



Pollyanna 8 Coal Lease Modification Application

Environmental Assessment,
DOI-BLM-NM-0040-2018-0001-EA

Applicant: Georges Colliers, Inc.
Lease Number: OKNM 091190

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CHAPTER 1. INTRODUCTION

1.1. Introduction and Background

In August 2014, a Lease Modification Application (LMA) to modify the existing Pollyanna 8 coal mine lease (OKNM 091190) was submitted to the Bureau of Land Management (BLM) Oklahoma Field Office (OFO) by Georges Colliers, Inc. (GCI). The LMA tract consists of approximately 5.6 million tons of federally owned coal (3.37 million tons of recoverable coal) overlain by 520 privately owned surface acres in eastern Oklahoma (Appendix A, Map 1.1 and 1.2).

The Pollyanna 8 mine (also known as the South Central Coal Mine) is an underground mine that uses room-and-pillar retreat-mining methods. GCI mine development activities are nearing the west end of the existing lease boundary. GCI has submitted the LMA to expand mining activities to the additional tract, thereby adding years to the operational life of the mine. There have been two portals used to access the mine. Portal 2 is currently being used and portal 1 has been sealed, however areas around both portal 1 and portal 2 are used for mine waste disposal. The mining activities on the LMA tract would be an extension of the existing mining operation; the same mining methods, waste disposal, portal access, and equipment at the existing mine would be used to mine the LMA tract.

1.2. Purpose and Need

The purpose of the BLM action is to respond to GCI's application to modify lease OKNM 091190 by adding up to 520 contiguous acres on the western edge of the existing lease parcel. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act of 1920 (MLA), as amended by the Federal Coal Leasing Amendments Act of 1976 (FCLAA), and the Federal Land Policy and Management Act of 1976 (FLPMA), which recognize that public lands shall be managed in a manner that acknowledges the nation's need for domestic sources of minerals.

1.3. Decision to be Made

The BLM will decide whether to lease the federal coal reserves in the LMA tract and, if so, under what terms, conditions, and stipulations.

1.4. Plan Conformance and Relationship to Statutes and Regulations

1.4.1. Plan Conformance or Land Use Analysis

The BLM, under the Secretary of the Interior, is the federal agency responsible for leasing federally administered coal. The FCLAA of 1976 requires that coal leases be issued in conformance with a comprehensive land use plan or, where there is no Federal interest in the surface and the coal resources are insufficient to justify the preparation costs of a comprehensive land use plan, a Land Use Analysis (LUA)[P.L. 94-377, Sec. 3 (3)(A)(i)]. I].

This LMA is for coal resources located outside the areas specifically designated as available for coal leasing in the BLM's 1994 Oklahoma Resource Management Plan (RMP), as amended. Therefore, the BLM is using the LUA process described at 43 CFR § 1610.5-7(c) and §3420.1-4 for this 520 acre tract of coal resources.

Consistent with land use planning requirements in 43 CFR §3420.1-4 (e), the BLM determined that the proposed LMA tract is acceptable for further consideration for leasing based on application of the four "coal screens" to the federal coal resources within the tract (Appendix B).

1.4.2. Relationship to Statues and Regulations

The proposed LMA and associated mining activities would be processed in accordance with all applicable laws, regulations, and orders including but not limited to:

- FCLAA of 1976
- Coal Leasing Amendments Act of 2005
- Surface Mining Control and Reclamation Act of 1977 (SMCRA)
- Applicable land use planning and coal leasing regulations found at 43 CFR 1600 and 3400

1.5. Scope of Analysis

The scope of analysis described in this Environmental Assessment (EA) is based on the issues discussed in Section 1.7.3, Table 1-1. While the scope of analysis focuses on the LMA tract, portals 1 and 2 are also discussed because coal mined from the LMA tract would be removed through portal 2 and coal mine waste associated with mining the tract would be permanently deposited at one or both of these portal areas (Appendix A, Map 1.2). In addition, because the Pollyanna 8 mine markets its coal to the AES Shady Point Station (98%) and Oklahoma-based industrial users (approximately 2%), combustion of the coal mined from the LMA tract at these end user points is incorporated into the scope of the analysis (Appendix A, Map 1.2).

1.6. Consultation and Coordination

1.6.1. Cooperating Agency Involvement

The Office of Surface Mine Reclamation and Enforcement (OSMRE) is a cooperating agency on this project because it has special expertise in coal mining and associated environmental effects. Although the State of Oklahoma, through a cooperative agreement with the Secretary of the Interior, is the coal permitting authority for federal lands (leased federal coal) in Oklahoma, OSMRE has oversight responsibility for the Oklahoma coal program. Furthermore, OSMRE must prepare a mining plan decision document for the Assistant Secretary for Lands and Mineral Management (ASLM). That document must include an environmental assessment of the proposed mining operation.

1.6.2. Tribal Consultation and Section 106 Consultation under the National Historic Preservation Act

Tribal consultation for the BLM is guided by a variety of laws, Executive Orders and Memoranda, as well as case law. The OFO is committed to, and has conducted tribal consultation and NEPA scoping during the Pollyanna 8 LMA process. This consultation and scoping is carried out at the government-to-government level. Tribal consultation is a separate process from public scoping, due to the unique relationship between the U.S. Government and federally recognized Tribes. The primary methods of Tribal consultation have included letters, providing Pollyanna 8 LMA materials, and one face-to-face meeting at a tribal office.

The BLM OFO initiated Tribal consultation by letter on October 13, 2017, to Tribal Leaders of:

- Caddo Nation
- Cherokee Nation
- Choctaw Nation
- Osage Nation
- Thlophlocco Tribal Town
- Wichita and Affiliated Tribes

Although all Tribes listed were contacted, not all were available or expressed an interest in consulting.

The OFO shared information with the appropriate Tribal Historic Preservation Offices of these tribes. Tribes were notified of the project, provided the Proposed Action and given an opportunity to express concerns or issues with the project. One tribe, the Caddo Nation, requested a face-to-face meeting at their office.

The BLM determined that because the coal expansion is underground and no new surface ground disturbance is proposed, the project will have no potential to cause effects to cultural resources as described under 36 CFR 800.3.a.1. Therefore, the BLM has no further obligation under Section 106 of the National Historic Preservation Act (16 U.S.C. 470f).

1.6.3. Section 7 Consultation under the Endangered Species Act

Consultation with the U.S. Fish and Wildlife Service (USFWS) under provisions of Section 7(a)(2) of the Endangered Species Act was completed on October 24, 2017. The OFO completed a Biological Evaluation based on an official species list provided by the USFWS's Oklahoma Ecological Services Field Office. The Biological Evaluation determined that there would be "no effect" on any federally listed species or designated critical habitat; therefore, further consultation is not required (BLM 2017a).

1.7. Scoping and Issues

1.7.1. Internal Scoping

An interdisciplinary team, including OSMRE, formulated issues associated with the Proposed Action during a workshop held at the OFO the week of October 23-27, 2017. Additional issue identification occurred through public scoping and tribal consultation and subsequent discussions, conference calls, and meetings.

1.7.2. External Scoping / Public Involvement

A public scoping period began on October 4, 2017, and finished on November 6, 2017. The BLM published public notice on the BLM's national NEPA Register and in the following newspapers: *Spiro Graphic*, *The Times Record*, *Poteau Daily News*, and *The Tulsa World*. In addition, the BLM sent a public scoping letter to 258 entities (comprised of individuals, organizations, businesses, and government agencies) with information about the Proposed Action and a request for comments within the 30-day public comment period. One comment letter was received from a landowner with property over the existing Pollyanna 8 mine and one letter was received from an organization. The letters expressed concern over impacts to water quality and quantity, land uses, air quality, property value, wildlife, environmental justice, cultural resources, seismicity, climate impacts, and NEPA analysis methods.

1.7.3. Issues

The issues for detailed analysis identified during public and agency scoping are summarized in Table 1-1. Impact indicators are used to describe the affected environment for each issue in Chapter 3, measure change, and to assess the impacts of alternatives.

Table 1-1. Issues Identified for Detailed Analysis.

ISSUE	ISSUE STATEMENT	IMPACT INDICATOR
Issue 1	How would leasing and mining the LMA tract affect greenhouse gas emissions? How would combustion of coal leased and mined from the LMA tract (the end use of the coal) affect greenhouse gas emissions?	Emissions of CO ₂ equivalents (tons)
Issue 2	How would haulage of coal leased and mined from the LMA tract affect particulate matter (PM ₁₀ —dust) emissions and subsequently air quality in LeFlore County?	Emissions of PM ₁₀ (tons)

Table 1-1. Issues Identified for Detailed Analysis.

ISSUE	ISSUE STATEMENT	IMPACT INDICATOR
Issue 3	How would combustion of coal leased and mined from the LMA tract (the end use of the coal) affect emissions of criteria pollutants and subsequently air quality in LeFlore County?	Emissions of criteria pollutants (tons)
Issue 4	What is the risk of subsidence from underground mining of the LMA tract using retreat room and pillar mining methods?	Acres at risk of subsidence
Issue 5	What effect would leasing and mining the LMA tract have on the quality of shallow groundwater at portal 2 as a result of permanent storage of coal mine waste and how would those impacts affect water quality in the nearby Poteau River?	Concentration of solutes (ppm)
Issue 6	How would leasing and mining the tract affect the availability of coal for domestic uses, particularly electrical power generation in the state of Oklahoma?	Average annual coal production (tons)

Issues evaluated and not discussed in further detail in this EA are described in Table 1-2.

Table 1-2. Issues not Included in Further Detail in the Environmental Assessment.

ISSUE	ISSUE STATEMENT	RATIONALE FOR NOT FURTHER DISCUSSING IN DETAIL IN THE EA*
ELM-1	How would leasing and mining the LMA tract affect fire management?	There is no history of coal fires from mining the existing lease tract and, as a result, no coal fires are anticipated from leasing and mining the LMA tract. In addition, there would be no fire management issues from leasing and mining the LMA tract because there would be no new ignition sources or fuels introduced.
ELM-2	How would the use of portal 2 to extract coal mined from the proposed LMA tract affect the Indiana (<i>Myotis sodalis</i>) and northern long-eared bat (<i>Myotis septentrionalis</i>)?	Abandoned mine portals and mine workings may provide useable habitat for Indiana and northern long-eared bats. Portal 1 of the Pollyanna 8 mine is currently sealed and inaccessible to bats. Under the Proposed Action, coal would be removed from the mine using portal 2. During the period of active mining of the LMA tract Indiana and northern long-eared bats would not inhabit the area around portal 2 nor the mine workings due to continuous human presence. Upon closure of the mine, portal 2 would be completely sealed. Protective measures for bats would be implemented in accordance with the 1996 Biological Opinion on implementation of SMCRA (USFWS 1996, USFWS et al. 2009). As a result there would be no impacts to Indiana and northern long-eared bats from the Proposed Action and this issue is not analyzed further.
ELM-3	How would leasing and mining the tract affect the following resources: Listed species (federal and special status), migratory birds, cultural resources, invasive species/noxious weeds, soils, surface structures, noise, recreation, and vegetation?	There would be no direct impacts to these resources as a result of the Proposed Action because there would be no new surface disturbance or activities. Based on the subsidence analysis provided in Section 3.5 (p.19-20), there would be no impacts from subsidence. There are no other mechanisms for impacts to these resources associated with the Proposed Action beyond those analyzed in Chapter 3, therefore this issue is not analyzed further.
ELM-4	How would leasing and mining the tract affect floodplains?	Floodplain mapping indicates that approximately 7 acres of the 100-year floodplain of New Spiro Lake overlap the LMA tract. In addition, portal 2 is completely within and portal 1 is mostly within the 100-year floodplain associated with the Poteau River. However, impacts to the floodplain of New Spiro Lake from the Proposed Action would not occur because the analysis of Issue 4 indicated there would be no subsidence and therefore, no surface impacts to this area. Impacts to floodplains within portals 1 and 2 areas would not occur because these areas are bermed to keep the coal waste disposal areas above the 100-year flood level. Approved post-mining land contours in the state permit for portals 1 and 2, retain these berms to ensure long-term protection of the floodplain. Because there would be no subsidence above the tract and areas around the portals are, and would continue to be, bermed, this issue was not analyzed further.

