation (see figure X above). This is born out by the tests conducted on soils around the site, all of which were primarily acidic

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soil pH. The soil survey map shows the area being made up of Hartsells, Muskingum and Gorgas soil types (Figure 1). The soil map unit description of these soils indicates their parent material is sandstone. Soil Chemical Properties of these soils indicate that their soil reaction, pH at the 0"-9" depth is generally within the acidic range of 3.5-5.5 for Hartsells, 4.5-5.5 or 6.5 depending upon depth for Muskingum and 4.5-6.5 for Gorgas.

- Additional tests of rocks on the site produced no reaction when the acetic acid test was applied. A magnifying glass was used to insure no small amount of reaction was caused. No fizzing or bubbling of any kind was observed when rocks from the Bledsoe Mine site were tested. Alternatively, tests conducted upon gravel from Vulcan Materials, Tuscumbia pit in Colbert County, Alabama, produced a strong bubbling and fizzing reaction. This was limestone gravel.

#### #2. Un-described Location in Jackson County

The location of the other documented and preserved specimen, collected by Al Shotz, from Jackson County was only described by the vegetative associates of the plant. These included *Quercus muehlenbergii* (Chinkapin oak), *Quercus shumardii* (Shumards oak), *Fraxinus americana* (white ash) and *Ulmus rubra* (slippery elm).

- The Alabama Forestry Commission describes the chinkapin oak as a tree, which is found in many of Alabama's counties. It is reported mostly from habitats in limestone outcroppings, limestone slopes or on dry limestone ridges.
- The shumard oak is found throughout the state, although it is generally confined to habitats of moist bottomlands and moist soils.
- *Fraxinus americana* or the white ash is widely distributed across the state. It is most commonly found in moist fertile soils along streams.
- *Ulmus rubra* or slippery elm is confined mostly to the northern half of the state of Alabama. The habitat for this tree is typically along stream banks and it thrives in limestone outcrops.
- This un-disclosed location was apparently made from along a stream within limestone – alkaline alluvium or along a stream at a slightly higher elevation with similar conditions. This determination is based upon the vegetative associates listed as occurring nearby, in that these plants listed above are either alkaline loving and or moist soil loving plant associates. The elevation of the site was not noted.

Biological Survey for Bledsoe Mine  
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- None of these species was observed on the Bledsoe Mine site. This could certainly be due to the fact that the soils found there are more acidic than the plants associated with Price's Potato-bean prefer and also that the site is more acidic in nature than that where Price's Potato-bean is found. These soils were apparently not developed from any limestone parent material and thus are primarily acidic.

#3. Photo of Price's Potato-bean – Personal Communication

I located a very knowledgeable photographer that works with a government agency, who had a personal photo of Price's Potato-bean from Jackson County. I inquired of the location where the photo was made. He was very familiar with the area and described the site as along a road near Sauta Cave, which is about 6 miles west of Scottsboro and just west of North Sauty Wildlife Management Area. The site was at an elevation of 600 to 700 feet, which is within the similar geologic setting and location as the previously described locations so as to have been found in soils, which have been heavily influenced by the limestone parent material.

**Conclusions**

Price's Potato-bean (*Apios priceana*) is a plant with very specific habitat requirements. Although it can grow within a fairly wide range of soil pH's, it is most often found naturally in areas with at least slight to moderate alkaline soils. This is based upon the collections housed in herbariums, the documentation utilized in listing the species under the Endangered Species Act, within the Recovery Plan, by personal experience and from conversations with botanists who have worked with it. It's exact habitat and vegetative associates vary somewhat across the state. The habitat conditions of Jackson County vary greatly from those of the Blackbelt in Dallas County.

The common element in the vast majority of those natural occurrences of Price's Potato-bean is some level of alkaline soils. To have alkaline soils, they are most often developed from a limestone based parent material. This could be from the Bangor limestone in the Tennessee Valley or it could be from the Selma Chalk in the Blackbelt. These weathered alkaline elements may directly be a part of the soil structure or influence it by moving particles away from the parent material by erosion processes.

- The Bledsoe Mine site is located within an area, which is above 1500 feet in elevation. Based upon the simple geological diagram from the USDA Soils Conservation Service's Soil Survey of 1954, the presence of limestone parent material would occur at a much lower level in the geological formation;
- Current USDA NRCS Soil Survey maps for the site indicate soil series that are acidic in nature. The simple tests I conducted upon soils found all around the Bledsoe Mine site, indicate a more acid soil and the site appears to not have the presence of alkaline soils;

Biological Survey for Bledsoe Mine  
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- The tests conducted upon rocks from the area do not indicate presence of a limestone parent material on the site;
- The vegetative associates on the site do not appear to be those commonly found with the plant in Jackson County or elsewhere. Plants found on the Bledsoe Mine site are those typically found in the acidic range of soils, not alkaline.

***Thus, based upon these very strong indicators of soils, geology and vegetative associates, the evidence of potential for the presence of Price's Potato-bean on this site would be extremely remote to non-existent.***

---

This biological survey was conducted by Wildlife Biologist, Tom Counts, of Conservation Services of Alabama, LLC. All observations contained herein are based upon over 25 years experience in conducting field level biological surveys. The surveys were conducted within the area designated by PERC Engineering as the permit boundary of the Bledsoe Mine. This survey reflects the conditions of the area on March 16, 2015.

*/s/ Tom Counts*

March 21, 2015

Tom Counts

Wildlife Biologist

Conservation Services of Alabama, LLC  
2724 Hawk Pride Mountain Road  
Tuscumbia, AL 35674

Biological Survey for Bledsoe Mine  
Jackson, County, Alabama  
Conducted for Perc Engineering

Background of the Author / Field Investigator

Tom U. Counts is a Wildlife Biologist and co-owner of Conservation Services of Alabama, LLC (2010 – 2015). He graduated from Auburn University, in Auburn, Alabama with a B.S. in Wildlife Management in 1977. Since that time he has had over 32 years of natural resource management with the Tennessee Valley Authority, U.S.D.A. Natural Resources Conservation Service (State Staff Wildlife Biologist) and the U.S. Forest Service (District Wildlife Biologist). He holds a Native Endangered Species Recovery Permit for Indiana and Gray bats from the U.S. Fish and Wildlife Service as well as State of Alabama License for Federal or State Protected Species Scientific Collections.

As the State Staff Wildlife Biologist (1990-2000) with USDA Natural Resources Conservation Service, he was responsible for training field office personnel to be aware of and to insure agency compliance with the Endangered Species Act of 1973, as amended, for all NRCS operations in the 67 counties of Alabama.

As the District Wildlife Biologist (2000-2010) for the Bankhead Ranger District of the U.S. Forest Service, he conducted surveys for federally listed species (including Price's Potato-bean) as well as Forest Service designated "sensitive" species for 10 years while employed with the US Forest Service. Since that time he has conducted plant surveys on thousands of acres of national forest lands, primarily in the Bankhead National Forest, located in northwest Alabama. While working with USFS, he also participated in a lengthy study and biological survey on Ft. Benning, Georgia.

A population of Price's Potato-bean occurs just off of national forest lands in Lawrence County, so numerous surveys have been conducted that included this species.

Biological Survey for Bledsoe Mine  
Jackson, County, Alabama  
Conducted for Perc Engineering

**Photo 1.**  
**Evidence of past mining uses of the site. Highwall, coal fines and excavations for mine works.**



Biological Survey for Bledsoe Mine  
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Conducted for Perc Engineering

**Photo 2. Current land use of planted loblolly pine plantation and hardwood forest.**



Biological Survey for Bledsoe Mine  
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**Photo 3. Evidence of past mining activity.**



Biological Survey for Bledsoe Mine  
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**Photo 4. Typical sample sites for soil and local rock.**





Biological Survey for Bledsoe Mine  
Jackson, County, Alabama  
Conducted for Perc Engineering

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<http://www.floraofalabama.org/SpecimenDetails.aspx?CollectionID=758607> (Jackson County Collection)  
<http://www.floraofalabama.org/SpecimenDetails.aspx?CollectionID=554472> (Jackson County Collection)

Personal communication with Alan Cressler, photographer. March 20, 2015.

Personal communication with Shannon Allen, Ecologist at Redstone Arsenal. February 27, 2015.

Biological Survey for Bledsoe Mine  
Jackson, County, Alabama  
Conducted for Perc Engineering

End of Document

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

4. If direct or indirect impacts are unavoidable, describe in detail the measures to be used to restore the area to pre-disturbance conditions and to enhance it.

The temporary destruction of small, insignificant, and undetected water holding depressions during mining operations will be restored during the reclamation process by regrading the disturbed area in such a manner as to create small water holding depressions approximately 1/4 acres in size of maximum depth of 2 feet to enhance the area for fish and wildlife.

Approved has been granted by the landowner to leave sediment basins as permanent water impoundments to provide watering for wildlife and fish habitat.

5. Is any disturbance of wetland areas proposed which requires approval of the U.S. Army Corps of Engineers?  
( ) Yes ( X ) No

Approval from the U.S. Army Corps of Engineers is attached.

If Yes, provide necessary written approval.

(b) Endangered/Threatened Species and Critical Habitats:

1. Identify any endangered or threatened plant or animal species or their critical habitat which will be directly or indirectly impacted by the proposed mining operation.

See Attachment II.-A.-2. for Protected Species Habitat Assessment and correspondence from the United States Fish and Wildlife Service.

2. Describe the potential impact on any endangered or threatened plant or animal species or their critical habitat within the proposed permit or adjacent areas.

See Attachment II.-A.-2. for Protected Species Habitat Assessment and correspondence from the United States Fish and Wildlife Service.

3. Describe in detail the measures which will be taken to prevent any adverse impact on any endangered or threatened plant or animal species or adjacent area.

See Attachment II.-A.-2. for Protected Species Habitat Assessment and correspondence from the United States Fish and Wildlife Service.



DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS, NASHVILLE DISTRICT  
WESTERN REGULATORY FIELD OFFICE  
2424 DANVILLE ROAD SW, SUITE N  
DECATUR AL 35603

April 21, 2015

SUBJECT: File No. LRN-2014-00263; Red Mesa Energy, LLC; Bledsoe Mine, Approved Jurisdictional Determination; Widows Creek Watershed, Tennessee River Mile 408.2, Right Bank, North of Stevenson, Jackson County, Alabama

Red Mesa Energy, LLC  
Attn: Mr. Bill Vaughan  
421 Office Park Drive  
Birmingham, Alabama 35223

Dear Mr. Vaughan:

This letter is in regard to your Jurisdictional Determination (JD) Report entitled, "Preliminary Wetlands / Jurisdictional Waters Determination, February 26, 2014", and subsequent addendum entitled, "Preliminary Wetlands / Jurisdictional Waters Review Addendum, January 2, 2015", which document potential waters of the United States on a survey area of approximately 28.26 acres. This project has been assigned File No. LRN-2014-00263, please refer to this number in any future correspondence.

The U.S. Army Corps of Engineers (USACE) has regulatory responsibilities pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Under Section 10, the USACE regulates any work in, or affecting, navigable waters of the U.S. It appears the project area does not include navigable waters of the U.S. and would not be subject to the provisions of Section 10. Under Section 404, the USACE regulates the discharge of dredged and/or fill material into waters of the United States, including wetlands.

After a review of the JD Report and a field inspection on November 4, 2014, an ephemeral stream (S-1), a wetland (W-1), and two man-made depressional open waters (P-1 and P-2), were determined to be geographically isolated and are therefore not Waters of the United States. Enclosed with this letter is an approved jurisdictional determination (AJD) for S-1, W-1, P-1, and P-2. The AJD expires five years from the date of this letter unless specifically revalidated by this office. The AJD is specific to the waters identified as S-1, W-1, P-1, and P-2 as described above and as shown in the enclosed maps labeled as "Figure 1 LRN-2014-00263, USGS Waters Map", and "Figure 2 LRN-2014-00263, Aerial Waters Map".

If you object to this decision, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeals Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this decision you must

-2-

submit a completed RFA form to the Great Lakes and Ohio River Division, Division Office at the following address:

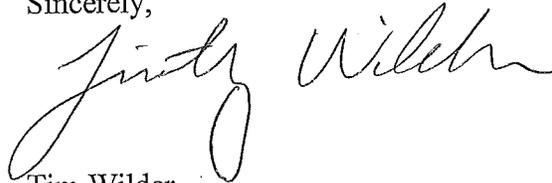
LRD Appeals Officer  
U.S. Army Corps of Engineers  
Great Lakes and Ohio River Division  
550 Main Street, Room 10032  
Cincinnati, OH 45202-3222  
TEL (513) 684-6212; FAX (513) 684-2460

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date listed on the RFA form. **It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.** Please note that this letter does not grant any property rights nor obviate your responsibility to comply with the provisions of any other law or regulation of any other local, state, or federal authority.

Please contact this office if you would like to schedule a pre-application meeting to further discuss alternatives for site development to assist you in avoiding and minimizing impact waters to waters of the United States. If your development plan requires the discharge of material into waters of the U.S., a Department of the Army Permit would be required.

We appreciate your awareness of the USACE regulatory program. If you have any questions, you may contact me or Mr. Eric Sinclair at (256)350-5620 or by e-mail at [william.e.sinclair@usace.army.mil](mailto:william.e.sinclair@usace.army.mil).

Sincerely,



Tim Wilder  
Chief, Western Regulatory Section  
Operations Division

Enclosures:

Approved Jurisdictional Determination Form  
Notification of Appeals Process (NAP) Fact Sheet  
Request for Appeal (RFA) Form  
Site Maps "Figure 1-3 LRN-2014-00263"

Electronic Copy Furnished:

Mr. Michael McConnell, AST Environmental, [mcconnell@astenv.net](mailto:mcconnell@astenv.net)

**APPROVED JURISDICTIONAL DETERMINATION FORM  
U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

**SECTION I: BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):**

**B. DISTRICT OFFICE, FILE NAME, AND NUMBER:** Nashville District, Red Mesa Energy, Bledsoe Mine, LRN-2014-00263,

**C. PROJECT LOCATION AND BACKGROUND INFORMATION:** A 28.26-acre property which may be used for a future coal mining operation, Bledsoe Mine. The same property has historically been used for coal mining operations. Four isolated waters exist within the property, an ephemeral stream (S-1), a wetland (W-1), two man-made depressional open waters (P-1 and P-2).

State: Alabama County/parish/borough: Jackson City: near Stephenson  
Center coordinates of site (lat/long in degree decimal format): Lat. 34.96021° N, Long. -85.84666° W.  
Universal Transverse Mercator: NAD 83

Name of nearest waterbody:

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: N/A isolated

Name of watershed or Hydrologic Unit Code (HUC): 06030001

- Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

**D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

- Office (Desk) Determination. Date: 6 March 2015
- Field Determination. Date(s): 4 November 2014

**SECTION II: SUMMARY OF FINDINGS**

**A. RHA SECTION 10 DETERMINATION OF JURISDICTION.**

There Are no "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

- Waters subject to the ebb and flow of the tide.
  - Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
- Explain:

**B. CWA SECTION 404 DETERMINATION OF JURISDICTION.**

There Are no "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

**1. Waters of the U.S.**

**a. Indicate presence of waters of U.S. in review area (check all that apply):<sup>1</sup>**

- TNWs, including territorial seas
- Wetlands adjacent to TNWs
- Relatively permanent waters<sup>2</sup> (RPWs) that flow directly or indirectly into TNWs
- Non-RPWs that flow directly or indirectly into TNWs
- Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
- Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
- Impoundments of jurisdictional waters
- Isolated (interstate or intrastate) waters, including isolated wetlands

**b. Identify (estimate) size of waters of the U.S. in the review area:**

Non-wetland waters: linear feet: width (ft) and/or acres.

Wetlands: acres.

**c. Limits (boundaries) of jurisdiction based on: Not Applicable.**

Elevation of established OHWM (if known):

**2. Non-regulated waters/wetlands (check if applicable):<sup>3</sup>**

- Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
- Explain:

<sup>1</sup> Boxes checked below shall be supported by completing the appropriate sections in Section III below.

<sup>2</sup> For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

<sup>3</sup> Supporting documentation is presented in Section III.F.

**S-1:** A 574' reach of ephemeral stream located on the property. S-1 flows into a wetland (W-1) that is geographically isolated from waters of the U.S by approximately 450' of uplands.

**W-1:** A 0.157 acre herbaceous wetland area located near the base of an un-reclaimed highwall. W-1 is situated on a site that has been heavily disturbed by previous surface coal mine activities. W-1 receives hydrology from S-1 but is geographically isolated by 450' of disturbed uplands from the nearest waters of the U.S (S-2), an ephemeral stream that flows on the eastern and southern border of the survey area. S-2 is depicted on Figures 1 and 2 of this document.

**P-1:** A 0.193 acre man-made pond. P-1 appears to have been constructed as a sediment pond within an upland area. The drainage patterns and hydrologic connectivity of the site have been severely altered by pre-SMCRA mining. P-1 is geographically isolated since it was dug as a depressional feature below normal contours of the surrounding landscape and has no ordinary outflow. It is separated by approximately 30' of disturbed uplands from the nearest waters of the U.S (S-2). P-1 was previously determined to be an isolated, non-jurisdictional water by the USACE on 27 July 2011. The determination was associated with the Lewis Hollow Mine, Humphrey Mining, LRN-2009-01117.

**P-2:** A 0.046 acre man-made pond. P-2 is a depressional feature located at the base of an unreclaimed highwall. P-2 appears to have been excavated during a previous mining operation within an upland area. The drainage patterns and hydrologic connectivity of the site have been severely altered by pre-SMCRA mining. P-2 is geographically isolated since it was dug as a depressional feature below normal contours of the surrounding landscape and has no outflow. It is separated by approximately 180' of disturbed uplands from the nearest waters of the U.S (S-2). P-2 was previously determined to be an isolated, non-jurisdictional water by the USACE on 27 July 2011. The determination was associated with the Lewis Hollow Mine, Humphrey Mining, LRN-2009-01117.

The four features listed above were examined, including a review of past jurisdictional determinations, maps/plans submitted by the applicant, Corps navigable waters study, USGS Survey Maps, aerial photographs and observations recording during site inspections. The data does not indicate a surface connection or shallow groundwater connection to waters of the U.S. A site visit on 4 November 2014 confirmed that the waterbodies do not have a surface or shallow groundwater connection to waters of the U.S. and are geographically isolated. The waterbodies do not support a link to interstate or foreign commerce. They are not known to be used by interstate or foreign travelers for recreation or other purposes; do not produce fish or shellfish that could be taken and sold in interstate or foreign commerce; and are not known to be used for industrial purposes by industries in interstate commerce. The waterbodies were determined to be non-jurisdictional under the CWA because they lacked links to interstate commerce sufficient to serve as a basis for jurisdiction.

**SECTION III: CWA ANALYSIS****A. TNWs AND WETLANDS ADJACENT TO TNWs**

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

**1. TNW**

Identify TNW:

Summarize rationale supporting determination:

**2. Wetland adjacent to TNW**

Summarize rationale supporting conclusion that wetland is "adjacent":

**B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):**

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody<sup>4</sup> is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

**1. Characteristics of non-TNWs that flow directly or indirectly into TNW****(i) General Area Conditions:**

Watershed size: **Pick List**

Drainage area: **Pick List**

Average annual rainfall: inches

Average annual snowfall: inches

**(ii) Physical Characteristics:****(a) Relationship with TNW:**

Tributary flows directly into TNW.

Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.

Project waters are **Pick List** river miles from RPW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Project waters are **Pick List** aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW<sup>5</sup>:

Tributary stream order, if known:

<sup>4</sup> Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

<sup>5</sup> Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

- Tributary is:  Natural  
 Artificial (man-made). Explain:  
 Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):

Average width: feet  
 Average depth: feet  
 Average side slopes: **Pick List**.

Primary tributary substrate composition (check all that apply):

- |  |  |                                   |
|--|--|-----------------------------------|
| <input type="checkbox"/> Silts           | <input type="checkbox"/> Sands                     | <input type="checkbox"/> Concrete |
| <input type="checkbox"/> Cobbles         | <input type="checkbox"/> Gravel                    | <input type="checkbox"/> Muck     |
| <input type="checkbox"/> Bedrock         | <input type="checkbox"/> Vegetation. Type/% cover: |                                   |
| <input type="checkbox"/> Other. Explain: |  |                                   |

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:

Presence of run/riffle/pool complexes. Explain:

Tributary geometry: **Pick List**

Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**

Estimate average number of flow events in review area/year: **Pick List**

Describe flow regime:

Other information on duration and volume:

Surface flow is: **Pick List**. Characteristics:

Subsurface flow: **Pick List**. Explain findings:

Dye (or other) test performed:

Tributary has (check all that apply):

- |   |   |
|---|---|
| <input type="checkbox"/> Bed and banks  |   |
| <input type="checkbox"/> OHWM <sup>6</sup> (check all indicators that apply): |   |
| <input type="checkbox"/> clear, natural line impressed on the bank            | <input type="checkbox"/> the presence of litter and debris          |
| <input type="checkbox"/> changes in the character of soil                     | <input type="checkbox"/> destruction of terrestrial vegetation      |
| <input type="checkbox"/> shelving   | <input type="checkbox"/> the presence of wrack line                 |
| <input type="checkbox"/> vegetation matted down, bent, or absent              | <input type="checkbox"/> sediment sorting                           |
| <input type="checkbox"/> leaf litter disturbed or washed away                 | <input type="checkbox"/> scour                                      |
| <input type="checkbox"/> sediment deposition                                  | <input type="checkbox"/> multiple observed or predicted flow events |
| <input type="checkbox"/> water staining                                       | <input type="checkbox"/> abrupt change in plant community           |
| <input type="checkbox"/> other (list):  |   |
| <input type="checkbox"/> Discontinuous OHWM. <sup>7</sup> Explain:            |   |

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

- |  |  |
|--|--|
| <input type="checkbox"/> High Tide Line indicated by:              | <input type="checkbox"/> Mean High Water Mark indicated by:            |
| <input type="checkbox"/> oil or scum line along shore objects      | <input type="checkbox"/> survey to available datum;                    |
| <input type="checkbox"/> fine shell or debris deposits (foreshore) | <input type="checkbox"/> physical markings;                            |
| <input type="checkbox"/> physical markings/characteristics         | <input type="checkbox"/> vegetation lines/changes in vegetation types. |
| <input type="checkbox"/> tidal gauges                              |  |
| <input type="checkbox"/> other (list):                             |  |

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain:

Identify specific pollutants, if known:

<sup>6</sup>A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

<sup>7</sup>Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- Riparian corridor. Characteristics (type, average width):
- Wetland fringe. Characteristics:
- Habitat for:
  - Federally Listed species. Explain findings:
  - Fish/spawn areas. Explain findings:
  - Other environmentally-sensitive species. Explain findings:
  - Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size:        acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

- Directly abutting
- Not directly abutting
  - Discrete wetland hydrologic connection. Explain:
  - Ecological connection. Explain:
  - Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List**.

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- Riparian buffer. Characteristics (type, average width):
- Vegetation type/percent cover. Explain:
- Habitat for:
  - Federally Listed species. Explain findings:
  - Fish/spawn areas. Explain findings:
  - Other environmentally-sensitive species. Explain findings:
  - Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately (        ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)      Size (in acres)      Directly abuts? (Y/N)      Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

### C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

**Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:**

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:
2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:
3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

### D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
  - TNWs: linear feet      width (ft), Or,      acres.
  - Wetlands adjacent to TNWs:      acres.
2. **RPWs that flow directly or indirectly into TNWs.**
  - Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
  - Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters:        linear feet        width (ft).
  - Other non-wetland waters:        acres.
- Identify type(s) of waters: .

**3. Non-RPWs<sup>8</sup> that flow directly or indirectly into TNWs.**

- Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

- Tributary waters:        linear feet        width (ft).
  - Other non-wetland waters:        acres.
- Identify type(s) of waters: .

**4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
- Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
- Wetlands directly abutting an RPW where tributaries typically flow “seasonally.” Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area:        acres.

**5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**

- Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area:        acres.

**6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**

- Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area:        acres.

**7. Impoundments of jurisdictional waters.<sup>9</sup>**

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- Demonstrate that impoundment was created from “waters of the U.S.,” or
- Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
- Demonstrate that water is isolated with a nexus to commerce (see E below).

**E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):<sup>10</sup>**

- which are or could be used by interstate or foreign travelers for recreational or other purposes.
- from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- which are or could be used for industrial purposes by industries in interstate commerce.
- Interstate isolated waters. Explain: .
- Other factors. Explain: .

**Identify water body and summarize rationale supporting determination:**

<sup>8</sup>See Footnote # 3.

<sup>9</sup>To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

<sup>10</sup> Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: linear feet width (ft).  
 Other non-wetland waters: acres.  
 Identify type(s) of waters: .  
 Wetlands: acres.

**F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):**

- If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.  
 Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.  
 Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).  
 Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .  
 Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- Non-wetland waters (i.e., rivers, streams): (S-1) 574' ephemeral stream linear feet 3 width (ft).  
 Lakes/ponds: One pond P-1- 0.193 P-2 - 0.046 Total 0.239 acres.  
 Other non-wetland waters: acres. List type of aquatic resource: .  
 Wetlands: W-1- 0.157 acre acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).  
 Lakes/ponds: acres.  
 Other non-wetland waters: acres. List type of aquatic resource: .  
 Wetlands: acres.

**SECTION IV: DATA SOURCES.**

**A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):**

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:  
 Data sheets prepared/submitted by or on behalf of the applicant/consultant.  
 Office concurs with data sheets/delineation report.  
 Office does not concur with data sheets/delineation report.  
 Data sheets prepared by the Corps:  
 Corps navigable waters' study: Nashville District Public Notice #86-23, dated May 1986.  
 U.S. Geological Survey Hydrologic Atlas:  
 USGS NHD data.  
 USGS 8 and 12 digit HUC maps.  
 U.S. Geological Survey map(s). Cite scale & quad name: 1:24,000, Doran Cove, AL.  
 USDA Natural Resources Conservation Service Soil Survey. Citation: Jackson County, AL.  
 National wetlands inventory map(s). Cite name: .  
 State/Local wetland inventory map(s): .  
 FEMA/FIRM maps: .  
 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)  
 Photographs:  Aerial (Name & Date): Google Earth.  
 or  Other (Name & Date): 30 September 2013, 4 November 2014.  
 Previous determination(s). File no. and date of response letter: LRN-2009-01117, 27 July 2011.  
 Applicable/supporting case law:  
 Applicable/supporting scientific literature:  
 Other information (please specify): .

**B. ADDITIONAL COMMENTS TO SUPPORT JD:** Four isolated waters exist within the property, an ephemeral stream (S-1), a wetland (W-1), two man-made depressional open waters (P-1 and P-2). See rationale in Section II. B. 2 .

## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Red Mesa Energy, LLC.		File Number: LRN-2014-00263	Date: 4-21-15
Attached is:		See Section below	
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
	PERMIT DENIAL	C	
<b>X</b>	APPROVED JURISDICTIONAL DETERMINATION	D	
	PRELIMINARY JURISDICTIONAL DETERMINATION	E	

**SECTION I -** The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://usace.army.mil/inet/functions/cw/cecwo/reg> or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**E: PRELIMINARY JURISDICTIONAL DETERMINATION:** You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

**SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

**REASONS FOR APPEAL OR OBJECTIONS:** (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

**ADDITIONAL INFORMATION:** The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

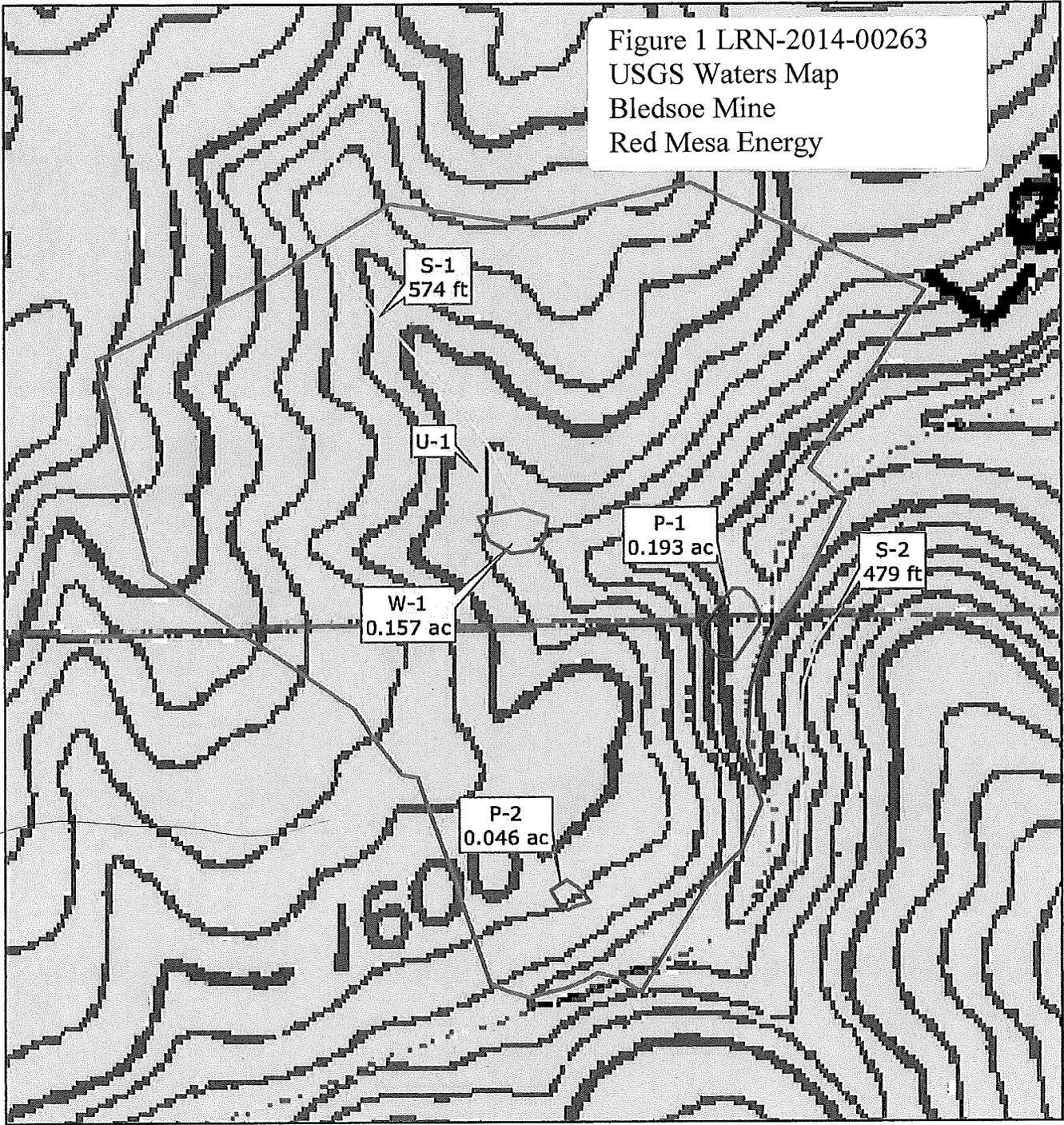
If you have questions regarding this decision and/or the appeal process you may contact:  
 U.S. Army Corps of Engineers  
 Western Regulatory Field Office  
 2424 Danville Rd SW, Suite N  
 Decatur, AL 35603

If you only have questions regarding the appeal process you may also contact:  
 U.S. Army Corps of Engineers  
 Great Lakes and Ohio River Division  
 550 Main Street, Room 10032  
 Cincinnati, OH 45202

**RIGHT OF ENTRY:** Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:
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Figure 1 LRN-2014-00263  
USGS Waters Map  
Bledsoe Mine  
Red Mesa Energy



0 500 1,000 Feet

SCALE = 1 : 3,000

-  Property Boundary
-  Ephemeral Stream
-  Wetland Boundary
-  Pond Boundary
-  Data Point Location

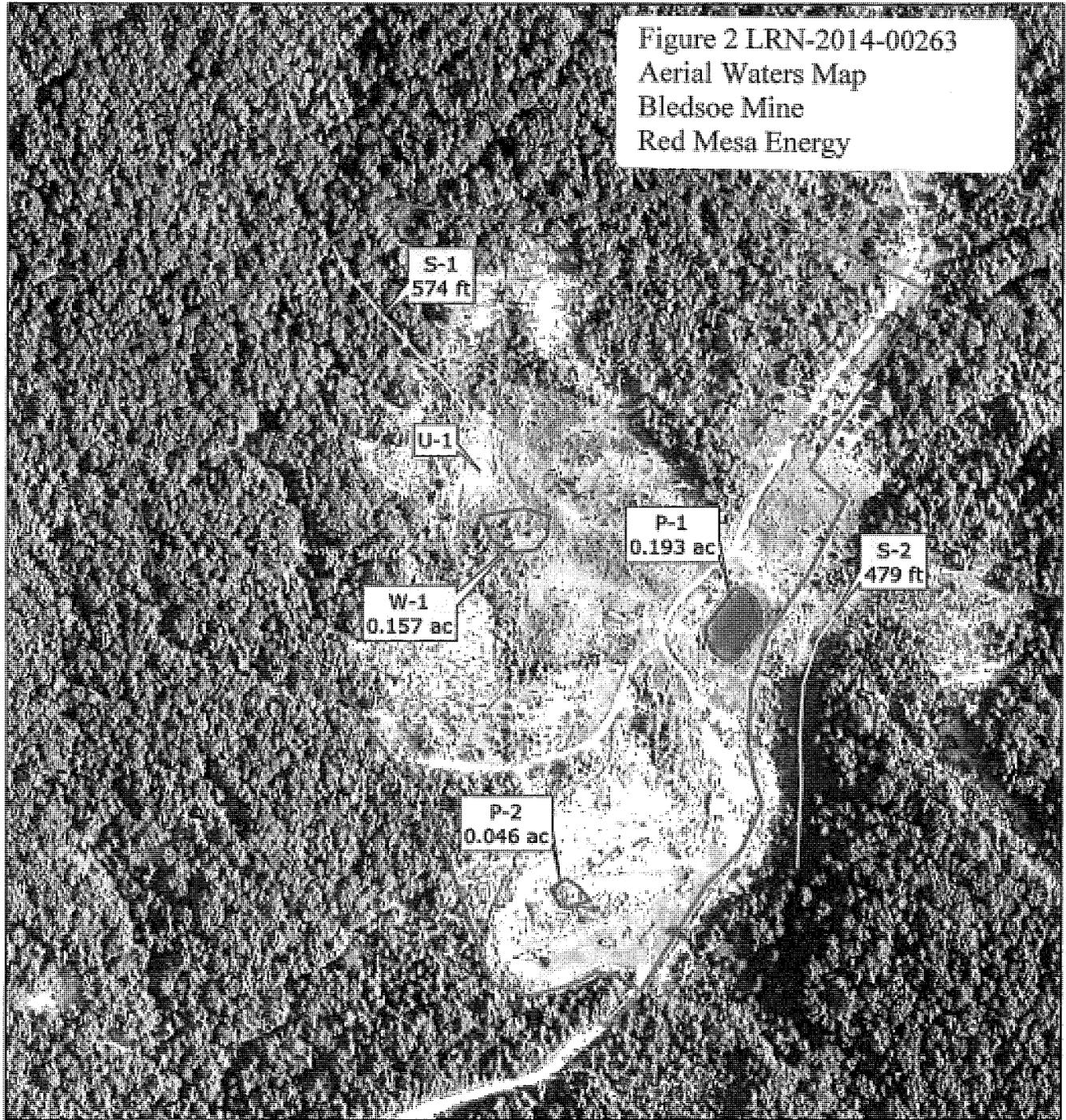


**Red Mesa Energy, LLC. Mine  
SITE ADDENDUM MAP  
Jackson County, AL  
JS13-121**

SOURCE: USGS Topographic Quadrangle  
Doran Cove [NW] Alabama. DOQQ: 2006

**AST** Environmental

Figure 2 LRN-2014-00263  
Aerial Waters Map  
Bledsoe Mine  
Red Mesa Energy



0 500 1,000 Feet

SCALE = 1 : 3,000

-  Property Boundary
-  Ephemeral Stream
-  Wetland Boundary
-  Pond Boundary
-  Data Point Location



Red Mesa Energy, LLC. Mine  
WETLANDS / STREAMS  
ADDENDUM MAP  
Jackson County, AL  
JS13-121

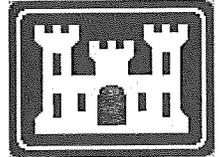
SOURCE: USGS Topographic Quadrangle  
Doran Cove [NW] Alabama. DOQQ: 2006

**AST** Environmental

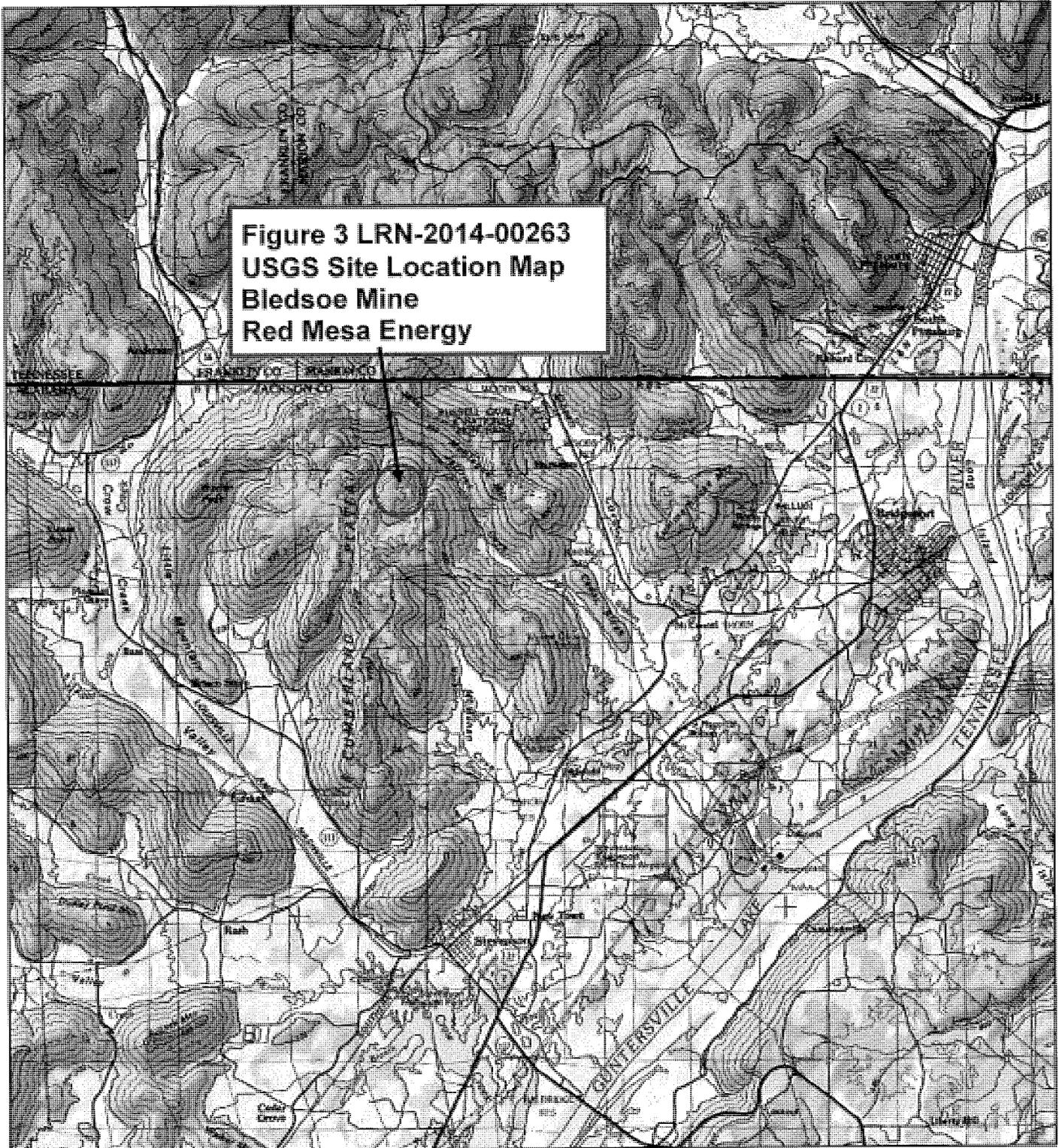


# US Army Corps of Engineers Western Regulatory Field Office

2424 Danville Road SW, Suite N  
Decatur, Alabama 35603  
(256) 350-5620  
(256) 350-5499 fax



**Figure 3 LRN-2014-00263  
USGS Site Location Map  
Bledsoe Mine  
Red Mesa Energy**



Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

(C) Other Areas of Special Concern:

1. Identify the area of special concern:

No other areas of special concern were listed by the USFWS, the DCNR, or the Alabama Heritage Data Base.

2. Describe the potential impact on any other areas of special concern.

No other areas of special concern were listed by the USFWS, the DCNR, or the Alabama Heritage Data Base.

3. Describe in detail the measures which will be taken to prevent any adverse impact on any other areas of special concern or any endangered or threatened plant or animal species or their critical habitat within the proposed permit or adjacent areas.

See Attachment II.-A.-2. for Protected Species Habitat Assessment and correspondence from the United States Fish and Wildlife Service.

No other areas of special concern were listed by the USFWS, the DCNR, or the Alabama Heritage Data Base.

(2) General Provision for Enhancement and Protection of Fish and Wildlife

(a) Describe those measures which will be taken during the active mining phase of the operation to minimize or prevent impacts to fish and wildlife.

As stated earlier, all required buffer zones or setbacks, as set forth in the regulations, will be maintained in order to avoid, protect, and minimize impacts of areas of special concern. Sediment basins will be utilized to maintain water quality standards entering the receiving stream. Diversion ditches will be constructed to control and direct all disturbed runoff through approved sediment basins. Hay dams, silt fences and rock check dams will be used to control minimal offsite drainage, such as haul roads, out slopes of sediment basins, etc., not entering sediment basins. Disturbed areas will be regraded and revegetated in a timely manner, as outlined in Part IV of the permit, to provide fish and wildlife habitat closely resembling premining conditions, where applicable.

(b) Describe the measures to be implemented during the reclamation process to enhance fish and wildlife.

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

1. During reclamation of the permit area, the disturbed area will be regraded in such a manner as to create small water holding depressions approximately 1/4 acre in size of maximum depth of 2 feet to enhance the area for fish and wildlife.
2. All sediment basins, if approved by the ASMC and the land owners, will be left as permanent water impoundments to provide watering for wildlife and fish habitat.
3. Various herbaceous species including, but not limited to, Kobe Lespedeza, Vetch, Sericea Lespedeza, Millet and Ryegrass will be planted in scattered and random locations to provide food and cover for wildlife that closely resemble pre-mining condition. These plants will be added in addition to the vegetation proposed in Part IV of this permit application.
4. The proposed post mining landuse for the permit area consists of unmanaged land with no current use. Areas along drainage courses, areas along the permit boundary, and areas around the proposed water holding depressions to be left in the regrading process will be planted with trees and shrubs, such as willow, loblolly pine, autumn olive, sawtooth oak, etc., in an effort to increase diversity of food and cover for wildlife.

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

If a stream channel diversion is proposed, describe in detail (including maps, diagrams or cross-sections, if necessary) how the provisions of 816.44(d) will be met. Include a copy of all other necessary State or Federal approvals.

None Proposed.

4. Is fish and wildlife habitat to be primary or secondary post-mining landuse? [780.18(b)(5)] ( ) Yes ( X ) No.

If yes, describe in detail the post-mining measures to be taken to attain this land use including the target specie(s) of wildlife, plant species to be used and a map delineating the proposed arrangement of plant groupings and water sources on the permit area following reclamation.

5. If the pre-mining land use is fish and wildlife habitat and the proposed post-mining land use is cropland, describe the post-mining provisions to be made for wildlife. Attach a map showing the location of trees, hedges, or fence rows to be used to diversify habitat types, if appropriate. [780.18(b)(5)]

Not applicable.

