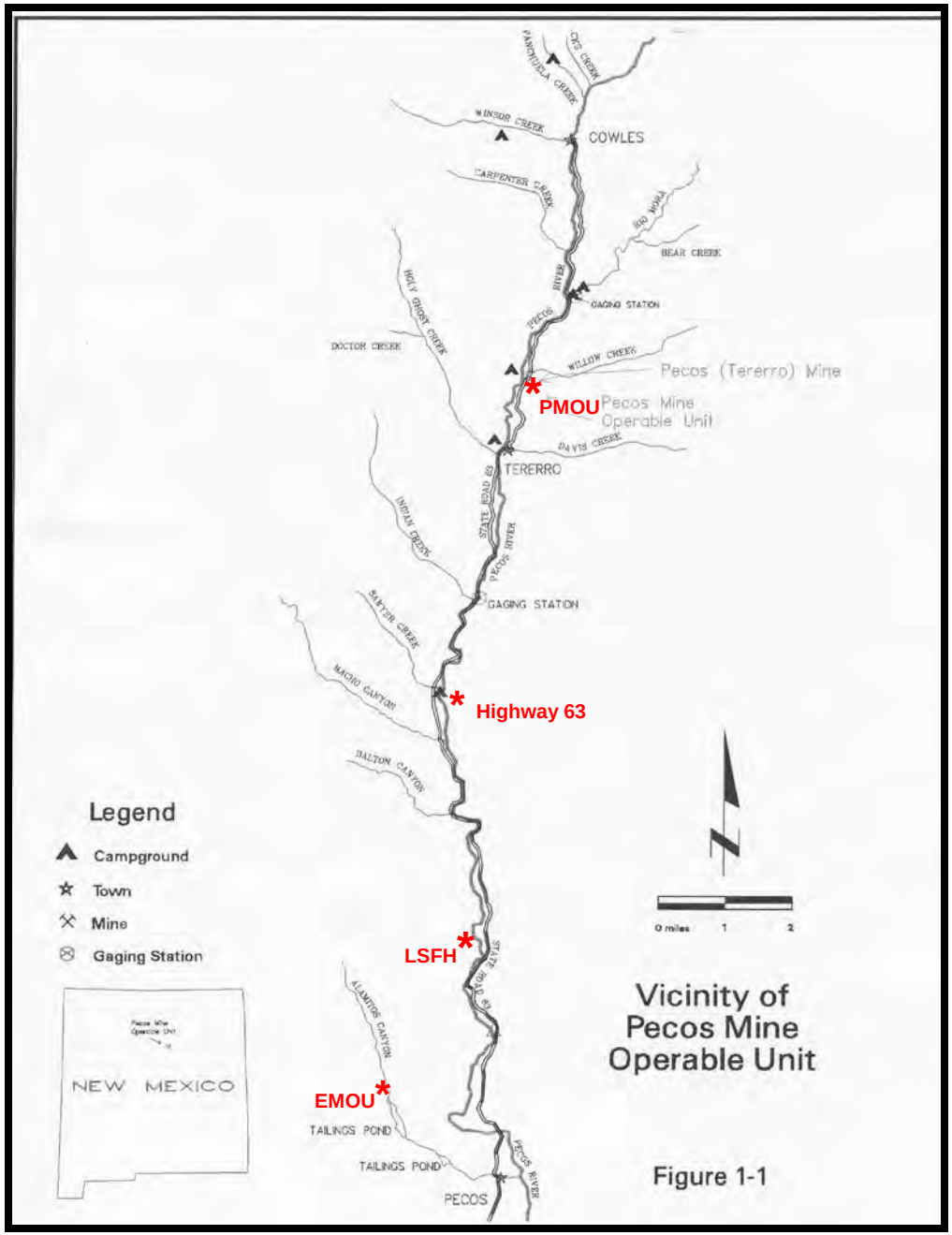
Tererro Mine Project

New Mexico Environment Department

Vicinity Map



Mining History

1882 First discovery of mineralization

Operated from 1903-1907 and 1926-1939 from 1800’ bgs

Employed an average of 600 (largest payroll in NM)

Population of 3000 in Town of Tererro

Ore rich in Pb and Zn, small amounts of Au, Ag and Cu

~2.3 tons of ore processed, ~$40M of minerals

- 11,137 lbs. of gold
- 352,664 lbs. of silver
- 19,297,000 lbs. of copper
- 138,412,000 lbs. lead
- 440,683,000 lbs. zinc

Ore trans via a 12 mile long aerial tramway (longest in NA)

Contamination History

1940-1979 Mine and mill waste used as construction and maintenance material.