Table 1-2. Issues not Included in Further Detail in the Environmental Assessment.

ISSUE	ISSUE STATEMENT	RATIONALE FOR NOT FURTHER DISCUSSING IN DETAIL IN THE EA*
ELM-5	How would leasing and mining the LMA tract affect tribal religious concerns?	During the tribal consultation process regarding the LMA (Section 1.6.2) tribes did not raise any religious concerns associated with leasing and mining the tract. As a result this issue was not analyzed in detail.
ELM-6	How would leasing and mining the LMA tract and hauling coal from the mine site to the AES Shady Point Station effect traffic and transportation?	Mining of the LMA tract would not change the rate of production of the mine or the amount of coal hauled to the AES Shady Point Station annually. All transportation of coal on county and state roads complies with laws contained in Oklahoma statutes (47 OK Stat 47-14) and Department of Transportation rules (OAC 730: 30-9). Traffic associated with current mining operations would remain the same. The Proposed Action would however, add eight additional years of the annual traffic resulting from hauling coal to the power plant from the mine. This increase in time is not enough to cause significant impacts, therefore this issue was not analyzed in detail.
ELM-7	What impacts would generation, temporary storage, and disposal of solid and hazardous materials as a result of leasing and mining the LMA tract have on people and the environment in the area?	Under the Proposed Action, there would be no change in the amount or degree of annual generation of solid and hazardous materials (e.g., filters, lubricants, fuels, paints, solvents, coolant, etc.) at the mine. All hazardous materials are monitored through the Spill Prevention Control and Countermeasures Plan (SPCC) according to 40 CFR §112 and are disposed of at an approved offsite permitted facility. This practice would continue under both alternatives. There have been no impacts on people and the environment associated with solid and hazardous materials at the mine, so there would be none expected from leasing and mining the LMA tract, therefore this issue is not analyzed in further detail.
ELM-8	How would leasing and mining the tract affect oil and gas development on and in the immediate vicinity of the tract?	Conflicts between coal bed methane (CBM) development and coal mining can exist because CBM is vented as part of the mining process (for both surface and underground mining). However, this issue is not carried forward for detailed analysis because there is no known interest in the CBM contained in the coal within the tract.
ELM-9	What impacts would leasing and mining the LMA tract have on paleontological resources anticipated to be present in the Hartshorne Formation (the geological formation containing the target coal seam within the tract)?	The LMA tract is within the McAlester and Hartshorne Formations, mapped as Potential Fossil Yield Classification (PFYC) 3. PFYC-3 areas are sedimentary geologic units where fossil content varies in significance, abundance and predictable occurrence (BLM 2016). The McAlester and Hartshorne Formations extend over approximately 660,400 acres in eastern Oklahoma. Under the Proposed Action, coal and rock material potentially containing fossils would be removed from the tract. This would occur on up to 520 acres (0.08 % of the extent of McAlester and Hartshorne Formations). Design features identified in Section 2.2.4 would result in data recovery of any fossil resources removed from the tract during mining activities. Due to these design features, the formations' PFYC classification, and the limited area of mining activity relative to the area of the formations, this issue is not carried forward for further analysis.
ELM-10	How would subsidence from underground mining of the LMA tract using retreat room and pillar mining methods affect the availability of shallow groundwater in the tract?	Based on a review of Oklahoma Water Resources Board (OWRB) data, there is one permitted well overlying the Pollyanna 8 mine but none above the proposed LMA tract (OWRB 2017). The base of useable water is from 75 feet to 200 feet below the surface (OWRB 2017). Based on the depth and magnitude of potential subsidence (See 3.6, Issue 4), the zone bearing useable water would be outside the fracture zone. In addition, the potential water-bearing zone is within or above mudrock layers that would tend to bend rather than fracture, further reducing risk of affecting availability of shallow groundwater for domestic and livestock uses. This issue is not carried forward because no water wells are known to occur over the LMA tract and subsidence would not impact shallow groundwater.

Table 1-2. Issues not Included in Further Detail in the Environmental Assessment.

ISSUE	ISSUE STATEMENT	RATIONALE FOR NOT FURTHER DISCUSSING IN DETAIL IN THE EA*
ELM-11	How would leasing and mining the tract affect environmental justice populations (if they exist) in the vicinity of the tract?	<p>Consistent with Executive Order (EO) 12898 (§59 Federal Register 7629, 1994) environmental effects to minority or low-income populations were considered. LeFlore County was used as the unit of analysis for determining presence or absence of environmental justice (EJ) “populations of concern”, or communities and populations that should be considered under the EO. The state of Oklahoma was used as the comparison population.</p> <p>The total population of Oklahoma is approximately 33% aggregate minority whereas the population of LeFlore County is approximately 28% aggregate minority. Approximately 16% of Oklahoma residents are considered to be in poverty whereas 19% of LeFlore County residents fall into this category (U.S. Census Bureau 2016). The BLM has determined that there may be low-income communities and populations in LeFlore County that should be considered “EJ populations” for purposes of complying with the EO. While there are 3% more residents in poverty, no disproportionate impacts would occur because there are few or minimal impacts from eight additional years of mining with no surface disturbance as described in the analysis in the issues statement. Consequently, EJ issues associated with leasing and mining the LMA tract are not carried forward for detailed analysis.</p>
ELM-12	How would leasing and mining the tract affect employment primarily in LeFlore County?	<p>The total labor force in LeFlore County is approximately 50% of the population above the age of 16 or approximately 35,000 people (U.S. Census Bureau 2016). The Pollyanna 8 mine currently employs approximately 80 people (or about 0.23% of total employment in the county). The majority of employees reside in LeFlore County with many of these individuals (more than half) located within 10-15 miles of the mine. Approximately 25% of employees live outside of LeFlore County with the majority of these residing in northern Arkansas. Per capita income in LeFlore County is estimated at \$18,881 (U.S. Census Bureau 2016) whereas the average income of mine employees is approximately \$41,600 per year assuming a \$20/hr. and standard 40-hour work week without overtime. Leasing and mining the LMA tract would not change total employment at the mine. However, leasing and mining the tract would give an additional eight years of work for Pollyanna 8 employees. The BLM has determined that additional analysis of this issue would not contribute further to a reasoned choice between alternatives. As a result, this issue is not carried forward for detailed analysis.</p>
ELM-13	How would leasing and mining the tract affect property and home values on the tract?	<p>The subsidence-related issue analysis (Issue 4 in Table 1-1) provided in detail in Section 3.6 indicates that no measureable subsidence would occur on the LMA tract and therefore no new surface disturbance. There would be no change in operations associated with the portals or delivery of coal to market. Given these circumstances, the BLM has determined a decision to lease the LMA tract would not affect property and home values on the tract. As a result this issue is not carried forward for detailed analysis.</p>

Table 1-2. Issues not Included in Further Detail in the Environmental Assessment.

ISSUE	ISSUE STATEMENT	RATIONALE FOR NOT FURTHER DISCUSSING IN DETAIL IN THE EA*
ELM-14	How would the proposed mining and mining-related activities affect the seismic sensitivities and earthquake propensity in the area?	Data suggests that the recent increase in earthquakes in Central Oklahoma is a result of saltwater injection wells (USGS 2017, OGS 2015, Rubenstein and Mahani 2015, Keranen et al. 2011, Keranen et al. 2014). Of the over 10,000 wells in Oklahoma that accept produced water (water returned to the surface through the well bore), there are three active wells in LeFlore County (Fractracker Alliance 2017). On average, each of these LeFlore County wells injects 85,430 barrels of produced water per year. For comparison, wells in Grant County, the county with the greatest number of earthquakes inject 505,418 barrels per well per year (OGS 2017). There have been no recorded earthquakes in LeFlore County and only two recorded in an adjacent county (Pushmataha) within the last 5 years (OGS 2017) despite ongoing oil and gas development. Recently, a 5.0 magnitude earthquake occurred near Cushing, OK, 137 miles from portal 2 (Fractracker Alliance 2017). Through BLM's normal inspection process, no effect on the mine nor its operation was observed. Based on this information, there would be no increases in seismic sensitivities or earthquake occurrences resulting from leasing and mining the LMA tract and this issue is not carried forward for detailed analysis.

* Supporting documentation for these statements is included in the project record.

CHAPTER 2. ALTERNATIVES

2.1. Alternative A – No Action

The BLM would deny the LMA, thus, federal coal reserves within the 520-acre tract would not be recovered by GCI. If the LMA is denied, GCI would continue mining at current levels on the existing lease and any additional adjacent leases they may acquire in the future. Due to the geologic features of the LMA tract (amount of recoverable coal, proximity to fault lines, and nearby natural gas wells), as well as the mining method used in the Pollyanna 8 mine, the 520-acre tract would not be mined in the foreseeable future.

2.2. Alternative B – Proposed Action Alternative

The BLM would approve the LMA, as a result, GCI would mine the LMA tract using retreat room-and-pillar underground mining methods (Fig. 2-1).

2.2.1. Location and Overview

The LMA tract encompasses approximately 520 privately owned surface acres five miles southeast of Spiro, Oklahoma (Appendix A, Map 1.2, Table 2-1). The tract contains an estimated 3.37 million tons of federally owned recoverable coal reserves.

Table 2-1. Legal Description of the LMA Tract.

LEGAL DESCRIPTION	ACRES
Township 9 North, Range 25 East, Indian Meridian, LeFlore County, OK	
Section 25, S/2	320
Section 36, N/2 N/2 and N/2 N/2 S/2 N/2	200
Total	520

2.2.2. Reasonably Foreseeable Mine Operations

The LMA tract would allow GCI to continue operations by providing a logical extension of the mine's current operation. As such, development of the coal resources of the Hartshorne coal seam within the LMA tract would occur in a similar manner as the current mine upon approval of a permit revision by the Oklahoma Department of Mines (ODM) and approval of the mining plan by the ASLM. The primary means of coal production on the tract would be retreat room-and-pillar mining methods using continuous miner units (Fig. 2-1). A continuous miner unit consists of a continuous miner, shuttle cars, roof bolter, belt feeder, and conveyor belts. Additional conveyor belts would transport mined coal to the surface. When retreating, some pillars would be removed on a case-by-case basis according to the mine's approved ground control plan. Pillars are not retreat mined beneath occupied structures.