6. If the post-mining land use is to be residential, commercial or industrial, describe the post-mining provisions to be made for wildlife such as green belts, trees, or hedgerows composed of plant species useful for wildlife. [780.18(b)(5)]

Not applicable.

7. If any exceptions to Section 816.117(c)(1-3) are proposed, describe in detail the proposed practice including target species of wildlife, plant species to be used, planting rate and/or stocking density, planting pattern with appropriate map and anticipated results of the proposed practice.

None proposed.

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

B. Cultural, Historical and Archaeological Resources

1. Describe and identify any cultural or historical resources located in or adjacent to the proposed permit area which are listed on the National Register of Historic Places. Delineate the location of the resources on the permit map. Describe in detail the measures to be taken to minimize or prevent adverse impacts on the resource(s). (779.12, 780.14, 780.31)

See Attachment II-B.

2. Describe and identify any known significant archaeological sites located in or adjacent to the proposed permit area. The description shall be based on all available information including, but not limited to, data of State and local archaeological agencies. Delineate the site(s) on the permit map. (779.12, 780.14)

See Attachment II-B.

C. Threatened and Endangered Species

Identify any threatened or endangered species of plants or animals or critical habitats of such species located in or adjacent to the proposed permit area. Delineate the location of the specie(s) or habitat(s) on the permit map. (780.14)

See Attachment II.-A.-2.



STATE OF ALABAMA  
ALABAMA HISTORICAL COMMISSION  
468 SOUTH PERRY STREET  
MONTGOMERY, ALABAMA 36130-0900

April 24, 2015

TEL: 334-242-3184

FAX: 334-240-3477

FRANK W. WHITE  
EXECUTIVE DIRECTOR  
R. Evan Parrish  
PERC Engineering, Inc.  
P.O. Box 712  
Jasper, AL 35502

Re: AHC 11-0834  
CRA  
Lewis Hollow Mine  
Jackson County

Dear Mr. Parrish:

Upon review of the cultural resource assessments conducted for the above referenced project, we have determined that project activities will have no adverse effect on cultural resources eligible for or listed on the National Register of Historic Places. Therefore, we concur with the proposed project activities.

However, should artifacts or archaeological features be encountered during project activities, work shall cease and our office shall be consulted immediately. Artifacts are objects made, used or modified by humans. They include but are not excluded to arrowheads, broken pieces of pottery or glass, stone implements, metal fasteners or tools, etc. Archaeological features are stains in the soil that indicate disturbance by human activity. Some examples are post holes, building foundations, trash pits and even human burials. This stipulation shall be placed on the construction plans to insure contractors are aware of it.

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact Stacye Hathorn at 334.230.2649 or [stacye.hathorn@preserveala.org](mailto:stacye.hathorn@preserveala.org). Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

Lee Anne Wofford  
Deputy State Historic Preservation Officer

LAW/SGH/amh



STATE OF ALABAMA  
ALABAMA HISTORICAL COMMISSION  
408 SOUTH PERRY STREET  
MONTGOMERY, ALABAMA 36130-0900

FRANK W. WHITE  
EXECUTIVE DIRECTOR

TEL: 334-242-3184  
FAX: 334-240-3477

July 15, 2011

Heath Franks  
PERC Engineering  
P.O. Box 1712  
Jasper, Alabama 35502-1712

Re: AHC 11-0834  
Cultural Resource Assessment  
Lewis Hollow Mine  
Jackson County, Alabama

Dear Mr. Franks:

Upon review of the cultural resource assessment conducted by the Office of Archaeological Research, we have determined that project activities will have no adverse effect on cultural resources eligible for or listed on the National Register of Historic Places. Therefore, we concur with the proposed project activities. However, should artifacts or archaeological features be encountered during project activities, work shall cease and our office shall be consulted immediately.

We appreciate your efforts on this project. Should you have any questions, please contact Greg Rhinehart at (334) 230-2662. Please have the AHC tracking number referenced above available and include it with any correspondence.

Truly yours,

A handwritten signature in cursive script that reads "Elizabeth Ann Brown".

Elizabeth Ann Brown  
Deputy State Historic Preservation Officer

EAB/GCR/gcr

University of Alabama Museums  
Office of Archaeological Research

June 29, 2011



Mr. Heath Franks  
PERC Engineering, Inc.  
P.O. Box 1712  
Jasper, Alabama 35502-1712

**OAR PROJECT NUMBER: 11-168**

Dear Mr. Franks:

Please find enclosed for your company a copy of our recent report entitled "A Phase I Cultural Resources Reconnaissance of the Proposed Lewis Hollow Mine, Jackson County, Alabama", by Karen L. Hawsey of our staff. Please note that SHPO has 30 days to comment on our findings.

It has been a pleasure to be of service to PERC Engineering, Inc. Please feel free to call for further information or services.

Sincerely,

A handwritten signature in cursive script that reads "Eugene Futato".

Eugene M. Futato/Deputy Director  
The University of Alabama  
Office of Archaeological Research

EMF:tkw  
FILE:2009-10SURVEY.FCL/I

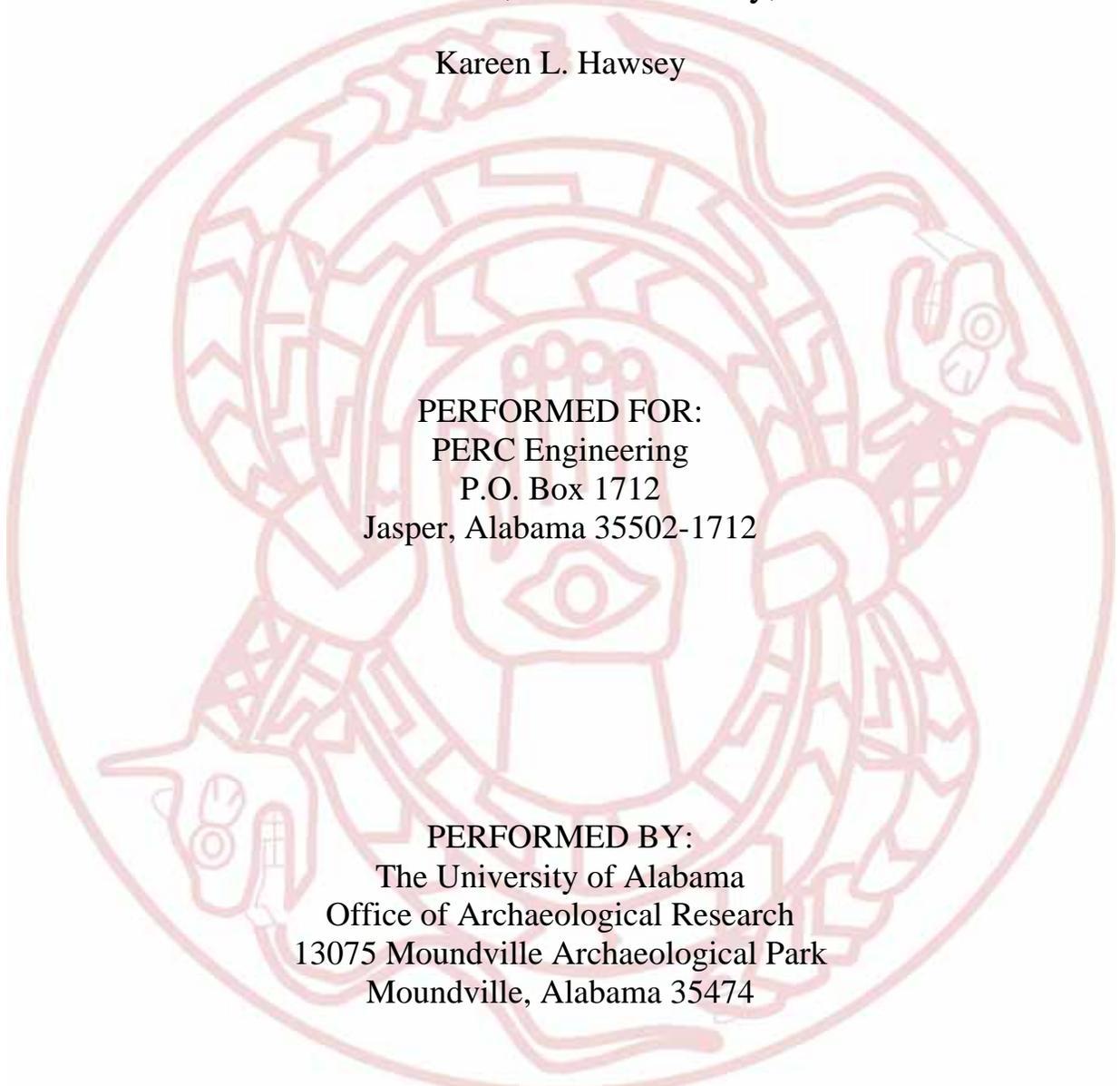
Enclosures: Survey Report  
Invoice for Professional Services

Copy of Survey Report to:

Alabama Historical Commission  
Attn: Stacey Hathorn

# A Phase I Cultural Resources Reconnaissance of the Proposed Lewis Hollow Mine, Jackson County, Alabama

Kareen L. Hawsey



PERFORMED FOR:  
PERC Engineering  
P.O. Box 1712  
Jasper, Alabama 35502-1712

PERFORMED BY:  
The University of Alabama  
Office of Archaeological Research  
13075 Moundville Archaeological Park  
Moundville, Alabama 35474

JUNE 2011

**OFFICE OF ARCHAEOLOGICAL RESEARCH**

*The University of Alabama*

*University of Alabama Museums  
13075 Mound State Parkway  
Moundville, Alabama 35474*

University of Alabama Museums  
Office of Archaeological Research

THE UNIVERSITY OF  
**ALABAMA**  
MUSEUMS

June 29, 2011

A Phase I Cultural Resources Reconnaissance of the Proposed Lewis Hollow  
Mine, Jackson County, Alabama

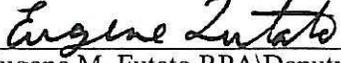
**OAR PROJECT NUMBER: 11-168**

PERFORMED FOR: PERC Engineering  
P.O. Box 1712  
Jasper, Alabama 35502-1712  
Attn: Heath Franks

PERFORMED BY: Karen L. Hawsey, Cultural Resources Technician  
Donald L. Brown, Cultural Resources Assistant  
The University of Alabama  
Office of Archaeological Research  
13075 Moundville Archaeological Park  
Moundville, Alabama 35474

DATE PERFORMED: June 21-23, 2011

  
\_\_\_\_\_  
Karen L. Hawsey  
Cultural Resources Technician  
Office of Archaeological Research

  
\_\_\_\_\_  
Eugene M. Futato RPA\Deputy Director  
The University of Alabama  
Office of Archaeological Research

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*A Phase I Cultural Resources Reconnaissance of the Proposed  
Lewis Hollow Mine, Jackson County, Alabama*

Kareen L. Hawsey

*Introduction*

The University of Alabama, Office of Archaeological Research (OAR) was contracted by PERC Engineering, Inc. to perform a cultural resources reconnaissance survey of the Humphrey Mining Company's proposed ±271 acre Lewis Hollow Mine and associated access roads in Jackson County, Alabama. Kareen L. Hawsey (Cultural Resources Technician), assisted by Donald L. Brown (Cultural Resources Assistant), conducted the survey on June 21-23, 2011 to locate and identify any archaeological sites or historic standing structures. The Principal Investigator for the survey is Eugene M. Futato, Deputy Director of OAR.

The research design of the Phase I survey is to locate and identify any archaeological sites or historic standing structures within the project boundaries, assess their archaeological significance and provide recommendations with regard to guidelines set forth by the *National Register of Historic Places*.

The project area is an approximate 271 acre (110 ha) irregularly shaped tract and approximately 3.5 mi of proposed access roads located in Sections 12, 13, 14, 23, 26, and 27, T1S, R7E of the USGS 7.5' Doran Cove, Alabama and Eureka, Alabama topographic quadrangles (Figure 1). The project area lies along the Cumberland Plateau near the southwestern portion of Lewis Hollow. Proposed access roads enter the project area from the south, west, and southwest, converging to the southwest of the main project area and following a general southwesterly track. The south portion of the proposed main access road lies to the west of Gin Hollow and terminates at County Road 171. The area is currently covered in mixed hardwoods, pines, and secondary growth. The topography of the survey area consists of narrow ridge crests and ridge spurs which slope steeply to narrow drainages.

*Environmental Setting*

The project area is located in the Jackson County Mountains District of the Cumberland Plateau physiographic section. The State of Alabama Geological Survey (Sapp and Emplainscourt 1975) characterizes the Jackson County Mountains District as a "submaturely dissected plateau of high relief characterized by mesa-like sandstone remnants above limestone lowland."

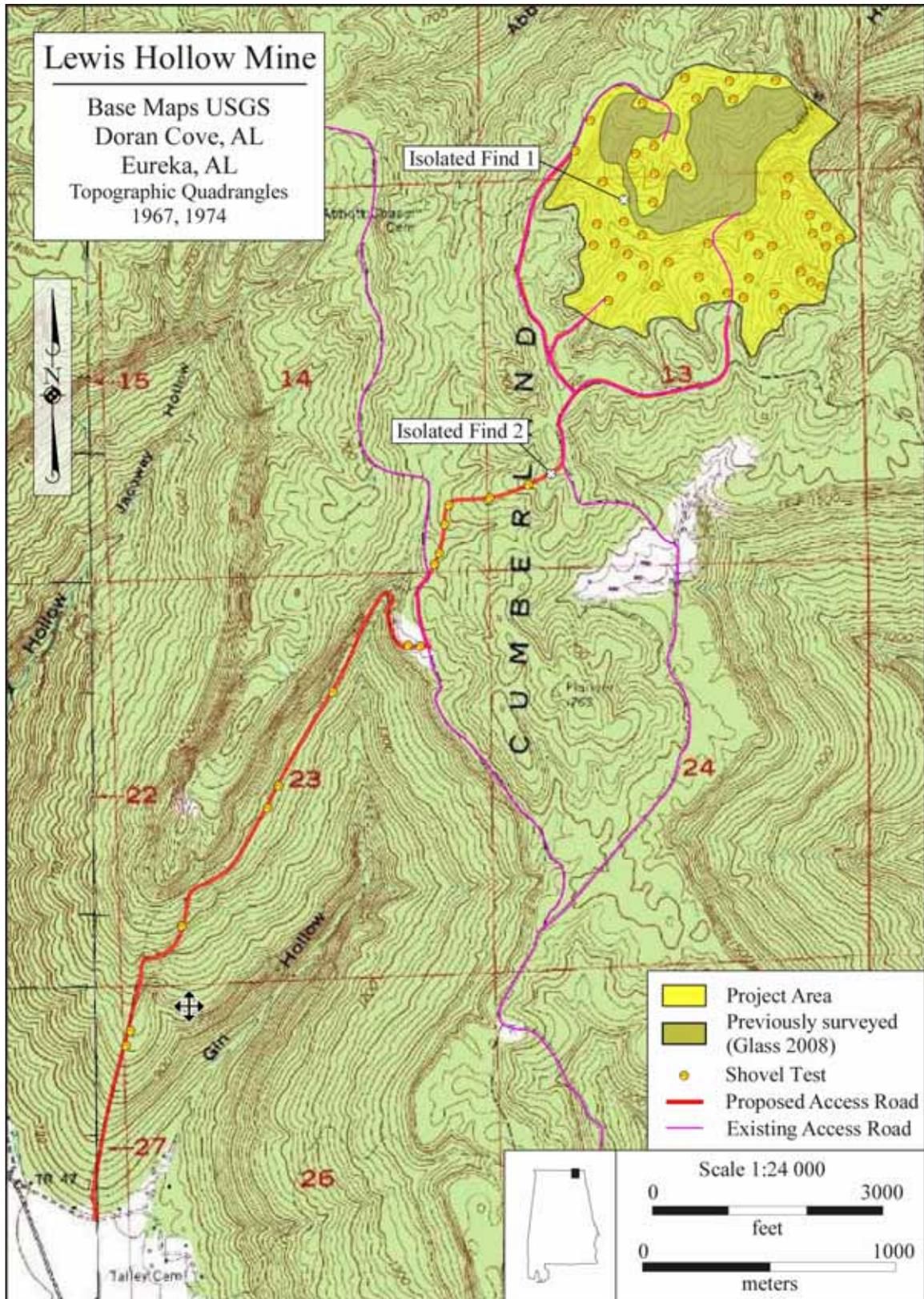


Figure 1. Location of the project area and associated proposed access roads.

Soil information has been derived from the United States Department of Agriculture's Natural Resources Conservation Service website (SSS 2008). It indicates that the following five soil mapping units are found in the project area (Figure 2):

*Hartsells fine sandy loam, rolling, shallow phase:* This well-drained soil, formed in loamy residuum weathered from sandstone, is found on upper hillsides with slopes ranging from 5 to 10 percent. Typical soil profiles consist of 5 inches of dark grayish brown fine sandy loam underlain by 4 inches of brown fine sandy loam, beneath which is yellowish brown loam subsoil. Cotton and corn are the major crops for this soil, but much is forested.

*Jefferson fine sandy loam, undulating phase:* This well-drained soil, formed in loamy colluvium derived from sandstone and shale, is located in stream terraces. Typical soil profiles consist of 3 inches of dark grayish brown gravelly silt loam underlain by 6 inches of yellowish brown gravelly silt loam, beneath which is yellowish brown silt loam subsoil. Most acreage is in forest.

*Limestone rockland rough:* This well-drained soil, formed in residuum weathered from limestone, is found on hillsides with slopes ranging from 25 to 40 percent. Much of the ground surface is covered with cobbles, stones, or boulders.

*Muskingum stony fine sandy loam, steep phase:* This well-drained soil, formed in loamy residuum weathered from sandstone, is found on hillsides with slopes ranging from 20 to 45 percent. Typical soil profiles consist of 4 inches of dark grayish brown channery silt loam underlain by yellowish brown channery silt loam subsoil. Most areas are in mixed forests, but gentler slopes can be used for growing corn, wheat, and hay.

*Rough stony land, Muskingum soil material:* This well-drained soil, formed in sandy residuum weathered from sandstone, is found on hillsides with slopes ranging from 20 to 45 percent. Much of the ground surface is covered with cobbles, stones, or boulders.

### *Literature and Document Search*

The literature and document search included an inspection of the Alabama State Site File (ASSF) for previously listed archaeological sites within the general area of the project. There are no sites listed within the project area and no sites within a one mile radius of the project area. The National Register of Historic Places (NRHP) and related supplements, including the Alabama Tapestry of Historic Places and the Alabama Register of Landmarks and Heritage, list no properties within or near the project area. The 1911 and 1941 Jackson County, Alabama soil maps show no structures within the project area. Finally, the National Archaeological Database Bibliography (NADB), housed at OAR, shows that one cultural resources survey has been conducted within the proposed project area. TARE, Inc. contracted Panamerican Consultants, Inc. (Glass 2008) to conduct a survey of the Lewis Hollow Mine, which encompasses approximately 62 acres of the present survey area (Figure 1). No cultural resources were located during those investigations.

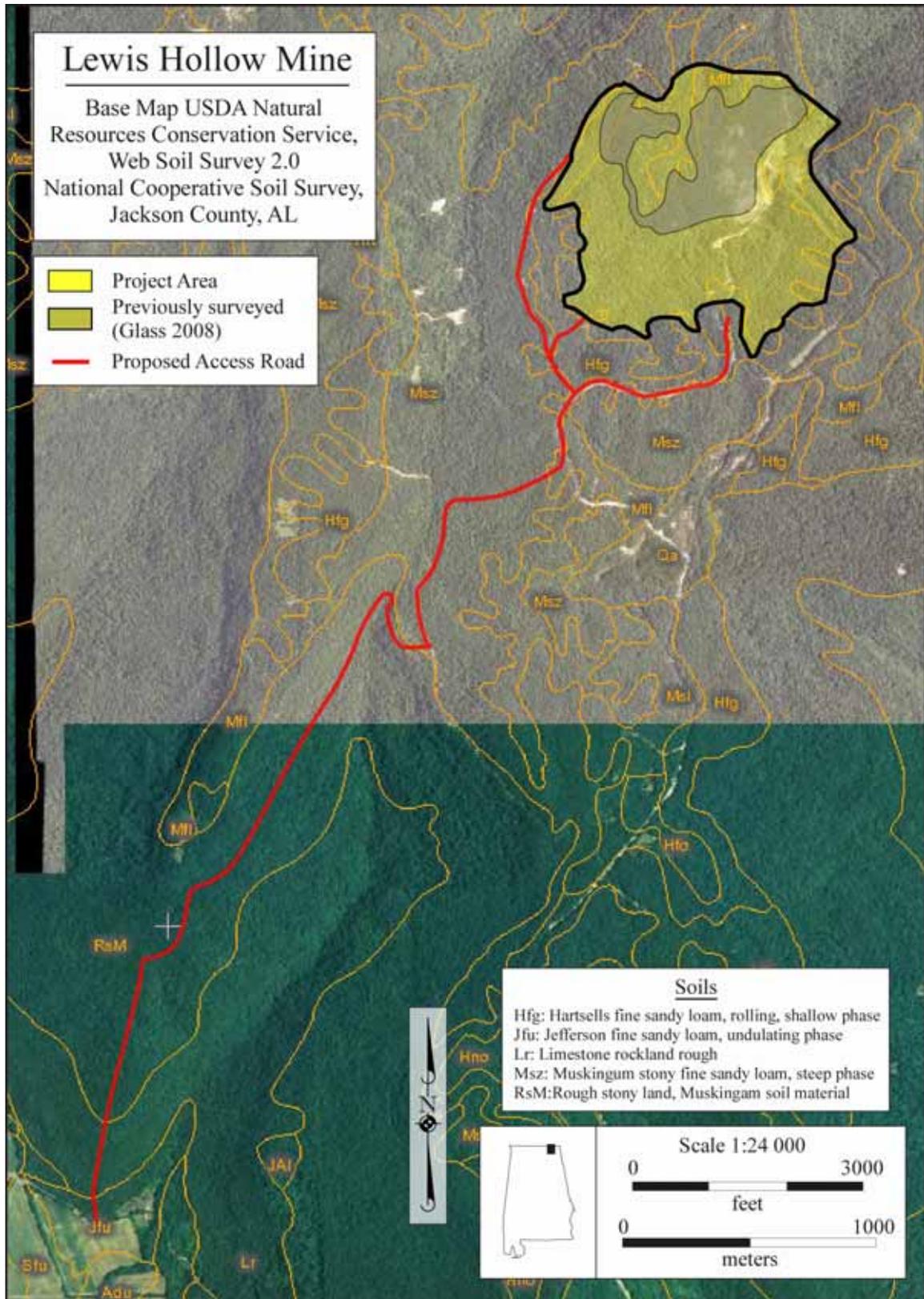


Figure 2. Soil map of the project area.

### *Field Methods*

Field investigations consisted of a pedestrian walkover employing visual inspection of exposed surface areas and subsurface shovel testing, consisting of the excavation of 60 shovel tests (Figure 1). Investigations were conducted by a two-person crew. As required in the state of Alabama, shovel tests had a minimum diameter of 30 cm and were excavated to sterile subsoil (Figure 3). All excavated soils were screened through 6 mm (¼ in) mesh screen in an effort to locate cultural materials. Soil profiles were recorded in each shovel test noting soil colors, soil textures and depths of soil texture/color changes.

Where soil was visible at the surface, initial investigations consisted of ground surface inspection. The locations included bare soil exposures along natural slopes, drainages, road surfaces, trails, and erosional surfaces. However, most land within the survey boundary had limited surface visibility.

Where visibility of the soil surface was limited, shovel tests were excavated at 30 m intervals in those areas with a high probability of containing archaeological sites. Such high probability areas were very limited in extent and consisted of landforms with relatively level settings (areas of <10% slope) and those settings showing an absence of disturbance from erosion that has removed soil surface horizons. Lower probability areas were sampled at greater intervals ranging from 60 m to 100 m. Slopes greater than 20% were only visually inspected. Steep terrain is evident in the majority of the survey area. Shovel test intervals in these areas exceeded the 60 m spacing and in some cases was curtailed altogether due to lack of surface soil horizons. Frequently inundated, lowlying, and wet areas with hydric soils were not shovel tested, but were walked over and examined for cultural materials.

In some cases, one artifact was recovered in an area and therefore did not meet the minimal requirement for inclusion on the ASSF. These artifacts were designated as *isolated finds* and were assigned chronological number designation. For each isolated find, the area was photographed, and sketch maps and field notes were recorded.

The topography of the project area is made up of narrow ridge crests and their accompanying steep side slopes. Unimproved roads and gravel roads provide access throughout the project area (Figures 4-5). Portions of the project area are covered in secondary growth (Figure 6), likely as a result of clearcutting, and portions are covered in hardwoods and secondary growth (Figure 7). Ridgetops in the project area are generally severely eroded (Figures 8-9). Steep slopes lie throughout the project area (Figure 10), many of which are made up of large boulders (Figures 11-12). Pushpiles in the project area indicate previous soil disturbances, which likely include timber harvesting (Figures 13-14). These eroded, sloped, and disturbed areas were considered to have low probability of containing archaeological sites due to evident soil disturbances. Very little topsoil remains in the project area due to extensive erosion, both on



Figure 3. Typical shovel test in the project area.



Figure 4. Typical unimproved access road in the project area.



Figure 5. Gravel access road in the project area.



Figure 6. Secondary growth along ridgetops in the project area.



Figure 7. Typical wooded land in the project area.



Figure 8. Typical ridgetop erosion in the project area.



Figure 9. Typical ridgetop erosion in the project area.



Figure 10. Typical slope in the project area.



Figure 11. Typical sloped, rocky areas within the project boundary.



Figure 12. Typical sloped, rocky areas within the project boundary.



Figure 13. Pushpiles in the project area.



Figure 14. Pushpiles in the project area.

ridge crests and on side slopes. The proposed access roads near the proposed mine generally follow existing access roads and are also fairly eroded. However, approximately two miles of the main proposed access road lie in wooded areas along trails (Figures 15-16). The majority of this portion of the proposed road lies along a steep slope (Figure 17) just to the west of Gin Hollow and has very little potential for intact cultural deposits.

The portion of the project area previously surveyed by Glass (2008) (Figure 1) was not re-surveyed, as the methods employed meet the 1996 AHC standards. This area is now heavily disturbed by recent mining operations (Figure 18) and contains at least two tailings ponds.

### *Laboratory Methods and Collection Curation*

All cultural materials recovered during the project were returned to the David L. DeJarnette Laboratory at Moundville Archaeological Park. The artifacts were washed, sorted, and analyzed using standard laboratory methods. All artifacts, photographs, field notes, maps, and documentation pertinent to the survey will be curated at the Erskine Ramsay Archaeological Repository located at Moundville Archaeological Park. This repository meets Department of the Interior curation standards as defined under 36 CFR Part 79 and required by Chapter 460- x -9 of the Administrative Code of Alabama.



Figure 15. Trail along the proposed southern access road.



Figure 16. Trail along the proposed southern access road.



Figure 17. Steep slope along the proposed southern access road.



Figure 18. Previously surveyed and mined area.

### *Isolated Finds*

Two artifacts, representing two Isolated Finds, were recovered that were not associated with any sites (Figure 1). Both isolated finds recovered from the project area were found on exposed ground surfaces, which were systematically walked over and visually inspected for additional cultural material. Shovel tests were excavated at approximate 10 m intervals in all cardinal directions from surface material to determine if subsurface cultural deposits exist in these areas. Subsequent visual inspection and shovel testing in each of these areas failed to result in the recovery of additional cultural material. Isolated Find 1, consisting of one unidentified chipped stone fragment, was recovered along an eroded ridge spur. Isolated Find 2, a Big Sandy projectile point (Figure 19), was recovered near the crest of a ridge along the proposed access road. A listing of these isolated finds can be found in Appendix A.



Figure 19. Isolated Find 2: Big Sandy projectile point.

### *Conclusions and Recommendations*

The University of Alabama, Office of Archaeological Research conducted a Phase I cultural resources survey of the proposed  $\pm 271$  acre Lewis Hollow Mine in Jackson County, Alabama. As stated in the introduction, the cultural resources survey focused on locating and identifying any archaeological sites or historic standing structures within the project boundaries, assessing their archaeological significance, and providing recommendations with regard to guidelines set forth by the *National Register of Historic Places*.

Because of its proximity to water resources, the plentiful food resources this land would have provided, and desirability of ridgetop land, some portions of the survey area likely would have been ideal for prehistoric and historic occupation. However, because the desirable ridgetop land in the survey area has been impacted by road building, ground disturbing activities, and erosion, and because the majority of the survey area is steeply sloped, the likelihood that intact cultural resources exist in the area is extremely low. As a result of the survey, no prehistoric or historic cultural resources were located within the survey area. Therefore, this office recommends a finding of 'no properties' for the survey area.

*References Cited*

Glass, William J.

- 2008 A Phase I Cultural Resources Survey at the Lewis Hollow Mine in Jackson County, Alabama. Report submitted to TARE, Inc., Crossville, Tennessee, by Panamerican Consultants, Inc., Tuscaloosa.

Sapp, C. Daniel, and Jacques Emplaincourt

- 1975 *Physiographic Regions of Alabama*. Map 168. Geological Survey of Alabama, University of Alabama, Tuscaloosa.

*Internet References*

Soil Survey Staff, Natural Resources Conservation Service (SSS)

- 2008 Official Soil Series Descriptions. Electronic document,  
<http://soils.usda.gov/technical/classification/osd/index>, accessed June 20, 2011.

APPENDIX A

Site	Provenience	Group	Category	Subcategory	Comments	Count	Weight
Isolated Find 1	Surface collection	Chipped Stone	Unidentified Chipped Stone	Bangor		1	11.5
Isolated Find 2	Surface collection	Chipped Stone	PP/K, Big Sandy	Ft. Payne	Missing Tip	1	2.7

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

D. Lands Unsuitable For Mining

1. Are there any areas located in or adjacent to the proposed permit area which have been designated unsuitable for mining or are under study for such designation in an administrative proceeding? (778.16)

( ) Yes. ( X ) No.

If yes, give the name(s) of the area(s), if known. Delineate the area(s) on the permit map. (780.14)

2. Describe in detail the measures to be taken to minimize or prevent adverse impacts on any public park. (780.31)

There are no public parks in or adjacent to the permit area.

3. Are request for waivers included in this application? (761.12) ( ) Yes. ( X ) No.

4. Do you claim exemption to this part based upon:

(a) Operations existing on the proposed permit area on August 3, 1977; or

(b) Operations subject to valid existing rights on August 3, 1977; or

(C) Substantial legal and financial commitments made prior to January 4, 1977? [762.13, 778.16(b)]

( ) Yes. ( X ) No.

If yes, give reason(s) for the claim with appropriate documentation.

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

E. Geology (779.13) See Attachment II-E

1. Give a description of the geology within the proposed permit area including, but not limited to, the logs of drill holes, or a description of a highwall, with thicknesses of overburden and coal down to the first aquifer to be affected below the lowest coal seam to be mined to identify acid-forming or toxic-forming zones.
2. Chemical analysis conducted to identify acid-forming or toxic-forming zones shall be made on a representative number of samples of the overburden within the permit area. Sampling of the overburden may be collected at five foot intervals from a lithologic unit or from the entire thickness if the unit is less than 5 feet thick, when the lithology is below the oxidized zone; from the oxidized zone one composite sample shall be collected and analyzed. Samples may be taken from drill holes or from channel samples from a highwall.
3. Analysis of each overburden sample shall be run for total sulfur. If the sulfur content is one percent or greater, it is recommended that additional analysis be run for pyritic sulfur. From a composite sample of each drill hole or channel sample of the highwall, neutralization potential analysis shall be run and the acid-base account calculated using the average of the sulfur content for the sampling location. Results shall be included in the permit application.
4. Total sulfur analysis of the coal seam(s) to be mined shall be run and reported with the permit application.
5. The name, depth, thickness, strike and dip of the coal seam(s) to be mined shall be included in the permit application.
6. Location of the coal crop line(s) within the proposed permit area are to be shown on an appropriate map.
7. All necessary maps and cross-sections needed to support the geologic description shall conform with the requirements of Section 780.10(b).
8. When used to collect information for the permit application, elevations and locations of test borings, core samples or other sample sites shall be provided (topographic map accuracy is adequate).

## ATTACHMENT II-E

### GEOLOGY

The surface disturbance associated with the Red Mesa Energy, LLC. - Bledsoe Mine is located in Sections 12 and 13, Township 1 South, Range 7 East, Jackson County, Alabama, as seen from the 1983 Photorevised Doran Cove and Eureka, Alabama U.S.G.S. 7.5 minute Quadrangles. The surface disturbance associated with this proposed underground mine will occupy approximately 28 acres (See Mine Site Location Map). The proposed recovery area will occupy approximately 853 acres and is located in Sections 11, 12, 13, 14, and 23, Township 1 South, Range 7 East, and Sections 7 and 18, Township 1 South, Range 8 East, all within Jackson County, AL. as seen on the attached Recovery Area Map. The room and pillar method of underground mining will be implemented at the Bledsoe Mine. Direction of development within the recovery area will initially be towards the North and West, however mining will also continue towards the south as shown on the Operations Map for this mine site found in Part III of the ASMC permit.

This site is located in the footprint of, or near, several other pre-law and permanent program permits, such as the Alabama Select, Inc. - Bledsoe Mine No. 1 (ASMC Permit # P-3760), the Midsouth Mining - Stevenson Mine (ASMC Permit # P-3515), the Black Panther - Stevenson Mine (ASMC Permit # P-3429), and the Pioneer Resources - Spenser Coal Underground Mine (A-125, 134 and 138). Many sources of information, including drill data from one or more of the above mentioned permits (DH-1026 drill holes),

exploratory drilling for this permit (EB-drill holes), and drill data taken from a proposed permit which was never permitted with ASMC (HMLH drill holes and monitoring wells) will be utilized in this report.

This site is located within the Plateau Coal Region of the Warrior Coal Field in the Appalachian Plateaus. According to "Depositional Setting 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. According to "Geology of Alabama", Special Report No. 14 of the Geological Survey of Alabama, the Appalachian Plateaus include a number of detached or partly detached high areas, such as Lookout, Blount, and Sand Mountains, and a number of high knobs, mainly in Jackson and Madison Counties. The reference also states "Sand Mountain is the southern continuation of Walden Ridge of Tennessee, and the knobs in Jackson, Madison, and Marshall counties are residual areas of the Cumberland Plateau of Tennessee that have been detached from the main area by stream erosion. These detached flat-topped mountains or plateaus, as they are in fact, and the smaller knobs coincide in general with the areas of Pottsville (Pennsylvanian) rocks of the State outside of the Coosa, Cahaba, and Warrior coal fields. If we disregard the irregularities of the surface brought about by erosion or if we conceive the valleys to be refilled to the level of the mountain tops, there would result a vast upland whose fairly even surface would slope gently and uniformly southward from an altitude at the northern boundary of the State ranging from 1,600 feet on the west in Madison County to 2,000 feet at the north end of Lookout Mountain, to an altitude of 500 feet at the margin of the Coastal Plain in

Tuscaloosa County on the south.”

According to “Report on the Coal Measures of the Plateau Region of Alabama”, from the Geological Survey of Alabama, the Plateau Region of Alabama consists of the high, wide, flat, and plainlike areas of the tops of the Cumberland Mountains, Sand Mountain, Raccoon Mountain, and Lookout Mountain. The reference states that “the Plateau Region is made up entirely of Coal Measures” and “ the plateaus or Coal Measures of these mountains are sharply defined by high abrupt bluffs which cap Sub-carboniferous rocks of the steep mountain sides. These steep mountain sides have usually one or more benches on them. The portions of the different mountains are highest along their edges or rims, next to the anticlinal valleys, and gradually slope and dip in undulations away from these elevated rims. These portions are therefore all broad shallow synclinal troughs or parts of such troughs. Their strata, and so their surfaces in many places, are in long flat waves from northeast to southwest and also from northwest to southeast.” The reference also states that “The Coal Measures of this Plateau Region are made up for the most part of the hard conglomerates near the base of the measures and of the measures under and between these conglomerates.” The upper conglomerate is called the Upper Conglomerate of Safford and consists of sandstone while the lower conglomerate is called either the Lower Conglomerate of Safford, the Millstone Grit, or the Cliff Rock. “These conglomerates give to the Plateau Region not only its distinct outlines, but also its prominence and perhaps even its existence since; but for the hard weather resisting qualities of these rocks the Plateau Region would probably have long since been, for the most part, washed away.” The reference states that the lower of the two conglomerates, in general, is the thicker

and harder of the two, and in many places is well suited for millstones, hence its name Millstone Grit. The reference goes on to say that the Coal Measures below the Millstone Grit have been called the Lower Measures, and the Coal Measures above the Upper Conglomerate of Safford are called the Upper Measures. The reference also states "The Lower Measures of the Plateau Region of Alabama are usually from 40 to 50 feet in thickness though they sometimes swell up to a thickness of 700 feet or more. They have also been called the false measures; improperly so, however, for the reason that they bear in places from one to five coal seams, and have furnished, mainly from one seam, about all of the coal that has ever been taken from the Plateau Region of Alabama and from many localities in Tennessee. The Lower Measures, however, in a general way do become more and more barren towards the southwest, or their coals thin out in this general direction." The reference goes on to relate that the coal seams of the Plateau Region in Alabama, are of variable thickness. They have been seen to bulge out to a thickness of 5 to 6 feet, and within a few feet of these thick pockets to be squeezed out to only a few inches in thickness. "These coals are usually of good quality, but the quality varies with the locality. They are commonly very hard and solid and not very bituminous. Some of them are lamellar in structure, others are cubical. They frequently carry much sulfur or pyrites." The reference also says that there are seams of light gray clay which underlie the seams of the Plateau Region, which at the outcrops are from one to six feet thick, and are fossiliferous with stem and leaf impressions.

According to "Hydrology of Area 21, Eastern Coal Province, Tennessee, Alabama, and Georgia", Water-Resources Investigations Open-File Report 82-679 from the USGS, the

plateau region is underlain by Pennsylvanian sandstone, shale, and coal. This reference states that “Pennsylvanian rocks, which contain the coal beds, cap the extensive uplands and outliers of the Cumberland Plateau in Area 21. These rocks are classified as the Pottsville Formation in Alabama, but for this report the general term Pennsylvanian rocks has been retained. The Pennsylvanian rocks consist chiefly of alternating beds of sandstone, conglomerate, shale, and siltstone with beds of underclay and coal. The coal beds are difficult to correlate regionally. Thickness of the Pennsylvanian rocks ranges from 210 feet at the southern boundary to more than 800 feet on Sand Mountain. The Pennsylvanian rocks capping the Plateau are resistant to both physical and chemical weathering and therefore, the regolith is generally thin. Rocks underlying the Cumberland Plateau at depth are exposed in the Cumberland Plateau escarpment. These exposures show an abrupt change from Pennsylvanian sandstone, shale, and coal above to Mississippian limestone and shale below.”

Locally, the strata which outcrops in the immediate vicinity of the Bledsoe Mine site includes sandstones, shales, and coal associated with the target coal seam for this facility, the Bon Air Seam. Earlier reports on this Coal Seam state that the name of this seam is not very well established. It has also been called the Orme, the Aetna, or the Cliff (Castle Rock) Seam. According to “Hydrology of Area 21, Eastern Coal Province, Tennessee, Alabama, and Georgia”, Water-Resources Investigations Open-File Report 82-679 from the USGS, the Bon Air (Castle Rock) Seam is located stratigraphically between the Underwood Seam and the Dade Seam, and underlies the Lower Conglomerate of Safford, and ranges in thickness from 6 to 48 inches. Within the recovery area, the Bon Air Seam

ranges from approximately 3.5 to 5.5 feet thick (see attached Coal Thickness Isopach Map).

Overburden thickness above the Bon Air Coal Seam ranges from 0 ft. at the cropline to approximately 280 ft. at the deepest point within the proposed recovery area. A description of typical Pottsville Formation strata overlying the target coal seam in this area is shown on the attached Generalized Fence Diagrams A-A' and B-B'.

Drill data has not indicated any faults or other structural features within or adjacent to the proposed Bledsoe Mine site.

Information utilized to describe the orientation, and lithology of the Bledsoe Mine site and adjacent areas include all the drill holes shown on the attached Drill Hole Location Map.

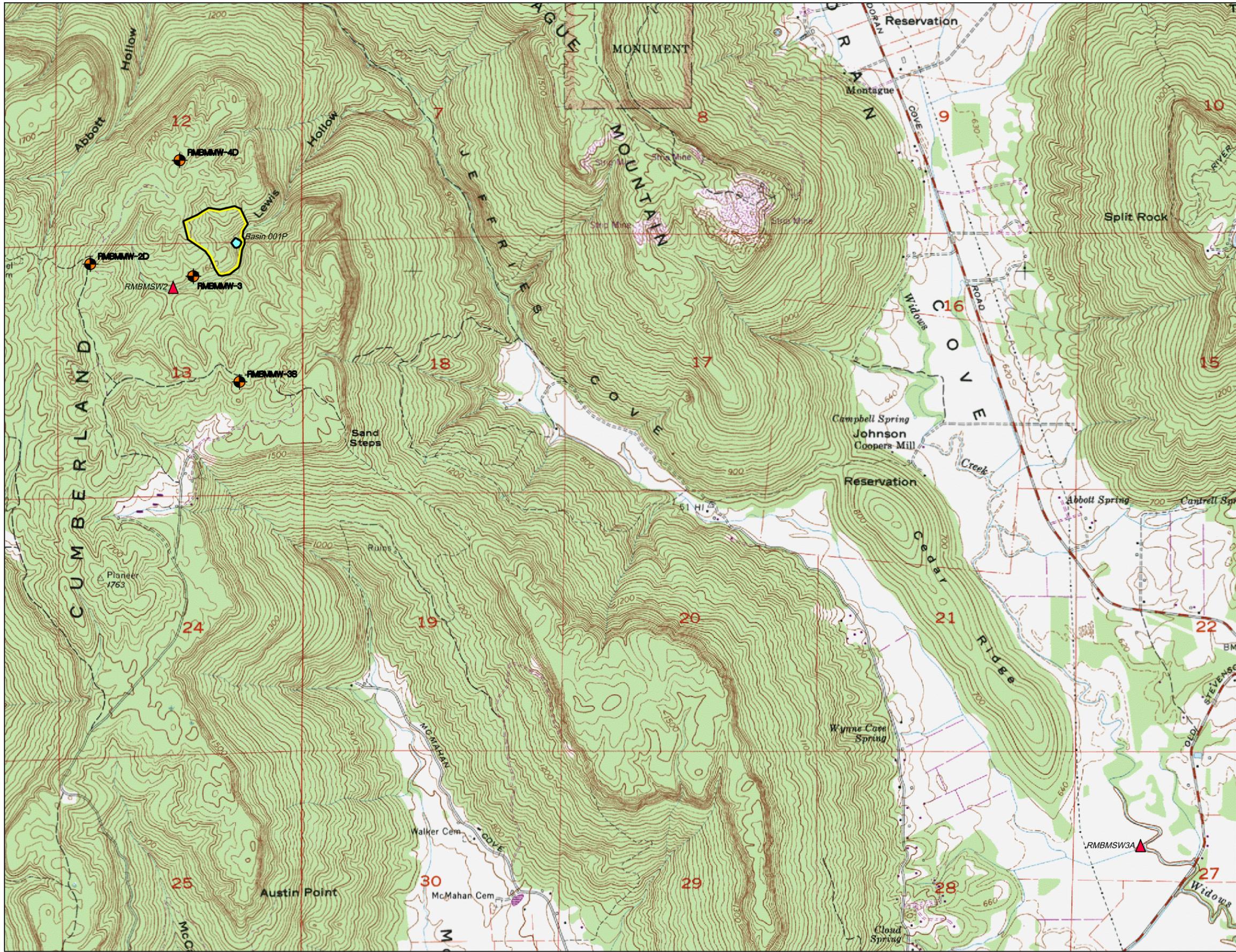
A coal sample from existing underground workings was collected by personnel of Red Mesa Energy, LLC. was sent to and analyzed by Central Testing Laboratory, LLC. (See attached coal sulfur analysis). The total sulfur content of the Bon Air Seam from this sample was analyzed as 0.63 percent on an 'as-received' basis.