1950 NM State Game Commission purchased all properties related to the mine and mill and transferred these assets to the NM State Game Commission

1982 LSFH was expanded. Following fish kill NMED conducted a preliminary water quality study in the area and found metals in seeps and surface water discharges around the Pecos Mine

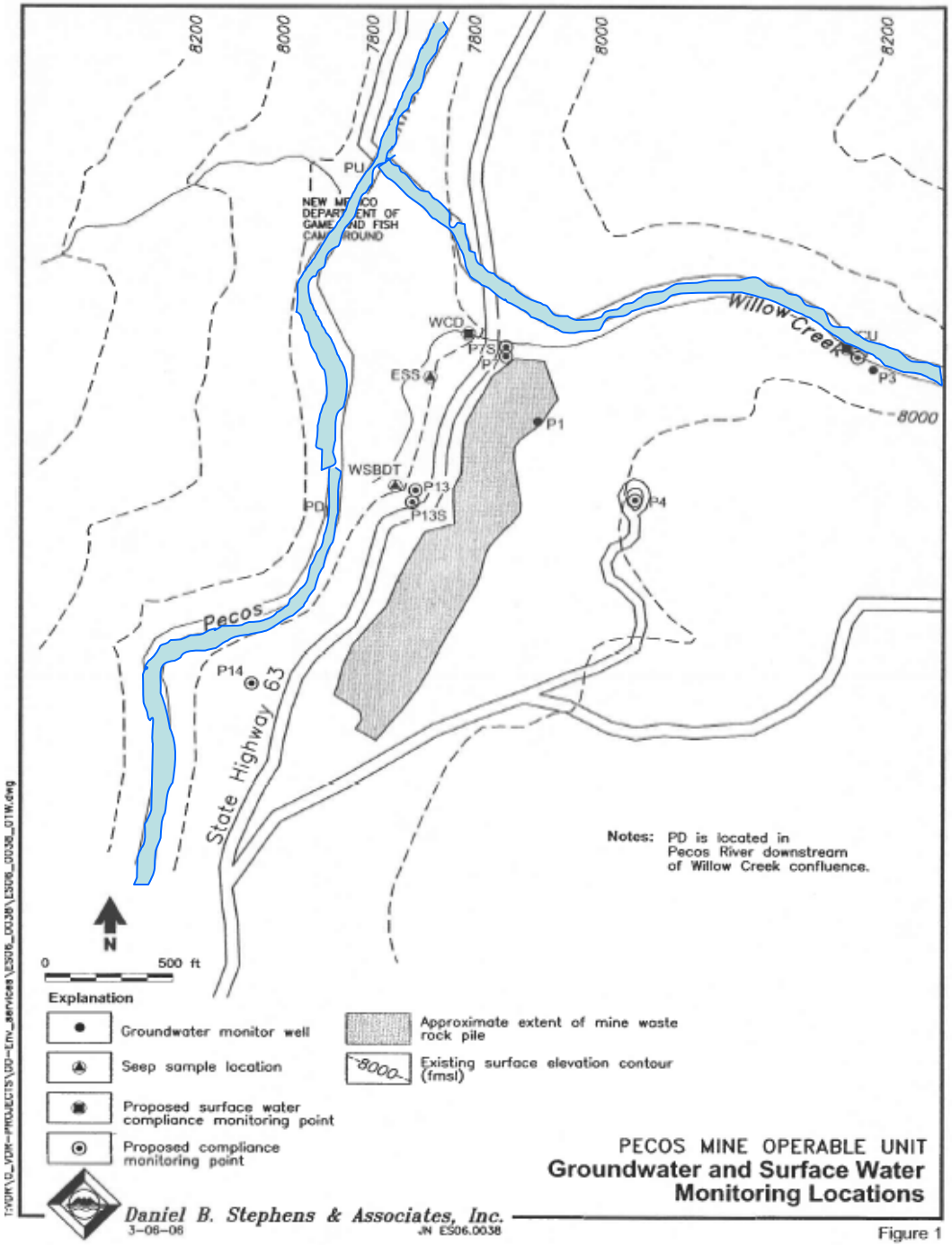
1991 Spring runoff resulted in fish kill (90,000)