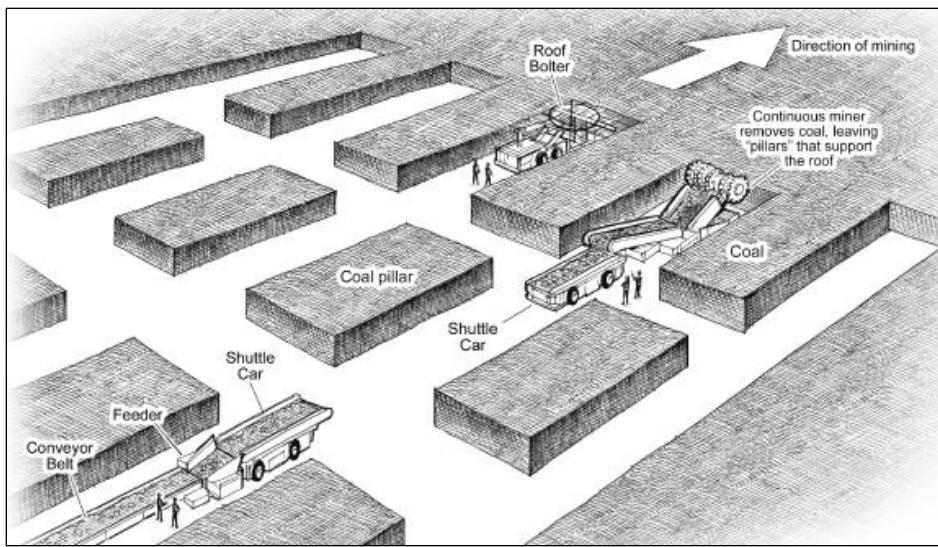


Figure 2-1. Illustration of typical underground mining operation using room-and-pillar mining techniques (Arch Coal, Inc. 2012)

Following mining, some coal reserves would be left intact within the LMA tract. This would be determined by the mine plan, approved ground control plan, and on a case-by-case basis depending on any challenges encountered during the mining process. Possible reasons to leave intact coal reserves include 1) presence of adverse ground conditions, such as faulting or bad roof conditions; 2) need for retention of the coal to provide support for "bleeder" entries, which are entries surrounding an area being mined or which has been mined out and need to be supported to allow continued ventilation; 3) need for barrier pillars to protect mains and sub-mains from ground pressures resulting from mining; and 4) MSHA safety requirements.

As coal is extracted from the mining face by the continuous miner, it is placed on shuttle cars which then travel back to the belt feeder to be placed onto the conveyor belts for transport out of the mine. When the limit is reached for the continuous miner, it is moved to another area for mining. Roof bolters go into the area previously occupied by the miner and provide ceiling support for the area. As the coal exits the mine through an existing portal, it is stored at the existing permitted stockpile area to await transport to the end user. Coal waste is permanently placed at portal areas 1 and 2. The opening to the mine at portal 1 is no longer in use for coal extraction activities and has been sealed and abandoned in accordance with regulatory requirements, however the area around portal 1 is still used for mine waste storage.

2.2.3. Annual Production and Life of Mining on the LMA Tract

Annual average coal production at the Pollyanna 8 mine is approximately 400,000 tons. This level of production is expected to continue under the Proposed Action. Based on the estimated amount of recoverable coal present in the LMA tract (3.37 million tons) this translates to an extension of the operational life of the mine by approximately eight years. The current end users of coal mined from the Pollyanna 8 mine are AES Shady Point Station (approximately 98%) and industrial operations such as cement production (approximately 2%). Given current coal market conditions and Pollyanna 8 contract commitments, these end users will likely continue to purchase coal from the Pollyanna 8 mine for the foreseeable future.

2.2.4. Design Features

The following design features would be implemented to minimize impacts from leasing and mining the LMA tract.

1. *Survey Control* - The company that performs, calculates, and produces the main survey control for the underground mine also establishes the surface control for the mine. The surface control locates any surface structures above the mine operations. This allows the company to produce one map that includes all surface features of the lease tract as well as the existing Pollyanna 8 tract. By maintaining the one survey control system, the mine has the location of the mine workings in relation to the surface features.
2. *Pillar Safety factors* - Kentucky Department for Surface Mining Reclamation and Enforcement's, Reclamation Advisory Memorandum 107 (1992) has been accepted industry-wide to ensure appropriate pillar sizes. Category 3 safety factors would be utilized by the mine to prevent subsidence. Category 4 safety factors would be invoked where applicable when mining beneath (1) hospitals, schools, churches and publicly owned buildings; (2) gas pipelines greater than 6 inches in diameter; (3) dams classified as Class B or C impoundments; (4) state and federal highway bridges.
3. *NM-14-LN Lease Notice* – This notice requires the operator to immediately notify the BLM Authorized Officer of any paleontological resources discovered as a result of operations under this lease. The operator shall suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and shall protect the discovery from damage or looting.
4. *Oklahoma Administrative Code (OAC) 460:20-31-13 Subsidence Control Plan / Mine plan* - This regulation requires the submittal of a subsidence control plan that includes a map of underground workings showing the location and extent of areas in which planned-subsidence mining methods will be used. The plan is to have detailed descriptions of the method of coal removal (in this case, room-and-pillar with number of entries, size of pillars, etc.), physical ground descriptions, monitoring, subsidence control measures, anticipated effects of subsidence (if any), and other information deemed necessary by ODM. When designing the retreat mining plan, the mine designs the cuts or portions of the pillars left in place. Typically, the operation uses the continuous miner to cut into the pillars until the limit of the equipment is reached, then the equipment is pulled out and shifted the width of the cutter and again advanced into the pillar. Up to four cuts may be made into the pillar to maximize production.
5. *Pillar Retreat Design*- A pillar retreat design plan must be submitted. This plan starts by mapping surface structures over the underground workings. As directed in this Act, a cone is projected downward and outward from 15 feet outside the limit of the structure to the coal seam. Where this projected boundary intersects a pillar, that pillar is not removed but pillars outside of this boundary can be removed. If the projected boundaries from separate structures intersect or overlap, no pillars are removed from the area of overlap.

6. *Fugitive Dust Minimization*- Reasonable precautions shall be taken to minimize fugitive dust emission from loading and unloading operations, haul roads, and stockpiles. The precautions shall include but not be limited to the following:

- Use of water and/or chemical stabilizers on roads and stockpiles
- Application of other coatings or coverings to substances to becoming airborne or wind-borne
- Coverings or wetting material in trucks
- Planting and maintain vegetation coverings or windbreaks
- Locate stockpiles as to provide minimum exposure to high winds and avoid open spaces in line with neighboring homes or businesses.

Additionally, no visible fugitive dust emissions shall be discharged beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, cause air quality standards to be exceeded, or interfere with the maintenance of air quality standards (ODEQ 2008, ODEQ 2009).

7. *Mine Safety*- The Mine Safety and Health Administration (MSHA) is responsible for enforcing the Federal Mine Safety and Health Act of 1977 (Mine Act), as amended. As part of that enforcement, MSHA conducts regular inspections (a minimum of one every quarter) of mine operations to ensure compliance. The Mine Act sets forth mandatory health and safety standards for the protection of life and prevention of injuries in coal or other mines. These rules are in 30 CFR parts 1-199. In addition, BLM conducts regular inspections and reports any unresolved safety violations to MSHA.

2.3. Alternatives Considered but Dismissed

As part of the analysis process, the BLM considered reducing the size of the LMA tract available for leasing, but did not carry this alternative forward because there would be no appreciable differences in effects and it would not resolve any conflicts that are not resolved under the existing range of alternatives and/or the application of design features.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1. Introduction

This chapter describes the existing conditions relevant to the issues presented in Table 1-1 and discloses the potential direct, indirect and cumulative impacts of the Proposed Action and No Action alternatives on those issues. No additional mitigation measures were identified as necessary following the analysis of each issue and therefore no discussion of mitigation or residual impacts is provided below.

3.2. Cumulative Actions

Table 3-1 provides a listing of past, present, and reasonably foreseeable future actions (RFFAs) incorporated into the analysis. Cumulative impacts are disclosed within the analysis of each issue.

Table 3-1. Past, Present, and RFFAs incorporated into the analysis.

Issue	Geographic/Temporal Scope	Past Action	Present Actions	RFFAs
Issue 1	State; National; Global/Eight years	Current status of state, national and global GHG	Current status of state, national, and global GHG emissions	Projected state, national, and global GHG emissions

Table 3-1. Past, Present, and RFFAs incorporated into the analysis.

Geographic/Temporal				
Issue	Scope	Past Action	Present Actions	RFFAs
Issue 2	State and County/Eight years	N/A because not currently contributing to emissions in county	Current status of area and county emissions.	Five inactive coal mines that may become active (Three in LeFlore Co.) with five associated lease actions. One lease action that would result in a new coal mine (in LeFlore Co.). Two lease actions associated with active mines. Continuation of current coal and non-coal sources
Issue 3	Same as Issue 2	Same as Issue 2	Same as Issue 2	Same as Issue 2
Issue 4	Current Pollyanna 8 lease, LMA tract/20 yrs.	Previously mined area of current lease	Current mining area of current lease	Pollyanna 8 LBA area
Issue 5	The area around portals 1 and 2 and the reach of the Poteau River between the portal areas/20 years	Coal waste deposited at portals 1 and 2, historic surface mine at portals 1 and 2	Continued presence of coal waste and historic surface mines at portals 1 and 2 ongoing coal waste storage at portal 2	Continuation of past and present actions Coal waste storage at portal 2 from Pollyanna 8 LBA adjacent to current lease.
Issue 6	Oklahoma/Eight years	Coal development occurring since 1850's	Five producing mines in 2016	Five inactive mines that may become active (with 5 associated lease actions) One lease action for a new mine Two lease actions associated with active mines.

3.3. Issue 1: How would leasing and mining the LMA tract affect greenhouse gas emissions? How would combustion of coal leased and mined from the LMA tract (the end use of the coal) affect greenhouse gas emissions?

Leasing and mining the LMA tract could affect greenhouse gas (GHG) emissions and are analyzed at county, state, and national scales. Mining of the LMA tract would take approximately eight years. GHG emissions were estimated for four sources: combustion, methane released, trucking, and equipment use. GHG emissions produced as a result of combustion of the mined coal would occur at the same time as mining occurs. Other pollutants associated with combustion of the mined coal is addressed in Issue 3. GHG emissions for each activity were calculated and converted to carbon dioxide equivalent (CO₂e). These calculations relied on data presented in the application package from GCI. Emissions are given in units of metric tons (MT) annually, over an eight-year time period.

3.3.1. Affected Environment

Numerous activities contribute to climate change, including emissions of GHGs (especially CO₂ and CH₄) from fossil fuel development, large wildfires, activities using combustion engines, changes to the natural

Table 3-2. Inventory baseline data for GHG emissions at national, state, and county levels (EPA 2015, EPA 2017a).

SOURCE	MILLION METRIC TONS OF CO ₂ E	% OF NATIONAL EMISSIONS
United States Total GHG Emissions	6,586	100
Oklahoma Large Facilities	64	0.97
Oklahoma Power Plant Sector	41	0.62
LeFlore County	2.3	0.04

Reference year is 2015 data inventory.

carbon cycle, and changes to radiative forces and reflectivity. Baseline emissions at national, state, and county level are included Table 3-2.

3.3.2. Environmental Impacts

3.3.2.1. *Impacts of Alternative A – No Action Alternative*

The LMA tract would not contribute to GHG emissions. However GCI would continue mining on the existing lease tract for the remaining operational life of the mine and emissions of GHGs would continue as reported to the EPA in accordance with 40 CFR 98. The no action alternative would not affect the remainder of the lease in terms of GHG emissions.

