ENVIRONMENTAL NARRATIVE

Peru Mill Industrial Park Project

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Prepared for

Department of Commerce
Economic Development Agency

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1.0 INTRODUCTION

The City of Deming proposes to develop the Peru Hill Mill Industrial Park, which is located approximately 3.5 miles northwest of Deming in Luna County, southwestern New Mexico (Figure 1.1). The City of Deming is applying for a United States (U.S.) Economic Development Administration (EDA) grant to finance improvements required by the proposed project. This Environmental Narrative was prepared to provide EDA with information required to gain an understanding of the present environmental condition of the proposed project site and the proposed project's potential impact upon the environment.

1.1 Beneficiaries

Existing businesses located near the proposed industrial park project and that will benefit from this proposed project include:

- **The Southwest Railroad, the Union Pacific Railroad (UPRR) and the Burlington Northern Santa Fe Railroad (BNSF).** The Southwest Railroad operates an existing rail line through the proposed industrial park. The Southwest Railroad interchanges with the UPRR in Deming, approximately 1 mile to the south, and with the UPRR in Rincon, approximately 50 miles to the northeast. Although the railroads will compete to earn the business of the park's future tenants, it can be expected that all will benefit from construction and operations of the park's tenants.

- **Businesses and industries that locate to the industrial park.** New businesses and industries are expected to locate operations in the proposed industrial park, and existing businesses or industries potentially could expand their operations and services by locating to new and potentially more suitable space for their operations. Tenants of the industrial park also will benefit from the competition between BNSF and UPRR, which will lead to favorable and competitive haul rates. Industry types that have been identified as being likely candidates for the proposed park include, but are not limited to: Cross-dock/transload facilities, local or specialized warehousing, logistic centers, food processing, solar energy generation, renewable energy projects, and manufacturing. (City of Deming 2010).

- **The City of Deming.** The City of Deming is expected to benefit from the proposed industrial park. New businesses and industries located at the park will contribute to the city's tax rolls and stimulate economic growth.

- **Residents of the City of Deming and surrounding areas.** Residents will benefit from the proposed project. Construction of the proposed industrial park will generate local jobs, and as new businesses and industries move into the park, new employment opportunities will become available to local residents. Deming residents should benefit from the increased economic growth the industrial park will generate, not only in the form of jobs but also from increases to the city's tax rolls, which should allow for the City of Deming to continue, improve, and/or increase services provided to its residents.

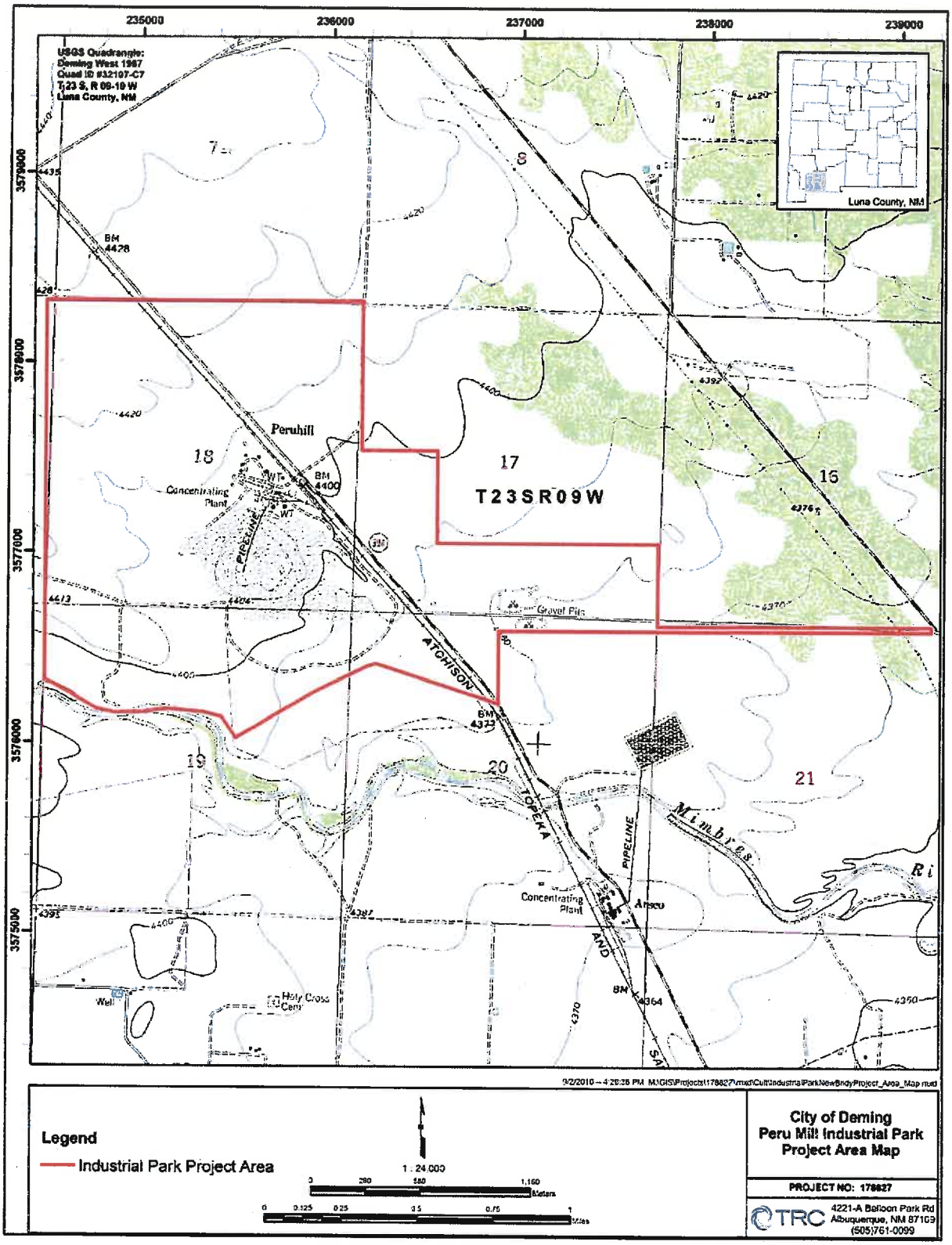

Figure 1.1 Project area map

2.0 AREA DESCRIPTION

The project area is located approximately 3.5 miles northwest of the City of Deming in Luna County, New Mexico. The project area is accessible by major transportation routes, including railroads and U.S. Interstate I-40. The proposed City of Deming Industrial Park is part of the Peru Hill Mill Property, a participant in the U.S. Environmental Protection Agency's (EPA) Brownfields Program. The Peru Hill Mill Property previously was used as a zinc-processing mill. Figure 1.1 depicts the project area and boundaries on a U.S. Geological Survey (USGS) 7.5 minute quadrangle map, and Figure 2.1 depicts the project area and boundaries on a Federal Emergency Management Agency (FEMA) floodplain map. Site photographs can be found in the Biological Assessment Report, provided as Appendix C to this Environmental Narrative.

The corresponding U.S. Geological Survey (USGS) 7.5 minute quadrangle map for the project area is West Deming, New Mexico (1964). The project area is an approximately 1,072-acre parcel located along the right-of-way of Arrowhead Road, between Sections 16 and 21 of Township 23 South, Range 9 West and in Township 23 South, Range 9 West, Sections 17-20 (Figure 1.1). The project area is bounded to the north and west by section fence lines that separate the property from New Mexico State Trust Land. To the east, the project area is bounded by a fence, a rail line operated by Southwest Railroad, and State Road 394 (Peru Mills Road). The southern boundary of the project area is defined by the Mimbres River near the southwestern corner, a power line, and natural gas pipeline.

Two tailings piles located west of the existing facilities are excluded from the project study area (Figure 1.1). Existing facilities in the project area include a water pumping facility owned by the City of Deming located along the central eastern boundary and north of the larger of two tailings piles (Figure 1.1). A corrugated metal barn constructed when the property was used for zinc processing currently is used as a heavy equipment shed. Other abandoned buildings from the zinc processing operation include a concrete shed adjacent to the heavy equipment shed, and a water storage tank adjacent to the water pump facility.

2.1 Topography

Elevation in the project area ranges from approximately 4,380 feet along the southern boundary to approximately 4,420 feet to the north.

2.2 Economic History and Historic Land Use

The property has a history of heavy industry and was previously part of the Peru Hill Mill and zinc mining lands. The Peru Mining Company, a subsidiary of Illinois Zinc Company, constructed the mill in 1928 and operated it until 1967. The Peru Hill Mill was a selective flotation mill used primarily to process zinc sulfide ore. In 1979, the mill was purchased by Barite of America (BOA) and it operated intermittently until 1985, when BOA filed for bankruptcy. The City of Deming acquired the site in 2002. Site characterizations revealed site soils (surficial) were contaminated by lead, zinc, and arsenic (Intera 2009). In 2002, the site enrolled in the New Mexico Voluntary Remediation and Brownfields Program, as it required large-scale environmental remediation efforts to clean up a 265-acre contamination area around the former main mill area. Remediation efforts included groundwater investigation, soils and asbestos investigations, development of a site closure/remediation plan, and developing a remedial cap system. Remediation restricts development within a 54.1-acre environmental easement that includes the tailings piles (City of Deming 2010).

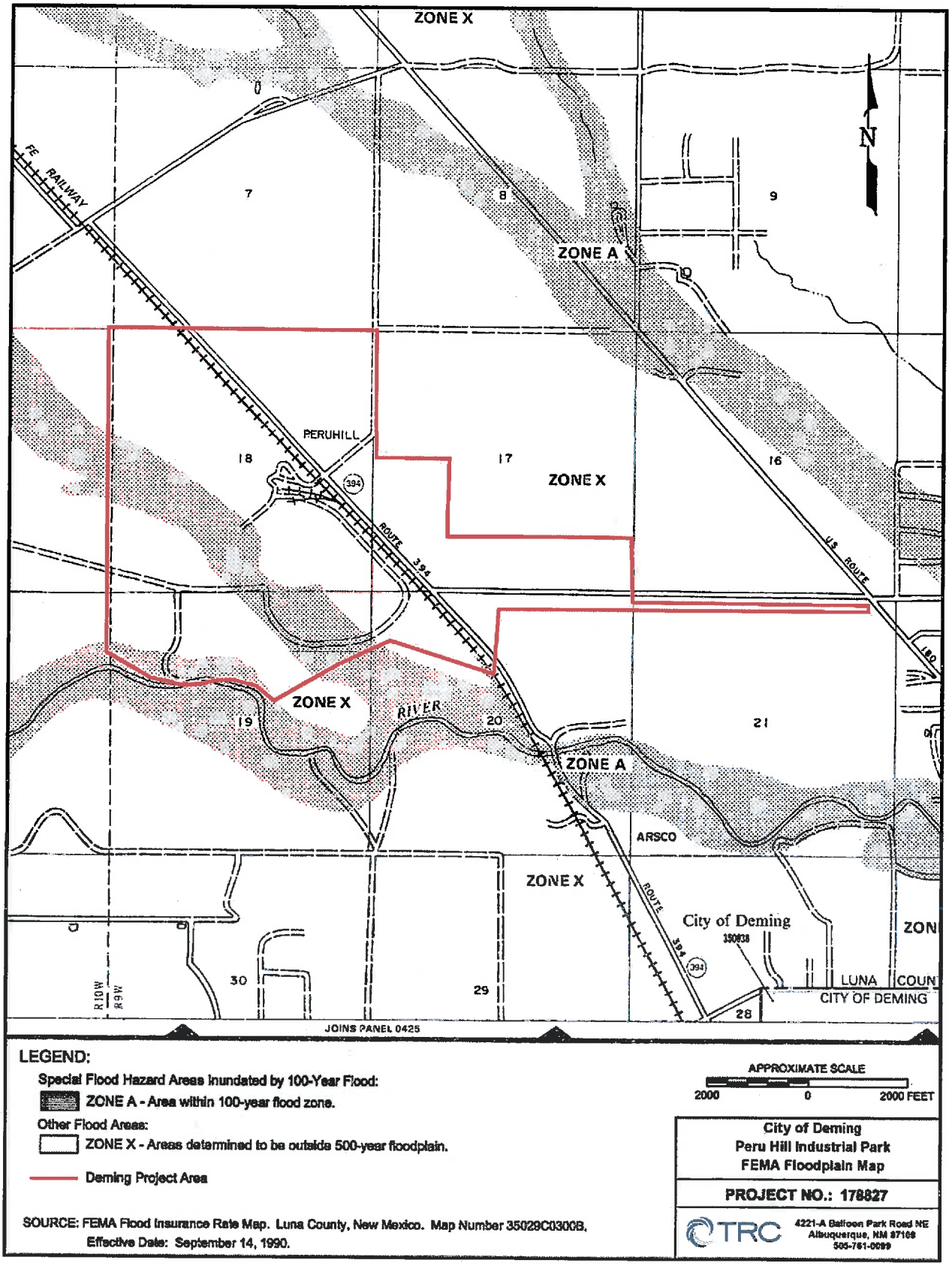

Figure 2.1 FEMA floodplain map

2.3 Unique Geologic Features

The project area is located within the Mexican Highland region of the Basin and Range physiographic province (USGS 2003), characterized by alluvial fans and internally drained basins generally below 4,500 feet that were formed from the sedimentation of collapsed tectonic faults during the Tertiary period (NRCS 2010, Griffith and Omernik 2009). The topography is generally flat, and the Mimbres River and Porter Draw run through the site.

3.0 ALTERNATIVES TO THE PROPOSED PROJECT

A No Action alternative was considered, under which the proposed industrial park would not be constructed, site and roadway improvements would not be made, Porter Draw would not be diverted, and the project site would not be returned to productive use. The property was purchased and annexed by the City of Deming with development of an industrial park as the only planned use of the site. The proposed site of the industrial park was chosen because of its past use as industrial property, current industrial zoning designation, and the proximity to two rail lines, which will provide convenient and competitive service to tenants of the proposed industrial park. No other site meets all of the above criteria, and thus no other site was considered for the location of the proposed industrial park.

4.0 SHORELINES, BEACHES AND DUNES, ESTUARY, WETLANDS, FLOODPLAINS

There are no shorelines, beaches, dunes, or estuaries on or near the project site. Portions of the project area adjacent to the Mimbres River and Porter Draw lie within the Federal Emergency Management Agency (FEMA) 100-year floodplain (Figure 1.2). In 2004, the U.S. Army Corps of Engineers (USACE) made a jurisdictional determination that the portions of the Mimbres River and Porter Draw that occur within the project site are not Waters of the U.S. A copy of this determination is provided as Appendix B.

5.0 VEGETATION AND WILDLIFE RESOURCES

No State or National Parks, or National Game Preserves are designated within the project area. The closest State Park is located approximately 18 miles southeast of the project area. There are no Wilderness Areas, as designated or proposed under the Wilderness Act, or wild or scenic rivers, as designated or proposed under the Wild and Scenic Rivers Act, located in or in the vicinity of the project area.

The subsections below summarize native vegetation and wildlife found in the project area and its immediate vicinity. A detailed Biological Assessment was completed for the project site in May and August 2010. The biological survey results are summarized in a report provided as Appendix C.

5.1 Vegetation

The project site is located within the Chihuahuan Basins and Playas ecoregion, which is dominated by desert shrubs and grasses adapted to low available moisture, high evapotranspiration rates, and extreme diurnal temperature fluctuations (Griffith and Omernik 2009). The project site is mostly desert grassland dominated by tobosa grass (*Hilaria mutica*), soapweed yucca (*Yucca palmilla*), broom snakeweed (*Gutierrezia sarothrae*) and Mormon tea (*Ephedra trifurca*); other shrubs include honey mesquite (*Prosopis glandulosa*), and creosote bush (*Larrea tridentata*).

The tobosa grassland contains patches, mainly in the southwestern portion of the project site, in which grass cover decreases and the dominant ground cover is broom snakeweed. Grassland vegetation in the vicinity of the tailings piles and existing facilities in the central-eastern portion of the project site is disturbed. The southeastern portion of the project site is dominated by soapweed yucca, Mormon tea,

fourwing saltbush (*Atriplex canescens*), sand sage (*Artemisia filifolia*), and mixed grasses. Riparian vegetation along the Mimbres River along the southern border of the project site to the west consists of open, deciduous woodland dominated by desert willow (*Chilopsis linearis*). The ditch near the City of Deming water pump facility is lined with tamarisk (*Tamarix* sp.) and giant reed (*Arundo* sp.).

The northern portion of the project site is dominated by tobosa grass, silverleaf nightshade, Russian thistle (*Salsola tragus*), soapweed yucca and creosote bush. Dense patches of tobosa grass were found in the central portion of the project site where the soil classification changed from the Berino and Mohave classification to the Bluepoint-Onite association. Grassland vegetation in the eastern portion of the project site appears to be disturbed and is dominated in most areas by broom snakeweed. In some eastern and central portions of the project site, vegetation was found in sparse patches and the sandy soils were exposed. Dominant vegetation in these areas consisted of broom dalea (*Psorothamnus scoparius*), broom snakeweed, honey mesquite and silverleaf nightshade. Vegetation north and south of Arrowhead Drive consists mainly of broom snakeweed, Russian thistle and mixed grasses.

5.2 Wildlife

The project site occurs in the Chihuahuan Desert, a biologically diverse and unique ecosystem that stretches across southeastern Arizona and southern New Mexico to the Edwards Plateau of western Texas, and extends south to central Mexico. Typical mammal species include ungulate grazers such as the pronghorn antelope (*Antilocapra americana*), and mule deer *(Odocoileus hemionus),* other herbivores such as desert cottontail *(Sylvilagus audubonii),* and black-tailed jack rabbit *(Lepus californicus),* and rodents including kangaroo rats (*Dipodomys*), deer mice (*Peromyscus*), woodrats, (*Neotoma floridana),* pocket gophers (*Geomyidae*), and ground squirrels (*Sciuridae*). Predators include coyote (*Canis latrans*), grey (*Urocyon cinereoargenteus*), desert foxes *(Vulpes velox),* bobcat *(Lynx rufus),* and mountain lion *(Puma concolor*), while typical omnivores include raccoon (*Procyon lotor),* badger *(Mustelidae*), skunk (*Mephitis mephitis),* and javelin (*Tayassuidae).* Common bird species include the greater roadrunner (*Geococcyx californianus),* scaled quail, (*Callipepla squamata*), cactus wren (*Campylorhynchus brunneicapillus*), black-throated sparrow (*Amphispiza bilineata*), Scott's oriole *(Icterus parisorum*), and raptors including the great horned owl *(Bubo virginianus)*, burrowing owl *(Athene cunicularia),* and red-tailed hawk *(Buteo jamaicensis).* Chihuahuan Desert herpetofauna are more strongly associated with the region, compared with common mammal and bird species which generally have more widespread distribution. Lizards species centered in the region include Texas horned lizard (*Phrynosoma cornutum*), Texas banded gecko (*Coleonyx brevis*) and reticulated gecko (*C. reticulatus*), greater earless lizard (*Cophosaurus texanus*), several species of spiny lizards (*Scelpoprus* spp.), and several species of whiptails (*Cnemidophorus* spp.). Representative snakes include the Trans-Pecos ratsnake (*Elaphe subocularis*), Texas blackheaded snake (*Tantilla atriceps*), and whipsnakes (*Masticophis* spp.) (WWF 2001).