1985 Comprehensive investigation of the area was conducted

1992 Administrative Order on Consent (AOC)

Amax Resource Conservation Company was required to follow CERCLA

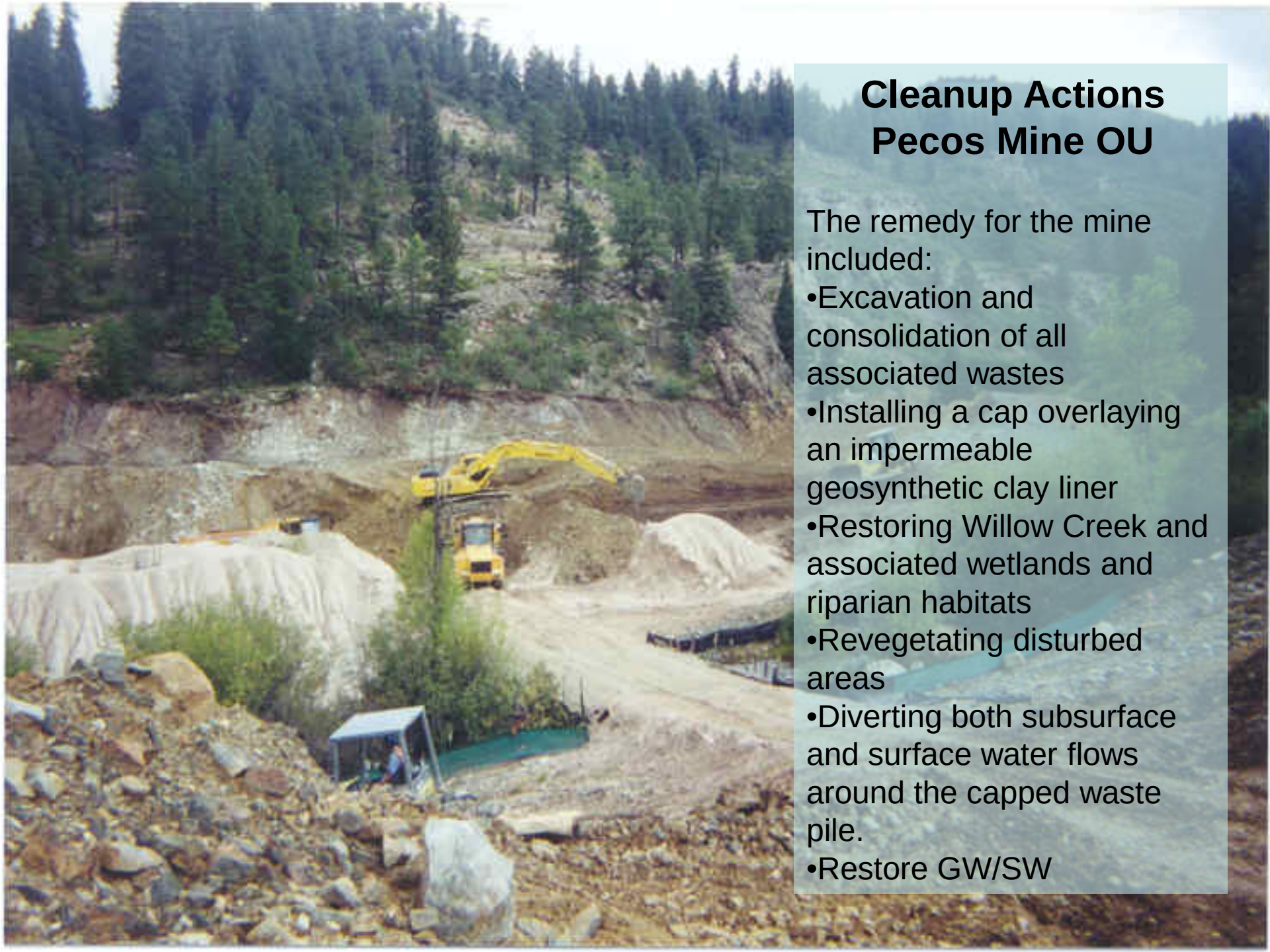
Pecos Mine OU



Site Description
Pecos Mine OU

This OU consists of:

- The mine
- 12.3 acres of waste rock (217,000 yds^3)
- Contaminated soils
- 5-10 acres of wetlands
- Willow Creek
- Pecos River
- Affected GW/SW



Cleanup Actions Pecos Mine OU

The remedy for the mine included:

- Excavation and consolidation of all associated wastes
- Installing a cap overlaying an impermeable geosynthetic clay liner
- Restoring Willow Creek and associated wetlands and riparian habitats
- Revegetating disturbed areas
- Diverting both subsurface and surface water flows around the capped waste pile.
- Restore GW/SW

Pecos Mine Reclamation

Tererro, New Mexico

Phase	Date	Description
1	1999-2000	Willow Creek Restoration
2	1999-2002	Materials Consolidation
3	2000-2001	Surface/Subsurface drainage
4	2001-2003	Mid-slope and perimeter channel
5	2002-2003	Capping and vegetation

Pecos Mine - 2003

Pecos Mine - 1933

Reclamation Overview


Willow Creek Restoration - 2003


Main Shaft - 2003


Underdrain - 2001


USD Channel - 2001


Willow Creek Campground Restoration - 2003


Consolidated, Capped and Revegetated Waste Rock Pile - 2003

Pecos River

Pre-Remediation Conditions - 1999

Initial environmental impact investigations indicated that Pecos Mine waste materials had impacted ground water, surface water, soil and sediment in down-gradient areas, primarily through waste rock piles and impacted soils areas situated throughout the site.

As a result of these impacts, reclamation operations were performed at the Pecos Mine from 1999 through 2003 encompassing several major components, including: waste materials consolidation and capping; construction of a shallow, subsurface flow Underdrain interception system; restoration of Willow Creek and its surrounding floodplain; closure of the mine's main shaft; restoration of the Willow Creek Campground; and site wide revegetation.

Willow Creek Restoration


Willow Creek Waste Rock Excavation - 1999


Willow Creek Pre-Reclamation Conditions - 1999

Willow Creek, a local tributary to the Pecos River, borders the Pecos Mine's northern boundary. Waste rock, generated from mining operations, was deposited into the creek and surrounding floodplain, completely diverting the creek from it's original pre-mining pathway until it was flowing entirely on waste rock deposits along the floodplain's southern edge.

Approximately 900 linear feet of Willow Creek was completely reconstructed after removal of nearly 65,000 cubic yards of waste rock from the Willow Creek floodplain. Reconstruction design incorporated non-impacted, upstream reach morphology considerations. (Continued on next page)


Restored Willow Creek - 2002


Restored Willow Creek - 2002


Willow Creek Streambed Construction - 2000


Willow Creek Revegetation - 2001

Willow Creek reconstruction work included: placement of a two-foot thick layer of heterogeneous cobbles, small boulders and gravel across the channel bottom and along the toe of each bank; placement of rock and soil backfill to recreate the bank slope adjacent to the stream channel; installation of continuous panels of woven and non-woven coir fabric banks backfilled with imported general fill; revegetation of the creek banks and riparian corridor with native, subirrigated grass, forbs and import and transplant woody species; and construction of a drop structure/fish barrier, step pools and grade control structures to ensure grade control within the steeply descending floodplain, channel stability and enhance aquatic habitat establishment.