Information including location, surface elevation, and depth to the target coal seam in several drill holes were utilized to construct the attached Structure-Contour Map for the Bon Air Seam. This map was constructed to determine the elevation and orientation of the Bon Air Coal Seam within the coal recovery area.

The lithology of MW-3, HMLHMW-4, HMLHOB-4, HMLHDH-2, and HMLHMDH-3, local surface topography from the Doran Cove 1983 Photorevised Alabama U.S.G.S. 7.5 minute Quadrangle, and coal structure taken from the attached Structure-Contour Map for the Bon Air Coal Seam was utilized to construct the attached generalized fence diagrams A-A' and B-B'. The location of the fence diagrams are shown on the Drill Hole Location Map.

The strike and dip of the strata within the proposed permit area is complex due to a local, small scale anticline and low, open folding in the recovery area however, in general, the strike direction is approximately North 74° West and dips toward both the Southwest at approximately 0.57° and the Northeast at approximately 0.94° as shown on the attached Structure-Contour Map.

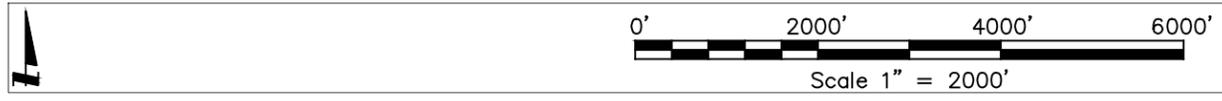
Aquifers encountered which would be affected by mining are discussed in the Determination of the Probable Hydrologic Consequences.



**VICINITY MAP**  
Scale: 1" = 4 Miles

**LEGEND**

	Permit Boundary
	FMBMW-38 Groundwater Monitoring Site
	RMBMSW3A Surfacewater Monitoring Site
	Basin 001P Proposed Sediment Basin



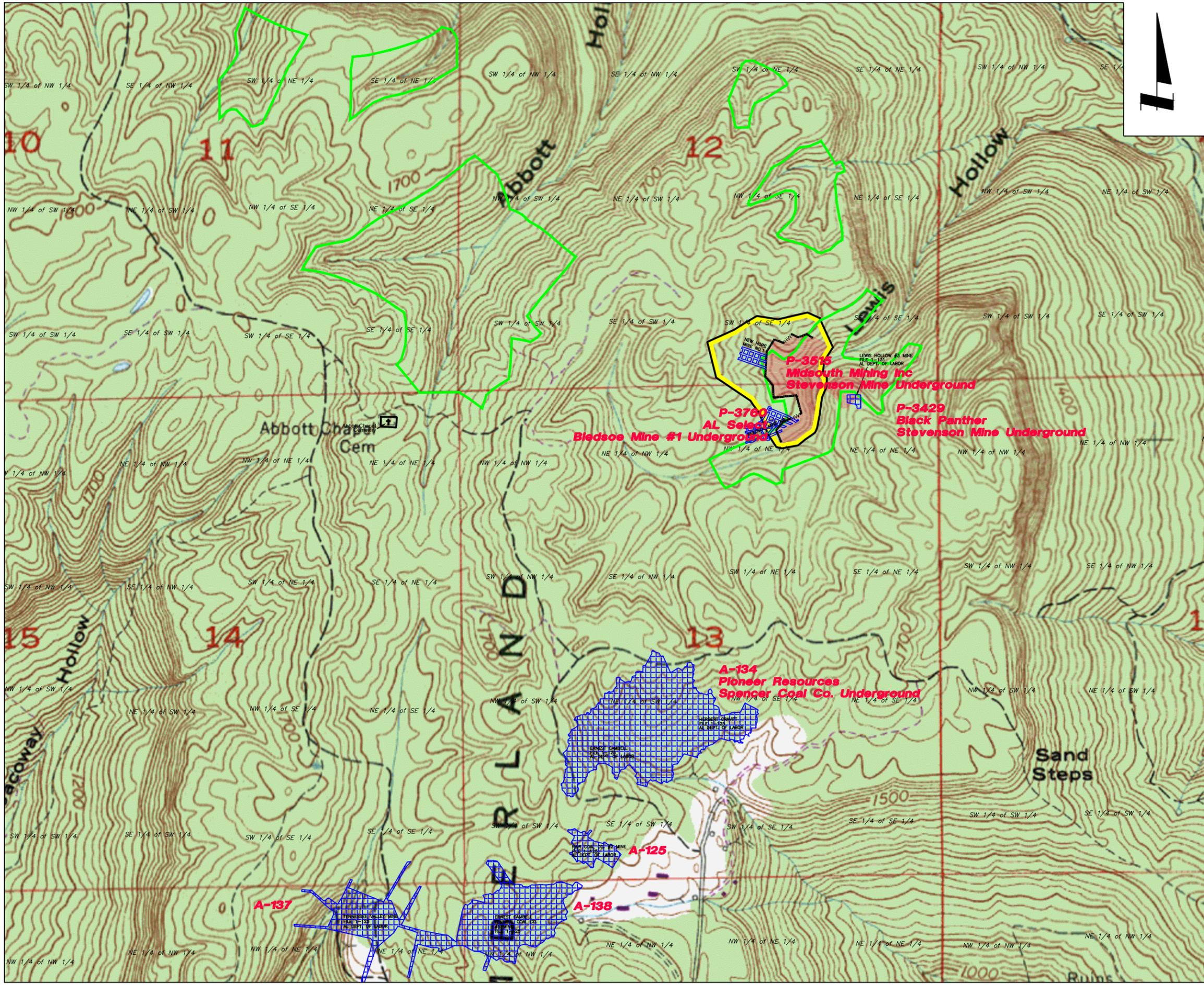
Base map - Doran Cove and Eureka  
Alabama United States Geological  
Survey Quadrangle Maps.

**PERC**  
ENGINEERING CO., INC.  
1606 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502  
(205) 384-5553 Office (205) 296-3114 Fax

**Red Mesa Energy, LLC.**  
**Bledsoe Mine**  
**Site Location Map**

.DWG NAME:	RMBledsoeMine	DATE:	03-06-2015
DRAWN BY:	S.A.E.	SCALE:	1"=2000'
APPROVED BY:	R.E.P.	JOB NUMBER:	14-04482-003

C:\Mining\Red Mesa Bledsoe Mine\RMBledsoeMine.dwg 04/15/15 15:00



VICINITY MAP  
Scale: 1" = 4 Miles

LEGEND	
	Permit Boundary
	Highwall
	Previously Mined (Underground)
	Previously Disturbed
	Black Panther Mining Stevenson Mine (P-3429)

Base map - Doran Cove and Eureka  
Alabama United States Geological  
Survey Quadrangle Maps.

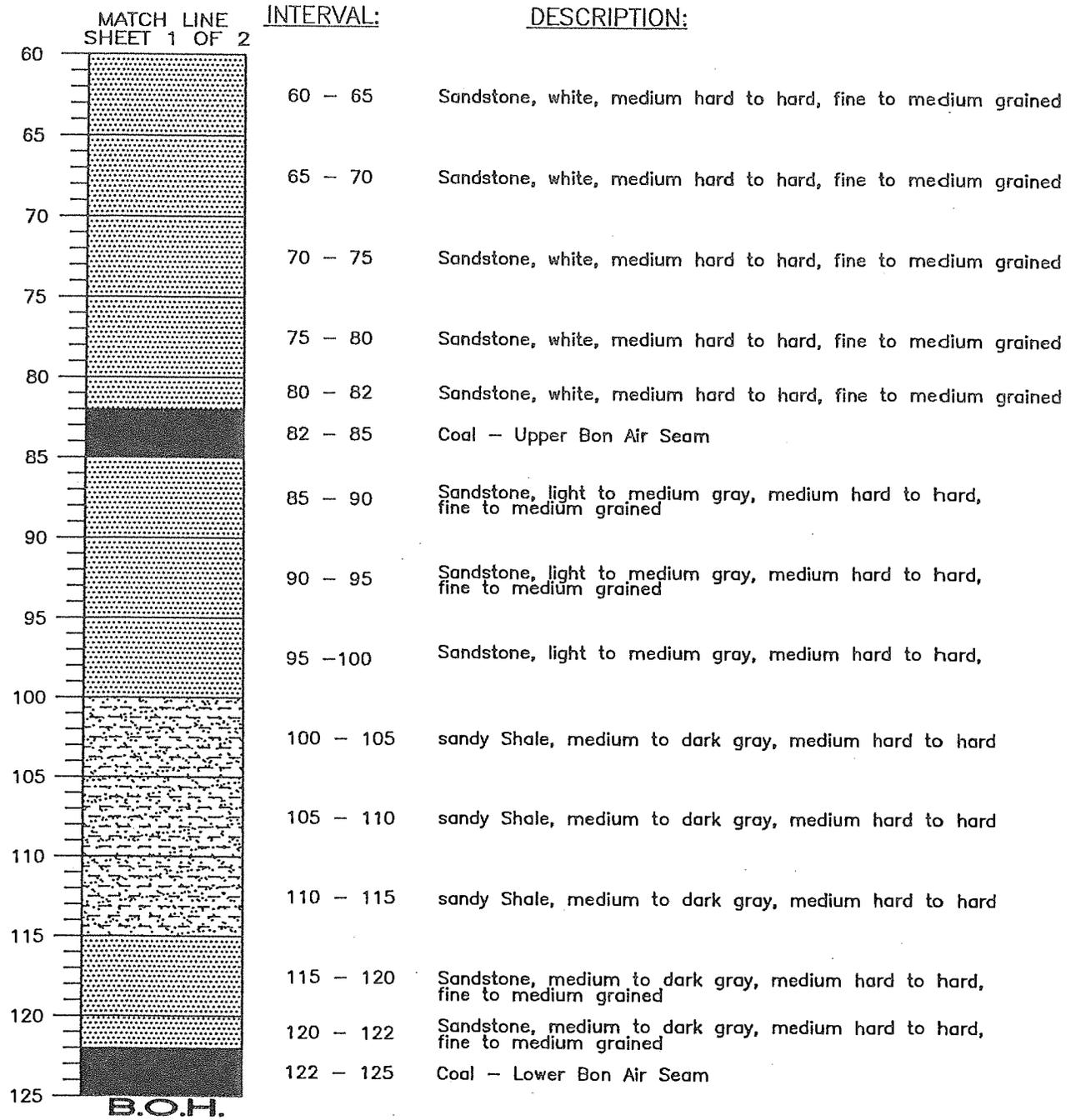
**PERC**  
ENGINEERING CO., INC.  
1806 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502  
(205) 384-5553 Office (205) 296-3114 Fax

**Red Mesa Energy, LLC.**  
**Bledsoe Mine**  
**Previous Mining Map**

DWG NAME:	RMBledsoeMine	DATE:	03-06-2015
DRAWN BY:	S.A.E.	SCALE:	1"=1000'
APPROVED BY:	R.E.P.	JOB NUMBER:	14-04482-003

C:\Mining\Red Mesa Bledsoe Mine\BledsoeMine.dwg 03/10/15 10:12





SHEET 2 OF 2  
 DRILL: ????

SURFACE ELEVATION: ±1644.47 ft. MSL



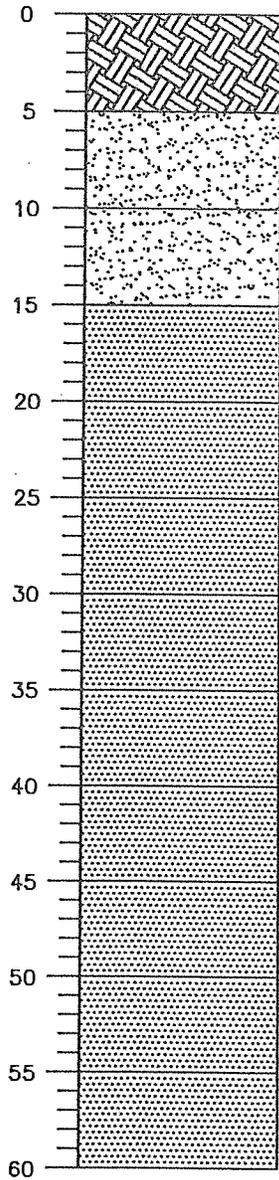
**Humphrey Mining, LLC  
 Lewis Hollow Mine  
 Lithologic Description for  
 HMLHDH-2**

DRAWN BY: JNG	DATE: 3-30-11
DWG. NAME: HMLHMLTH	
APPROVED BY: TST	SCALE: 1" = 10' vertical

V:\local\Cross\venter\_mine\CAD\PERC\HMLTH.dwg 10/20/10 10:13

INTERVAL:

DESCRIPTION:



0 - 5	Surface Material, sand, weathered, light to medium orange
5 - 10	sand, weathered, light to medium orange
10 - 15	sand, weathered, light to medium orange
15 - 20	Sandstone, weathered, light orange, medium hard to hard, fine grained
20 - 25	Sandstone, weathered, light orange, medium hard to hard, fine grained
25 - 30	Sandstone, weathered, light to dark orange, medium hard to hard, fine to medium grained
30 - 35	Sandstone, weathered, light to dark orange, medium hard to hard, fine to medium grained
35 - 40	Sandstone, weathered, light to medium orange, medium hard to hard, fine to medium grained
40 - 45	Sandstone, light gray, medium hard to hard, fine to medium grained
45 - 50	Sandstone, light gray, medium hard to hard, fine to medium grained
50 - 55	Sandstone, light gray, light brown, medium hard to hard, fine to medium grained
55 - 60	Sandstone, light gray, medium hard to hard, fine to medium grained

MATCH LINE  
SHEET 2 OF 2

SHEET 1 OF 2

DRILL: ????

SURFACE ELEVATION: ±1644.47 ft. MSL



**PERC**  
ENGINEERING CO., INC.  
1822 Highway 73 West Jasper, Alabama 36021  
P.O. Box 1712 Jasper, Alabama 36002  
(205) 394-0533 Office (205) 394-0401 Fax

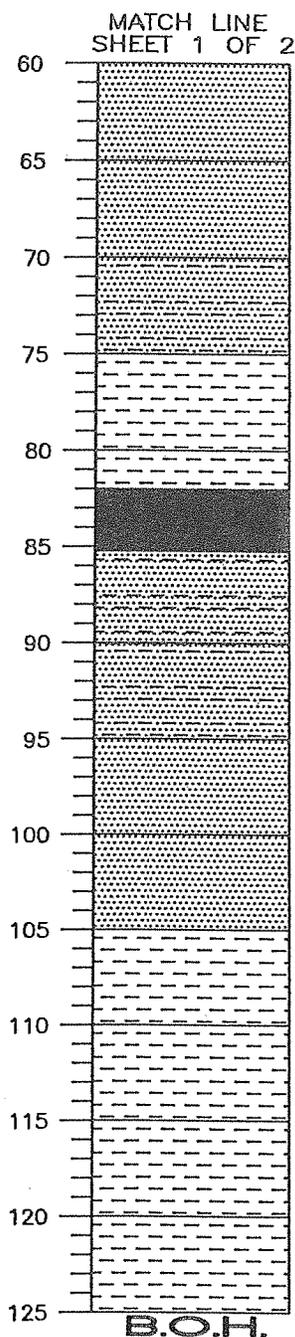
**Humphrey Mining, LLC  
Lewis Hollow Mine  
Lithologic Description for  
HMLHDH-2**

DRAWN BY: JNG  
DWG. NAME: HMLHMLITH

DATE: 3-30-11

APPROVED BY: TST

SCALE: 1" = 10' vertical



INTERVAL:

DESCRIPTION:

60 - 65	Sandstone, white, medium hard to hard, fine to medium grained
65 - 70	Sandstone, light to medium gray, medium hard to hard, fine to medium grained, contaminated with Coal
70 - 75	Sandstone with Shale streaks, light to medium gray, medium hard to hard, fine to medium grained
75 - 80	Shale, black, soft to medium hard
80 - 82	Shale, black, soft to medium hard
82 - 85.25	Coal - Upper Bon Air Seam
85.25 - 90	Sandstone with Shale streaks, medium to dark gray, medium hard to hard, fine to medium gray, contaminated with Coal
90 - 95	Sandstone with Shale streaks, light to medium gray, Medium hard to hard, fine to medium grained
95 - 100	Sandstone, medium gray, hard, fine to medium grained
100 - 105	Sandstone, medium gray, hard, fine to medium grained
105 - 110	Shale, light to medium gray, hard
110 - 115	Shale, medium to dark gray, hard, contaminated with Coal
115 - 120	Shale, medium to dark gray, hard, contaminated with Coal
120 - 125	Shale, medium to dark gray, hard

SHEET 2 OF 2

DRILL: ?????

SURFACE ELEVATION: ±1598.70 ft. MSL



**Humphrey Mining, LLC  
Lewis Hollow Mine  
Lithologic Description for  
HMLHDH-3**

DRAWN BY: JNG  
DWG. NAME: HMLHMLITH

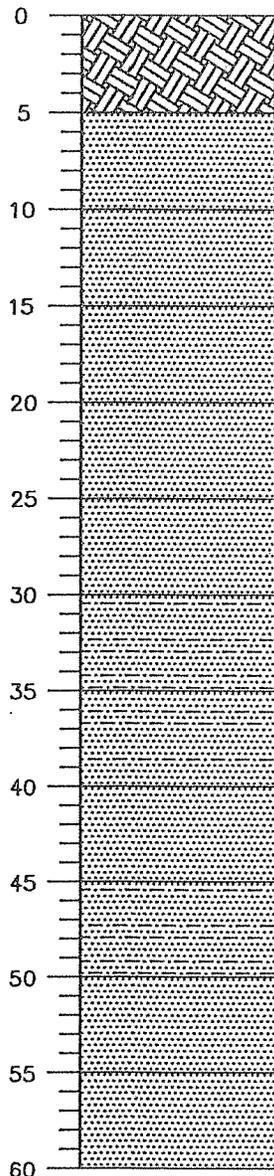
DATE: 3-15-11

APPROVED BY: TST

SCALE: 1" = 10' vertical

INTERVAL:

DESCRIPTION:



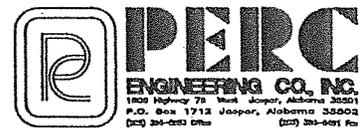
0 - 5	Surface Material, Sandstone, white to light orange, fine to medium grained, soft to medium hard
5 - 10	Sandstone, white to light orange, fine to medium grained, soft to medium hard
10 - 15	Sandstone, white to light orange, fine to medium grained, medium hard to hard
15 - 20	Sandstone, white to light orange, fine to medium grained, medium hard to hard
20 - 25	Sandstone, white, fine to medium grained, medium hard to hard
25 - 30	Sandstone, white, fine to medium grained, medium hard to hard
30 - 35	Sandstone with Shale streaks, light to medium gray, fine to medium grained, medium hard to hard
35 - 40	Sandstone with Shale streaks, light to medium gray, fine to medium grained, medium hard to hard
40 - 45	Sandstone, light to medium gray, fine to medium grained, medium hard to hard
45 - 50	Sandstone with Shale Streaks, light gray, fine to medium grained, medium hard to hard
50 - 55	Sandstone, light gray, fine to medium grained, hard
55 - 60	Sandstone, white, fine to medium grained, hard

MATCH LINE  
SHEET 2 OF 2

SHEET 1 OF 2

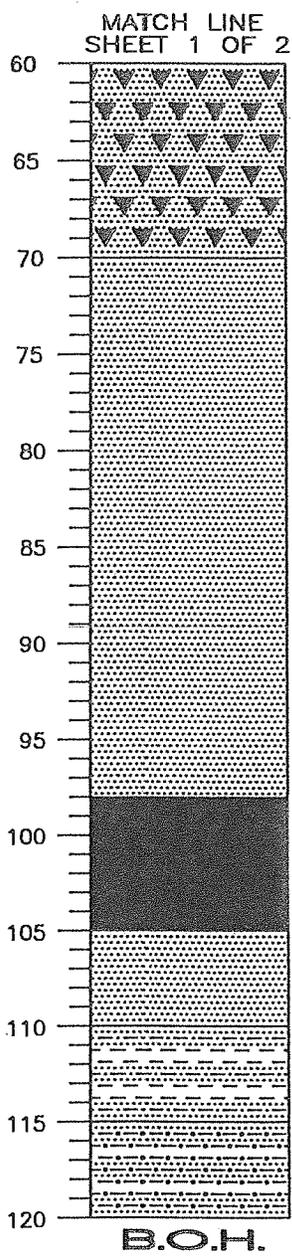
DRILL: ?????

SURFACE ELEVATION: ±1598.70 ft. MSL



**Humphrey Mining, LLC  
Lewis Hollow Mine  
Lithologic Description for  
HMLHDH-3**

DRAWN BY: JNG	DATE: 3-15-11
DWG. NAME: HMLHMLITH	
APPROVED BY: TST	SCALE: 1" = 10' vertical



INTERVAL:

DESCRIPTION:

60 - 70 Clay with interbedded fine grained Sandstone, gray

70 - 98 Sandstone, light gray, fine to medium grained

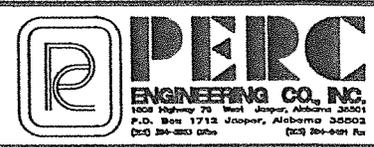
98 - 105 Coal - Lower Bon Air Seam

105 - 110 Sandstone, gray, fine grained

110 - 115 Shale with interbedded fine grained Sandstone, gray

115 - 120 silty Shale, with interbedded Sandstone and clay, gray

SHEET 2 OF 2  
 DRILL: ?????  
 SURFACE ELEVATION: ±1597.30 ft. MSL



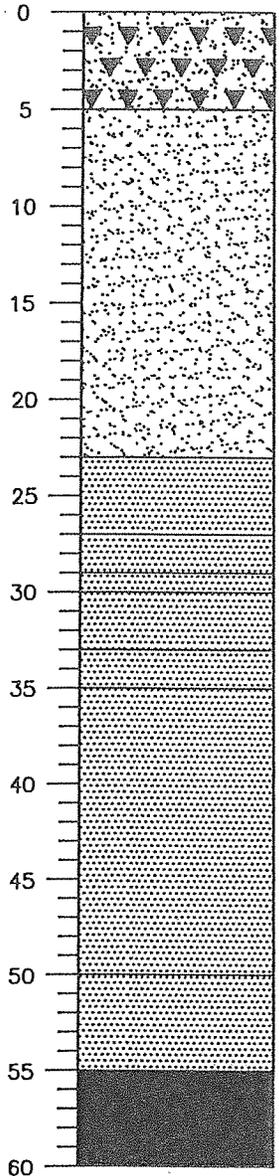
**Humphrey Mining, LLC  
 Lewis Hollow Mine  
 Lithologic Description for  
 MW-3**

DRAWN BY: JNG	DATE: 1-26-11
DWG. NAME: HMLHMLITH	
APPROVED BY: TST	SCALE: 1" = 10' vertical

C:\Users\Gross\workspace\mine\CAD\HMLHMLITH.dwg 10/29/10 10:13

INTERVAL:

DESCRIPTION:



0 - 5 Clayey Sand, red-brown

5 - 23 Sand, tan

23 - 27 Sandstone, gray, fine to medium grained

27 - 29 Sandstone, tan, fine to medium grained

29 - 30 Sandstone, gray, fine to medium grained

30 - 33 Sandstone, tan, fine to medium grained

33 - 35 Sandstone, light gray, fine to medium grained

35 - 50 Sandstone, tan, fine to medium grained

50 - 55 Sandstone, gray, fine grained

55 - 60 Coal - Bon Air Seam

MATCH LINE  
SHEET 2 OF 2

SHEET 1 OF 2

DRILL: ????

SURFACE ELEVATION: ±1597.30 ft. MSL



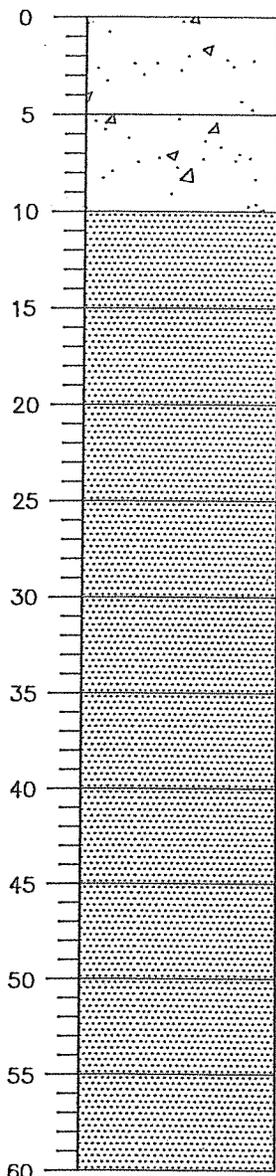
**Humphrey Mining, LLC  
Lewis Hollow Mine  
Lithologic Description for  
MW-3**

DRAWN BY: JNG  
DWG. NAME: HMLHMLTH

DATE: 1-26-11

APPROVED BY: TST

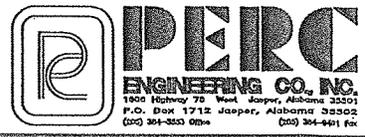
SCALE: 1" = 10' vertical



INTERVAL:	DESCRIPTION:
0 - 5	Spoil
5 - 10	Spoil (bottom of Upper Bon Air Seam)
10 - 15	Sandstone, weathered, light orange, medium hard to hard, fine to medium grained
15 - 20	Sandstone, white, medium hard to hard, fine to medium grained
20 - 25	Sandstone, white, medium hard to hard, fine to medium grained
25 - 30	Sandstone, white, medium hard to hard, fine to medium grained
30 - 35	Sandstone, white, medium hard to hard, fine to medium grained
35 - 40	Sandstone, white, hard, fine to medium grained
40 - 45	Sandstone, white, hard, fine to medium grained
45 - 50	Sandstone, white, hard, fine to medium grained
50 - 55	Sandstone, white, hard, fine to medium grained
55 - 60	Sandstone, white, hard, fine to medium grained

MATCH LINE  
SHEET 2 OF 2

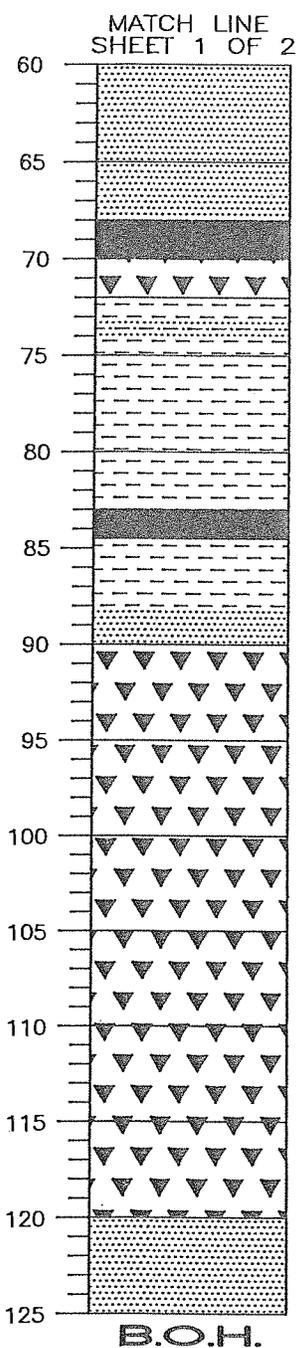
SHEET 1 OF 2  
 DRILL: ????  
 SURFACE ELEVATION: ±1547.36 ft. MSL



**Humphrey Mining, LLC  
 Lewis Hollow Mine  
 Lithologic Description for  
 HMLHMW-4**

DRAWN BY: JNG	DATE: 3-3-11
DWG. NAME: HMLHMLITH	
APPROVED BY: TST	SCALE: 1" = 10' vertical

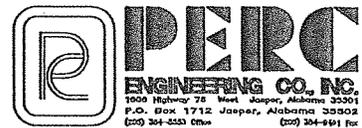
M:\projects\crane\winning\_mine\CAD\HMLHMLITH.dwg 10/29/10 10:13



INTERVAL:

DESCRIPTION:

60 - 65	Sandstone, light gray, hard, fine to medium grained
65 - 68	Sandstone, white, medium hard to hard, fine to medium grained changes to medium to dark gray at 67'
68 - 70	Coal, Lower Bon Air Seam (24 inches thick)
70 - 72	Fireclay
72 - 75	Shale with some interbedded Sandstone, medium to dark gray, medium hard to hard
75 - 80	Shale, medium to dark gray, medium hard to hard
80 - 83	Shale, contaminated with Coal, black, soft to medium
83 - 84.5	Coal, marker seam (18 inches)
84.5 - 90	Shale, medium to dark gray, hard (to 88 ft.) Sandstone, medium to dark gray, hard, fine to medium grained
90 - 95	Clay, light to medium gray
95 - 100	Clay, light to medium gray
100 - 105	Clay, light to medium gray
105 - 110	Clay, light to medium gray
110 - 115	Clay, light to medium gray
115 - 120	Clay, light to medium gray
120 - 125	Sandstone, white to light gray, hard, fine to medium grained



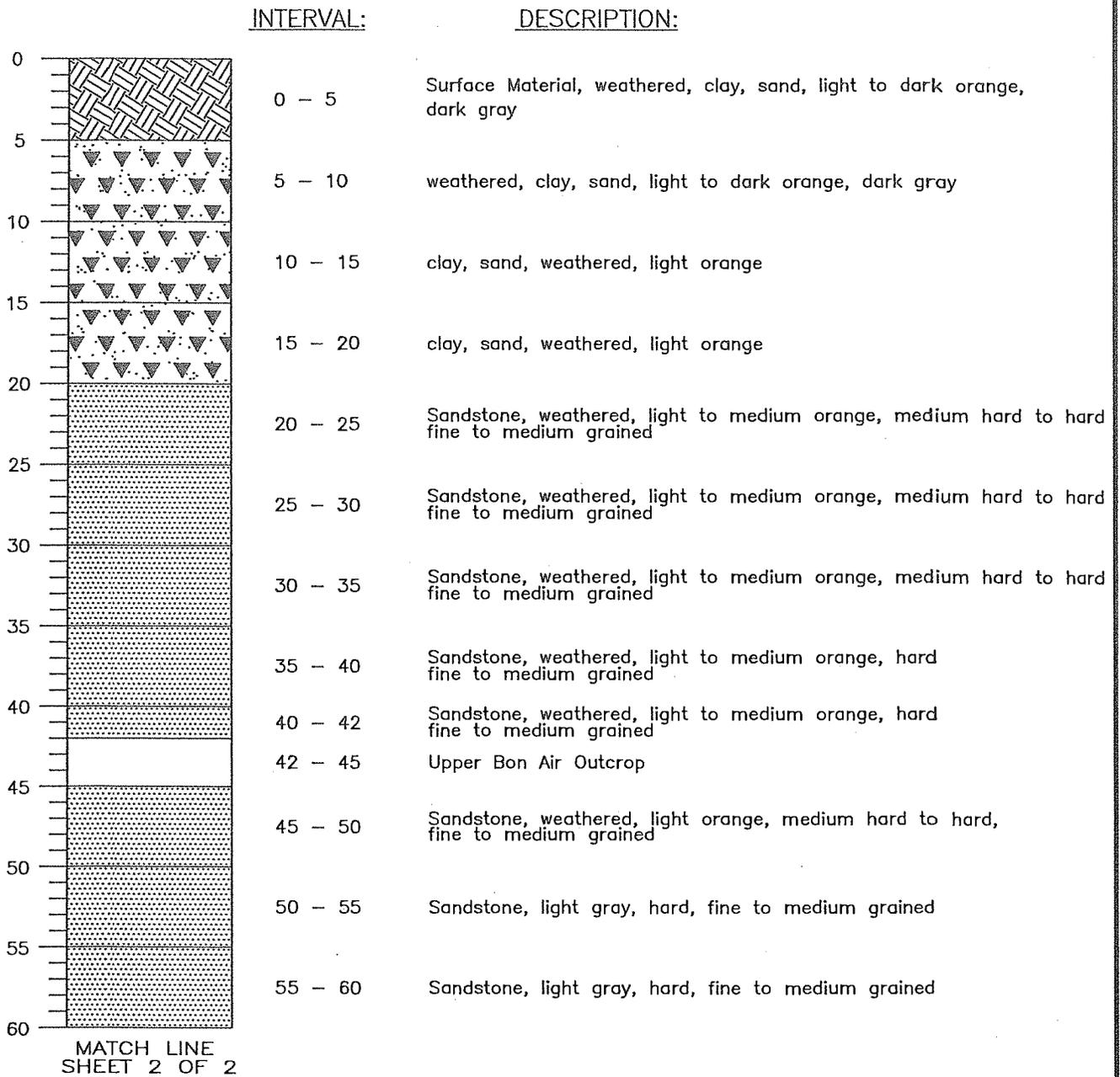
Humphrey Mining, LLC  
Lewis Hollow Mine  
Lithologic Description for  
HMLHMW-4

DRAWN BY: JNG	DATE: 3-3-11
DWG. NAME: HMLHMLITH	
APPROVED BY: TST	SCALE: 1" = 10' vertical

SHEET 2 OF 2

DRILL: ????

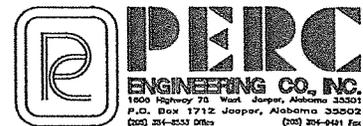
SURFACE ELEVATION: ±1547.36 ft. MSL



SHEET 1 OF 2

DRILL: ????

SURFACE ELEVATION: ±1604.57 ft. MSL



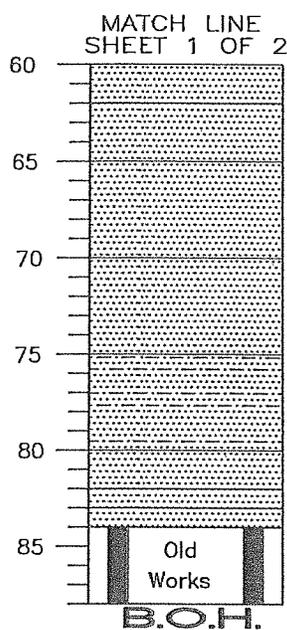
**Humphrey Mining, LLC  
Lewis Hollow Mine  
Lithologic Description for  
HMLHOB-4**

DRAWN BY: JNG  
DWG. NAME: HMLHMLITH

DATE: 3-14-11

APPROVED BY: TST

SCALE: 1" = 10' vertical



INTERVAL:

DESCRIPTION:

60 - 62	Sandstone, light gray, hard, fine to medium grained
62 - 65	Sandstone, light gray, light brown, hard, fine to medium grained
65 - 70	Sandstone, light brown, hard, fine to medium grained gray at 69
70 - 75	Sandstone, light gray, hard, fine to medium grained
75 - 80	Sandstone with Shale streaks, light gray, hard, fine to medium grained
80 - 82	Sandstone, light gray, hard, fine to medium grained
82 - 83	Sandstone, light gray, hard, fine to medium grained
83 - 84	Sandstone, medium gray to black, medium hard to hard, fine to medium grained, contaminated with Coal
84 - 88	Oldworks (Lower Bon Air Seam)

V:\Jobs\Grass\Humphrey\mine\CAD\HMLHMLITH.dwg, 10/20/10 10:13

SHEET 2 OF 2

DRILL: ?????

SURFACE ELEVATION: ±1604.57 ft. MSL



**Humphrey Mining, LLC**  
**Lewis Hollow Mine**  
**Lithologic Description for**  
**HMLHOB-4**

DRAWN BY: JNG  
DWG. NAME: HMLHMLITH

DATE: 3-14-11

APPROVED BY: TST

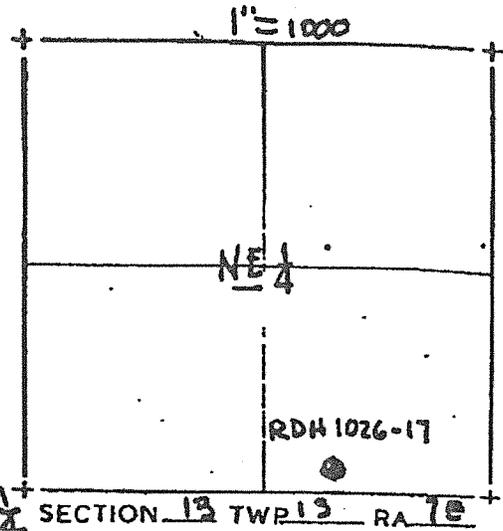
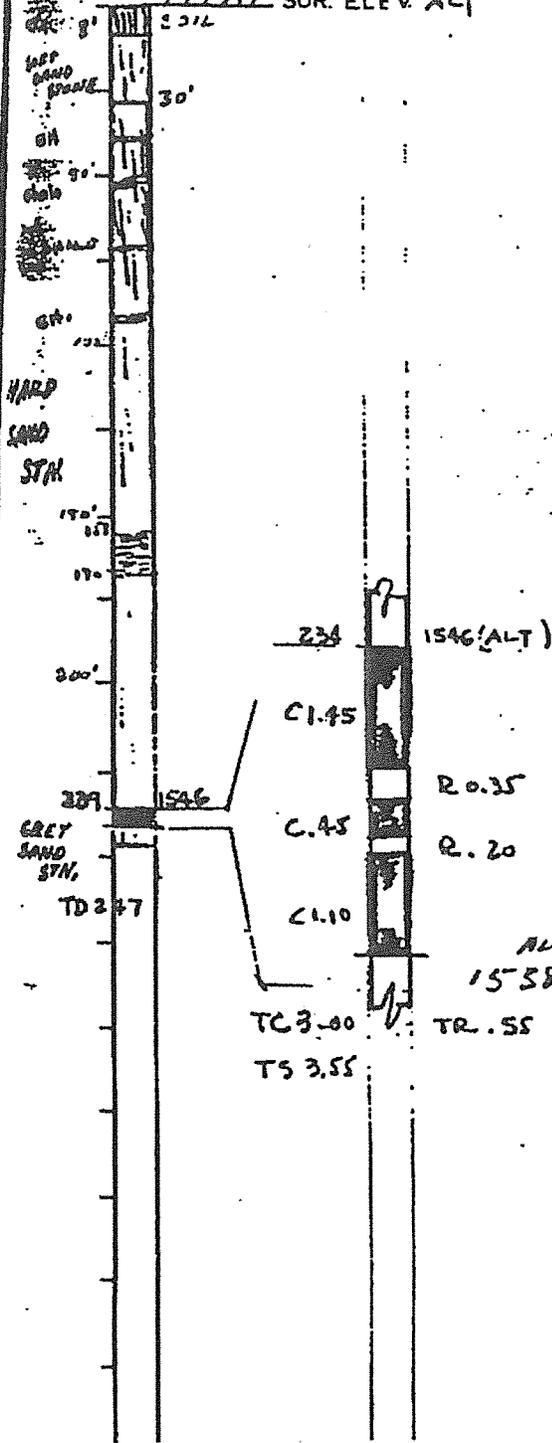
SCALE: 1" = 10' vertical

**REESE E. MALLETT ASSOCIATES, INC.**  
BIRMINGHAM, ALABAMA

DRILL HOLE LOGS

Drill Holes 1 thru 29

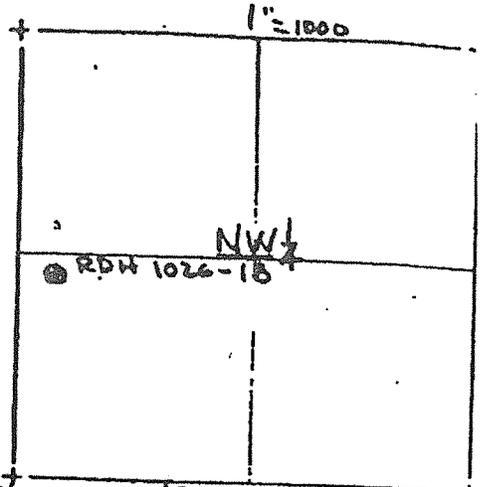
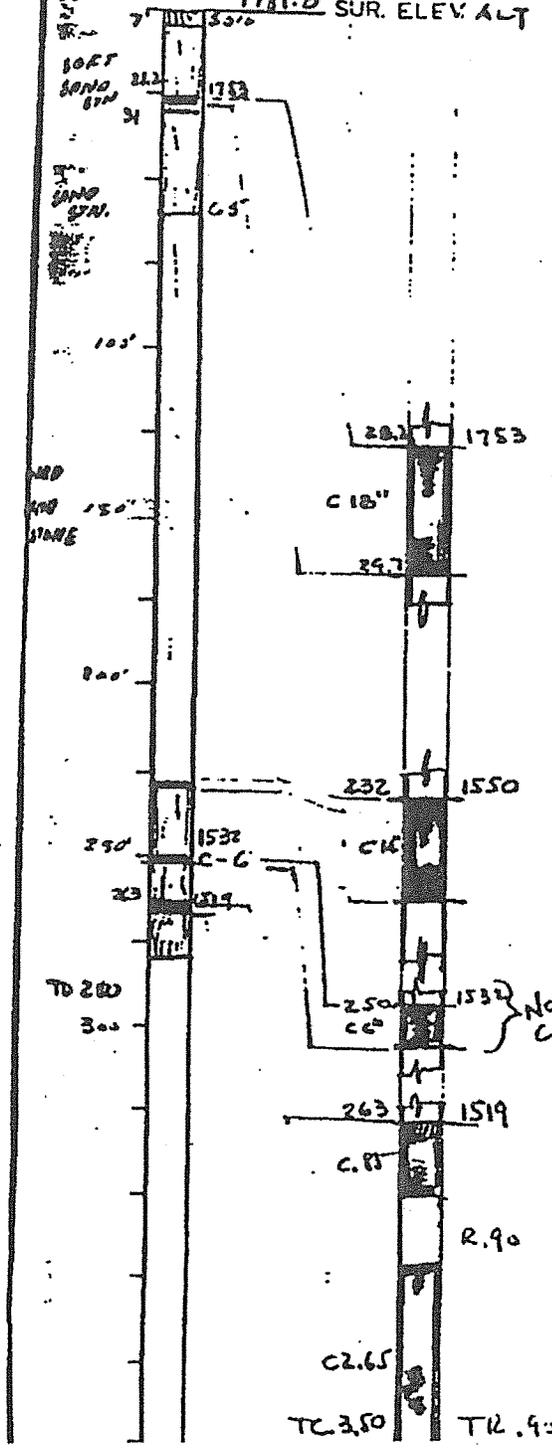
DRILL HOLE 1026-17  
 DATE DRILLED \_\_\_\_\_  
 TOTAL DEPTH 247  
1779.9 SUR. ELEV. ALT



SAM	MOIS	SG	SINK	PROX(FLOAT)					
PLE	TURE	%FLT	ASH	ASH	VM	FC	SUL	Btu	REMAI

DRILL HOLE 1026-18  
 DATE DRILLED \_\_\_\_\_  
 TOTAL DEPTH 280

1781.8 SUR. ELEV. ALT

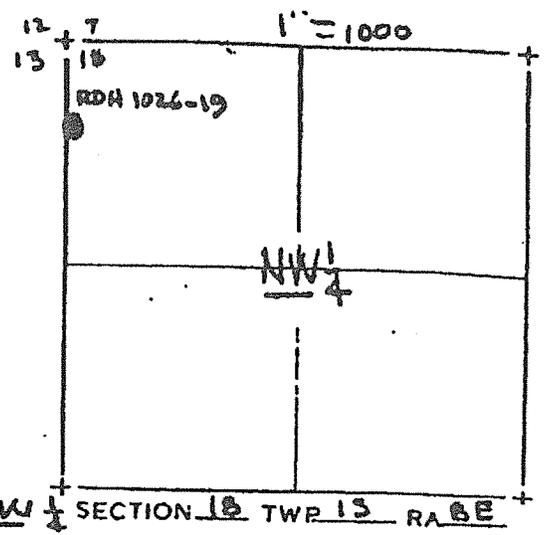
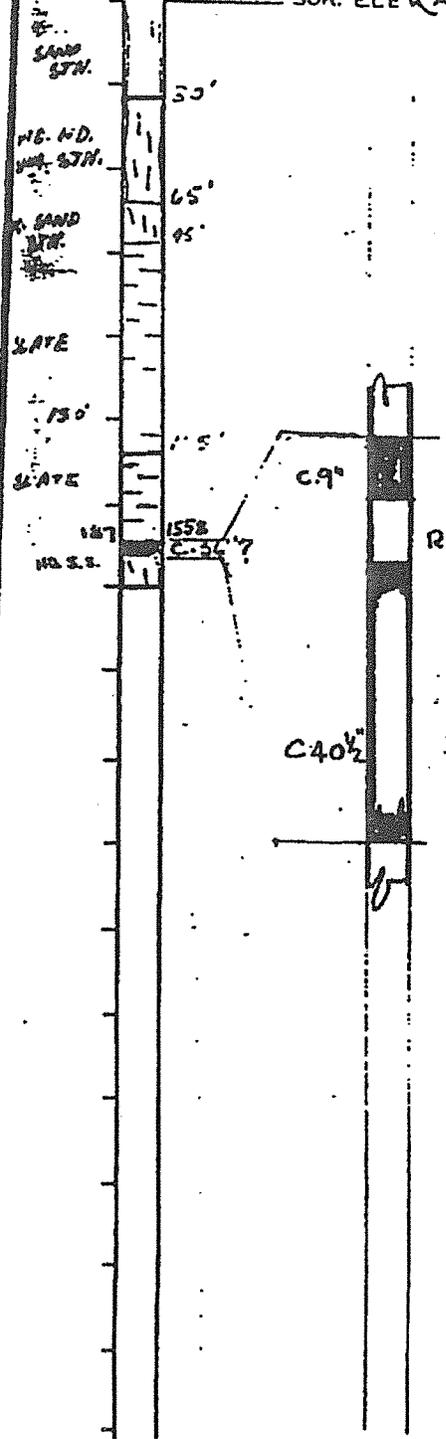


NW 1/4 SECTION 16 TWP 13 R 6E

SAM. MOIS.	SG.	SINK	PROX(FLOAT)						
PLE	TURE	%	FLI	ASH	VM	FC	SUL	Blw	REN

No COAL SEE GQL LOG

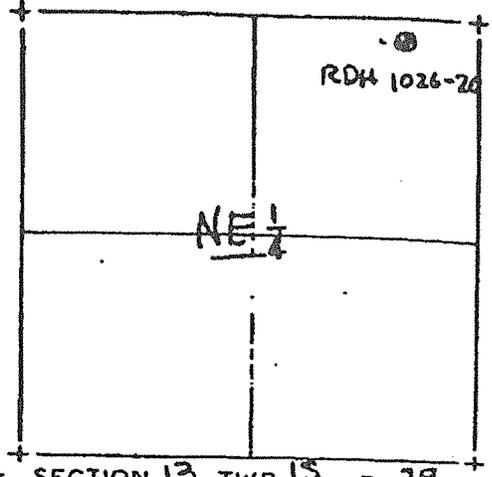
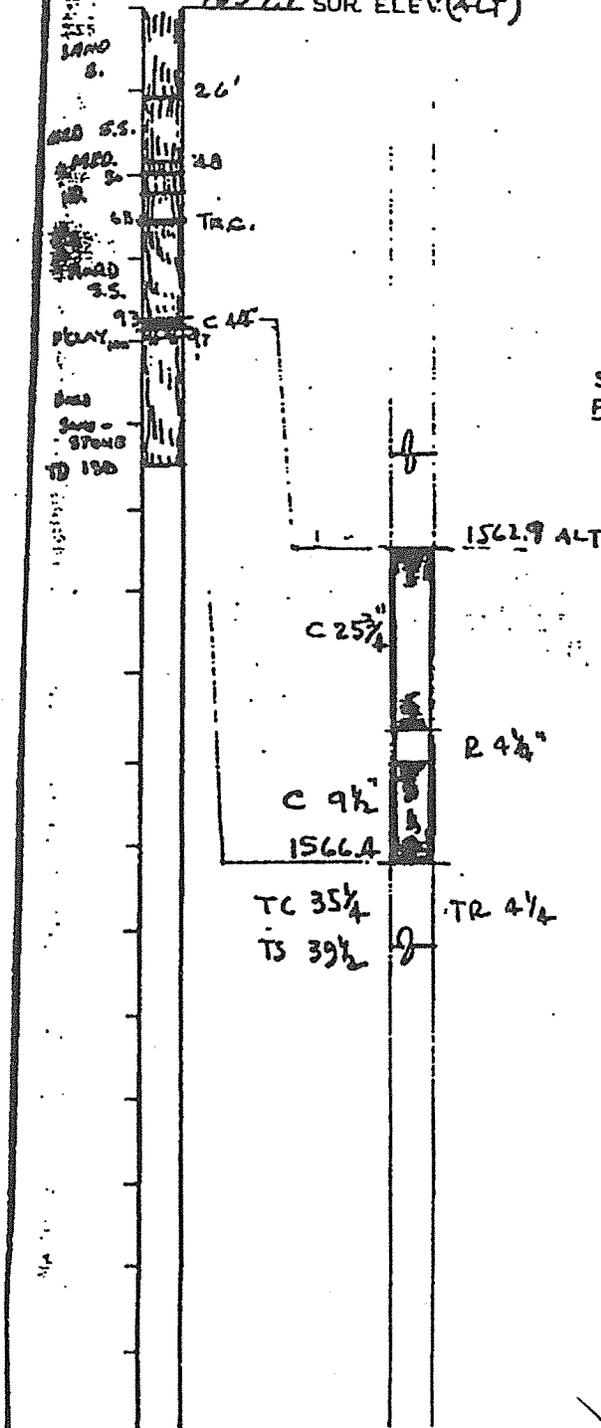
DRILL HOLE 1026-19  
 DATE DRILLED \_\_\_\_\_  
 TOTAL DEPTH 200  
 1744.9 SUR. ELEV (ALT)



ALT 1557.9  
 SAM. MOIS. — SG. SINK. PROX(FLOAT)  
 PLE TURE % FLT ASH ASH VM FC SUL Blu REM.