3.3.2.2. *Impacts of Alternative B – Proposed Action Alternative*

Coal combustion: To calculate the amount of GHGs that would be produced by the combustion of coal mined from the proposed LMA tract, it is assumed that the combustion is complete. Calculations used emission factors of 1.885, 0.000217, and 0.000032 MT/short ton of coal for CO₂, CH₄, and N₂O, respectively, and factors of 1, 25, and 298 were then respectively applied to convert emissions of these three gasses to CO₂e (EPA 2014). Results of these calculations are given in Table 3-3.

Methane released from coal mining: As a result of coal extraction, methane trapped in the coal seam is released. The amount of methane present varies with the geologic setting of the coal bed. The average methane content of Hartshorne coal at depths of 1,000 to 1,500 feet is 534 standard cubic feet per ton of coal (Iannacchione and Puglio 1979). It is assumed that all methane from the recovered coal would be liberated, and only a small portion of methane in the coal left in place would be liberated. From the coal left in place, methane would seep out of natural fractures—cleats and joints—and new fractures caused by mining activity. Methane production from in-place coal would just be a fraction of that generated from an equal volume of coal ground out of the seam and transported to the surface. Based on knowledge of the coal seam, a factor of 25% was used to calculate methane released by coal left in place.

To determine total and annual GHG emissions over the eight- and ten-year time periods, the quantity of methane released from the mined coal (3.37 million short tons) and the quantity of the coal left in place (2.25 million short tons) was multiplied by the U.S. Bureau of Mines emission factor of 534 standard cubic feet of gas/short ton of coal. This calculated gas volume was input into the EPA *Coal Mine Methane Units Converter* to give emissions in metric tons of CH₄ and CO₂e (EPA 2017b). The quantity of methane released from the coal left in place was further multiplied by the 25% factor discussed above. Table 3-3 gives GHGs emissions from mined coal and coal left in place.

Truck haulage: Coal from the LMA tract would be burned mostly at the AES Corporation Shady Point Generation Plant in LeFlore County. Round-trip distance between the mine and power plant is 26 miles. The mine also supplies coal to other industrial users throughout the local area. The longest round trip distance reported for these users is 300 miles. From past production and haulage reports supplied by the company (personal communication, Shawn Clark, GCI, October 13-16, 2017) a percentage of total production was allotted for hauling to the AES Plant and a percentage to industrial users. Given an average fuel economy reported by the company for a truck having a 25-ton payload, a total of 996,121 gallons of diesel fuel would be consumed in coal haulage. Appropriate emission factors of 10.21 kg/gallon, 0.0051 g/mile, and 0.0048 g/mile for CO₂, CH₄, and N₂O, respectively, were applied to convert GHG emissions to CO₂e (EPA 2014). Using the estimated total recoverable coal value of 3.37 million short tons, calculated GHGs as a result of truck haulage are in Table 3-3.

Mining equipment: Coal would be recovered with equipment already owned and operated by the company. Most of the heavier equipment is underground, electrically powered and associated with the

direct recovery of coal. Diesel-powered surface equipment is normally used to load coal into over-the-road transports. Mine personnel provided data on monthly average fuel and electricity consumption (personal communication, Shawn Clark, GCI, October 18, 2017). An emission factor of 10.21 kg CO₂/gallon of fuel was applied for equipment powered by diesel engines. For electricity usage total output emission factors for the electricity market region were applied (EPA 2014). Table 3-3 gives an estimate of GHG emissions from equipment mining 3.37 million short tons of coal.

Summary: Total project GHG emissions resulting from the Proposed Action are presented in Table 3-3. Leasing and mining the LMA tract would not increase annual emissions in LeFlore County, the state of

Oklahoma, or the global environment, however, it would add eight additional years of emissions produced at this level. Due to the persistent nature of GHG emissions, the Proposed Action would add a net amount of 7.4 million metric tons of CO₂e that would potentially contribute to climate change. The Air Resources Technical Report for Oil and Gas Development (ARTR) for New Mexico, Oklahoma, Texas, and Kansas (BLM 2017b)

gives an in-depth discussion of the relationship between GHGs and climate change. The report states that “Climate change is a global process that is impacted by the sum total of GHGs in the Earth’s atmosphere. The incremental contribution to global GHGs from a proposed land management action cannot be translated into effects on climate change globally or in the area of any site-specific action.” (BLM 2017b, pg. 29).

Current contributors of GHGs at the county and national level are expected to continue. There are eight proposed federal leasing actions in addition to the Pollyanna 8 LMA (See Section 3.8.1). The amount of recoverable coal, mining methods, and end users for these leases are unknown at this time, therefore a meaningful GHG emissions calculation cannot be completed. Additionally, any impacts from GHG emissions produced from mining the LMA tract are not likely to occur in the immediate vicinity, but rather at the national or global scale. For reasons discussed above, it is unknown what effects 7.4 million metric tons of CO₂e would have on climate change. However, considering that this only accounts for 0.013% of the annual GHG emissions at the national level, this incremental addition is unlikely to have significant impacts on climate change.

3.4. Issue 2: How would mine operations, including haulage of coal leased and mined from the LMA tract affect PM₁₀ and PM_{2.5} (dust) emissions and subsequently air quality in LeFlore County?

Leasing and mining the LMA tract could affect PM₁₀ (dust) emissions and are analyzed at a state and county scale. Mining of the LMA tract would take approximately eight years. PM₁₀ (dust) produced as a result of mining equipment and activities and hauling the coal on unpaved roads would occur at the same

Table 3-3. CO₂e resulting from the Proposed Action compared to county and national emissions.

SOURCE	MT OF TOTAL CO ₂ E	MT OF ANNUAL ¹ CO ₂ E	% OF TOTAL PROPOSED EMISSIONS	% OF ANNUAL LEFLORE COUNTY EMISSIONS	% OF 2015 NATIONAL EMISSIONS
Combustion of coal	6.4 million	800,264	86.14	34.8	0.012
Methane released	1.01 million	126,612	13.62	5.3	0.0018
Truck hauling	10,170	1,272	0.13	0.05	0.000018
Mine equipment	6,979	876	0.093	.038	0.000013
Total Proposed	7.4 million	924,502	100.00	40.20	0.013

¹The LMA tract would take approximately eight years to mine.

time as mining occurs. No sources (such as stationary engines) are present that emit other criteria pollutants at levels requiring reporting, therefore they were not analyzed further.

3.4.1. Affected Environment

Onsite equipment and activities: GCI operates the Pollyanna 8 Mine under an Air Permit with the Oklahoma Department of Environmental Quality. It operates as a minor source with PM₁₀ (particulate matter with an aerodynamic diameter of 10 microns or less) emissions of 69.80 tons per year (TPY) (ODEQ 2013). However, GCI reports a potential-to-emit 94.6 TPY of PM₁₀ and no emissions of HAPs (ODEQ 2009). The activities within the permit contributing to PM₁₀ and PM_{2.5} (dust) emissions on-site include equipment items and transfers, stockpiles, truck loading, wind erosion and onsite unpaved road emissions on-site (ODOEQ 2009, ODEQ 2013). The permit lists specific conditions to extract up to 600,000 TPY of coal throughput.

All equipment at the site is powered by electricity with the exception of the non-road mobile equipment and the loaders which are diesel-fueled. Emissions from non-road mobile equipment are regulated through 40 CFR 89, and regulatory mechanisms are in place to ensure emissions from these sources are limited to established air quality thresholds. An 8,000 gallon diesel storage tank (too small to be subject to NSPS Subpart Kb and with a vapor pressure below 1.5 psia) is reported in the Operating Air Permit (ODEQ 2008, ODEQ 2009). In 2015, PM₁₀ at the Pollyanna 8 Mine was reported at 53.98 TPY, less than the permitted amount of 69.80 TPY (Table 3-4). No other criteria or hazardous pollutants were reported for the facility (ODEQ 2015). Baseline PM₁₀ emissions including PM_{2.5} (dust) at state, and county level are included in Table 3-4.

Table 3-4. Inventory baseline data for PM₁₀ and PM_{2.5} emissions at state and county levels (EPA 2014).

SOURCE	PM ₁₀ (TPY)	PM _{2.5} (TPY)
Oklahoma		
Industrial Processes	13,000	6,113
Mining Sector	5,701	744
Dust-Unpaved Roads	575,622	57,278
LeFlore County		
Industrial Processes	491	107
Mining Sector	306	38
Dust-Unpaved Roads	16,695	1,661
GCI 2013 Permit	69.80	---
GCI 2015 Inventory	53.98	---

3.4.2 Environmental Impacts

3.4.1.1. Impacts of Alternative A – No Action Alternative

The LMA tract would not contribute to emissions of PM₁₀ and PM_{2.5} (dust). GCI would continue mining on the existing lease tract for the remaining operational life of the mine and emissions of PM₁₀ and PM_{2.5} (dust) would be expected to continue at current permit levels as reported in Table 3-4.

3.4.1.2. Impacts of Alternative B – Proposed Action Alternative

PM₁₀ emissions from three sources occurring at the GCI Plant are estimated: mine ventilation, onsite mining equipment and activities and off-site (PM₁₀) fugitive dust on unpaved roads.

Onsite equipment and activities: GCI proposes to operate the mine with no new surface disturbance. GCI's permitted emissions of PM₁₀ include processing up to 600,000 TPY of coal however the LMA tract proposes to operate only up to approximately 400,000 TPY of coal. PM₁₀ emissions onsite include equipment items and transfers, stockpiles, wind erosion, truck loading, onsite unpaved road dust emissions and other coal handling and operations. Current permit levels were scaled to the LMA tract

annual coal throughput of 400,000 TPY under the proposed action, representing 70% of permitted production. Emissions from onsite equipment and activities are 63.18 TPY and included in Table 3-5.

Mine ventilation: PM emissions for mine ventilation are not included in the GCI air permit however they are included in this analysis for completeness. PM₁₀ and PM_{2.5} (particulate matter with emissions from mine ventilation were determined from an annual coal production 400,000 tons of coal per year, emissions rates from MSHA and AP-42 (1.0 mg/m³-PM₁₀ and 0.10 PM_{2.5} fraction; EPA 2006), and an average ventilation rate (386,419 cfm). The average ventilation flow rate was based on adsorption isopleths that depend on mine depth (1,200 feet) and coal production. The emission calculation assumes no controls in place for vented PM emissions. Emissions from PM₁₀, 6.33 TPY and PM_{2.5}, 0.63 TPY are expected under this source and are included Table 3-5.

Offsite (PM₁₀) fugitive dust on unpaved roads: Emissions from vehicle-travel on unpaved roads are estimated using EPA's AP-42 methodology and include two miles of unpaved roads. The percent of silt content of unpaved surface material taken from AP-42 is 8.6 %. (EPA 2006). The emission factor equation only estimates particulate emissions from re-suspended road surface material. This only includes fugitive dust, and does not include emissions from vehicle engines. Total length of unpaved roads are estimated at two-miles roundtrip. The average weight of the vehicles on the unpaved road is 40 tons. Total annual trips are estimated at 16,848 load trips per year. PM₁₀(dust) emissions from offsite unpaved roads are 60.07 TPY and included in Table 3-5.

Table 3-5. Emissions from the Proposed Action compared with County and GCI Permit Emissions.

SOURCE	TONS TOTAL PM ₁₀	TPY ANNUAL PM ₁₀	% OF LEFLORE CO. PM ₁₀ INDUSTRIAL EMISSIONS	% OF LEFLORE CO. PM ₁₀ MINING EMISSIONS	% OF LEFLORE CO. PM ₁₀ (DUST) EMISSIONS	% OF GCI PERMIT PM ₁₀ EMISSIONS
Onsite equipment and activities ¹	505.44	63.18	16.45	20.65	--	90.5
Offsite (PM ₁₀) fugitive dust on unpaved roads	480.56	60.07	--	--	0.36	--

¹Includes 6.33 TPY of ventilation PM₁₀ not originally estimated in GCI operating permit.
--Not applicable to source.