Willow Creek restoration work was initiated in 1999 and completed in 2000.


Fish Barrier Drop Structure - 2001


Restored Willow Creek - 2003


Restored Willow Creek - 2003

Main Shaft Cap Cover Construction

Main Shaft - 1933

Pre-Construction Main Shaft - 2002

Mid-Construction Main Shaft - 2002

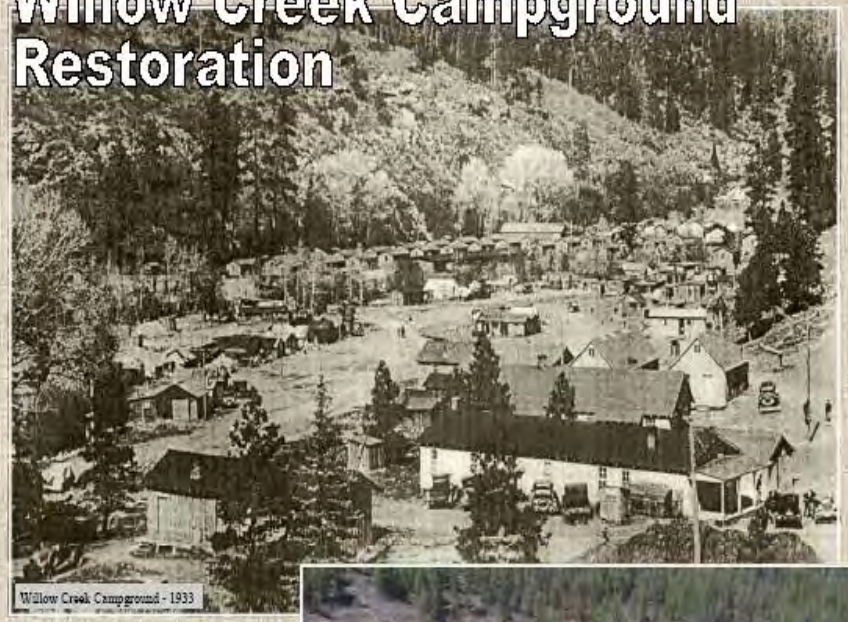
The Pecos Mine main shaft is located on the north end and at the top of the mine's waste rock pile and is 20.5-feet long, 6.8-feet wide and estimated to be over 700-feet deep. Reclamation construction operations in 2001 exposed workings from the side of the shaft, prompting further investigation as to it's condition, resulting in the need for an enhanced cover as an additional public safeguard and added protection against potential shaft cave-in.

The cover was constructed including construction of a reinforced concrete collar, two reinforced concrete anchor walls connected to the cover by a steel rebar network; a reinforced concrete cover placed over the concrete collar; and rock fall fabric netting extended from each anchor wall. In addition, a rock-filled gabion retaining wall was designed and constructed to provide the necessary stability for the anchor walls and the cover system, blending to the finished waste rock pile cap.

Main shaft cover construction work was initiated and completed in 2002.

Post-Construction Main Shaft - 2002

Willow Creek Campground Restoration



Willow Creek Campground - 1933

The Willow Creek Campground was used as a office and materials and equipment staging location during all Pecos Mine reclamation work from 1999 through 2003. Upon completion of reclamation activities, the Willow Creek Campground was revegetated, restored and enhanced as a New Mexico Department of Game and Fish day-use area with the construction of new features including pipe rail fencing and gates, improved parking and roadway areas and installation of a hand-pump well.

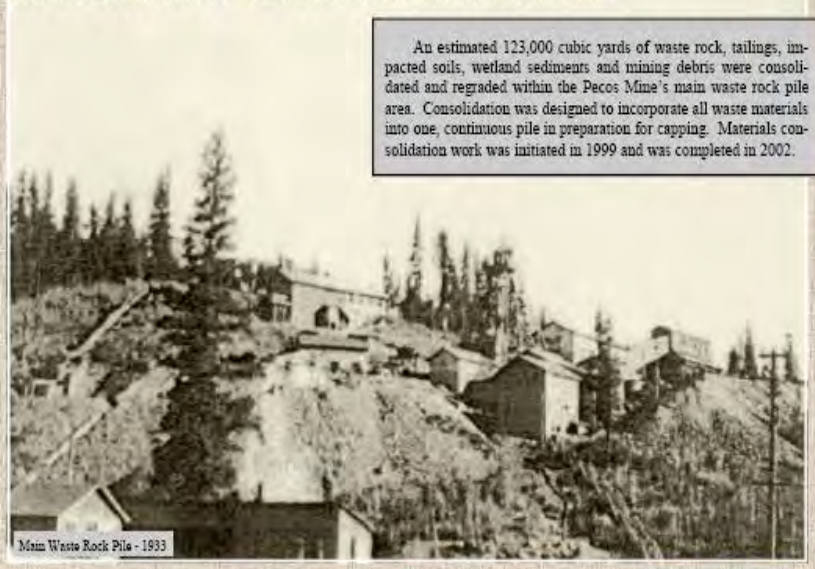
Post-Construction Willow Creek Campground - 2004

Post-Construction Willow Creek Campground - 2003

Post-Construction Willow Creek Campground - 2003

Materials Consolidation

An estimated 123,000 cubic yards of waste rock, tailings, impacted soils, wetland sediments and mining debris were consolidated and regraded within the Pecos Mine's main waste rock pile area. Consolidation was designed to incorporate all waste materials into one, continuous pile in preparation for capping. Materials consolidation work was initiated in 1999 and was completed in 2002.