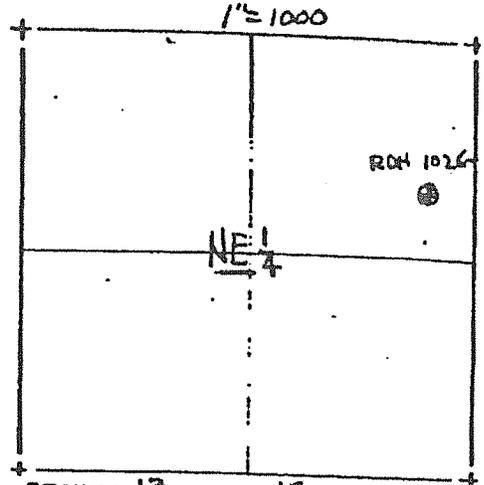
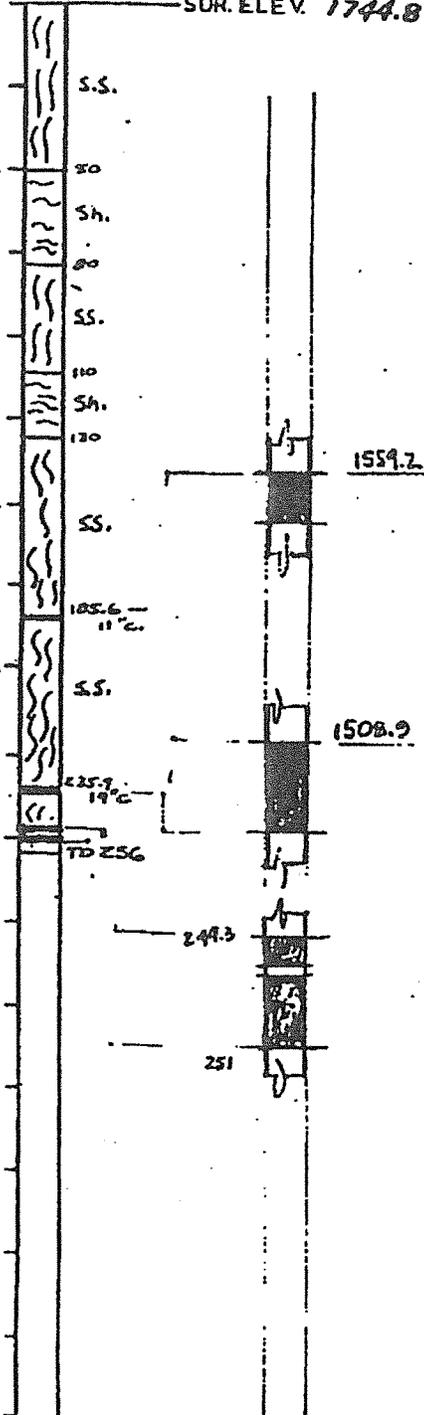
C 9°  
 R. 9 1/2°  
 C 40 1/2°

DRILL HOLE 1026-20  
 DATE DRILLED \_\_\_\_\_  
 TOTAL DEPTH 138  
1657.1 SUR. ELEV. (ALT)



SAM. MOIS. — SG SINK PROX(FLOAT)  
 PLE TURE % FLT ASH ASH VM FC SUL Btu REM.

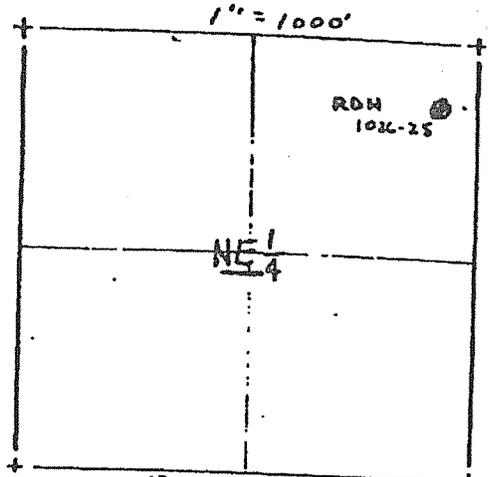
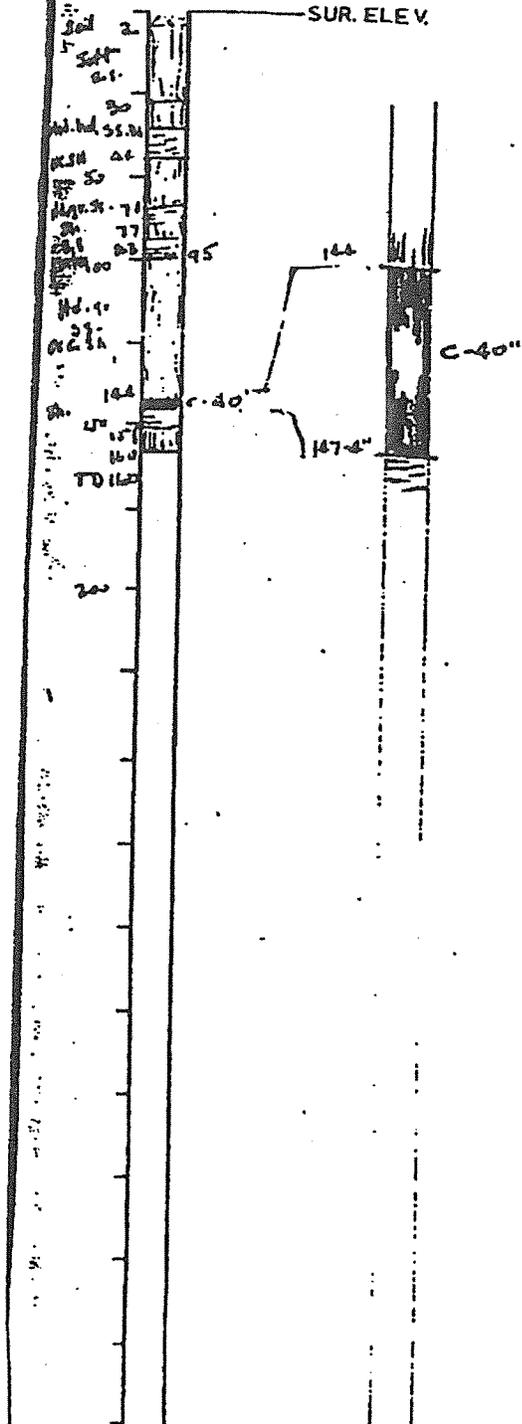
DRILL HOLE 1026-24  
 DATE DRILLED \_\_\_\_\_  
 TOTAL DEPTH 256  
 1744.8 SUR. ELEV. 1744.8



NE 1/4 SECTION 13 TWP. 13 RA. 7E

SAM	MOIS	—SG	SINK	PROX(FLOAT)
PLE	TURE	%FLT	ASH	ASH VM FC SUL BLU REM

DRILL HOLE 1026-25  
 DATE DRILLED \_\_\_\_\_  
 TOTAL DEPTH 160

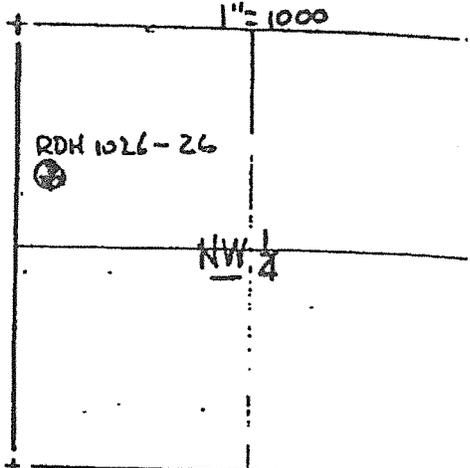
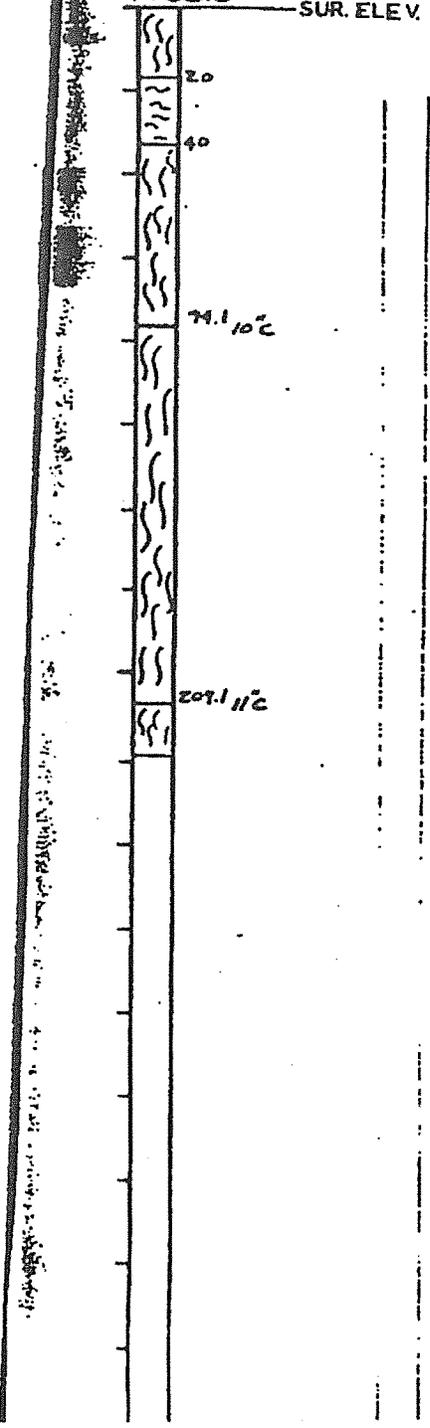


NE 1/4 SECTION 13 TWP. 15 RA. 7E

SAM	MOIS	SG	SINK	PROX (FLOAT)
PLE	TURE	% FLI	ASH	ASH VM FC SUL Btu REM.

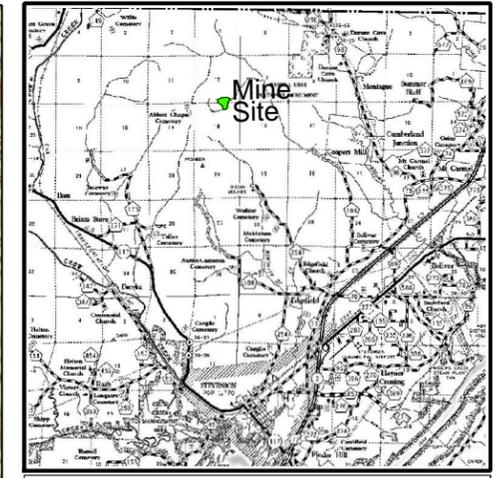
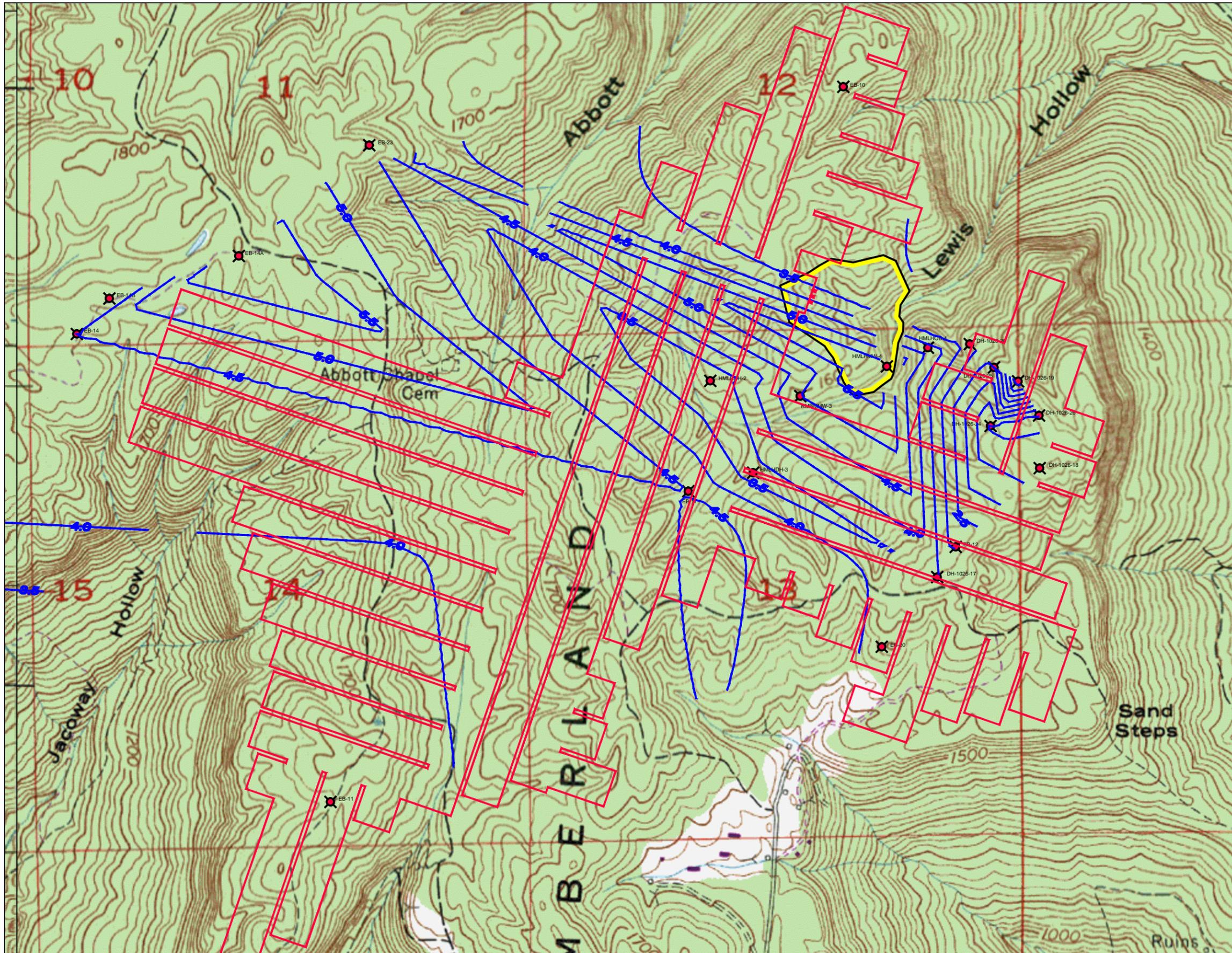
DRILL HOLE 1026-26  
 DATE DRILLED \_\_\_\_\_  
 TOTAL DEPTH 226

1766.0 SUR. ELEV.



NW 1/4 SECTION 18 TWP. 15 RA. 6E

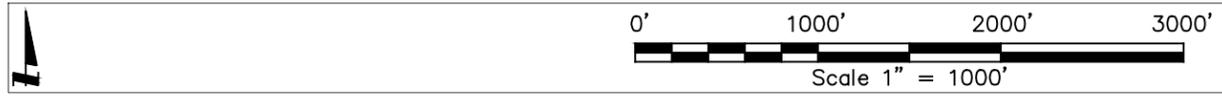
SAM	MOIS	SG	SINK	PROX (FLOAT)
PLE	TURE	% FLT	ASH	ASH VM FC SUL B1U REI



**VICINITY MAP**  
Scale: 1" = 2 Miles

**LEGEND**

	Permit Boundary
	Drill Hole Location
	Upper Bon Air Coal Seam Thickness (Ft)
	Coal Recovery Boundary



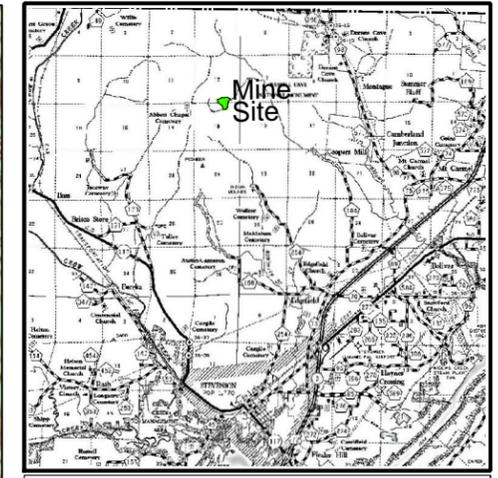
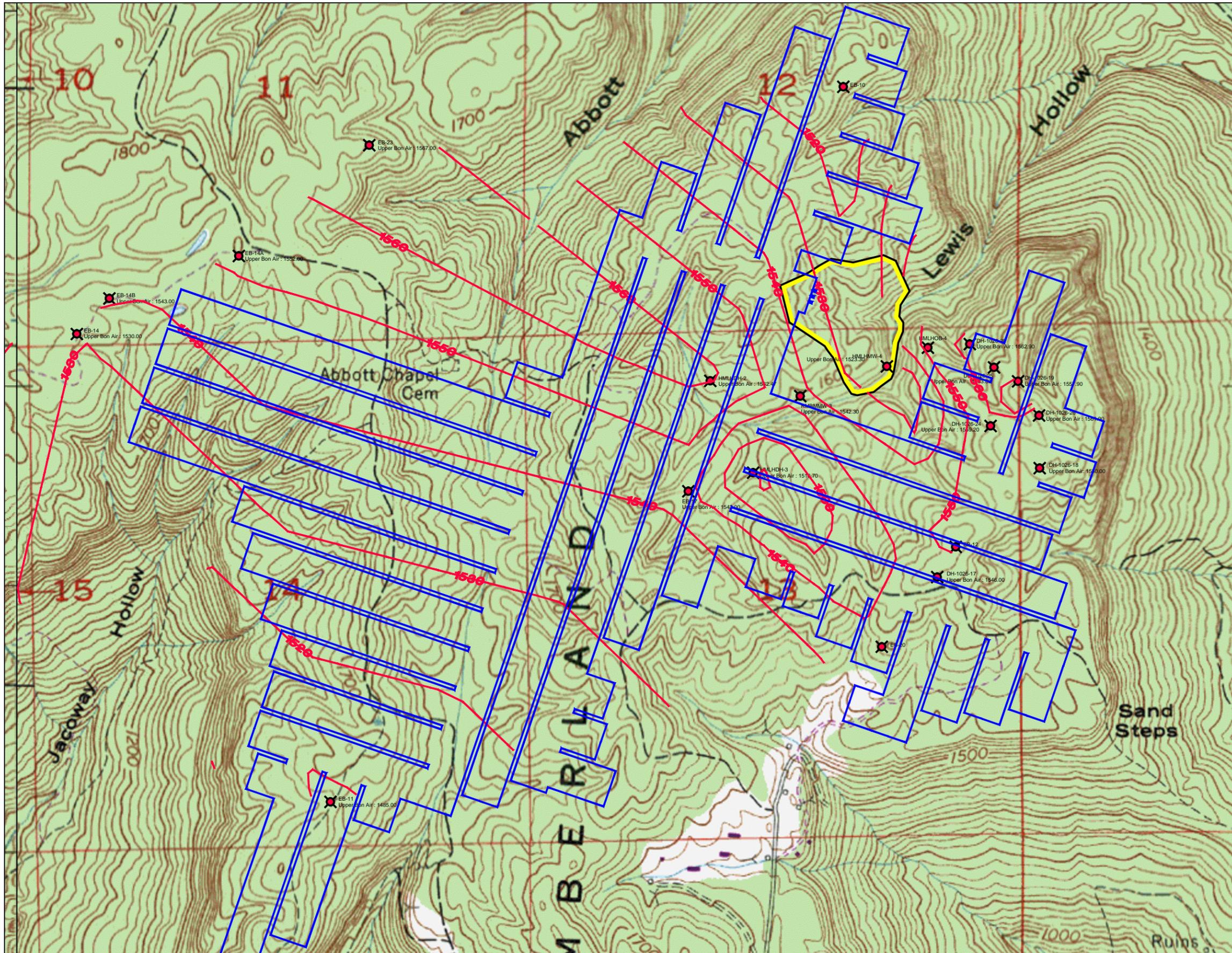
Base map - Doran Cove and Eureka  
Alabama United States Geological  
Survey Quadrangle Maps.

**PERC**  
ENGINEERING CO., INC.  
1606 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502  
(205) 384-5553 Office (205) 296-3114 Fax

**Red Mesa Energy, LLC.**  
**Bledsoe Mine**  
**Coal Thickness Isopach Map**

.DWG NAME:	RMBledsoeMine	DATE:	03-06-2015
DRAWN BY:	S.A.E.	SCALE:	1"=1000'
APPROVED BY:	T.S.T.	JOB NUMBER:	14-04482-003

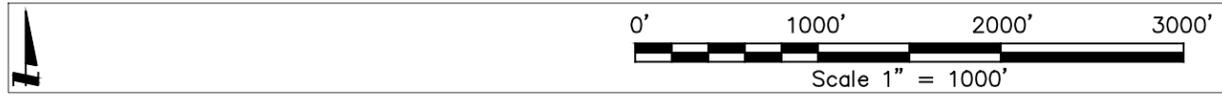
V:\Mining\Red Mesa Bledsoe Mine\RMBledsoeMine.dwg 04/15/15 15:00



**VICINITY MAP**  
Scale: 1" = 2 Miles

**LEGEND**

	Permit Boundary
	Drill Hole Location
	1540 Upper Bon Air Structure Contour (Top of Seam)
	Coal Recovery Boundary



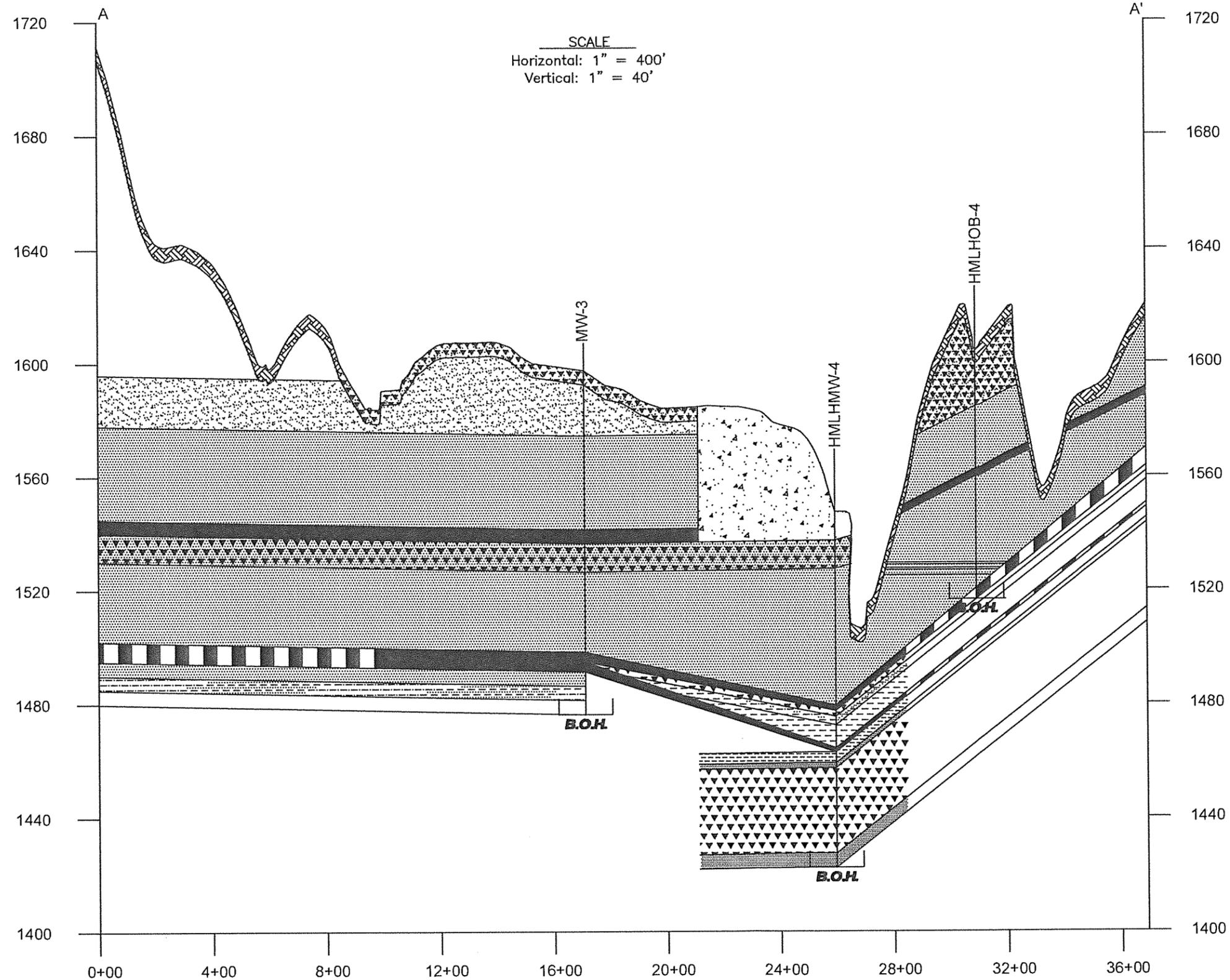
Base map - Doran Cove and Eureka  
Alabama United States Geological  
Survey Quadrangle Maps.

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ENGINEERING CO., INC.  
1606 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502  
(205) 384-5553 Office (205) 296-3114 Fax

**Red Mesa Energy, LLC.**  
**Bledsoe Mine**  
**Structure Contour Map**

DWG NAME:	RMBledsoeMine	DATE:	03-06-2015
DRAWN BY:	S.A.E.	SCALE:	1"=1000'
APPROVED BY:	T.S.T.	JOB NUMBER:	14-04482-003

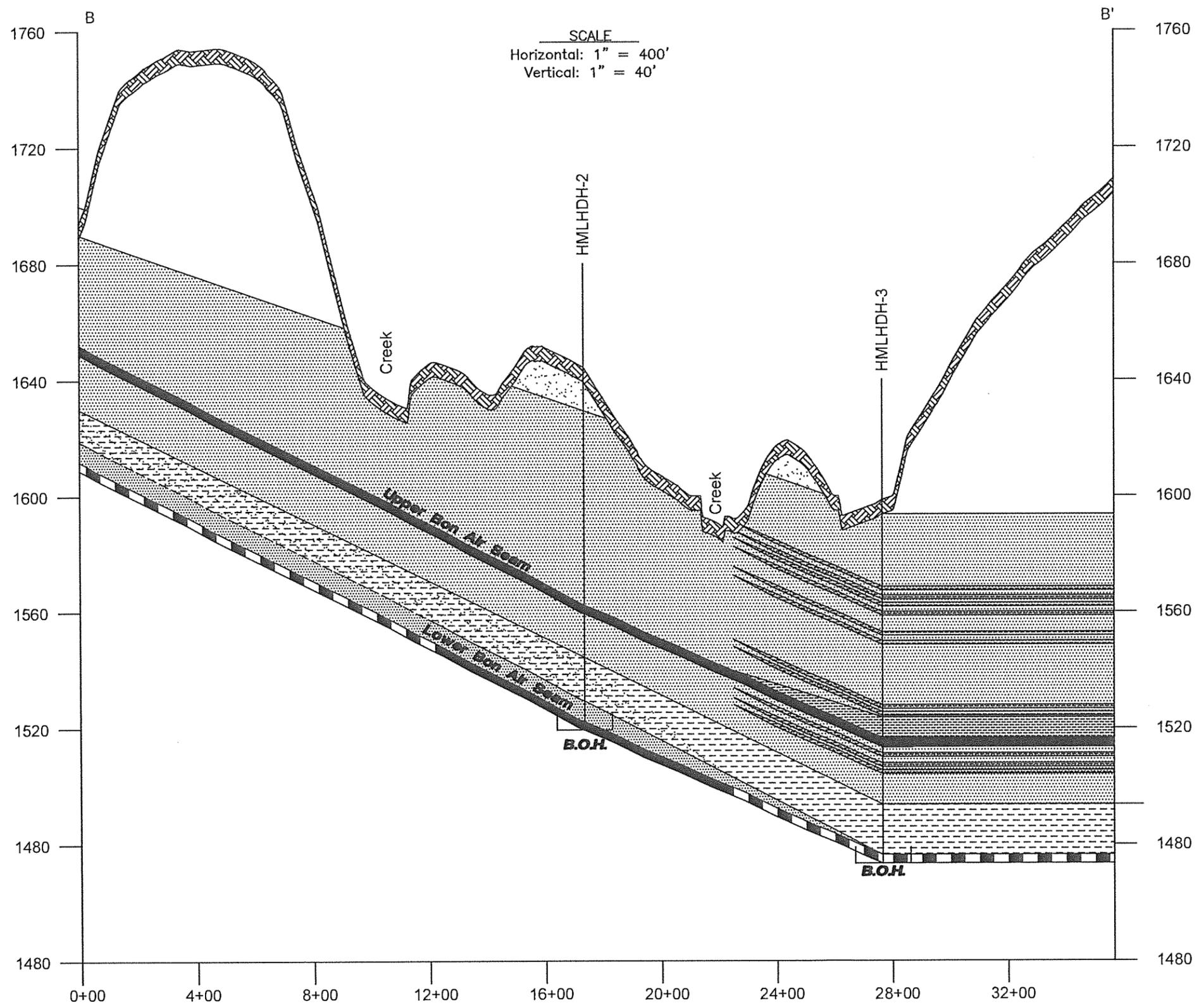
V:\Mining\Red Mesa Bledsoe Mine\RBledsoeMine.dwg 04/15/15 15:00



**PERC ENGINEERS CO., INC.**  
INCORPORATED IN THE STATE OF ARIZONA

**Red Mesa Energy, LLC.  
 Bledsoe Mine  
 Generalized Fence Diagram A - A'**

DRAWN BY: J.N.G. DWG. NAME: RMBledsoeMine	DATE: 07-11-2011
APPROVED BY: T.S.T.	SCALE: as shown



SCALE  
 Horizontal: 1" = 400'  
 Vertical: 1" = 40'

LEGEND

- Coal
- Sandstone with Shale interbeds
- Shale
- Sandstone
- Surface Material
- Sandy Shale
- Sand
- Unknown
- Bottom of Hole

Lithology is dashed where inferred.

The Lower Bon Air Seam is laterally inconsistent with respect to thickness.

 <b>Red Mesa Energy, LLC.</b> <b>Bledsoe Mine</b> <b>Generalized Fence Diagram B - B'</b>	
DRAWN BY: J.N.G. DWG. NAME: RMBledsoeMine	DATE: 07-11-2011
APPROVED BY: T.S.T.	SCALE: as shown

**CERTIFICATION STATEMENT:**

The preceding geologic section was prepared for Red Mesa Energy, LLC. at the Bledsoe Mine site by a qualified professional and I hereby certify that it is true and correct to the best of my knowledge or belief.

---

Date: \_\_\_\_\_

TIMOTHY S. THOMAS  
PROFESSIONAL ENGINEER  
LICENSE NO. 18830

**ATTACHMENT II-F**  
**GROUNDWATER HYDROLOGY**

The following descriptions of regional groundwater and aquifer characteristics are based on information contained in the 'Hydrology Reports' for Areas 21, 22, 23, & 24 by the U.S. Geological Survey and also information contained in various hydrogeological evaluations submitted to, and approved by, the Alabama Surface Mining Commission.

As stated in Part II-E, "Hydrology of Area 21, Eastern Coal Province, Tennessee, Alabama, and Georgia" states that Pennsylvanian rocks, which contain the coal beds, cap the extensive uplands and outliers of the Cumberland Plateau in Area 21 (where the proposed permit exists) and that these rocks are classified as the Pottsville Formation in Alabama. The reference also states that these Pennsylvanian Pottsville rocks consist chiefly of alternating beds of sandstone, conglomerate, shale, and siltstone with beds of underclay and coal.

According to the same reference, 'groundwater in the coal-resources area of the Cumberland Plateau primarily occur in fractures in sandstone, shale, and conglomerate. These rocks have a low intergranular permeability, but fractures provide secondary openings for storage and movement of groundwater. Water-bearing openings generally occur within 100 feet of land surface. Although water-bearing openings are numerous, the yields are generally low. Large springs commonly occur at the base of the steep escarpments bordering the upland coal-resources area of the Cumberland Plateau

(Hollyday and others, 1982).’ From the same reference: ‘fractured Pennsylvanian sandstone and shale yield most of the ground water to wells in the coal-resources area of the Cumberland Plateau section. Reported yeilds to more than 500 wells in the Pennsylvanian rocks range from less than 1 to about 1,000 gal/min. Specific capacity (yield per foot of drawdown in a well) can be used to estimate transmissivity, a measure of the ability of an aquifer to transmit water (Walton, 1962). Estimated transmissivities at 20 sites range from 50 to 13,000 square feet per day with 68 percent bewteen 120 and 6,700 square feet per day. This wide range is due to the variation in size and extent of the fractures.’

The same reference also states that groundwater levels in Area 21 fluctuate seasonally. ‘Highest levels usually occur in the spring in response to intermittent recharge from precipitation. During the growing season, precipitation that would otherwise become recharge is instead transpired by growing plants or evaporated from the land surface. Lowest water levels usually occur in the fall as a result of continuing discharge and little or no recharge from precipitation. Drought in winter or unusually heavy precipitation in summer can noticeably alter this normal pattern of water-level fluctuations.

Lastly, the same reference states that groundwater in Pennsylvanian rocks was of the calcium-magnesium-sulfate-bicarbonate type, that groundwater in Pennsylvanian rocks has the lowest medium pH and specific conductance in Area 21, and that groundwater in Pennsylvanian rocks were ‘softer’ than groundwater from other rock types in Area 21. The refernce also stated: ‘Iron and sulfata may cause some problems in the area. Locally, iron

exceeds the 300 ug/l recommended limit for drinking water (U.S. Environmental Protection Agency, 1979), especially in waters from Pennsylvanian rocks...?.

Locally, groundwater occurring within and adjacent to the Bledsoe Mine exists in Pottsville Formation strata and the groundwater occurring above the target coal seam at this site is isolated from underlying groundwater by a very thick interval of clay.

Groundwater at this site will be characterized by Groundwater Monitoring Sites MW-3, RMBMMW-2D, RMBMMW-3S, and RMBMMW-4D, as shown on the Mine Site Location Map. Groundwater Monitoring Sites RMBMMW-2D, RMBMMW-3S, and RMBMMW-4D were drilled and cased in 2014 by contractors of Earthcon. Drill type is unknown. Construction details are shown on the attached 'Casing Specifications'. Groundwater Monitoring Site RMBMMW-3S monitors the groundwater immediately overlying the Bon Air Seam, and Groundwater Monitoring Sites RMBMMW-2D and RMBMMW-4D monitor the groundwater immediately underlying the Bon Air Seam. In addition, piezometer RMBMMW-3 is a modified groundwater monitoring site originally drilled and cased for a proposed permit which was never permitted with ASMC, and modified to measure the groundwater level in sandstone strata immediately below the target coal seam.

Based on the topography within and adjacent to the proposed permit area, the local dip of the strata, and the lithology of the strata overlying the Bon Air Seam, it is evident that the groundwater overlying the target seam at this facility exists as a water table aquifer. The reason for this statement is that immediately adjacent to, and towards the north and

northwest from the proposed permit area, the local upland plateau is dissected by Abbott Hollow. Towards the north and northeast the upland plateau is dissected by Jefferies Cove, and towards the southeast the upland plateau is dissected by McMahan Cove. These topographic features play a dominant role in groundwater recharge for the interval overlying the Bon Air Seam within and immediately adjacent to the proposed permit area. Collectively, these features reduce the recharge area for the aquifer overlying the Bon Air Seam to little more than the proposed recovery area itself and prevents groundwater from other up-dip or up-gradient areas from migrating into this isolated ridge. Moreover, the local topography largely dictates the migration of groundwater out of, or away from, the proposed permit area. Groundwater migrating towards the south from the aquifer overlying the Upper Bon Air Seam is limited to a very narrow ridgetop which would, at best, convey only a small percentage of gross groundwater movement in this direction. The majority of groundwater in this interval would either discharge into adjacent, unnamed tributaries (as base flow) or migrate downward to deeper aquifers. The lithology in this interval is largely composed of unconsolidated sand and sandstone, which has the ability to store and convey groundwater at a moderate to high rate, based on consolidation and cementing. Obviously, recharge into this interval is from direct infiltration from precipitation. Based on its' relatively small recharge area (only a few hundred acres), it is unlikely this interval would be considered a reliable source of groundwater for domestic use from a quantity standpoint. Furthermore, no legitimate use of this groundwater was documented in the well inventory. This aquifer is the one most likely to be affected (from a quantity standpoint) by the proposed underground mine.

As stated above, the Bon Air Seam is underlain by an interval of sandstone approximately 40 feet thick which constitutes another smaller, localized aquifer (which is also dictated by adjacent topographical features mentioned above). This aquifer is the one most likely to be affected (from a quality standpoint) by the proposed underground mine. No legitimate use of this groundwater was documented in the well inventory either.