Various migratory birds and raptors were observed in the project area during the biological field investigation, including mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), ash-throated flycatcher (*Myiarchus cinerascens),* western kingbird (*Tyrannus verticalis*), Cassin's sparrow (*Aimophila casinii*), western meadowlark (*Sturnella neglecta*), loggerhead shrike (*Lanius ludovicianus*), black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), hooded oriole (*Icterus cucullatus*), yellow grosbeak (*Pheucticus chrysopeplus*), Chihuahuan raven *(Corvus cryptoleucus),* turkey vulture *(Cathartes aura),* and Swainson's hawk *(Buteo swainsoni*). One nesting mourning dove was flushed from its nest in the central portion of the project site. One egg was observed in the nest. An active great-horned owl (*Bubo virginianus*) nest is located in the southeastern corner of the heavy equipment shed; two adult owls were observed with one downy feathered young. An abundance of owl pellets and whitewash in the shed indicate that owls have probably occupied the site for several seasons.

Western burrowing owls (*Athene cunicularia hypugaea*) were observed in the western and northern portions of the project site, and in kangaroo rat mound complex located northeast of Peru Mill Road and south of Arrowhead Drive (Appendix A: Project Area Photographs).

Black-tailed jackrabbits (*Lepus californicus*), Texas horned lizard (*Phrynosoma cornutum*), little striped whiptail (*Cnemidophorus inornatus*), New Mexico whiptail (*Cnemidophorus inornatus*) and juvenile toads of the genus *Spea* also were observed on the project site during the survey. Bat droppings were observed in openings to a small concrete building adjacent to the heavy equipment shed, indicating use of the building by bats for roosting. Observations of cattle droppings provide evidence of cattle grazing in the project area.

6.0 ENDANGERED SPECIES

A list of threatened, endangered, and sensitive species with potential to occur in Luna County is provided as Table 6.1. The list was compiled from information provided by the U.S. Fish and Wildlife Service (USFWS) (USFWS 2010), the Biota Information System of New Mexico (BISON-M 2010), the New Mexico Rare Plant Technical Council (NMRPTC 1999), and the New Mexico Administrative Code (19.21.2.8 NMAC and 19.33.6.8 NMAC). The list includes three species of invertebrates, two species of fish, three species of herpetofauna (reptiles and amphibians), 19 species of birds, two species of mammals, and two species of plants. Table 6.1 also summarizes the habitat requirements, range, and population distribution for each species, which were used to determine which wildlife species could potentially occur on the project site.

A detailed Biological Assessment was completed for the project site in May and August 2010. The biological survey results are summarized in a report provided as Appendix C. Potential impacts to species are summarized below. The USFWS was contacted regarding the proposed project, and responded with an email that it had no comments or concerns regarding potential project impacts to threatened or endangered species. Agency correspondence is provided as part of the Biological Assessment Report found in Appendix C. As part of the jurisdictional determination by USACE (Appendix B), USACE indicated that threatened and endangered species and migratory birds are not likely to occur along the portions of the Mimbres River and Porter Draw located within the project site, as these upland drainages are not Waters of the U.S.

6.1 Herpetofauna

The project area does not have suitable habitat for the Chiricahua leopard frog (*Rana chiricahuensis*); therefore, no mitigation is recommended. The Great Plains narrowmouth toad (*Gastrophryne olivacea*) is not likely to occur in the project area; therefore, no mitigation is recommended.

The reticulate Gila monster (*Heloderma suspectum suspectum*) potentially could occur in the project area. Because Gila monsters use underground burrows for thermal shelter, ground disturbing activities associated with the proposed project have the potential for negative impacts to the Gila monster. Several kangaroo mound complexes were located in the project area, and the project area has the potential to support other burrowing animals including foxes, badgers, coyotes, and jackrabbits.

Surveys for underground burrows are recommended prior to conducting ground-disturbing activities in order to avoid direct project impacts to reticulate Gila monsters. Burrows should be inspected for recent signs of activity, and the species occupying each active burrow should be determined, if possible.

6.2 Birds

All the 16 species of threatened, endangered and sensitive bird species with the potential to occur on the project site (Table 6.1) are also protected by the Migratory Bird Treaty Act (MBTA). Scheduling project construction outside the breeding season of most migratory birds (typically March to July for many southwestern terrestrial species) is generally the easiest way to avoid prohibited take of species protected under the MBTA. For project activities occurring during the breeding season, pre-construction clearance surveys for nesting migratory birds are recommended to avoid incidental take under the MBTA. Most non-nesting adult birds are highly mobile and thus able to avoid direct impacts from project activities.

An active great-horned owl (*Bubo virginianus*) nest is located in the heavy equipment shed north of the main tailings pile. If the building is removed because of project activities, demolition should occur in late summer or fall, after young have fledged and prior to the initiation of a new nest, to avoid direct impacts to the great-horned owl. Great-horned owls can start breeding as early as November in the southern portion of their range, continuing through early February, with the young typically fledging from late April through June (BISON-M 2010).

Table 6.1 List of Threatened, Endangered, and Sensitive Species in Luna County, New Mexico

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
INVERTEBRATES				
Cooke's Peak Woodlandsnail *(Ashmunella macromphala)*	SOC, t	Feeds on decaying organic matter under rocks and debris on the very steep northern slope of Cooke's Peak from about 6,900–7,000 feet in elevation.	Known only from Cooke's Peak, Luna County, about 15 miles north of the project area.	No – Project area is outside known distribution.
Florida Mountainsnail *(Oreohelix florida)*	SOC	This species was described from recent shells collected near the central peak on the west side of the Florida Mountains.	Endemic to the Florida Mountains of southwestern New Mexico, believed to be extinct.	No – Project area is outside known distribution.
Shortneck Snaggletooth *(Gastrocopta dalliana dalliana)*	SOC	Feeds on algae and detritus in an array of habitats ranging from Sonoran desert shrublands to montane forest. In New Mexico, this species has been taken from a wooded canyon at 5,900 feet in elevation.	Living specimens in New Mexico are known only from Indian Creek Canyon on the northern slope of Animas Peak, Hidalgo County.	No – Project area is outside known distribution.
FISH				
Beautiful Shiner *(Cyprinella formosa)*	T	Mid-water column species living in pools of small to medium streams and along shorelines of larger streams, near beds of aquatic vegetation or other cover.	Extirpated from New Mexico. Formerly occurred in perennial reaches of the Mimbres drainage in northwest Luna County.	No – Extirpated from New Mexico.
Rio Grande Sucker *(Catostomus plebius)*	SOC	Small to large, middle elevation (6,500 to 8,000 feet) streams, feeding on plankton and invertebrates in swiftly flowing riffle areas over rocks and gravel bottoms.	Normally occurs in the Mimbres River in Grant County, but may occur further downstream during and immediately following flood periods.	No – Lack of permanent aquatic habitat.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
HERPETOFAUNA				
Chiricahua Leopard Frog *(Rana chiricahuensis)*	T	Variety of permanently moist, heterogeneous aquatic habitats including springs and seeps, ponds, marshes, stock tanks, wells, intermittent rocky creeks, and mainstream river reaches.	Known to occupy dense riparian habitat along the Mimbres River in northwest Luna County.	No – Lack of suitable aquatic habitat; project area is outside known distribution.
Great Plains Narrowmouth Toad *(Gastrophryne olivacea)*	e	Grassland and desert-grassland habitats, including tobosa grasslands and swales. Breeds opportunistically in temporary aquatic habitats such as rain pools and ponds.	Known population exists in extreme south-central Luna County the vicinity of Hermanas.	Yes – Potential suitable habitat in the project area.
Reticulate Gila Monster *(Heloderma suspectum suspectum)*	e	Inhabits lower slopes of mountains and nearby outwash plains, especially in canyons and arroyos with periodic water frequents adjacent irrigated farmlands.	In New Mexico, Gila monsters occur regularly in the Gila Valley and from the Arizona border to the eastern slopes of the Peloncillo Mountains in Hidalgo County.	Yes – Potential suitable habitat in the project area.
BIRDS				
Brown Pelican *(Pelecanus occidentalis carolinensis)*	e	Usually found in warmer water marine habitats in North America; rarely occurs inland. Reliable New Mexico records are all of solitary birds near large lakes and reservoirs.	Rare vagrants in New Mexico, primarily as immature wanderers in summer and fall. Recorded in 13 New Mexico counties, including Luna County.	Yes – Rare vagrant or migrant.
Neotropic Cormorant *(Phalacrocorax brasilianus)*	t	Larger bodies of open water such as lakes and reservoirs. Requires trees, shrubs, or dead snags near water for nesting in areas free from human disturbance.	In New Mexico, breeds only in the lower Rio Grande Valley near Elephant Butte and Caballo reservoirs. Nonbreeders occur north to Bernalillo, west to the Gila Valley, and east to the Tularosa and lower Pecos valleys.	Yes – Rare vagrant or migrant.
Bald Eagle *(Haliaeetus leucocephalus alascanus)*	t	Associated with open expanses of water (e.g. streams and lakes) in a variety of habitats. Roosts in trees at protected sites, such as groups of trees or canyons.	Statewide migrant and local winter resident in New Mexico. Winter roost and concentration areas include the Gila and lower Rio Grande valleys, and Elephant Butte and Caballo reservoirs. Breeds at only a few sites to the extreme north and west of the state.	Yes – Local winter resident or occasional migrant.
Common Black-Hawk *(Buteogallus anthracinus)*	SOC	Riparian woodlands along permanent lowland streams. Requires mature, well-developed stands (e.g., cottonwood bosques) for breeding.	Uncommon summer resident from March to October in New Mexico. Regularly occurs in the San Francisco, Gila, and Mimbres valleys; occasionally occurs in the middle Rio Grande valley.	Yes – Potential suitable habitat in the project area.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
Northern Gray Hawk *(Buteo nitidus maxima)*	SOC	Lowland riparian woodlands.	Rare and local summer migrants in New Mexico. Reported in the Gila and Mimbres valleys. Breeds south of the U.S. border	Yes – Rare summer migrant.
Northern Aplomado Falcon *(Falco femoralis septentrionalis)*	E/NEP, e	Variable open habitats, including savannahs, desert grasslands, typically associated with yucca grasslands and adjacent shrubby habitats at lower elevations.	Largely extirpated in the U.S. historical breeding range along the U.S./Mexico border from southeast Arizona to Texas. Captive-bred birds are being released in south Texas and New Mexico (BISON-M 2010), including the Armendaris Ranch near Engle, New Mexico and White Sands Missile Range (Peregrine Fund 2010).	Yes – Potential suitable habitat in the project area.
American Peregrine Falcon *(Falco peregrinus anatum)*	SOC, t	Occurs in a variety of habitats, from upper and lower montane areas to desert scrub and grasslands. Typically nests on ledges or in potholes on cliffs in wooded/forested habitats near large open areas for foraging.	Permanent resident species in New Mexico that breeds locally in mountain areas and migrates statewide.	Yes – Uncommon spring and fall migrant.
Arctic Peregrine Falcon *(Falco peregrinus tundrius)*	SOC, t	Breeds in the Arctic tundra, and inhabits coastlines and mountains from Florida to South America in winter.	Very rare migrant throughout New Mexico.	Yes – Rare transient migrant.
Mountain Plover *(Charadrius montanus)*	SOC	Shortgrass prairies and dry playas during the breeding season. Regularly observed on turf farms and occasionally observed in other agricultural fields during late summer and fall migration.	Breeds in the Great Plains, from Montana south to eastern New Mexico; breeds locally in central-western New Mexico and migrates statewide.	Yes – Rare spring migrant.
Common Ground-dove *(Columbina passerina pallescens)*	e	Agricultural and undeveloped areas, including native shrublands and weedy areas, below 5,400 feet.	Local warm-season (April-September) visitor to the southernmost part of the state, including the lowermost Rio Grande and Pecos valleys.	Yes – Rare summer migrant.
Yellow-billed Cuckoo *(Coccyzus americanus)*	C	Lowland deciduous woodlands, willow and alder thickets, second-growth woods, deserted farmlands, and orchards.	Occurs statewide in New Mexico during migration. Reported as summer breeding season residents throughout the Gila National Forest and at the White Sands Missile Range.	Yes – Spring and fall migrant.
Western Burrowing Owl *(Athene cunicularia hypugaea)*	SOC	Grasslands and open shrublands. Nests and roosts in abandoned burrows of fossorial mammals such as prairie dogs, ground squirrels, foxes, badgers, and armadillos.	Rare year-round residents and common breeding residents in southern New Mexico. Permanent resident at the White Sands Missile Range.	Yes – Potential suitable habitat in the project area.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
Violet-crowned Hummingbird *(Amazilia violiceps ellioti)*	t	Well-developed riparian woodlands at low to moderate elevations, typically with cottonwood, sycamore, white oak and hackberry.	A Mexican highland species that reaches its northernmost distribution in Guadalupe Canyon in southeast Arizona and southwest New Mexico (Hidalgo County). Single birds have been documented in Anthony and Las Cruces, New Mexico.	No – Lack of suitable habitat in project area.
Lucifer Hummingbird *(Calothorax lucifer)*	t	Slopes and adjacent canyons in arid montane areas with flowering species such as agave and ocotillo.	In New Mexico, occurs in the Peloncillo Mountains and Guadalupe Canyon (Hidalgo County) and the lower Rio Grande Valley.	No – Lack of suitable habitat in project area.
Southwestern Willow Flycatcher *(Empidonax traillii extimus)*	E, e	Dense riparian shrublands, including groves of willows, arrowweed, buttonbush, tamarisk, and Russian olive, often with a scattered overstory of cottonwood.	Occurs statewide in New Mexico during spring and fall migration. Breeds in the Chama, Rio Grande, Zuni, San Francisco, Gila, and probably the Hondo basins and in the San Juan and western Sangre de Cristo mountains.	Yes – Spring and fall migrant.
Bell's Vireo *(Vireo bellii)*	SOC, t	Dense shrublands or woodlands along lowland stream courses, with willows, mesquite, and seepwillow.	Local summer resident in New Mexico in the lower Rio Grande, lower Gila, lower San Francisco, and lower Pecos valleys.	Yes – Spring and fall migrant.
Gray Vireo *(Vireo vicinior)*	t	Oak woodlands with a well-developed grass component in southern New Mexico; arid juniper woodlands on foothills and mesas to the north.	Widespread and locally common summer residents in southern New Mexico, northward to the San Juan and upper Rio Grande valleys. Rare and local during migration.	Yes – Rare spring and fall migrant.
Baird's Sparrow *(Ammodramus bairdii)*	SOC, t	Grassland species ranging from desert grasslands in the south to mountain meadows up to 11,800 feet in the San Juan and Sangre de Cristo mountains. Breeds in shortgrass prairie in the northern Great Plains.	Regular migrants and local winter residents in New Mexico, primarily in the eastern plains and southern lowlands. Rare winter residents around White Sands National Monument.	Yes – Spring and fall migrant.
Varied Bunting *(Passerina versicolor)*	t	In New Mexico, prefers dense stands of mesquite and associated growth in canyon bottoms.	In New Mexico, occurs in Guadalupe Canyon (Hidalgo County) and near Carlsbad Caverns National Park (Eddy County). Vagrants have been observed in Luna, Sierra, and Otero counties.	No – Lack of suitable habitat in project area.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
MAMMALS				
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	SOC	Occurs in a variety of xeric to mesic habitats, including desert scrub, sagebrush, chaparral, and deciduous and coniferous forests. Townsend's big-eared bats do not move or forage far from their day roosts (i.e. caves and mine tunnels), and often rest in abandoned buildings during nighttime foraging	Occurs throughout much of western North America, from British Columbia to Mexico, and eastward to Texas, with isolated populations further east. Known to occur in the Gila National Forest and White Sands Missile Range.	Yes – Foraging and nighttime roosting.
Desert Pocket Gopher *(Geomys arenarius)*	SOC	Most common in soft alluvial soils of arroyo bottoms and flood plains. Also occupies irrigation ditches, borrow pits, roadsides, and agricultural lands with sandy or loamy soils.	Occurs in Doña Ana, Otero, Luna, and Socorro counties as isolated populations in sandy or loamy soils of the White Sands area, the lower Rio Grande Valley, and the eastern half of the Deming Plain.	Yes – Potential suitable habitat in the project area.
PLANTS				
Desert Night-blooming Cereus *(Cereus greggii* var. *greggii)*	SOC	Mostly in sandy to silty gravelly soils in gently broken to level terrain in desert grassland or Chihuahuan desert scrub. Typically found growing up through and supported by shrubs, especially creosote bush and mesquite (NMRPTC 2010).	In New Mexico, occurs in Doña Ana, Grant, Hidalgo, and Luna counties. A population has been documented about 10 to 15 miles north of the project area (NMRPTC 2010).	Yes – Potential suitable habitat in the project area.
Sand Prickly Pear *(Opuntia arenaria)*	SOC, e	Sandy areas, particularly semi-stabilized sand dunes among open Chihuahuan desert scrub, often with honey mesquite and a sparse cover of grasses, 3,800–4,300 feet in elevation (NMRPTC 2010).	In New Mexico, southern Doña Ana, Luna, and Socorro counties. Documented Luna County populations are located near the U.S./Mexico border about 30 miles south of the project area (NMRPTC 2010).	No – Project area is outside known distribution and above elevation range.

Notes:

†List compiled from BISON-M (2010), NMRPTC (1999), USFWS (2010), and the New Mexico Administrative Code (19.21.2.8 NMAC and 19.33.6.8 NMAC).

*Status: E=Federal Endangered; E/NEP=Federal Endangered /Nonessential Experimental Population; T=Federal Threatened; C=Federal Candidate; SOC=Federal Species of Concern; e=State Endangered; t=State Threatened

**Habitat and distribution information compiled from BISON-M (2010) unless otherwise specified.

The western burrowing owl (*Athene cunicularia hypugaea*) uses underground burrows for roosting and nesting, and may occur in the project area year-round. Ground disturbing activities associated with the proposed project have the potential for negative impacts to the burrowing owl. Several kangaroo mound complexes are located in the project area, and the project area has the potential to support other burrowing animals including foxes, badgers, coyotes, and jackrabbits. Active burrowing owl nest burrows were observed in kangaroo mound complexes in the eastern and northern portions of the project area.

Surveys for burrowing owls and potential burrow sites are recommended prior to conducting ground-disturbing activities in order to avoid direct project impacts to western burrowing owls. Burrows should be inspected for recent signs of nesting or roosting activity by burrowing owls, including nest decoration (e.g. feathers, scat, insect parts, and grass clippings), fresh whitewash, and recent pellets at burrow entrances.

6.3 Mammals

Townsend's big-eared bat (*Corynorhinus townsendii*) potentially could use a small concrete building adjacent to the heavy equipment shed and the water cooling towers located in the eastern portion of the project area, adjacent to Arrowhead Drive, as a roosting site during night-time foraging. The project is not expected to affect the water cooling towers; however, if the concrete building is removed as a result of project activities, demolition during the day would avoid direct impacts to Townsend's big-eared bat.

The project area has potential suitable habitat for desert pocket gophers (*Geomys arenarius*); however, pocket gopher mound complexes were not observed in the project area. Ground disturbing activities potentially could impact desert pocket gophers. Mitigation measures are not likely to be required for this USFWS Species of Concern.