Main Waste Rock Pile - 1933


Pre-Reclamation Conditions - 1999


Pre-Reclamation Conditions - 1999


Waste Rock Excavation/Regrading - 2002


Waste Rock Excavation/Regrading - 2002


Waste Rock Excavation/Regrading - 2002


Cap Subgrade Placement - 2002


Mid-Slope Channel Construction - 2002


Cap Subgrade Placement - 2002


Main Waste Rock Pile - 1933

Underdrain/USD Channel Construction

The Underdrain was constructed as a 1,850 linear foot deep trench collection system, to a maximum depth of 30 feet, along the entire uphill/upgradient side of the Pecos Mine's main waste rock pile. The Underdrain was designed to divert shallow, colluvial ground water flow from the waste rock pile for eventual discharge to Willow Creek. In addition, connection spurs were constructed within two natural drainages emptying into the Underdrain, effectively tying the Underdrain system into the subsurface bedrock. (Continued on next page)

Underdrain Construction - 2001

Bench Excavation - 2000

Underdrain Construction - 2001

The 2,105 linear foot Upgradient Surface Water Drainage (USD) channel was constructed to overlay the Underdrain and designed to divert run-on from the waste rock pile for eventual discharge to Willow Creek. In addition, confluences were constructed to overlay the Underdrain connection spurs within two natural drainages upgradient of the waste rock pile.

Underdrain and USD Channel construction work was initiated in 2000 and was completed in 2001.

USD Channel Construction - 2001

USD Channel - 2001

Capping


Anchor Trench Construction - 2003


Drainage Net Placement - 2003


Subgrade Compaction - 2002


Topsoil Placement - 2003


Perimeter Channel Construction - 2003

Central Perimeter Channel - 2003


GCL Placement - 2003

A 13 acre cap system was constructed across the entire consolidated Pecos Mine main waste rock pile. The cap system was designed as a semi-impermeable hydrologic barrier, including a 6-inch prepared clay bedding layer, a geosynthetic clay liner and a 24-inch loosely compacted topsoil layer. Approximately 53,000 cubic yards of soil materials were imported from near and off site borrow areas for construction of the cap subgrade and topsoil layers.

In addition, two grass-lined mid-slope and three rock filled gabion mattress lined perimeter drainage channels were constructed as part of the cap system, diverting surface water run-on from the cap for eventual discharge to the Pecos River.

Cap construction work was initiated in 2002 and was completed in 2003.