The quality of local groundwater at this site will be characterized by samples taken at Groundwater Monitoring Sites RMBMMW-2D, RMBMMW-3S, and RMBMMW-4D (shown on the Mine Site Location Map). Personnel from the PERC Engineering Laboratory have sampled the above mentioned monitoring wells on six occasions between the dates 09-29-14 and 02-05-15. All samples were taken with either a hand bailer or a submersible pump after development. Practices employed by the PERC Engineering Laboratory concerning the volume of groundwater extracted at groundwater monitoring sites prior to sampling is outlined as follows: Where recharge of groundwater is sufficient, three well volumes of groundwater (measured from the static depth) are pumped prior to sampling so the sample obtained is from recharge. Where recharge is slow, and three well volumes cannot be obtained within the monitoring cycle (usually monthly), only one well volume will be pumped. The well will then be allowed to recharge and a sample will be obtained after a volume equal to the volume of the pump line has been discharged. In infrequent instances where recharge is very limited, and the volume of water in the well is too small to be pumped to the surface, a 'bottom sampler' is employed to bail as much water as possible from the well. The well will then be allowed to recharge and the bottom sampler will again be used to obtain a sample when ample groundwater is present to be collected. Depth to water, and pH, are measured in the field, and the sample is split into two

separate containers: a 473 ml plastic bottle is acidified and utilized for metals analysis, and a one quart plastic bottle is utilized for all other analysis. Both are stored in an ice chest for transport to the PERC Engineering Laboratory. All well samples were taken to the PERC Engineering Laboratory are analyzed according to ASTM specifications. Parameters tested include pH, iron, manganese, conductivity, sulfates, acidity, and alkalinity. Average parameter values for selected analysis on these wells are as follows:

<u>Well #:</u>	<u>pH*</u> <u>(S.U.):</u>	<u>FeT</u> <u>(mg/l):</u>	<u>SpC</u> <u>(umhos):</u>	<u>SO4</u> <u>(mg/l):</u>
RMBMMW-3S	6.87	3.91	464	184.20
RMBMMW-2D	5.56	0.19	44	<1
RMBMMW-4D	6.74	16.36	263	8.07

\*median

Groundwater quality in the Pottsville Formation in this area was described by Brenda S. Peacock in "Hydrology of Area 21, Eastern Coal Province, Tennessee, Alabama, and Georgia", Water-Resources Investigations Open-File Report 82-679 from the USGS on pages 66 and 67. The following is an excerpt from this study characterizing Pottsville Formation groundwater:

<u>Parameter:</u>	<u>Max:</u>	<u>Min:</u>	<u>Ave:</u>
pH (s.u.)	8.30	6.00	7.00*
SpC (umhos)	810	20	63*
SO4 (mg/l)	166.0	4.00	27.0

\*median

A comparison between averages shown for local groundwater at the Bledsoe Mine vs Pottsville Formation averages show that the local groundwater is of lower pH, higher or lower specific conductivity, and higher or lower sulfate concentrations than the Pottsville

averages shown above. This indicates that local groundwater is of lower quality than the Pottsville averages and as such is probably not reliable as a domestic source from a quality standpoint. The quality exhibited above for the aquifer overlying the target coal seam is indicative of groundwater which is previously affected by coal related disturbance.

A well inventory conducted by PERC Engineering Co., Inc. 2014 reveals that there are no residences within a ½ mile radius of the proposed Bledsoe Mine. Based on this information, no groundwater is utilized within a ½ mile radius of the proposed Bledsoe Mine for domestic purposes.

Groundwater movement in the vicinity of the Bledsoe Mine is dictated by adjacent topographical features mentioned above. In addition, local groundwater movement is also affected by the direction of the dip of the local strata, strata composition, and adjacent highwalls created by previous mining.

**MW-2**

N 34° 57.529'

W 85° 51.325'

Elevation 1767'

0' - 6': Soil

6' - 60': Sandstone, white, weathered at 15', 25'. Abundant water and fracture at 30' - 39'.

60' - 142': Shale, light tan, thin coal at 137'.

142' - 215': Sandstone

215' - 238': Shale

238' - 240': Coal

240' - 255': Sandstone

**MW-2D**

TD 259.10' BTOC

Bottom of well 256.40' BGS

Stickup 2.70'

10' screen

Top of sand 244 BGS

Top of Bentonite 238' BGS

PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 173375  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW2D  
Code : w  
Date Taken : 02/05/2015  
Sampled By : jdc  
Time Taken : 1115  
Depth or Flow : 235.42'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	16	mg/l	Heath Brown	02/09/2015	0800	305.1 (1)
Alkalinity	10	mg/l	Heath Brown	02/09/2015	1000	310.1 (1)
Conductivity	58	us/cm	Danny C. Mays	02/06/2015	1605	120.1 (1)
Iron	0.10	mg/l	Danny C. Mays	02/12/2015	1225	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	02/12/2015	1315	243.1 (1)
pH	6.40	s.u.	Johnny Collier	02/05/2015	1115	150.1 (1)
Report			Sherri Fields	02/12/2015		
Sulfate	1	mg/l	Heath Brown	02/06/2015	1445	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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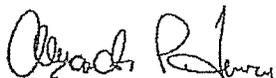
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172938  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW2D  
Code : w  
Date Taken : 01/07/2015  
Sampled By : jdc  
Time Taken : 1100  
Depth or Flow : 235.25'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	20	mg/l	Heath Brown	01/16/2015	0805	305.1 (1)
Alkalinity	6	mg/l	Heath Brown	01/16/2015	0910	310.1 (1)
Conductivity	76	us/cm	Heath Brown	01/09/2015	1550	120.1 (1)
Iron	0.28	mg/l	Danny C. Mays	01/08/2015	1555	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	01/08/2015	1630	243.1 (1)
pH	6.05	s.u.	Johnny Collier	01/07/2015	1100	150.1 (1)
Report			Sherrri Fields	01/16/2015		
Sulfate	<1	mg/l	Heath Brown	01/16/2015	1350	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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Page

1

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P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172463  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW2D  
Code : w  
Date Taken : 12/08/2014  
Sampled By : jdc  
Time Taken : 1050  
Depth or Flow : 235.75'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	14	mg/l	Heath Brown	12/15/2014	0830	305.1 (1)
Alkalinity	10	mg/l	Heath Brown	12/15/2014	0935	310.1 (1)
Conductivity	181	us/cm	Johnny Collier	12/08/2014	1050	120.1 (1)
Iron	0.66	mg/l	Danny C. Mays	12/12/2014	1050	236.1 (1)
Manganese	0.16	mg/l	Danny C. Mays	12/12/2014	1125	243.1 (1)
pH	6.75	s.u.	Johnny Collier	12/08/2014	1050	150.1 (1)
Report			Sherri Fields	12/19/2014		
Sulfate	<1	mg/l	Heath Brown	12/18/2014	0800	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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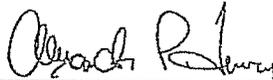
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P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171768  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW2D  
Code : w  
Date Taken : 10/23/2014  
Sampled By : swr  
Time Taken : 1254  
Depth or Flow : 234.75'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	12	mg/l	Michael Roell	10/24/2014	1520	305.1 (1)
Alkalinity	6	mg/l	Michael Roell	10/24/2014	1430	310.1 (1)
Conductivity	30	us/cm	Heath Brown	10/27/2014	1535	120.1 (1)
Iron	0.09	mg/l	Danny C. Mays	10/30/2014	1105	236.1 (1)
Manganese	0.10	mg/l	Danny C. Mays	10/30/2014	1155	243.1 (1)
pH	6.81	s.u.	Steve Riddlesperger	10/23/2014	1254	150.1 (1)
Report			Sherri Fields	11/05/2014		
Sulfate	<1	mg/l	Heath Brown	11/04/2014	0900	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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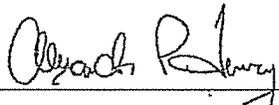
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171313  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW2D  
Code : w  
Date Taken : 09/29/2014  
Sampled By : swr  
Time Taken : 1253  
Depth or Flow : 204'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	14	mg/l	Michael Roell	09/30/2014	1545	305.1 (1)
Alkalinity	8	mg/l	Michael Roell	09/30/2014	1400	310.1 (1)
Conductivity	25	us/cm	Heath Brown	10/03/2014	1530	120.1 (1)
Iron	0.21	mg/l	Danny C. Mays	10/03/2014	1415	236.1 (1)
Manganese	0.13	mg/l	Danny C. Mays	10/03/2014	1445	243.1 (1)
pH	6.81	s.u.	Steve Riddlesperger	09/29/2014	1253	150.1 (1)
Report			Sherri Fields	10/13/2014		
Sulfate	<1	mg/l	Heath Brown	10/10/2014	1445	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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- 4) EPA-600/4-88/039 Revised July 1991
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**MW-3**

N 34° 57.138'

W 85° 50.711'

Elevation 1728'

0' - 2': Soil

2' - 45': Sandstone, white, hard

45' - 85': shale, dark to light gray.

85' - 86': Coal

86' - 98': Sandstone, white, water at 90'.

98' - 113': Shale

113' - 193': Sandstone

193' - 199': Shale

198' - 203': Coal

203' - 218': Shale

**MW-3S**

TD 192.25' BTOC

Bottom of well 189.66' BGS

Stickup 2.75'

15' screen

Top of sand 172' BGS

Top of Bentonite 168' BGS

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Sample Number : 173374  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW3S  
Code : w  
Date Taken : 02/05/2015  
Sampled By : jdc  
Time Taken : 1035  
Depth or Flow : 69.32'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	34	mg/l	Heath Brown	02/09/2015	0800	305.1 (1)
Alkalinity	222	mg/l	Heath Brown	02/09/2015	1000	310.1 (1)
Conductivity	581	us/cm	Danny C. Mays	02/06/2015	1605	120.1 (1)
Iron	2.77	mg/l	Danny C. Mays	02/12/2015	1225	236.1 (1)
Manganese	0.19	mg/l	Danny C. Mays	02/12/2015	1315	243.1 (1)
pH	6.82	s.u.	Johnny Collier	02/05/2015	1035	150.1 (1)
Report			Sherri Fields	02/12/2015		
Sulfate	59	mg/l	Heath Brown	02/06/2015	1445	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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*Heath Brown*

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Sample Number : 172937  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW3S  
Code : w  
Date Taken : 01/07/2015  
Sampled By : jdc  
Time Taken : 1000  
Depth or Flow : 169.25'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	30	mg/l	Heath Brown	01/16/2015	0805	305.1 (1)
Alkalinity	228	mg/l	Heath Brown	01/16/2015	0910	310.1 (1)
Conductivity	529	us/cm	Heath Brown	01/09/2015	1550	120.1 (1)
Iron	6.65	mg/l	Danny C. Mays	01/08/2015	1555	236.1 (1)
Manganese	0.25	mg/l	Danny C. Mays	01/08/2015	1630	243.1 (1)
pH	6.90	s.u.	Johnny Collier	01/07/2015	1000	150.1 (1)
Report			Sherri Fields	01/16/2015		
Sulfate	62	mg/l	Heath Brown	01/16/2015	1350	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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*Heath Brown*

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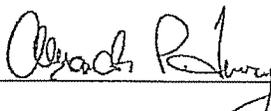
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172461  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW3S  
Code : w  
Date Taken : 12/08/2014  
Sampled By : jdc  
Time Taken : 1010  
Depth or Flow : 169.65'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	34	mg/l	Heath Brown	12/15/2014	0830	305.1 (1)
Alkalinity	222	mg/l	Heath Brown	12/15/2014	0935	310.1 (1)
Conductivity	185	us/cm	Johnny Collier	12/08/2014	1010	120.1 (1)
Iron	3.03	mg/l	Danny C. Mays	12/12/2014	1050	236.1 (1)
Manganese	0.19	mg/l	Danny C. Mays	12/12/2014	1125	243.1 (1)
pH	6.84	s.u.	Johnny Collier	12/08/2014	1010	150.1 (1)
Report			Sherri Fields	12/19/2014		
Sulfate	64	mg/l	Heath Brown	12/18/2014	0800	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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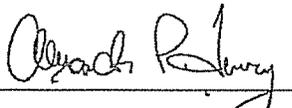
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
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(205) 384-5553

Sample Number : 172076  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW3S  
Code : w  
Date Taken : 11/13/2014  
Sampled By : swr  
Time Taken : 1047  
Depth or Flow : 169.6'  
Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	30	mg/l	Michael Roell	11/14/2014	1400	305.1 (1)
Alkalinity	230	mg/l	Michael Roell	11/14/2014	1320	310.1 (1)
Conductivity	478	us/cm	Steve Riddlesperger	11/13/2014	1047	120.1 (1)
Iron	4.39	mg/l	Danny C. Mays	11/20/2014	1300	236.1 (1)
Manganese	0.20	mg/l	Danny C. Mays	11/20/2014	1350	243.1 (1)
pH	7.14	s.u.	Steve Riddlesperger	11/13/2014	1047	150.1 (1)
Report			Sherri Fields	11/20/2014		
Sulfate	666	mg/l	Heath Brown	11/14/2014	1515	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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Sample Number : 171312  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW3S  
Code : w  
Date Taken : 09/29/2014  
Sampled By : swr  
Time Taken : 1217  
Depth or Flow : 174'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	28	mg/l	Michael Roell	09/30/2014	1545	305.1 (1)
Alkalinity	264	mg/l	Michael Roell	09/30/2014	1400	310.1 (1)
Conductivity	641	us/cm	Heath Brown	10/03/2014	1530	120.1 (1)
Iron	7.92	mg/l	Danny C. Mays	10/03/2014	1415	236.1 (1)
Manganese	0.26	mg/l	Danny C. Mays	10/03/2014	1445	243.1 (1)
pH	6.63	s.u.	Steve Riddlesperger	09/29/2014	1217	150.1 (1)
Report			Sherri Fields	10/13/2014		
Sulfate	72	mg/l	Heath Brown	10/10/2014	1445	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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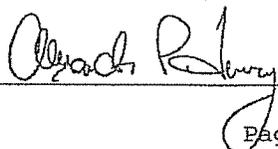
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171767  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW3S  
Code : w  
Date Taken : 10/23/2014  
Sampled By : swr  
Time Taken : 1202  
Depth or Flow : 168.20'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	24	mg/l	Michael Roell	10/24/2014	1520	305.1 (1)
Alkalinity	256	mg/l	Michael Roell	10/24/2014	1430	310.1 (1)
Conductivity	546	us/cm	Heath Brown	10/27/2014	1535	120.1 (1)
Iron	2.71	mg/l	Danny C. Mays	10/30/2014	1105	236.1 (1)
Manganese	0.17	mg/l	Danny C. Mays	10/30/2014	1155	243.1 (1)
pH	6.63	s.u.	Steve Riddlesperger	10/23/2014	1202	150.1 (1)
Report			Sherrri Fields	11/05/2014		
Sulfate	70	mg/l	Heath Brown	11/04/2014	0900	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
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**MW-4**

N 34° 57.882'

W 85° 50.956'

Elevation 1785'

0' - 4': Soil

4' - 70': Sandstone, white, weathered with water at 45', 62'

70' - 72': Shale

72' - 73.5': Coal

73.5' - 101': Shale, light gray to tan, thin coal at 96'

101' - 170': Sandstone

170' - 190': Shale

190' - 199': Sandstone

199' - 230': Shale, dark tan/yellow

230' - 233': Coal

233' - 250': Sandstone

**MW-4D**

TD 250.00' BTOC

Bottom of well 247.50' BGS

Stickup 2.50'

10' screen

Top of sand 235 BGS

Top of Bentonite 229' BGS

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Sample Number : 173376  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW4D  
Code : w  
Date Taken : 02/05/2015  
Sampled By : jdc  
Time Taken : 1140  
Depth or Flow : 226.32'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	20	mg/l	Heath Brown	02/09/2015	0800	305.1 (1)
Alkalinity	146	mg/l	Heath Brown	02/09/2015	1000	310.1 (1)
Conductivity	203	us/cm	Danny C. Mays	02/06/2015	1605	120.1 (1)
Iron	0.23	mg/l	Danny C. Mays	02/12/2015	1225	236.1 (1)
Manganese	0.23	mg/l	Danny C. Mays	02/12/2015	1315	243.1 (1)
pH	7.18	s.u.	Johnny Collier	02/05/2015	1140	150.1 (1)
Report			Sherri Fields	02/12/2015		
Sulfate	6	mg/l	Heath Brown	02/06/2015	1445	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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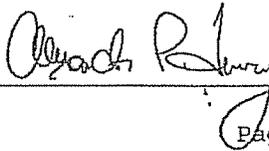
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172939  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW4D  
Code : w  
Date Taken : 01/07/2015  
Sampled By : jdc  
Time Taken : 1215  
Depth or Flow : 226.15'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	26	mg/l	Heath Brown	01/16/2015	0805	305.1 (1)
Alkalinity	138	mg/l	Heath Brown	01/16/2015	0910	310.1 (1)
Conductivity	154	us/cm	Heath Brown	01/09/2015	1550	120.1 (1)
Iron	5.95	mg/l	Danny C. Mays	01/08/2015	1555	236.1 (1)
Manganese	0.15	mg/l	Danny C. Mays	01/08/2015	1630	243.1 (1)
pH	6.34	s.u.	Johnny Collier	01/07/2015	1215	150.1 (1)
Report			Sherri Fields	01/16/2015		
Sulfate	8	mg/l	Heath Brown	01/16/2015	1350	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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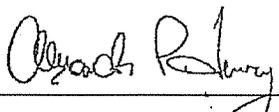
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172462  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW4D  
Code : w  
Date Taken : 12/08/2014  
Sampled By : jdc  
Time Taken : 1035  
Depth or Flow : 226.65'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	20	mg/l	Heath Brown	12/15/2014	0830	305.1 (1)
Alkalinity	144	mg/l	Heath Brown	12/15/2014	0935	310.1 (1)
Conductivity	366	us/cm	Johnny Collier	12/08/2014	1035	120.1 (1)
Iron	35.45	mg/l	Danny C. Mays	12/12/2014	1050	236.1 (1)
Manganese	0.59	mg/l	Danny C. Mays	12/12/2014	1125	243.1 (1)
pH	7.00	s.u.	Johnny Collier	12/08/2014	1035	150.1 (1)
Report			Sherri Fields	12/19/2014		
Sulfate	9	mg/l	Heath Brown	12/18/2014	0800	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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Sample Number : 172463  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW2D  
Code : w  
Date Taken : 12/08/2014  
Sampled By : jdc  
Time Taken : 1050  
Depth or Flow : 235.75'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	14	mg/l	Heath Brown	12/15/2014	0830	305.1 (1)
Alkalinity	10	mg/l	Heath Brown	12/15/2014	0935	310.1 (1)
Conductivity	181	us/cm	Johnny Collier	12/08/2014	1050	120.1 (1)
Iron	0.66	mg/l	Danny C. Mays	12/12/2014	1050	236.1 (1)
Manganese	0.16	mg/l	Danny C. Mays	12/12/2014	1125	243.1 (1)
pH	6.75	s.u.	Johnny Collier	12/08/2014	1050	150.1 (1)
Report			Sherri Fields	12/19/2014		
Sulfate	<1	mg/l	Heath Brown	12/18/2014	0800	8051 (3)

- 1) EPA-600/4-79-020 Revised March 1983
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Sample Number : 171314  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW4D  
Code : w  
Date Taken : 09/29/2014  
Sampled By : swr  
Time Taken : 1340  
Depth or Flow : 223'  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	18	mg/l	Michael Roell	09/30/2014	1545	305.1 (1)
Alkalinity	164	mg/l	Michael Roell	09/30/2014	1400	310.1 (1)
Conductivity	333	us/cm	Heath Brown	10/03/2014	1530	120.1 (1)
Iron	0.25	mg/l	Danny C. Mays	10/03/2014	1415	236.1 (1)
Manganese	0.12	mg/l	Danny C. Mays	10/03/2014	1445	243.1 (1)
pH	6.26	s.u.	Steve Riddlesperger	09/29/2014	1340	150.1 (1)
Report			Sherri Fields	10/13/2014		
Sulfate	10	mg/l	Heath Brown	10/10/2014	1445	8051 (3)

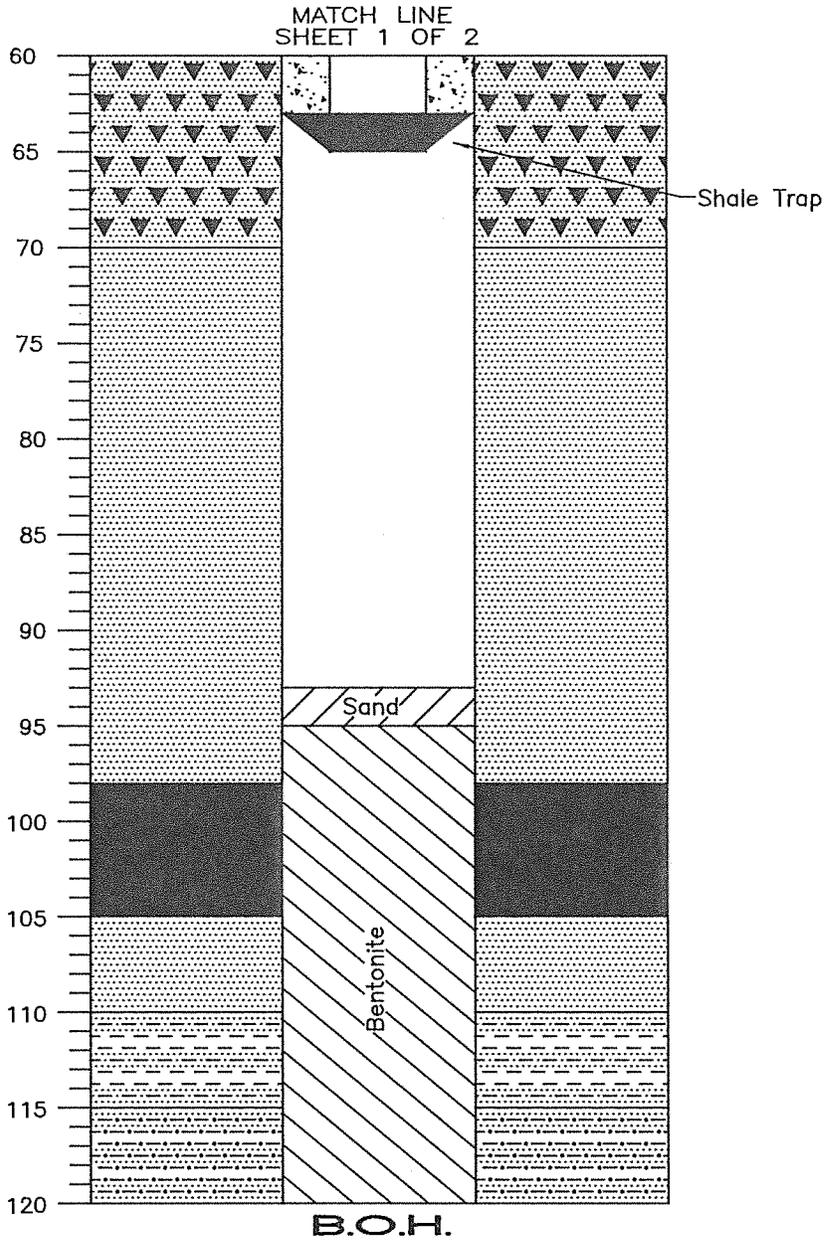
- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

APPROVED BY: \_\_\_\_\_

*Michael Roell*

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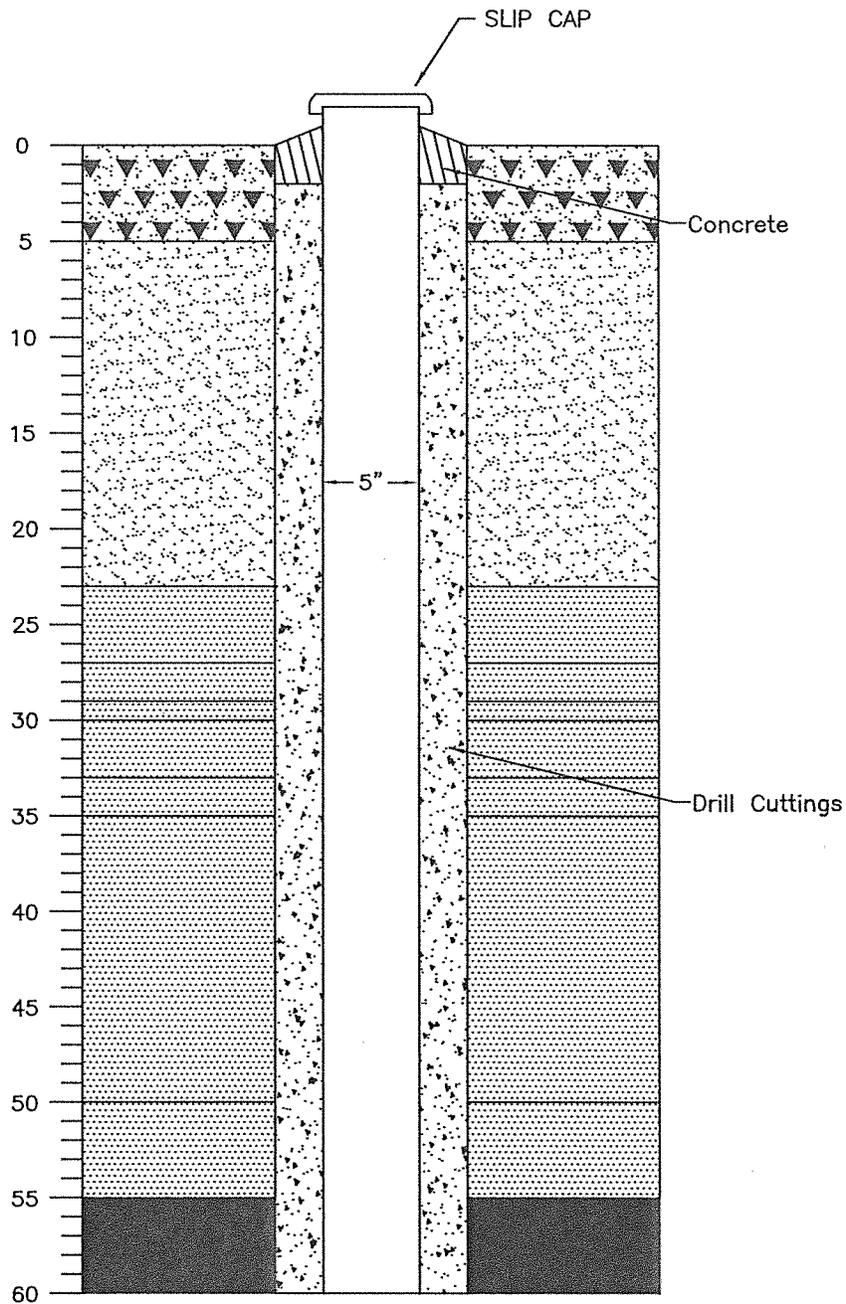
1



SHEET 2 OF 2  
 DRILL: ????  
 SURFACE ELEVATION: ±?????.00 ft. MSL

 <p style="font-size: small; margin: 0;"> <b>PERC</b>        ENGINEERING CO., INC.        1804 Highway 78 West Jasper, Alabama 35501        P.O. Box 1712 Jasper, Alabama 35502        (205) 354-3333 Office (205) 354-4481 Fax     </p>	
<p><b>Red Mesa Energy, LLC.</b>  <b>Bledsoe Mine</b>  <b>Casing Specifications for</b>  <b>RMBMMW-3</b></p>	
DRAWN BY: S.A.E.	DATE: 03-10-2015
DWG. NAME: RMBM_CasingSpec	
APPROVED BY: TST	SCALE: 1" = 10' vertical

V:\Mining\Red Mesa Bledsoe Mine\RMBM\_CasingSpec.dwg 03/10/15 14:01



MATCH LINE  
SHEET 2 OF 2

SHEET 1 OF 2

DRILL: ?????

SURFACE ELEVATION: ±?????.00 ft. MSL



**PERC**  
ENGINEERING CO., INC.  
1600 Highway 75 West Jasper, Alabama 35501  
P.O. Box 1712 Jasper, Alabama 35502  
(205) 384-5533 Office (205) 384-4441 Fax

**Red Mesa Energy, LLC.  
Bledsoe Mine  
Casing Specifications for  
RMBMMW-3**

DRAWN BY: S.A.E.  
DWG. NAME: RMBM\_CasingSpec

DATE: 03-10-2015

APPROVED BY: TST

SCALE: 1" = 10' vertical

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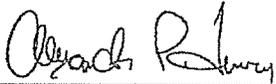
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 173372  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin,Stream,Well ID: RMBMMW-3  
Code : w  
Date Taken : 02/05/2015  
Sampled By : jdc  
Time Taken : 1010  
Depth or Flow : 55.10'  
Tests to be done : Report,  
Depth Only

Parameter	Result	Units	Analyst	Date	Time	Method
Report			Sherri Fields	02/09/2015		

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
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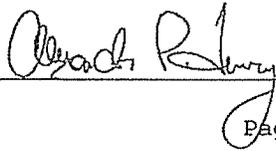
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172940  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW-3  
Code : w  
Date Taken : 01/07/2015  
Sampled By : jdc  
Time Taken : 0920  
Depth or Flow : 55.25'  
Tests to be done : Report,  
Depth Only

Parameter	Result	Units	Analyst	Date	Time	Method
Report			Sherri Fields	01/12/2015		

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
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1

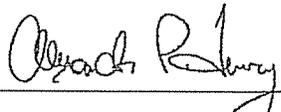
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172466  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW-3  
Code : w  
Date Taken : 12/08/2014  
Sampled By : jdc  
Time Taken : 1125  
Depth or Flow : 56.0'  
Tests to be done : Report,  
Depth Only

Parameter	Result	Units	Analyst	Date	Time	Method
Report			Sherri Fields	12/11/2014		

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
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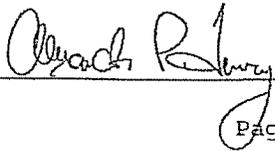
PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172075  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: BMBMMW-3  
Code : w  
Date Taken : 11/13/2014  
Sampled By : swr  
Time Taken : 1020  
Depth or Flow : 57.0'  
Tests to be done : Report,  
Depth Only

Parameter	Result	Units	Analyst	Date	Time	Method
Report			Sherri Fields	11/14/2014		

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
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P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171766  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMMW-3  
Code : w  
Date Taken : 10/23/2014  
Sampled By : swr  
Time Taken : 1021  
Depth or Flow : 56.0'  
Tests to be done : Report,  
Depth Only

Parameter	Result	Units	Analyst	Date	Time	Method
Report			Sherri Fields	10/24/2014		

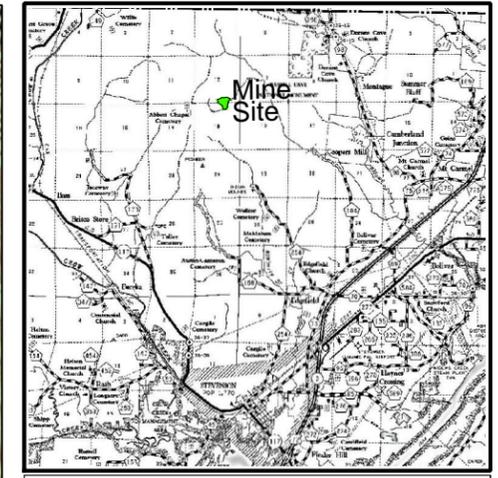
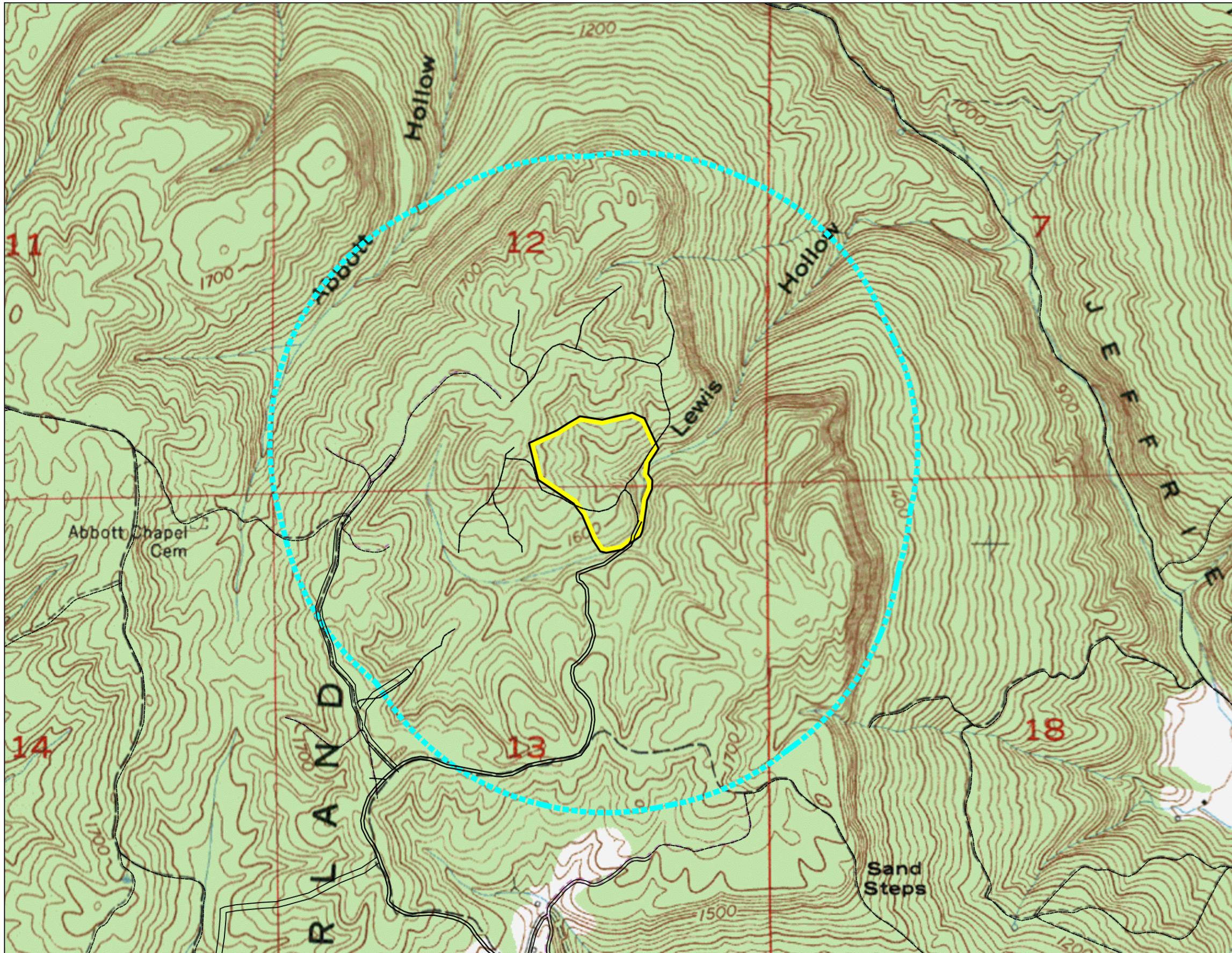
- 1) EPA-600/4-79-020 Revised March 1983
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*Alach R. R. R.*

Page

1



**VICINITY MAP**  
Scale: 1" = 2 Miles

**LEGEND**

	Permit Boundary
	Well Inventory Boundary

**NOTES**

- No Residences were identified within the Well Inventory Boundary



Base map - Doran Cove and Eureka  
Alabama United States Geological  
Survey Quadrangle Maps.

**PERC**  
ENGINEERING CO., INC.  
1606 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502  
(205) 384-5553 Office (205) 296-3114 Fax

**Red Mesa Energy, LLC.  
Bledsoe Mine Permit Map  
Well Inventory Map**

DWG NAME:	RMBledsoeMine	DATE:	03-11-2015
DRAWN BY:	S.A.E.	SCALE:	1"=1000'
APPROVED BY:	T.S.T.	JOB NUMBER:	14-04482-004

C:\Mining\Red Mesa Bledsoe Mine\RBledsoeMine.dwg 04/15/15 15:00

**ATTACHMENT II-G**  
**SURFACE WATER HYDROLOGY**

Surface runoff from the proposed Red Mesa, LLC. - Bledsoe Mine will drain into an unnamed tributary to Widows Creek. Widows Creek drains into the Tennessee River. Widows Creek lies in subwatershed 060 of hydrologic unit code 06030001 as defined by the USDA Soil Conservation Service.

One sediment control structure is proposed for this facility. Sediment basin 001P will drain into an unnamed tributary to Widows Creek. Sediment basin 001P is proposed as a permanent water impoundment, fish and wildlife habitat. Widows Creek is owned by the State and is perennial. The use of Widows Creek, if any legitimate use exists, is to support the local wildlife or contribute to the quality and quantity of the Tennessee River. The use of Widows Creek has been classified as "Fish & Wildlife" in Chapter 335-6-11-.02 of "Water Use Classifications For Interstate and Intrastate Waters" as taken from the Water Quality Program at ADEM. According to Chapter 335-6-10 of the same reference, the best usage of the "Fish & Wildlife" classification is fishing, the propagation of fish, aquatic life, and wildlife, and any other usage except utilization as a supply for drinking or food processing, or for swimming and water contact sports.

Baseline surface water quality and quantity for Widows Creek (which receives all runoff from the proposed mine site) is characterized in this report by samples taken at downstream Surface Water Monitoring Site RMBMSW-3A and upstream Surface Water Monitoring Site RMBMSW-2 as shown on the attached Mine Site Location Map. Both

downstream Surface Water Monitoring Site RMBMSW-3A and upstream Surface Water Monitoring Site RMBMSW-2 was sampled on 6 occasions by the PERC Engineering Laboratory between 09-30-14 and 02-05-15. All surface water samples were taken by the 'grab' method. Flowrate measurements were taken according to ASTM D3858 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method" or other equally valid methods. All samples analyzed by the PERC Engineering Laboratory are according to ASTM standards. Parameters tested on all occasions include pH, total iron, total manganese, total suspended solids, specific conductance, sulfates, acidity, and alkalinity. See attached results of analysis. Parameters tested at both sites include flowrate (discharge), pH, total iron, total manganese, total suspended solids, specific conductance, sulfates, acidity, and alkalinity. All samples were analyzed by the PERC Engineering Laboratory according to ASTM standards. In addition, a split of two samples of both the upstream monitoring site and the downstream monitoring site (one sample for the high flow and one sample for the low flow) was sent to CH2MHILL where the following analysis was conducted according to ASTM standards: Antimony, Arsenic, Barium, Cadmium, Lead, Selenium, Thallium, Mercury, and Cyanide to satisfy ADEM 2C monitoring requirements. It is assumed that this analysis is valid. See attached surface water analysis.

All parameters mentioned above were plotted vs. stream flow (in CFMS) to characterize water quality in the receiving stream at different flowrates prior to mining by Red Mesa, LLC. at the proposed -Bledsoe Mine. Baseline conditions at the 7Q2, Average, and 2 yr. flowrates are given in the Determination of the Probable Hydrologic Consequences

(Attachment II-H).

Downstream Surface Water Monitoring Site RMBMSW-3A drains approximately 8.90 square miles. In general, slope conditions within this watershed is variable but predominantly steep from the mountain range down to the flood plains and the flood plain areas are flat. moderate. Elevations range from approximately 1700 feet MSL at the drainage divide to approximately 600 feet MSL at the monitoring site. The pre-mine landuse within the drainage area of Surface Water Monitoring Site RMBMSW-3A has been estimated at approximately 9.46 percent agricultural and open spaces, 0.70 percent previously disturbed, and 89.84 percent forest as referenced by the Photorevised Doran Cove and Eureka, Alabama U.S.G.S. 7.5 minute Quadrangles. and updated utilizing ASMC information.

A topsoil waiver is not proposed for this facility.

Dominant soil series within this watershed area are limited to Enders, Hartsells, and Muskingum soil series. Descriptions of these soil series were taken from local published soil surveys and are as follows:

#### ENDERS SERIES:

Soils of the Enders series are moderately deep and deep, well drained, and gently sloping to moderately steep. They formed in material weathered from interbedded shale and

sandstone. These soils are on ridgetops on the Southern Appalachian Plateau and are also on some of the side slopes. The following describes a representative profile:

0 to 5 inches: brown, very friable loam.

5 to 40 inches: red, firm silty clay; has some yellowish-brown mottles in lower part; blocky structure

40 to 52 inches: mottled red and brown, firm silty clay

52 inches +: level-bedded shale

These soils are very strongly acid. Their content of organic matter and their natural fertility are low. Crops grown on these soils make good response to lime and fertilizer. Water enters the soils readily and moves through the profile at a moderate to slow rate. The available moisture capacity is moderate to low. The root zone is moderately deep.

#### HARTSELLS SERIES:

The Hartsells series consists of shallow to moderately deep, well-drained soils that are gently sloping or sloping in most places. These soils developed mainly in residuum weathered from sandstone that is interbedded, in places, with thin lenses of shale. The depth to bedrock ranges from about 12 to 60 inches. Hartsells soils are low in natural fertility and in organic matter. The following describes a representative profile:

0 to 6 inches: grayish-brown fine sandy loam, weak, fine, granular structure; very friable; many fine roots; few fragments of sandstone; strongly acid; clear wavy boundary.

6 to 10 inches: yellowish-brown fine sandy loam; weak, fine, granular and subangular blocky structure; friable; many fine roots; few small fragments of

sandstone, strongly acid; clear wavy boundary.

10 to 26 inches: yellowish-brown loam; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

These soils are strongly acid. Infiltration for water is medium, and the permeability of the subsoil is moderate. The moisture-supplying capacity ranges from low to moderately high. The hazard of erosion is moderate to severe. Because of low moisture-supplying capacity and generally strong slopes, the shallow Hartsells soils are better suited to sod crops and to trees, mainly to loblolly pine.

#### MUSKINGUM SERIES:

The Muskingum series consists of shallow and very shallow, excessively drained, strongly sloping to steep soils. These soils formed in residuum weathered mainly from sandstone but partly from shale. The following describes a representative profile:

0 to 2 inches: very dark grey stony fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear wavy boundary.

2 to 8 inches: greyish-brown to dark greyish-brown stony fine sandy loam; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear wavy boundary.

8 to 12 inches: yellowish-brown; stony fine sandy loam; weak, fine, granular and some weak, fine subangular blocky structure; friable; strongly acid.

12 inches +: partly weathered sandstone

The Muskingum soils are low in natural fertility and in organic matter. They are strongly acid. Surface runoff is medium to rapid, infiltration of water is medium, and permeability is rapid. The moisture-supplying capacity is low. The hazard of erosion is moderate to severe. The native vegetation is mainly oak, hickory, sassafras, dogwood, and pine. Most

of the acreage of these soils is wooded and should be left in trees. Pine is very well suited.

These soils are not generally suitable for cultivation.

PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171350  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW3A  
Code : s  
Date Taken : 09/30/2014  
Sampled By : ls  
Time Taken : 1630  
Depth or Flow : 0.08 cfs  
Tests to be done : pH, TSS, Cond, SO4, Acid, Alk,  
Report, Fe, Mn,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	12	mg/l	Heath Brown	10/13/2014	1550	305.1 (1)
Alkalinity	176	mg/l	Heath Brown	10/13/2014	1500	310.1 (1)
Conductivity	375	us/cm	Heath Brown	10/03/2014	1530	120.1 (1)
Iron	0.28	mg/l	Danny C. Mays	10/03/2014	1415	236.1 (1)
Manganese	0.14	mg/l	Danny C. Mays	10/03/2014	1445	243.1 (1)
pH	7.13	s.u.	Leslie Stephens	09/30/2014	1630	150.1 (1)
Report			Sherri Fields	10/17/2014		
Sulfate	1	mg/l	Heath Brown	10/10/2014	1445	8051 (3)
TSS	<1	mg/l	Heath Brown	10/01/2014	1115	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171399  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW3A  
Code : s  
Date Taken : 10/02/2014  
Sampled By : jdc  
Time Taken : 1220  
Depth or Flow : 0.081cfs  
Tests to be done : Phenols Cn F2CM Al Hardness  
Report pH Cond

Parameter	Result	Units	Analyst	Date	Time	Method
Aluminum	0.00317	mg/l	CH2M Hill	10/15/2014	1817	EPA 200.8
Conductivity	353	us/cm	Johnny Collier	10/02/2014	1220	120.1 (1)
Cyanide	<0.02	mg/l	Guardian Systems	10/15/2014	1737	335.4 (1)
pH	7.58	s.u.	Johnny Collier	10/02/2014	1220	150.1 (1)
Phenols	<0.1	mg/l	Guardian Systems	10/15/2014	1400	420.1 (1)
Report			Sherri Fields	10/30/2014		
Total Hardness	3.88	mg/l	CH2M Hill	10/20/2014	1544	SM2340B

- 1) EPA-600/4-79-020 Revised March 1983
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171765  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW3A  
Code : s  
Date Taken : 10/23/2014  
Sampled By : swr  
Time Taken : 1115  
Depth or Flow : 1.116cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	20	mg/l	Michael Roell	10/24/2014	1520	305.1 (1)
Alkalinity	158	mg/l	Michael Roell	10/24/2014	1430	310.1 (1)
Conductivity	298	us/cm	Heath Brown	10/27/2014	1535	120.1 (1)
Iron	0.27	mg/l	Danny C. Mays	10/30/2014	1105	236.1 (1)
Manganese	0.09	mg/l	Danny C. Mays	10/30/2014	1155	243.1 (1)
pH	6.21	s.u.	Steve Riddlesperger	10/23/2014	1115	150.1 (1)
Report			Sherri Fields	11/05/2014		
Sulfate	<1	mg/l	Heath Brown	11/04/2014	0900	8051 (3)
TSS	1	mg/l	Heath Brown	10/27/2014	1400	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172079  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW3A  
Code : s  
Date Taken : 11/13/2014  
Sampled By : swr  
Time Taken : 1240  
Depth or Flow : 0.917cfs  
Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,  
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	8	mg/l	Michael Roell	11/14/2014	1400	305.1 (1)
Alkalinity	162	mg/l	Michael Roell	11/14/2014	1320	310.1 (1)
Conductivity	307	us/cm	Steve Riddlesperger	11/13/2014	1240	120.1 (1)
Iron	0.46	mg/l	Danny C. Mays	11/20/2014	1300	236.1 (1)
Manganese	0.12	mg/l	Danny C. Mays	11/20/2014	1350	243.1 (1)
pH	7.71	s.u.	Steve Riddlesperger	11/13/2014	1240	150.1 (1)
Report			Sherri Fields	11/20/2014		
Sulfate	<1	mg/l	Heath Brown	11/14/2014	1515	8051 (3)
TSS	4	mg/l	Heath Brown	11/14/2014	1315	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172465  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW3A  
Code : s  
Date Taken : 12/08/2014  
Sampled By : jdc  
Time Taken : 1245  
Depth or Flow : 1.876cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	14	mg/l	Heath Brown	12/15/2014	0830	305.1 (1)
Alkalinity	156	mg/l	Heath Brown	12/15/2014	0935	310.1 (1)
Conductivity	308	us/cm	Johnny Collier	12/08/2014	1245	120.1 (1)
Iron	0.72	mg/l	Danny C. Mays	12/12/2014	1050	236.1 (1)
Manganese	0.22	mg/l	Danny C. Mays	12/12/2014	1125	243.1 (1)
pH	6.95	s.u.	Johnny Collier	12/08/2014	1245	150.1 (1)
Report			Sherri Fields	12/19/2014		
Sulfate	<1	mg/l	Heath Brown	12/18/2014	0800	8051 (3)
TSS	26	mg/l	Heath Brown	12/09/2014	1255	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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- 4) EPA-600/4-88/039 Revised July 1991
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172941  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW3A  
Code : s  
Date Taken : 01/07/2015  
Sampled By : jdc  
Time Taken : 1335  
Depth or Flow : 3.44 cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report, TSS, F2C Metals + Al

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	18	mg/l	Heath Brown	01/16/2015	0805	305.1 (1)
Alkalinity	150	mg/l	Heath Brown	01/16/2015	0910	310.1 (1)
Conductivity	163	us/cm	Heath Brown	01/09/2015	1550	120.1 (1)
Iron	0.45	mg/l	Danny C. Mays	01/08/2015	1555	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	01/08/2015	1630	243.1 (1)
pH	6.16	s.u.	Johnny Collier	01/07/2015	1335	150.1 (1)
Report			Sherri Fields	01/28/2015		
Sulfate	<1	mg/l	Heath Brown	01/16/2015	1350	8051 (3)
TSS	7	mg/l	Heath Brown	01/08/2015	1320	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 173377  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW3A  
Code : s  
Date Taken : 02/05/2015  
Sampled By : jdc  
Time Taken : 1350  
Depth or Flow : 1.52 cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	16	mg/l	Heath Brown	02/09/2015	0800	305.1 (1)
Alkalinity	154	mg/l	Heath Brown	02/09/2015	1000	310.1 (1)
Conductivity	168	us/cm	Danny C. Mays	02/06/2015	1605	120.1 (1)
Iron	0.43	mg/l	Danny C. Mays	02/12/2015	1225	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	02/12/2015	1315	243.1 (1)
pH	6.22	s.u.	Johnny Collier	02/05/2015	1350	150.1 (1)
Report			Sherri Fields	02/12/2015		
Sulfate	<1	mg/l	Heath Brown	02/06/2015	1445	8051 (3)
TSS	8	mg/l	Heath Brown	02/06/2015	1000	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171349  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW-2  
Code : S  
Date Taken : 09/30/2014  
Sampled By : ls  
Time Taken : 1515  
Depth or Flow : 0.029cfs  
Tests to be done : pH, TSS, Cond, SO4, Acid, Alk,  
Report, Fe, Mn,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	6	mg/l	Heath Brown	10/13/2014	1550	305.1 (1)
Alkalinity	8	mg/l	Heath Brown	10/13/2014	1500	310.1 (1)
Conductivity	39	us/cm	Heath Brown	10/03/2014	1530	120.1 (1)
Iron	0.17	mg/l	Danny C. Mays	10/03/2014	1415	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	10/03/2014	1445	243.1 (1)
pH	7.7	s.u.	Leslie Stephens	09/30/2014	1515	150.1 (1)
Report			Sherri Fields	10/17/2014		
Sulfate	<1	mg/l	Heath Brown	10/10/2014	1445	8051 (3)
TSS	<1	mg/l	Heath Brown	10/01/2014	1115	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171398  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW-2  
Code : s  
Date Taken : 10/02/2014  
Sampled By : jdc  
Time Taken : 1115  
Depth or Flow : 0.021cfs  
Tests to be done : Phenols Cn F2CM Al Hardness  
Report pH Cond

Parameter	Result	Units	Analyst	Date	Time	Method
Aluminum	0.0804	mg/l	CH2M Hill	10/15/2014	1925	EPA 200.8
Conductivity	20	us/cm	Johnny Collier	10/02/2014	1115	120.1 (1)
Cyanide	<0.02	mg/l	Guardian Systems	10/15/2014	1737	335.4 (1)
pH	5.63	s.u.	Johnny Collier	10/02/2014	1115	150.1 (1)
Phenols	<0.1	mg/l	Guardian Systems	10/15/2014	1400	420.1 (1)
Report			Sherri Fields	10/30/2014		
Total Hardness	3.94	mg/l	CH2M Hill	10/20/2014	1541	SM2340B

- 1) EPA-600/4-79-020 Revised March 1983
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 171764  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW-2  
Code : s  
Date Taken : 10/23/2014  
Sampled By : swr  
Time Taken : 0917  
Depth or Flow : 0.335cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	12	mg/l	Michael Roell	10/24/2014	1520	305.1 (1)
Alkalinity	4	mg/l	Michael Roell	10/24/2014	1430	310.1 (1)
Conductivity	14	us/cm	Heath Brown	10/27/2014	1535	120.1 (1)
Iron	0.21	mg/l	Danny C. Mays	10/30/2014	1105	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	10/30/2014	1155	243.1 (1)
pH	6.37	s.u.	Steve Riddlesperger	10/23/2014	0917	150.1 (1)
Report			Sherri Fields	11/05/2014		
Sulfate	<1	mg/l	Heath Brown	11/04/2014	0900	8051 (3)
TSS	<1	mg/l	Heath Brown	10/27/2014	1400	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172074  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: BMBMSW-2  
Code : s  
Date Taken : 11/13/2014  
Sampled By : swr  
Time Taken : 1012  
Depth or Flow : 0.378cfs  
Tests to be done : pH, Cond, Fe, Mn, SO4, Acid, Alk,  
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	10	mg/l	Michael Roell	11/14/2014	1400	305.1 (1)
Alkalinity	4	mg/l	Michael Roell	11/14/2014	1320	310.1 (1)
Conductivity	16	us/cm	Steve Riddlesperger	11/13/2014	1012	120.1 (1)
Iron	0.30	mg/l	Danny C. Mays	11/20/2014	1300	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	11/20/2014	1350	243.1 (1)
pH	7.44	s.u.	Steve Riddlesperger	11/13/2014	1012	150.1 (1)
Report			Sherri Fields	11/20/2014		
Sulfate	<1	mg/l	Heath Brown	11/14/2014	1515	8051 (3)
TSS	1	mg/l	Heath Brown	11/14/2014	1315	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
- 2) Standard Methods for the Examination Water and Wastes Water
- 3) HACH Water Analysis Handbook, 2nd Edition
- 4) EPA-600/4-88/039 Revised July 1991
- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172464  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW-2  
Code : s  
Date Taken : 12/08/2014  
Sampled By : jdc  
Time Taken : 1140  
Depth or Flow : 0.655cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	12	mg/l	Heath Brown	12/15/2014	0830	305.1 (1)
Alkalinity	2	mg/l	Heath Brown	12/15/2014	0935	310.1 (1)
Conductivity	308	us/cm	Johnny Collier	12/08/2014	1140	120.1 (1)
Iron	0.10	mg/l	Danny C. Mays	12/12/2014	1050	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	12/12/2014	1125	243.1 (1)
pH	7.30	s.u.	Johnny Collier	12/08/2014	1140	150.1 (1)
Report			Sherri Fields	12/19/2014		
Sulfate	<1	mg/l	Heath Brown	12/18/2014	0800	8051 (3)
TSS	2	mg/l	Heath Brown	12/09/2014	1255	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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- 5) EPA, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition
- 6) Code of Federal Regulations, Title 40, Part 136, Appendix A

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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 172936  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW-2  
Code : s  
Date Taken : 01/07/2015  
Sampled By : jdc  
Time Taken : 0930  
Depth or Flow : 3.26 cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report, TSS, F2C Metals + Al

Parameter	Result	Units	Analyst	Date	Time	Method
Acidity	26	mg/l	Heath Brown	01/16/2015	0805	305.1 (1)
Alkalinity	2	mg/l	Heath Brown	01/16/2015	0910	310.1 (1)
Conductivity	19	us/cm	Heath Brown	01/09/2015	1550	120.1 (1)
Iron	0.18	mg/l	Danny C. Mays	01/08/2015	1555	236.1 (1)
Manganese	<0.04	mg/l	Danny C. Mays	01/08/2015	1630	243.1 (1)
pH	5.63	s.u.	Johnny Collier	01/07/2015	0930	150.1 (1)
Report			Sherri Fields	01/28/2015		
Sulfate	<1	mg/l	Heath Brown	01/16/2015	1350	8051 (3)
TSS	1	mg/l	Heath Brown	01/14/2015	1110	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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PERC ENGINEERING CO., INC.  
P.O. Box 1712  
Jasper, Alabama 35502  
(205) 384-5553

Sample Number : 173373  
Client : Red Mesa  
Facility : Bledsoe Mine  
Job Number :  
NPDES Permit # :  
Basin, Stream, Well ID: RMBMSW-2  
Code : s  
Date Taken : 02/05/2015  
Sampled By : jdc  
Time Taken : 1015  
Depth or Flow : 1.08 cfs  
Tests to be done : pH, Cond, SO4, Acid, Alk, Fe, Mn,  
Report, TSS,

Parameter	Result	Units	Analyst	Date	Time	Method
pH	6.23	s.u.	Johnny Collier	02/05/2015	1015	150.1 (1)
TSS	2	mg/l	Heath Brown	02/06/2015	1000	160.2 (1)

- 1) EPA-600/4-79-020 Revised March 1983
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APPROVED BY: \_\_\_\_\_

## ANALYTICAL REPORT

For:  
**PERC Engineering Co., Inc - Red Mesa Bledsoe Mine**

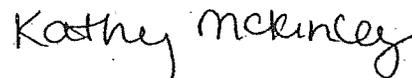
**ASL Report #: N2833**

**Project ID: 921378.OTC**

**Attn: Sherri Fields**

cc:  
Paul Henry/alexanderphentry@percengineering.com

Authorized and Released By:



**Laboratory Project Manager**

**Kathy McKinley**

*(541) 758-0235 ext.23144*

*October 29, 2014*

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.



Accredited in accordance with NELAP:  
Oregon (100022)  
Arizona (0771)  
Louisiana (05031)

ASL Report #: N2833

**Sample Receipt Comments**

We certify that the test results meet all NELAP requirements except those listed below:

- CH2M HILL Applied Sciences Laboratory is not accredited by NELAP for the following tests: E200.8M.

**Sample Cross-Reference**

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
N283301	171398 RED MESA SW2	10/02/14 11:15	10/08/14
N283302	171399 RED MESA SW3A	10/02/14 12:20	10/08/14



## CASE NARRATIVE METALS ANALYSIS

**Lab Name:** CH2M HILL ASL

**ASL SDG#:** N2833

**Project:** PERC Engineering Co., Inc

**Project #:** 921378.OTC

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With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

All analyses were performed in accordance with 40 CFR Part 136.

**Method(s):**

E200.8, IC-ICPMS: E200.2

E245.1

SM2340B

**Analytical Exception(s):**

E200.8, IC-ICPMS: The dissolved arsenic result exceeded the total arsenic result in sample 171399 RED MESA SW3A. This was confirmed by re-analysis.

Client sample 171398 RED MESA SW2:

ICPMS: analyzed at 19:25

Dissolved arsenic: analyzed at 18:00

Arsenic species: analyzed at 14:48

Client sample 171399 RED MESA SW3A:

ICPMS: analyzed at 19:31

Dissolved arsenic: analyzed at 18:17

Arsenic species: analyzed at 15:26

E245.1:

Client sample 171398 RED MESA SW2:

Analyzed at 18:51

Client sample 171399 RED MESA SW3A:

Analyzed at 18:53

SM2340B:

Client sample 171398 RED MESA SW2:

Analyzed at 15:41

Client sample 171399 RED MESA SW3A:

Analyzed at 15:44

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 171398 RED MESA SW2	Lab Sample ID: N283301
Project Name: PERC Engineering Co., Inc	Date Received: 10/08/2014
Sample Date: 10/02/2014	Report Revision No: 0
Sample Time: 11:15	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Aluminum	1	3.17	10.0	80.4		ug/L	E200.8	E200.2	10/15/2014
Antimony	1	0.031	0.50	0.031	U	ug/L	E200.8	E200.2	10/15/2014
Arsenic	1	0.030	0.50	0.082	J	ug/L	E200.8	E200.2	10/15/2014
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	10/15/2014
Chromium	1	0.10	1.00	0.17	J	ug/L	E200.8	E200.2	10/15/2014
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	10/15/2014
Hardness, Total as CaCO3	1	0.71	3.31	3.94		mg/L	SM2340B	NONE	10/20/2014
Lead	1	0.041	0.50	0.10	J	ug/L	E200.8	E200.2	10/15/2014
Mercury	1	0.045	0.10	0.053	J	ug/L	E245.1	METHOD	10/16/2014
Nickel	1	0.025	0.50	0.46	J	ug/L	E200.8	E200.2	10/15/2014
Selenium	1	0.069	0.50	0.10	J	ug/L	E200.8	E200.2	10/15/2014
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Zinc	1	2.50	10.0	2.58	J	ug/L	E200.8	E200.2	10/15/2014

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 171398 RED MESA SW2	Lab Sample ID: N283301F
Project Name: PERC Engineering Co., Inc	Date Received: 10/08/2014
Sample Date: 10/02/2014	Report Revision No: 0
Sample Time: 11:15	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Dissolved Metals</b>									
Arsenic	1	0.030	0.50	0.079	J	ug/L	E200.8	FLDFLT	10/21/2014

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 171399 RED MESA SW3A	Lab Sample ID: N283302
Project Name: PERC Engineering Co., Inc	Date Received: 10/08/2014
Sample Date: 10/02/2014	Report Revision No: 0
Sample Time: 12:20	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Aluminum	1	3.17	10.0	56.4		ug/L	E200.8	E200.2	10/15/2014
Antimony	1	0.031	0.50	0.031	U	ug/L	E200.8	E200.2	10/15/2014
Arsenic	1	0.030	0.50	0.068	J	ug/L	E200.8	E200.2	10/15/2014
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	10/15/2014
Chromium	1	0.10	1.00	0.30	J	ug/L	E200.8	E200.2	10/15/2014
Copper	1	0.50	2.00	0.68	J	ug/L	E200.8	E200.2	10/15/2014
Hardness, Total as CaCO3	1	0.71	3.31	3.88		mg/L	SM2340B	NONE	10/20/2014
Lead	1	0.041	0.50	0.072	J	ug/L	E200.8	E200.2	10/15/2014
Mercury	1	0.045	0.10	0.055	J	ug/L	E245.1	METHOD	10/16/2014
Nickel	1	0.025	0.50	0.48	J	ug/L	E200.8	E200.2	10/15/2014
Selenium	1	0.069	0.50	0.093	J	ug/L	E200.8	E200.2	10/15/2014
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Zinc	1	2.50	10.0	3.44	J	ug/L	E200.8	E200.2	10/15/2014

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 171399 RED MESA SW3A	Lab Sample ID: N283302F
Project Name: PERC Engineering Co., Inc	Date Received: 10/08/2014
Sample Date: 10/02/2014	Report Revision No: 0
Sample Time: 12:20	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Dissolved Metals</b>									
Arsenic	1	0.030	0.50	0.55		ug/L	E200.8	FLDFLT	10/21/2014

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Sample Date: N/A Sample Time: N/A Type: QC Matrix: Water	Method Blank ID: WB1-1016  Date Received: N/A Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	10/16/2014

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Sample Date: N/A Sample Time: N/A Type: QC Matrix: Water	Method Blank ID: WB10-1021  Date Received: N/A Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Arsenic	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	10/21/2014

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Project Name: PERC Engineering Co., Inc				Method Blank ID: WB2-1013			
Sample Date: N/A				Date Received: N/A			
Sample Time: N/A				Report Revision No: 0			
Type: QC							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Aluminum	1	3.17	10.0	3.17	U	ug/L	E200.8	E200.2	10/15/2014
Antimony	1	0.031	0.50	0.10	J	ug/L	E200.8	E200.2	10/15/2014
Arsenic	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	10/15/2014
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	10/15/2014
Chromium	1	0.10	1.00	0.10	U	ug/L	E200.8	E200.2	10/15/2014
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	10/15/2014
Hardness, Total as CaCO3	1	0.71	3.31	0.71	U	mg/L	SM2340B	NONE	10/20/2014
Lead	1	0.041	0.50	0.041	U	ug/L	E200.8	E200.2	10/15/2014
Nickel	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Selenium	1	0.069	0.50	0.069	U	ug/L	E200.8	E200.2	10/15/2014
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	10/15/2014
Zinc	1	2.50	10.0	2.50	U	ug/L	E200.8	E200.2	10/15/2014

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS10W1021 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>							
Arsenic	21.0	20.1	ug/L	96	E200.8	E200.2	10/21/2014

\*=See case narrative  
 U=Not detected at specified detection limit  
 E=Estimated value above calibration range  
 J=Estimated value below reporting limit

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS1W1016 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>							
Mercury	1.00	1.0	ug/L	100	E245.1	METHOD	10/16/2014

\*=See case narrative  
 U=Not detected at specified detection limit  
 E=Estimated value above calibration range  
 J=Estimated value below reporting limit

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc	Blank Spike ID: BS2W1013
Type: QC	Report Revision No: 0
Matrix: Water	Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>							
Aluminum	50.0	51.2	ug/L	102	E200.8	E200.2	10/15/2014
Antimony	50.0	48.6	ug/L	97	E200.8	E200.2	10/15/2014
Arsenic	50.0	51.5	ug/L	103	E200.8	E200.2	10/15/2014
Beryllium	50.0	48.2	ug/L	96	E200.8	E200.2	10/15/2014
Cadmium	50.0	51.6	ug/L	103	E200.8	E200.2	10/15/2014
Chromium	50.0	51.5	ug/L	103	E200.8	E200.2	10/15/2014
Copper	50.0	50.8	ug/L	102	E200.8	E200.2	10/15/2014
Lead	50.0	51.4	ug/L	103	E200.8	E200.2	10/15/2014
Nickel	50.0	51.3	ug/L	103	E200.8	E200.2	10/15/2014
Selenium	50.0	50.6	ug/L	101	E200.8	E200.2	10/15/2014
Silver	25.0	24.1	ug/L	96	E200.8	E200.2	10/15/2014
Thallium	50.0	52.3	ug/L	105	E200.8	E200.2	10/15/2014
Zinc	50.0	54.1	ug/L	108	E200.8	E200.2	10/15/2014

\*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

# CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: 171398 RED MESA SW2	Lab Sample ID: N283301
Project Name: PERC Engineering Co., Inc	Date Received: 10/8/2014
Sampling Date: 10/2/2014	Report Revision No.: 0
Sampling Time: 11:15:00 AM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	10/22/2014
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	10/22/2014

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: 171399 RED MESA SW3A	Lab Sample ID: N283302
Project Name: PERC Engineering Co., Inc	Date Received: 10/8/2014
Sampling Date: 10/2/2014	Report Revision No.: 0
Sampling Time: 12:20:00 PM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	10/22/2014
Arsenic, AsV	0.15	0.50	0.31	J	ug/L	IC-ICPMS	10/22/2014

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: Method Blank	Lab Sample ID: N2833
Project Name: PERC Engineering Co., Inc	Date Received: NA
Sampling Date: NA	Report Revision No.: 0
Sampling Time: NA	
Type: QC	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<b>Metals</b>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	10/22/2014
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	10/22/2014

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

**Client Information**

Client Sample ID: Blank Spike  
 Project Name: PERC Engineering Co., Inc  
 Type: QC  
 Matrix: Water

**Lab Information**

Lab Sample ID: N2833  
 Date Received: NA  
 Report Revision No.: 0  
 Reported By:

Analyte	% Recovery	Analysis Method	Date Analyzed
<b>Metals</b>			
Arsenic, AsIII	100	IC-ICPMS	10/22/2014
Arsenic, AsV	98	IC-ICPMS	10/22/2014

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

10/21/14  
 2015

COC #

Project # or Purchase Order # **20151**

Project Name **RED MESA BUESOE MILIE**

Company Name or Home Address/Phone Number  
**PERC ENGINEERING Co., Inc. (205) 304-5553**

Email Address for Reporting  
**perc@perc-engineering.com**

Report Copy to:  
**SHERIFF FIRE LABS**

Turnaround Time  
 7 days  14 days  21 days (STD)  24 hours  48 hours  72 hours

Drinking Water? Yes  No  Return

Sample Disposal: Dispose  Return

CLIENT SAMPLE ID

171398 RED MESA SW2

171399 RED MESA SW3A

TOTAL # OF CONTAINERS

Date	Time	Type	Matrix	Preservative					EPA Tier QC Level	Canister ID	Lab ID		
				H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	NaOH	ZnAcNaOH					
10-2-14	1115	✓	GRAB	ASBESTY					H403	H403	1	3	4
10-2-14	1220	✓	✓	ASBESTY					METALS MEANS	METALS MEANS			

Requested Analytical Method #	Lab #	Page	of
	A2033		

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Volatile Contaminants/Odororous  Biohazard  Other

Relinquished By: **[Signature]** Date/Time: **10/7/14 08:55**

Relinquished By (Please sign and print name): **[Signature]** Date/Time: **10/8/14 10:00**

Relinquished By (Please sign and print name): **[Signature]** Date/Time: **10/8/14 10:00**

Shipped Via:  UPS  Fed-Ex  Other

Tracking #

Special Instructions: **SEE ATTACHMENT**  
 Instructions and Agreement Provisions on Reverse Side



SDG ID: N2833

Date Received: 10/8/2014

Client/Project: Perc Engineering

Received By: RM

- Were custody seals intact and on the outside of the cooler?  Yes  No  N/A
- Shipping Record:  Hand Delivered  On File  COC
- Radiological Screening for DoD  Yes  No  N/A
- Packing Material:  Hand Delivered  Ice  Blue Ice  Box
- Temp OK? (<6C) Therm ID: TH173 Exp. 11/14 1.9 °C  Yes  No  N/A
- Was a Chain of Custody (CoC) Provided?  Yes  No  N/A
- Was the CoC correctly filled out (If No, document below)  Yes  No  N/A
- Did sample labels agree with COC? (If No, document below)  Yes  No  N/A
- Did the CoC list a correct bottle count and the preservative types (No=Correct on CoC)  Yes  No  N/A
- Were the sample containers in good condition (broken or leaking)?  Yes  No  N/A
- Was enough sample volume provided for analysis? (If No, document below)  Yes  No  N/A
- Containers supplied by ASL?  Yes  No  N/A
- Any sample with < 1/2 holding time remaining? If so contact LPM  Yes  No  N/A
- Samples have multi-phase? If yes, document on SRER  Yes  No  N/A
- All water VOCs free of air bubbles? No, document on SRER  Yes  No  N/A
- pH of all samples met criteria on receipt? If "No", preserve and document below.  Yes  No  N/A
- Dissolved/Soluble metals filtered in the field?  Yes  No  N/A
- Dissolved/Soluble metals have sediment in bottom of container? If so document below.  Yes  No  N/A

**Preservation Adjustment**

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials/Time	24 hour pH check Initials/Time

Did pH of all metals samples preserved upon receipt meet criteria 24 hours after preservation?  Yes  No

**Sample Exception Report** (The following exceptions were noted)

Client was notified on:	Client contact:
Resolution to Exception:	

## ANALYTICAL REPORT

For:

**PERC Engineering Co., Inc - Red Mesa/Bledsoe**  
**1606 Highway 78 West**  
**Jasper, AL 35501**

**ASL Report #: P1043**

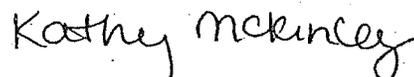
**Project ID: 921378.OTC**

**Attn: Sherri Fields**

cc:

**Paul Henry/alexanderphentry@percengineering.com**

Authorized and Released By:



Laboratory Project Manager

**Kathy McKinley**

*(541) 758-0235 ext.23144*

*January 27, 2015*

All analyses performed by CH2M HILL are clearly indicated. Any subcontracted analyses are included as appended reports as received from the subcontracted laboratory. The results included in this report only relate to the samples listed on the following Sample Cross-Reference page. This report shall not be reproduced except in full, without the written approval of the laboratory.

Any unusual difficulties encountered during the analysis of your samples are discussed in the attached case narratives.



Accredited in accordance with NELAP:  
Oregon (100022)  
Louisiana (05031)

ASL Report #: P1043

### Sample Receipt Comments

We certify that the test results meet all NELAP requirements except those listed below:

- CH2M HILL Applied Sciences Laboratory is not accredited by NELAP for the following tests: E200.8M.

### Sample Cross-Reference

ASL Sample ID	Client Sample ID	Date/Time Collected	Date Received
P104301	172936-RMBMSW-2	01/07/15 09:30	01/13/15
P104302	172941-RMBMSW3A	01/07/15 13:35	01/13/15



## CASE NARRATIVE METALS ANALYSIS

**Lab Name:** CH2M HILL ASL

**ASL SDG#:** P1043

**Project:** PERC Engineering Co., Inc

**Project #:** 921378.OTC

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With the exceptions noted as flags, footnotes, or detailed in the section below; standard operating procedures were followed in the analysis of the samples and no problems were encountered or anomalies observed.

All laboratory quality control samples were within established control limits, with any exceptions noted below, or in the associated QC summary forms.

Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. For diluted samples, the reporting limits are adjusted for the dilution required.

Calculations are performed before rounding to minimize errors in calculated values.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the section below, or in the sample receipt documentation.

All analyses were performed in accordance with 40 CFR Part 136.

**Method(s):**

E200.8, IC-ICPMS: E200.2, FLDFLT

E245.1

**Analytical Exception(s):**

E200.8, IC-ICPMS:

Analysis time for client sample 172936-RMBMSW-2:

Arsenic species: 17:03

Total Arsenic: 17:25

Dissolved Arsenic: 17:30

Other ICPMS analytes: 11:55

Analysis time for client sample 172941-RMBMSW3A:

Arsenic species: 17:16

Total Arsenic: 17:46

Dissolved Arsenic: 17:52

Other ICPMS analytes: 12:01

E245.1:

Analysis time for client sample 172936-RMBMSW-2:

Mercury: 14:24

Analysis time for client sample 172941-RMBMSW3A:

Mercury: 14:28

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Client Sample ID: 172936-RMBMSW-2				Lab Sample ID: P104301			
Project Name: PERC Engineering Co., Inc				Date Received: 01/13/15			
Sample Date: 01/07/15				Report Revision No: 0			
Sample Time: 09:30							
Type: Grab							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Aluminum	1	3.17	10.0	60.9		ug/L	E200.8	E200.2	01/26/15
Antimony	1	0.031	0.50	0.15	J	ug/L	E200.8	E200.2	01/26/15
Arsenic (CC)	1	0.030	0.50	0.052	J	ug/L	E200.8	E200.2	01/23/15
Beryllium	1	0.025	0.50	0.040	J	ug/L	E200.8	E200.2	01/26/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/26/15
Chromium	1	0.10	1.00	0.23	J	ug/L	E200.8	E200.2	01/26/15
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	01/26/15
Lead	1	0.041	0.50	0.072	J	ug/L	E200.8	E200.2	01/26/15
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	01/14/15
Nickel	1	0.025	0.50	0.69		ug/L	E200.8	E200.2	01/26/15
Selenium	1	0.069	0.50	0.093	J	ug/L	E200.8	E200.2	01/26/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	01/26/15
Zinc	1	2.50	10.0	9.04	J	ug/L	E200.8	E200.2	01/26/15

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 172936-RMBMSW-2	Lab Sample ID: P104301F
Project Name: PERC Engineering Co., Inc	Date Received: 01/13/15
Sample Date: 01/07/15	Report Revision No: 0
Sample Time: 09:30	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Dissolved Metals</b>									
Arsenic (CC)	1	0.030	0.50	0.034	J	ug/L	E200.8	FLDFLT	01/23/15

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 172941-RMBMSW3A	Lab Sample ID: P104302
Project Name: PERC Engineering Co., Inc	Date Received: 01/13/15
Sample Date: 01/07/15	Report Revision No: 0
Sample Time: 13:35	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Aluminum	1	3.17	10.0	163		ug/L	E200.8	E200.2	01/26/15
Antimony	1	0.031	0.50	0.057	J	ug/L	E200.8	E200.2	01/26/15
Arsenic (CC)	1	0.030	0.50	0.21	J	ug/L	E200.8	E200.2	01/23/15
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/26/15
Chromium	1	0.10	1.00	0.66	J	ug/L	E200.8	E200.2	01/26/15
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	01/26/15
Lead	1	0.041	0.50	0.26	J	ug/L	E200.8	E200.2	01/26/15
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	01/14/15
Nickel	1	0.025	0.50	0.62		ug/L	E200.8	E200.2	01/26/15
Selenium	1	0.069	0.50	0.17	J	ug/L	E200.8	E200.2	01/26/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	01/26/15
Zinc	1	2.50	10.0	4.99	J	ug/L	E200.8	E200.2	01/26/15

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Client Sample ID: 172941-RMBMSW3A	Lab Sample ID: P104302F
Project Name: PERC Engineering Co., Inc	Date Received: 01/13/15
Sample Date: 01/07/15	Report Revision No: 0
Sample Time: 13:35	
Type: Grab	
Matrix: Water	

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Dissolved Metals</b>									
Arsenic (CC)	1	0.030	0.50	0.10	J	ug/L	E200.8	FLDFLT	01/23/15

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information				Lab Information			
Project Name: PERC Engineering Co., Inc				Method Blank ID: WB1-0114			
Sample Date: N/A				Date Received: N/A			
Sample Time: N/A				Report Revision No: 0			
Type: QC							
Matrix: Water							

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Mercury	1	0.045	0.10	0.045	U	ug/L	E245.1	METHOD	01/14/15

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information		Lab Information	
Project Name: PERC Engineering Co., Inc		Method Blank ID: WB1-0123	
Sample Date: N/A		Date Received: N/A	
Sample Time: N/A		Report Revision No: 0	
Type: QC			
Matrix: Water			

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>									
Aluminum	1	3.17	10.0	3.17	U	ug/L	E200.8	E200.2	01/26/15
Antimony	1	0.031	0.50	0.031	U	ug/L	E200.8	E200.2	01/26/15
Arsenic (CC)	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/23/15
Beryllium	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Cadmium	1	0.030	0.50	0.030	U	ug/L	E200.8	E200.2	01/26/15
Chromium	1	0.10	1.00	0.10	U	ug/L	E200.8	E200.2	01/26/15
Copper	1	0.50	2.00	0.50	U	ug/L	E200.8	E200.2	01/26/15
Lead	1	0.041	0.50	0.041	U	ug/L	E200.8	E200.2	01/26/15
Nickel	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Selenium	1	0.069	0.50	0.069	U	ug/L	E200.8	E200.2	01/26/15
Silver	1	0.025	0.50	0.025	U	ug/L	E200.8	E200.2	01/26/15
Thallium	1	0.025	0.20	0.025	U	ug/L	E200.8	E200.2	01/26/15
Zinc	1	2.50	10.0	2.50	U	ug/L	E200.8	E200.2	01/26/15

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Sample Date: N/A Sample Time: N/A Type: QC Matrix: Water	Method Blank ID: WB10-0123  Date Received: N/A Report Revision No: 0

Analyte	Dilution Factor	DL	RL	Result	Qual	Units	Analysis Method	Prep Method	Date Analyzed
Dissolved Metals									
Arsenic (CC)	1	0.030	0.50	0.030	U	ug/L	E200.8	FLDFLT	01/23/15

U=Not detected at specified detection limit  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS10W0123 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>							
Arsenic (CC)	20.0	19.4	ug/L	97	E200.8	FLDFLT	01/23/15

\*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc Type: QC Matrix: Water	Blank Spike ID: BS1W0114 Report Revision No: 0 Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>							
Mercury	1.00	1.0	ug/L	100	E245.1	METHOD	01/14/15

\*=See case narrative  
 U=Not detected at specified detection limit  
 E=Estimated value above calibration range  
 J=Estimated value below reporting limit

# CH2M HILL Applied Sciences Laboratory (ASL)

Client Information	Lab Information
Project Name: PERC Engineering Co., Inc	Blank Spike ID: BS1W0123
Type: QC	Report Revision No: 0
Matrix: Water	Dilution Factor: 1

Analyte	Spike Amount	Result	Units	%Recovery	Analysis Method	Prep Method	Date Analyzed
<b>Metals</b>							
Aluminum	50.0	50.7	ug/L	101	E200.8	E200.2	01/26/15
Antimony	50.0	47.7	ug/L	95	E200.8	E200.2	01/26/15
Arsenic (CC)	50.0	49.6	ug/L	99	E200.8	E200.2	01/23/15
Beryllium	50.0	49.1	ug/L	98	E200.8	E200.2	01/26/15
Cadmium	50.0	50.3	ug/L	101	E200.8	E200.2	01/26/15
Chromium	50.0	50.6	ug/L	101	E200.8	E200.2	01/26/15
Copper	50.0	45.4	ug/L	91	E200.8	E200.2	01/26/15
Lead	50.0	48.8	ug/L	98	E200.8	E200.2	01/26/15
Nickel	50.0	48.9	ug/L	98	E200.8	E200.2	01/26/15
Selenium	50.0	49.7	ug/L	99	E200.8	E200.2	01/26/15
Silver	25.0	23.1	ug/L	92	E200.8	E200.2	01/26/15
Thallium	50.0	50.7	ug/L	101	E200.8	E200.2	01/26/15
Zinc	50.0	53.2	ug/L	106	E200.8	E200.2	01/26/15

\*=See case narrative

U=Not detected at specified detection limit

E=Estimated value above calibration range

J=Estimated value below reporting limit

# CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: 172936-RMBMSW-2	Lab Sample ID: P104301
Project Name: PERC Engineering Co., Inc	Date Received: 1/13/2015
Sampling Date: 1/7/2015	Report Revision No.: 0
Sampling Time: 9:30:00 AM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	1/13/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	1/13/2015

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: 172941-RMBMSW3A	Lab Sample ID: P104302
Project Name: PERC Engineering Co., Inc	Date Received: 1/13/2015
Sampling Date: 1/7/2015	Report Revision No.: 0
Sampling Time: 1:35:00 PM	
Type: Grab	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<b>Metals</b>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	1/13/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	1/13/2015

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: Method Blank	Lab Sample ID: WB1-0113
Project Name: PERC Engineering Co., Inc	Date Received: NA
Sampling Date: NA	Report Revision No.: 0
Sampling Time: NA	
Type: QC	
Matrix: Water	

Analyte	MDL	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
<i>Metals</i>							
Arsenic, AsIII	0.13	0.50	0.13	U	ug/L	IC-ICPMS	1/13/2015
Arsenic, AsV	0.15	0.50	0.15	U	ug/L	IC-ICPMS	1/13/2015

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

# CH2M HILL Applied Sciences Laboratory (ASL)

<u>Client Information</u>	<u>Lab Information</u>
Client Sample ID: Blank Spike	Lab Sample ID: BS1W0113
Project Name: PERC Engineering Co., Inc	Date Received: NA
Type: QC	Report Revision No.: 0
Matrix: Water	

Analyte	% Recovery	Analysis Method	Date Analyzed
<i>Metals</i>			
Arsenic, AsIII	113	IC-ICPMS	1/13/2015
Arsenic, AsV	106	IC-ICPMS	1/13/2015

U=Not detected at specified detection limits  
 J=Estimated value below reporting limit  
 E=Estimated value above calibration range  
 \*=See case narrative

PO# 20254

Project # or Purchase Order #

Project Name: Real Mesa / Bledsoe

Company Name or Home Address/Phone Number: PERC Engineering 808 1712 Jasper 1205 3845553

Email Address for Reporting: shells@perc-engineering.com

Report Copy to:  24 hours  48 hours  72 hours  21 days (STD)  14 days  7 days

Turnaround Time:  24 hours  48 hours  72 hours  21 days (STD)  14 days  7 days

Drinking Water?  Yes  No

Sample Disposal:  Dispose  Return

CLIENT SAMPLE ID

Date Time COMP GRAB WATER SOIL AIR

1-9-15 0930 ✓ ✓ 172941-KR1845W3A 2

1-9-15 1335 ✓ ✓ 172941-KR1845W3A 2

TOTAL # OF CONTAINERS

Requested Analytical Method #	UNPRES	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	NaOH	ZnAcNaOH
200.8 FD - 245.2						

THIS AREA FOR LAB USE ONLY

Lab # \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

P10413  
2.7°C

EPA Tier QC Level	1 (Screening)	2	3	4
Canister ID				
Lab ID				

Possible Hazard Identification:  Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Volatile Contaminants/Odorous  Biohazard  Other \_\_\_\_\_

Relinquished By: [Signature] Date/Time: 1-12-15 14:30

Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Relinquished By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Relinquished By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Relinquished By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Received By: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Special Instructions

Received By: [Signature] (Please sign and print name) Date/Time: 1/13/15 10:00

Special Instructions: Shipped Via UPS

Tracking # 1Z R52 W03 139985 8896

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original - LAB, Yellow - LAB, Pink - Client

Rev 09/2010 LAB FORM 340

Page 18 of 19



SDG ID: P1043

Date Received: 1/13/15

Client/Project: PERC ENGR

Received By: KF

- Were custody seals intact and on the outside of the cooler?  Yes  No  N/A
- Shipping Record:  Hand Delivered  On File  COC
- Radiological Screening for DoD  Yes  No  N/A
- Packing Material:  Hand Delivered  Ice  Blue Ice  Box
- Temp OK? (<6C) Therm ID: TH173 Exp. 2/15 2.7 °C  Yes  No  N/A
- Was a Chain of Custody (CoC) Provided?  Yes  No  N/A
- Was the CoC correctly filled out (If No, document below)  Yes  No  N/A
- Did sample labels agree with COC? (If No, document below)  Yes  No  N/A
- Did the CoC list a correct bottle count and the preservative types (No=Correct on CoC)  Yes  No  N/A
- Were the sample containers in good condition (broken or leaking)?  Yes  No  N/A
- Was enough sample volume provided for analysis? (If No, document below)  Yes  No  N/A
- Containers supplied by ASL?  Yes  No  N/A
- Any sample with < 1/2 holding time remaining? If so contact LPM  Yes  No  N/A
- Samples have multi-phase? If yes, document on SRER  Yes  No  N/A
- All water VOCs free of air bubbles? No, document on SRER  Yes  No  N/A
- pH of all samples met criteria on receipt? If "No", preserve and document below.  Yes  No  N/A
- Dissolved/Soluble metals filtered in the field?  Yes  No  N/A
- Dissolved/Soluble metals have sediment in bottom of container? If so document below.  Yes  No  N/A

**Preservation Adjustment**

Sample ID	Reagent	Reagent Lot Number	Volume Added	Initials/Time	24 hour pH check Initials/Time

Did pH of all metals samples preserved upon receipt meet criteria 24 hours after preservation?  Yes  No

**Sample Exception Report (The following exceptions were noted)**

Client was notified on:	Client contact:
Resolution to Exception:	

## ATTACHMENT II-H

### DETERMINATION OF THE PROBABLE HYDROLOGIC CONSEQUENCES

Baseline data collected at downstream Surface Water Monitoring Site RMBMSW-3A (see Mine Site Location Map) by personnel of the PERC Engineering Laboratory is attached. Parameters analyzed include pH, Total Iron, Total Manganese, Specific Conductance, and Total Suspended solids. The log values of these parameters (except pH) were plotted vs. the corresponding log value of the flow (discharge) using Statpak by Northwest Analytical, Inc. The pH was plotted vs. the log of the flow (discharge) without alteration. These plots are also attached. The data values mentioned above were regressed by the 'least squares' method using the NWA Statpak by Northwest Analytical, Inc. Values for the square of the multiple correlation coefficient ( $R^2$ ), the intercept ( $a$ ), and the slope ( $b$ ) for each plot are shown. The regression line is used to predict surface water quality values below the mine site in the receiving stream at specific flowrates before mining by Red Mesa, LLC. at the Bledsoe Mine occurs. These specific flows are at the 7Q2, average, and 2 year floods. The method for calculating the 7Q2 flows in the receiving stream is shown in "Low-Flow Characteristics of Alabama Stream", Geological Survey of Alabama, Bulletin 117. Average flow in the receiving stream was estimated utilizing the average daily discharge at a nearby USGS continuous gauging station. This station (03572900 - 'Town Creek Near Geraldine, AL') is located in Section 34, Township 7 South, Range 6 East, Dekalb County, Alabama. The reason this station was selected was due to the fact that it is located within the same hydrologic unit code (06030001) as the proposed mine site and the average streamflow is taken from 23 years (1958-1980) of daily discharge data. The method of calculation for the 2 year flows in the receiving

stream is shown in "Magnitude and Frequency of Floods in Alabama", Water-Resources Investigations Report 84-4191.

Surface water quality values for baseline conditions at these specific flowrates for downstream Surface Water Monitoring Site RMBMSW-3A is shown on the attached 'Water Quality & Quantity Projections' page. Notice on this page that TSS exceeded EPA effluent limitations at the 2 year flowrate.

