

FINDING OF NO SIGNIFICANT IMPACT

In accordance with the National Environmental Policy Act of 1969, including guidelines in 33 Code of Federal Regulations, Part 230, the Tulsa District has assessed the environmental impacts of plugging and closing 42 mine shafts within the boundary of the Tar Creek Superfund Site in Ottawa County, Oklahoma. The purpose of the shaft closures is to address adverse affects and hazards associated with historical mining activities at the Tar Creek Superfund Site. The proposed actions would include filling the shaft openings with a layer of existing large surface rock, a layer of impervious clay, and a concrete cap. The enclosed Environmental Assessment indicates the shaft closures would have no significant adverse affects on the natural or human environment. Therefore, an Environmental Impact Statement will not be prepared.



Date: 1 APR 05

Miroslav Kurka
Colonel, U.S. Army
District Engineer

ENVIRONMENTAL ASSESSMENT

TAR CREEK SECTION 111 PROJECT
PLUGGING OF VARIOUS MINE SHAFTS



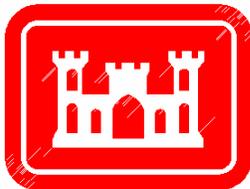
Prepared for:

UNITED STATES ARMY CORPS OF ENGINEERS
Tulsa District
Tulsa, Oklahoma

Task Order 0007
Contract No. W912BV-04-D-2005

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Work Order No. 03886.525.007



ENVIRONMENTAL ASSESSMENT

TAR CREEK SECTION 111 PROJECT
PLUGGING OF VARIOUS MINE SHAFTS

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SECTION 1 PROJECT PURPOSE, NEED, AND SCOPE

1.1 INTRODUCTION

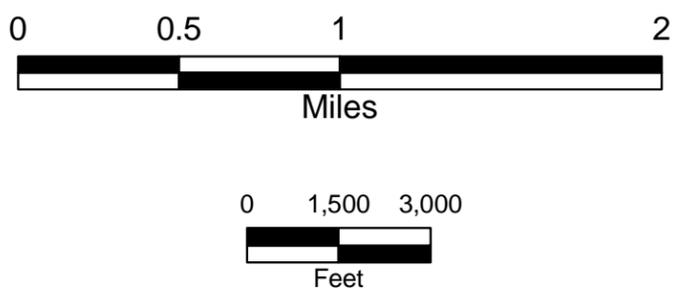
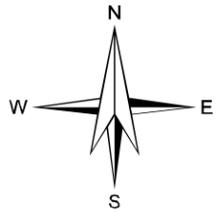
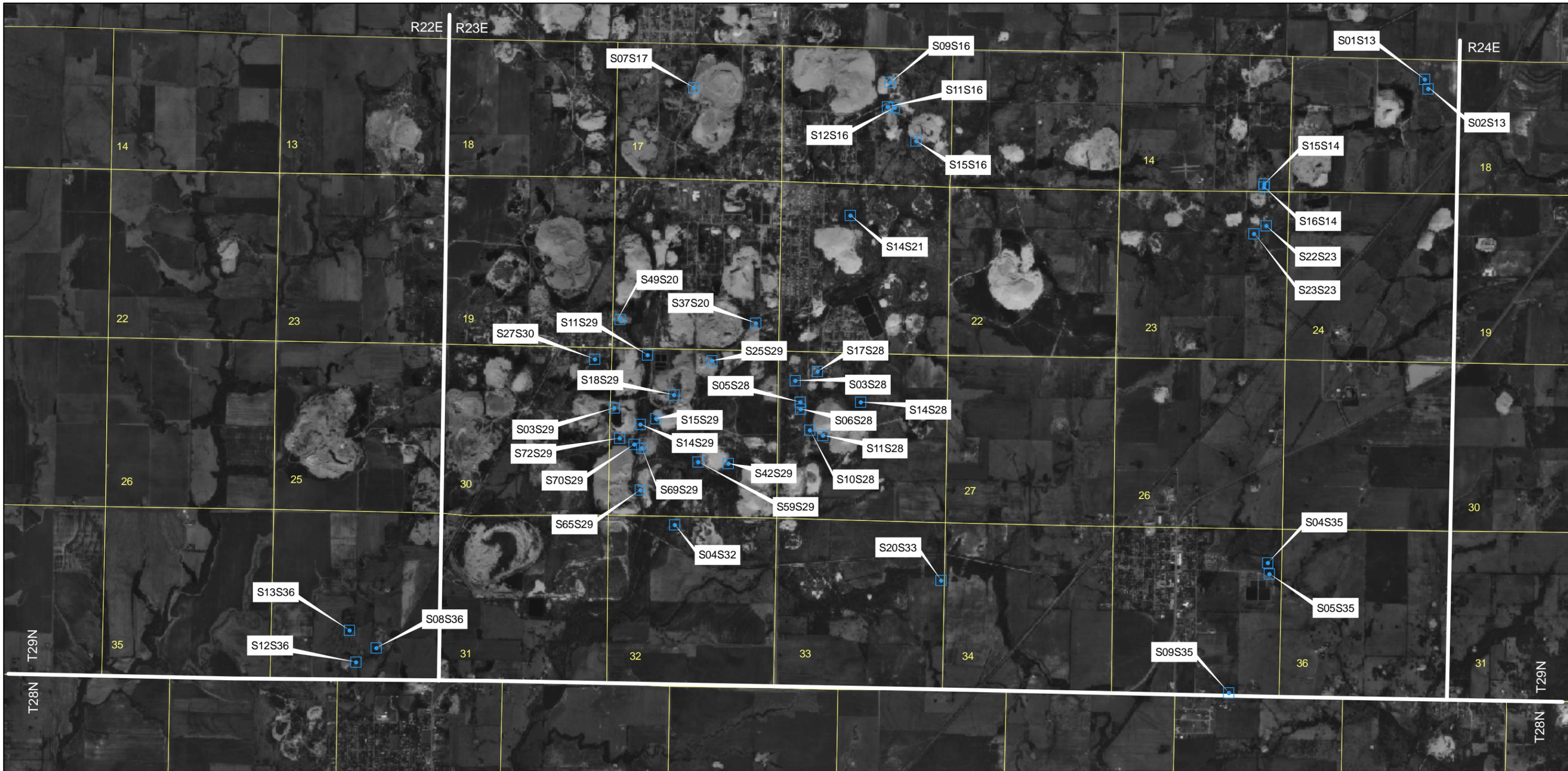
The United States Army Corps of Engineers (USACE), Tulsa District, contracted Weston Solutions, Inc. (WESTON®) under Contract No. W912BV-04-D-2005 Task Order 0007, to perform an Environmental Assessment of various Section 111 demonstration projects being performed in the Tar Creek Oklahoma area. This document is the second of two such assessments that WESTON performed under this task order, and is an assessment of 42 mine shaft closures. These closures are being conducted under authority of Section 111 of the Energy and Water Development Appropriations Act of 2004 (Public Law 108-137). The Corps of Engineers has been given authority under this Act to implement demonstration projects determined by the Secretary of the Army to be necessary to address lead exposure and other environmental problems related to historical mining activities in Ottawa County, Oklahoma.

Tar Creek is a Superfund Site located in northeastern Oklahoma, among the mining cities of Picher, Cardin, Quapaw, Commerce and North Miami. It covers approximately 40 square miles of Ottawa County. Lead and Zinc mining practices have left extensive underground tunnels, mine and mill waste material (chat piles), boreholes, open shafts, and surface-collapse features, creating environmental problems and risks to the public's health and safety of local residents. Due to related hazards from the presence of open shaft and collapse features, the U.S. Army Corps of Engineers (USACE) proposes to plug and/or cap 42 mine shafts that have been identified as "high priority". The Tulsa District USACE has prepared a scope of work for Phase 1 plugging and/or capping mine shafts (July, 2004). This environmental assessment (EA) identifies and evaluates the potential impacts associated with the proposed project. The locations of the mine shafts are shown in Figure 1-1. A general description of the 42 mine shafts proposed to be capped or plugged is located in Section 2 of this EA.

1.2 PROJECT SCOPE

The project scope is confined to evaluating the potential impacts to the 42 identified mine shaft locations, not the Tar Creek Superfund site as a whole. The natural and human aspects of the local area have been assessed along with the potential environmental impacts that may occur resulting from project implementation.

The National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190) requires all federal agencies to address environmental impacts of any federal action on the natural and human environment. Guidance for complying with NEPA is contained in Title 40 of the Code of Federal Regulations (CFR), Parts 1500 through 1508 and the U.S. Army Corps of Engineers NEPA guidelines at 33 CFR Part 230. The EA was also prepared in accordance with the USACE Engineering Regulation (ER) 200-2-2, *Procedures for Implementing NEPA*. The intent of NEPA is to ensure that applicable environmental information is made available to public officials and citizens regarding major actions undertaken by Federal agencies. The purpose of this EA is to evaluate the environmental impacts and consequences of implementing phase 1 of the proposed plugging and/or capping mine shafts project in accordance with the NEPA.



Legend

	Shafts
S13S36	Shaft Designation Shaft 13 in Section 36
	Sections



FIGURE 1-1

Tar Creek Superfund Site
Mine Shaft Locations
Ottawa County, Oklahoma

SOURCES:
Luza, 86
Imagery - USGS 3.5 Min Digital Ortho Quarter Quads, 1996

DATE MAR 2005	WO# 03886.525.008	SCALE 1 IN = 3000 FT
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SECTION 2 ALTERNATIVES

In determining the alternatives, three main project concerns were considered: engineering, economics, and the environment. These three aspects were considered individually as well as collectively to identify their effects on one another in order to develop possible project alternatives. The engineering component has the objective of producing high levels of efficiency and structural soundness to the site. The economic aspect strives to achieve a balance between implementation and the resulting remediated site. The environmental aspect considers the biophysical features and proposes procedures to minimize impacts. The anticipated impacts to the identified public interest review factors are summarized in the Impact Assessment Matrix at the end of Section 4. The proposed projects presented in Alternative 2 are intended to have only positive impacts on the economy and natural environment. Two alternative plans were considered during formulation of the project and are described in the following subsections.

2.1 ALTERNATIVE 1: NO ACTION

The “no action” alternative would maintain existing conditions and current land use. Existing environmental values and conditions would remain unchanged, as they presently exist. Surface collapse features would continue to grow over time.

2.2 ALTERNATIVE 2: PLUGGING AND/OR CAPPING MINE SHAFTS

The US Army Corp of Engineers (USACE) plan is to permanently close all proposed mine shaft openings by filling them with a layer of existing large surface rock, a layer of impervious clay, and a concrete cap. The area surrounding the shafts would then be covered with top soil and vegetated. Based on variable conditions, each shaft may require its own unique approach to properly plug or cap.

The conditions that are described in the following paragraphs for each shaft reflect observations during site visits to each shaft on the 8, 9, and 10 of December 2004. The shaft numbers and locations are based on Plate 1, Map of Mine Workings and Shafts in Picher Field, Northeastern Oklahoma (Luza, 1986). Additional GPS-based coordinates for each shaft are listed in Table 2-1. The descriptions of each shaft include the location, surface features, vegetation, structures, the presence or absence of water and debris filling the shaft, and the quality of habitat in the area around the shaft that may be disturbed by activities associated with shaft-filling. Natural resources are discussed in more detail for the area and per shafts where more detail is appropriate in Section 3.5. Photographs of mine shafts are provided in Appendix A. A detailed listing of the vegetation at each shaft is in Appendix B.