Revegetation


Disking - 2003

Main Cap


Hydroseeding - 2003


Erosion Control - 2003


Vegetation Progress - 2003


Drill Seeding - 2003

Borrow Areas


Mulch Application - 2003


Willows Planting - 2001

Willow Creek

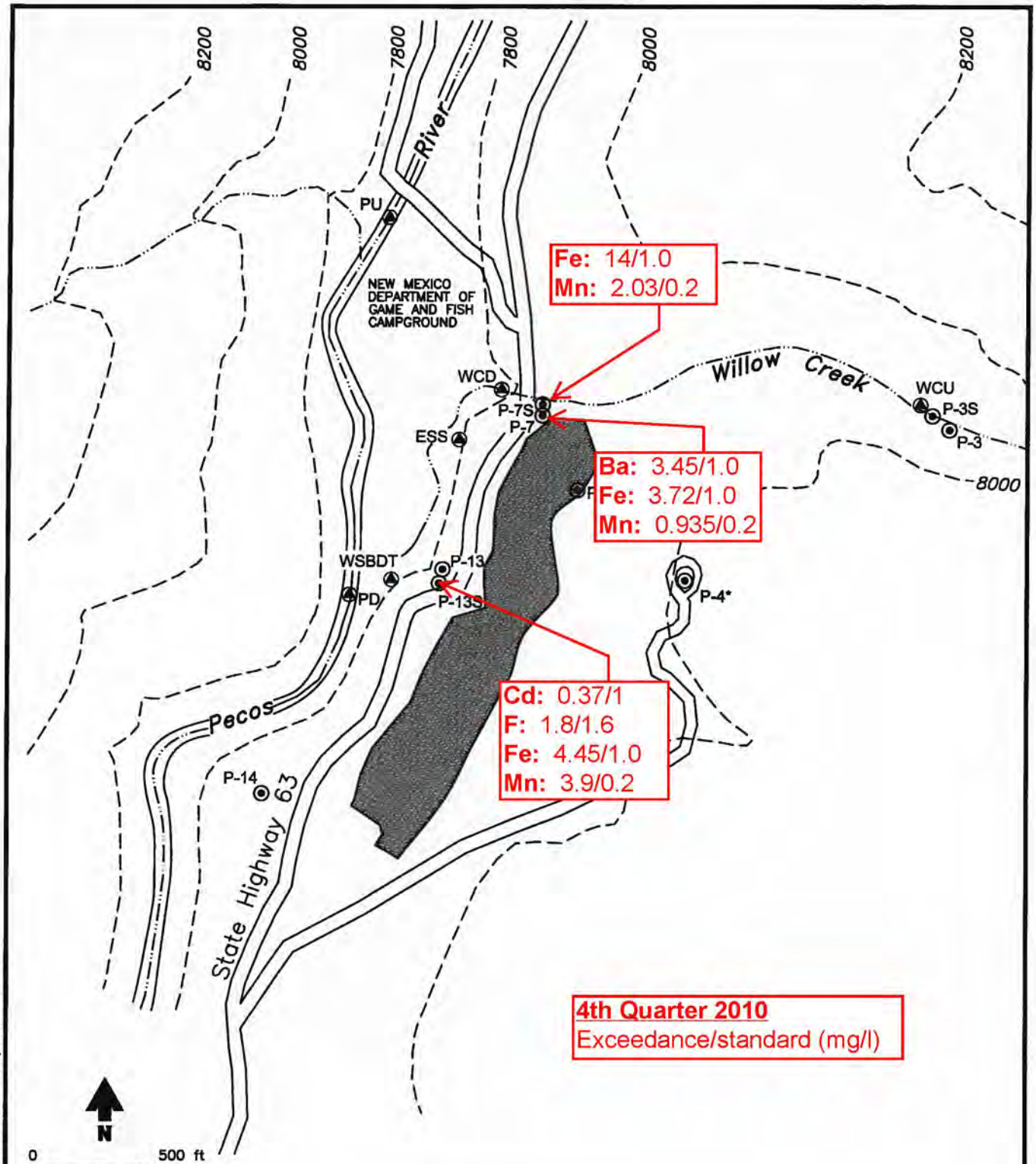
Drill Seeding - 2001


Vegetation Progress - 2002

Pecos Mine revegetation work implemented three types of seed and woody species mixes, including native upland, sub-irrigated and wetland species. Plantings included 28 different species of grasses, forbs and sedges and 17 different species of containerized woody plants.

Various revegetation methods were utilized due to the Pecos Mine's confined areas and steep slopes. Drill seeding methods were used on relatively flat areas. Hydroseeding and hydromulching methods were utilized in areas steep slopes that could not be drill seeded. Broadcast seeding methods were used for small areas inaccessible to drill seeding equipment. All woody species were planted by hand.

Erosion control measures were installed to minimize soil loss on the cap during vegetation establishment, especially in those areas with steep slopes. The addition of Regreen (a sterile wheat hybrid) to the upland and sub-irrigated seed mixes were employed to provide rapid soil stabilization and erosion control. Erosion control blankets were installed across the entire waste rock pile cap and other surrounding areas and Turf reinforcement matting was installed along the bottom of the mid-slope drainage channels immediately following application of seed, fertilizer and mulch.



Note: * Well used for water levels only

PECOS MINE OPERABLE UNIT

Groundwater and Surface Water Monitoring Locations

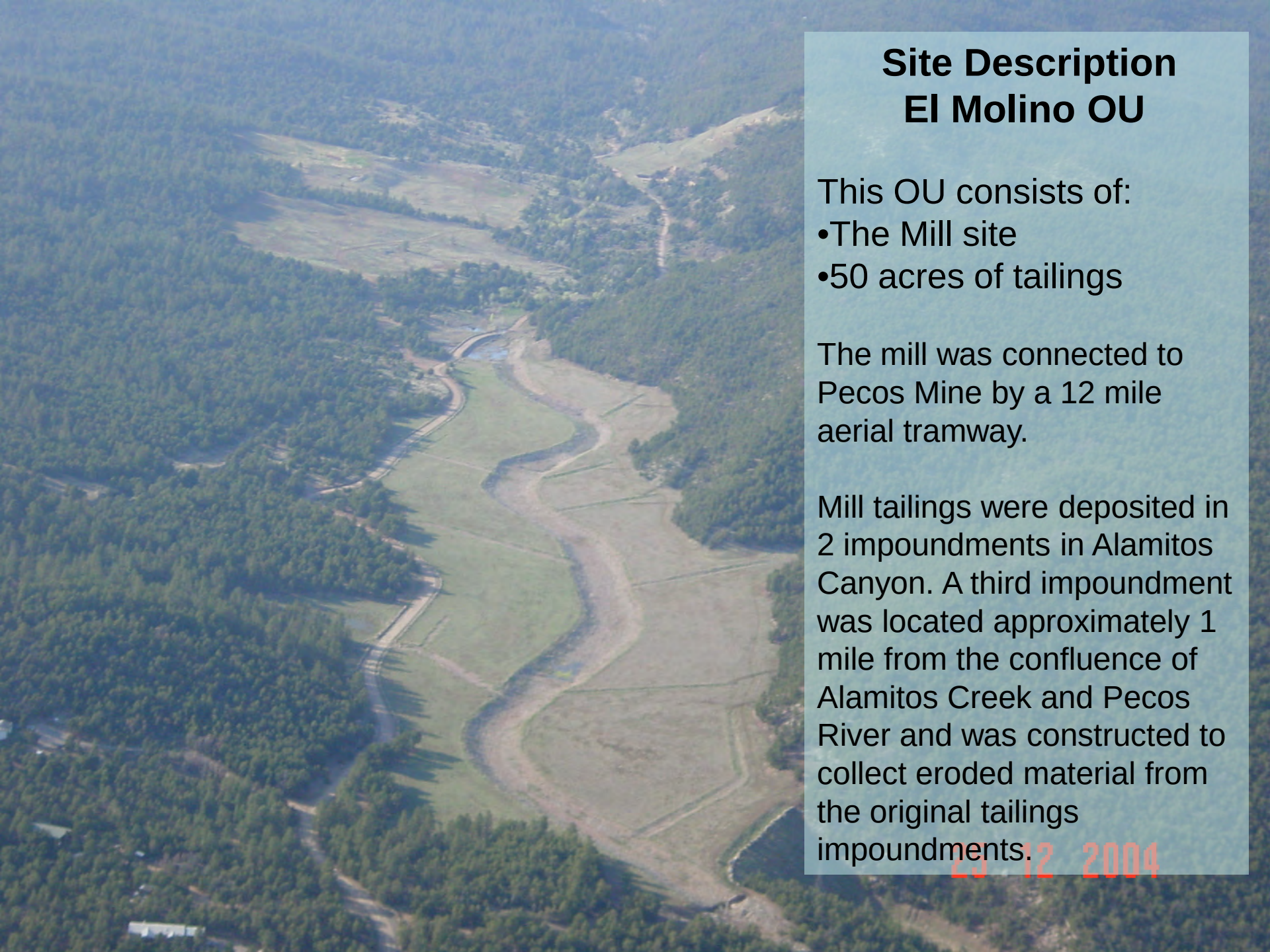
Daniel B. Stephens & Associates, Inc.