Comparisons should also be made between baseline surface water quality in the receiving stream and effluent limitations specified by the Alabama Dept. of Environmental Mgt. for the receiving stream' use classification, which is listed as 'Fish and Wildlife' as referenced by Chapter 335-6-11-.02 in their Water Quality Program, and mentioned previously in this report. Chapter 335-6-10-.02 in this reference states the best usage of the "Fish and Wildlife' classification for Widows Creek is as follows: the best usage of the 'Fish and Wildlife' classification is fishing, the propagation of fish, aquatic life, and wildlife, and any other usage except utilization as a supply for drinking or food processing, or for swimming and water contact sports. According to the same reference, the following water quality restrictions are imposed by ADEM for this use classification: Wastes shall not cause the pH to deviate more than one unit from the normal pH, nor be less than 6.0 or greater than 8.5. The temperature shall not exceed 90 degrees Fahrenheit. Dissolved oxygen concentrations will not be less than 5 mg/l. Only such amounts of toxic substances or taste, odor, and color producing substances will be allowed which will not exhibit acute or chronic toxicity. Fecal coliform will not exceed a geometric mean of 1,000/100ml on a monthly average. Radioactive materials will not exceed the requirements of the State

Dept. of Public Health and there shall be no turbidity of other than natural origin that will cause substantial visible contrast with the natural appearance of the waters or interfere with any beneficial uses which they serve. Officials from ADEM were contacted and asked what parameter concentrations would degrade these use classifications for parameters not listed in Chapter 335-6-10. They responded that if the parameter is not specifically listed in the above referenced Chapter, baseline quality of the body of water would be used to determine whether or not degradation is taking place. Notice in the attached 'Water Quality & Quantity Projections' page for downstream Surface Water Monitoring Site RMBMSW-3A that TSS exceeded EPA effluent limitations for the 2 year flowrate for this use classification. It should be noted that this is a result of baseline watershed conditions and not related to impact from the proposed facility.

'During Mining' water quality estimates for the receiving stream are also given in the attached 'Water Quality & Quantity Projections' page. All estimates for quality and quantity in the receiving stream during the mining of the proposed permit area are based on: 1) baseline surface water quality, 2) the size of the proposed permit area within this watershed, 3) the drainage area of the watershed of the receiving stream at the monitoring site, 4) the anticipated discharge quality of the sediment basins, and 5) the amount of previous disturbance within the watershed. As shown, no parameter exceeded EPA effluent limitations at any flowrate calculated. As shown in the attached 'Water Quality & Quantity Projections' page, mining at the Bledsoe Mine site is expected to increase TSS, conductivity, mineralization, and sulfate values, and will slightly decrease pH values, but not increase TSS values at the 2 year flowrate. These changes in surface water quality are both temporary given the nature of the disturbance, are not significant based

on baseline water quality in this watershed, and should not have a profound affect on the use-classification of Widows Creek if the operator complies with state and federal water quality guidelines.

The quantity of discharge created from dewatering the proposed Bledsoe Mine was approximated utilizing "Procedures For Predictive Analysis Of Selected Hydrologic Impacts Of Surface Mining" by David B. McWhorter. This procedure estimates quantities of water involved in the hydrologic budget for a given area. One value obtained by utilizing this procedure is an estimate of groundwater which infiltrates past the root zone of plants and into the groundwater system on a yearly basis for the area in question; which in this case is the recovery area for this proposed facility. Utilizing this procedure the pumping rate from the Bledsoe Mine was estimated at 2.0005 CFS assuming 1) the recovery area is fully developed, and 2) no groundwater returns to the surface as recharge to the surrounding streams. It was also assumed that the pumping from the proposed Pratt Mine will be continuous at the rate mentioned above. Obviously the amount of dewatering at any one time will depend upon several factors such as extent of mine development, fracturing present in the developed area, amount of subsidence generated by the facility, and rainfall frequency, intensity, & duration in the immediate vicinity of the developed mine area. Also not all infiltrated groundwater will reach the Bon Air Seam interval due to groundwater movement along bedding planes and their intersection with overlying stream channels. However, this value is conservative in nature and this approach will assume a higher level of environmental impact to the receiving stream.

Also shown in the attached 'Water Quality & Quantity Projections' page, a decrease in

surface water quantity is expected at two of the three flowrates calculated. This is due mainly to sediment basin storage capacity, anticipated evaporation from the basin, the interval of time between rainfall events, and a corresponding time of retention of runoff in the sediment basin prior to basin discharge during a rainfall event.

The long term effects of mining by Red Mesa on surface water quality in the receiving stream are also shown on the attached 'Water Quality & Quantity Projections' page. Post mining estimates are based on: 1) baseline surface water quality, 2) estimated impact during mining, 3) the size of the permit area as compared to the size of the RMBMSW-3A watershed, and 4) the amount of previous disturbance within the RMBMSW-3A watershed. Post mining surface water in the receiving stream will be of generally lower quality but this difference is expected to be insignificant mainly due to the fact that the proposed surface disturbance associated with this operation will be small (approximately 28 acres).

Sediment delivered to the receiving stream from the mine site, as determined by a computer program developed at PERC Engineering Co., Inc. utilizing the Universal Soil Loss Equation (USLE), and modified using conservative values for sediment basin trapping efficiencies and sediment delivery ratios for the receiving streams. Sediment levels in surface runoff will be controlled by sediment basin 001P as designed in Part III-B of this application.

Changes in water quantity within the permit area due to the affects of mining have been estimated using "Procedures For Predictive Analysis Of Selected Hydrologic Impacts Of

Surface Mining" by David B. McWhorter. Values for precipitation, temperature, and solar radiation were obtained from the National Weather Service and NOAA. Runoff curve numbers were taken from "Applied Hydrology and Sedimentology for Disturbed Areas" by Barfield, Warner, and Haan. Water use coefficients were taken from "Water Requirements for Stabilization of Spent Shale" by Wymore. Effective rooting depth values were taken from "Agronomy Journal, Volume 52". Available Water Capacity values for soils and B Horizon mined areas were taken from the Soil Conservation Service's Soil Survey. Available Water Capacity values for A Horizon mined areas were taken from an average of over 50 site-specific studies conducted in Cullman, Marion, Jefferson, Tuscaloosa, Walker, and Winston counties by Tim Thomas of PERC Engineering Co., Inc. utilizing "A Method of Comparing Soil Materials for Plant Available Water" by Sam Lyle. It is estimated that there will be a 35.3 percent increase in base flows, a 3 percent increase in average flows, and a 31.1 percent decrease in peak flowrates relative to baseline conditions within the permit area as a result of mining by Red Mesa. Changes in flowrates are shown in the attached 'Water Quality & Quantity Projections' page.

No groundwater will be significantly affected as a result of the underground mining operation at the Bledsoe Mine. As stated in Part II-F, it has been universally documented that underground mining operations decrease the quality of groundwater in the interval underlying the recovered coal seam and decrease the quantity of the aquifer overlying the target coal seam. As such, the interval above the Bon Air at this site has already been affected by previous underground mining of the Bon Air. In addition, and as shown on the Previous Mining Map in Part II-E, the proposed permit lies within a very small area of previous surface mining, therefore some groundwater overlying the proposed target coal

seam has already been affected by previous disturbance. has already been affected by previous disturbance. The sandstone aquifer overlying the Bon Air Seam currently receives infiltration from groundwater affected by this previous disturbance. No changes in groundwater quantity for the aquifer underlying the target coal seam is anticipated.

As stated in Part II-F, a well inventory conducted by PERC Engineering Co., Inc. 2014 reveals that there are no residences within a ½ mile radius of the proposed Bledsoe Mine. Based on this information, no groundwater is utilized within a ½ mile radius of the proposed Bledsoe Mine for domestic purposes. This mine site is isolated both aerially and lithologically. However, in the event that it is shown that mining by Red Mesa , LLC. has diminished the quality or quantity of any local well outside of the ½ mile radius (however unlikely), one of the following methods of replacing the domestic supply will be implemented: 1) an alternative source of groundwater for either shallow groundwater wells or wells with inadequate casing would involve drilling a new well in which the casing would penetrate an aquitard, such as shale below the target coal seam, and the well would also terminate below the aquitard in water-producing strata, such as sandstone, or 2) connect the residence to an existing municipal water supply, or 3) other methods which replace the groundwater users supply and is agreeable to both the user and the operator will be considered an alternative.

No alteration of the drainage area of the receiving stream is anticipated as a result of this operation.

## PHC FINDINGS:

The findings of the preceding Determination of the Probable Hydrologic Consequences for Red Mesa at their Bledsoe Mine is as follows:

A) The median pH of the groundwater of aquifers both above and below the target coal seam is 6.87 and 6.15 respectively, values which are not conducive to the survival of iron bacteria, according to "Alkaline and Acid Production Potentials of Overburden Material: The Rate of Release" by Gwendelyn Geidel. In "Occurrence and Prediction of Acid Drainages", Frank T. Caruccio, Gwendelyn Geidel, and Mike Pelletier report that three types of bacteria were identified as being catalysts in contributing to the production of acid mine drainage. They are thiobacillus thiooxidans, thiobacillus ferrooxidans, and ferrobacillus ferrooxidans, which are all reported to be indigenous to aqueous environments with pH values that range from 2.8 to 3.2.. Therefore, acid production as a result of bacterial activity is not an important consideration at this mine site. Coal will be stored on-site in stockpiles until being transported off-site. The stockpads will be created by compacting coal until the necessary thickness and compaction is reached. All pads will be maintained by grading to ensure proper drainage. After all mining is completed and the stockpile pad is no longer needed, the coal material will be picked up and transported to a washer off-site for processing. Any pad material that is not suitable for processing will either be transported to an approved solid refuse disposal site, where it will be disposed of in accordance with approved measures described in that permit application or these materials will be covered with a

minimum of 4 feet of the best available non-toxic, non-acid forming, non-combustible material that is available on site.

B) Adverse impacts to the hydrologic balance:

As stated in the PHC, "Procedures For Predictive Analysis Of Selected Hydrologic Impacts Of Surface Mining" by David B. McWhorter was utilized to predict changes in groundwater storage within the permit area resulting from surface mining. As stated in Part II-H, an increase in storage is expected, and will result in an increased base flow. This change in storage should not be adverse to the hydrologic balance. No other adverse impacts are anticipated as a result of this operation.

C) Contamination, diminution, and interruption of underground or surface source of water used for legitimate purpose on site and adjacent areas:

Surface Water: 'During Mining' water quality estimates for the receiving stream are also given in the attached 'Water Quality & Quantity Projections' page. All estimates for quality and quantity in the receiving stream during the mining of the proposed permit area are based on: 1) baseline surface water quality, 2) the size of the proposed permit area within this watershed, 3) the drainage area of the watershed of the receiving stream at the monitoring site, 4) the anticipated discharge quality of the sediment basins, and 5) the amount of previous disturbance within the watershed. As shown, no parameter exceeded EPA effluent limitations at any flowrate calculated. As shown in the attached 'Water Quality & Quantity Projections' page, mining at the Bledsoe Mine site is expected to slightly

increase TSS, conductivity, mineralization, and sulfate values, and will slightly decrease pH values. These changes in surface water quality are both temporary given the nature of the disturbance, are not significant based on baseline water quality in this watershed, and should not have a profound affect on the use-classification of Widows Creek if the operator complies with state and federal water quality guidelines. The most significant change during mining to the surface water quality of the receiving stream will be TSS, and as stated above, this change will be both temporary and insignificant. Groundwater: No groundwater will be significantly affected as a result of the underground mining operation at the Bledsoe Mine. As stated in Part II-F, it has been universally documented that underground mining operations decrease the quality of groundwater in the interval underlying the recovered coal seam and decrease the quantity of the aquifer overlying the target coal seam. As such, the interval above the Bon Air at this site has already been affected by previous underground mining of the Bon Air. In addition, and as shown on the Previous Mining Map in Part II-E, the proposed permit lies within a very small area of previous surface mining, therefore some groundwater overlying the proposed target coal seam has already been affected by previous disturbance. The sandstone aquifer overlying the Bon Air Seam currently receives infiltration from groundwater affected by this previous disturbance. No changes in groundwater quantity for the aquifer underlying the target coal seam is anticipated.

D) Sediment yield from disturbed areas:

As stated in the PHC, sediment delivered to the receiving stream from the mine

site, as determined by a computer program developed at PERC Engineering Co., Inc. utilizing the Universal Soil Loss Equation (USLE), and modified using conservative values for sediment basin trapping efficiencies and sediment delivery ratios for the receiving streams. Sediment levels in surface runoff will be controlled by sediment basin 001P as designed in Part III-B of this application.

E) Acidity, TSS, TDS, Fe, Mn, pH, other:

The long term effects of mining by Red Mesa on surface water quality in the receiving stream are also shown on the attached 'Water Quality & Quantity Projections' page. Post mining estimates are based on: 1) baseline surface water quality, 2) estimated impact during mining, 3) the size of the permit area as compared to the size of the RMBMSW-3A watershed, and 4) the amount of previous disturbance within the RMBMSW-3A watershed. Post mining surface water in the receiving stream will be of generally lower quality but this difference is expected to be insignificant mainly due to the fact that the proposed surface disturbance associated with this operation will be small (approximately 28 acres).

F) Flooding or Streamflow Alterations: None anticipated at this site.

G) Groundwater and Surface Water Availability:

No changes in the post recovery groundwater availability from the overburden aquifer is anticipated at this site.

H) Other: No other impacts are anticipated at this site.

I) Supplemental Information: None required for this mine site.

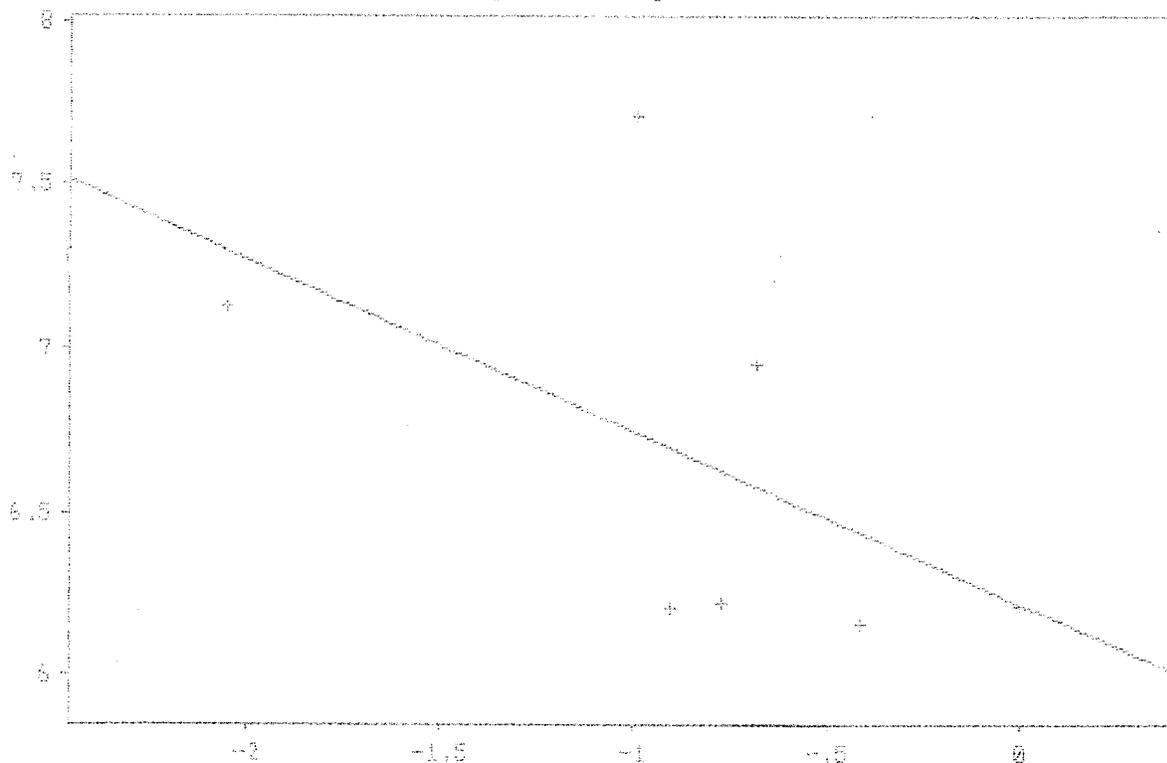
	FLOW	PH	FET	MNT	SPC	TSS	ACID
1:	0.009	7.13	0.28	0.14	375	0.5	12
2:	0.125	6.21	0.27	0.09	298	1	20
3:	0.103	7.71	0.46	0.12	307	4	8
4:	0.211	6.95	0.72	0.22	308	26	14
5:	0.387	6.16	0.45	0.02	193	7	18
6:	0.171	6.22	0.43	0.02	168	8	16

	ALK	SO4	DATE
1:	176	1	09-30-14
2:	158	1	10-23-14
3:	162	0.5	11-13-14
4:	156	0.5	12-08-14
5:	150	0.5	01-07-15
6:	154	0.5	02-05-15

Variable	Variable Name	Variable Description
1	FLOW	(CFPM)
2	PH	(S.U.)
3	FET	(mg/l)
4	MNT	(mg/l)
5	SPC	(umhos)
6	TSS	(mg/l)
7	ACID	(mg/l)
8	ALK	(mg/l)
9	SO4	(mg/l)
10	DATE	mm-dd-yy

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	7.188219	7.175553	6.224365	6.216428
B REG COEFF	-2.732918	-.404076	-.227519	-.0340779
A STD ERROR	0.4264336	0.4452585	0.5446257	0.4916492
B STD ERROR	2.089733	0.3040859	0.2160687	0.0313768
A t-STAT	16.8566	31.75845	11.4287	23.10312
B t-STAT	-1.307783	-1.328822	-1.052994	-1.086088
STD ERR EST	0.5953845	0.0866369	0.6294592	0.0914079
R-SQUARED	0.2995111	0.3062503	0.2170366	0.2277377
COVARIANCE	-.0443680	-.0065600	-.3861882	-.0578435
F-TEST	1.710297	1.765769	1.108796	1.179588
CORR COEFF	-.547276	-.5533989	-.4658718	-.4772187
DURBN-WATSN	2.136653	2.119711	1.905664	1.881597

PH predicted by LOGFLOW

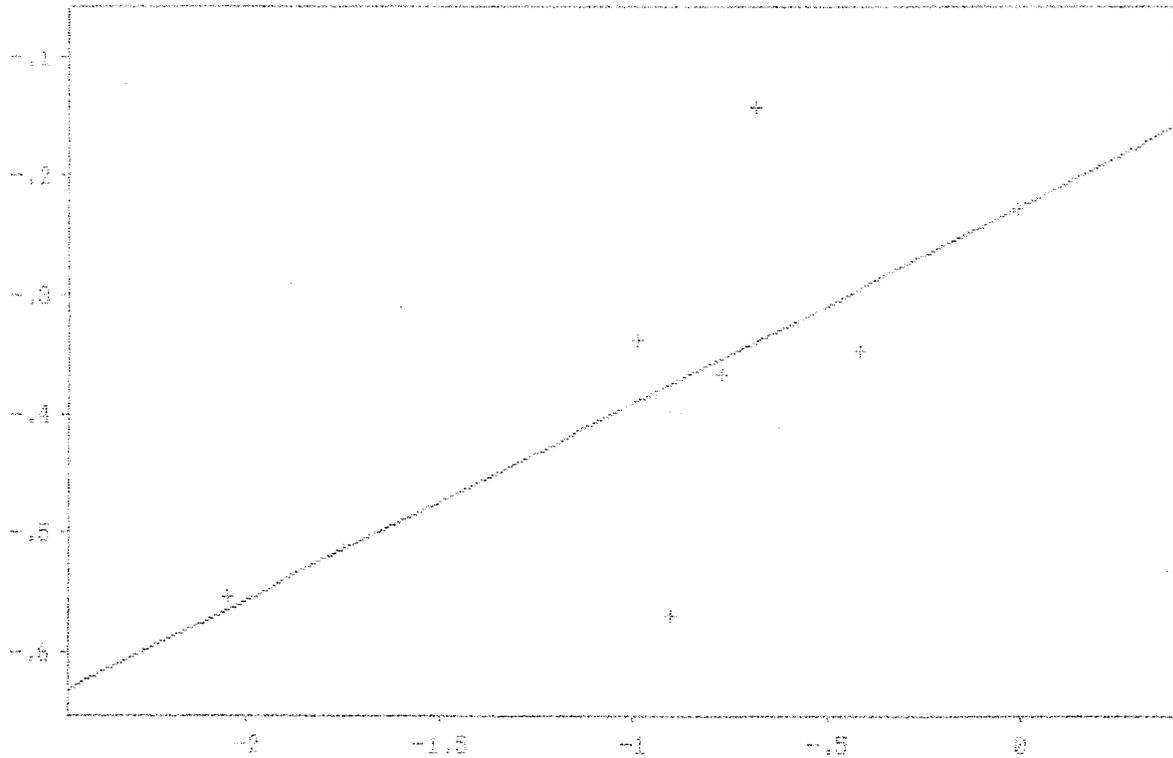


RED MESA - BLEDSOE MINE  
 FOR RMBMSW-3A  
 PLOT OF LOG FLOW (X) VS. PH (Y)

Linear ---

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	0.3407288	0.323798	0.5836247	0.59334
B REG COEFF	0.5622537	1.427438	0.0068762	0.1648291
A STD ERROR	0.1175193	0.0810435	0.133616	0.1684287
B STD ERROR	0.5759019	1.235625	0.0530093	0.1126176
A t-STAT	2.899344	-4.472202	4.367927	-1.838856
B t-STAT	0.9763011	1.155236	1.261593	1.463618
STD ERR EST	0.1640798	0.3520412	0.1544286	0.3280816
R-SQUARED	0.1924353	0.2501737	0.2846434	0.3487652
COVARIANCE	0.0091280	0.0231740	0.1135149	0.2797791
F-TEST	0.9531638	1.334569	1.591617	2.142178
CORR COEFF	0.4386745	0.5001737	0.5335198	0.5905634
DURBN-WATSN	2.16126	2.21953	2.289249	2.194242

LOGFIT predicted by LOGFLOW

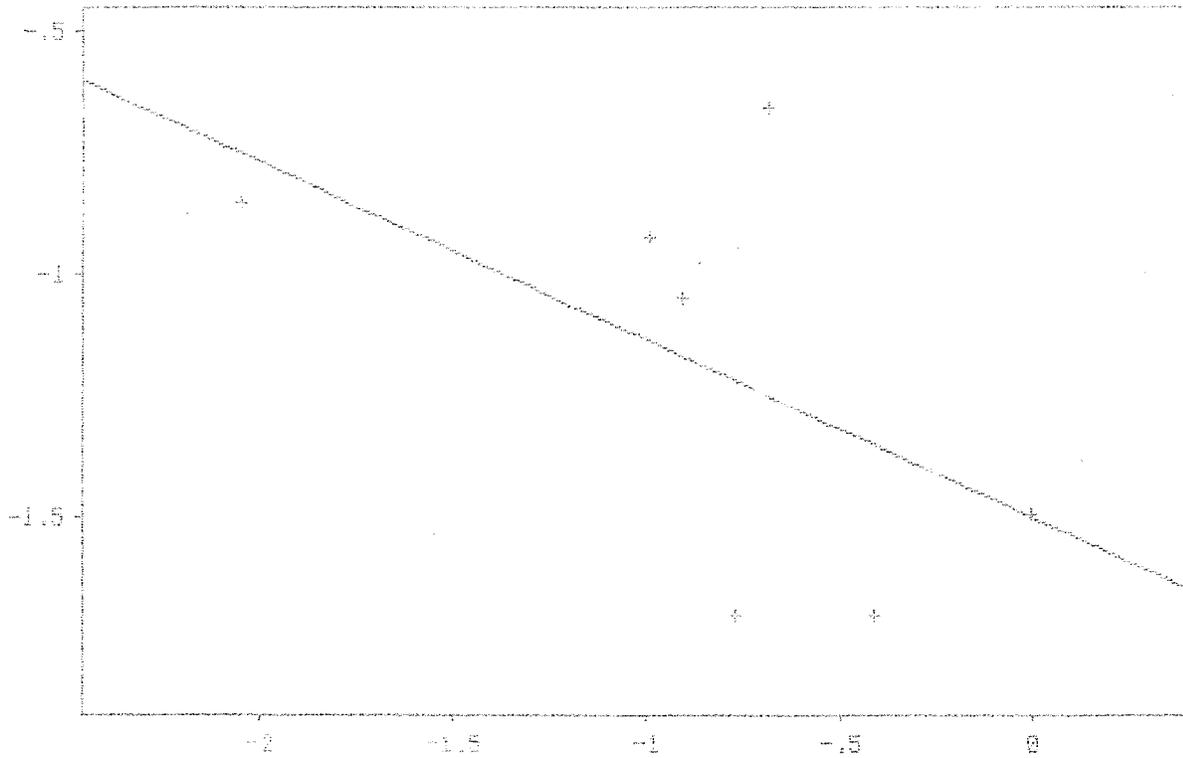


RED MESA - BLEDSOE MINE  
 FOR RMBMSW-3A  
 PLOT OF LOG FLOW (X) VS LOG FeT (Y)

Linear ———

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	0.1426194	0.1582217	0.0596808	0.0315696
B REG COEFF	-.244251	-4.7415	-.0188922	-.3675373
A STD ERROR	0.0559861	0.1053488	0.0700971	0.0277731
B STD ERROR	0.2743593	3.262893	0.0273095	0.3490186
A t-STAT	2.547407	-2.769111	0.8514023	-3.927928
B t-STAT	-.8902595	-1.453158	-.6793438	-1.053059
STD ERR EST	0.0781675	0.9296288	0.0810157	1.016774
R-SQUARED	0.1653733	0.3455142	0.1034421	0.2170578
COVARIANCE	-.0039653	-.0769767	-.0320675	-.6238537
F-TEST	0.792562	2.111668	0.461508	1.108934
CORR COEFF	-.4066612	-.5878046	-.3216242	-.4658946
DURBN-WATSN	1.820072	1.695085	1.88067	1.614271

LOGMNT predicted by LOGFLOW

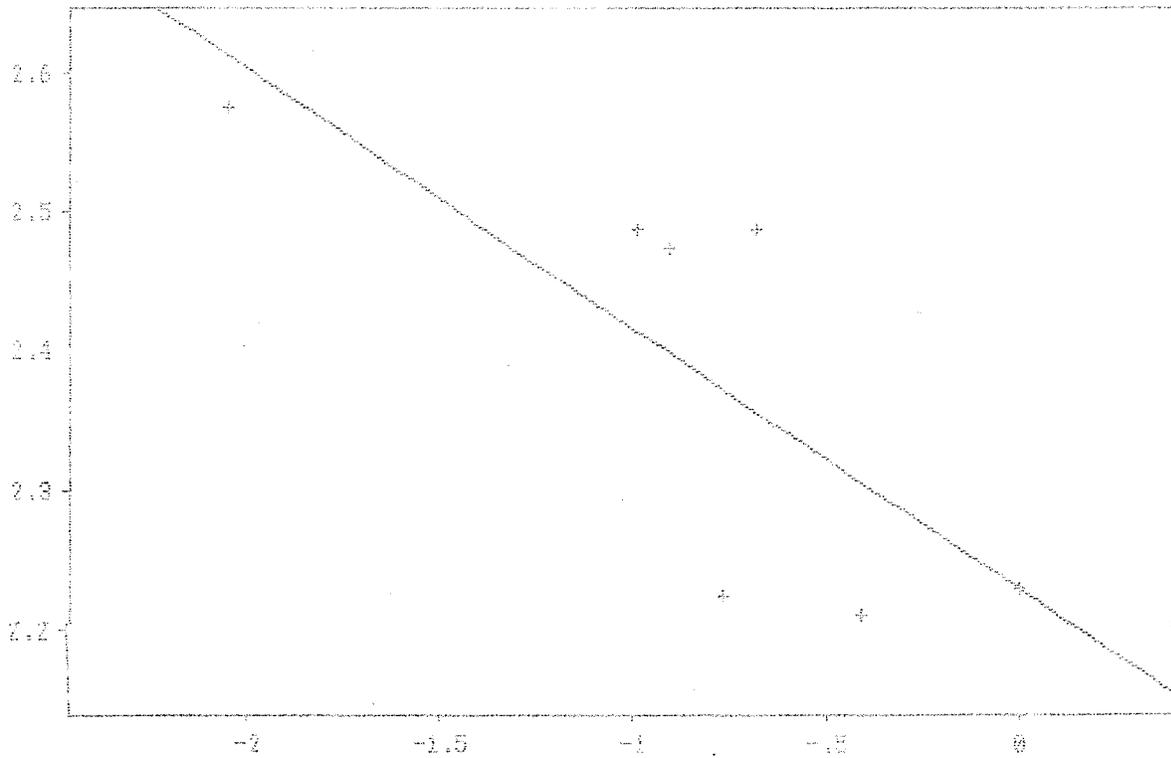


RED MESA - BLEDSOE MINE  
 FOR RMBMSW-3A  
 PLOT OF LOG FLOW (X) VS. LOG MnT (Y)

Linear ---

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	357.4315	366.284	160.7535	169.9981
B REG COEFF	-522.454	-2.109121	-49.08231	-.1862828
A STD ERROR	42.85127	66.36852	54.77167	41.77013
B STD ERROR	209.9922	0.8879399	21.7295	0.0974800
A t-STAT	8.34121	32.58057	2.934975	20.90188
B t-STAT	-2.487969	-2.375297	-2.258787	-1.910985
STD ERR EST	59.82873	0.2529824	63.30317	0.2839822
R-SQUARED	0.6074579	0.5851499	0.5605419	0.4772516
COVARIANCE	-8.481867	-.0342409	-83.31177	-.3161943
F-TEST	6.189992	5.642037	5.102119	3.651865
CORR COEFF	-.7793959	-.7649509	-.7486935	-.690834
DURBN-WATSN	1.258452	1.227332	1.156511	1.254465

LOGSPC predicted by LOGFLOW

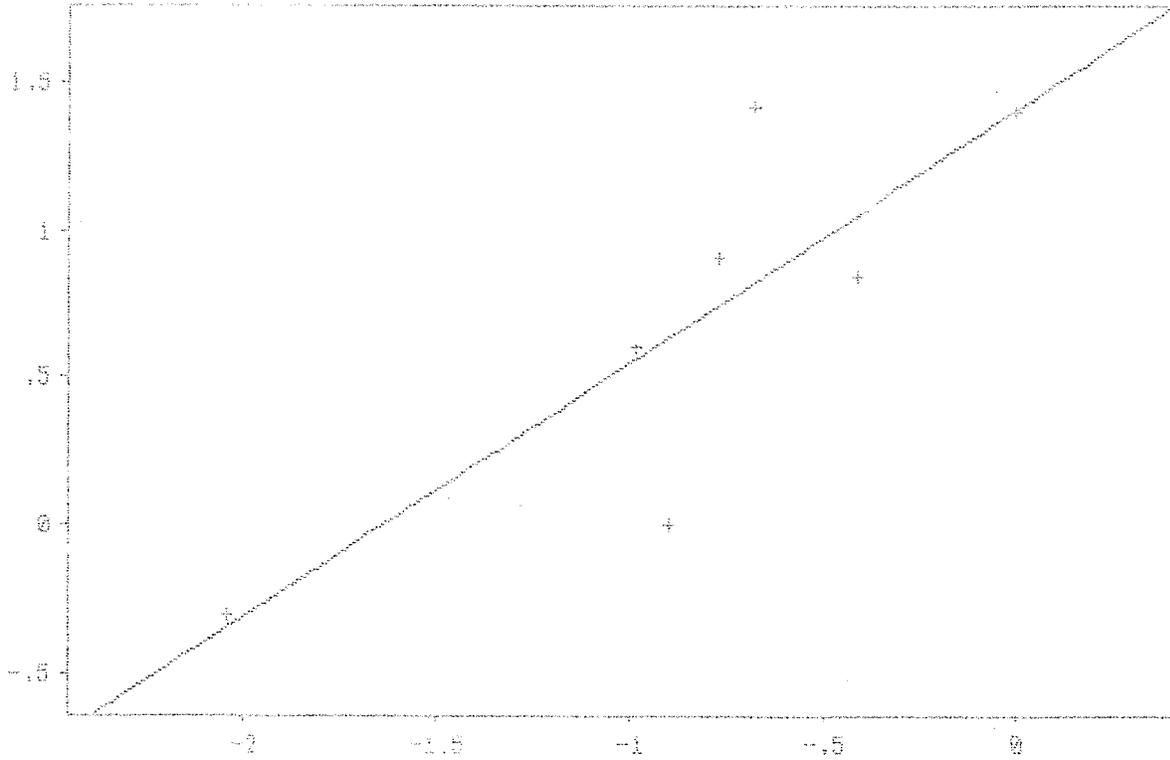


RED MESA - BLEDSOE MINE  
 FOR RMBMSW-3A  
 PLOT OF LOG FLOW (X) VS. LOG SpC (Y)

Linear ---

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	2.982736	1.105081	15.23572	25.24034
B REG COEFF	28.43299	7.333086	3.368325	0.8544919
A STD ERROR	6.983281	0.9821179	8.088673	22.71367
B STD ERROR	34.22149	4.355208	3.209009	0.3570144
A t-STAT	0.4271253	0.1124286	1.883587	3.587577
B t-STAT	0.8308518	1.683751	1.040646	2.393438
STD ERR EST	9.750022	1.240839	9.348602	1.040067
R-SQUARED	0.1471788	0.4147783	0.2159564	0.5888389
COVARIANCE	0.4616	0.1190502	5.717357	1.450405
F-TEST	0.6903147	2.835017	1.101757	5.728546
CORR COEFF	0.3836388	0.6440328	0.4647111	0.7673584
DURBN-WATSN	2.646915	2.853056	2.642278	2.405872

LOGTSS predicted by LOGFLOW

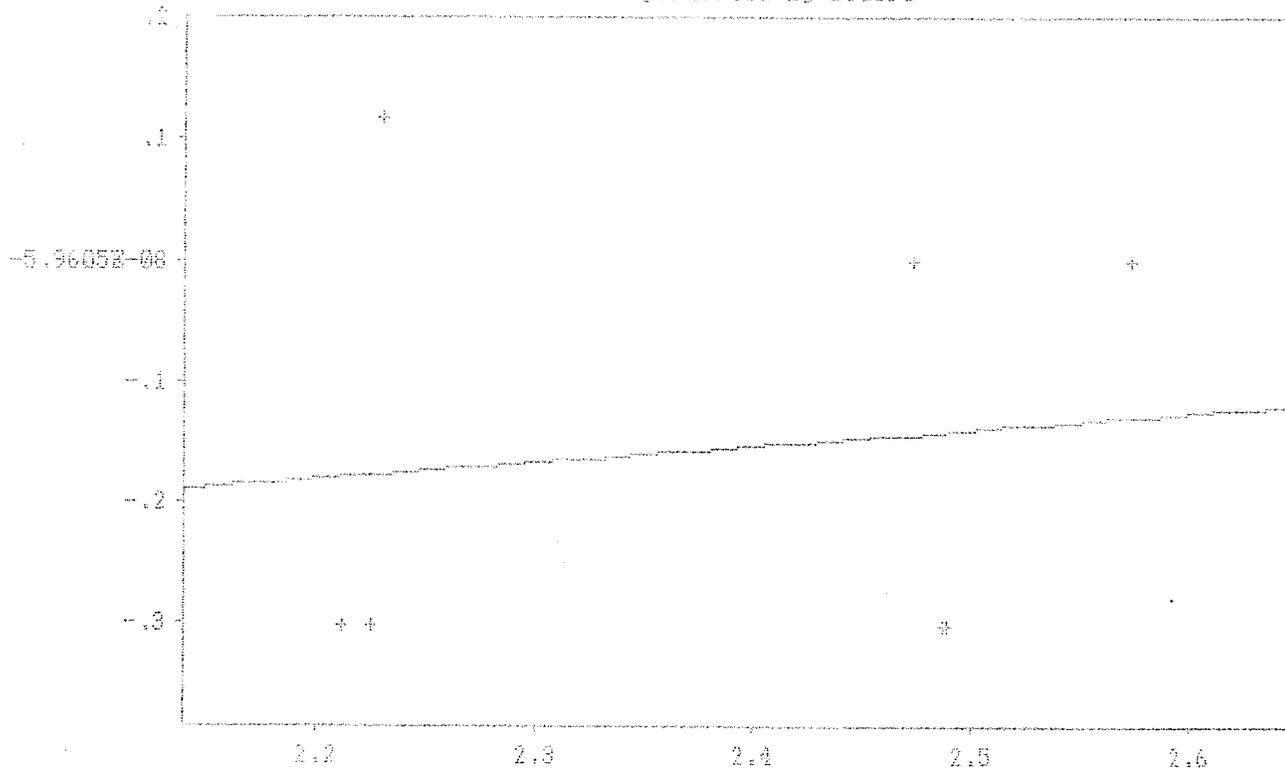


RED MESA - BLEDSOE MINE  
 FOR RMBMSW-3A  
 PLOT OF LOG FLOW (X) VS. LOG TSS (Y)

Linear ---

	A+(B*X)	A*EXP(B*X)	A+B*LOG(X)	A*X^B
A REG COEFF	0.1734804	0.3179696	-1.691684	0.0239577
B REG COEFF	0.0018277	0.0025338	0.424945	0.5890988
A STD ERROR	0.3381587	0.1490601	1.666763	0.0553572
B STD ERROR	0.0012040	0.0016690	0.2998293	0.4156517
A t-STAT	0.5130147	-2.444177	-1.014952	-1.614917
B t-STAT	1.518111	1.518111	1.41729	1.41729
STD ERR EST	0.2299368	0.3187601	0.2355314	0.3265158
R-SQUARED	0.3655488	0.3655489	0.3342997	0.3342997
COVARIANCE	13.33333	18.48392	0.0524460	0.0727055
F-TEST	2.304662	2.304662	2.00871	2.008709
CORR COEFF	0.6046063	0.6046064	0.5781866	0.5781866
DURBN-WATSN	1.687369	1.574537	1.557604	1.431178

LOGS04 predicted by LOGSFC



RED MESA - BLEDSOE MINE  
 FOR RMBSW-3A  
 PLOT OF LOG SpC (X) VS. LOG S04 (Y)

Linear

WATER QUALITY & QUANTITY PROJECTIONS  
AS A RESULT OF IMPACT FROM AN UNDERGROUND FACILITY

Company Name : RED MESA ENERGY, LLC.  
 Mine Name : BLEDSOE MINE  
 Site ID Number : UNNAMED TRIB TO WIDOWS CREEK AT RMEMSW-3A

Watershed Drainage Area (sq.mi.) : 8.90  
 Permit Area (sq.mi.) : 0.044  
 Previously Disturbed Area (sq.mi.): 0.063  
 Percent Previously Disturbed : 0.71%  
 Percent to be Permitted : 0.49%  
 Remaining Watershed Area : 99.51%  
 Pumping Rate from U.G. Mine (cfs) : 2.000005

=====  
 CHANGES IN POST MINE FLOW RATES WITHIN PERMIT AREA...

7Q2 : 1.353 AVG : 1.030 2YR : 0.689

=====  
 N.P.D.E.S. EFFLUENT LIMITS N.P.D.E.S. EFFLUENT LIMITS  
 OR SURFACE RUNOFF QUALITY OR U.G. DISCHARGE QUALITY  
 pH (s.u.) -- 6.00 pH (s.u.) -- 6.00  
 FeT (mg/l) -- 3.00 FeT (mg/l) -- 3.00  
 MnT (mg/l) -- 2.00 MnT (mg/l) -- 2.00  
 SpC (umhos) - 2000.00 SpC (umho) -- 2000.00  
 TSS (mg/l) -- 35.00 TSS (mg/l) -- 35.00  
 =====

REGRESSION ANALYSIS VALUES.....

Parameter	A	B
pH	6.22	-0.034
Fe	0.593	0.165
Mn	0.032	-0.368
SpC	170	-0.186
TSS	25.24	0.854
SO4	0.024	0.580

=====  
 WATERSHED DRAINAGE AREA FLOWS IN CFSM.....

	Baseline	During Mining	Post Mining
7Q2 Event	0.0710	0.2954	0.0711
AVG Event	2.010	2.230	2.010
2YR Event	75.50	75.63	75.38

=====  
 QUALITY PARAMTERS/PROJECTIONS.....

	pH	FeT	MnT	SpC	TSS	SO4
7Q2 EVENT-----						
Baseline	6.81	0.383	0.085	278	2.6	0.7
During Mining	6.19	2.375	1.543	1589	27.3	1.8
Post Mine	6.74	0.582	0.230	409	5.1	0.8
AVG EVENT-----						
Baseline	6.07	0.665	0.025	149	45.8	0.5
During Mining	6.07	0.911	0.232	344	44.7	0.7
Post Mine	6.07	0.690	0.045	169	45.7	0.5
2YR EVENT-----						
Baseline	5.37	1.210	0.007	76	1013.6	0.3
During Mining	5.37	1.224	0.022	91	1005.8	0.3
Post Mine	5.37	1.212	0.008	78	1012.8	0.3

**CERTIFICATION STATEMENT:**

All hydrologic analyses and computations performed in preparing this Determination of Probable Hydrologic Consequences were prepared by, or under the direction of, a professional engineer.

\_\_\_\_\_ **PRELIMINARY** \_\_\_\_\_

Date: \_\_\_\_\_

TIMOTHY S. THOMAS

PROFESSIONAL ENGINEER

REGISTRATION NO. 18830

III-D and III-E 880-X-8E-.06(1)(I)7(j)

## HYDROLOGIC MONITORING PLAN

COMPANY NAME Red Mesa, LLC.

MINE NAME Bledsoe Mine COUNTY Jackson NPDES# (AL0069647)

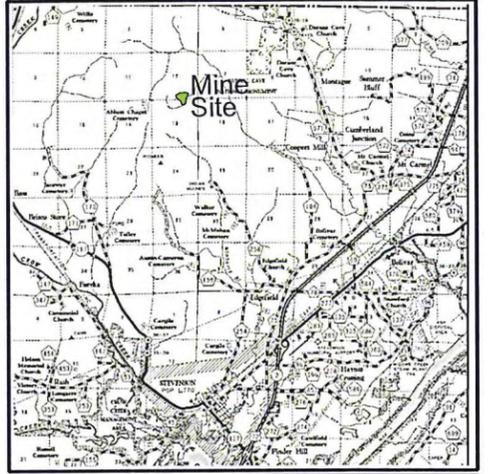
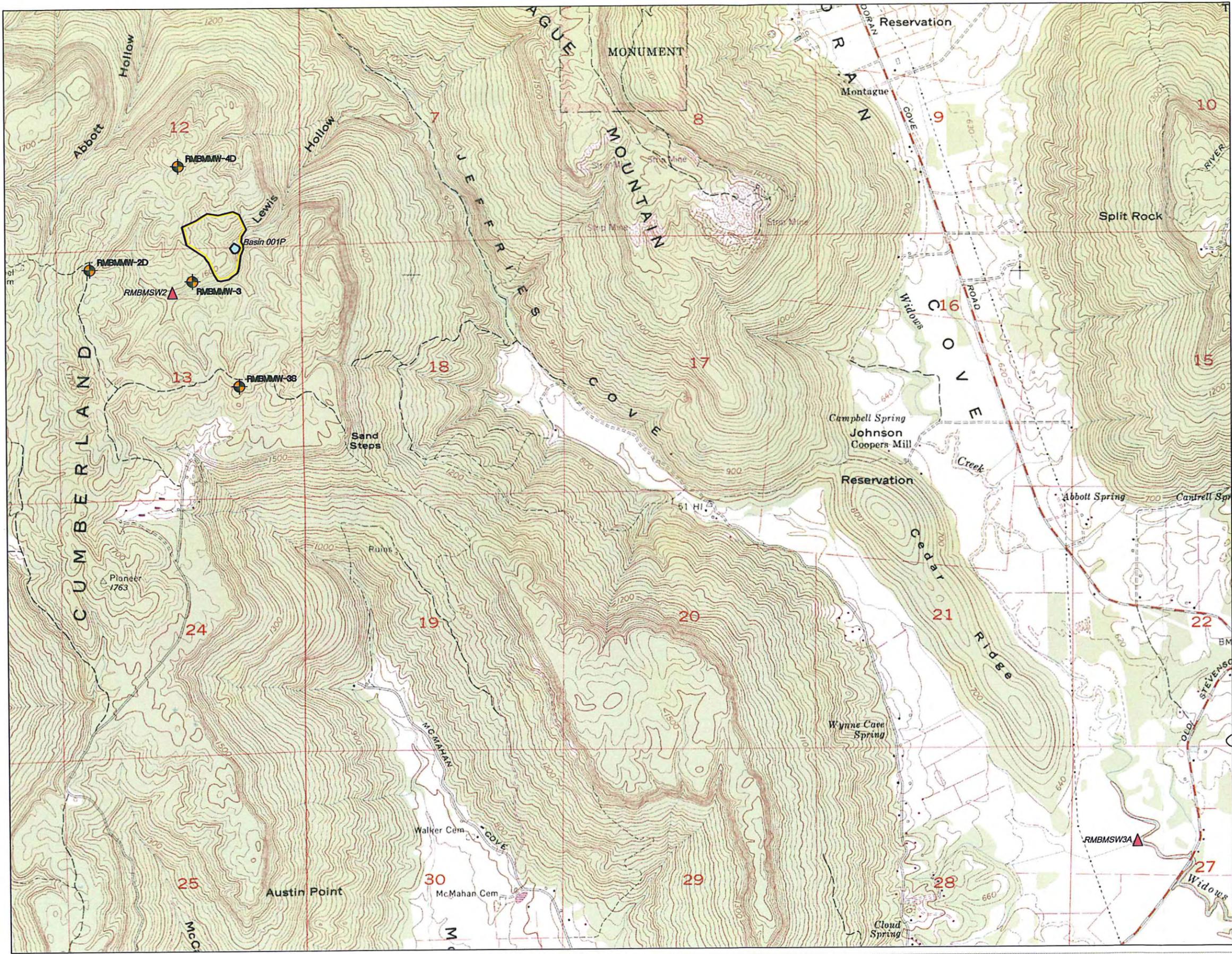
\*A MAP SHOWING ALL MONITORING POINTS MUST ACCOMPANY THIS PLAN

### I. Surface Water Monitoring Program: (Discharge Points)

List each discharge point to be monitored and indicate type or source of discharge	List parameters to be sampled for each discharge point	List frequency of sampling for each discharge point	Duration of Monitoring
Basins: 001P	NPDES parameters (See attached)	Twice monthly	Until joint approval by ASMC and ADEM. In no case sooner than ASMC approval of Phase II Bond release.