6.4 Plants

The desert night-blooming cereus (*Cereus greggii* var. *greggii*) potentially could occur in the project area. Prior to conducting vegetation clearing, an inspection of shrubs suitable of providing structural support and protection to this cactus, particularly mesquite, could be conducted to determine if the desert night-blooming cereus occurs in the project area. Individual plants, if they are located, could be relocated to areas of the project area where the vegetation community will not be disturbed.

7.0 LAND USE AND ZONING

The project site is zoned by the City of Deming as D – Industrial. The City's Zoning Map is included as Appendix D. The City of Deming Comprehensive Plan (2003) supports industrial development. In a survey conducted during the planning process, 87 percent of respondents agreed that Deming needs to attract more industry. The Plan designated the Peru Mill site as light industrial; at the time the site was unincorporated. Following annexation of the site by the city in 2008 and 2009, it was zoned for industrial use (City of Deming 2010).

The project site is bounded to the north and west by section fence lines that separate the property from New Mexico State Trust Land. The southern boundary of the project site is defined by the Mimbres River near the southwestern corner, an overhead electric transmission line, and a natural gas pipeline. The project extends east along the right-of-way along Arrowhead Road to where Arrowhead road intersects U.S. Highway 180. Existing facilities in the project area include a water pumping facility owned by the City of Deming located along the central eastern boundary and north of the larger of two tailings piles (Figure 1.1

The proposed industrial park is located in a mainly undeveloped area north of Interstate-10 and northwest of the developed portions of the City of Deming. The abandoned, former Peru Mill structures and the remediated tailings environmental easement area are the only developments on the site. These existing structures include a corrugated metal barn currently used as a heavy equipment shed, a concrete shed adjacent to the heavy equipment shed, and a water storage tank adjacent to the water pumping facility.

Immediately to the east of the park is the Luna Energy Facility, a natural gas power plant. An area located approximately 1.25 miles east of the proposed park and north of US Highway 180 is mostly

residential. To the southeast of the proposed industrial park and south of the Mimbres River is the former American Smelting and Refining Company Mill, consisting of several structures and a remediated tailings pond environmental easement area. Residential housing is scattered south of the Mimbres River, approximately 1 mile south of the proposed industrial park, in the area. New Mexico State Trust Land borders the project site to the north and west.

8.0 SOLID WASTE MANAGEMENT

Solid waste generated by future tenants of the industrial park will be collected by the City of Deming and disposed of in landfills licensed to receive waste of the type generated.

9.0 HAZARDOUS OR TOXIC SUBSTANCES

The City of Deming will require any hazardous, toxic, or radioactive substances used or produced by future tenants of the proposed industrial park to be stored, handled, and disposed of in accordance with all local, state, and federal regulations, and that, if required, appropriate management plans, such a Spill Prevention Control and Countermeasures Plans are prepared and available on-site.

A completed Applicant Certification Clause is provided as Appendix A.

10.0 WATER RESOURCES

The project area is located within the Mimbres Watershed (EPA 2010), a closed basin drained by the Mimbres River that includes essentially all of Luna County. The Mimbres River is formed by snow-pack and runoff from the southwestern slopes of the Black Range. Only the upper reach of the river is perennial. As it flows southward, the river dissipates on the desert floor north of Deming. The river floods the Deming area approximately once a decade after periods of unusually heavy rainfall in the Cooke's and Black ranges (Wikipedia 2010). Porter Draw, an ephemeral drainage lacking a defined channel, flows from the western boundary of the project area southeast into the Mimbres River. A small ditch in the vicinity of the City of Deming water pumping facility was filled with water at the time of the field survey.

The USACE made a jurisdictional determination that the project site does not include any Waters of the U.S. (Appendix B).

11.0 WATER SUPPLY AND DISTRIBUTION SYSTEMS

Water currently is supplied to the site via 12" water line located along Peru Mill Road. The supply line is fed by an existing well located just north of the environmental easement area. The City of Deming operates the well and is limited to a capacity of 442-acre-feet per year.

The water requirements for the industrial park will vary widely depending upon the type of industries attracted to the proposed industrial park. Examples of the requirements of two typical tenants are discussed in Section 12.0. Water supply would be from City-supplied water, and other than some individual requirements as described in Section 12.0, would not pose any significant issues. It is assumed the demand would vary from 500 to 100,000 gallons per day, depending on the type of industries attracted.

12.0 WASTEWATER COLLECTION AND TREATMENT FACILITIES

Currently there is no sanitary sewer service to the site. The capacity of the city's existing sewage treatment plant is 2 million gallons per day. Currently the treatment plant processes 1.3 million gallons per day. As with water, wastewater requirements for the industrial park will vary widely depending on the type of industries attracted to the proposed industrial park. In order to exemplify extremes, the following two industries were selected to illustrate the water and wastewater requirement variances. These industries are typical industrial park tenants (City of Deming 2010).

Warehousing. Warehousing is considered a 'dry' industry and as such has very low water and sewerage requirements. Typically a warehouse will require a large area dedicated to storage and only toilets/sinks for warehouse workers and drivers.

Typical water and wastewater characteristics for a warehouse are:

Flow	500 to 1,000 gallons/day
Water characteristics	normal 'city' water
Biological oxygen demand (BOD)	350 mg/l
Population equivalent	10 to 15 persons
Treatment requirements	Septic tank or small residential package treatment plant
Treatment capital cost	$20,000

Food Processing. Food processing is considered a 'wet' industry and uses water to process the final product. While portions of the rending process are kept as dry as possible (in order to minimize water usage), the end process is very water-intensive. Also, the water characteristics are intended to provide highly sterile liquid for the food processing; thus, city water with normal minimal chlorine residual (1 to 2 mg/l) would usually require re-chlorination in order to boost the residual for disinfection purposes.

Typical water and wastewater characteristics for a food processing industry are:

Flow	100,000 gallons/day
Water characteristics	chlorine added to 5-10 mg/l residual
BOD	2,500 mg/l
Population equivalent	10,000 persons
Treatment requirements	Custom designed package wastewater treatment plant
Treatment capital cost	$800,000

Individual wastewater treatment for each industrial tenant could be effective if the flow and waste characteristics are small and domestic in nature. For more water intensive industries, combining the park-wide wastewater into a single treatment location is more likely the desired configuration. If treated wastewater would discharge to either a nearby stream (Mimbres River), groundwater, or be reused n some manner, permitting is required. Wastewater collection will likely require a high degree of treatment in order to protect the receiving body (the Mimbres River). National Pollution Discharge Elimination System Permits would be required for surface water discharges, and the New Mexico Environment Department would permit any groundwater discharges. In the scenario where wastewater is treated centrally, the City of Deming would run the plant for a fee to tenants.

12.1 Impacts to Surface Water Runoff and Status of Storm Water Discharge Permit Process

The project site generally drains from northwest to southeast. There are currently no storm water facilities within the boundary of the proposed industrial park. The Mimbres River and Porter Draw FEMA-designated floodplain bisect the site (Figure 12.1). Both the Mimbres River and Porter Draw are characterized as ephemeral streams with 100-year discharges of 17,800 cubic feet per second (cfs) and 8,481 cfs, respectively.

The Porter Draw floodplain will be modified by re-routing the draw south along the western property line. This floodplain modification will require the preparation of a Conditional Letter of Map Revision prior to construction of any site improvements. Figure 12.1 depicts the approximate location of the relocated Porter Draw. In a letter dated September 2, 2010, USACE determined construction of the diversion ditch will not require a Section 404 Permit, as this activity will not affect Waters of the U.S. A copy of this letter is provided in Appendix B.

13.0 ENVIRONMENTAL JUSTICE (EXECUTIVE ORDER 12898)

The implementation of this project will not have an adverse impact upon low income or minority residents. The project will have a positive impact upon these two populations by attracting business to the region which will generate local jobs, contribute to the tax base, and stimulate the local and regional economy.

14.0 STREETS, TRAFFIC, PARKING

The site can be accessed via Peru Mill Road, Arrowhead Drive, and Rifle Range Road. Interstate-10 runs east-west and is approximately 1.25 miles south of the project site. U.S. Highway 180 runs north-south, intersects Arrowhead Drive, and is located about 1 mile east of the site.

Improvements to several roadways will be required (Figure 14.1). Improvements to Arrowhead Drive (approximately 1.7 miles) would be required in order to provide access to the proposed industrial park. These improvements include continuation of the paved section from the Luna Energy Facility to Peru Mill road, intersection improvements to U.S. Highway 180 (acceleration and de-acceleration lanes) and the purchase of the additional right-of-way.

Peru Mill Road is a two-lane paved road in very poor condition. Implementation of the proposed project would require complete reconstruction of the entire 3.9-mile length of Peru Mill Road.

Second Street is an east-west road urban connector road in fair condition that connects the northwestern portion of the City of Deming to the southern end of Peru Mill Road. Improvements to 2nd Street will provide convenient access for local traffic to access the proposed industrial park via Peru Mill Road, and include curb and gutter improvements and construction of an underground storm water sewer from U.S. Highway 180 to Peru Mill Road. Given the residential nature of 2nd Street, it is recommended that large truck traffic be prohibited.

The road improvements summarized above are not expected to create new traffic patterns. Implementation of the proposed project and the associated road improvements are not expected to result in exceeding the capacities of the improved roadways, or in exceeding the capacities of existing roadways for which improvements are not anticipated. Existing land uses in the vicinity of the proposed project site are not expected to be affected by traffic coming to and from the proposed industrial park.

15.0 AIR QUALITY

Luna County is classified as an Attainment Area for air quality. Strong winds generating blowing dust do occur in the county. The New Mexico Environment Department monitors concentrations of particulate matter at a monitoring station on the roof of the Post Office on Pine Street in Deming. In 2003, violations of the federal standard for particulate matter occurred, requiring the creation of the Luna County Natural Events Action Plan (NEAP) to avoid nonattainment. The NEAP was submitted to the U.S. EPA in October 2004.

There are no local topographical or meteorological conditions that hinder the dispersal of air emissions.

16.0 NOISE

Noise emanating from the proposed industrial park will vary based on what type of tenants and industries are attracted to the park. Industry types that have been identified as being likely candidates for the proposed park include, but are not limited to: cross-dock/transload facilities, local or specialized warehousing, logistic centers, food processing, solar energy generation, renewable energy projects, and manufacturing (City of Deming 2010). It is unlikely that noise associated with any of these industries will significantly increase ambient noise levels. The proposed industrial park does not abut any residential areas, schools, churches, or recreation areas.

17.0 CONSTRUCTION

During construction, the contractor will be required to periodically spray the work area with water in an effort to reduce dust levels. Construction work will be restricted to daylight hours in an effort to minimize construction-related noises. Best management practices will be implemented to reduce dust, erosion, and siltation resulting from construction activities.

18.0 PERMITS

As construction commences, a Storm Water Pollution Prevention Plan will need to be completed and a Notice of Intent filed with the U.S. Environmental Protection Agency to apply for coverage under a Construction General Permit. These permitting activities have not commenced as the project is still in the planning process.

The USACE was consulted regarding construction of the diversion ditch to divert Porter Draw to the Mimbres River and it responded that a 404 Permit was not required by the project (Appendix B).

No other permits have been identified as required to construct the proposed project.

19.0 PUBLIC NOTICE/CONTROVERSY

Plans for and descriptions of the proposed project have occurred in several City of Deming planning documents, including the Peru Mill Master Plan (June 2010), the City of Deming Comprehensive Plan (July 2010), and the City of Deming Infrastructure Capital Improvement Plan (in progress). There have no public objections or controversies surrounding the proposed project.

20.0 CUMULATIVE EFFECTS

No adverse incremental environmental impacts are anticipated as a result of the cumulative effects of the proposed project when they are added to other past, present, or reasonably foreseeable future actions.

Direct effects consist of construction related dust, erosion, and temporarily elevated noise levels. Indirect effects consist of effects produced by future tenants of the proposed industrial park, and potentially include increased noise levels, traffic, water consumption, wastewater, and solid waste.

No residents or businesses will be displaced as a result of this project. The proposed water and sewer lines will installed in existing and future street and highway rights-of-way.

Very localized impacts to vegetation and wildlife species will occur along the existing length of Porter Draw that bisects the project site, as the Diversion Channel with re-route water from its current alignment through the project site into the Mimbres River. As this is an ephemeral drainage that does not support wetlands or habitat for threatened or endangered species, these impacts will be insignificant from both a direct and cumulative impacts perspective.

Human communities are expected to benefit from implementation of the proposed project, as the project is expected to attract new long-term employment opportunities, including workforce training, to the area, and the local economy will be stimulated through increased tax income for the City of Deming and jobs creation.

21.0 HISTORIC/ARCHAEOLOGICAL RESOURCES

Class I (records search) and Class III (100 percent) pedestrian cultural resource surveys were completed for the proposed project in May and August 2010. The Class III cultural resource survey recorded 13 new archaeological sites (LA 166764 through LA 166772 and LA 167608 through LA 167611), one historic structure constructed prior to 1965, and 73 isolated occurrences (IO). Of the 13 sites, three (LA 166766–LA 166768) are prehistoric, nine (LA 166764, LA 166765, LA 166770–LA 166772, and LA 167608–167611) are historic, and one (LA 166769) is both prehistoric and historic. The historic components date to the early twentieth through late twentieth century and the prehistoric components are either Archaic (LA 166767 and LA 166769) or unknown. LA 166766, LA 166767, LA 166769, and LA 167608 are recommended eligible for inclusion on the National Register of Historic Places under Criteria D, information potential concerning the prehistoric or historic occupation of the Deming area. LA 166772 is recommended eligible under Criterion C, as an excellent intact example of a riveted water tank and tower dating to the 1920s or 1930s.

The 73 IOs consist of prehistoric and historic artifacts, primarily chipped stone items (e.g., projectile points, chipping debris), bottles, glass fragments, tin cans, and other metal objects. Most of the IOs were fully documented and are not likely to yield important information beyond what has already been recorded; however a few IOs, such as a U.S. Army button (IO 23), are worthy of collection and further archival research. No further work is recommended for the remaining IOs. No active acequias or descansos are in or near the project APE. No buildings or additional structures, other than the water tank and tower (Structure 4, LA 166772), with construction dates prior to 1965 are in the project APE or within 30 m (100 ft) of the APE.

In the event that bones or prehistoric or historic archaeological materials are uncovered during construction or earth-disturbing activities, the City of Deming will cease work immediately, protect the remains from further disturbance, and notify the appropriate land management agency. If bones are found, the City of Deming will immediately notify local law enforcement and the Office of the Medical Investigator pursuant to 18-6-11.2C (Cultural Properties Act NMSA 1978). In accordance with 18-6-11.2C and/or 36 CFR 800.13(b) (Protection of Historic Properties), the City of Deming will notify the State Historic Preservation Officer (SHPO) or the State Archaeologist immediately at (505) 827-6320. In either case, the appropriate land management agency and the SHPO will determine the necessary steps to evaluate significance and document, protect or remove the material or remains, in compliance with the law.

22.0 REFERENCES

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APPENDIX A

APPLICANT CERTIFICATION CLAUSE

Appendix A: Applicant Certification Clause

The applicant represents and certifies that it has used due diligence to determine that the description of the project site described herein is accurate with respect to the presence or absence of contamination from toxic and hazardous substances. The term "site" includes the entire scope of the project, including future phases of the project and all areas where construction will occur.

1. Is the site currently, or has it in the past 50 years, been used for any of the following operations or activities:
   a. Generation of hazardous substances or waste? _X_ Yes ___ No

   b. Treatment, storage (temporary or permanent), or disposal of solid or hazardous substances or waste? ___ Yes _X_ No
   Site was never used as a TSDF facility; however, tailing wastes from historical zinc ore milling activities were stored on site.

   c. Storage of petroleum products? ___ Yes _X_ No

   d. Used/waste oil storage or reclamation units? ___ Yes _X_ No

   e. Research or testing laboratory? ___ Yes _X_ No
   It is possible the historic zinc mill had a small testing bench to test the quality of the ore; however, the site was never formally or exclusively a research or testing laboratory.

   f. Ordnance research, testing, production, or storage? ___ Yes _X_ No

   g. Chemical manufacturing or storage? ___Yes _X_ No

   h. Military weapons or ammunition training or testing? ___Yes _X_ No

   i. Iron works/foundry? ___Yes _X_ No

   j. Railroad yard? ___Yes _X_ No

   k. Industrial or manufacturing operation? _X_ Yes ___ No

If any of the above operations ever occurred at the site, and if appropriate cleanup or other mitigation actions were performed in accordance with the local, State, and federal laws, please attach documentation of these actions.
The Voluntary Remediation Completion Report (2009) for the site and Completion Certificates are provided as Attachment 1 to Appendix A.

2. Do wells draw water from an underlying aquifer to provide the local domestic water supply? _X_ Yes ___ No

3. Has a federal, State, or local regulatory authority ever conducted an environmental assessment, environmental impact statement, or a preliminary assessment/site inspection, or similar environmental surveyor inspection report at the site? If yes, please attach copies of these reports or results. _X_ Yes ___ No
   The Voluntary Remediation Completion Report (2009) for the site and Completion Certificates are

provided as Attachment 1 to Appendix A.

4. Have any environmental or OSHA citations or notices of violation been issued to a facility at the site? If yes, please attach copies. ___ Yes _X_ No

5. Have any unauthorized releases of hazardous substances occurred at any facility at the site which resulted in notification of the EDA's National Response Center? ___ Yes _X_ No

6. Is any material containing asbestos located at the site? If yes, please attach information concerning State and federal regulatory compliance. ___ Yes _X_ No

7. Is there any equipment (electrical transformers, etc.) containing polychlorinated biphenyls (PCB) on the site? Is yes, please attach a description of the equipment. ___ Yes _X_ No

8. Are there underground storage tanks on the site? If yes, please attach a detailed description, including the number of underground storage tanks on the site, whether the tanks have been inspected (or removed) and the results of such inspections. ___ Yes _X_ No

9. Has the site been tested for radon? If yes, please attach results. ___ Yes _X_ No

10 Have there been or are there now any environmental investigations by federal, State or local government agencies that could affect the site in question? If yes, please attach available information.
_X_ Yes ___ No
The Voluntary Remediation Completion Report (2009) for the site and Completion Certificates are provided as Attachment 1 to Appendix A.

The applicant acknowledges that this certification regarding hazardous substances and/or waste is a material representation of fact upon which EDA relies when making and executing an award. EDA reserves the right to terminate any award made in conjunction with the representations contained herein if, at any time during the useful life of the project, EDA becomes aware of the presence of hazardous materials or waste at the site, or that hazardous materials or waste have been inappropriately handled thereon.

Further, if it is determined at any time that the presence of hazardous materials or waste, or handling thereof, has been misrepresented, EDA may pursue other available legal remedies against the applicant.

Applicant Name _____

Name and title of applicant's authorized representative _____

Signature of applicant's authorized representative _____

Date signed _____

Attachment 1

Voluntary Remediation Completion Report

and

Completion Certificates

VOLUNTARY REMEDIATION COMPLETION REPORT

The Former Peru Hill Mill Facility
Deming, New Mexico

Prepared for:

The New Mexico Environment Department
Voluntary Remediation Program
1190 St. Francis Drive
Santa Fe, New Mexico 87504

Prepared by:

INTERA Incorporated
6000 Uptown Boulevard NE, Suite 100
Albuquerque, New Mexico 87110

January 27, 2009

EXECUTIVE SUMMARY

This report is the final Voluntary Remediation Completion Report (VRCR) for the Peru Hill Mill facility (Site) located in Deming, New Mexico. The VRCR has been prepared by INTERA Incorporated (INTERA) on behalf of the City of Deming (COD) at the request of the New Mexico Environment Department (NMED) Voluntary Remediation Program (VRP). NMED requested that INTERA prepare this report in a letter to INTERA dated May 16, 2003. The report was not completed in 2003 because the COD decided to add acreage to the Site and perform additional remediation work. NMED requested INTERA finish the VRCR in a letter to INTERA dated August 27, 2008. This work is being conducted under NMED Organization Code ENV00051 and Project Site Code 53023002.