Summary of PM₁₀, PM₁₀(dust) and PM_{2.5}from LMA Tract: PM₁₀ and PM_{2.5} onsite and PM₁₀ from dust on offsite unpaved roads are expected under the LMA tract. PM₁₀ onsite and PM₁₀ offsite emissions are included in Table 3-5 for LeFlore County and also discussed below. Emissions of PM_{2.5}, PM₁₀ and PM₁₀ (dust) from the LMA tract within Oklahoma are also compared and further discussed below.

PM₁₀ onsite equipment and activities emissions are 63.18 TPY and would represent 16.45 percent of LeFlore County industrial emissions and 20.65 percent of the mining sector emissions in LeFlore County. Within Oklahoma the LMA tract PM₁₀ emissions would represent 0.49 percent of PM₁₀ emissions in the industrial sector and 1.11 percent of PM₁₀ emissions in the mining sector.

PM_{2.5} onsite equipment and activities emissions are 0.63 TPY of emissions from mine ventilation and would represent 0.13 percent of LeFlore County industrial emissions and 1.7 percent of LeFlore County mining sector emissions. Within Oklahoma the LMA tract PM_{2.5} emissions would represent 0.01 percent of PM₁₀ emissions in the industrial sector and 0.09 percent of PM_{2.5} emissions in the mining sector.

PM₁₀ offsite unpaved road emissions are not part of onsite emissions but were considered and analyzed within this EA. PM₁₀ emissions offsite are 60.07 TPY and represent 0.36 % of LeFlore County PM₁₀ dust on unpaved roads and 0.01% of PM₁₀ dust on unpaved roads within Oklahoma.

The latest available National Emissions Inventory (NEI), 2014, at the LeFlore County and Oklahoma level were used to compare the LMA Tract Emissions. Overall PM₁₀ (dust) and PM_{2.5} emissions resulting from the LMA tract would not increase emissions in the LeFlore County and within Oklahoma however emissions would continue at or below current permitted levels of 69.80 TPY for an additional eight years.

Current emission sources in the state and county are expected to continue. In the reasonably foreseeable future within LeFlore County, three inactive mines are expected to resume production and would have a total of 4 proposed federal lease actions associated with them, one proposed federal lease action would result in a new mine (lease area has portions in both LeFlore and Haskell Counties), and there is one proposed federal lease action associated with the Pollyanna 8 mine (in addition to the Proposed Action). Additional reasonably foreseeable future coal actions within the state include, two inactive mines that may become active with two proposed federal lease actions associated with them, and one proposed federal lease action associated with an active mine. Production rates and mining methods for these actions as well as when they would be mined are unknown at this time, therefore a meaningful calculation could not be completed. There are currently no non-attainment areas in the state of Oklahoma for criteria air pollutants, including PM₁₀ and PM_{2.5} emissions. Because the Proposed Action would not increase current PM₁₀ and PM_{2.5} annual emissions, LeFlore County would remain in attainment. When added to reasonably foreseeable future actions, leasing and mining the LMA tract would not increase PM₁₀ and PM_{2.5} emissions beyond the attainment threshold due to regulatory mechanisms (permitting requirements) in place.

3.5. Issue 3: How would combustion-related activities such as the combustion of coal (the end use of the coal) and truck haulage (exhaust emissions) from the LMA tract affect emissions of criteria pollutants and hazardous air pollutants and subsequently air quality in Leflore County?

Leasing and mining the LMA tract would affect air quality in Leflore County and emissions are analyzed at a county scale. Emissions from combustion-related activities are combustion of the coal at the coal processing plant and exhaust emissions from truck haulage to the coal processing plant and other destinations. Mining of the LMA tract would take approximately eight years Criteria and hazardous air pollutant emissions as a result of combustion of the coal and truck haulage (exhaust emissions) from mined coal of the LMA tract would occur at the same time as mining occurs.

3.5.1. Affected Environment

Criteria Pollutants: The Clean Air Act (CAA) provides the main framework for national, state, and local efforts to protect air quality (EPA 2016). National ambient air quality standards (NAAQS) currently exist for six criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), and particulate matter (PM). There are two categories of PM, particulate matter less than 10 micrometers (PM-10) and particulate matter less than 2.5 micrometers (PM-2.5). Criteria pollutant emissions from industry within Leflore County are reported in Table 3-6. VOC's are also included and analyzed as they are precursors to ozone formation. Leflore County, as well as the entire state of Oklahoma remains in attainment for all state, local and NAAQS.

The Oklahoma Department of Environmental Quality (ODEQ) has 26 air quality monitors in the state. The nearest monitors to the LMA tract are the Savanna Site, approximately 50 miles southwest from Leflore County, the McAlester Site, approximately 52 miles west of Leflore County, and the Muskogee water Plant Site, approximately 65 northwest from Leflore County.

Criteria pollutants such as SO₂ can settle from the air as sulfates through dry and wet deposition. Natural sources of sulfates can include volcanoes while anthropogenic sources of sulfates can include coal-fired power plants, diesel engines and industrial boilers. SO₂ emissions are 3,935 TPY for Leflore County industry sources and reported in Table 3-6 (ODEQ 2016). AES Shady Point Power Station contributes 3,934 TPY to the total industry emissions of SO₂ within Leflore County and included in Table 3-6.

Sulfates can cause visibility impairment in units of light extinction. Caney Creek Wilderness Area, located across the Oklahoma border in the state of Arkansas, is a protected Class I Wilderness area located in the Ouachita National forest in west central Arkansas (USFS 2013). Each state is required to develop its State Implementation Plan (SIP) to improve visibility at Class I areas, The Arkansas Department of Environmental Quality reports that the entire state is achieving greater visibility improvements than required under the Regional Haze Program for Class 1 Wilderness areas. Arkansas is in attainment with all NAAQS for criteria pollutants to include sulfur dioxide (ADEQ 2017).

Hazardous Air Pollutants (HAPs): The Clean Air Act (CAA) regulates 188 air toxics, also known as hazardous air pollutants (HAPs). HAP emissions are 84.40 TPY for Leflore County industry sources and reported in Table 3-6 (ODEQ 2016). The AES Shady Point Power Station contributes 49.75 TPY of HAPs to the total industry emissions of HAPs within Leflore County, Table 3-6.

Mercury is listed as a HAP. The CAA directs EPA to establish technology-based standards for certain sources that emit air toxics such as mercury. Those sources also are required to obtain CAA operating permits and to comply with all applicable emission standards (EPA 2017a). AES Shady Point Power Station operates under such permit as a Title V site within the state of Oklahoma. The EPA has authority to regulate power plant mercury emissions. The Agency can do this by establishing "performance standards" or "maximum achievable control technology" (MACT), whichever the Agency deems most appropriate. For major sources, Section 112 requires that EPA establish emission standards that require the maximum degree of reduction in emissions of hazardous air pollutants. These emission standards are commonly referred to as MACT standards (EPA 2017a).

3.5.2. Environmental Impacts

3.5.2.1. *Impacts of Alternative A – No Action Alternative*

Combustion-related activities such as the combustion of coal (the end use of the coal) and truck haulage (exhaust emissions) from mining of coal within the LMA tract would not contribute to air quality pollutants in Leflore County. However, GCI would continue mining the current tract and adjacent private coal for the remaining operational life of the mine and air quality emissions would continue at current permitted levels. Emissions at AES Shady Point plant and on-road county exhaust emissions would also continue at current permitted levels.

3.5.2.2. *Impacts of Alternative B – Proposed Action Alternative*

Coal Combustion: Criteria and hazardous pollutants resulting from coal combustion at the AES Shady Point Power Station is expected to continue at the current rate as guided by state permitting and federal statutes. The Pollyanna 8 mine currently supplies approximately 40% of the coal used at the power station. This level is expected to continue for the life of the mine, therefore, the total emissions resulting from burning of coal from the LMA tract would be approximately 40% of emissions produced at AES Shady Point Power Station (Table 3-6) for eight years. This would represent 40%, 24.08%, 27.21%, 24.73%, 35.09% and 23.58% of SO₂, NO_x, CO, PM₁₀, PM_{2.5}, HAPs and VOC emissions from the Leflore County industry sector, respectively (Table 3-6).

Mercury emissions: Reporting of mercury emissions is included in HAPs, and not reported separately. Mercury emissions produced at coal-fired power plants varies substantially based on type of coal used, combustion methods, and technology used at the plant. Calculations for these variables does not yet exist (Senior 2017). There are, however, regulatory mechanisms in place as discussed in 3.5.1 above that limit mercury emissions. One concern with the release of mercury into the atmosphere is deposition into waterways. This deposition can cause bioaccumulation in fish tissue. In Oklahoma, there are 54 lakes with fish consumption advisories due to presence of mercury. Many of those advisories only apply to sensitive populations and/or specific species and size of fish (ODEQ 2017). The source of mercury in Oklahoma lakes cannot be determined because sources of mercury can be local, regional, or global (Godfrey 2017, Seigneur et al. 2004). Mercury emissions from the combustion of coal at the AES Plant are expected to remain the same or decrease (due to improved reduction technology). The LMA tract would account for approximately 40% of these emissions for a period of eight years.

Table 3-6. 2014 LeFlore County Industry Point Source Emissions (ODEQ 2016) reported in tons per year (TPY) compared to emissions calculated for the Proposed Action (PA). 2014 data is the most recent complete inventory data available.

Source	SO _x (% of LeFlore Co. Industry Point Source Emissions)	NO _x (% of LeFlore Co. Industry Point Source Emissions)	CO (% of LeFlore Co. Industry Point Source Emissions)	PM ₁₀ (% of LeFlore Co. Industry Point Source Emissions)	PM _{2.5} (% of LeFlore Co. Industry Point Source Emissions)	HAPS (% of LeFlore Co. Industry Point Source Emissions)	VOC (% of LeFlore Co. Industry Point Source Emissions)
AES Shady Point Power Station	3,934.38 (99.98%)	1,150.17 (60.20%)	1,704.64 (68.01%)	327.09 (61.83%)	189.22 (87.73%)	49.75 (58.94%)	7.24 (4.44%)
Bituminous Coal and Lignite Surface (Total Mining) ¹	0 (0%)	0 (0%)	0 (0%)	121.25 (22.92%)	13.95 (6.47%)	0 (0%)	0 (0%)
Bituminous Coal and Lignite Surface (Polyanna 8) ²	0 (0%)	0 (0%)	0 (0%)	51.68 (9.77%)	0 (0%)	0 (0%)	0 (0%)
Bituminous Coal and Lignite Surface (Other Mining) ²	0 (0%)	0 (0%)	0 (0%)	69.57 (13.15%)	13.95 (6.47%)	0 (0%)	0 (0%)
Other Industry Point Sources	0.62 (0.02%)	760.33 (39.80%)	801.86 (31.99%)	80.66 (15.24%)	12.51 (5.80%)	34.65 (41.05%)	155.76 (95.56%)
Total Point source emissions (All industry)	3,935.00 (100%)	1,910.50 (100%)	2,506.50 (100%)	529.00 (100%)	215.68 (100%)	84.40 (100%)	163.00 (100%)
Combustion of Coal from Pollyanna 8 Mine ³	1573.75 (40%)	460.07 (24.08%)	681.86 (27.21%)	130.84 (24.73%)	75.69 (35.09%)	19.9 (23.58%)	2.90 (1.78%)

¹ Equals sum of (Pollyanna 8) and (Other Mining sources).