Table 2-1

Mine Shaft GPS-Based Coordinates and Locations

							Coordinates		
	Township	Range	Section	1/4	1/4	Shaft	Mine	Northing	Easting
1	29	23	32	NE	NW	4	Quebec	36.957	94.842
2	29	23	30	NE	NE	27	Lucky bill	36.972	94.851
3	29	23	29	SW	NW	3	Domado	36.967	94.848
4	29	23	29	NW	SW	72	Douthat	36.965	94.848
5	29	23	29	NW	NW	11	Baby Jim	36.972	94.845
6	29	23	29	SE	NW	18	Rialto	36.969	94.842
7	29	23	29	SE	NW	15	Rialto	36.967	94.844
8	29	23	29	NW	SW	70	Admiralty No. 4	36.964	94.846
9	29	23	29	NW	SW	69	Admiralty No. 4	36.964	94.845
10	29	23	29	SW	NW	14	Domado	36.966	94.846
11	29	23	20	SW	SW	49	Kenoyer	36.975	94.848
12	29	23	29	SW	SW	65	Admiralty No. 4	36.960	94.845
13	29	23	29	NW	SE	42	Skelton	36.963	94.836
14	29	23	29	NW	SE	59	Skelton	36.963	94.839
15	29	23	14	SE	SE	16	Blue Ribbon	36.987	94.779
16	29	23	14	SE	SE	15	Blue Ribbon	36.988	94.779
17	29	23	33	NW	NE	20	Graig Lease	36.953	94.813
18	29	23	29	NW	NE	25	Barbara J.	36.972	94.838
19	29	23	20	SE	SE	37	OKO	36.975	94.833
20	29	23	13	NE	NE	2	Scott	36.996	94.762
21	29	23	13	NE	NE	1	Scott	36.997	94.762
22	29	23	35	SW	SE	9	Julie Shapp	36.944	94.782
23	29	23	35	SE	NE	5	Harry Whitebird	36.954	94.778
24	29	23	35	NE	NE	4	Harry Whitebird	36.955	94.778
25	29	23	28	NW	NW	3	Birthday	36.970	94.829
26	29	23	28	SW	NW	5	Federal	36.968	94.828
27	29	23	28	SW	NW	6	Federal	36.968	94.828
28	29	23	28	SE	NW	11	New Chicago No. 2	36.965	94.826
29	29	23	28	SW	NW	10	Fort Worth	36.966	94.827
30	29	23	28	NW	NW	17	MoMule	36.971	94.827
31	29	23	28	SE	NW	14	New Chicago No. 2	36.968	94.822
32	29	23	21	NW	NE	14	Eudora Whitebird	36.984	94.823
33	29	23	16	NE	SE	15	Consolidated No. 3	36.991	94.817
34	29	23	16	NW	SE	11	Cortez	36.994	94.820
35	29	23	16	NW	SE	12	Cortez	36.994	94.819
36	29	23	16	SW	NE	9	Hunt	36.996	94.819
37	29	23	17	SE	NW	7	Ohimo	36.995	94.841
38	29	22	36	SE	SW	12	Scammon Hill	36.945	94.876
39	29	22	36	NE	SW	13	Scammon Hill	36.948	94.876
40	29	22	36	SW	SE	8	Scammon Hill	36.946	94.873
41	29	23	23	SE	NE	23	Blue Bonnet	36.590	94.465
42	29	23	23	NE	NE	22	Blue Bonnet	36.590	94.464

2.2.1 Mine Shaft Site No. 4 - Section 32

This shaft is located in the NE ¼ of the NW ¼ of Section 32 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a wooded area adjacent to a wetland complex and a pasture which is used for grazing. The top of the shaft is stable with water and leaves visible at a few feet below the ground surface. The vegetation in the area near the shaft includes several trees, some herbaceous plants as well as woody vegetation. Wildlife habitat is of poor quality. This site is shown in photographs No.1 and 2 in Appendix A.

2.2.2 Mine Shaft Site No. 27- Section 30

This shaft is located in the NE ¼ of the NE ¼ of Section 30 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a wooded area surrounded by chat. The visible indication of the shaft is a large concrete pipe casing a few inches above ground. Water is not visible in the shaft. The vegetation in the area near the shaft includes several trees as well as some woody vegetation. Wildlife habitat is of poor quality. This site is shown in photographs No. 3 and 4 in Appendix A.

2.2.3 Mine Shaft Site No. 3 – Section 29

This shaft is located in the SW ¼ of the NW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a large area consisting of chat and fines. The shaft opening does not appear stable and is marked by mounds of mill fines and small clumps of vegetation. Water in the shaft is visible within several feet below the ground surface. The area has been heavily disturbed and vegetation is composed principally of grasses and trees. Wildlife habitat in the area of the shaft is of poor quality. This site is shown in photographs No. 5 and 6 in Appendix A.

2.2.4 Mine Shaft Site No. 72 - Section 29

This shaft is located in the NW ¼ of the SW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a wooded area and surrounded by a large waste rock pile. The top of the shaft is open, stable, and is within a rectangular concrete structure. Water is visible in the shaft at a few feet below the ground surface. The vegetation in the area near the shaft is composed of several trees, shrubs and grasses. Wildlife habitat in the area of the shaft is of poor quality. This site is shown in photographs No. 7 and 8 in Appendix A.

2.2.5 Mine Shaft Site No. 11 – Section 29

This shaft is located in the NW ¼ of the NW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a heavily wooded area and the shaft opening is marked with a metal grate on top of a concrete collar. Water is visible in the shaft at several feet below ground surface and vegetation in the area near the shaft includes several trees, shrubs, and

grasses. Wildlife habitat is of fair quality. This site is shown in photographs No. 9 and 10 in Appendix A.

2.2.6 Mine Shaft Site No. 18 – Section 29

This shaft is located in the SE ¼ of the NW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a wooded area with four metal beams marking the shaft opening. Deteriorated wood cribbing was observed at the top of the shaft and water and debris are visible several feet below ground surface. The vegetation in the area near the shaft includes some trees, a few herbaceous plants, and some woody vegetation. Wildlife habitat in the area of the shaft is of poor quality. This site is shown in photograph No. 11 in Appendix A.

2.2.7 Mine Shaft Site No. 15 – Section 29

This shaft is located in the SE ¼ of the NW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a large open area composed mostly of fines with some chat. The shaft opening is marked by a metal grate and surrounding the area are three abandoned car bodies and a large mine tailing pile. The chat around the opening is eroding into the shaft; however, water does not appear to be visible in the shaft. The vegetation in the area near the shaft includes some trees, a few grasses, and some woody vegetation. Wildlife habitat is of poor quality. This site is shown in photograph No. 12 in Appendix A.

2.2.8 Mine Shaft Site No. 70 – Section 29

This shaft is located in the NW ¼ of the SW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma. It is located in a heavily wooded area and the shaft opening is surrounded by a concrete structure which lies adjacent to Tar Creek. Water, leaves and other debris are visible in the shaft within a few feet below the ground surface. The vegetation in the area near the shaft includes some trees, a few grasses and some woody vegetation. Wildlife habitat is of fair quality. This site is shown in photographs No. 13 and 14 in Appendix A.

2.2.9 Mine Shaft Site No. 69 – Section 29

This shaft is located in the NW ¼ of the SW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma on the Admiralty #4 mine. It is located in an area covered by chat, concrete and some grass. The shaft opening is surrounded by a concrete structure, waste rock and mine tailings. Water is visible in the shaft at a few feet below the ground surface and vegetation in the area includes a few trees, shrubs and grasses. Wildlife habitat in the area of the shaft is of poor quality. This site is shown in photographs No. 15 and 16 in Appendix A.

2.2.10 Mine Shaft Site No. 14 – Section 29

This shaft is located in the SW ¼ of the NW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma on the Domado mine. It is located in a densely wooded area, marked by a metal grate and surrounded by a concrete structure. Water is visible in the shaft and vegetation is sparse and includes a few trees, and some woody vegetation and grasses. Wildlife habitat in the area of the shaft is of fair quality. This site is shown in photographs No. 17 and 18 in Appendix A.

2.2.11 Mine Shaft Site No. 49 – Section 20

This shaft is located in the SW ¼ of the SW ¼ of Section 20 Township 29N, Range 23E in Ottawa County, Oklahoma on the Kenoyer mine. It is located in a heavily wooded area. Although the opening is not visible, the shaft is currently collapsing below ground surface. Water is not visible in the resulting depression and vegetation includes a few trees, and shrubs. Wildlife habitat in the area of the shaft is of fair quality. This site is shown in photographs No. 19 and 20 in Appendix A.

2.2.12 Mine Shaft Site No. 65 – Section 29

This shaft is located in the SW ¼ of the SW ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma on the Admiralty #4 mine. It is located in a large open area surrounded by fines and sparse vegetation. The opening of the shaft is water-filled in the center of a large collapse feature. The vegetation near the shaft includes a few trees and shrubs. Wildlife habitat in the area of the shaft is of poor quality. This site is shown in photograph No. 21 in Appendix A.

2.2.13 Mine Shaft Site No. 42 – Section 29

This shaft, formerly noted as No. 43 – Section 29, was corrected by Ed Keheley in March 2005 to Shaft 42 – Section 29. It is located in the NW ¼ of the SE ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma on the Skelton mine. A collapse feature in the midst of a heavily wooded area denotes the shaft opening which is a few feet below ground surface and filled with water. The vegetation near the shaft includes a few trees, shrubs and grasses. Wildlife habitat in the area of the shaft is of fair quality. This site is shown in photograph No. 22 in Appendix A.

2.2.14 Mine Shaft Site No. 59 – Section 29

This shaft was used as an equipment shaft and is located in the NW ¼ of the SE ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma on the Skelton mine. A large concrete structure marks the shaft opening which is located directly adjacent to a wetland with chat piles near the site. Water is visible in the shaft at a few feet below the ground surface and vegetation is

composed primarily of woody vegetation and grasses. Wildlife habitat in the area of the shaft is of fair quality. This site is shown in photograph No. 23 in Appendix A.

2.2.15 Mine Shaft Site No. 16 – Section 14

This shaft is located in the SE ¼ of the SE ¼ of Section 14 Township 29N, Range 23E in Ottawa County, Oklahoma on the Blue Ribbon mine. It is located in a heavily vegetated area adjacent to a main county road. The shaft opening is very large and is in the center of a large collapse feature, which is surrounded by a fence. Water is not visible from the top of the collapse and vegetation near the shaft includes some trees, grasses and shrubs. Wildlife habitat in the area of the shaft is of fair quality. This site is shown in photographs No. 24 and 25 in Appendix A.

2.2.16 Mine Shaft Site No. 15 – Section 14

This shaft is located in the SE ¼ of the SE ¼ of Section 14 Township 29N, Range 23E in Ottawa County, Oklahoma on the Blue Ribbon mine. It is located in a wooded area a few feet north of Mine Shaft Site No. 16 – Section 14. The shaft opening is a very large water-filled collapse feature resembling a pond. Immediately surrounding the shaft, are large waste rock piles. The vegetation near the shaft includes some trees, shrubs and grasses. Wildlife habitat in the area of the shaft is of fair quality. This site is shown in photograph No. 26 in Appendix A.

2.2.17 Mine Shaft Site No. 20 – Section 33

This shaft is located in the NW ¼ of the NE ¼ of Section 33 Township 29N, Range 23E in Ottawa County, Oklahoma on the Craig mine. It is located in a fescue pasture used for grazing and is surrounded by a fence. Water is not visible in the shaft and vegetation at the site is composed primarily of shrubs and grasses. Wildlife habitat in the area of the shaft is of fair quality. This site is shown in photographs No. 27 and 28 in Appendix A.

2.2.18 Mine Shaft Site No. 25 – Section 29

This shaft is located in the NW ¼ of the NE ¼ of Section 29 Township 29N, Range 23E in Ottawa County, Oklahoma on the Barbara J. mine. It is located in a large open area composed primarily of chat and fines. Water marks the shaft opening which is immediately surrounded by vegetation. The vegetation near the shaft includes trees and shrubs. This site is shown in photograph No. 29 in Appendix A.

2.2.19 Mine Shaft Site No. 37 – Section 20

This shaft is located in the SE ¼ of the SE ¼ of Section 20 Township 29N, Range 23E in Ottawa County, Oklahoma on the OKO mine and within the Bureau of Indian Affairs property northeast of the town of Cardin, Oklahoma. It is located in a wooded area at the base of a chat pile. Water

is not visible in the shaft and vegetation at the site is composed primarily of trees and grasses. Wildlife habitat in the area of the shaft is of poor quality. This site is shown in photographs No. 30 and 31 in Appendix A.

2.2.20 Mine Shaft Site No. 2 – Section 13

This shaft is located in the NE ¼ of the NE ¼ of Section 13 Township 29N, Range 23E in Ottawa County, Oklahoma on the Scott mine. It is located in a wooded area adjacent to a soybean field. Water is visible in the shaft at a few feet below the ground surface and vegetation near the shaft includes several trees, woody vegetation, and some herbaceous plants. Wildlife habitat in the area of the shaft is of good quality. This site is shown in photograph No. 32 in Appendix A.

2.2.21 Mine Shaft Site No. 1 – Section 13

This shaft is located in the NE ¼ of the NE ¼ of Section 13 Township 29N, Range 23E in Ottawa County, Oklahoma on the Scott mine. It is located in a wooded area a few feet north of Site No.2-Section 13 and also borders the soybean field. Water is visible in the shaft at a few feet below the ground surface and vegetation near the shaft includes several trees, shrubs and grasses. Wildlife habitat is of good quality. This site is shown in photograph No. 33 in Appendix A.

2.2.22 Mine Shaft Site No. 9 – Section 35

This shaft is located in the SW ¼ of the SE ¼ of Section 13 Township 29N, Range 23E in Ottawa County, Oklahoma on the Julie Shapp mine. It is located in a wooded area next to several large concrete pillars and adjacent to a fescue pasture that is heavily grazed. Water is visible in the shaft at several feet below the ground surface. The vegetation near the shaft includes several trees, woody vegetation, and some herbaceous plants. Wildlife habitat is of fair quality. This site is shown in photographs No. 34 and 35 Appendix A.

2.2.23 Mine Shaft Site No. 5 – Section 35

This shaft was probably an equipment shaft and is located in the SE ¼ of the NE ¼ of Section 13 Township 29N, Range 23E in Ottawa County, Oklahoma on the Harry Whitebird mine and east of the town of Quapaw, Oklahoma. The shaft is located in a wooded area with leaves and concrete debris surrounding the shaft opening. Water is visible in the shaft at several feet below the ground surface and vegetation near the shaft includes several trees and some woody vegetation. Wildlife habitat is of good quality. This site is shown in photographs No. 38 and 39 in Appendix A.