The Site is located four miles northeast of the COD and is an abandoned mining materials mill created to primarily process zinc sulfide ore. The former facility was situated on a 1,320-acre property and operated from 1926 until 1967. The facility operated intermittently from 1967 until 1985 and has been vacant since 1985. The COD took ownership of the Site in 2002.

Through Site characterization activities completed by INTERA in 2002, surface soil contamination was determined to extend approximately south and east of the former main mill area. Subsurface soil (greater than a depth of 2 feet below ground surface [bgs]) and ground water samples collected at the Site were not impacted above standards by former Site operations. Surface soil conditions were determined to be the only major environmental media requiring remediation at the facility. The COD along with their contractor, Zia Engineering and Environmental Consultants, determined that a consolidation of tailings from across the Site would be necessary to contain the tailings and prevent tailings movement by water and wind erosion to other areas of the Site and/or off-site. Site cleanup levels were developed for surface soils (the soil screening levels are 1,000 mg/Kg for lead, 69,000 mg/Kg for zinc, and 70 mg/Kg for arsenic). New Mexico Soil Screening Guidance (NMSSG) levels developed by NMED VRP and the Hazardous Waste Bureau, which were used for lead and zinc, are industrial use NMSSG levels; the level for arsenic was developed by performing a site-specific risk assessment in 2002.

The Peru Hill Mill Site was originally 1,360 acres when the COD entered the Site into the VRP in 2002. The COD added two parcels to the Peru Hill Mill Site in 2005. The COD tract (20 acres) and the Henderson tract (40 acres) were added to the eastern part of the Site (total Site area is 1,420 acres). Additional tailings removals were conducted within the COD and Henderson additional areas by the COD from 2005 through 2007.

Confirmation soil sampling results indicate that removal efforts at the Site were effective and confirmation soil sample results indicate remaining soil concentrations of lead, arsenic, and zinc are below the Site specific cleanup levels.

An approximately 45-acre tailings impoundment was created near the center of the Site, and all tailings above the Site screening levels were moved to the impoundment area. The impoundment was capped with gravel rock to create a "desert varnish" surface. An additional secondary tailings impoundment was added to the Site in 2005. The secondary tailings pile received tailings

from removals conducted at the additional properties (approximately 60 acres) added to the Site in 2005 and 2006.

Other environmental issues, such as asbestos building materials, solid and hazardous waste, polychlorinated biphenyls, etc. were addressed during remedial activities. Also, several former on-site production wells were abandoned. The Site was reseeded with a native vegetation grass mix.

The Site remediation is complete and the COD will submit an Affidavit of Completion to the NMED VRP in the near future. Once NMED issues a Conditional Certificate of Completion the COD plans to reuse the Site as an industrial park.

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LIST OF ABBREVIATIONS AND ACRONYMS

µg/L	micrograms per liter, also known as parts per billion (ppb)
ACM	asbestos-containing material
AHERA	Asbestos Hazards Emergency Response Act
bgs	below ground surface
BOA	Barite of America
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
cfs	cubic feet per second
COC	contaminant of concern
COD	City of Deming
CORRACTS/TSD	Resource Conservation and Recovery Act Corrective Action Report/Transfer, Storage, and/or Disposal Facilities
E&E	Ecology and Environment
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
GAI	Geohydrology Associates, Inc.
HWB	Hazardous Waste Bureau
in/hr	inches per hour
INTERA	INTERA Incorporated
LUST	leaking underground storage tank
mg/kg	milligrams per kilogram, also known as parts per million (ppm)
mg/L	milligrams per liter
NMED	New Mexico Environment Department
NMEID	New Mexico Environmental Improvement Division
NMSSG	New Mexico Soil Screening Guidance
NMWQCC	New Mexico Water Quality Control Commission
Neptune	Neptune and Company
NMAC	New Mexico Administrative Code
NPL	National Priorities List
OSHA	Occupational Safety and Health Act
PCB	polychlorinated biphenyl
PEL	Permissible Exposure Limit
PID	photoionization detector
PLM	polarized light microscopy
ppm	parts per million
PSTB	Petroleum Storage Tank Bureau
RCRA	Resource Conservation and Recovery Act
Rinchem	Rinchem Company, Inc.
Site	Peru Hill Mill facility
SCL	State-Equivalent CERCLIS List

LIST OF ACRONYMS AND ABBREVIATIONS (Concluded)

SSI	Screening Site Inspection
SSL	soil screening level
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
TSCA	Toxic Substance Control Act
USGS	United States Geologic Survey
UST	underground storage tank
VOC	volatile organic compound
VRCR	Voluntary Remediation Completion Report
VRP	Voluntary Remediation Program
XRF	x-ray fluorescence
Zia	Zia Engineering and Environmental Consultants

1.0 INTRODUCTION

This report is the final Voluntary Remediation Completion Report (VRCR) for the Peru Hill Mill facility (Site) located in Deming, New Mexico. The VRCR has been prepared by INTERA Incorporated (INTERA) on behalf of the City of Deming (COD) at the request of the New Mexico Environment Department (NMED) Voluntary Remediation Program (VRP). NMED requested that INTERA prepare this report in a letter to INTERA dated May 16, 2003. The report was not completed in 2003 because the COD decided to add acreage to the Site and perform additional remediation work. NMED requested INTERA finish the VRCR in a letter to INTERA dated August 27, 2008. This work is being conducted under NMED Organization Code ENV00051 and Project Site Code 53023002.

This VRCR is being prepared on behalf of the COD to document that Site conditions meet applicable VRP standards and NMED can rely on its contents to issue a Conditional Certificate of Completion.

Section 1.0 of this VRCR provides an introduction to this report, complete with a general project background, a Site history description, and an outline of those contaminants of concern. Section 2.0 of this VRCR provides information to the Site setting, including the geologic and hydrogeologic characteristics of the area as well as potential receptors present at the Site. Section 3.0 of this VRCR outlines those sampling and analysis activities that have been conducted at the Site and Section 4.0 of this VRCR outlines those remedial activities conducted to correct the impacted areas of the Site. Section 5.0 of this VRCR discusses an outline of deliverables to be prepared for the Site and provided to the VRP. Finally, Section 6.0 of this VRCR discusses how the activities conducted at the Site and those proposed activities will meet the VRP performance standard.

1.1 Background

The Site was an abandoned mining materials mill Site, created to primarily process zinc sulfide ore, and is located four miles northeast of the COD (Figure 1). The former facility was situated on a 1,320-acre property and operated from 1926 until 1967. The facility operated intermittently from 1967 until 1985.

The Site was vacant until 2002, when the COD took ownership. Prior to the COD, the last known owner of the Site was Barite of America (BOA). The COD was interested in the Site for redevelopment as an industrial park. The close proximity to the northern part of the COD, the availability of a railroad spur, and several large-diameter production water wells located at the Site make Peru Hill Mill an attractive area for industrial park redevelopment. Several Site investigations have been performed at Peru Hill Mill by the State of New Mexico Environmental Improvement Division (NMEID) (now the NMED) (Site work conducted in 1990) and by the NMED (Site work conducted in 1992), the United States Environmental Protection Agency (EPA) Region 6 contractor (Ecology and Environment [E&E]) (Site work conducted in 1998), Zia Engineering and Environmental Consultants, Inc. (Zia), and INTERA (Site work conducted by INTERA and Zia from 2000 to 2003). These groups, either working alone or concurrently, have performed soil and ground water sampling at the Site to aid in the determination of the

lateral and vertical extent of contamination from the presence of mine material tailings resulting from former milling operations. Surficial soils, subsurface soils, ambient air, and ground water were sampled.

The results of the Site characterization activities listed above revealed the presence of surface soil contamination to the south and east of the former main mill area (Figure 2). Subsurface soil (greater than a depth of 2 feet below ground surface [bgs]) and ground water samples collected at the Site were not significantly affected by former Site operations. The Phase II Site Investigation Report completed by INTERA in February 2002 provides detailed information on these Site characterization activities (INTERA, 2002a).

Surface soil conditions were determined to be the only environmental media requiring remediation at the facility. The COD along with their contractor, Zia, determined that a consolidation of tailings from across the Site would be necessary to contain the tailings and prevent tailings movement by water and wind erosion to other areas of the Site and/or off-site. Site cleanup levels were developed for surface soils (the site-specific soil screening levels [SSL] are 1,000 milligrams per kilogram [mg/kg] for lead, 69,000 mg/kg for zinc, and 70 mg/kg for arsenic). New Mexico Soil Screening Guidance (NMSSG) levels developed by NMED VRP and the Hazardous Waste Bureau (HWB) used for lead and zinc are industrial-use NMSSG levels; the level for arsenic was developed by performing a site-specific risk assessment in 2002 (Neptune and Company 2003). An approximate 45-acre tailings impoundment was created near the center of the Site, and all tailings determined to be above the Site SSL (1,000 mg/kg lead, 69,000 mg/kg zinc, and 70 mg/kg arsenic) were moved to the impoundment area. The tailings impoundment was capped with gravel rock to create a "desert varnish" surface.

The areas of the Site designated for tailings and affected surface soil removal were divided into 300-by-300-foot grids for excavation and confirmation soil sampling purposes, and are illustrated in Figure 2. Confirmation soil samples were collected by INTERA on behalf of the COD to make sure the excavation of tailings had been completed to below Site screening levels. Those grid areas that exceeded any of the Site SSL were re-excavated and re-sampled.

1.2 Site History

The Site is located approximately four miles northwest of Deming on State Road 394 in Luna County, New Mexico. The Peru Hill Mill was a selective flotation mill used primarily to process zinc sulfide ore and formerly included a 104-acre tailings impoundment from the abandoned Peru Hill Mill. Peru Mining Company, a subsidiary of Illinois Zinc Company, constructed the mill and operated it from 1928 to 1967. BOA acquired the facility from Illinois Zinc Company in 1979 and operated it intermittently under three different names until 1985, when BOA filed for bankruptcy. Ownership of the Site passed from Barite Limited through bankruptcy to SMS Financial, a financial title and holding company. Luna County acquired the property for delinquency in paying taxes (BOA had not paid property taxes since 1982) and deeded the property to the COD.

The Site originally was 1,360 acres when the COD entered the Site into the VRP in 2002. The COD added two parcels to the Peru Hill Mill Site in 2005. The COD tract (20 acres) and the Henderson tract (40 acres) were added to the eastern part of the Site.

The total Site area is 1,420 acres. The Site is legally described as:

1,360 +/- acre Peru Hill Mill Parcel

The West Half of the Southwest Quarter (W ½ , SW ¼) of Section Seventeen (17), the North Half (N ½) of Section Nineteen (19), the West Half (W ½) of Section Twenty (20), and all of Section Eighteen (18), Township Twenty-three (23) South, Range Nine (9) West.

20 Acre City of Deming Parcel

The West Half of the Southeast Quarter of the Southwest Quarter (W ½, SE ¼, SW 1/4), Section Seventeen (17), Township Twenty-three (23) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico.

40 Acre Henderson Parcel

The West Half of the Southwest Quarter of the Southeast Quarter (W ½ of SW ¼ of SE ¼) of Section Seventeen (17) and the East Half of the Southeast Quarter of the Southwest Quarter (E ½ of SE ¼ of SW ¼) of Section Seventeen (17), Township Twenty-three (23) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico.

1.3 Contaminants of Concern

The major environmental concern at the Site was the existence of mill tailings located near the main mill area, which have been redistributed by erosion, wind, and/or surface water to other areas both on- and off-site. The tailings were estimated by NMED to be distributed over an area of approximately 161 acres (Figure 1). The total area of the tailings impoundment (located near the main mill building) and the redistributed tailings is approximately 265 acres (NMED 1992).

Preliminary x-ray fluorescence (XRF) data from a Site investigation conducted by E&E led to the determination that lead, copper, and zinc were the primary inorganic contaminants of concern (COC) at the Site (E&E 1998).

Sampling data from the INTERA Phase II Site investigation indicated that arsenic was as much of a concern as lead and zinc, and that copper was not a substantial concern (INTERA 2002). Substantially elevated levels of lead, zinc, and arsenic (greater than each metal's respective NMSSG industrial level) were identified and Site cleanup goals were focused on these metals.

Petroleum hydrocarbons, assumed to have been stored in an underground storage tank (UST) at the Site, were other COCs. The UST was discovered during the Zia Phase I Environmental Site Assessment (ESA) (Zia 2001). This UST was removed from the Peru Hill Mill facility by the COD under the supervision of Zia representatives and according to all applicable NMED

Petroleum Storage Tank Bureau (PSTB) regulations. No evidence of petroleum hydrocarbons in subsurface soils was observed during removal of the UST.

Polychlorinated biphenyls (PCB) were another COC at the Site. In 1998, the NMED HWB completed a drum removal event and removed soil stained with oil from leaking pad-mounted transformers. The soil was sampled by NMED HWB and found to contain concentrations of PCBs. The NMED HWB did not take confirmation samples after soil removal; therefore no determination was made that all PCB-contaminated soil had been removed from the Site (personal communication with Dana Bahar, February 28, 2001). During the completion of a Phase I ESA conducted by Zia as a subcontractor to INTERA in 2001, Zia identified pad-mounted transformers that had leaked or were continuing to leak oil to surficial soils. Zia noted a total of five transformers on the Site, one east of the Motor Control Center room east of the southern end of the Barite warehouse and four others approximately 50 yards south of the main mill structure. PCBs are recognized as a toxic substance by the federal government under the Toxic Substance Control Act (TSCA). Transformers containing oil with PCBs at a concentration of 500 parts per million (ppm) or greater are considered violations of the TSCA and are subject to regulatory action. INTERA sampled stained soils believed to be stained with oil containing PCBs near pad-mounted transformers. One area of stained soils (approximately 0.5 yards) was determined to contain PCBs. The PCB-containing soil was removed by the COD and in advertently placed within the tailings impoundment. This action was not part of the COD remediation plan for the Site nor was this approved of by any NMED Bureau.

1.4 List of Reports Submitted to the Voluntary Remediation Program

This section contains a summary of pertinent reports that provide the necessary background information for this VRCR.

- **"Hydrologic Assessment of Barite of America Plant Site, Luna County, New Mexico," dated September 1980, by Geohydrology Associates, Inc. (Geohydrology Associates, Inc. 1980).**

The NMEID Health and Environment Department required that BOA perform a hydrologic assessment of the Peru Hill Mill plant Site as part of the facility discharge plan. Geohydrology Associates, Inc. (GAI) of Albuquerque, New Mexico performed the hydrologic assessment which consisted of two tests: 1) three cylinder infiltrometer tests were performed on the abandoned tailings materials and 2) a pump test was performed on a Peru Hill Mill facility production well. GAI concluded that the infiltration rate of the tailings is relatively low and that most of the precipitation that lands on the tailings will run off before it has sufficient time to chemically interact with the minerals in the tailings. GAI added that most of the precipitation that does infiltrate the tailings will be lost by evaporation or become trapped above a widespread clay layer, which is present below the mill Site. GAI concluded from their pump test data that the transmissivity of the aquifer sediments is quite high beneath the Peru Hill Mill facility, and given the regional ground water gradient, which is to the southeast at 0.1, the rate of ground water movement in the area is approximately 3.4 feet per day.

- **"Preliminary Assessment, Peru Hill Mill, Deming, New Mexico," dated August 31, 1990, by New Mexico Environmental Improvement Division (NMEID 1990).**

The NMEID performed a Preliminary Assessment at the Peru Hill Mill facility in 1990. The NMEID concluded that although ground water samples collected from the Site monitoring wells were below New Mexico Water Quality Control Commission (NMWQCC) standards, there were no monitoring wells located downgradient of the 104-acre tailings impoundment. Previous samples collected from the liquid tailings (during and after mill operation, before the liquid tailings dried) indicated the presence of barium, iron, lead, manganese, fluoride, cadmium, chromium, copper, and zinc above background.

The NMEID Preliminary Assessment at the Peru Hill Mill facility determined that the presence of wind-blown tailings needed further assessment to determine the associated environmental and health hazards. The NMEID recommended that a Screening Site Inspection (SSI) be performed at the Peru Hill Mill to determine: 1) the extent and potential hazards of the wind blown tailings, 2) if contaminants are present in ground water down gradient of the tailings impoundment, and 3) if contaminants are present in the ephemeral surface water drainage (Mimbres River) which serves as a source of irrigation water during times of flow.

- **"Screening Site Inspection, Peru Hill Mill, Deming, New Mexico," dated April 3, 1992, by New Mexico Environment Department (NMED 1992).**

An SSI was performed by NMED in 1992 to document the presence of heavy metals in the tailings impoundment and to evaluate the potential for a release of metals into the air, ground water, and surrounding Site soils. At the time the SSI was performed by NMED, the estimated area of the tailings impoundment and redistributed tailings was 265 acres at the Peru Hill Mill facility (including the area east of Peru Hill Mill Road). Resource Conservation and Recovery Act (RCRA) metals were identified in surface and subsurface soil samples collected from the tailings impoundment. Cadmium, lead, and zinc were identified in two downwind ambient air monitors. According to NMED, concentrations of cadmium in the two downwind ambient air samplers exceeded health based benchmarks for cancer risk for inhalation.

Ground water was evaluated by collecting samples from two existing monitoring wells and installing and sampling two ground water monitoring wells (located hydraulically downgradient from the tailings impoundment). Analysis of filtered ground water samples did not indicate the presence of metals.

NMED evaluated the soil exposure pathway by collecting redistributed tailings samples from locations greater than one mile from the Site. Metals were found to be elevated in redistributed tailings which cover an area of approximately 161 acres. NMED concluded that lead was detected near a residence at concentrations exceeding three times the concentrations at background locations; however, the lead concentrations near the residence were below EPA action levels.

- **"Removal Assessment Report for Peru Hill Mill, Deming, Luna County, New Mexico," dated December 10, 1998, by Ecology and Environment, Inc.**

The EPA Region 6 contractor, E&E, was contracted to evaluate the Site under the Comprehensive Environmental Resource Comprehensive Liability Act (CERCLA) for inclusion on the Superfund list. Although the levels of metals certainly were substantial enough to warrant consideration as a Superfund Site, the few potential receptors identified in the area prevented the Site from being placed on the Superfund list.

E&E conducted on- and off-site assessment activities from April through July 1998 to define the nature and extent of heavy metals contamination related to the Peru Hill Mill Site. Assessment activities included: deed search for ownership, solicitation of property owners for Site access, delineation of the tailings, soil sampling, high volume air sampling, asbestos sampling, estimation of tailings volume, and XRF screening (E&E screened 593 soil samples using XRF). E&E concluded that the XRF data showed copper, lead, and zinc were elevated within the vicinity of the mill and tailings compound. The highest concentrations of copper, lead, and zinc were 3,720, 22,870, and 77,376 ppm respectively. Copper, lead, and zinc were not significantly elevated in most of the soil samples collected away from the main tailings impoundment area and mill structure. E&E also noted that soil samples collected in occupied residential properties downwind of the mill property showed low levels of metals concentrations.