² Total includes in Bituminous Coal and Lignite Surface mining (Total Mining). Shows individual contribution of Pollyanna 8 mine and Other Mining sources.

³ Assumes 40% of the coal used for combustion at AES Shady Point Power Station is sourced from the Pollyanna 8 Mine.

Truck Haulage: Coal from the LMA tract would be hauled mostly to the AES Shady Point Power Station in Leflore County. Round-trip distance between the Pollyanna 8 mine and the power station is 26 miles. The mine also supplies coal to other industrial users throughout the local area. The longest round trip distance reported for these users is 300 miles. From past production and haulage reports supplied by the company, (personal communication, Shawn Clark, GCI, October 13-16, 2017) a percentage of total production was allotted for hauling to the AES Plant and a percentage to other industrial users. Given an average fuel economy reported by the company for a truck having a 40-ton payload, a total of 124,514 gallons of diesel fuel would be consumed in coal haulage per year.

Table 3-8. On-Road Vehicle Emissions (EPA 2014)

Industry	SO _x (TPY)	NO _x (TPY)	CO (TPY)	PM ₁₀ (TPY)	PM _{2.5} (TPY)	HAPS (TPY)	VOC (TPY)
On-Road Vehicle Emissions Oklahoma ¹	503.35	91,918.71	359,678	5,889.52	3,099.40		32,779.72
On-Road Vehicle Emissions LeFlore County ¹	5.85	968.44	4,095.86	65.72	33.61	102.75	381.89
Truck Haulage (On-Road Emissions) LMA Tract ²	0.0041	0.19	0.50	0.11	0.06		0.14
Percent Contribution Truck Haulage from LMA Tract	0.07	0.02	0.01	0.17	0.18		0.04

2014 latest EPA available inventory.

¹ Includes inventory from light and heavy-duty diesel and gasoline vehicles

² Includes modeled emissions only from heavy-duty diesel emission trucks.

An EPA modeling protocol for emissions from mobile sources, MOVES (motor vehicle emission simulator), was used to generate emission factors for each criteria pollutant (EPA 2014). The emission factors were then applied to the total mileage traveled (996,112 miles) from truck haulage of the LMA tract on paved roads, for a heavy-duty diesel vehicle with a 40-ton payload to generate annual exhaust emissions in tons per year for each pollutant, Table 3-8. Criteria emissions from truck haulage of the LMA tract was then compared to the 2014 National Emissions Inventory, (latest inventory) Leflore County, Table 3-7 (EPA 2014). Criteria and HAP Emissions from truck haulage of the LMA tract would all represent less than one percent of all county on-road vehicle emissions.

Summary: With current emissions levels, Leflore County is in attainment for criteria pollutants and HAPs (including mercury) and would be expected to remain within those levels if the LMA tract is leased and mined. When added to reasonably foreseeable future actions discussed in Issue 2 (p. 16), emissions resulting from combustion related activities associated with the LMA tract are not expected to increase current levels of emissions or exceed attainment standards in the county.

3.6. Issue 4: What is the risk of subsidence from underground mining of the LMA tract using retreat room and pillar mining methods?

Subsidence is a process characterized by downward displacement of surface material caused by natural phenomena such as removal of underground fluids, natural consolidation, or dissolution of underground minerals, or by man-made activity such as underground mining. The area in which subsidence from mining the LMA tract would cause impacts to resources is the surface area above the tract.

3.6.1. Affected Environment

Across the entire geographic scope of analysis, the coal seam crops out on the southeast side of the area and dips to the north and west over the lease tract. Generally, as you move from southeast to northwest and to the west, the coal seam gradually gets deeper. Over the LMA tract, the southeast corner has approximately 1,000 feet of overburden while the northwest corner has approximately 1,200 feet of overburden. Over the geographic scope of analysis, the coal seam averages six feet in thickness.

A Ground Control Analysis (Keystone Mining Services, LLC 2017) was completed approximately 6,000 feet to the east of the proposed LMA and having approximately the same geographic stratigraphy. The analysis compared survey results before mining and after retreat mining at three separate locations distributed across the landscape. These survey locations showed no movement outside the error of the survey equipment, concluding that no measurable subsidence had occurred in areas previously mined.

3.6.2. Environmental Impacts

3.6.2.1. *Impacts of Alternative A – No Action Alternative*

Under the No Action alternative, there would be no risk of subsidence on the area above LMA tract due to mining. Mining would continue on the current Pollyanna 8 mine. The risk of subsidence in these areas would require a separate analysis and would not be influenced by which alternative is selected for this project.

3.6.2.2. *Impacts of Alternative B – Proposed Action Alternative*

Coal resources would be recovered by a retreat room and pillar mining method. To maximize production, the company, upon retreating from the panel, removes sections of the support pillars. The room and pillar method allows the rock above the mine to gradually settle and subside. The amount of subsidence depends upon several factors, including the number and size of the pillars to support the roof during retreat mining, the geologic conditions above the mine workings, and the thickness of the coal seam being removed.

A subsidence control plan would be submitted in accordance with Oklahoma Coal Reclamation Act of 1979 (Design Feature 4) that would include methods to minimize impacts from subsidence. Surface structures over the LMA tract would be protected in accordance with the 1966 Pennsylvania Law (Design Feature 5), reducing the number of pillars that would be retreat mined. Additionally, barrier pillars, approximately 200 feet wide are put between the mining panels to prevent any ground movement.

In the Ground Control Analysis completed to the east of the LMA tract (Keystone Mining Services, LLC 2017), no measurable subsidence had occurred. The likelihood of subsidence effects decreases as the depth of overburden increases, therefore, the likelihood of subsidence in the LMA tract would be further reduced because the overburden depth is 75 to 275 feet greater than in the study area.

Based on the implementation of the design features along with the results from the Ground Control Analysis completed in the area east of the LMA tract, no measureable subsidence would occur. Therefore, no impacts to resources above the LMA tract (soils, surface facilities, cultural resources, vegetation, etc.) would occur. When added to the reasonably foreseeable development of nearby federal and private coal, it would not contribute to cumulative impacts associated with subsidence.

3.7. Issue 5: What effect would leasing and mining the LMA tract have on the quality of shallow groundwater at portal 2 as a result of permanent storage of coal mine waste and how would those impacts affect water quality in the nearby Poteau River?

The geographic scope of analysis associated with this issue is the area around portals 1 and 2 and the reach of the Poteau River between the portal areas (Appendix A, Map 1.2).

3.7.1. Affected Environment

Coal and adjacent strata often contain iron sulfide minerals. These sulfide minerals chemically break down to produce acid when exposed to oxygen and water. Underground mining equipment, continuous miners and coal shuttle cars, require a certain roof height to operate. If the coal bed thickness is less than that height, a portion of the roof rock must be ground away with the coal. However, the rock at the Pollyanna 8 mine is generally left mixed in with the coal and shipped to the power plant.

Underground development waste, another type of coal mine waste, is separated from the coal and deposited in the onsite disposal pits. Underground development waste is earth material excavated to access the coal either during construction of the portal or when a fault or other geologic feature within the

mine works must be crossed. Groundwater within a saturated coal mine waste deposit might discharge to the nearby Poteau River or spread outward to water wells.

Overburden testing at the portal 2 mine permit area did not reveal potentially acid-forming material in strata above and immediately below the Hartshorne coal bed. Furthermore, impounded water in the abandoned mine pit that was drained for the development of portal 2 was of a quality similar to the nearby Poteau River. Pit water, as tested in 2008, was suitable for wildlife and livestock. Although it was more alkaline and had a higher dissolved-solids concentration than Poteau River water, its iron and manganese concentrations were lower or comparable to nearby river water. Pit water had been in contact with mine spoil. Mine spoil here was produced by a Hartshorne coal strip mining operation conducted before the enactment of SMCRA.

3.7.2. Environmental Impacts

3.7.2.1. *Impacts of Alternative A – No Action Alternative*

There would be no coal mine waste produced from the tract. However, groundwater in contact with existing waste deposits at portals 1 and 2 would continue to be sources of waste-derived solutes. Mining would continue on the current tract and adjacent private coal for the remaining operational life of the mine, adding to the waste at the portal 2 disposal pit.

3.7.2.2. *Impacts of Alternative B – Proposed Action Alternative*

The LMA tract might produce little or no development waste that would need to be deposited in the portal 2 disposal pit. Unanticipated faults, coal pinch outs, or channel sandstone bodies blocking access to the coal bed on the other side of such features are possible. Those geologic situations would result in more development waste going to the portal 2 disposal pit. That additional waste is not likely to fundamentally change the chemical nature of existing waste deposit because it would be excavated from the same or lithologically similar geologic strata that make up the existing coal development waste.

Surface-mining permit areas for portals 1 and 2 have five and four groundwater monitoring wells, respectively. Wells are screened either above the coal, within or through the Hartshorne coal bed. This coal bed dips to the west-northwest, and the wells are on the up-dip side where the coal is shallow.

Table 3.6 lists these wells (plus stations on the Poteau River) and gives the periods of record during which water samples were collected for laboratory testing. The table also identifies the statistical method used to analyze water monitoring data that had been reported to ODM.

Table 3-6. Water-sampling stations and events associated with portals 1 and 2 at Pollyanna No. 8 Mine.

[GWMP, groundwater monitoring point; SWMP, surface-water monitoring point; OP, operations monitoring period; BL, baseline monitoring period]

Monitoring station	Mine portal	Period of record	No. of sampling events ²	Two-sample comparison ³	Trend
Poteau River ¹	1 & 2	JUN 2009 – JUN 2017	30 (2)	OP: up v. down	
GWMP-1	1	AUG 1994 – JUN 2017	71 (8)	BL v. OP	
GWMP-2	1	AUG 1994 – JUN 2017	68 (8)	BL v. OP	
GWMP-3	1	AUG 1994 – JUN 2017	70 (7)	BL v. OP	
GWMP-4	1	AUG 1994 – JUN 2013	48 (8)	BL v. OP	
GWMP-4a	1	SEP 2009 – JUN 2017	22 (0)		OP
GWMP-9	1	SEP 2009 – JUN 2017	29 (0)		OP
GWMP-5	2	JUN 2009 – JUN 2017	29 (1)		OP
GWMP-6	2	JUN 2009 – JUN 2017	30 (2)		OP
GWMP-7	2	JUN 2009 – JUN 2017	29 (2) DRY	NO DATA	NO DATA
GWMP-8	2	JUN 2009 – JUN 2017	30 (2)		OP

¹SWMP-7 (upstream); SWMP-6 (downstream)

²Numbers in parentheses are baseline events

³Mann-Whitney test if no nondetects, otherwise Wilcoxon test (cendiff command) using NADA package for R

⁴Seasonal Kendall test if no nondetects, otherwise Kendall's tau (cenken command) using NADA package for R

Pollyanna 8 water monitoring can be grouped into two periods. The baseline period is the time of sampling and measurement before permitted land disturbance could have affected monitored conditions at a given station. As a general matter, baseline monitoring ends when the permit is issued and land disturbance can begin. The operations period for any given well is that time from the end of that well's baseline period up until the state coal permitting authority allows water monitoring to stop at that monitoring station.