2.2.24 Mine Shaft Site No. 4 – Section 35

This shaft is located in the NE ¼ of the NE ¼ of Section 13 Township 29N, Range 23E in Ottawa County, Oklahoma on the Harry Whitebird mine and a few feet north of Mine Shaft Site No. 5 – Section 35. The shaft is located in a wooded area with leaves surrounding the shaft opening. Water is visible in the shaft at several feet below the ground surface and vegetation near the shaft includes several trees and some woody vegetation. Wildlife habitat is of good quality. This site is shown in photographs No. 38 and 39 in Appendix A.

2.2.25 Mine Shaft Site No. 3 – Section 28

This shaft is located in the NW ¼ of the NW ¼ of Section 28 Township 29N, Range 23E in Ottawa County, Oklahoma on the Birthday mine and to the east of Highway 69. The shaft is located in a mixed open and wooded area with an opening marked by a large concrete structure and leaves. Water is not visible in the shaft and vegetation near the shaft includes a few trees, some shrubs and grasses. Wildlife habitat is of poor quality. This site is shown in photographs No. 40 and 41 Appendix A.

2.2.26 Mine Shaft Site No. 5 – Section 28

This shaft is located in the SW ¼ of the NW ¼ of Section 28 Township 29N, Range 23E in Ottawa County, Oklahoma on the Federal mine. The shaft is located near a large debris pile and in the midst of heavy vegetation. Water is visible in the shaft at a few feet from ground surface and vegetation includes some shrubs and grasses. Wildlife habitat is of fair quality. This site is shown in photographs No. 42 and 43 in Appendix A.

2.2.27 Mine Shaft Site No. 6 – Section 28

This shaft is located in the SW ¼ of the NW ¼ of Section 28 Township 29N, Range 23E in Ottawa County, Oklahoma on the Federal mine. The shaft is located in a large open area consisting mostly of fines. The shaft opening is stable and surrounded by a concrete structure and water is visible in the shaft several feet from the ground surface. The vegetation near the shaft includes very few trees. The habitat is of poor quality for wildlife. This site is shown in photographs No. 44 and 45 in Appendix A.

2.2.28 Mine Shaft Site No. 11 – Section 28

This shaft is located in the SE ¼ of the NW ¼ of Section 28 Township 29N, Range 23E in Ottawa County, Oklahoma on the New Chicago No. 2 mine. The shaft is located in an open field at the base of a waste rock pile. The shaft opening is stabilized by surrounding concrete, covered with leaves and debris, and water is visible in the shaft at several feet from ground surface. Vegetation includes some grasses and shrubs. This site is shown in photographs No. 46 and 47 in Appendix A.

2.2.29 Mine Shaft Site No. 10 – Section 28

This shaft is located in the SW ¼ of the NW ¼ of Section 28 Township 29N, Range 23E in Ottawa County, Oklahoma on the Fort Worth mine. The shaft is located in a grassland immediately adjacent to a large chat and waste rock pile. Water is visible in the shaft at several feet from ground surface and vegetation near the shaft includes some grasses and shrubs. Wildlife habitat is of poor quality. This site is shown in photographs No. 48 and 49 in Appendix A.

2.2.30 Mine Shaft Site No. 17 – Section 28

This shaft is located in the NW ¼ of the NW ¼ of Section 28 Township 29N, Range 23E in Ottawa County, Oklahoma on the Mo Mule mine. The shaft is marked by an extensive water-filled collapse feature and surrounded by larger amounts of debris. The vegetation near the shaft includes some trees and shrubs. The habitat is of poor quality for wildlife. This site is shown in photographs No. 50 and 51 in Appendix A.

2.2.31 Mine Shaft Site No. 14 – Section 28

This shaft is located in the SE ¼ of the NW ¼ of Section 28 Township 29N, Range 23E in Ottawa County, Oklahoma on the New Chicago #2 mine. The shaft opening is located in a wooded area and enclosed by a large structure consisting of railroad tie cribbing with sheet metal walls. The vegetation near the shaft includes woody vegetation and some trees. The habitat on this site is of fair quality for wildlife. This site is shown in photograph No. 52 in Appendix.

2.2.32 Mine Shaft Site No. 14 – Section 21

This shaft is located in the NW ¼ of the NE ¼ of Section 21 Township 29N, Range 23E in Ottawa County, Oklahoma on the Eudora Whitebird mine. The mine shaft is located in a wooded area with litter and concrete pieces scattered around the site. The vegetation near the shaft includes woody vegetation and some trees. The habitat is of fair quality for wildlife. This site is shown in photographs No. 53 and 54 in Appendix A.

2.2.33 Mine Shaft Site No. 15 – Section 16

This shaft is located in the NE ¼ of the SE ¼ of Section 16 Township 29N, Range 23E in Ottawa County, Oklahoma to the eastbound of the town of Picher and on the Consolidated No. 3 mine. The shaft is located in an area consisting of chat. Water in the shaft is visible within several feet from ground surface and vegetation near the shaft is sparse. Wildlife habitat is of poor quality. This site is shown in photograph No. 55 in Appendix A.

2.2.34 Mine Shaft Site No. 11 – Section 16

This shaft is located in the NW¼ of the SE ¼ of Section 16 Township 29N, Range 23E in Ottawa County, Oklahoma on the Cortez mine. The mine shaft is located in a fairly open area consisting mostly of chat. A concrete collar surrounds the shaft opening where water in the shaft is not visible. The vegetation near the shaft is sparse. Wildlife habitat is of poor quality. This site is shown in photograph No. 56 in Appendix A.

2.2.35 Mine Shaft Site No. 12 – Section 16

This shaft is located in the NW¼ of the SE ¼ of Section 16 Township 29N, Range 23E in Ottawa County, Oklahoma on the Cortez mine. The mine shaft is located in a depressed center of a chat pile and is marked by a concrete casing. Water in the shaft is not visible and vegetation near the shaft includes some trees, shrubs and grasses. Wildlife habitat is of poor quality. This site is shown in photographs No. 57 and 58 in Appendix A

2.2.36 Mine Shaft Site No. 9 – Section 16

This shaft is located in the SW ¼ of the NE ¼ of Section 16 Township 29N, Range 23E in Ottawa County, Oklahoma on the Hunt mine. The mine shaft is bordered by chat piles on one side and heavy forest on the other. Erosion is occurring below the ground and around the shaft; however, water in the shaft is not visible. The vegetation near the shaft is sparse and includes woody vegetation and some herbaceous plants. Wildlife habitat is of poor quality. This site is shown in photographs No. 59 and 60 in Appendix A

2.2.37 Mine Shaft Site No. 7 – Section 17

This shaft is located on the Bureau of Indian Affairs (BIA) property in the SE ¼ of the NW ¼ of Section 17 Township 29N, Range 23E in Ottawa County, Oklahoma on the Ohimo mine. The mine shaft is located in midst chat piles in a heavily wooded area. The opening itself is hidden by heavy vegetation and water in the shaft is not visible. The vegetation near the shaft includes woody vegetation, herbaceous plants and some trees. Wildlife habitat is of poor quality. This site is shown in photographs No. 61 and 62 in Appendix A

2.2.38 Mine Shaft Site No. 12 – Section 36

This shaft is in the SE ¼ of the SW ¼ of Section 36 Township 29N, Range 22E in Ottawa County, Oklahoma on the Scamming Hill mine. The mine shaft is located in a somewhat wooded area adjacent to a fescue pasture. The shaft is filled with concrete debris and water in the shaft is not visible. The vegetation near the shaft includes herbaceous plants, some grasses and a few trees. The habitat is of poor quality for wildlife. This site is shown in photographs No. 63 and 64 in Appendix A

2.2.39 Mine Shaft Site No. 13 – Section 36

This shaft is in the NE ¼ of the SW ¼ of Section 36 Township 29N, Range 22E in Ottawa County, Oklahoma on the Scammon Hill mine. The mine shaft is located in a wooded area adjacent to a soybean field. The shaft opening is filled with debris and leaves; however, water in the shaft is visible within several feet from the ground surface. The vegetation near the shaft includes woody vegetation and several trees. Wildlife habitat is of poor quality. This site is shown in photograph No. 65 in Appendix A

2.2.40 Mine Shaft Site No. 8 – Section 36

This shaft is in the SW ¼ of the SE ¼ of Section 36 Township 29N, Range 22E in Ottawa County, Oklahoma on the Scammon Hill mine. The mine shaft is located in a wooded area adjacent to a fescue pasture which is used for grazing. The shaft opening is marked with concrete and wood cribbing. Water in the shaft is visible within several feet from the ground surface and vegetation near the shaft includes herbaceous plants, shrubs and several trees. Wildlife habitat is of poor quality. This site is shown in photographs No. 66 and 67 in Appendix A.

2.2.41 Mine Shaft Site No. 23 – Section 23

This shaft is in the SW ¼ of the SE ¼ of Section 23 Township 29N, Range 23E in Ottawa County, Oklahoma on the Blue Bonnette mine. The mine shaft is located in grassland in a collapse feature and water in the shaft is not visible. The vegetation near the shaft includes some trees, herbaceous plants and shrubs. The habitat is poor quality for wildlife. This site is shown in photograph No.68 in Appendix A

2.2.42 Mine Shaft Site No. 22 – Section 23

This shaft is in the SW ¼ of the SE ¼ of Section 23 Township 29N, Range 23E in Ottawa County, Oklahoma on the Blue Bonnette mine. The mine shaft is located in a grassland and is surrounded by shrubs and trees with no water visible. The vegetation near the shaft includes herbaceous cover and some trees. Wildlife habitat is of poor quality. This site is shown in photograph No. 69 in Appendix A.

SECTION 3

DESCRIPTION OF THE EXISTING ENVIRONMENT

3.1 LOCATION

The proposed project and mine shaft sites are located in and around the towns of Picher, Cardin, and Commerce Oklahoma, within Ottawa County. There are forty two mine shafts proposed to be plugged. Figure 2-1 depicts the location of each mine shaft. The proposed project site boundary is shown on the Ottawa County 7.5-minute topographic map (Figure 3-1).

3.2 CLIMATE

The general climate of the project is typified by hot, humid summers and mild to cold wet winters. The average annual precipitation for the area is 44.6 inches with higher precipitation occurring in the spring and fall months. The average annual temperature is 57.3° Fahrenheit (F). The average summer temperature is 77.4° F, while the average winter temperature is 36° F.

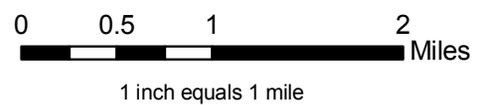
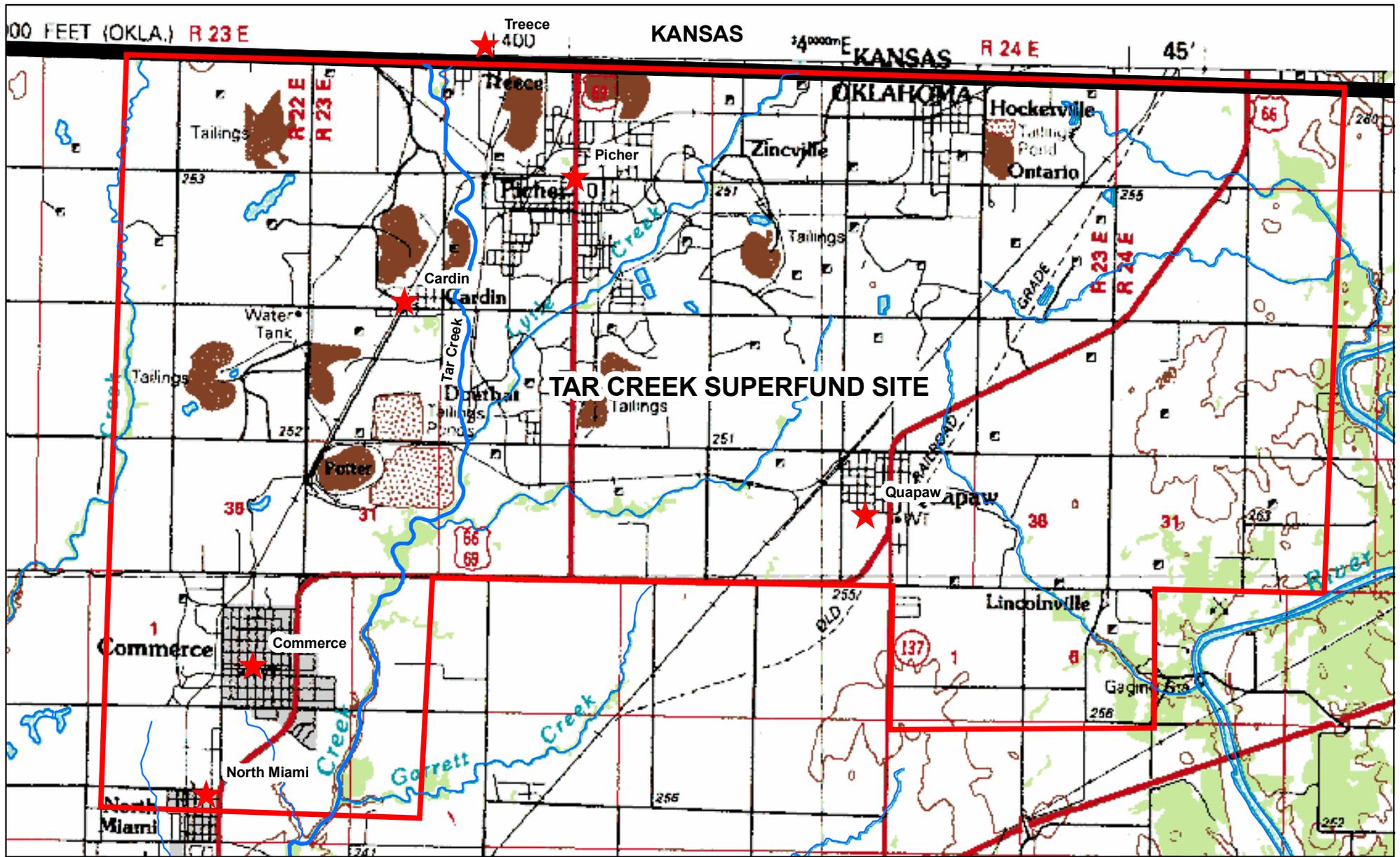
3.3 LAND USE

Ottawa County is situated in a land resource region identified by the United States Department of Agriculture as Cherokee Prairies. The area is located in the subunit classification number 251 within the Prairie Parklands Province (Bailey, 1995). Although the majority of Ottawa County is considered pasture lands, the area around Picher, and the surrounding mining areas are barren. Within the superfund site, the resulting chat piles, and other mining waste prevent the cultivation of the soil for agricultural uses. Areas void of chat, and chat piles are frequently used as pasturelands, intermixed with a few agricultural fields.