High volume air samples were analyzed for the presence of arsenic, cadmium, lead, and total suspended particulates. Of the samples analyzed, most fell below laboratory detection limits. Ambient air samples with metals detected above the laboratory detection limit were identified to contain lead; however, the levels of lead identified were well below the Occupational Safety and Health Administration (OSHA) established permissible exposure limit (PEL).

- **"Phase I Environmental Site Assessment Peru Hill Mill Property, Deming, Luna County, New Mexico," dated May 21, 2001, by Zia Engineering & Environmental Consultants, Inc.**

Zia of Las Cruces, New Mexico was contracted by INTERA on behalf of NMED VRP Manager Ms. Chris Bynum to perform a Phase I ESA at the Peru Hill Mill facility in Deming, New Mexico. The Zia ESA concluded the following:

1. The Site reconnaissance indicated that the Peru Hill Mill facility was used as a mill and tailing impoundment at the location until the 1980s.

2. Ground water in the vicinity of the Site was estimated to be at a depth of 130–220 feet below the existing ground surface. Zia inferred the ground water flow direction to be towards the southwest, based on the assumption that ground water flow closely parallels the ground surface topography.

3. Review of Federal Emergency Management Agency floodplain records showed that the Site is located in Zone X and A—an area determined to be outside the 500-year

floodplain with a portion of the subject property located within the 100-year floodplain (with no base flood elevations determined).

4. Five electrical transformers were observed on the Site during the initial Site reconnaissance.

5. The hazardous materials noted on Site were tailings of zinc ore and barium ore, drums of unknown contents, piles of unknown chemicals, and two abandoned vehicles.

6. An undetermined amount of windblown tailings dust covering a significant portion of the Site was noted as possibly needing to be removed or mitigated on Site.

7. No aboveground storage tanks were noted during the Site visit (with the exception of the water tank located near the entrance to the main mill area).

8. Surface indication of one UST was observed on the Peru Hill Mill facility during the Site reconnaissance.

9. Signs of potential contamination were observed during the Site reconnaissance as stained soils located around the mill complex, an unusual odor generally present at the mill Site (possible due to sulfur compounds in the tailings), a large barren area immediately west of the tailings pile, and an extensive tailings dump area southwest of the mill complex.

10. Surface indication of un-controlled/un-permitted wastewater/effluent discharges was observed on the Site during the Site reconnaissance in the form of an unlisted septic tank.

11. The Mimbres River, eight water supply and four monitoring wells, a rock/grout pond, exposed soil, and the BOA tailings pond were sensitive receptors observed at the Site during the Site reconnaissance.

12. The windblown tailings dust was noted as an ongoing air emission from the Site during the visual survey.

13. A cursory review of immediately adjoining properties to the Peru Hill Mill facility revealed no apparent indications of environmental concern with significant potential to impact the Site.

14. The Site was not listed as a(n) National Priorities List (NPL), CERCLA, Emergency Response Notification System (ERNS), RCRA Generator, RCRA Corrective Action Report/Transfer, Storage, and/or Disposal Facilities (CORRACTS/TSD), RCRA Non-CORRACTS/TSD, New Mexico State-equivalent CERCLIS List (SCL), Leaking UST (LUST), UST, Solid Waste Facility, or registered UST Site.

15. No NPL, CERCLIS, ERNS, RCRA Generator, RCRA CORRACTS/TSD, RCRA non-CORRACTS, SCL, or LUST Sites were listed within the approximate minimum search distances from the Site.

- **"Asbestos Survey, Peru Hill Mill Property, Deming, Luna County, New Mexico," dated July 25, 2001, by Zia Engineering and Environmental Consultants, Inc.**

Zia conducted an asbestos survey of building materials at the Site in June 2001. Asbestos containing material (ACM) is defined by the EPA and OSHA as any materials or product containing more that 1% asbestos as determined by analysis by polarized light microscopy (PLM). Zia collected 22 samples of representative building materials present in the Site buildings and submitted them for asbestos analysis. Four of the suspect materials were determined to be ACM. They were 1) vinyl floor tile (Chrysotile) in the residential house (approximately 200 square feet); 2) the hopper surfacing material (Chrysotile) at the east side of the warehouse building (approximately 50 square feet); 3) window glazing (Chrysotile) located within the residential house (approximately 50 linear feet); and 4) packing gasket (Chrysotile) located within the maintenance shed and pump building (approximately 150 linear feet).

Zia recommended that all regulated ACM be removed and disposed of according to all local, state, and federal regulations prior to any demolition or renovation to any of the existing Site buildings.

- **"Phase II Site Investigation Report, Peru Hill Mill Facility, Deming, New Mexico," dated February 2002, by INTERA.**

The INTERA report concluded that lead and arsenic were the primary inorganic COCs for the surface soils at the Site. Although other metals attributable to the tailings have been detected in Site soils (cadmium, cobalt, copper, and manganese) only the concentrations previously identified for lead and arsenic exceed the SSLs developed by NMED VRP and the HWB (NMED 2000). A total of 21 surface soil samples were collected at the Site and submitted to the laboratory for NMWQCC metals analysis (metals included in this list are: silver, arsenic, barium, cadmium, chromium, copper, lead, selenium, uranium, mercury, and cyanide). Laboratory analytical results indicated that surficial soils have been affected by past Site operations. All surface soil samples exceeded the NMED residential SSL for arsenic (3.9 mg/kg). Fourteen surface soil samples exceeded the NMED industrial SSL for arsenic (17 mg/kg). Fourteen surface soil samples exceeded the NMED residential SSL for lead (400 mg/kg). One surface soil sample exceeded the NMED industrial SSL for lead (1,000 mg/kg).

INTERA installed a total of 17 soil borings at the Site and collected two to three subsurface soil samples from each soil boring for laboratory analysis. Analytical results indicated that some shallow subsurface soils have been impacted by past Site operations. Arsenic, lead, zinc, and cadmium were identified in shallow subsurface soil samples above their respective residential NMED SSL (3.9 mg/kg, 400 mg/kg, 23,000 mg/kg, and 70 mg/kg, respectively). Lead was identified in two shallow subsurface soil samples above the industrial NMED SSL for lead (1,000 mg/kg). The area of impacted soil at the Site extends from the ground surface to approximately 2 feet bgs. Significant impacts below 2 feet bgs were not identified.

During the August 2001 field activities, two surface soil samples were collected in the area of the four transformers located to the south of the main mill structure and analyzed for PCBs. One

surface soil sample was identified to contain a concentration of 1.3 mg/Kg of the PCB Aroclor 1260, which slightly exceeds the NMED residential SSL for Aroclor 1260 of 1.1 mg/Kg.

Four soil borings were advanced around the perimeter of the UST identified in the Zia Phase I ESA. Subsurface soil samples collected from these soil borings and analyzed for volatile organic compounds (VOC) and total petroleum hydrocarbons (TPH) did not indicate the presence of TPH in subsurface soils. The results for subsurface soil samples found VOC concentrations were not above applicable residential or industrial NMED SSLs. All subsurface soil samples were analyzed for NMWQCC-regulated metals. Concentrations exceeding the residential NMED SSL for arsenic (3.9 mg/kg) were identified in four of the subsurface soil samples. The exceeding concentrations of arsenic ranged from 4.1 to 8.5 mg/Kg. One concentration of cadmium (77.0 mg/kg) was identified above the residential NMED SSL (70.0 mg/kg). Two subsurface soil samples were identified to contain lead (2,570 mg/Kg and 1,210 mg/kg) above the industrial NMED SSL (1,000 mg/kg) and one subsurface soil sample was identified to contain lead (504 mg/kg) above the residential NMED SSL (400 mg/kg). Two subsurface samples were identified to contain concentrations of zinc (42,700 mg/kg and 23,500 mg/kg) above the residential NMED SSL (23,000 mg/kg).

Cyanide, acids, bases, and solvents are also potential COCs at the Site. On a visit to the Site, INTERA saw no visible evidence of the laboratory building or dump pits in the area identified by former Site personnel. Subsurface soil sample analytical results did not identify concentrations of cyanide above the respective SSL. In addition, subsurface soil sample results for pH collected from the soil borings located in this area ranged from 7.66 to 8.93.

Ground water samples were collected from the four monitoring wells located at the Site. Laboratory sample results indicate that ground water has not been impacted above NMWQCC standards for metals or for VOCs. VOCs identified in ground water samples are believed to be the result of surface water infiltration into MW-03 (before it was retrofitted) and/or cross-contamination between ground water samples collected at MW-03 and MW-04. Before monitoring well MW-03 was retro-fitted, there was no wellhead protection provided at the ground surface (concrete, steel casing, and cap were absent) and surface water runoff from precipitation events readily infiltrated the monitoring well.

- **"Abandoned Underground Storage Tank Removal Report, Peru Hill Mill Property, Deming, Luna County, New Mexico" dated April 8, 2002, by Zia Engineering & Environmental Consultants, Inc.**

A 560-gallon steel petroleum UST was removed from the Peru Hill Mill main mill area by Zia on behalf of the COD. Four pencil-sized holes were found in the sides of the UST. A soil sample taken from the base of the UST excavation was analyzed for petroleum hydrocarbons. The laboratory results indicated that petroleum hydrocarbons were not present in the soil sample above laboratory detection limits. The UST was removed from the Site and disposed of at the COD landfill. A complete copy of this report is included in Appendix A.

- **"Ground Water Monitoring Report, Peru Hill Mill, Deming, New Mexico," dated July 2002, by INTERA.**

INTERA completed a second round of ground water sampling in May 2002. All ground water samples were analyzed for dissolved metals (antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, nickel, selenium, thallium, and zinc) using EPA Methods 6010, 6020, and 7010. No metals were identified in any of the ground water samples above any of the applicable NMED NMWQCC standards.

- **"Derivation and Application of Soil Screening Levels for Peru Hill Mill, Deming, New Mexico," dated November 15, 2002, prepared by Neptune and Company, Inc.**

INTERA contracted Neptune and Company (Neptune) of Los Alamos, New Mexico to perform a recommendation regarding a Site-specific arsenic SSL for the Peru Hill Mill Site in Deming, New Mexico. Neptune calculated risk-based SSLs for arsenic using reasonable maximum exposure and central-tendency exposure assumptions. Neptune recommended an arsenic SSL of 70 mg/kg based on an industrial/occupational Site use scenario for the Peru Hill Mill Site. A complete copy of this report is included in Appendix E.

- **"Phase I Environmental Site Assessment 20-Acres of Vacant Land, Arrowhead Road, Deming, Luna County, New Mexico," dated November 22, 2005, by Zia Engineering & Environmental Consultants, LLC.**

Zia was contracted by the COD to perform a Phase I ESA on the 20-acre tract of vacant land southeast of the Peru Hill Mill facility (Figure 1). The COD chose to purchase and cleanup the windblown tailings material on this property east of the Peru Hill Mill tailings pile. The COD added this property to the Peru Hill Mill VRP Site following NMED approval. NMED approval was granted on November 3, 2006. The Zia ESA concluded the following:

1. Site reconnaissance indicated the 20-acre parcel to be a cleared, grubbed, and seeded tract of vacant land. The property has not been previously developed.

2. The Site was purchased from Mr. Jose Santos by the COD in December 2004.

3. Zia inferred the ground water flow direction in the vicinity of the Site to be roughly parallel to topographic gradient which slopes to the south and west.

4. Review of the Federal Emergency Management Agency (FEMA) floodplain records showed that the Site is located in Zone X—defined as an area outside the 500-year floodplain.

5. Review of the Natural Resource Conservation Service Soil Survey from the United States Department of Agriculture (USDA) showed that the Site was characterized by soils with moderate to moderately slow permeability.

6. Zia contacted Mr. Tom Bates from the COD for historical information pertaining to the Site. Mr. Bates stated that the COD has removed approximately 250,000 yards of tailings from the Site and moved this to the capped areas at the Peru Hill Mill facility.

7. The environmental database regulatory review did not identify any regulatory facilities within Approximate Minimum Search Distance (AMSD) for any of the environmental databases required to be searched by ASTM.

8. The Peru Hill Mill facility was identified as a recognized environmental condition location, as defined by ASTM E 1527-05, by Zia based on its distance and the topographic up gradient from the Site. The Peru Hill Mill facility is an active remediation Site within the NMED VRP. Remediation activities were performed on the Peru Hill Mill facility to minimize the potential risks to groundwater and to address more immediate issues relative to potential impacts to human health and the environment resulting from windblown dust and surficial materials. Numerous potential hazardous material sources were located on the Peru Hill Mill Site. The largest of these potential hazards was the tailings pile and related windblown dust. These tailings were the byproduct of the zinc sulfide ore milling and extraction process. Sampling indicated elevated metals concentrations of lead, zinc and arsenic above regulatory action levels. The majority of the remaining tailings have been consolidated and capped to prevent any further windblown release.

9. Zia completed soil testing on the 20-acre Site in August 2005 and found twelve of fifteen samples analyzed were over the State Industrial SSL for arsenic however all of the samples are less than the Site specific Industrial SSL developed for the Peru Hill Mill facility (70 mg/kg). NMED has indicated that the Peru Hill Mill facility specific SSL for arsenic can be extended to cover the 20-acre parcel once added to the PHM VRP Site.

- **"Phase I Environmental Site Assessment 40-Acres of Vacant Land, Deming, Luna County, New Mexico," January 4, 2007, by Zia Engineering & Environmental Consultants, LLC.**

Zia was contracted by the COD to perform a Phase I ESA on the 40-acre Henderson property southeast of the 20-acre vacant tract and the Peru Hill Mill facility (Figure 1). The COD chose to purchase and cleanup the windblown tailings material on this property east of the Peru Hill Mill tailings pile. On November 3, 2006 NMED approved the inclusion of this property to the Peru Hill Mill VRP. The Zia ESA concluded the following:

1. Site reconnaissance indicated the 40-acre parcel to have no apparent current use, but an abandoned residence was on the property.

2. The COD obtained title for the Site from Linda Nancy Vick, successor trustee of the J. William Henderson Revocable Trust on November 2, 2006.

3. Zia inferred the ground water flow direction in the vicinity of the Site to be roughly parallel to topographic gradient which slopes to the south and west.4. Review of the FEMA floodplain records showed that the Site is located in Zone X—defined as an area outside the 500-year floodplain.

5. Site reconnaissance found one water well on the Site. Zia recommended the on-site water well be plugged unless it will be used in the future, in which case the well water should be tested by a licensed laboratory to determine if the water is potable.

6. Review of the Natural Resource Conservation Service Soil Survey from the USDA showed that the Site was characterized by soils with moderate to moderately slow permeability.

7. Zia contacted Mr. Tom Bates from the COD for historical information pertaining to the Site. Mr. Bates stated that Luna County had partially scraped the surface tailing material and windblown sand in about 2000 – 2001. This material was left on the property at the request of Mr. Henderson, the property owner at the time. According to Mr. Bates, the City plans to perform remediation to remove the four existing piles and scrape the remaining property. The contaminated scrapings and piles were moved off-site to the Peru Hill Mill facility in early 2007.

8. The Peru Hill Mill facility was identified as a recognized environmental condition by Zia based on its location and the topographic up gradient, migration of windblown contaminated dust and surface soils. The Peru Hill Mill facility is an active remediation Site within the NMED VRP. Remediation activities were performed on the Peru Hill Mill facility to minimize the potential risks to groundwater and to address more immediate issues relative to potential impacts to human health and the environment resulting from windblown dust and surficial materials. Numerous potential hazardous material sources were located on the Peru Hill Mill Site. The largest of these potential hazards was the tailings pile and related windblown dust. These tailings were the byproduct of the zinc sulfide ore milling and extraction process. Sampling indicated elevated metals concentrations of lead, zinc and arsenic above regulatory action levels. The majority of the remaining tailings have been consolidated and capped to prevent any further windblown release.

9. Zia also observed, during Site reconnaissance, two 55-gallon drums on the Site. The two drums did not appear to constitute a recognized environmental condition at the time. Zia observed a septic system access pipe north of the mobile home. Based on the lack of evidence of stressed vegetation or noxious odors the on-Site residential septic tank did not appear to constitute a recognized environmental condition. Other nonhazardous trash and debris was also noted on the Site but did not appear to constitute a recognized environmental condition.

2.0 SUMMARY OF SITE SAMPLING AND ANAYLYSIS ACTIVITIES

Section 2.0 of this VRCR outlines a summary of the sampling and analysis activities that have taken place at the Site during environmental remediation.

2.1 Purpose of Confirmation Soil Sampling Investigation

INTERA performed confirmation soil sampling on behalf of NMED to provide evidence that tailings located on the Site had been adequately removed and placed within the tailings impoundment. Confirmation soil sampling was conducted in parallel to tailings excavation and occurred over time on six separate days: August 26, 2002; October 15 and 16, 2002; November 7, 2002; November 26, 2002; and June 4, 2003.

2.2 Results of Sampling and Analysis

The following subsection outlines the results of sampling and analysis activities completed at the Site.

2.2.1 Soil Sampling Methodology

The COD, NMED VRP, INTERA, and Zia personnel considered current and future Site use when they established the spacing interval for systematic confirmation soil sampling, the sampling grid size, and the number of sampling points within each grid (meeting, COD, NMED VRP, Zia personnel, May 16, 2002). Zia, on behalf of the COD, contracted a licensed surveyor to construct the sampling grid using construction staking methods. Grid areas were 300 by 300 feet each, except where locations relative to Site boundaries or other obstacles affects grid size. In all, 100 grid points were flagged and numbered from G-01 to G-100 (Figure 2). Five surface soil samples were collected from within each 300-by-300-foot sampling grid area and three surface soil samples from each grid area whose dimensions measure less than 300 by 300 feet. Sampling locations were determined using a random number generator and an x, y coordinate system. Samples from within each grid area were combined as one composite sample, assigned a sample identification number based upon the grid number for which the sample was collected, and submitted for laboratory analysis.

All grids were sampled after tailings material was excavated from a given grid area and transported to the tailings impoundment. INTERA mobilized to the Site after a substantial number of grids were excavated (knowledge of the completion of the excavation of grids was provided via verbal communication between INTERA and the COD contractor, Zia). Soil sampling was completed according to the "Voluntary Remediation Program, Soil Sampling Plan for Remedial Action Confirmatory Sampling, Peru Hill Mill, Deming, New Mexico," dated July 2002, by INTERA. This document was developed on behalf of the COD for NMED by INTERA. A summary of the results from this sampling event is provided in the following subsections.

Surface soils were collected from the top 2 centimeters of soil. Previous soil sampling at the Site indicated that the tailings impact to Site soils is largely confined to the first inch of soil. Sampling soil from the top 2 centimeters of each grid follows these findings and complies with

the depth increment commonly used in studies of potential risks posed by elevated metals that may potentially become airborne.

Figure 3 shows the grid area locations, numerical designations, and soil sample results. Grid areas located within the tailings impoundment area (G-24 through G-26, G-34 through G-37, G-45 through G-48, and G-57 through G-60) were not sampled. Some sample locations were offset from the grid because of unavoidable Site conditions, these offset distances were minimized. All deviations from the grid were documented in the field log notebook and on the soil sample location map. All sample locations were marked using a global positioning system hand-held unit and these locations were documented for future reference (if needed).