Statistical analysis of the Pollyanna 8 groundwater and river data employed two-sample comparison (do the two groups have the same median?) and test for trend (is the median value changing over time?). When there had been no baseline sampling, or only one or two baseline sampling events, a two-sample comparison was not attempted. Instead, monitoring data collected during the operations phase of the mine were tested for trend.

The Mann-Whiney test was used to compare medians. The seasonal Kendall test for trend was run using free USGS software available for download (Kendall.exe) from <http://pubs.usgs.gov/sir/2005/5275/downloads/>. Some of the water-monitoring data included censored values, that is, numbers reported to be less than the laboratory instrument's detection limit. Statistical analysis of censored data requires special techniques. The free statistics programming language R is available for download from the Comprehensive R Archive Network (CRAN) <http://cran.r-project.org/>. R package NADA (Nondetects And Data Analysis) contains statistical methods designed for censored data.

Each statistical test used in the analysis of Issue 5 determined whether to accept the null hypothesis. For the systems under study for this EA, the null hypothesis is an assumption that there is no difference between baseline data and operations data, and there is no trend over time in operations data. The null hypothesis is a situation assumed to be true until data indicate that it is likely to be false. Statistical tradition uses a default of 5% as a significance level (corresponding confidence level is 95%). The significance level is the probability of incorrectly rejecting the null hypothesis when it is in fact true.

Statistical analysis focused on nine water characteristics: static water level (groundwater only), pH, total iron, total manganese, total dissolved solids, total suspended solids (river water only), sulfate, acidity, and alkalinity. There were enough data for these measured characteristics to run the statistical tests. Certain changes in solute concentrations as revealed by these test would generally be desirable while others

would be undesirable. For example, higher pH; more alkalinity; and lower concentrations of iron, manganese, total dissolved solids, and acidity might mark improved water quality. Changes in the opposite direction would usually indicate degraded water quality.

Thirty-two comparisons between baseline data and operations data yielded mixed results for four monitoring wells. Some median values for water characteristics were higher during the operations period than they had been during the time of baseline sampling. Statistically significant differences were noted for 13 comparisons. Static water level was higher during mining compared to the pre-mine state at GWMP-1, but the opposite was true at GWMP-4. The only statistically significant change in monitoring data for GWMP-2 was a drop in median pH after the baseline sampling period. On the other hand, median pH rose during the operations period at GWMP-1. Results for the remaining nine statistically significant baseline-versus-operations comparisons all show a drop in median solute concentrations below the baseline state. This drop occurred for iron, manganese, acidity, and alkalinity at GWMP-1; manganese, total dissolved solids, acidity, and alkalinity at GWMP-3; and total dissolved solids at GWMP-4.

Like comparison-of medians tests, trend analyses of groundwater data for the other water monitoring stations showed a mix of no-change, increasing values, and decreasing values for the selected parameters. Out of 40 trend tests, 11 showed changes that were statistically significant at the 95% confidence level over the time the mine has been in operation. Static water level and pH increased at GWMPs 4a, 9, and 5. The only statically significant change for GWMP-6 was a drop in pH. Total iron and sulfate increased at GWMP-8 while sulfate and total dissolved solids decreased at GWMP-5.

Poteau River water showed no statically significant change at the 95% confidence level in solutes or suspended solids when comparing samples collected at upstream station SWMP-7 and downstream station SWMP-6. While SWMP-7 appears to be located above any influence from Pollyanna 8 Mine, a sediment pond at portal 2 discharges below SWMP-6. Consequently, sampling at SWMP-6 captures effects of most but not all mine-related surface runoff and groundwater discharge into the adjacent Poteau River.

In summary, land disturbance at portals 1 and 2, including their associated coal waste disposal features, has not had a consistent effect on local monitored groundwater or Poteau River water. Statistical analysis of the available water data reported to ODM suggests that the coal mine waste to date has not been a major contributor of solutes and is unlikely to be so with mining of the 520-acre LMA. This inference conforms with the nature of the overburden for which tests show a lack of acid-forming strata above the coal bed. Based on these conclusions, the Proposed Action is unlikely to result in impacts to shallow groundwater or Poteau River water quality due to the permanent storage of coal mine waste. Therefore it would not contribute to cumulative effects when added to current coal mine waste storage at the portal areas or storage of coal mine waste resulting from mining the future Pollyanna 8 LBA. As a result, there would be no impacts to fish and wildlife species that depend on the Poteau River and would not interfere with recreational uses of the river.

3.8. Issue 6: How would leasing and mining the tract affect the availability of coal for domestic uses, particularly electrical power generation in the state of Oklahoma?

The geographic scope of analysis associated with how leasing and mining the Pollyanna 8 LMA tract would affect the availability of coal for domestic uses is the state of Oklahoma. This geographic scope of analysis was chosen because the coal mined from the Pollyanna 8 mine is primarily consumed within the state of Oklahoma. Approving the Pollyanna 8 LMA would allow for the continuance of coal development and utilization of Oklahoma-mined coal for energy and other industrial uses within the state of Oklahoma. The AES Shady Point power generation plant produces approximately 350 megawatts of electrical energy annually and services approximately 250,000 homes and businesses across Oklahoma.

3.8.1. Affected Environment

Coal development in Oklahoma began in 1873 and has persisted, intermittently, since. Average coal production between 2010 and 2016 was 970,032 tons annually (ODM 2017). During that six-year reporting period, coal production trended downward from a production high of 1,174,572 tons in 2011 to 670,610 tons in 2016 (ODM 2017). During 2016, 670,610 tons of Oklahoma coal was produced from five active mines in Okmulgee, Haskell, and LeFlore counties (as reported by May 2, 2017; personal communication with Suzen Rodesney, OSM, December 14, 2017). The Pollyanna 8 mine in LeFlore County currently produces an average of approximately 400,000 tons of coal annually from the Hartshorne formation in eastern Oklahoma, and accounted for approximately 59% of the annual Oklahoma coal production in 2016.

In the reasonably foreseeable future, the five currently active mines are expected to continue producing at their current rate. Two of those mines have future lease actions proposed that would add years to their operational life, but not necessarily increase annual production (including Pollyanna 8). Additional lease actions proposed would result in one new mine and resumed production in four currently inactive mines. Another mine currently in suspension is expected to begin production in the foreseeable future (Appendix A, Map 1.3). In total, there is expected to be ten producing coal mines in Oklahoma in the foreseeable future. Based on current and projected production rates, that would increase annual coal production in Oklahoma by 20-30% annually over the next two to 30 years after initial production begins.

3.8.2. Environmental Impacts

3.8.2.1. *Impacts of Alternative A – No Action Alternative*

GCI would not mine the coal contained within the proposed LMA tract. Approximately 3.37 million tons of recoverable federal coal deposits would be bypassed and would not contribute to annual coal production in Oklahoma. The coal in this LMA tract would be bypassed and likely not developed in the foreseeable future due to the following constraints: 1) depth of coal, 2) geological complications (e.g., faulting), 3) coalbed methane development immediately to the west of the tract, 4) limited acreage (520 acres), 5) quantity of recoverable coal, and 6) difficulty of future mine access. Bypassing the LMA would render this tract operationally and geologically isolated. Any future attempt at recovery of these federal coal deposits would be challenging from an operational perspective, in particular proper ventilation and geologic fault avoidance would be prohibitively difficult. Ultimately, 3.37 million tons of federal coal would not be available for domestic energy and other industrial uses. For the remaining operational life of the mine, Pollyanna 8 would continue to contribute to annual coal production in Oklahoma. Additionally, the reasonably foreseeable future actions discussed above would still be expected.

3.8.2.2. *Impacts of Alternative B – Proposed Action Alternative*

There are an estimated 3.37 million tons of recoverable federal coal deposits contained within the proposed LMA tract. Pollyanna 8 annual production accounts for approximately 59% (400,000 tons) of all coal mined in Oklahoma each year. If the Proposed Action is selected, current production at Pollyanna 8 would remain the same, but would occur for eight additional years. When added to foreseeable future coal production discussed above, the LMA tract would account for a smaller percentage of the overall production, but would contribute the same amount of coal available for domestic uses.

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APPENDIX A: MAPS

Map 1.1: Regional View of Pollyanna 8 Mine and Proposed LMA

Map 1.2: Area View of Pollyanna 8 Mine and Proposed LMA

Map 1.3: Proposed LMA in Relation to Reasonably Foreseeable Federal Coal Development in Oklahoma

OKLAHOMA FIELD OFFICE

BLM NM/OK/KS/TX

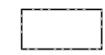


Map 1.1

Regional View of Pollyanna 8 Mine and Proposed LMA Polyanna 8 - Coal Lease Modification Application