9-10-08

JN ES06.0038

Figure 1

S:\Projects\ES06.0038_PMOU\VR\ES06_0038_04W_update2008.DWG



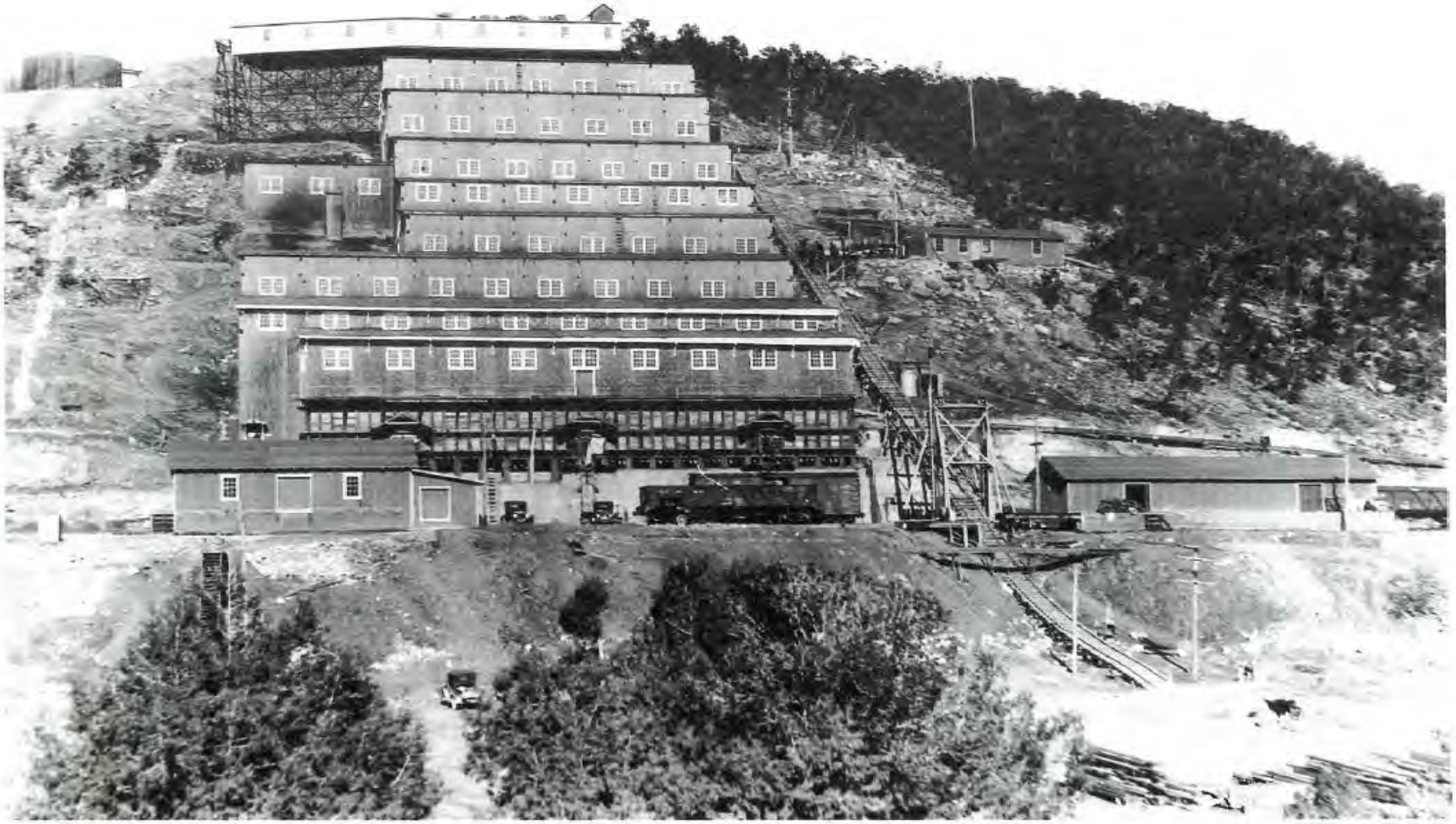
Site Description
El Molino OU

This OU consists of:
- The Mill site
- 50 acres of tailings

The mill was connected to Pecos Mine by a 12 mile aerial tramway.