All confirmation soil samples were below the Site cleanup goals for arsenic (70 mg/kg) and zinc (69,000 mg/kg). Several grids exceeded the Site SSL for lead (1,000 mg/kg). Soil samples collected from Grids which exceeded the NMED SSL for lead (1,000 mg/kg) during initial confirmation sampling were G-6, G-13, G-15, G-16, G-17, G-23, G-31, G-70, G-82, G-84, and G-85. These grids were re-excavated and re-sampled for arsenic, lead, and zinc. A select number of grids had to be re-excavated and re-sampled a third time (Grids G-13, G-15, G-31, G-70, and G-84) before the confirmation soil sampling results were below the Site SSL for lead.

It should be noted that the COD, with permission from the NMED VRP, re-evaluated Grids 3, 4, 64, 77, 90, and 93 – 98 prior to excavation. COD asked permission from NMED to resample these Grids for lead, arsenic, and zinc because of sample variability and distance from the source. COD believed that soil within these grid areas was below Site cleanup levels for lead, arsenic and zinc and therefore did not need to be excavated. Composite soil sample results indicated that the COD was for the most part correct, composite soil samples showed these grids were below Site cleanup goals for lead, arsenic, and zinc with the exception of Grids 9 and 19. Grids 9 and 19 were then excavated and confirmation soil sampling results indicated that excavation methods were effective.

Sample handling was conducted in accordance with the Site-established Quality Assurance Project Plan (NMED 2001). Soil samples were not preserved in any special manner. Samples were collected from within each grid using stainless steel hand trowels, mixed thoroughly in a grid-dedicated plastic bag, and containerized in a 4-ounce glass bottle. To ensure that no cross-contamination occurred, hand trowels used during collection were decontaminated by cleaning with an Alconox solution, rinsing (three times) with deionized water, and wiping with a disposable towel. Field personnel who handled the samples changed gloves between grid areas and wore disposable gloves during equipment decontamination. Equipment blanks and duplicate samples were collected to assist in monitoring potential sample cross-contamination and to verify that decontamination procedures were effective.

All equipment blanks indicated that decontamination procedures were effective. No lead, arsenic, or zinc concentrations were identified in the equipment blank samples. Duplicate sample results indicated relative percent (%) differences ranging from 0.7% to 81%. The average relative % difference was 22.15%.

2.2.2 Soil Sampling Results

A summary of all soil sample results are outlined in Table 1. A complete copy of each laboratory analytical report is included in Appendix F. All soil samples were submitted to Hall Environmental of Albuquerque, New Mexico, for analysis of lead, arsenic, and zinc by EPA Method 6010. Hall subcontracted SVL Analytical of Kellogg, Idaho to perform the metal analysis.

2.2.3 Ground Water

Two ground water monitoring events have been conducted by INTERA on behalf of NMED at the Peru Hill Mill facility. Ground water samples were collected in September 2001 and July 2002 from the four ground water monitoring wells located at the Site. The ground water samples were analyzed for the priority pollutant metals (antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, nickel, selenium, thallium, and zinc) using EPA Methods 6010, 6020, and 7010.

Ground water samples were collected using a Grundfos® submersible pump and disposable bailers. Each ground water sample was field filtered prior to containerization and submission to the contract laboratory. The 2002 INTERA ground water monitoring report completed for the Site is summarized in Section 1.4.

Ground water monitoring events were also conducted by Summit Technical at the request of the COD at the Peru Hill Mill facility. Ground water sampling events were conducted by Summit Technical on January 30, 2006 and January 9, 2008. Four ground water samples (one collected from each monitoring well) were analyzed for the following dissolved metals: mercury by EPA Method 7470; barium, beryllium, cadmium, chromium, copper, lead, nickel, and zinc by EPA Method 6010B; and, antimony, arsenic, selenium, and thallium by EPA Method 6020. Copies of the laboratory analytical reports from the 2006 and 2008 sampling events are included in Appendix F.

2.2.4 Surface Water

Surface water was not characterized during the Site investigation and remediation activities, because surface water flow in the area is minimal. The Mimbres River, located approximately 2,500-feet to the southwest of the tailings impoundment, only flows during periods of heavy precipitation and runoff.

2.2.5 Air

E&E conducted limited air sampling in April 1998 to assess the respirable and total suspended particulate contaminants in ambient air and to evaluate the potential for off-site migration of dust particles from tailings. Thirty-one samples were collected and submitted for laboratory analysis for arsenic, cadmium, lead, and total suspended particulates. No concentrations were identified above applicable OSHA PELs (E&E 1998).

Ambient air samples were not monitored during remediation activities and personal and/or high-volume air samples were not collected; however, dust suppression methods were utilized (see Section 3.1.4).

2.2.6 Other Media

According to EPA and OSHA regulations, ACMs are any materials or products containing more than 1% asbestos as determined by PLM methods. Based on the analytical results from the samples, ACMs were identified in the vinyl floor tile, hopper surfacing material, window glazing and packing gaskets in four of the structures at the Site. Further analysis indicates that these materials can be defined as Category I non-friable. The ACMs were removed by the COD and disposed at Otero/Lincoln County Regional Landfill located 23 miles south of Alamogordo, New Mexico. A copy of the asbestos material waste manifest is included in Appendix I.

The contents of eight (8) 55-gallon drums were determined during the Phase II Site Investigation in order to characterize the waste for disposal. A powdery blue material mixed with soil was contained in two steel 55-gallon drums, a powdery white material mixed with soil was contained in three steel 55-gallon drums, and a brown sludge-type material contained in one steel drum. Two steel 55-gallon drums contained oil. The contents and disposal of the drums are discussed further in Section 3.1.7.5.

3.0 RESULTS OF REMEDIATION ACTIVITIES

Remediation activities were performed at the Site to minimize the potential risks to surface soil, subsurface soil, and ground water, as well as to address more immediate issues concerning potential impacts to human health and the environment resulting from windblown dust and surficial materials. These activities included the tasks listed below:

- Consolidation of the tailings pile, spill area and on-site windblown material to minimize further tailings migration by wind and water erosion;
- Closure of on-site wells to minimize the potential for direct ground water contamination;
- Removal and disposal of miscellaneous solid waste, hazardous materials, abandoned UST, and miscellaneous debris;
- Demolition and removal of on-site buildings and associated building materials;
- Removal of transformers; and
- Securing the Site from general public access.

3.1 Status of Site Remediation

The following subsections provide a description of the remedial activities.

3.1.1 Closure Plan

As discussed previously in Section 2, to address the tailings issue, COD proposed to consolidate the majority of the Site contaminated soils (tailings) within an impoundment and then install an engineered cover/cap system over the consolidated soil (tailings) materials.

By using the EPA's HELP (Hydrologic Evaluation of Landfill Performance) modeling analysis, it was determined that a cover section of approximately 24 inches of native material overlain with a 6-inch erosion cap (compacted to maximum of 90% of modified proctor per American Society for Testing and Materials D-1557) results in minimal potential for the average annual precipitation to penetrate the cover/cap (Zia 2002). Average annual precipitation rates in the area should not migrate through the cover/cap section into underlying tailings materials prior to evapotranspiration of the precipitation into the atmosphere (according to the HELP model). The HELP model demonstrates that the placement of the cover/cap as stated will reduce the potential for migration of contaminants into ground water (Zia 2002).

3.1.2 Soil Remediation

The COD utilized COD and Luna County employees and resources to conduct tailings consolidation and cover/capping activities. Tailings consolidation work began in November 2001. Based on daily field logs used by the COD, the estimated volume of contaminated soil that was consolidated and capped was approximately 2,555,520 cubic yards. The estimated volume of contaminated soil that was consolidated and capped in the secondary tailings area was approximately 231,526 cubic yards. The estimated volume of native material that was used for a 24-inch intermediate (cover) layer was approximately 175,000 cubic yards of soil and the estimated volume of material that was used for the 6-inch erosion cap was approximately 50,000

cubic yards of soil. All cover/cap material, except for approximately 38,000 cubic yards, was obtained from on-site sources. The 38,000 cubic yards of cover material (sandy soil) was imported from foundation excavation activities at the adjacent Duke Energy/Luna Power project as clean fill. The Duke Energy/Luna Power project is located east of the Site, north of Arrowhead Road. Other soil material utilized in the cover and capping activities was obtained from on-site sources (this soil was determined not to be contaminated with lead, arsenic, and/or zinc based on previous sampling activities). The consolidation of affected soils and placement of the final cover was completed in 2008.

As compared to preliminary assumptions made in the project closure report "*Final Closure / Remediation Plan, Peru Hill Mill Tailings and Surrounding Areas, Former Peru Hill Mill Site, Luna County, New Mexico,*" (Zia Engineering & Environmental Consultants, May 7, 2002), the total volume of consolidated materials was significantly greater than originally planned. The original estimate assumed approximately 680,000 cubic yards of material was to be consolidated. As indicated previously, the final estimated volume of consolidated material was approximately 1.15 million cubic yards. This increased volume resulted from a greater depth of affected soil material immediately adjacent to the tailings (greater than 6 inches of depth) than originally assumed. Also contributing to the larger volume of material than previously estimated was greater extents of affected soil material to be consolidated to the west and south based on soil sampling results conducted by INTERA and because the COD purchased additional property and thus increased the total area of the cleanup.

3.1.3 Cap Construction

To address the increased volume of impacted soil and unexpected Site conditions, the final footprint of the consolidated tailings impoundment was slightly modified from the original design (see attached Figure 4, as-built survey of the Site showing final footprint and original design outline) and the drainage swales were modified by moving them farther away from the edge of tailings (to better allow for positive drainage away from the cover and capped area). Specifically, the original footprint acreage was anticipated to be approximately 54 acres. The final footprint acreage was approximately 45 acres. To make up the difference, the height of the consolidated pile was increased by approximately 1.3 feet from the original design (see attached Figure 5 and Figure 5.1). The COD, in coordination with Zia, made these modifications in the field, which are not considered to affect the overall design intent nor approach for the final cover and cap design.

The final 24-inch and 6-inch cover and cap were not installed in a portion of the northern slope of the Site to allow for additional placement of potentially contaminated materials which could be encountered once the final building foundations are removed. This area is shown on the attached as-built survey (Figure 4). However, this area was covered with clean fill material to minimize the potential for windblown dust and to limit precipitation infiltrating through the tailings. Once the buildings are removed, if additional contaminated soils are encountered, they will be consolidated into the northern slope and the final cover and cap section will be placed. If buildings are not removed prior to July 2004, then the final cover and cap section will be placed on the northern slope regardless. The cover of the secondary tailings impoundment is similar in design, materials, and construction as the primary tailings impoundment.

Material type, placement, and compaction testing of the consolidated tailings and cover/cap soils was field verified by periodic Site visits and testing conducted by Terracon (Terracon was contracted by the COD to provide construction testing oversight). Copies of the laboratory analyses and field density reports that were performed by Terracon are included in Appendix G. The copies of the laboratory analyses on the intermediate and final cap layers on the primary tailings pile were conducted to confirm that compaction requirements were met as outlined in the project specifications. Based on the laboratory analyses submitted by Terracon, final placed materials met or exceeded design specification requirements for material type and compaction.

Field verification for the thickness of the intermediate and final cap layers was performed on the tailings pile. Twelve random locations were determined and hand-augered by Zia personnel to verify depth. Table 2 indicates the location and depth of the layers. At all locations the intermediate layer was a minimum of 24 inches in depth and the final cap layer was a minimum of 6 inches in depth. These results confirm the cover and cap were constructed as per the project specifications. In summary, the spill area and windblown tailings identified as having elevated concentrations of lead, arsenic, and zinc above regulatory action levels were consolidated, covered, and capped by COD and Luna County personnel in compliance with the approved Closure/Remediation Plan as developed by Zia. Testing and sampling conducted during the closure and capping activities indicate that the areas having elevated concentrations were addressed, materials were placed in the final cover/cap area as generally designed, and the final 24-inch and 6-inch cover and cap layers were placed per design requirements (including material type, depth, and compaction).

3.1.4 Ground Water

Ground water remediation was not required at this Site because sample results indicate that ground water has not been impacted. Seven existing on-site water supply wells were abandoned to minimize the potential for contamination caused by surface infiltration.

In Zia's initial Phase I ESA, there were several wells and suspected wells that were identified within the property boundary and Site location (Zia 2001). The COD used data from the ESA to verify all suspected well locations. Based on COD activities, five of the suspected locations were identified as being water supply wells. The remaining well locations were identified as either miscellaneous piping or stub-outs from abandoned on-site buried utilities. In addition to the identified locations, the COD identified three other wells on Site as they conducted tailing consolidation activities (these were not identified during the Phase I ESA). The current monitoring well locations, as well as the water supply wells, the abandoned water supply wells, and those suspected wells identified in the Zia Phase I ESA are shown on Figure 6.

A total of seven on-site water supply wells were abandoned in place (four water supply wells were abandoned using concrete and three were backfilled using inert soil). One water supply well (No. 3) located near the main mill area and adjacent to the Site water tank was rehabilitated and is currently used to supply water to the Site during remedial activities. Water supply well 1 was closed using 16 cubic yards of concrete and water supply wells 2, 7, and BH were closed using 8 cubic yards of concrete each. As mentioned previously, water supply well No. 3 is currently in use. Water supply well No. 6, located due west of the main mill area, has not been

abandoned and the well casing is currently covered with a steel plate at the ground surface. Water supply well No. 6 is currently not in use and was not abandoned because the COD felt its location was far enough away from the main mill area and the tailings pile to not be threatened by Site remedial activities and/or future Site activities.

The three wells that were found during remedial activities were abandoned by the COD by filling these water supply wells with soil. These three water supply wells were observed to be large diameter (>2 feet) and were located south and southwest of the tailings pile. These water supply wells were not identified in the previous assessment reports and were discovered by the COD during the consolidation of the tailings. These water supply wells are believed to have been hand-dug and stones with mortar were placed in the soil boring to keep the boring from collapsing. Numerical designations for these three water supply wells are labeled as Wells No. 8, 9, and 10 for purposes of this VRCR, and their locations are shown on Figure 6.

3.1.5 Surface Water

To address erosion and runoff control issues from on and around the tailings pile, a detailed hydrologic analysis of the Site and surrounding areas was conducted by Zia to identify flow characteristics. The U.S. Army Corps of Engineers' HEC-HMS Hydrologic Modeling System was used to perform computer modeling of both off-site and on-site storm water runoff. The purpose of this investigation was to evaluate the amount of runoff that enters the tailings area from any adjacent watersheds (Zia 2002).

The Rational Method was used to perform computer modeling of on-site storm water runoff from the final cover and cap areas of the tailings (Zia 2002). The rational method is used around the world for peak flow estimation of small rural drainage basins. The rational method equation is given below:

$$Q = kCiA$$

where:

- Q - peak flow (cfs).
- k - conversion factor equal to 1.008 (SI) or .00278 (metric).
- C - dimensionless runoff coefficient.
- i - rainfall intensity (in/hr).
- A - catchment area (acres).

Based on this evaluation, surface flows were estimated. Swales and rundowns were designed to control surface runoff and upstream flows from the cover/cap area and to direct the flows away from the covered areas. Swales were placed as appropriate along the foot of the capped areas to guide runoff away from the slope faces and toward the nearest accessible wash. In addition, two pond areas and a swale were installed to further control Site runoff and direct off- and on-site flows around the final cover and cap area. The pond areas were designed by Zia to such a size to assure that they would not require permitting through the New Mexico Office of the State Engineer as a Dam Structure.

The as-built drawing (Figure 4) shows the location of the drainage paths, ponds, and swale installed to direct the flows away from and around the consolidated tailings pile. Based on the final grading and construction of these structures, the final cover and cap area as constructed is adequately protected from significant erosion resulting from on-site runoff as well as from runoff from the pile itself.

3.1.6 Air

Dust was abated during the relocation of the contaminated materials (tailings) by frequent water spray in the immediate areas of soil consolidation. Water was applied by hose or with a water truck during the entire length of the construction period. Water was applied to minimize the potential for contaminated windblown dust leaving the Site while materials were being consolidated as well as for COD worker protection purposes.

In addition, while not originally planned as part of closure activities, the COD planted pine trees along the western edge of the Site to serve as a windbreak for additional dust control. The final consolidated tailings and the majority of surrounding disturbed areas have been covered with a gravelly native soil to further minimize windblown dust. The final gravel cap layer was "seeded" in August and September 2003 with a native seed mix from Curtis and Curtis, Inc. (Bates 2008). The seed mix was planted to promote the development of some vegetative growth over the area. The presence of the vegetation has further enhanced evapotranspiration of moisture and reduced wind and water erosion of the cap material.

3.1.7 Other Media

Other media (PCB contaminants, asbestos, etc.) are discussed in Sections 3.1.7.1 through 3.1.7.5 of this VRCR. Other media requiring attention from the COD are PCB contaminants, asbestos containing materials, an underground storage tank, construction building materials, and hazardous materials.

3.1.7.1 PCB Contaminants

During the Phase II Site characterization an area of stained soil adjacent to two pad-mounted transformers was determined to be impacted by PCBs. One sample concentration was determined to be slightly higher than the NMED residential SSL for Aroclor 1260. The stained soil was excavated and placed within the tailings impoundment (approximately 0.5 yards). Confirmation of removal of impacted soil was conducted by visually observing the area (soil samples for confirmation laboratory analysis were not collected by the COD). The COD has indicated that all stained soils previously determined to be impacted by PCBs were removed and placed within the tailings impoundment. This action was not part of the COD remediation plan nor was this action approved by any NMED Bureau. The COD feels this action sufficiently addresses the PCB-soil contamination because the soil is located within the tailings impoundment so no direct exposure can occur and is sufficiently capped to prevent infiltration and/or ground water impact of PCBs.

The two pad-mounted transformers along with another pad-mounted transformer located approximately 150 feet to the north (within the mill area) and a pole-mounted transformer (which

has been removed from its pole and placed within the main mill area) were removed from the Site on March 8, 2003, by Rinchem Company, Inc. (Rinchem) of Chaparral, New Mexico. Zia sampled the oil within the single pad-mounted transformer in January 2002 and it was determined to be non-PCB. The oil within the pole-mounted transformer is believed to contain PCBs based on the assumed age of the transformer (the oil was not sampled by either Zia or the COD). Copies of the PCB sampling results are included as Appendix H.

In addition, based on the identified age and manufacturer information obtained by Zia personnel from fluorescent light ballasts located within the main mill and crusher buildings, it is highly likely that these light ballasts contained PCBs. These light ballasts were removed by Rinchem in August 2004 and disposed of according to all federal, state, and local regulations. Disposal manifests provided by Rinchem are included along with the PCB oil sample laboratory analysis in Appendix H.

3.1.7.2 Asbestos Containing Material

An asbestos survey of the Site area buildings was conducted on June 12, 2001, by Mr. Kevin Salcido of Zia Engineering. Based on this investigation, minor amounts of ACM were identified within the floor tile in the residential house (15% Chrysotile), as well as the tan window glazing (2% Chrysotile); hopper surfacing material (55%) adjacent to the warehouse building; and packing gaskets located in the pump house and maintenance shop (40–50% Chrysotile). The regulatory limit for a determination that a material contains asbestos is 1%.