3.4 SOCIAL AND ECONOMIC CONDITIONS

3.4.1 Study Area

The Tar Creek Superfund Site comprises 40 square miles and is part of the Tri-State Mining District which includes northeastern Oklahoma, southeastern Kansas, and northwestern Missouri. Specifically, the site includes the Old Picher Field lead and zinc mining area located in northeastern Ottawa County, Oklahoma. The Tar Creek Superfund site consists of five mining towns: Picher, Cardin, Quapaw, Commerce, and North Miami, as well as other communities, now largely abandoned, within Ottawa County. The proposed project is separate from, but within the boundaries of the Tar Creek Superfund Site.



- LEGEND**
- Site Boundary
 - Creek
 - ★ Town



FIGURE 3-1
 7.5 MINUTE TOPOGRAPHIC MAP
 TAR CREEK SUPERFUND SITE
 ENVIRONMENTAL ASSESSMENT
 OTTAWA COUNTY, OKLAHOMA

DATE MARCH 2005	PROJECT NO. 03886.525.003	SCALE 1" = 1 MILE
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3.4.2 Population

According to the U.S. Census Bureau website (Census 2000 data), an estimated 33,194 persons live in Ottawa County, Oklahoma, while an estimated 1,640 persons live in Picher, Oklahoma. The racial makeup of the City of Picher is 77.13% White, 0.00% African American, 13.78% Native American, 0.12% Asian, 0.18% Pacific Islander, 0.06% from other races, and 8.72% from two or more races. Hispanic or Latino persons make up 1.4% of the population of Picher. The racial makeup of the Ottawa, county is 74.1% White, 0.6% African American, 16.5% Native American, 0.3% Asian, and 0.1% Pacific Islander. Approximately 1.5% of the population is from other races, and 3.8% are from two or more races. Hispanic or Latino persons make up 3.2% of the population of the County. (<http://factfinder.census.gov>)

3.4.3 Employment

According to the U. S. Census Bureau, the labor force of the town of Picher is comprised of approximately 616 people, of which 545 are employed and 71 are unemployed. The unemployment rate is 5.6% compared to the unemployment figure for the State of Oklahoma of 5.3% and the national unemployment rate of 5.8%. Almost half the workforce (45.7%) of Picher, Oklahoma, is employed in either the manufacturing industry or in the educational, health, and social services industry. An additional 20.9% of the workforce is employed in the retail trade industry (12.5%) and the construction industry (8.4%).

In Ottawa County, Oklahoma, approximately 15,110 people are in the labor force of which 14,172 persons are employed while 905 are unemployed and 33 are in the armed forces. The unemployment rate for Ottawa County is 6.0%. Persons working in the educational, health, and social services make up 23.9% of the workforce. An additional 17.7% of the workforce is employed in the manufacturing industry while arts, entertainment, recreation, accommodation, and food services (10.5%) and retail trade (10.3%) make up a total of 20.8%. (<http://factfinder.census.gov>)

3.4.4 Income

The 2000 median household income for Picher, Oklahoma was \$19,722, while the mean household income was \$28,494. The median household income for Ottawa County was \$27,507. The State of Oklahoma had a median household income of \$33,400 in 2000. The 2000 per capita income for Picher, Oklahoma was \$10,938 as compared to the County of Ottawa per capita income of \$14,478 and the State of Oklahoma per capita income of \$17,646. (<http://factfinder.census.gov>)

3.4.5 Social Ecology

The population living in this rural area is primarily a non-minority population.

3.4.6 Executive Order 12898

This Executive Order pertains to “Federal Actions to Address Environmental Justice in Minority and Low-Income Populations”, February 11, 1994. This mandate states that if possible, no federal actions should place any adverse environmental, economic, social, or health effects on minority or low-income groups.

3.4.7 Executive Order 13045

Executive Order 13045 pertains to “Protection of Children for Environmental Health and Safety Risks”, April 21, 1997. This mandate requires that federal agencies are to identify and assess environmental health and safety risks that may affect children.

3.5 NATURAL RESOURCES

3.5.1 Soil Types

The *Soil Survey Ottawa County, Oklahoma*, published by the United States Department of Agriculture in cooperation with the Oklahoma Agricultural Experiment Station, defines the soils in the western two-thirds of the county as the Cherokee Prairies unit and the eastern one-third of the county as the Ozark Plateau unit.

The Tar Creek Superfund Site consists of areas near Picher and Quapaw, Oklahoma, down to Miami, Oklahoma. These areas consist mainly of the Cherokee Prairies unit. The Cherokee Prairies consists of five soil associations that were formed mainly under grasses. Three of these soils associations are present in the area of the Tar Creek Superfund site. The parent material of these soils is primarily material from sandstone and shale or is alluvium. However, some of the soils are from limestone or from calcareous shale.

Dennis-Parsons-Bates association is nearly level to moderately sloping upland soils formed in material from sandstone and shale. This soil association is mostly on broad, nearly level to moderately sloping uplands in the central and western part of the county. The Dennis-Parsons-Bates association covers approximately 33 percent of Ottawa County and is dissected by large V-shaped drainage pathways. The soils were formed under tall prairie grass in material from sandstone and shale of Pennsylvanian age. The Parsons soils are dominant on the broad flats, and the Dennis and Bates soils are dominant on the slopes.

The Dennis-Taloka association is nearly level to moderately sloping upland soils formed in material from sandstone and shale or in old alluvium. This soil association is made up of broad, nearly level to moderately sloping uplands cut by V-shaped drainage pathways. Most of the Tar Creek Superfund Site consists of Dennis-Taloka association soils. The soil formed under tall prairie grass is material from sandstone and shale or old alluvium. This association makes up

about 16 percent of the County of Ottawa. The Dennis and Taloka soils are dominant in this association.

The Osage-Verdigris-Lightning association is nearly level soils on flood plains. The soil is acidic and includes the areas surrounding the Neosho River and its tributaries including Tar Creek. The soils are formed in alluvium washed from soils on the prairies and comprise about seven percent of the county. The Osage, Verdigris, and Lightning soils are dominant in this association.

According to the Ottawa County Soil Survey at least 30 of the mine shafts are located on or adjacent to soils classified as mine pits and dumps (Mp). The unit that includes mine pits and dumps is described in the Ottawa County soil survey as a miscellaneous land type that consists of piles of rocks and chat from lead and zinc mines. Where this unit is mapped, it may range from a thin layer of rock or chat to large piles. In some areas the chat disrupts drainage and causes wet areas to form where they would not naturally occur. Most of this unit is devoid of vegetation and has little agricultural value.

3.5.2 Prime and Unique Farmland

Soil that is prime or unique farmland as defined in the Farmland Protection Policy Act is classified as prime farmland. According to the U.S. Department of Agriculture, it is soil that is best suited for producing food, feed, forage, fiber, and oilseed crops. The Tar Creek Superfund site is not classified as prime or unique farmland.

3.5.3 Wild and Scenic Rivers

There are no waterways within the Tar Creek Superfund Site that are classified as wild and scenic pursuant to the Federal Wild and Scenic Rivers Act (16 USC 1271-1287), Public Law 90-542, approved October 2, 1968.

3.5.4 Vegetation

The proposed project area is located within the Prairie Parkland Province (PPP) as described by the US Department of Agriculture, (Bailey 1995). This province covers a large geographical area of the central United States ranging from Canada in the north to Oklahoma in the south, and is characterized by alternating tracts of prairie and deciduous forests. Historically, moderately tall prairie grasses would have dominated the prairie areas, and consisted of species such as big and little bluestem, Indian grass, and switchgrass intermixed with wildflowers and legumes. The historical deciduous forests in the PPP would have been dominated by oak and hickory species. The riparian zone along Tar Creek would have consisted of deciduous forest dominated by species such as eastern cottonwood, bur oak, red oak, green ash, sycamore, black walnut, black willow and American elm.

The historic vegetative communities of the area have been drastically altered due to past mining activities, and land use practices. The existing vegetative communities associated with the 42 proposed project sites vary from historical prairie, sparse upland forest, agricultural fields, improved pasture, riparian forest, and old field succession. Generally, the quality of the existing

vegetation associated with the mine shafts is poor from the standpoint of maturity, succession, and structure. The soils around most all of the proposed project locations are dominated by mine chat, mine tailings, waste rock, and mining debris. Consequently, the vegetative ground cover in most areas is extremely sparse due to the amount of chat content in the substrate, and is incapable of supporting lush vegetation. Pockets of native and non-native prairie grasses along with improved pasture grasses are present at all of the proposed project locations, along with scattered shrub species, and small isolated trees.

A list of the observed predominant vegetative species for all of the proposed project locations is shown in Appendix B. Of the 42 proposed project sites, only six contain vegetative communities which could be considered as fair to medium quality habitat. The remainder of the sites would be characterized as having poor quality habitat with little value for most wildlife species. Following is a description of the vegetation found at the six proposed project locations exhibiting fair to medium quality wildlife habitat.

Mine Shaft Site No.70-Section 29 lies within a narrow riparian zone adjacent to Tar Creek, and contains fair to medium wildlife habitat consisting of numerous large and small northern red oaks, river birch, eastern cottonwood, eastern red cedar, switchgrass, sumac, and greenbrier.

Mine Shaft Site No's 1 and No. 2-Section 13 are located along the edge of a soybean field, and adjacent to an abandoned field in old growth succession. This area provides some of the better quality wildlife habitat for deer and quail. Species noted in the area include several large eastern cottonwoods, hawthorn, eastern red cedar, honeysuckle, switchgrass, Johnsongrass, and big bluestem. Species noted in the old growth successional field include red mulberry, hackberry, eastern red cedar, false indigo, coral berry, sumac, switchgrass, big bluestem, broomsedge, persimmon, thistle, *Sericea lespedeza*, blackberry, and Illinois bundle flower.

Mine Shaft Site No.5-Section 35 is located near the City of Quapaw's municipal waterworks and along a small drainage. The southern portion of the site is overgrown and covered with Virginia creeper. The northern portion of the site is heavily wooded and provides suitable habitat for fox squirrel, quail, and deer. Other vegetative species occurring at this site include wild cherry, hackberry, honeysuckle, greenbrier, Osage orange, and coral berry.

Mine Shaft Site No.14-Section 28 is heavily overgrown with honeysuckle and green ash and provides excellent habitat for white tail deer. Access to the site is difficult due to the number and density of small green ash trees and abundance of honeysuckle. Other species occurring at this site include hackberry, poison ivy, and black cherry.

Mine Shaft Site No. 13-Section 36 is adjacent to a soybean field and at the head of a small drainage. The habitat along the drainage is fairly good, but is surrounded on the east and northeast by a fescue pasture. The habitat along the creek provides a travel corridor for wildlife species. Other vegetative species occurring at this location include American elm, green ash, hackberry, several large cottonwoods, small red oaks, red cedar, greenbrier, and honeysuckle.

3.5.5 Aquatic Community

Tar Creek runs through the Tar Creek Superfund site, but is not within any of the proposed mine shaft areas. Fish and other wildlife were not observed in Tar Creek during the May 2004 site visit, and have been recorded as absent from much of the creek since the 1980s due to the effects of mining. Water is present within some of the open mine shafts, and minnows of an unidentified species were noted to occur in at least one location (Mine Shaft No. 16- Section 14).

3.5.6 Floodplains

Thirteen of the 42 mine shafts are located within Zone A of the Federal Emergency Management Agency's Flood Insurance Rate Maps, which represent special flood hazard areas that would be inundated by a 100-yr flood. The rest of the mine shaft sites are in Zone X, which is outside the 500-yr flood plain as shown on the map in Appendix C.

3.5.7 Wetlands

The USACE 1987 Wetland Delineation Manual defines wetlands as: those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (COE, 1987). There are three sites located in wet areas (mine shaft sites No. 4 – Section 32, No. 11 – Section 29, and No. 59 – Section 29). However, no wetlands are identified on NWI maps for these particular locations.