Polyanna 8 LMA



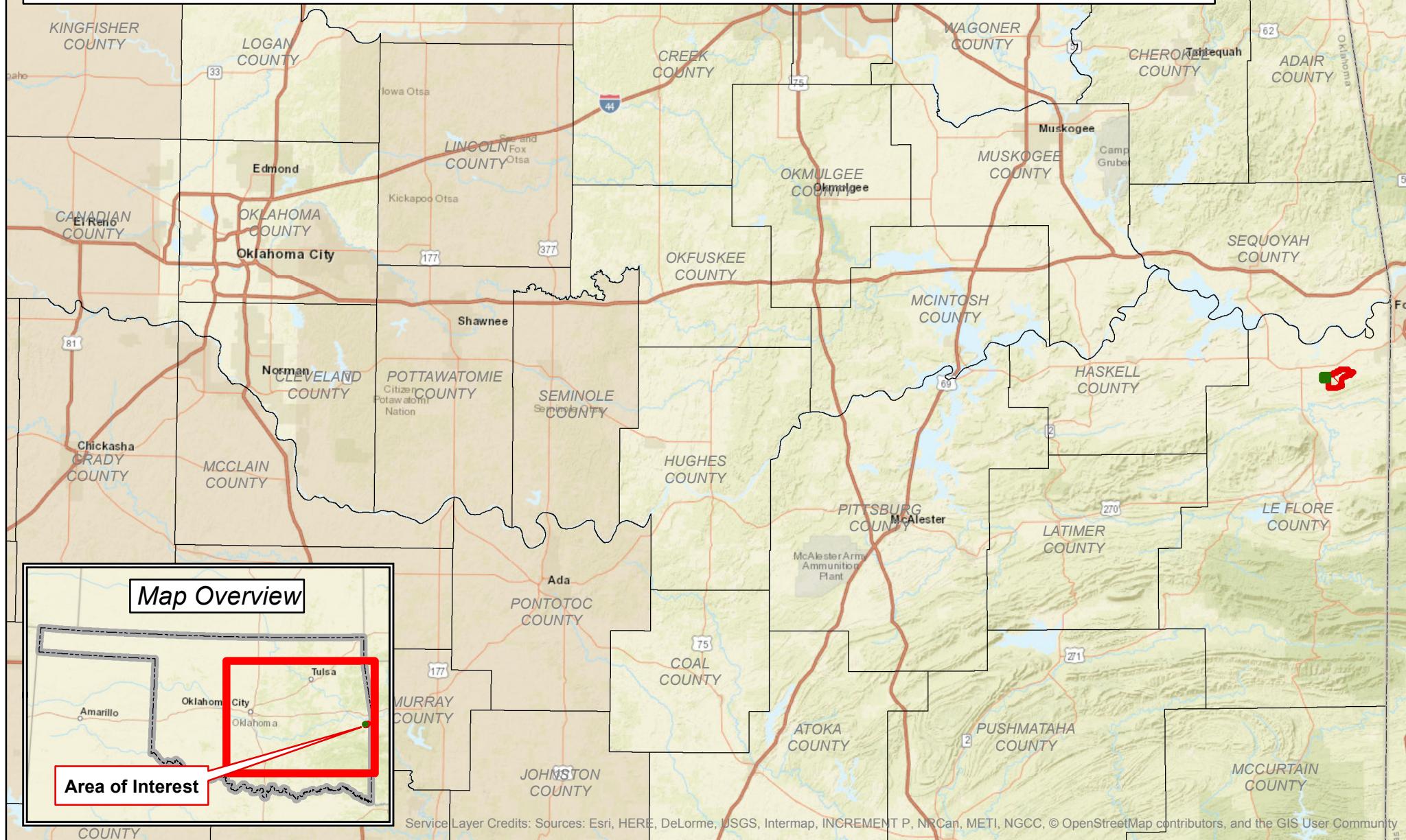
Oklahoma State Boundary



OKNM_091190_Boundary



Oklahoma County Boundaries



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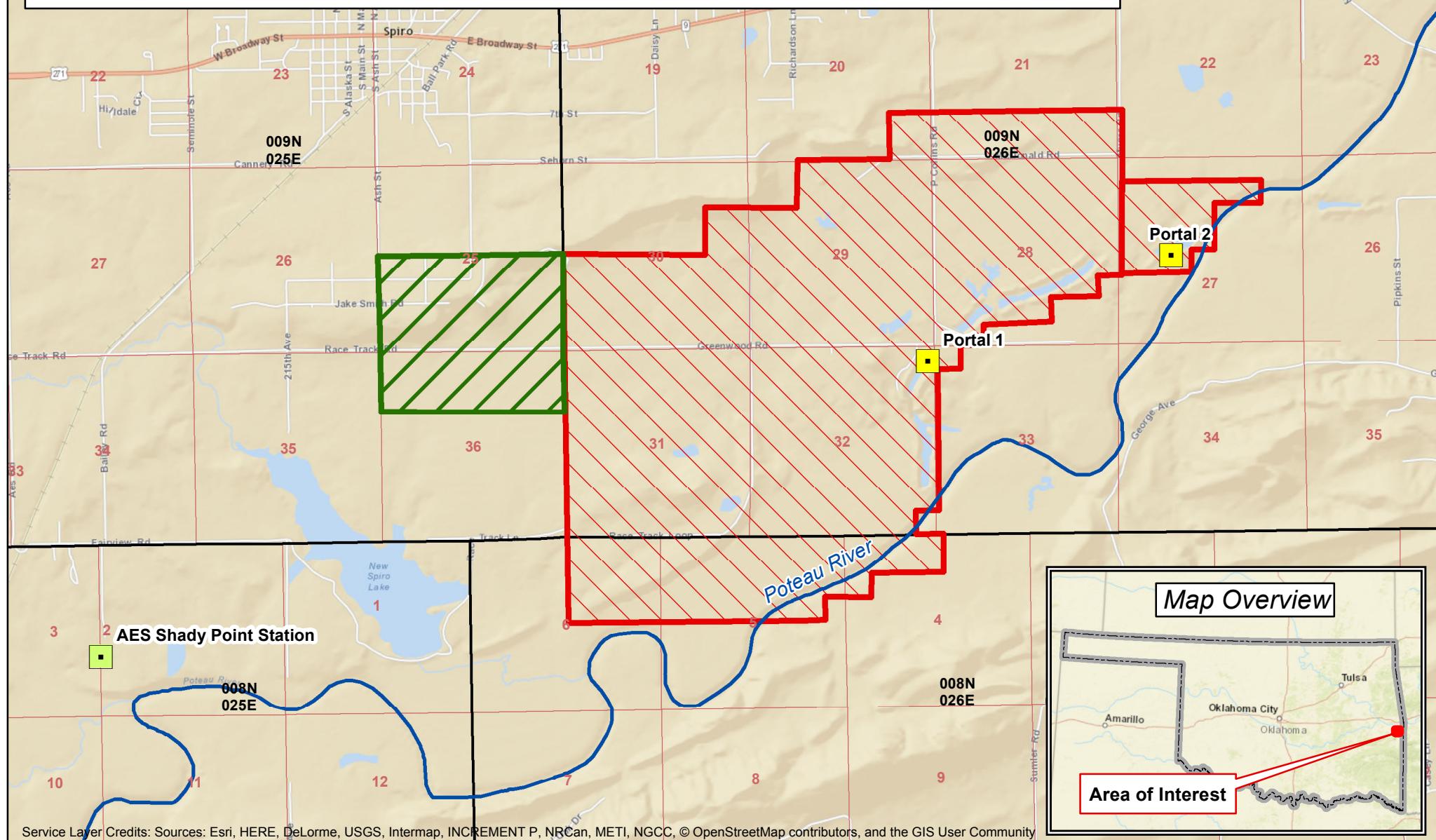
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Map 1.2

Area View of Pollyanna 8 Mine and Proposed LMA Polyanna 8 - Coal Lease Modification Application

Polyanna 8 Proposed LMA

OKNM 091190 (Polyanna 8) Boundary

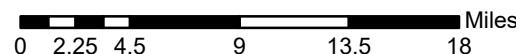


Map Overview



OKLAHOMA FIELD OFFICE

BLM NM/OK/KS/TX

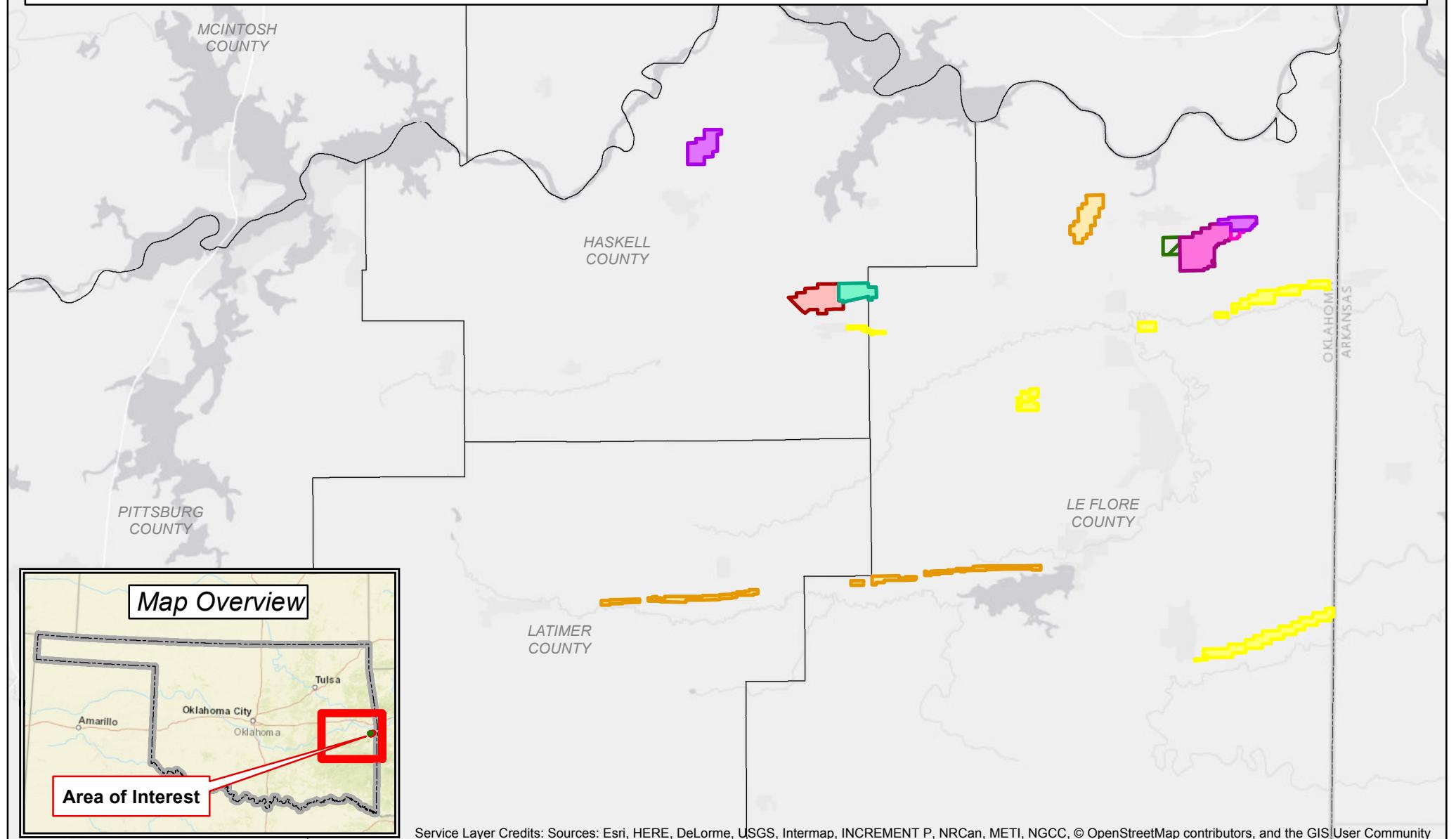


Map 1.3

Proposed LMA in Relation to Reasonably Foreseeable Coal Development in Oklahoma

Polyanna 8 - Coal Lease Modification Application

- | | |
|---|---|
| Proposed Federal Lease Actions (Active Mines) | Polyanna 8 Existing Lease Area |
| Proposed Federal Lease Action (New Mine) | Inactive Mines with Proposed Federal Leasing Actions |
| Inactive Mines with Suspended Federal Lease | Polyanna 8 LBA (Proposed Action) |
| | Active Mines with Federal Coal Reserves (No Proposed Federal Lease Actions) |



Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, METI, NGCC, © OpenStreetMap contributors, and the GIS User Community

APPENDIX B – COAL SUITABILITY SCREENS

The project ID Team has reviewed and discussed each of the four “coal screens” found at 43 CFR 3420.1-4(e). The results of the screens are presented below:

1-4(e)(1) – Development Potential Screen

No explicit exceptions for underground mines are identified in the regulations. Given that the LMA tract is adjacent to an active mine and is intended to extend the life of that mine, the team finds that the LMA tract satisfies the development potential screen. The LMA tract is estimated to contain 3.37 million tons of recoverable coal.

1-4(e)(2) - Unsuitability Criteria Screen

The ID Team recommends that this screen does not apply to the LMA because of the “Underground mining exemption from criteria” found at 43 CFR 3461.1: *(a) Federal lands with coal deposits that would be mined by underground mining methods shall not be assessed as unsuitable where there would be no surface coal mining operations, as defined in §3400.0-5 of this title, on any lease, if issued.* Given that the LMA is entirely underground, the ID team recommends that this criteria does not apply.

1-4(e)(3) – Multiple Land Use Decisions Screen

The LMA surface is privately owned and there are no ID Team is unaware of any conflicting land use decisions that would eliminate these coal deposits from further consideration for leasing. Consistent with 43 CFR 3420.1-4(e)(3), the BLM has considered appropriate resources and potential resource impacts in its NEPA and decision-making process.

1-4(e)(4) Surface Owner Consultation Screen

The BLM has consulted all surface owners whose lands overlie the LMA coal deposits to determine preference for or against mining by other than underground mining techniques. Even though no methods other than underground mining techniques are considered in this proposal, the BLM still notified 37 surface owners by letter. Two responses were received, one via letter and one via phone call. Both responses were opposed to surface mining on their property. Consistent with 43 CFR 3420.1-4(e)(4), surface owner responses are on file at the Oklahoma Field Office for use in future planning or project-level efforts.