Employees from the COD removed, bagged, and disposed of the ACMs at the Otero/Lincoln County Regional Landfill located approximately 23 miles south on Highway 54 from Alamogordo, New Mexico. All abatement activities were conducted under the direction of a COD employee, Mr. John Delgado, certified for Asbestos Hazards Emergency Response Act (AHERA) asbestos abatement activities (AHERA Certification No. NES950512007). Appendix I contains a copy of the asbestos waste manifest for disposal at Otero/Lincoln County Regional Landfill dated November 7, 2002.

3.1.7.3 Underground Storage Tank

Based on the May 2001 Phase I ESA conducted by Zia, piping and a "fuel island area" characteristic of an UST were observed on the Site during the Zia Site reconnaissance. COD personnel excavated in and around the location of the abandoned UST on February 18, 2002. The excavation work was conducted under the supervision of Zia Engineering personnel within the main mill area of the Site. The COD conducted the excavation work to expose the UST and prepare it for removal by a licensed contractor. The UST removal activities were completed on the morning of February 19, 2002, by Molinas Plumbing and Backhoe Service (contracted directly by the COD), Contractor License #28131. Zia measured the tank immediately after it was excavated from the subsurface and determined it to be approximately 560 gallons. It was oriented horizontally in an east-west direction with the top of the tank located approximately 2 feet bgs. The total depth of the excavation was approximately 6 feet. The tank was found to be metal with a single dispenser riser located directly above it. The tank was determined to be empty and dry ice was used to evacuate the air vapors from the tank by Molinas Plumbing. Molinas Plumbing then placed cloth straps beneath the tank on each side and lifted it from the

excavation pit. Upon removal, the tank was inspected and found to be in poor condition with four pencil-sized holes located in the sides.

Within the bottom of the excavation, a small area (approximately 2 feet square) located immediately beneath the tank showed slight evidence of discolored soils. Soils consisted of very tight clays and/or caliche immediately beneath the bottom of the tank.

Mr. Fred Small, New Mexico Certified Scientist (CS #108), conducted field screening for the presence of aromatic hydrocarbon vapors using a photoionization detector (PID). The PID registered no hydrocarbon vapors either from the general excavation area or from a soil sample which was removed from underneath the excavated area of the UST and allowed to volatize within a sealed glass jar. A second soil sample was taken from within the central area located immediately underneath the UST location. The soil sample was placed on ice and submitted to Hall Environmental Analysis Laboratory under proper chain of custody for analysis using EPA methods 8015B and 8021BA. The analytical results indicated that hydrocarbon components were below laboratory detection levels.

Upon completion of the field sampling, Molinas Plumbing loaded the UST onto a flatbed transport, removed it from the Site, and disposed of it at the COD Landfill.

A complete copy of the Zia UST Removal Report is included in Appendix A. In addition, a complete copy of the NMED PSTB Inspection Report, dated February 19, 2002, is included in Appendix A. The NMED PSTB Inspection Report indicates that no evidence of a release or spill was observed during UST removal activities. The UST excavation was filled with soil backfill to bring the excavation to even grade with the existing ground surface.

3.1.7.4 Construction Building Materials

Building materials that do not contain hazardous materials were retained by the COD. The COD salvaged some of the former on-site milling equipment located within the main mill area. The COD refurbished and now maintains the main mill area warehouse building (a.k.a. Barite Building). Other non-hazardous waste materials not salvaged were disposed of at the COD municipal solid waste landfill.

Approximately 925 tons of wood has been transported off of the Site and disposed of at the municipal landfill. Approximately 160 tons of scrap metal and mining equipment have been removed from the Site by Ore Pro Equipment Sales of Tucson, Arizona. The demolition of the Ball Mill Building started in February 2007 and was completed in June 2007 (Bates 2008). The demolished concrete from the buildings and foundations was removed and placed on-site in an old ponding area located to the west of the former mill structures. Concrete slabs and foundations buried below 3 feet remain in place (slabs or foundations above the 3-foot line were removed, demolished, and placed on Site in the old ponding area) (Bates 2008).

3.1.7.5 Hazardous Materials

Additional hazardous materials identified by INTERA included miscellaneous processed ores, soil, and dust contained in 55-gallon drums in and around the mill buildings (INTERA 2002). Please see Section 2.2.6. A total of six 55-gallon drums were characterized. Five 55-gallon

drums did not contain RCRA contaminants (i.e., those constituents whose concentration levels are used to distinguish a waste material as either solid waste or hazardous waste). One drum was determined to be classified as hazardous because of the level of cadmium identified in the waste characterization sample. Cadmium was identified at a concentration of 1.2 milligrams per liter (mg/L) (TCLP); and the RCRA level for hazardous waste determination is 1.0 mg/L cadmium (TCLP). These solid wastes were transported and dumped within the tailings impoundment. The COD also placed the contents of the hazardous waste drum within the tailings impoundment along with the other consolidated contaminated soils.

Two 55-gallon steel drums were identified to contain oil. These drums were transported to the main mill warehouse area for temporary storage. The two drums, which contained oil (specifically turbine oil used to lubricate well pumps) were removed and disposed of by Nunn Waste Management located in Anthony, Texas. A copy of the oil disposal manifest is included in Appendix J.

3.2 Planned Long-Term Remediation System Operation and Maintenance

The COD will be responsible for conducting the operation and maintenance on the capped area at the Site (Zia 2002). The following sections detail the activities to take place. The contact information for the responsible agency will be:

City Administrator
City of Deming
309 South Gold Street
Deming, New Mexico 88031
(505) 546-8848

3.2.1 Inspection Plan

The COD will conduct an inspection of the Site at no less than once every six months for signs of potential erosion and also for signs of damage by wildlife (burrowing animals) for a minimum period of 10 years (Zia 2002a). During periods of heavy precipitation, inspections will occur more frequently to verify the integrity of the drainage system and review the Site cover for signs of potential erosion. Inspections will be accomplished by walking throughout the closed areas and producing written reports with photographs which document observations made by the inspector. On-site inspections will be conducted by the COD bi-annually for a period of not less than 10 years following construction of the cap (Zia 2002a).

3.2.2 Monitoring Plan

At present, four ground water monitoring wells will remain in place at the Site. Based on discussions with the NMED, the COD will conduct sampling of these four monitoring wells in 2011 and 2016. Depending upon sampling results from these two sampling events, the COD may petition to the NMED for cessation of ground water sampling activities. Copies of all ground water monitoring reports will be provided to the NMED not less than 30 days after receipt of analytical data from the laboratory. The frequency and extent of monitoring is a slight modification of the planned activities as identified by the Final Closure/Remediation Report (Zia

2002a) in response to comments and input from the NMED. No annual sampling of the soil is anticipated at this time.

3.2.3 Maintenance Plan

The COD will employ a series of preventive and corrective maintenance procedures to preserve the integrity of the closed Site. If the erosion layer of the cover has been eroded or damaged, or if other problems resulting from settlement, subsidence, or displacement are detected, the cover will be repaired using similar on-site material. If erosion occurs to an extent necessitating repair of the cover due to concentrated surface runoff, a review of erosion/runoff control structures will occur to determine if, due to subsidence or other altered field conditions, revisions or additions to the structures are required. It is currently proposed that active maintenance be for a period not less than 10 years. The assumption is that within a 10-year period of time the capped area will have revegetated and stabilized relative to erosion and/or settlement. The COD conducted reseeding activities in August and September 2003. The Site was reseeded using a native plant mix of grasses from Curtis and Curtis, Inc. (Bates 2008). This native vegetation plant mix was used to stabilize the excavated and capped areas.

3.2.4 Site Security

Site security has been implemented at the Site as part of the general remediation activities. Security measures already taken include: rehabilitation of the boundary barbed wire fencing, installation of a gate and lock system at the entrance to the Site in October 2007, and regularly scheduled patrolling of the Site by the COD police enforcement agency. The COD has installed a secondary fence system located around the foot of existing consolidated and capped tailings pile to further minimize access and potential damage to the cover/cap system. In addition, an environmental easement was filed with Luna County on November 5, 2007 for the secondary fence area for future protection of the final cover/cap area. A copy of the environmental easement is included in Appendix L.

Site gates and fences will be regularly inspected as part of the ongoing monitoring plan for the Site. In addition, periodic COD police enforcement agency patrols will continue to occur to minimize the potential for vandalism and to minimize COD liabilities.

3.2.5 Summary of Planned Operation and Maintenance Activities

Operation, maintenance, and Site security measures taken by the COD are in conformance with or exceed proposed activities as identified in the Final Closure/Remediation Plan (Zia 2002a). Regular and periodic inspections of the cover and cap system will be performed by the COD. On-site drainage structures will be inspected and results provided in the long-term monitoring reports. In addition, periodic inspection and maintenance of fencing and gate systems will be conducted by the COD in conjunction with inspection of the cover/cap area and drainage systems. Site security and establishment of the permanent environmental easement will further help to minimize the potential for damage to the cover and cap area as well as to protect the area from inadvertent development in the future.

3.3 Site Activities After 2003

Zia completed and submitted a Final Closure and Remediation Plan for the Peru Hill Mill Site, VRP Site #53023003, on May 7, 2006 (Zia 2006). Further tasks were completed after the 2006 Zia submission.

Based on the information submitted by Zia and the COD, the remediation appears to be complete at the Site. INTERA was not involved in any of the Site activities since 2003. INTERA does not necessarily endorse the work of Zia and/or the COD. INTERA has simply summarized all information provided by the COD and Zia to the best of our ability. The following activities have been completed at the Peru Hill Mill Site by the COD and/or Zia after 2003:

3.3.1 Property Additions to the Original Voluntary Remediation Agreement (VRA)

The Final Closure and Remediation Plan developed by Zia for the Peru Hill Mill Site recommended stabilization of windblown material lying east of Peru Hill Mill Road (Zia 2002a). The COD chose to pursue purchase and cleanup the 20-acre tract east of the Peru Hill Mill and remove the windblown tailings material from this property (Figure 1.1). This property was sampled in 1998 by E & E and was found to contain elevated levels of arsenic and lead (E & E 1998 and Zia 2006). The COD requested that the Peru Hill Mill 2003 VRA be amended to include this 20-acre property. In addition, the COD also requested an adjacent 40-acre property to be added to the Peru Hill Mill VRA. E & E found elevated levels of arsenic and lead on this property as well. In November 2006, the COD also obtained title to this 40-acre parcel of land from Linda Nancy Vick, successor trustee of the J. William Henderson Revocable Trust. The 40-acre parcel added to the Peru Hill Mill VRA is known as the Henderson tract. The Henderson property is located east of the 20-acre tract purchased by the COD in 2004 (Figure 1.1). The 20-acre tract is known as the "City of Deming 20-acre tract." The following subsections provide a description of the remedial activities conducted at these two additional Peru Hill Mill properties.

In December 2005, a Phase I ESA was prepared by Zia for the 20-acre parcel purchased by the COD in 2004. This report was submitted to NMED VRP along with a request for inclusion of the parcel in the VRA for Peru Hill Mill. In January 2007, Zia prepared another Phase I ESA for the 40-acre Henderson property which was submitted to the NMED VRP along with a request for its inclusion in the VRA for Peru Hill Mill. (See Section 1.4 "List of Reports Submitted to the Voluntary Remediation Program" for summaries of both Phase I ESAs). Both the 20-acre property and 40-acre Henderson property were included into the Peru Hill Mill VRA on November 3, 2006 by NMED.

3.3.2 2005 Sampling and Remediation

During August 2005, Zia completed soil sampling, material sampling, and wipe sampling at the Peru Hill Mill Site and the COD 20-acre tract (Zia 2006) (Figure 10 and 11). A copy of the Sampling Plan and Results can be found in Appendix K, along with the *Final Closure/Remediation Plan Addendum* submitted by Zia. The Zia Sampling Plan called for drilling and sampling in areas around the Peru Hill Mill Site that were previously identified as having potential for soil contamination. The COD 20-acre tract was also sampled by Zia for

windblown tailings contamination and the secondary tailings pile was sampled by Zia to determine the need for capping and surveyed for the filing of an environmental easement. Samples were collected at various depths to determine the depth of impacted soil to be remediated. In addition, wipe samples were collected from the concrete floor, aluminum siding and steel framing of the Ball Mill and Barite Building to analyze for the presence of lead dust.

Results from this sampling event showed no contamination under the buildings or inside the Ball Mill Building water tank located west of the Ball Mill Building. Samples collected near the Ball Mill Building (B-16 and B-17) and near the Barite Building (B-5 and B-13) (Figure 10) showed elevated levels of lead contamination exceeding NMED Industrial SSLs (Zia 2006). Arsenic concentrations at these sampling locations exceed the NMED Industrial SSL but are lower than the site-specific arsenic cleanup level (Zia 2006). Zia recommended the removal of the contaminated soils in these areas. Varying levels of contamination were found under the two concrete pads south and southwest of the Ball Mill Building, in the on-site tanks, and at various soil sampling locations throughout the Peru Hill Mill Site. Contaminant levels at the COD 20-acre parcel and in the newly created 3.26-acre secondary capped tailings pile were below the site-specific cleanup level of 70 mg/Kg for arsenic (Zia 2006).

August 2005 wipe samples collected from the interior of the Ball Mill and the Barite Buildings showed elevated levels of lead and zinc (Figure 11) (Zia 2006). Zia recommended that the COD power-wash the interior of the buildings (Zia 2006). The COD personnel power-washed the interior of the two buildings in 2006 and moved the soil from the wash water pooling area to the north face of the primary tailings pile (Zia 2006). The 2005 sampling also revealed lead and arsenic contamination above NMED Industrial SSLs in the interior of the Ball Mill Building under the concrete flooring (Zia 2006). After removing a portion the concrete flooring in the Ball Mill Building and scraping the soil to a minimum depth of 24 inches, the COD determined that the time and cost of saving the building was not in their best interest. The Ball Mill Building and two adjacent concrete pads were demolished and removed from the Site in late 2006, early 2007.

During the summer and fall of 2005, the COD scraped a minimum of 24 inches of sediment from the COD 20-acre parcel located east of the Peru Hill Mill in an effort to remediate the windblown contamination (Zia 2006). This material was transported back to the Peru Hill Mill Site and a 3.26-acre secondary capped tailings pile was created northwest of the Barite Building (Figure 1) (Zia 2006). The August 2005 sampling event revealed contaminant levels below the Peru Hill Mill SSLs for arsenic, lead, and zinc (Zia 2006). Removal of the windblown contaminants was completed in early 2006 and the Site was ripped in February 2006 (Bates 2008). In April 2007, the COD scraped and removed the windblown material from the Henderson tract and placed it on the 3.26-acre secondary tailings pile (Zia 2008). This tract was also ripped in April and May of 2007 and these areas were not directly re-seeded by the COD (Bates 2008).

The demolition of the Ball Mill Building started February 5, 2007 and was completed in June 2007 (Bates 2008). In May and June 2007, the demolished concrete from the buildings and foundations was removed and placed on-site in an old ponding area located to the west of the former mill structures. Concrete slabs and foundations buried below 3 feet remain in place (slabs or foundations above the 3-foot line were removed, demolished, and placed on-site in the old ponding area) (Bates 2008).

The COD also removed all concrete pads (with the exception of the two mentioned above) remaining at the Peru Hill Mill Site in 2005-2006 (Zia 2006). The area under the pads was scraped down to a minimum depth of 24 inches and the soil and concrete was placed on the north face of the primary tailings pile. Confirmation soil samples were collected at the base of the excavation and soil concentrations for arsenic, lead, and zinc were below the site-specific cleanup levels for these three metals (Zia 2006).

During April, May and June of 2006, the COD also removed wooden ore storage bins from the north side of the Ball Mill Building (Zia 2006). City personnel removed as much of the raw ore product found in some of the bins and placed it on the north face of the primary tailings pile 2005-2006. The beams and boards of the bins were disposed of in the COD landfill in 2007 (Zia 2006).

The August 2005 sampling also revealed high levels of arsenic and lead contamination in the east clarifier tanks (Zia 2006). The COD disassembled and sandblasted the tanks to remove the contamination in February 2007 (Bates 2008). The contaminated material and tank supports were placed on the north face of the primary tailings pile. The upper portions of the metal tanks were sold as scrap. The area between the two east clarifier tanks had high levels of metal contamination from the ground surface to a depth of five feet. Since there was concern that the contamination may have spread laterally as well, the area was excavated laterally and vertically to a maximum six foot depth (Zia 2006). Confirmation sampling results from this area indicate that the remediation activities were effective and the remaining metal concentrations in soil are all below applicable NMED industrial SSLs (Zia 2008).

A railroad car located behind the Ball Mill Building was power-washed and relocated to the northwest quarter of Section 18 by the COD in 2005 and 2006 (Zia 2006).

3.3.3 Confirmatory Sampling and Final Remediation

In July 2007, Zia conducted follow-up confirmation sampling for the Peru Hill Mill area and the COD 20-acre tract. The confirmation sampling was to verify removal of contaminated soils exceeding the SSLs identified in the August 2005 sampling. Sampling was also conducted at the Henderson tract, recently purchased by the COD, and the northwest quadrant of the Peru Hill Mill property (Figure 12). The northwest quadrant of the Peru Hill Mill Site had been removed from the VRP as requested by the COD, but the COD had requested this area to be added back into the VRP (Zia 2008).

Surface soil samples were collected in the numerous areas around the Ball Mill and Barite Buildings where lead contamination was identified in 2005 above NMED and site-specific SSLs for lead and arsenic (Zia 2006). Three soil samples were also collected from the north side of the Ball Mill Building where ore bins had been removed to confirm that no contamination above site-specific cleanup levels remained at this location. And five confirmatory samples were collected from the area between the two east clarifier tanks. The COD also power-washed the interior walls of the Barite Building to remove contamination found in the 2005 sampling. Follow-up wipe samples, three samples per homogenous surface, were taken to confirm adequate reduction of lead dust.

The results from the confirmation samplings showed that none of the surface soil samples from the northwest quadrant of the Peru Hill Mill property, the COD 20-acre tract, or the Henderson tract were above the site-specific industrial SSLs for lead and arsenic. Within the Peru Hill Mill area, three surface soil samples indicated lead levels above the site-specific cleanup level.

The COD was notified of the three locations of elevated lead concentrations above the site-specific cleanup level at the Peru Hill Mill main mill area. The COD conducted soil scraping in these three areas and incorporated the excavated material onto the north face of the primary tailings impoundment. In August 2007, after the additional COD excavation work, Zia re-sampled the three areas where lead levels were found above the site-specific cleanup level for lead during the 2005 confirmation sampling. One of the three sample areas still indicated a lead level above the site-specific cleanup level. The COD was notified and they conducted additional soil removal in this area. Zia re-sampled this location in September 2007 and found lead levels meeting the site-specific cleanup level for industrial use (Zia 2008).

Wipe samples from the Barite Building all exceeded the residential Housing and Urban Development standard for lead. These results were discussed with the NMED VRP staff, INTERA, and the COD. One possibility for this lead occurrence which was discussed by the COD, Zia, and NMED representatives is that the steel beams in the building had been painted with lead based paint. NMED determined that the Housing and Urban Development standards for residential standards for lead were not applicable for this building (because an industrial re-use is planned) and no further wipe samples needed to be collected (Zia 2008).