3.5.8 Wildlife

The species of wildlife expected to utilize or be present within the proposed project area may include white-tailed deer (*Odocoileus virginianus*), turkey (*Meleagris gallopavo*), fox squirrel (*Sciurus niger*), gray squirrel (*S. caroliniensis*), cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), mink (*Mustela vison*), opossum (*Didelphis marsupialis*), skunk (*Mephitis mephitis*), and muskrat (*Ondatra zibethicus*). Various avian species comprised of raptors, neotropical migrants, as well as a variety of herpetofauna including timber rattle snakes (*Crotalus horridus*), copperhead (*Agkistrodon contortrix*), amphibians, salamanders, lizards, and turtles. Predatory mammals including the coyote (*Canis latrans*) may be abundant while the density of gray fox (*Vulpes fulva*) may be relatively low.

3.5.9 Threatened and Endangered Species

In accordance with the Endangered Species Act of 1973, the U.S. Fish and Wildlife Service (USFWS) was contacted for information concerning Federally-listed threatened and endangered species. Federally-listed species listed as occurring in Ottawa County include the endangered gray bat (*Myotis grisescens*), endangered Ozark big-eared bat (*Plecotus townsendii ingens*), endangered American Burying Beetle (*Nicrophorus americanus*), endangered winged mapleleaf

mussel (*Quadrula fragosa*), threatened bald eagle (*Haliaeetus leucocephalus*), threatened Neosho madtom (*Noturus placidus*), threatened Ozark cavefish (*Amblyopsis rosae*), and threatened piping plover (*Charadrius melodus*).

Gray Bat

The gray bat has been a state and federally listed endangered species since 1976. The gray bat is a medium sized bat with a wingspan of 10 to 11 inches, and a total length of 4 to 5 inches. It has grayish brown fur and is the only bat within its range with unicolored dorsal hair. The bat roosts almost exclusively in caves year-round and has very specific requirements. They are generally limited to limestone caves, and have specific temperature requirements. Winter caves must be cold (42 to 52 degrees Fahrenheit) and deep with steep vertical walls. Summer caves are warm (57-77 degrees F) with tightly restricted rooms. Summer caves are typically located close to rivers and lake shorelines.

Ozark Big-eared Bat

The Ozark big-eared bat has been a state and federally listed endangered species since 1973. The bat is a medium sized bat with very large ears (over 1 inch). Its snout has prominent lumps with fur that ranges in color from light to dark brown. The Ozark bat is found in caves, cliffs, and rock ledges associated with oak-hickory forests of the Ozarks. They forage along the edges of upland forests for insects. Edge habitat between forested and open areas is the preferred foraging area. The species does not migrate and has a range of less than 20 miles.

American Burying Beetle

The American burying beetle (ABB) has been a state and federally listed endangered species since 1989. The ABB is large (1-1.5 inches) and relatively robust beetle having a shiny black appearance with four orange-red spots on the wing covers (elytra). A large reddish-orange spot on the pronotum of the beetle is indicative of the species. The habitat requirements for the beetle are not fully known however, the ABB has been found in a variety of habitat types. The ABB is considered a habitat generalist and has been found in open grasslands, forests, as well as transitional areas. The beetle is a carrion feeder and relies on small vertebrate carcasses for food and reproductive purposes.

Winged Mapleleaf Mussel

The winged mapleleaf mussel was listed as a federally endangered species in 1991. It was once found in 13 states in river and stream tributaries to the Mississippi River where it lived on gravel or sand in riffles of clear, high quality water. Today it is only found in one river, the St. Croix River in Minnesota and Wisconsin. The one remaining population of winged mapleleaf is found in riffles with clean gravel, sand, or rubble bottoms and in clear, high quality water. In the past, it may also have been found in large rivers and streams on mud, mud-covered gravel, and gravel bottoms. Winged mapleleaf mussels grow up to four inches long. They have thick shells that are greenish brown, chestnut, or dark brown in color. To feed, the winged mapleleaf siphons in water and filters out food particles primarily phyto- and zooplankton.

Neosho Madtom

The Neosho madtom was listed as a federally threatened species in 1991. The Neosho madtom has features characteristic of all North American catfish, including scale less skin and a relatively

large head with sensory barbels. Adult Neosho madtoms average less than three inches in length. They have a brownish midline stripe and an overall mottled appearance. The preferred habitat of adult Neosho madtoms is shallow riffles with loose, incompact gravel bottoms. They are occasionally found in areas with sandy bottoms covered with leaf litter. Historically, the Neosho madtom was found in the Neosho, Cottonwood, Spring, and Illinois Rivers in Kansas, Missouri, and Oklahoma. It is believed to be no longer present in the Illinois River and is scattered through the rest of its historic range. In Oklahoma, it is present only in Ottawa and Craig counties.

Ozark cavefish

The Ozark cavefish was listed as a federally threatened species in 1984. It is a small (2-1/4 inches long), blind, pinkish-white fish that lives in cave streams and springs within the Springfield Plateau in Arkansas, Missouri, and Oklahoma. It senses motion given off by organisms in the water to locate food. The cavefish primarily eat plankton. They also eat isopods, amphipods, crayfish, salamander larvae, and bat guano.

Bald Eagle

Bald Eagles prefer large trees or high cliffs along large waterways for perching, foraging, and nesting purposes. Foraging for fish and carrion occurs along lakes and waterways. Eagles winter along oceans, rivers, lakes, or in areas where carrion is present. The Bald Eagle migrates through the area and winters along the Neosho River near Grand Lake downstream of the demonstration areas.

Piping Plover

The Piping Plover is a small shorebird about 7 inches long with a wingspan of 15 inches. Adults have sand-colored upper parts with white undersides and are easily distinguished by their bright orange legs. This species migrates across the eastern ¾ of the Oklahoma during the spring and fall utilizing sandy shorelines on lakes and sandbars along the major river systems for forage and resting areas.

3.6 CULTURAL RESOURCES

In accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, consultation was initiated in 2004 with the Oklahoma State Historic Preservation Office (SHPO). The Picher-Cardin mining area is potentially a historic district eligible for listing on the National Register of Historic Places. Numerous historic structures related to the historic mining activities in the area are present within the Picher Field project area. These structures may include, but are not limited to, processing towers, mine shafts, foundations, structure footings, and chat waste piles. Many or all of these historic features or structures may be contributing elements to a potential National Register historic district. Consultation for the general Tar Creek area, specifically relating to the Picher Field, was also initiated with appropriate Native American tribes. These tribes included the Caddo Tribe of Oklahoma, Cherokee Nation of Oklahoma, Delaware Tribe of Indians of Oklahoma, Eastern Shawnee Tribe of Oklahoma, Miami Tribe of Oklahoma, Modoc Tribe of Oklahoma, Osage Nation of Oklahoma, Ottawa Tribe of Oklahoma, Peoria Tribe of Indians of Oklahoma, Quapaw Tribe of Oklahoma, Seneca-Cayuga Tribe of Oklahoma, Wichita and Affiliated Tribes of Oklahoma, and Wyandotte Tribe of Oklahoma.

3.7 AIR QUALITY

Air quality throughout the superfund site is affected by particulates picked up by the wind from the chat piles. Air monitoring by the Quapaw tribe began in October 2003. After one complete year of air sampling and monitoring data is available, US EPA Region 6 Air Program and the Quapaw Tribe will review it to determine if any further air sampling or monitoring is warranted. Ten high volume air samplers (five lead and five PM10), two low volume PM10 air samplers silica sampling data, and two low volume continuous monitors (one PM10 and one PM2.5) are being operated at four air monitoring sites in Picher and Cardin. The four air monitoring sites are located near homes, and in neighborhoods, that are downwind of chat piles. One background site is located approximately two miles south of Picher at the Quapaw Tribe's Industrial Park. Over 1,320 (600 lead, 600 PM10 and 120 silica) air samples will be collected during the first year.

Currently no air pollutant sources, either natural, man-made, point, or non-point have been identified to be of sufficient duration or concentration to define the area's air as being of low quality. No current non-attainment areas in accordance with the National Ambient Air Quality Standards (NAAQS) with respect to the criteria pollutants CO, SO₂, O₃, NO_x, PM-10, and Pb, are found at or near the proposed site.

3.8 HAZARDOUS AND TOXIC MATERIAL/WASTE

The Tar Creek Superfund site was added to the National Priorities List in 1983 because of the presence of hazardous and toxic waste material. Extensive lead and zinc mining in the tri-state area resulted in the formation of acid mine water which has affected the groundwater, sediments and surface water at this site with heavy metals, including arsenic, cadmium, lead, and zinc. The hazardous waste on the site is a primary focus of the proposed actions described in this EA.

The aquifer serving the area is threatened due to several boreholes and abandoned wells connecting the aquifer. The upper aquifer was the source of drinking water for some families, and the lower aquifer serves the town of Picher. Evaluation of public water supply sampling results by the ODEQ showed that the water produced from all public wells in the mining area met primary drinking water standards and did not pose a health threat.

Presently, the major health threat is the lead and cadmium in off-site contaminated chat which was distributed as sand and gravel fill to playgrounds, school yard, ball fields, private homes for yards and driveways, and on roadways. In addition numerous chat piles as high as 1500 feet are scattered throughout the area. Inhalation and ingestion of lead contaminated dust from the chat appears to be the source of a significant number of elevated blood lead levels in children living and playing in the areas near chat.

SECTION 4

ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

4.1 LAND USE

In general, most of the mine shaft sites are either uninhabited areas, or areas used as pasturelands. Several of them contain chat piles, boulder piles, concrete mining debris, or refuse. Because of the presence of litter, one can assume that some of the mine shafts (mine shaft 15-Section 29; and 14-Section 21) are being used as local dump sites. Mine shafts that are BIA managed would remain under such management after the plugging/or capping of mine shafts. Likewise, those mine shafts located in privately owned lands would also remain privately owned. In the case of difficult access to a site, temporary access roads may be constructed when plugging/or capping some mine shafts. The proposed project would not affect the current land use of any of the 42 mine shaft sites. Some of the mine shafts proposed to be closed are being used as refuse dumping sites. The plugging and/or capping of those mine shafts could potentially reduce the presence of trash around the proposed sites.

4.2 FUTURE WITHOUT-PROJECT CONDITIONS

Under the without-project conditions, past population trends in Ottawa County would most likely continue. Political decisions, such as the Tar Creek buyout plan could influence population stability within the mining towns of Ottawa County. Several families have already applied for this plan. In addition, trends in the racial and ethnic composition of the population are expected to follow historic trends in the area. Therefore, dramatic changes in social ecology are not expected. The population trends adjacent to the project locations should show no change. Job opportunities in Ottawa County areas would continue to be linked to future population dynamics in the county. Furthermore, employment trends should remain the same under the without-project conditions. Income within the county should also remain unchanged.

4.3 FUTURE WITH-PROJECT CONDITIONS

A summary of the probable impacts associated with implementation of the proposed projects are shown in Table 4-1, Project Impact Assessment Matrix. The proposed project should not have a direct impact on the number of people living in Ottawa County. Population trends of the past would most likely continue. Plugging and/or capping of mine shafts may temporarily increase the noise and traffic patterns affecting persons living around and commuting through the project areas. However, long-term adverse impacts are not expected. Plugging and capping associated with the proposed project could lead to a more desirable area for business development and residency and therefore could boost the overall quality of life, population, economy, and income in the area. The proposed projects could potentially provide additional short-term job opportunities associated with the plugging and/or capping activities. Local businesses such as eateries and stores may benefit from additional workers in the area during project implementation.

However, the overall unemployment rate should not be affected and is expected to remain at current levels. Overall long-term changes in employment are not expected to change as a direct result of the demonstration projects. Construction-related expenditures may slightly increase local income but are expected to be short-term. The long-term direct effects of the proposed project are not expected to affect local income. The plugging and/or capping of mine shafts are not expected to affect the distribution of people living in the county. No significant change in ethnic diversity, social or economic conditions is anticipated.

Table 4-1

Project Impact Assessment Matrix							
Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
A. Soil Effects							
1. Noise Levels				X			
2. Aesthetic values/Heritage		X					
3. Recreational Opportunities		X					
4. Transportation				X			
5. Public Health and Safety	X						
6. Community Cohesion		X					
7. Community Growth and Development				X			
8. Business and Home Relations				X			
9. Existing/Potential Land Use			X				
10. Controversy				X			
B. Economic Benefits							
1. Property Values			X				
2. Tax Revenues				X			
3. Public Facilities and Services				X			
3.A Sewage				X			
3.B Drinking Water				X			
3.C Solid Waste				X			
4. Regional Growth				X			
5. Employment			X				
6. Business Activities			X				
7. Farmland/Food Supply				X			
8. Commercial Navigation				X			
9. Flooding Effects				X			
10. Energy Needs and Resources				X			
C. Natural Resource Effects							
1. Air Quality				X			
2. Terrestrial Habitat					X		
3. Wetlands				X			
4. Aquatic Habitat				X			
5. Habitat Diversity and Interspersion				X			
6. Biological Productivity				X			
7. Surface Water Quality				X			
8. Water Supply				X			
9. Groundwater				X			
10. Soils				X			
D. Cultural Resources							
1. Historic Architectural values					X		
2. Pre-Historic & Archeological Values				X			

4.4 EXECUTIVE ORDER 12898

Environmental justice has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Implementation of the proposed project would benefit equally all local communities, populations, races, and socioeconomic groups.