If a sample is taken during or within 24-hours after an applicable precipitation event (an increase in discharge volume caused by an applicable 24-hour precipitation event), an exemption for Iron (Total), Manganese (Total) and Total Suspended Solids may be claimed and Settleable Solids, pH and Flow run and reported. The exemption is only applicable if the ADEM "New Source Coal Mine and Associated Discharge Limitations, Conditions and Requirements" are followed.

Note: Performance monitoring to commence no sooner than original opening of mine. See attached map for all monitoring site locations.



VICINITY MAP  
Scale: 1" = 4 Miles

**LEGEND**

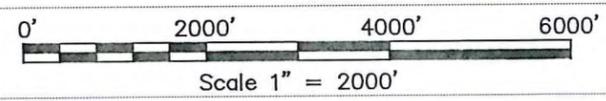
- Permit Boundary
- RMBMW-38 Groundwater Monitoring Site
- RMBMSW3A Surfacewater Monitoring Site
- Basin 001P Proposed Sediment Basin

I, Timothy S. Thomas, a Registered Professional Engineer, hereby certify the foregoing to be a true and correct map to the best of my knowledge and belief.

Timothy S. Thomas, P.E.  
AL Reg. #18830  
Date 4-16-15

**PERC**  
ENGINEERING CO., INC.  
1606 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502  
(205) 384-5553 Office (205) 295-3114 Fax

**Red Mesa Energy, LLC.  
Bledsoe Mine  
Hydrologic Monitoring Plan**



Base map - Doran Cove and Eureka  
Alabama United States Geological  
Survey Quadrangle Maps.

DWG NAME:	RMBledsoeMine	DATE:	03-09-2015
DRAWN BY:	S.A.E.	SCALE:	1"=2000'
APPROVED BY:	R.E.P.	JOB NUMBER:	14-04482-003

V:\Mining\Red Mesa Bledsoe Mine\RMBledsoeMine.dwg 04/15/15 15:00



## NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM INDIVIDUAL PERMIT

PERMITTEE: Red Mesa Energy, LLC  
1830 Fountain Dr. Unit 607  
Reston, Virginia 20190

FACILITY LOCATION: Bledsoe Mine No. 1  
573 County Road 85  
Stevenson, AL 35772  
Jackson County  
T1S, R7E, Sections 12 & 13

PERMIT NUMBER: AL0069647

DSN Receiving Water  
001-1 Unnamed Tributary to Widows Creek

*In accordance with and subject to the provisions of the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251-1378 (the "FWPCA"), the Alabama Water Pollution Control Act, as amended, Code of Alabama 1975, §§ 22-22-1 to 22-22-14 (the "AWPCA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, §§22-22A-1 to 22-22A-16, and rules and regulations adopted thereunder, and subject further to the terms and conditions set forth in this Permit, the Permittee is hereby authorized to discharge into the above-named receiving waters.*

ISSUANCE DATE: August 31, 2007

EFFECTIVE DATE: September 1, 2007

EXPIRATION DATE: August 31, 2012

MODIFICATION ISSUANCE DATE: May 2, 2014

MODIFICATION EFFECTIVE DATE: May 2, 2014

  
Glenna L. Dean  
Alabama Department of Environmental Management

LANCE R. LEFLEUR  
DIRECTOR



ROBERT J. BENTLEY  
GOVERNOR

Alabama Department of Environmental Management  
adem.alabama.gov  
1400 Coliseum Blvd. 36110-2400 ■ Post Office Box 301463  
Montgomery, Alabama 36130-1463  
(334) 271-7700 ■ FAX (334) 271-7950

May 2, 2014

Punkaj Rishi  
President  
Red Mesa Energy, LLC  
1830 Fountain Dr. Unit 607  
Reston, Virginia 20190

RE: Final Permit  
Bledsoe Mine No. 1  
NPDES Permit No. AL0069647  
Jackson County (073)

Dear Mr. Rishi:

Enclosed is the modified and issued National Pollutant Discharge Elimination System (NPDES) permit for the above referenced facility. The issuance, effective, expiration, modification issuance, and modification effective dates of the permit are specified on the cover page.

Please see Part I.B of the permit for monitoring and reporting requirements. The original signature of a principal executive officer or authorized agent must appear on all DMRs submitted to the Department. The principal executive officer must submit, in writing, authorization allowing a designated agent to sign DMR forms submitted to the Department. The submittal must specify either an individual or a position having responsibility for the overall operations of the regulated facility or activity.

The Department provides a voluntary web-based electronic environmental (E2) reporting system for submittal of discharge monitoring reports (DMRs). The E2 DMR system provides an alternative method to submit DMR data and allows ADEM to electronically validate, acknowledge receipt, and upload data to the state's central wastewater database. This system is expected to reduce costs to both the regulated community and ADEM and to improve the accuracy of reported compliance data. If you wish to participate in this program, the Permittee Participation Package may be downloaded online at <https://e2.adem.alabama.gov/npdes> or you may obtain a hard copy by submitting a written request or by emailing [e2admin@adem.alabama.gov](mailto:e2admin@adem.alabama.gov).

The Department encourages you to voluntarily consider additional pollution prevention practices/alternatives at your facility which may assist you in complying with effluent limitations, and possibly reduce or eliminate pollutant discharges.

Birmingham Branch  
110 Vulcan Road  
Birmingham, AL 35209-4702  
(205) 942-6168  
(205) 941-1603 (FAX)

Decatur Branch  
2715 Sandlin Road, S.W.  
Decatur, AL 35603-1333  
(256) 353-1713  
(256) 340-9359 (FAX)

Mobile Branch  
2204 Perimeter Road  
Mobile, AL 36615-1131  
(251) 450-3400  
(251) 479-2593 (FAX)

Mobile-Coastal  
3664 Dauphin Street, Suite B  
Mobile, AL 36608  
(251) 304-1176  
(251) 304-1189 (FAX)

Should you have any questions concerning this matter, please contact Michael T. Bergh by email at mtbergh@adem.state.al.us or by phone at (334) 274-4238.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffery W. Kitchens". The signature is fluid and cursive, with the first name being the most prominent.

Jeffery W. Kitchens, Chief  
Stormwater Management Branch  
Water Division

JWK/mtb File: FPER/198

Enclosure

cc: Catherine McNeill, ADEM  
Michael T. Bergh, ADEM  
Christa Marks, Alabama Surface Mining Commission

## HYDROLOGIC MONITORING PLAN (continued)

### A. Reporting and Recording Specifications:

#### a) NPDES outfalls:

Reporting as required by NPDES permit to Alabama Department of Environmental Management plus a simultaneous Notice of Filing to ASMC containing the following:

- 1) Name of Company
- 2) Name of Mine
- 3) ASMC permit number
- 4) NPDES number
- 5) Sampling period covered by report
- 6) List of the discharge points sampled and analysis results

#### b) Other:

### B. Non-Compliant Discharge Reporting:

Reporting as required by the NPDES permit to Alabama Department of Environmental Management plus simultaneous copy (indicating ASMC permit number) to ASMC.

HYDROLOGIC MONITORING PLAN (continued)

II. Other Surface Water Monitoring.

Bodies of water receiving discharges from the mine:

unnamed tributary to Widows Creek

List Monitoring Points and indicate type or describe location	List Parameters to be sampled	Frequency (minimum)	Duration of Monitoring
RMBMSW-3A downstream	Discharge pH Manganese Iron Total Suspended Solids Specific Conductance	Quarterly	Life of mine
RMBMSW-2 upstream	Same as Above	Same as Above	Same as Above

## HYDROLOGIC MONITORING PLAN (continued)

### A. Reporting and Recording Specifications:

- 1) Frequency of Reporting: Quarterly
- 2) Contents of Report: Name of company, mine name, ASMC permit number and for all monitoring locations, the dates samples were taken and sample results for each parameter and who collected and analyzed the samples.

### III. Monitoring requirements for removal of sediment ponds and other treatment facilities:

Monthly for 6 months prior to application for approval to remove facility. Monitoring data will be submitted to ASMC with application to remove the facility.  
Monitoring sites shall be located to sample water entering the facility (i.e., untreated drainage). Show proposed locations on the monitoring location map.  
Parameters to be samples shall be those required by the NPDES permit.

## HYDROLOGIC MONITORING PLAN (continued)

### IV.

#### A. Monitoring requirements for Phase II bond release:

---

List Monitoring Sites	Parameters	Sample Frequency	Duration of Monitoring
inflow* into the following basins:  001P	NPDES parameters (See attached)	Monthly	No less than monthly for previous 6 months prior to application for Phase II Bond release.**

\* If no inflow into basin, then a sample of basin discharge. If no basin discharge, then grab sample from basin itself.

\*\* For the Increment within which the respective basin is bonded, or the respective basin's drainage area is located.

Note: When additional outfalls are added to the NPDES permit, or sampling requirements are added or removed by ADEM, this monitoring plan will be modified to comply without ASMC revision.

#### B. Reporting:

Reports shall be submitted with application for Phase II Bond Release indicating Sample location number, monitoring period and analysis results and date for each sample, plus sampling and analytical data. A map showing location of the sample sites should be included.

HYDROLOGIC MONITORING PLAN (continued)

V. Groundwater Monitoring

List Monitoring Sites and indicate type of site	Parameters	Frequency (minimum)	Duration of Monitoring
RMBMMW-3S (Above Bon Air Seam)	Iron Manganese pH Specific Conductance Water level	Quarterly	Life of mine
RMBMMW-2D (Below Bon Air Seam)	Same as Above	Same as Above	Same as Above
RMBMMW-4D (Below Bon Air Seam)	Same as Above	Same as Above	Same as Above

- If a well is destroyed during mining and reclamation operations, the well will be re-drilled in approximately the same location. The well will be drilled to the same depth, and casing standards will be identical to those shown in 'Casing Specifications' in this report.

## HYDROLOGIC MONITORING PLAN (continued)

### A. Reporting and Recording

Reports to be filed with ASMC quarterly supplying the following information: Company name, mine name, permit number, and for each monitoring site, the date and sample results for each parameter. Include sampling and analytical information for all samples.

### VI. Maintenance of records and Availability for Inspection:

a) Active Mining - copies of all monitoring records shall be maintained at office.

b) During periods of temporary cessation of operations and after active mining, all monitoring records will be kept at:

Red Mesa Energy, LLC. (Office)

722 Overbridge Lane (Address)

Chattanooga, TN 37405 (City & State)

Sam Magruder (Custodian of Records)

c) All monitoring records will be made available upon request to ASMC Personnel for inspection.

VII. Describe how the data obtained from the performance monitoring may be used to determine the impacts of the operation upon the hydrologic balance. Describe how parameters to be monitored relate to the suitability of the surface and groundwater for current and approved postmining land use.

Surface Water Monitoring Site RMBMSW-3A is downstream of all mining to be conducted by Red Mesa Energy, LLC Results of performance monitoring as outlined in the monitoring plan can be compared to the results of performance monitoring for Surface Water Monitoring Site RMBMSW-2 to determine impact to the receiving streams and confirm or deny the estimates of the PHC. Groundwater Monitoring Sites RMBMMW-2D, RMBMMW-3S, and RMBMMW-4D will monitor the characteristics of the aquifer above and below the target coal seam. Performance monitoring data will be compared to results of analysis from baseline sampling to determine impact to these aquifers and be compared to predictions made in the PHC. The proposed postmining land use is undeveloped or no current land use or management (grasses utilized as terminal vegetation). Alabama Department of Environmental Management recommendations for water quality to support this land use on this stream classification are less stringent than those limitations currently in force for surface mine effluent, therefore the existing monitoring plan is adequate and no additional parameters are recommended.

VIII. Please NOTE: ALL PERFORMANCE MONITORING REPORTS should be submitted in duplicate. For companies with multiple permits, each permit should have a corresponding monitoring report. Sites serving multiple permits should be included in all pertinent monitoring reports.

IX. If a waiver is requested for a particular water-bearing stratum, give details. 880-X-8H-06-(1)(h)(2)

None proposed.

X. Plans For Recording and Reporting Data (779.13)

Describe how surface and groundwater quantity and quality data will be collected, recorded, and reported to the Regulatory Authority according to Section 816.52.

Surface water samples shall be taken by the 'grab' method. Flowrate measurement of surface water samples shall be according to ASTM D3858 "Standard Practice for Open Channel Flow Measurement of Water by Velocity - Area Method" or other equally valid approved methods. Groundwater samples shall be taken according to Standard Methods 105 "Collection and Preservation of Samples" and 906A "Collection" or other equally valid approved methods. pH of all samples will be measured in the field. The sample will be stored in ice and all other parameters will be analyzed within their allowable holding times as specified by Standard Methods. Practices employed concerning the volume of groundwater extracted at groundwater monitoring sites prior to sampling is outlined as follows: Where recharge of groundwater is sufficient, three well volumes of groundwater (measured from the static depth) are pumped prior to sampling so the sample obtained is from recharge. Where recharge is slow, and three well volumes cannot be obtained within the monitoring cycle (usually monthly), only one well volume will be pumped. The well will then be allowed to recharge and a sample will be obtained after a volume equal to the volume of the pump line has been discharged. In infrequent instances where recharge is very limited, and the volume of water in the well is too small to be pumped to the surface, a 'bottom sampler' is employed to bail as much water as possible from the well. The well will then be allowed to recharge and the bottom sampler will be used to obtain a sample when ample groundwater is present to be collected.

**Red Mesa, LLC.**

**Bledsoe Mine**

**HYDROLOGIC  
RECLAMATION PLAN**

**submitted by:**

**PERC Engineering Co., Inc.  
P.O. Box 1712  
Jasper, AL. 35502-1712**

## Hydrologic Reclamation Plan (880-X-8H-.06(1)(g)):

### I. Steps to Minimize Hydrologic Balance Disturbance:

Surface mining and reclamation activities conducted on the Red Mesa , LLC. - Bledsoe Mine area will be conducted to minimize disturbance to the hydrologic balance. Several ways in which this will be accomplished are, but not limited to the following:

- a. Monitoring and Reporting of sediment basin 001P at this mine site (where all runoff from the mine area will drain), and Surface Water Monitoring Sites RMBMSW-3A and RMBMSW-2 as required by the Regulatory Authorities will be performed in accordance with the approved Hydrologic Monitoring Plan.
- b. Physical and chemical treatment of the outfalls at this mine site as necessary to comply with State and Federal Water Quality Laws.
- c. Upon completion of mining, and regrading, overburden materials will be sampled systematically and sent to the Auburn University Testing Laboratory, for analyses to determine type and amount of soil amendments necessary to maintain vegetative growth as reported in Part IV-C-1 of the permit application due to a topsoil variance being applied for at this facility. This sampling system should be adequate (see below).
  1. The chemical analyses will consist of the followings parameters: pH, % Sulfur, Phosphorus, Potassium, Magnesium, Calcium, Maximum Potential Acidity, Neutralizing Potential, NO<sub>3</sub>-N, and Recommendations for the amounts of Limestone, Nitrogen, P205, and K<sub>2</sub>O to be added to the soil.
  2. The physical analyses will consist of the following parameters: Sieve Analysis, % Sand, % Silt, % Clay, Textural Classification, and Available Water Capacity.
- d. Husbandry practices will include, seeding spot areas within the Bledsoe Mine to increase cover and the addition of proper nutrients. Suitable mulch shall be used on all regraded and topsoiled areas to control erosion, promote germination of seeds and increase the moisture retention capacity of the soil. A maximum of 3 tons per acre of hay will be used as mulch.
- e. With respect to the Hydrologic Balance, mining at this site is not expected to significantly affect the regional aquifer in the area, and as stated in Part II-H, an increase in storage is expected, (approximately 28.5% increase) and will result in an increased base flow. This change in storage should not be adverse to the hydrologic balance. No other adverse impacts are anticipated as a result of this operation.

### II. Material Damage Outside the Permit Area:

All surface mining and reclamation activities within the Bledsoe Mine will be conducted to minimize and prevent material damage to the hydrologic balance. Several ways in which

this will be accomplished are, but not limited to the following:

1. Observing the 300 ft. setbacks from occupied dwellings, unless acceptable waivers are submitted and approved by ASMC.
2. Mining within the permit boundary.
3. Observing and complying with all State and Federal Water Quality Limits.
4. Mine openings within the permit area (other than blast holes) will be eliminated in the following methods:
  - A) Exploration Holes - Exploration holes will be backfilled with the drill cuttings and capped with two (2) feet of clay.
  - B) Monitoring Wells - Groundwater monitoring wells will be sealed at the time of abandonment with a concrete cap (1.5'x1.5'x.5').
  - C) Mine Openings - After mining is completed the openings will be sealed by constructing concrete block walls and by utilizing other available material, in accordance with the requirements of M.S.H.A.. The earthen material used in the sealing process will consist of non-toxic, nonacid, and noncombustible material compacted to 90% of the standard proctor. Upon completion of the sealing of the openings the pit will be filled to a minimum height of 2' above the openings and regraded to a maximum slope of 2.5H to 1V.
5. Timely regrading for drainage control.
6. On site sediment control to prevent sediment from entering ponds.
7. Timely revegetation of all disturbed areas.

### **III. Applicable State and Federal Water Quality Laws:**

To meet the applicable State and Federal effluent limitation standards as set forth by the Environmental Protection Agency and the Alabama Department of Environmental Management, the applicant shall minimize potential water quality problems by properly handling and disposing of any acid or toxic forming materials and treating contaminated drainage. To assure water quality standards, periodic performance monitoring will be conducted as approved in the Hydrologic Monitoring Plan. Sediment basins will be utilized as collection sites for surface water treatment when runoff from the mine site requires it.

In the event quality problems should arise, the following procedures will be used :

- 1) Lime or caustic soda to raise a low pH.
- 2) Potassium permanganate to decrease manganese levels if the pH is too high.
- 3) Alum to decrease total suspended solid concentrations.

In the event alternative methods or chemicals are needed, the Regulatory Authority will be notified and new methods or chemicals will be approved prior to use.

#### **IV. Rights of Present Water Users:**

As stated in Part II-F, a well inventory conducted by PERC Engineering Co., Inc. in 2014 reveals that there are no residences within a ½ mile radius of the proposed Bledsoe Mine. Based on this information, no groundwater is utilized within a ½ mile radius of the proposed Bledsoe Mine for domestic purposes. This mine site is isolated both aerially and lithologically.

#### **V.A. Acid and Toxic Drainage:**

The median pH of the groundwater of aquifers both above and below the target coal seam is 6.87 and 6.15 respectively, values which are not conducive to the survival of iron bacteria, according to "Alkaline and Acid Production Potentials of Overburden Material: The Rate of Release" by Gwendelyn Geidel. In "Occurrence and Prediction of Acid Drainages", Frank T. Caruccio, Gwendelyn Geidel, and Mike Pelletier report that three types of bacteria were identified as being catalysts in contributing to the production of acid mine drainage. They are thiobacillus thiooxidans, thiobacillus ferrooxidans, and ferrobacillus ferrooxidans, which are all reported to be indigenous to aqueous environments with pH values that range from 2.8 to 3.2.. Therefore, acid production as a

result of bacterial activity is not an important consideration at this mine site. Coal will be stored on-site in stockpiles until being transported off-site by overland conveyor. The stockpads will be created by compacting coal until the necessary thickness and compaction is reached. All pads will be maintained by grading to ensure proper drainage. After all mining is completed and the stockpile pad is no longer needed, the coal material will be picked up and transported to a washer off-site for processing. Any pad material that is not suitable for processing will either be transported to an approved solid refuse disposal site, where it will be disposed of in accordance with approved measures described in that permit application or these materials will be covered with a minimum of 4 feet of the best available non-toxic, non-acid forming, non-combustible material that is available on site.

**V.B. Contribution of TSS to Streamflow:**

Total Suspended Solids within the permit area will be controlled by utilizing sediment basin 001P to control runoff. The sediment basin will be designed to retain all settleable solids, skim and retain all floating solids and provide adequate detention volume and time to minimize the contribution of total suspended solids into the receiving stream. In the event that a problem arises with the TSS in the discharge of the sediment basin, Alum will be introduced into the basins to decrease total suspended solid concentrations. An alternative to Alum could be the construction of a floating silt fence to cause the solid to floc and settle to the bottom. Silt fences, hay filter dams, dust control on roads, lush vegetation, diversions ditches and other prudent practices will be utilized in controlling TSS.

**V.C. Water Treatment Facilities:**

The sediment basin will be the primary treatment facility to which chemical treatment may be introduced as needed to maintain effluent limits set forth by the Regulatory Authority.

Sediment basins will be constructed downstream of the permit area to control drainage and collect sediment from the disturbed area during surface mining and during the reclamation phase. In the event quality problems should arise, the following procedures will be used

:

- 1) Lime or caustic soda to raise a low pH.
- 2) Potassium permanganate to decrease manganese levels if the pH is too high.
- 3) Alum to decrease total suspended solid concentrations.

In the event alternative methods or chemicals are needed, the Regulatory Authority will be notified and new methods or chemicals will be approved prior to use.

#### **V.D. Drainage Control:**

Sediment basin 001P will be constructed during mining operations to control drainage and collect sediment from the disturbed area during the construction phase and during the reclamation and restabilization phase. All surface and groundwater runoff will be controlled through the basin whose design is shown in Part III-B of the application. The basin will be constructed, prior to any disturbance in its drainage area, under the supervision of a qualified Registered Professional Engineer or be a qualified person under his direct supervision. Upon completion of construction, the basin will then be certified to the Regulatory Authority as having been constructed by bringing desirable material in and compacting it in lifts until the construction specifications are met. Drainage structure will be installed as per design plans with any necessary erosion control and/or stabilization procedures such as riprap, concrete, drop structures, energy dissipaters, etc. being implemented as deemed necessary by the project engineer. Upon completion of construction the entire disturbed area will be revegetated in accordance with the approved Reclamation Plan (IV-C-5).

**V.E. Restore Approximate Recharge Capacity:**

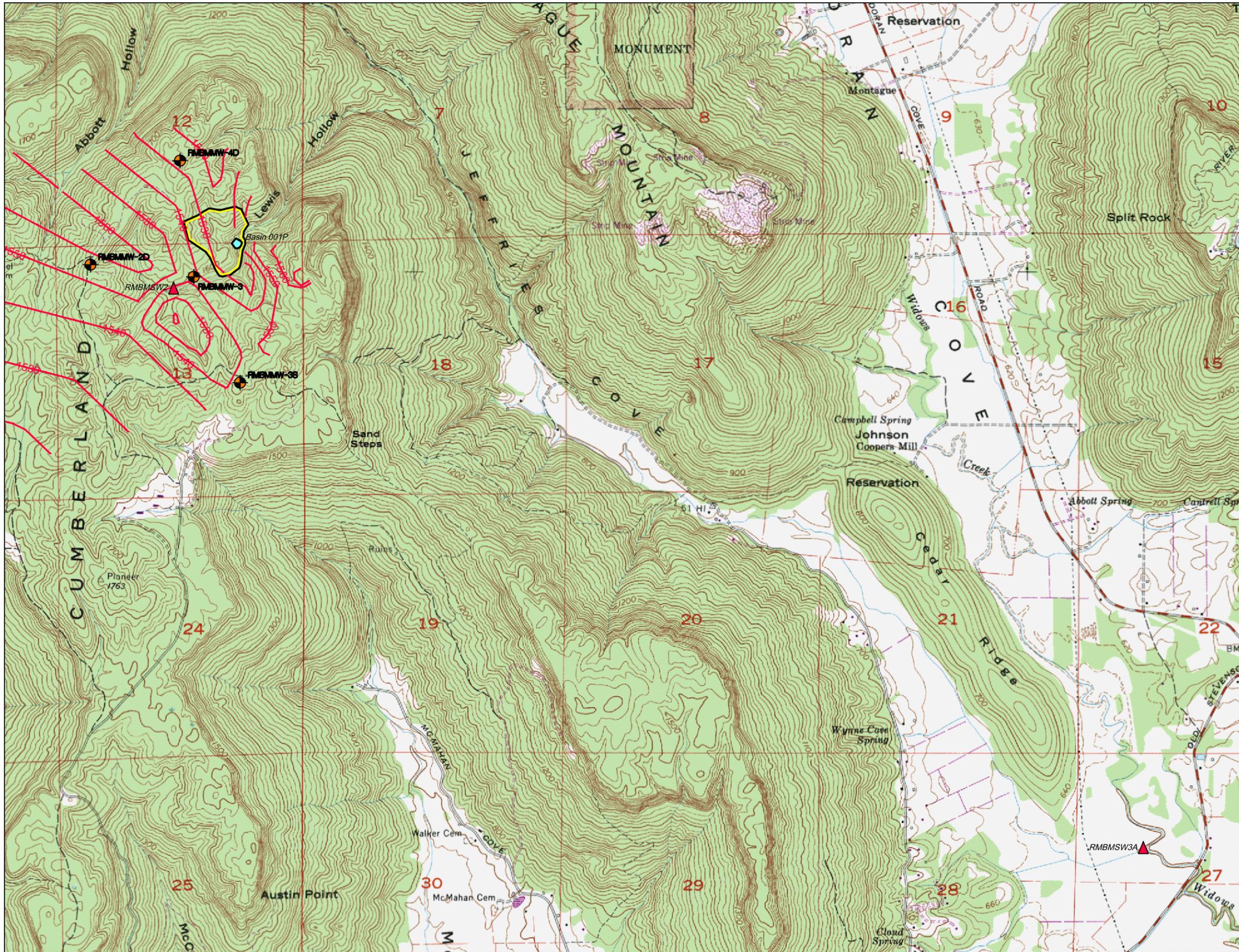
No significant affects are anticipated.

**V.F. Rights of Present Water Users:**

In the event that it is shown that mining by Red Mesa , LLC. has diminished the quality or quantity of any local well outside of the ½ mile radius (however unlikely), one of the following methods of replacing the domestic supply will be implemented: 1) an alternative source of groundwater for either shallow groundwater wells or wells with inadequate casing would involve drilling a new well in which the casing would penetrate an aquitard, such as shale below the target coal seam, and the well would also terminate below the aquitard in water-producing strata, such as sandstone, or 2) connect the residence to an existing municipal water supply, or 3) other methods which replace the groundwater users supply and is agreeable to both the user and the operator will be considered an alternative.

**V.G. Potential Adverse Consequences from PHC:**

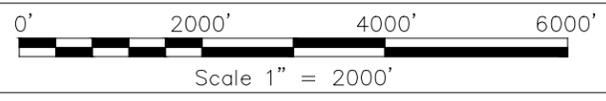
None anticipated.



**VICINITY MAP**  
Scale: 1" = 4 Miles

**LEGEND**

	Permit Boundary
	FMBMW-3B Groundwater Monitoring Site
	RMBMSW3A Surfacewater Monitoring Site
	4540 Structure Contour Line
	Basin 001P Proposed Sediment Basin



Base map - Doran Cove and Eureka  
Alabama United States Geological  
Survey Quadrangle Maps.

**PERC**  
ENGINEERING CO., INC.  
1606 Hwy. 78 West Jasper, AL 35501/P.O. Box 1712-35502  
(205) 384-5553 Office (205) 296-3114 Fax

**Red Mesa Energy, LLC.**  
**Bledsoe Mine**  
**Hydrologic Reclamation Plan Map**

.DWG NAME:	RMBledsoeMine	DATE:	03-09-2015
DRAWN BY:	S.A.E.	SCALE:	1"=2000'
APPROVED BY:	R.E.P.	JOB NUMBER:	14-04482-003

C:\Mining\Red Mesa Bledsoe Mine\RMBledsoeMine.dwg 04/15/15 15:00

**CERTIFICATION STATEMENT:**

The preceding Hydrologic Reclamation Plan for Red Mesa , LLC. at the Bledsoe Mine was prepared by, or under the direction of, a professional engineer and I certify that it is true and correct to the best of my knowledge and belief.

\_\_\_PRELIMINARY\_\_\_

Date: \_\_\_\_\_

TIMOTHY S. THOMAS  
PROFESSIONAL ENGINEER  
REGISTRATION NO. 18830

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

F. Groundwater Hydrology (779.13) See Attachment II-F.

The permit application shall contain a description of the groundwater hydrology within the proposed permit area and potentially impacted off-site areas. In obtaining the necessary base line or pre-mining information, the applicant should be guided in conducting the studies by the availability and usage of groundwater in the potentially impacted off-site areas with particular emphasis being placed on those locations where present or potential future usage of groundwater is of local importance. The description should be based on a comprehensive survey of existing water wells and springs that may be affected by the proposed mining operations or from wells drilled by the applicant. Information addressed in the survey shall include:

- (1) Static elevation of the groundwater.
- (2) Elevation and depth below the surface of any aquifer(s) or water table encountered.
- (3) The lithologic description and thickness of any aquifer(s) encountered.
- (4) Results of aquifer test(s), if conducted, shall be reported identifying the transmissivity, draw down, recovery rates, and specific capacity.
- (5) Known uses of the groundwater such as light industrial, agricultural, domestic, etc. estimating the approximate amount of water used per day.
- (6) Quality of the groundwater should be determined using sampling and laboratory techniques cited in Section 779.13(d)(4) or equally reliable methods to determine at a minimum:
  - (I) pH;
  - (ii) Total iron, mg/l;
  - (iii) Total manganese, mg/l;
  - (iv) Total dissolved solids or specific conductance at 25° C if the latter can be shown as a direct relationship with total dissolved solids.
- (7) Describe any geological structures including their orientation that will have an affect on the movement of the groundwater in the aquifer such as:
  - (I) Joint systems;
  - (ii) Faults or fault zones;
  - (iii) Folds;
  - (iv) Cleats in the coal; and
  - (v) Bedding planes.
- (8) Appropriate maps and cross-sections needed to supplement

Applicant: Red Mesa Energy, LLC  
Mine Name: Bledsoe Mine  
Permit Number: P- \_\_\_\_\_

the description of the groundwater hydrology shall conform with the requirements of Section 780.10(b).

Applicant: Red Mesa Energy, LLC  
Mine Name: Bledsoe Mine  
Permit Number: P- \_\_\_\_\_

G. Surface Water Hydrology (779.13)

The permit application shall contain information and a description of the surface water that will flow into or from the proposed permit area in a form and to a degree that will describe seasonal variations in both quantity and quality of the surface water within the proposed permit area and potentially impacted off-site areas. The pre-mine or base-line study should be designed to a level that takes into consideration water availability and present and potential future usage of the surface water. The period of time for which such a survey should be conducted is flexible, but should be adequate to properly evaluate low flow and high flow conditions based on either site specific studies, or where available, from existing data files which are reasonable and statistically representative of the proposed permit and potentially impacted off-site areas. At a minimum the submitted information on the surface water hydrology shall include:

- 1) Name of the water shed(s) which will receive discharge from the proposed permit area.
- 2) The location of any surface water bodies such as streams, lakes, important impoundments or springs that may be adversely affected by the proposed mining operations.
- 3) Known use of the surface water leaving the proposed permit area (or that will receive discharge from it), if any.
- 4) Water quality data shall be submitted to identify seasonal flow characteristics of, at a minimum:
  - (i) pH;
  - (ii) Total iron, mg/l;
  - (iii) Total manganese, mg/l;
  - (iv) Total suspended solids;
  - (v) Total dissolved solids or specific conductance at 25°C if the latter can be shown to have direct relationship with the total dissolved solids;
  - (vi) Base-line acidity information shall be provided if the need for acid neutralization is anticipated for the proposed mining operation or if required by the regulatory authority.
- 5) Water sampling and analytical methods listed in the references cited in Section 779.13(d)(4) or their equivalent should be used. Standard Methods For The Examination of Water and Wastewater.
- 6) When modeling or other simulation methods are employed to evaluate the affects of mining on the hydrologic regime both on and off the proposed permit area, representative seasonal precipitation data shall be reported.
- 7) The location of monitoring stations used to collect data for

Applicant: Red Mesa Energy, LLC  
Mine Name: Bledsoe Mine  
Permit Number: P- \_\_\_\_\_

the permit application should be shown on a map which conforms to the standards of Section 780.10(b).

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

H. Determination of the Probable Hydrologic Consequences (779.13)

See Attachment II-H.

The permit application shall contain a determination of the probable hydrologic consequences (PHC). The probable hydrologic consequence is a prediction of possible adverse affects of the proposed surface mining and reclamation activities upon the quantity and quality of surface and groundwater systems both on and off the proposed permit area and is based upon the results and findings of the base-line or pre-mining geologic and hydrologic studies. The assessment may be based upon site specific studies or from representative data that can be transferred or can be made to simulate the condition at the proposed permit and off-site areas.

- 1) Specifically, the PHC prediction shall include an estimate of the impact of the mining and reclamation operations upon the dissolved and suspended solids, total iron, total manganese and pH of the surface and ground water.
- 2) In the event it is determined that off-site water quantity cannot be protected from adverse affects of the proposed surface mining operations, the applicant shall identify an alternative source of water supply of at least equal quality and quantity that can be developed to replace the existing one.

Applicant: Red Mesa Energy, LLC  
Mine Name: Bledsoe Mine  
Permit Number: P- \_\_\_\_\_

I. Land Use Information

1. Describe in detail the land use(s) existing at the time of the application. Give the number of acres and describe sufficiently so the areas can be identified on a map. If necessary, include a map showing land use units. (779.22)

14 acres unmanaged lands or no current use.  
13 acres previously disturbed  
1 acre sediment basin

2. Give the applicable land use classification under local law, if any. (779.22)

There are none.

3. Is any of the area prime farmland? (779.27,785.17)  
( ) Yes ( X ) No

If yes, submit the information required in Section 785.17.

If no, show or state how the determination was made.

See Attachment II-I-3.

4. Has the land use of any area on the proposed permit area changed within the last 5 years? (779.22)  
( ) Yes ( X ) No

If yes, identify those areas and describe their historic use.

5. Has any area within the proposed permit been previously mined?(779.22) ( X ) Yes ( ) No

If yes, complete the following:

a) Describe the area or shown on a map. See Permit Map

b) Was the area reclaimed? ( ) Yes ( X ) No

If yes, under what Law? ( ) 1969 ( ) 1975 ( )  
Interim Law Unknown

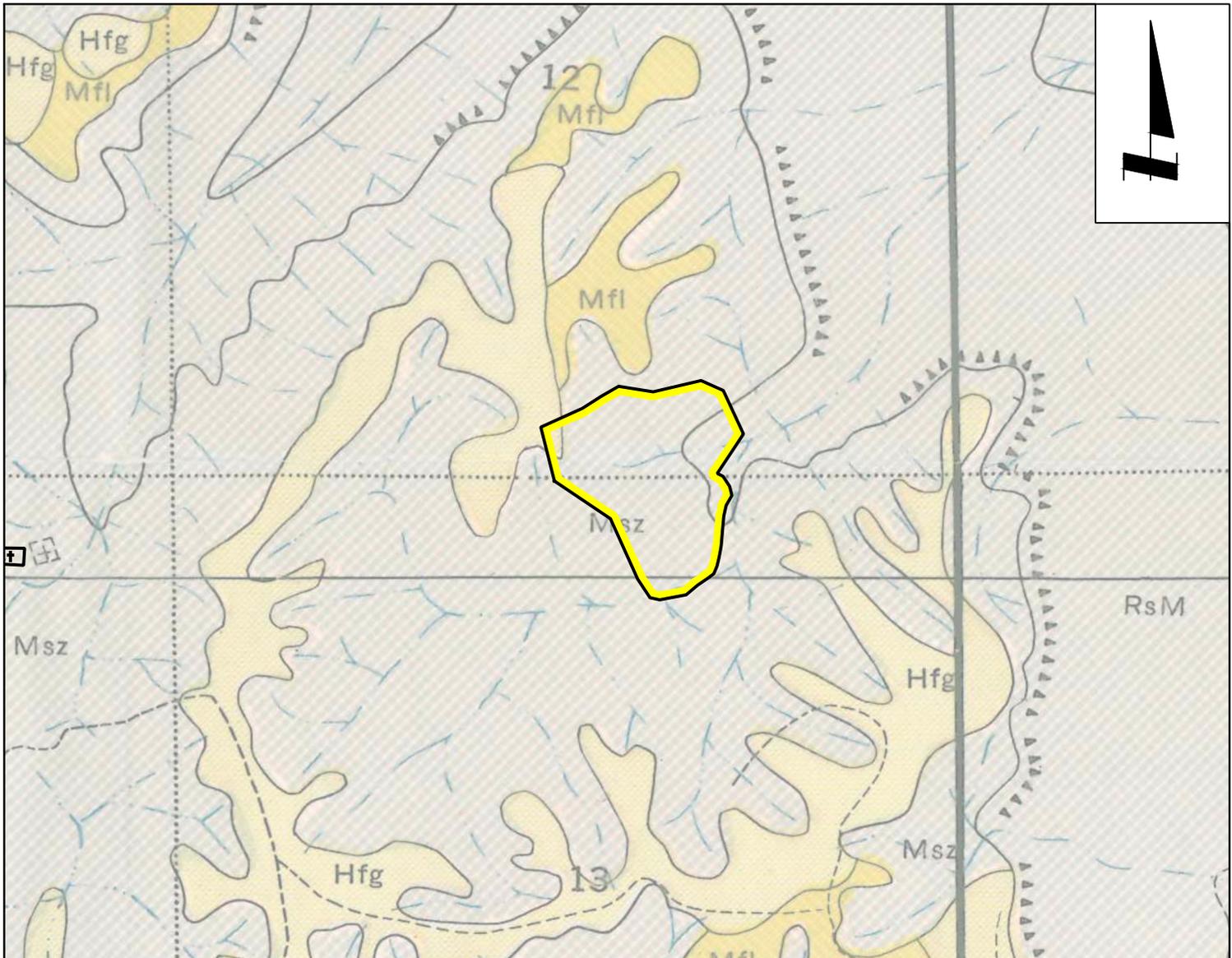
c) Describe the land use of the area prior to any mining, or if this cannot be determined, describe the land use(s) of surrounding unmined land. (779.22)

6. Describe in detail, land uses of areas adjacent to the proposed permit area. (779.22)

Areas adjacent to the permit support unmanaged forest consisting primarily of pine trees and mixed deciduous

Applicant: Red Mesa Energy, LLC  
Mine Name: Bledsoe Mine  
Permit Number: P- \_\_\_\_\_

trees.



BASE MAP - DORAN COVE AND EUREKA  
 ALABAMA UNITED STATES GEOLOGICAL  
 SURVEY QUADRANGLE MAPS.

- Mfi MUSKINGUM FINE SANDY LOAM, HILLY PHASE
- Msl MUSKINGUM STONY FINE SANDY LOAM, HILLY PHASE
- Msz MUSKINGUM STONY FINE SANDY LOAM, STEEP PHASE
- Hfg HARTSELLS FINE SANDY LOAM, ROLLING SHALLOW PHASE
- RsM ROUGH STONY LAND (MUSKINGUM SOIL MATERIAL)

**LEGEND:**

PERMIT BOUNDARY



**Red Mesa Energy, LLC.  
 Bledsoe Mine  
 Attachment II-I-3  
 Soils Map**

NO SOILS WITHIN THE PERMIT BOUNDARY ARE CONSIDERED PRIME FARMLAND SOILS PER SOIL SURVEY OF JACKSON COUNTY, ALABAMA PREPARED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE. SERIES 1941, NO. 8 ISSUED MARCH, 1954.

V:\Mining\Red Mesa Bledsoe Mine\RM\BledsoeMine.dwg 04/15/15 15:00

DRAWN BY: S.A.E.	DATE: 03-09-2015
DWG. NAME: RMBledsoeMine	
APPROVED BY: R.E.P	SCALE: 1"=1000'

Applicant: Red Mesa Energy, LLC  
 Mine Name: Bledsoe Mine  
 Permit Number: P-\_\_\_\_\_

7. Discuss the capability of the lands within the permit area to support a variety of land uses other than the current use. (779.22)

Soil Type	Corn (BU)	Soybeans (BU)	Alfalfa (AUM)	Grass Hay (AUM)
Msz Muskingum fine sandy loam, hilly phase	--	--	--	--
Rsm, Rough stony land (Muskingum soil material)	--	--	--	--
Hfg, Hartsells fine sandy loam, rolling shallow phase	20	0.8	--	--

BU: Bushel  
 - Not Rated  
 AUM: Animal - Unit - Month

8. Give the premining productivity of the proposed permit area based on actual yield data or estimates based on data from similar sites. (If estimates, give sources of data used.) (779.22)

Soil Type	Corn (BU)	Soybeans (BU)	Alfalfa (AUM)	Grass Hay (AUM)
Msz Muskingum fine sandy loam, hilly phase	--	--	--	--
Rsm, Rough stony land (Muskingum soil material)	--	--	--	--
Hfg, Hartsells fine sandy loam, rolling shallow phase	20	0.8	--	--

Applicant: <u>Red Mesa Energy, LLC</u>
Mine Name: <u>Bledsoe Mine</u>
Permit Number: P- _____

J. Vegetative Information

Delineate on a map, or describe in detail, the existing plant communities within the proposed permit area (and adjacent areas, if required). List the predominate over story, under story, and ground cover species (use common name only). Give approximate acreage covered by each plant community and approximate age of timber stands. (779.19)

Part of the proposed permit area has been disturbed by prior surface mining activities related to underground mining. No overstory exists within the previously disturbed areas except where sumac bushes have naturally reseeded and pine trees have re-established. Ground cover within the permit area includes kudzu, broom sedge, thistle and dog fennel. Predominately areas with and adjacent to the permit area which have not been disturbed consist of cut-over loblolly and virginia pine tracts whose average age is approximately 20-30 years. Ground cover in these areas consist of green briar, blackberry, broom sedge and dog fennel. A few areas adjacent to the permit area consist of deciduous forest communities whose dominant species range to 60 years old or more. Dominant species in these areas are sweetgum, red oak, poplar, and hickory. Under story consists mainly of immature individuals of the above species with redbud and dogwood. The over story in these areas are dense so as to prevent any significant ground cover other than honey suckle and seedings of the variety mentioned above.