Mill tailings were deposited in 2 impoundments in Alamitos Canyon. A third impoundment was located approximately 1 mile from the confluence of Alamitos Creek and Pecos River and was constructed to collect eroded material from the original tailings impoundments.

EL MOLINO MILL ALAMITOS CANYON EARLY 1900's



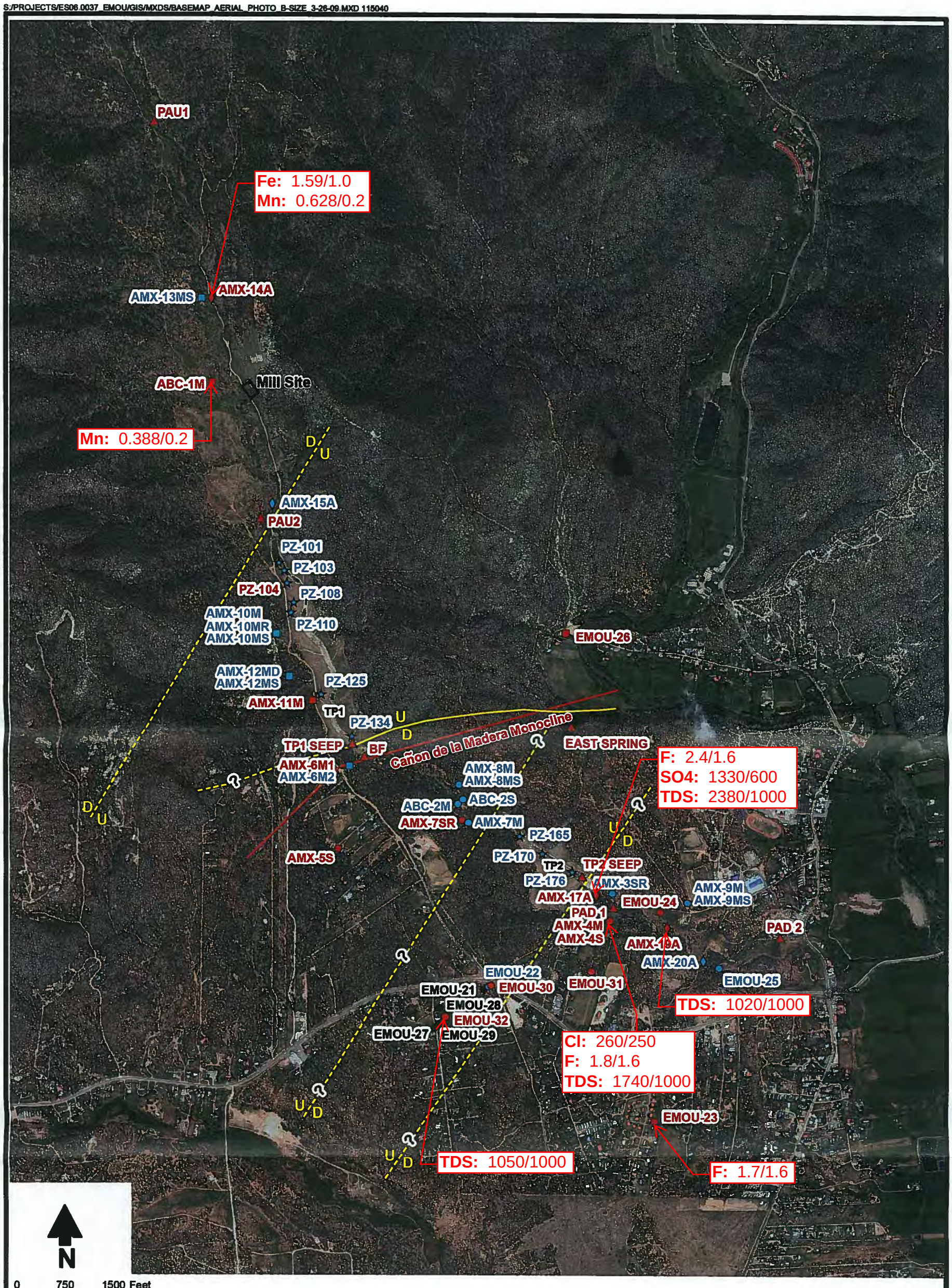

28 12 2004


8-18'93


04.01.2005 13:20


25 12 2004

S:/PROJECTS/ES06.0037_EMOU/GIS/MXDS/BASEMAP_AERIAL_PHOTO_B-SIZE_3-26-09.MXD 115040



4th Quarter 2010
Exceedance/standard (mg/l)

Explanation

Monitoring station type (indicated by symbol)
- ◊ Alluvial groundwater
- ☐ Madera groundwater
- ○ Sangre de Cristo groundwater
- △ Surface water or seep
- ☆ Tailing piezometer

Monitoring use (indicated by color)
- Compliance
- Water level only
- Domestic (not monitored)

Other features
- Fault
- Monocline

Figure 1

Daniel B. Stephens & Associates, Inc.
04/05/2011
JN ES06.0037

EL MOLINO OPERABLE UNIT
EMOU Site Map and Monitoring Stations