4.5 EXECUTIVE ORDER 13045

Implementation of the proposed projects should not adversely impact children. The long-term affects of the projects would in fact reduce the risk of children falling into open mine shafts. During the construction phase, engineering controls would be implemented to reduce the amount of dust created at the work sites. Also, all construction zones would be restricted from general access by the public.

4.6 NATURAL RESOURCES

4.6.1 Soil Types

The native soils in all mine shaft sites would not be removed or altered. No adverse impacts are expected to the soil at any of the mine shaft locations.

4.6.2 Prime and Unique Farmland

Prime and unique farmlands were not identified at any of the mine shaft locations. Therefore, the proposed project would not adversely impact prime or unique farmlands.

4.6.3 Wild and Scenic Rivers

There are no waterways within the Tar Creek Superfund Site that are classified as wild and scenic pursuant to the Federal Wild and Scenic Rivers Act (16 USC 1271-1287), Public Law 90-542, approved October 2, 1968.

4.6.4 Vegetation

The vegetation associated with the proposed project locations varies from sparsely vegetated land with chat piles, mine tailings, and mine debris, to improved pasture land, agriculture land, to old field succession. The areas around the open mine shafts contain chat, and some successional vegetation including trees and shrubs. The list of observed predominant vegetative species for all of the proposed project locations is provided in Appendix B.

The quality of the existing vegetation associated with the project locations is poor from the standpoint of maturity, succession, and structure. Of the 42 proposed project sites, only six contain vegetative communities which could be considered as fair to medium quality habitat. The remainder of the sites would be characterized as having very poor quality habitat of little value to most wildlife species.

The proposed project is not expected to remove a significant amount of woody vegetation. A few mature trees may be removed from some of the mine shaft openings to facilitate the closure of the shafts. There is existing access to most of the mine shafts so only a minimal amount of vegetation would be removed to permit equipment access to the sites for closure. Any new access roads, if needed, would be re-vegetated using native grass and forb species mixtures, shrubs and trees. Based on the limited and minor disturbances to vegetation, adverse impacts (beyond minor) are not readily anticipated. However, re-vegetation of all disturbed areas is proposed as compensatory mitigation (Section 5.0).

4.6.5 Aquatic Community

No significant water resources including Tar Creek were identified at any of the proposed project locations. Therefore adverse affects to water resources are not expected to occur as a result of constructing the proposed project.

4.6.6 Floodplains

Thirteen mine shafts, which are proposed to be plugged, exist within the 100-yr flood plain. While plugging activities may temporarily disturb the area inside this plain, long-term effects should not disrupt the surface flow pattern. Therefore, the 100-yr flood plain should not be negatively impacted.

4.6.7 Wetlands

Although the NWI mapping system does not have wetland data available for any of the proposed mine shaft areas, wetlands were observed on or near Site No 4 – Section No.32, Site No.11 – Section 29, and Site No.59 – Section 29. The proposed project should not impact any of the observed wet areas or wetlands.

4.6.8 Wildlife

Although little wildlife habitat and cover exist at most of the mine shaft locations, limited wildlife use occurs. These species could be affected during the implementation of the projects on a short-term basis. Temporary impacts could result from general disruption of the area due to traffic and noise. Mobile wildlife species should exit and avoid the area during construction activities. Based on the lack of water features there is little potential threat to aquatic species.

Avifauna resting and/or foraging habitat impacts should be minimal and temporary. Impacts from project construction related to elevated noise levels and temporary habitat disturbance to wildlife are expected to be minimal and short-term.

4.6.9 Threatened and Endangered Species

Based on evaluation of the required habitat types for the identified species, no corresponding habitat for the listed threatened and endangered species is present at or surrounding any of the proposed project locations. Based on the lack of habitat or occurrence of threatened and endangered species there would be no adverse affects on threatened or endangered species from the proposed projects.

The lack of suitable riverine habitat at the proposed project locations excludes the Neosho madtom and the winged mussel from being present. Although the Neosho madtom may have historically been present in Tar Creek, if suitable habitat existed, the present conditions are such that it could no longer use the creek as habitat.

Very little suitable cave habitat is present in the proposed project areas for either of the endangered bat species. Due to the necessary temperature requirements and the feeding range and foraging habitats of these species, and the fact that most of the mine shafts are full of water or plugged with debris, bats are not likely to utilize the mine shafts as habitat. Also, no bats were sighted on any of the cave walls visible above the waterline in the caves. All the known caves currently used by the Ozark big-eared bat species in Oklahoma are located in Adair or Delaware counties south of the project area. Historically the bats may have used natural caves in Ottawa County.

The mine shafts do not provide suitable habitat for the bald eagle, the piping plover, or the cavefish. The American burying beetle's habitat is not well known, but it does tend to be present in grasslands and forested areas, which are sparse at most of the proposed project locations.

4.6.10 Cumulative Impacts

Cumulative impacts result from incremental impacts of a proposed action when combined with other foreseeable actions, and other past actions. They can result from individually insignificant, but collectively significant actions undertaken over the same period of time by the action agency or other Federal, state, or local agencies. The assessment of cumulative impacts in NEPA documents is required by CEQ regulations. Consequently, to comply with the NEPA the impacts of the proposed action along with impacts of actions or projects under construction, recently completed, or anticipated to be constructed in the foreseeable future must be assessed.

Many activities have occurred and continue to occur within the boundaries of the Tar Creek watershed. The known actions and projects including completed projects, ongoing projects, and reasonably foreseeable projects which are likely to be implemented by state, local or Federal agencies in the proposed project area include the following:

Recently Completed Activities and Projects

- Land Reclamation of Picher Boys and Girls Club. Completed on November 2004. Demonstration project , Tulsa District Corps of Engineers
- Filling of mine shaft in Section 14 or 15 Township 29N. Range 23E. Completed on Summer/Fall 2003. Oklahoma Conservation Commission.
- Abandoned well plugging numerous wells into the Roubidoux aquifer. Completed in 2004. Oklahoma Department of Environmental Quality.
- Chat fines injection pilot study in the NE ¼ NW ¼ Section 22, Township 29N. Range 23E. Completed on December 2004. Environmental Protection Agency.

Ongoing Activities and Projects

Environmental Protection Agency

- Yard Remediation
- Chat injection pilot study in NW ¼ NE ¼ Section 32 Township 29N Range 23E.

U.S. Army Corps of Engineers, Tulsa District:

- Mine Shaft plugging and/or capping

Potential Future Actions or Projects:

Environmental Protection Agency

- No Action (may include monitoring).
- Mine waste removal by excavation and hauling of mine and mill residues and smelter waste to an off-site landfill for disposal
- Surficial source removal by excavation and hauling of mine, mill residues and smelter waste (such as subsidence areas, mine shafts, and/or underground mine workings) to on-site locations for disposal
- Beneficial commercial reuse of mine and mill residues and smelter waste for road building in concrete and encapsulation in polymers for decorative items such as shingles
- Removal of high metal concentrations by washing the mine and mill residues and treating the wash water
- Restoration of former mine and mill residues and smelter wastes in place
- Containment and stabilization of mine and mill residues and smelter wastes
- Treatment of mine and mill residues and smelter waste
- Phyto-remediation
- Passive Treatment Systems
- Institutional Controls

U.S. Army Corps of Engineers, Tulsa District

- Tulsa District Watershed Management Plan Feasibility Study
- Mine hazards, including potential subsidence in populated areas and major road corridors, open and/or poorly sealed mine shafts, and open boreholes
- Chat Injection & Additional surface land reclamation.

There are numerous actions occurring, completed, and proposed to occur within the study area. Due to existing conditions within the project area and types of projects implemented to date, it does not appear that there have been significant cumulative adverse impacts. Minor adverse impacts which may have occurred to date, have been mitigated by the benefits associated with the action(s), and mitigation measures implemented during construction.

These have included implementation of dust control and reduction measures on construction sites, re-vegetation of disturbed work areas with native grass and forb species, and restriction of public access to work sites. However, implementation of some of the proposed future activities may have the potential for significant adverse impacts on the environment. However, these impacts cannot be quantified until additional studies are completed and detailed plans developed. The environmental impacts of future proposed actions and their cumulative effects will need to be addressed on a case by case basis, as these projects develop, and data becomes available.

4.7 CULTURAL RESOURCES

In 2004 Tulsa District executed a Memorandum of Agreement (MOA) with the Oklahoma State Historic Preservation Office (SHPO) and Bureau of Indian Affairs, Eastern Oklahoma Region (BIA) for a series of five small pilot projects in the Tar Creek area in order to achieve compliance under Section 106. In February 2005, Tulsa District executed a Programmatic Agreement (PA) with the Advisory Council on Historic Preservation (ACHP), SHPO, Oklahoma Archeological Survey (OAS), Quapaw Tribe of Oklahoma, and a number of other federal agencies, resulting in Section 106 compliance under a set of stipulations. Most significantly, the PA requires the full development of a Heritage Study for the Tar Creek area which addresses the history and importance of lead and zinc mining and the association of identifiable groups such as the Quapaw Tribe.

As outlined in section 3.6, Section 106 coordination with the Advisory Council on Historic Preservation has resulted in a Programmatic Agreement (PA). The PA specifically exempts all environmental remediation activities within a particular “core area” as outlined in the PA. Outside of the “core area”, but still within the area of potential effect as identified in the PA, certain activities, including the filling and capping of mine shaft entrances, are categorically excluded from further Section 106 review. Activities not specifically excluded, however, may be required to undergo Section 106 review. Execution of the PA is evidence that Tulsa District has complied with the requirements of Section 106 of the National Historic Preservation Act of 1966 (as amended).

SECTION 5 RESTORATION PLAN

One of the purposes of the proposed project is to reduce the adverse affects of past mining activities on the natural environment and human health. To accomplish this, some disturbance of the existing area and vegetation would be required to implement the proposed actions. Implementation of the proposed plans would result in the loss of some small shrubs and/or saplings and disturbance of existing ground cover at most of the sites. However, implementation of the proposed project would ultimately result beneficial for the surrounding community and environment.

Plugging activities would also have the potential to temporarily increase noise and dust levels in the general area. These impacts would be short-term and would be minimized with engineering controls.

Since the identified impacts would be minimal and temporary, no compensatory mitigation would be required for implementation of the proposed plugging and/or capping mine shafts. The following measures to avoid and minimize adverse impacts of the proposed projects have been explored and may be implemented during construction.

- Removal of woody vegetation would be held to a minimum
- Existing access roads would be used as much as possible for construction activities

Clearing and grubbing will be accomplished only to the extent necessary to perform excavation, embankment, borrow, or other work required. Clearing and grubbing within the construction limits will be strictly adhered to. In cutting timber growth, cuts will be made such that all trees are felled into the area to be cleared. Care will be exercised so as not to damage existing trees, vegetation, structures, or utilities that are outside the clearing limits.

Debris will not be burned on site. Trees and other vegetation cleared from the sites will be pushed into wildlife brush piles as directed by the Corps inspector. Other construction materials, debris, and trash will be considered salvage and will be removed from the site and recycled or properly disposed of in a permitted landfill.

After backfilling the vertical opening above the concrete plug, the upper two feet of the shaft will be filled with the same material as is adjacent to the shaft such as chat, topsoil, etc. The transition between the disturbed areas and the undisturbed areas will be graded to minimize abrupt slope changes and possible erosion. Final grade contours will be carried to existing contours such that there is a smooth transition with no ponding. The area around the excavation will be graded to prevent surface water from flowing and ponding into areas of work.

Each mine shaft will have a 3 foot x 3 foot concrete pad having a minimum thickness of 4 inches placed over the location of the former shaft. A brass cap will be imbedded into the concrete pad and stamped to indicate and identify each site as a plugged mine shaft.

SECTION 6 FEDERAL, STATE, AND LOCAL AGENCY COORDINATION

Several agencies were contacted to facilitate evaluation of the resources in the area including land use, air quality, geology, soils, floodplains, water resources, biological resources, cultural resources, social, economic, and hazardous materials and wastes:

Quapaw Nation
U.S. Fish and Wildlife Service
U.S. Natural Resource Conservation Service
Oklahoma Scenic Rivers Commission
Oklahoma State Historic Preservation Office
Oklahoma Archeological Survey
Oklahoma Historical Society
Oklahoma Conservation Commission
Oklahoma Department of Wildlife Conservation
U.S. Army Corps of Engineers: Floodplain Management Branch

The U.S. Army Corps of Engineers, in the process of assembling a Reconnaissance Phase Watershed Management Plan, has held several public meetings in the area of Picher and Miami since the summer of 2003. Monthly technical meetings promoting cooperative effort of multiple agencies and tribes for a comprehensive solution to problems in the Tar Creek area have also occurred since the summer of 2003. Agencies and tribes involved in these efforts include:

U. S. Army Corps of Engineers
Environmental Protection Agency
U.S. Geological Survey
Oklahoma Department of Environmental Quality
Local Environmental Action Demanded (L.E.A.D)
Quapaw Tribe of Oklahoma
Eastern Shawnee Tribe of Oklahoma
Cherokee Tribe of Oklahoma
Tulsa University Tribal Environmental Management Services
Bureau of Indian Affairs

SECTION 7
APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

Table 7-1
Applicable Environmental Laws and Regulations

<u>Statutes/Policies</u>	<u>Compliance of Alternatives</u>
Archeological and Historic Preservation Act, 1974, as amended, 16 U.S.C. 469, <u>et seq</u>	Full
Clean Air Act, as amended, 42 U.S.C. 7609, <u>et seq</u>	Full
Clean Water Act, 1977, as amended (FWPCA), 33 U.S.C. 1251, <u>et seq</u>	Full
Endangered Species Act, 1973, as amended, 16 U.S.C. 1531, <u>et seq</u>	Full
Farmland Protection Policy Act, 7 U.S.C. 4201, <u>et seq</u>	Full
Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1-12, <u>et seq</u>	Full
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, <u>et seq</u>	Full
Land and Water Conservation Fund Act, 1965, as amended, 16 U.S.C. 4601, <u>et seq</u>	Full
National Historic Preservation Act, 1966, as amended, 16 U.S.C. 470a, <u>et seq</u>	Full
National Environmental Policy Act, as amended, 42 U.S.C. 4321, <u>et seq</u>	Full
Native American Graves Protection and Repatriation Act, 1990, 25 U.S.C. 3001-13, <u>et seq</u>	Full
Rivers and Harbors Act, 33 U.S.C. 401, <u>et seq</u>	Full
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, <u>et seq</u>	N/A
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, <u>et seq</u>	N/A
Water Resources Planning Act, 1965	N/A

<u>Executive Orders</u>	<u>Compliance of Alternatives</u>
Floodplain Management (E.O. 11988)	Full
Protection of Wetlands (E.O. 11990)	Full
Environmental Justice (E.O. 12898)	Full
Federal Facilities on Historic Properties (E.O. 13006)	Full
Accommodation of Native American Sacred Sites (E.O. 13007)	Full
Environmental Health and Safety Risks (E.O. 13045)	Full
Migratory Bird Treaty Act, 16 U.S.C.703-711 <u>et seq</u> (E.O. 13186)	Full

SECTION 8 REFERENCES

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APPENDIX A

Photographs of Mine Shaft Sites December 2004

PHOTOGRAPH No. 1



PHOTOGRAPH No. 2



Date: December 8, 2004

Location: Mine Shaft Site No. 4- Section 32

Description: Photographs 1 and 2 are views of Mine Shaft Site No. 4 – Section 32. Photograph 2 is the view of a wetland located south and west of Mine Shaft.

PHOTOGRAPH No. 3



PHOTOGRAPH 4



Date: December 8, 2004

Location: Mine Shaft Site No. 27- Section 30

Description: Photographs 3 and 4 are views of Mine Shaft Site No. 27- Section 30.
Photograph 4 is the view of catalpa trees surrounding Mine Shaft Site No. 27.

PHOTOGRAPH 5



PHOTOGRAPH 6



Date: December 8, 2004

Location: Mine Shaft Site No. 03- Section 29

Description: Photographs 5 and 6 are views of Mine Shaft Site No. 03- Section 29.

PHOTOGRAPH 7



PHOTOGRAPH 8



Date: December 8, 2004

Location: Mine Shaft Site No. 72- Section 29

Description: Photograph 7 and 8 are views of Mine Shaft Site No. 72- Section 29.

PHOTOGRAPH 9



PHOTOGRAPH 10



Date: December 8, 2004

Location: Mine Shaft Site No. 11- Section 29

Description: Photographs 9 and 10 are views of Mine Shaft Site No. 11- Section 29. Photograph 10 shows the area of Mine Shaft Site No. 11-Section 29 view from the access road.

PHOTOGRAPH 11



Date: December 8, 2004

Location: Mine Shaft Site No. 18- Section 29

Description: Photograph 11 is a view of Mine Shaft Site No. 18- Section 29.

PHOTOGRAPH 12



Date: December 8, 2004

Location: Mine Shaft Site No. 15- Section 29

Description: Photograph 12 shows Mine Shaft Site No. 15- Section 29.

PHOTOGRAPH 13



PHOTOGRAPH 14



Date: December 8, 2004

Location: Mine Shaft Site No. 70- Section 29

Description: Photographs 13 and 14 are views of Mine Shaft Site No. 70- Section 29. Photograph 14 shows Tar creek adjacent to mine shaft.

PHOTOGRAPH 15



PHOTOGRAPH 16



Date: December 8, 2004

Location: Mine Shaft Site No. 69- Section 29

Description: Photographs 15 and 16 are views of Mine Shaft Site No. 69- Section 29.

PHOTOGRAPH 17



PHOTOGRAPH 18



Date: December 8, 2004

Location: Mine Shaft Site No. 14- Section 29

Description: Photographs 17 and 18 are views of Mine Shaft Site No. 14- Section 29.

PHOTOGRAPH 19



PHOTOGRAPH 20



Date: December 8, 2004

Location: Mine Shaft Site No. 49- Section 20

Description: Photographs 19 and 20 are views of Mine Shaft Site No. 14- Section 20.

PHOTOGRAPH 21



Date: December 8, 2004

Location: Mine Shaft Site No. 65- Section 29

Description: Photograph 21 shows Mine Shaft Site No. 65- Section 29.

PHOTOGRAPH 22



Date: December 8, 2004

Location: Mine Shaft Site No. 42- Section 29

Description: Photographs 22 shows Mine Shaft Site No. 43- Section 29.

PHOTOGRAPH 23



Date: December 8, 2004

Location: Mine Shaft Site No. 59- Section 29

Description: Photograph 23 is a view of Mine Shaft Site No. 59- Section 29.

PHOTOGRAPH 24



PHOTOGRAPH 25



Date: December 8, 2004

Location: Mine Shaft Site No. 16- Section 14.

Description: Photographs 24 and 25 are views of Mine Shaft Site No. 16- Section 14. This picture clearly shows the large collapse and surrounding vegetation.

PHOTOGRAPH 26



Date: December 8, 2004

Location: Mine Shaft Site No. 15- Section 14.

Description: Photograph 26 shows Mine Shaft Site No. 15- Section 14. Surface-collapse was full of water at that time.

PHOTOGRAPH 27



PHOTOGRAPH 28



Date: December 9, 2004

Location: Mine Shaft Site No. 20- Section 33.

Description: Photographs 27 and 28 are views of Mine Shaft Site No. 20- Section 33. Photograph 28 shows part of the fescue pasture in which this shaft is located.

PHOTOGRAPH 29



Date: December 9, 2004

Location: Mine Shaft Site No. 25- Section 29.

Description: Photograph 29 shows Mine Shaft Site No. 25- Section 29. Chat material, two catalpa trees and sumac surround this site.

PHOTOGRAPH 30



PHOTOGRAPH 31



Date: December 9, 2004

Location: Mine Shaft Site No. 37- Section 20.

Description: Photographs 30 and 31 are views of Mine Shaft Site No. 37- Section 20. Mine Shaft located at the base of a chat pile.

PHOTOGRAPH 32



Date: December 9, 2004

Location: Mine Shaft Site No. 2- Section 13.

Description: Photograph 32 is a view of Mine Shaft Site No. 2- Section 13.

PHOTOGRAPH 33



Date: December 9, 2004

Location: Mine Shaft Site No. 1- Section 13.

Description: Photograph 33 is a view of Mine Shaft Site No. 1- Section 13.

PHOTOGRAPH 34



PHOTOGRAPH 35



Date: December 9, 2004

Location: Mine Shaft Site No. 9- Section 35.

Description: Photographs 34 and 35 are views of Mine Shaft Site No. 9- Section 35.

PHOTOGRAPH 36



PHOTOGRAPH 37



Date: December 9, 2004

Location: Mine Shaft Site No. 5- Section 35.

Description: Photographs 36 and 37 show the surface of the collapse. Photograph 37 views the inside of the mine shaft.

PHOTOGRAPH 38



PHOTOGRAPH 39



Date: December 9, 2004

Location: Mine Shaft Site No. 4- Section 35.

Description: Photographs 38 and 39 are views of Mine Shaft Site No. 4-Section 35.

PHOTOGRAPH 40



PHOTOGRAPH 41



Date: December 9, 2004

Location: Mine Shaft Site No. 3- Section 38.

Description: Photographs 40 and 41 are views of Mine Shaft Site No. 3-Section 38.

PHOTOGRAPH 42



PHOTOGRAPH 43



Date: December 9, 2004

Location: Mine Shaft Site No. 5- Section 28.

Description: Photographs 42 and 43 are views of Mine Shaft Site No. 5 Section 28. An old mill site is located next to this mine shaft.

PHOTOGRAPH 44



PHOTOGRAPH 45



Date: December 9, 2004

Location: Mine Shaft Site No. 6- Section 28.

Description: Photographs 44 and 45 are views of Mine Shaft Site No. 6 Section 28. Chat material surrounds this site.

PHOTOGRAPH 46



PHOTOGRAPH 47

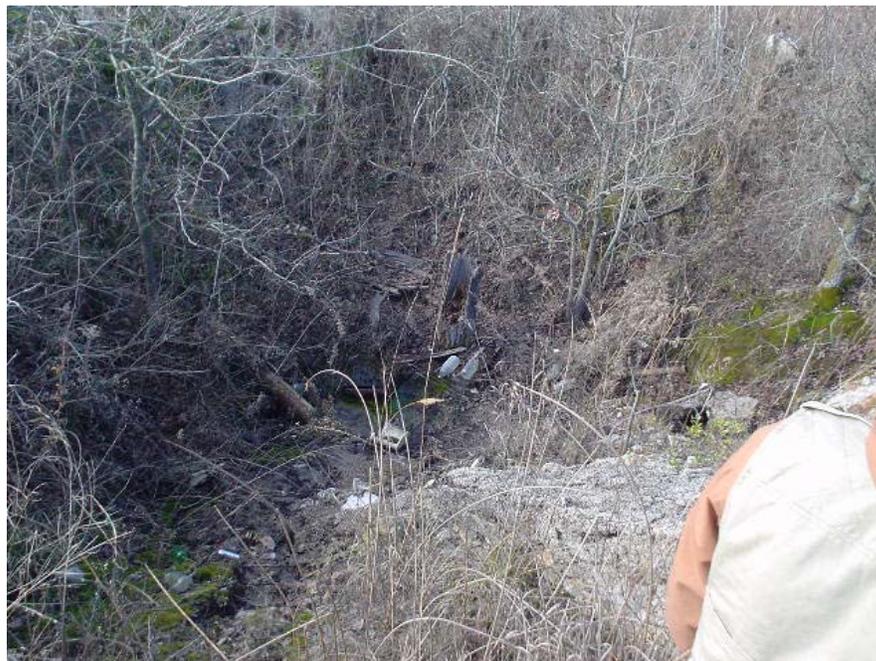


Date: December 9, 2004

Location: Mine Shaft Site No. 11- Section 28.

Description: Photographs 46 and 47 are views of Mine Shaft Site No. 11 Section 28.

PHOTOGRAPH 48



PHOTOGRAPH 49



Date: December 9, 2004

Location: Mine Shaft Site No. 10- Section 28.

Description: Photographs 48 and 49 are views of Mine Shaft Site No. 10 Section 28.

PHOTOGRAPH 50



PHOTOGRAPH 51



Date: December 9, 2004

Location: Mine Shaft Site No. 17- Section 28.

Description: Photographs 50 and 51 are views of Mine Shaft Site No. 17 Section 28.

PHOTOGRAPH 52



Date: December 9, 2004

Location: Mine Shaft Site No. 14- Section 28.

Description: Photograph 52 shows Mine Shaft Site No. 14 Section 28.

PHOTOGRAPH 53



PHOTOGRAPH 54



Date: December 9, 2004

Location: Mine Shaft Site No. 14- Section 21.

Description: Photographs 53 and 54 are views of Mine Shaft Site No. 14 Section 21. Picture shows dumping of trash.

PHOTOGRAPH 55



Date: December 9, 2004

Location: Mine Shaft Site No. 15- Section 16.

Description: Photograph 55 shows Mine Shaft Site No. 15 Section 16.

PHOTOGRAPH 56



Date: December 9, 2004

Location: Mine Shaft Site No. 11- Section 16.

Description: Photograph 56 shows Mine Shaft Site No. 11 Section 16.

PHOTOGRAPH 57



PHOTOGRAPH 58



Date: December 9, 2004

Location: Mine Shaft Site No. 12- Section 16.

Description: Photographs 57 and 58 are views of Mine Shaft Site No. 12 Section 16.

PHOTOGRAPH 59



PHOTOGRAPH 60



Date: December 9, 2004

Location: Mine Shaft Site No. 9- Section 16.

Description: Photographs 59 and 60 are views of Mine Shaft Site No. 9 Section 16.

PHOTOGRAPH 61



PHOTOGRAPH 62



Date: December 10, 2004

Location: Mine Shaft Site No. 7- Section 17.

Description: Photographs 61 and 62 are views of Mine Shaft Site No. 7 Section 17. This Mine Shaft is located north of Pitcher, Oklahoma.

PHOTOGRAPH 63



PHOTOGRAPH 64



Date: December 10, 2004

Location: Mine Shaft Site No. 12- Section 36.

Description: Photographs 63 and 64 are views of Mine Shaft Site No. 12 -Section 36. Mine shaft filled with concrete debris.

PHOTOGRAPH 65



Date: December 10, 2004

Location: Mine Shaft Site No. 13- Section 36.

Description: Photograph 65 shows Mine Shaft Site No. 13 -Section 36. Mine Shaft located north of Commerce, Oklahoma. Concrete debris present.

PHOTOGRAPH 66



PHOTOGRAPH 67



Date: December 10, 2004

Location: Mine Shaft Site No. 8- Section 36.

Description: Photographs 66 and 67 are views of Mine Shaft Site No. 8 -Section 36. Mine Shaft surrounded by fescue grass pasture.

PHOTOGRAPH 68



Location: Mine Shaft Site No. 23- Section 23

Description: Photograph 68 shows Mine Shaft Site No. 23 Section 23

PHOTOGRAPH 69



Location: Mine Shaft Site No. 22- Section 23.

Description: Photograph 69 is a view of Mine Shaft Site No. 22 Section 23.

APPENDIX B

Plant Species Observed at Mine Shaft Locations December 2004

**Identified Trees Species for Proposed Mine Shaft Sites
Table B-1**

List of Trees

Shafts	No. 4- Section 32	No. 27- Section 30	No. 3- Section 29	No. 72- Section 29	No. 11- Section 29	No. 18- Section 29	No. 15- Section 29	No. 70- Section 29	No. 69- Section 29	No. 14- Section 29	No. 49- Section 20	No. 65- Section 29	No. 43- Section 29	No. 59- Section 29
Trees														
Eastern Red Cedar (<i>Juniperus virginiana</i>)		x		x	x	x		x		x	x		x	
Boxelder (<i>Acer negundo</i>)														
Green Ash (<i>Fraxinus pennsylvanica</i>)														
Red Mulberry (<i>Morus rubra</i>)														
Osage Orange (<i>Maclura pomifera</i>)														
Persimmon (<i>Diospyros virginiana</i>)														
Cottonwood (<i>Populus deltoides</i>)	x	x					x	x						
American Elm (<i>Ulmus americana</i>)	x	x			x									
Hackberry (<i>Celtis occidentalis</i>)		x									x			
River Birch (<i>Betula nigra</i>)				x				x	x	x				
Black Willow (<i>Salix nigra</i>)	x		x		x	x								
Black Cherry (<i>Prunus serotina</i>)														
Northern Red Oak (<i>Quercus rubra</i>)								x		x				
Catalpa (<i>Catalpa speciosa</i>)		x			x	x	x				x			

**Identified Plant Species for Proposed Mine Shaft Sites
Table B-1**

List of Trees Continued

Trees	No. 10- Section 28	No. 17- Section 28	No. 14- Section 28	No. 14- Section 21	No. 15- Section 16	No. 11- Section 16	No. 12- Section 16	No. 9- Section 16	No. 7- Section 17	No. 12- Section 36	No. 13- Section 36	No. 8- Section 36	No. 22- Section 23	No. 23- Section 23
Eastern Red Cedar (<i>Juniperus virginiana</i>)	x					x	x				x	x	x	x
Boxelder (<i>Acer negundo</i>)			x	x										
Green Ash (<i>Fraxinus pennsylvanica</i>)			x	x							x			
Red Mulberry (<i>Morus rubra</i>)														
Osage Orange (<i>Maclura pomifera</i>)				x										
Persimmon (<i>Diospyros virginiana</i>)														
Cottonwood (<i>Populus deltoides</i>)		x			x		x				x	x	x	x
American Elm (<i>Ulmus americana</i>)	x								x		x			
Hackberry (<i>Celtis occidentalis</i>)			x								x			
River Birch (<i>Betula nigra</i>)				x										
Black Willow (<i>Salix nigra</i>)														
Black Cherry (<i>Prunus serotina</i>)			x											
Northern Red Oak (<i>Quercus rubra</i>)											x			
Catalpa (<i>Catalpa speciosa</i>)		x							x	x		x		

**Identified Herbaceous/Forbs Species for Proposed Mine Shaft Sites
Table B-3**

List of Herbaceous/Forbs

Shafts	No. 4- Section 32	No. 27- Section 30	No. 3- Section 29	No. 72- Section 29	No. 11- Section 29	No. 18- Section 29	No. 15- Section 29	No. 70- Section 29	No. 69- Section 29	No. 14- Section 29	No. 49- Section 20	No. 65- Section 29	No. 43- Section 29	No. 59- Section 29
Herbaceous/Forbs														
Big Bluestem (<i>Andropogon gerardii vitman</i>)														
Broomsedge (<i>Andropogon virginicus</i>)	x			x		x								
Bermudagrass (<i>Cynodon dactylon</i>)	x													
Tall Fescue (<i>Festuca arundinacea</i>)	x													
Indiangrass (<i>Sorghastrum nutans</i>)														
Johnsongrass (<i>Sorghum halepense</i>)									x					
Broad-Leaved Cat-tail (<i>Typha latifolia</i>)														
Narrow-Leaved Cattail (<i>Typha angustifolia</i>)														
Illinois Bundleflower (<i>Desmanthus illinoensis</i>)														
Sericea Lespedeza (<i>Lespedeza cuneata</i>)														
Yarrow (<i>Achillea millefolium</i>)														
Western Ragweed (<i>Ambrosia psilostachya</i>)	x													
Horseweed (<i>Conyza canadensis</i>)														
Switchgrass (<i>Panicum virgatum</i>)			x	x	x	x	x	x	x	x		x	x	x

**Identified Herbaceous/Forbs Species for Proposed Mine Shaft Sites
Table B-3**

List of Herbaceous/Forbs Continued

Shafts	No. 16- Section 14	No. 15- Section 14	No. 20- Section 33	No. 25- Section 29	No. 37- Section 20	No. 2- Section 13	No. 1- Section 13	No. 9- Section 35	No. 5- Section 35	No. 4- Section 35	No.3- Section 28	No. 5- Section 28	No.6- Section 28	No.11- Section 28
Herbaceous/Forbs														
Big Bluestem (<i>Andropogon gerardii vitman</i>)						x	x							
Broomsedge (<i>Andropogon virginicus</i>)	x	x				x	x				x	x		
Bermudagrass (<i>Cynodon dactylon</i>)											x	x		
Tall Fescue (<i>Festuca arundinacea</i>)	x	x	x					x						
Indiangrass (<i>Sorghastrum nutans</i>)	x	x									x	x		
Johnsongrass (<i>Sorghum halepense</i>)						x	x							
Broad-Leaved Cat-tail (<i>Typha latifolia</i>)												x		
Narrow-Leaved Cattail (<i>Typha angustifolia</i>)														x
Illinois Bundleflower (<i>Desmanthus illinoensis</i>)						x	x							
Sericea Lespedeza (<i>Lespedeza cuneata</i>)						x	x							
Yarrow (<i>Achillea millefolium</i>)						x	x							
Western Ragweed (<i>Ambrosia psilostachya</i>)											x			
Horseweed (<i>Conyza canadensis</i>)			x											
Switchgrass (<i>Panicum virgatum</i>)	x	x			x		x				x			

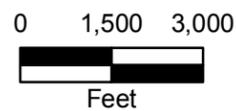
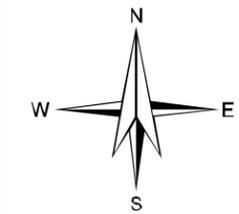
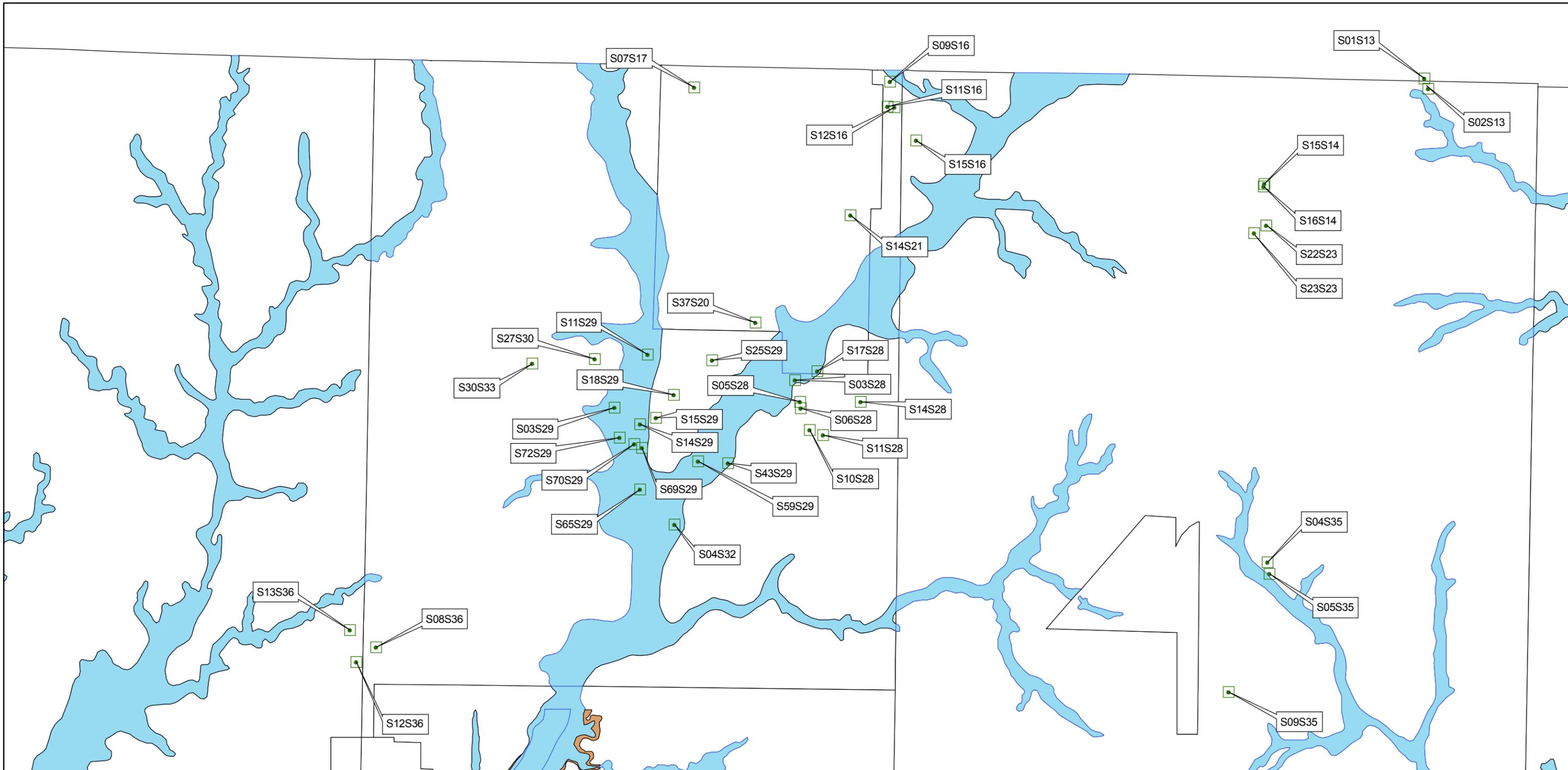
**Identified Herbaceous/Forbs Species for Proposed Mine Shaft Sites
Table B-3**

List of Herbaceous/Forbs Continued

Shafts	No. 10- Section 28	No. 17- Section 28	No. 14- Section 28	No. 14- Section 21	No. 15- Section 16	No. 11- Section 16	No. 12- Section 16	No. 9- Section 16	No. 7- Section 17	No. 12- Section 36	No. 13- Section 36	No. 8- Section 36	No. 22- Section 23	No. 23- Section 23
Herbaceous/Forbs														
Big Bluestem (<i>Andropogon gerardii vitman</i>)														
Broomsedge (<i>Andropogon virginicus</i>)	x	x			x					x			x	x
Bermudagrass (<i>Cynodon dactylon</i>)										x		x		
Tall Fescue (<i>Festuca arundinacea</i>)										x		x		
Indiangrass (<i>Sorghastrum nutans</i>)										x				
Johnsongrass (<i>Sorghum halepense</i>)														
Broad-Leaved Cat-tail (<i>Typha latifolia</i>)														
Narrow-Leaved Cattail (<i>Typha angustifolia</i>)	x													
Illinois Bundleflower (<i>Desmanthus illinoensis</i>)														
Sericea Lespedeza (<i>Lespedeza cuneata</i>)														
Yarrow (<i>Achillea millefolium</i>)														
Western Ragweed (<i>Ambrosia psilostachya</i>)								x						
Horseweed (<i>Conyza canadensis</i>)														
Switchgrass (<i>Panicum virgatum</i>)					x		x	x	x				x	x

APPENDIX C

Flood Plain Map



LEGEND

- Zone A: Special Flood Hazard Areas Inundated by 100-yr Flood
- Zone X: Areas Determined to be Outside 500-yr Flood Plain
- Zone X500: Areas of 500-yr Flood



FIGURE C-1
 Tar Creek Superfund Site
 Mine Shaft Locations
 and Floodplain Map
 Ottawa County, Oklahoma

DATE JAN 2005	WO# 03886.525.008	SCALE 1 IN = 3000 FT
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Source:
 Flood Insurance Rate Maps
 Federal Emergency Management Agency