4.0 DISCUSSION OF HOW ACTIVITIES MEET THE VRP PERFORMANCE STANDARD

In order for the Site to reach closure under the VRP, the VRP risk-based performance standard must be met, as described by Subpart I, Section 110B of the VRP regulations (NMED 1999). If soil concentrations do not exceed the applicable guidelines (either Tier 1, 2, or 3), or meet the definition of background, then the VRP performance standard is met for soils. If ground water concentrations meet their applicable NMWQCC standards, or the definition of background, then the VRP performance standard is met for ground water (NMED 1999). A comparison of Site concentrations to applicable water quality standards and NMED SSL approved by the NMED is considered a Method 2 risk assessment by the VRP regulations. Applicable Method 2 standards and guidelines include but are not limited to:

a. Risk-based soil remediation guidelines developed by NMED;

b. Standards for ground water, as listed in the most recent version of the NMWQCC regulation, 20.6.1 New Mexico Administrative Code (NMAC) and 20.6.2 NMAC, or other more stringent applicable standards, as appropriate; and

c. Other applicable standards (when more than one applicable standard exists, the most stringent applicable standard will be applied) (NMED 1999).

INTERA completed a Method 2 risk assessment for ground water by comparison of ground water concentrations to NMWQCC standards. A Method 2 risk assessment for concentrations of lead and arsenic in soil was completed by comparison to their respective NMED SSLs for an industrial/occupational Site use scenario.

Ground water sample results were compared to NMWQCC Standards. Concentrations in ground water samples, collected from the four ground water monitoring wells, did not exceed their applicable NMWQCC Standards. This Method 2 risk assessment for ground water is sufficient to meet the VRP performance standard for the Site.

A Method 3 Risk Assessment was completed for the Site to develop a site-specific cleanup level for arsenic for an industrial/occupational Site use scenario. The level developed for the Site is 70 mg/kg.

Metals, specifically, lead, zinc, and arsenic were identified above the NMED SSLs for industrial properties prior to Site remediation. After completion of site-specific remediation, Site soils were identified to be below applicable NMED-developed industrial SSLs for lead and zinc. No confirmation soil samples collected and analyzed after remedial activities exceeded the concentration of 70 mg/kg for arsenic. Site soils currently meet the performance standard.

5.0 CONCLUSIONS

Site remedial activities began in November 2001 with the movement of soils into the tailings impoundment area. Completion of the soils consolidation and final cover/capping concluded in September 2007. Figure 7 is an aerial photograph of the Site pre-remedial activities. Figure 8 is an aerial photograph of the Site post-remedial activities.

Confirmation soil sampling results indicate that remaining Site soils are below the site-specific cleanup levels for lead, zinc, and arsenic (1,000 mg/kg, 23,000 mg/kg, and 70 mg/kg, respectively). In certain instances, several grids were sampled two to three times after additional excavation activities to ascertain that removal activities were effective and that all concentrations of soils above Site cleanup levels for lead, zinc, and arsenic were removed and placed within the primary and secondary tailings impoundments.

Ground water sample results did not indicate an exceedance of any ground water standard and therefore, ground water remediation activities were not required at this Site. In order to prevent potential future impacts, COD plugged and abandoned a total of seven water supply wells according to the New Mexico State Engineer Guidelines.

All other potentially hazardous materials at the Site have been removed and no longer pose a threat to human health and the environment. These include:

- PCB oil and associated transformers removal and disposal;
- Removal and disposal of asbestos containing materials;
- UST removal and disposal;
- Construction building materials removal and disposal; and
- Disposal of hazardous material and associated miscellaneous debris solid waste.

The COD acquired two properties for remediation and inclusion to the initial Peru Hill Mill VRA in 2005. A COD 20-acre tract and a 40-acre Henderson tract were added and scraped. The contaminated soils were placed within the primary tailings impoundment at the Peru Hill Mill Site. A smaller 3.26-acre secondary tailings impoundment was also created at the Peru Hill Mill Site. Confirmation sampling results at the COD 20-acre tract and the Henderson 40-acre tract indicated that the removal efforts had been effective and that elevated levels of lead and arsenic above site-specific SSLs no longer remained. At the completion of the remediation work, the entire Peru Hill Mill Site is 1,420 acres.

Based on the final grading and construction of the drainage paths, ponds and swale structures, the final cover and cap area is adequately protected from significant erosion resulting from on-site runoff as well as from runoff from the pile itself.

Operation, maintenance, and Site security measures taken by the COD and planned for the future are in conformance with or exceed proposed activities as identified in the May 2002 Final Closure/Remediation Plan.

Regular and periodic inspections of the cover and cap system and the on-site drainage structures will be conducted and documented by the COD (Zia 2002). In addition, periodic inspection and

maintenance of fencing and gate systems will be conducted by the COD on a regular basis in conjunction with inspection of the cover/cap area and drainage systems.

Site security and establishment of the permanent environmental easement will help to minimize the potential for damage to the cover and cap area as well as protect the area from potential development in the future. The COD has erected a security fence around the constructed tailings impoundment area and associated drainages. Gates were added and locked accordingly. Currently, four-strand barbed wire surrounds the majority of the Site to prevent trespass.

The VRP Performance Standard has been met for the soil and ground water media through the performance of a Method 2/3 risk assessment. In accordance with Subpart V of the VRP regulations, the COD should be eligible for receipt of a Conditional Certificate of Completion, for industrial land-use, conditional upon the maintenance of future non-residential land use and applicable Site maintenance and monitoring. Purchasers or prospective purchasers of the Site are eligible for receipt of a Covenant Not to Sue in accordance with Subpart IV of the VRP regulations (NMED 1999).

The Site remediation is complete and the COD will submit an Affidavit of Completion to the NMED VRP in the near future. Once NMED issues a Conditional Certificate of Completion the COD plans to reuse the Site as an industrial park.

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TABLES

TABLE 1
Confirmation Soil Sampling Results
Arsenic, Lead, and Zinc
Peru Hill Mill Site, Deming, New Mexico
Pre-July 2003

SURFACE SOIL SAMPLE NUMBER	Sample Collection Date	ANALYTE (mg/Kg)		
		Arsenic*	Lead**	Zinc
NMED Residential SSL (mg/Kg):		*3.9*	*400.0*	*23,000.0*
NMED Industrial SSL (mg/Kg):		*17.0*	*1,000.0*	*69,000.0*
G-1	11/26/2002	4.6	94.5	746.0
G-2	11/26/2002	3.5	83.7	865.0
COD SS-01 (Grid 3)	11/26/2002	7.0	189.0	1700.0
COD SS-02 (Grid 4)	11/26/2002	8.3	294.0	8450.0
G-5	11/7/2002	17.6	235.0	2630.0
G-6	11/7/2002	48.7	1260.0	13700.0
[illegible]	6/4/2003	6.4	[illegible]	7750.0
G-7	11/7/2002	20.2	705.0	19000.0
G-8	11/26/2002	12.9	501.0	7230.0
COD SS-03 (Grid 9)	11/26/2002	15.6	6200.0	16200.0
[illegible]	6/4/2003	2.9	[illegible]	2460.0
G-10	8/26/2002	10.0	200.0	4600.0
G-11	8/26/2002	12.0	300.0	3900.0
G-12	8/26/2002	14.0	660.0	2800.0
G-13	8/26/2002	8.8	2600.0	13000.0
G-13-R1	11/26/2002	11.2	1420.0	22100.0
[illegible]	6/4/2003	5.5	[illegible]	2100.0
G-14	11/7/2002	7.8	184.0	2080.0
G-15	11/7/2002	11.8	1400.0	13100.0
G-15-R1	11/26/2002	26.4	1760.0	19800.0
[illegible]	6/4/2003	9.2	[illegible]	12200.0
G-16	11/7/2002	40.0	1990.0	17000.0
[illegible]	11/26/2002	16.2	[illegible]	23400.0
G-17	11/7/2002	30.7	1290.0	11600.0
[illegible]	11/26/2002	2.5	[illegible]	1480.0
G-18	11/7/2002	40.6	753.0	11400.0
COD SS-04 (Grid 19)	11/26/2002	28.7	3060.0	36700.0
[illegible]	6/4/2003	8.2	[illegible]	5990.0
G-20	8/26/2002	2.0	82.0	540.0
G-21	8/26/2002	3.6	250.0	1500.0
G-22	8/26/2002	6.4	340.0	4000.0
G-23	8/26/2002	7.3	2300.0	7700.0
[illegible]	11/26/2002	4.8	[illegible]	2190.0
G-24	Will Not Be Sampled - Within Tailings Impoundment			
G-25	Will Not Be Sampled - Within Tailings Impoundment			
G-26	Will Not Be Sampled - Within Tailings Impoundment			
G-27	10/15/2002	13.1	507.0	6800.0
G-28	10/15/2002	10.3	410.0	6000.0
G-29	10/15/2002	10.9	283.0	4460.0
G-30	11/7/2002	12.4	157.0	3150.0
G-31	8/26/2002	6.6	2500.0	5400.0
G-31-R1	11/26/2002	9.3	1050.0	3090.0
[illegible]	6/4/2003	1.5	[illegible]	769.0
G-32	8/26/2002	7.4	590.0	3300.0
G-33	8/26/2002	10.0	330.0	4200.0
G-34	Will Not Be Sampled - Within Tailings Impoundment			
G-35	Will Not Be Sampled - Within Tailings Impoundment			
G-36	Will Not Be Sampled - Within Tailings Impoundment			
G-37	Will Not Be Sampled - Within Tailings Impoundment			

TABLE 1
Confirmation Soil Sampling Results
Arsenic, Lead, and Zinc
Peru Hill Mill Site, Deming, New Mexico
Pre-July 2003

SURFACE SOIL SAMPLE NUMBER	Sample Collection Date	ANALYTE (mg/Kg)		
		Arsenic*	Lead**	Zinc
NMED Residential SSL (mg/Kg):		*3.9*	*400.0*	*23,000.0*
NMED Industrial SSL (mg/Kg):		*17.0*	*1,000.0*	*69,000.0*
G-38	10/15/2002	11.8	487.0	5350.0
G-39	10/15/2002	8.2	160.0	1370.0
G-40	10/15/2002	8.8	361.0	3170.0
G-41	11/7/2002	37.1	511.0	5550.0
G-42	8/27/2002	11.0	110.0	3100.0
G-43	8/27/2002	9.9	110.0	4600.0
G-44	Will Not Be Sampled - Within Tailings Impoundment			
G-45	Will Not Be Sampled - Within Tailings Impoundment			
G-46	Will Not Be Sampled - Within Tailings Impoundment			
G-47	Will Not Be Sampled - Within Tailings Impoundment			
G-48	Will Not Be Sampled - Within Tailings Impoundment			
G-49	10/15/2002	19.2	356.0	4160.0
G-50	10/15/2002	19.8	346.0	4150.0
G-51	10/15/2002	21.0	568.0	4730.0
G-52	11/7/2002	33.1	497.0	5240.0
G-53	8/27/2002	8.0	83.0	2200.0
G-54	8/27/2002	5.7	92.0	2600.0
G-55	8/27/2002	7.2	90.0	2300.0
G-56	Will Not Be Sampled - Within Tailings Impoundment			
G-57	Will Not Be Sampled - Within Tailings Impoundment			
G-58	Will Not Be Sampled - Within Tailings Impoundment			
G-59	Will Not Be Sampled - Within Tailings Impoundment			
G-60	Will Not Be Sampled - Within Tailings Impoundment			
G-61	10/15/2002	8.6	119.0	1220.0
G-62	10/15/2002	11.4	296.0	3120.0
G-63	10/15/2002	23.0	464.0	4700.0
COD SS-05 (Grid 64)	11/26/2002	28.8	452.0	4000.0
G-65	8/27/2002	13.0	110.0	2300.0
G-66	8/27/2002	4.8	110.0	1200.0
G-67	8/27/2002	7.6	120.0	2000.0
G-68	8/27/2002	34.0	430.0	3700.0
G-69	8/26/2002	46.0	600.0	4300.0
G-70	8/26/2002	39.0	2300.0	8300.0
G-70-R1	11/26/2002	17.3	1260.0	3800.0
G-70R2	6/4/2003	2.2	29.0	228.0
G-71	8/26/2002	31.0	670.0	4600.0
G-71A	8/26/2002	25.0	730.0	5000.0
G-72	10/16/2002	15.6	858.0	4480.0
G-73	8/26/2002	17.0	960.0	5500.0
G-74	10/16/2002	4.3	87.5	682.0
G-75	10/15/2002	15.2	237.0	1890.0
G-76	10/16/2002	5.0	70.7	580.0

TABLE 1
Confirmation Soil Sampling Results
Arsenic, Lead, and Zinc
Peru Hill Mill Site, Deming, New Mexico
Pre-July 2003

SURFACE SOIL SAMPLE NUMBER	Sample Collection Date	ANALYTE (mg/Kg) Arsenic*	Lead**	Zinc
NMED Residential SSL (mg/Kg):		*3.9*	*400.0*	*23,000.0*
NMED Industrial SSL (mg/Kg):		*17.0*	*1,000.0*	*69,000.0*
COD SS-06 (Grid 77)	11/26/2002	19.0	251.0	2690.0
G-78	8/27/2002	32.0	430.0	3700.0
G-79	8/27/2002	17.0	180.0	2300.0
G-80	8/27/2002	19.0	130.0	2400.0
G-81	8/26/2002	42.0	470.0	4800.0
G-82	8/26/2002	48.0	1300.0	5800.0
[illegible]	11/26/2002	57.9	[illegible]	2880.0
G-83	8/26/2002	15.0	310.0	3900.0
G-84	8/26/2002	6.1	1700.0	6300.0
G-84-R1	11/26/2002	9.0	1110.0	3800.0
[illegible]	6/4/2003	5.9	[illegible]	846.0
G-85	8/26/2002	22.0	1300.0	6000.0
[illegible]	11/26/2002	9.7	[illegible]	5610.0
G-86	11/7/2002	46.4	530.0	3920.0
G-87	11/7/2002	51.7	432.0	3590.0
G-88	11/7/2002	39.7	396.0	3270.0
G-89	11/7/2002	34.4	421.0	3720.0
COD SS-07 (Grid 90)	11/26/2002	21.0	297.0	3020.0
G-91	8/26/2002	7.1	200.0	2300.0
G-92	8/26/2002	6.4	240.0	2000.0
COD SS-08 (Grid 93)	11/26/2002	25.2	536.0	3430.0
COD SS-09 (Grid 94)	11/26/2002	28.5	478.0	3190.0
COD SS-10 (Grid 95)	11/26/2002	20.8	384.0	2670.0
COD SS-11 (Grid 96)	11/26/2002	22.9	442.0	2890.0
COD SS-12 (Grid 97)	11/26/2002	20.4	306.0	2380.0
COD SS-13 (Grid 98)	11/26/2002	20.6	330.0	2890.0
G-99	8/26/2002	6.1	260.0	1800.0
G-100	8/26/2002	9.8	670.0	3500.0
G-101 (Duplicate of G-13)	8/26/2002	12.0	1100.0	7800.0
G-102 (Duplicate of G-05)	11/7/2002	18.6	248.0	2610.0
G-103 (Duplicate of G-02)	11/26/2002	4.9	92.9	846.0
G-104 (Duplicate of G-15-R2)	6/4/2003	10.5	738.0	10100.0

Notes:
All results reported in milligrams per Kilogram (mg/Kg)
SSL - Soil Screening Level
Yellow shading indicates a result above the applicable SSL (site determined clean-up level) for lead
Green shading indicates a result once above the SSL for lead, but now below the SSL after more excavation and re-sampling
* - The Site-specific clean-up level for Arsenic is 70.0 mg/Kg
** - Using Lead SSL when Peru Hill Mill entered the VRP in 2002

TABLE 2 FIELD VERIFICATION LAYER DEPTHS – Intermediate and Final Cap Layers, Primary Tailings Pile			
Depth Location	UTM Coordinates (NAD 83)	Intermediate Layer (inches)	Final Cap Layer (inches)
1	13S 0235504, 3577381	25"	7"
2	13S 0235640, 3577286	24"	7"
3	13S 0235738, 3577205	24"	6"
4	13S 0235449, 3577205	24"	8"
5	13S 0235631, 3577200	27"	6"
6	13S 0235444, 3577107	25"	6"
7	13S 0235543, 3577101	24"	6"
8	13S 0235871, 3577090	25"	6"
9	13S 0235807, 3577002	24"	7"
10	13S 0235533, 3577014	25"	6"
11	13S 0235553, 3577695	25"	7"
12	13S 0235642, 3576935	24"	6"

Table 3				
2005 Confirmation Soil Sampling Results				
Surface Soil Sample Number	Sample Collection Date	Analyte (mg/kg) ?		
		Arsenic	Lead	Zinc
NMED Residential SSL (mg/kg):		N/A	400.0	23000.0
NMED Industrial/Occupational SSL (mg/kg):		70.0	1000.0	69000.0
Pilings Soils Sampling				
P-1	8/9/2005	**20.2**	296	3200
P-2	8/9/2005	**33.1**	330	3300
P-3	8/9/2005	17	278	3120
Mill Area Soils Sampling				
B-12 0.0	8/10/2005	**22.5**	**2,070**	16,000.0
B-12 5.0	8/10/2005	ND	64	280.0
B-12 10.0	8/10/2005	**15.5**	**1,050**	4,510.0
B-4 0.0	8/10/2005	ND	ND	260.0
B-4 5.0	8/10/2005	ND	ND	49.0
B-4 10.0	8/10/2005	ND	ND	31.9
B-13 0.0	8/10/2005	**12.2**	**1,170**	5,220.0
B-13 5.0	8/10/2005	ND	30	28.4
B-13 10.0	8/10/2005	3.05	26	28.6
B-5 0.0	8/10/2005	**28.6**	**1,530**	12,400.0
B-5 6.1	8/10/2005	ND	97	1,470.0
B-5 10.0	8/10/2005	3.25	15	29.8
B-17 0.0	8/10/2005	**36.1**	**2,750**	16,600.0
B-17 5.0	8/10/2005	ND	21	40.6
B-17 10.0	8/10/2005	2.41	18	41.4
B-16 0.0	8/10/2005	**33.6**	**14,100**	15,400.0
B-16 5.0	8/10/2005	ND	256	288.0
B-16 10.0	8/10/2005	3.54	275	715.0
B-7 0.0	8/10/2005	**14.7**	**1,100**	23,000.0
B-7 5.0	8/10/2005	**11.9**	**820**	17,000.0
B-7 10.0	8/10/2005	3.18	25	1,260.0
B-2 0.0	8/10/2005	ND	270	2,700.0
B-2 5.0	8/10/2005	ND	ND	52.2
B-2 10.0	8/10/2005	ND	ND	46.8
B-1 0.0	8/10/2005	ND	ND	153.0
B-1 5.0	8/10/2005	ND	ND	60.3
B-1 10.0	8/10/2005	ND	ND	28.9
B-3 0.0	8/10/2005	ND	360	5,980.0
B-3 5.0	8/10/2005	ND	ND	36.7
B-3 10.0	8/10/2005	ND	ND	25.1
B-6 0.0	8/10/2005	4.41	210	1,420.0

Table 3 -continued				
2005 Confirmation Soil Sampling Results				
Surface Soil Sample Number	Sample Collection Date	Analyte (mg/kg) ?		
		Arsenic	Lead	Zinc
B-6 5.0	8/10/2005	ND	42	74.0
B-6 10.0	8/10/2005	ND	16	40.2
B-8 0.0	8/10/2005	ND	ND	288.0
B-8 5.0	8/10/2005	5.3	35	5,190.0
B-8 10.0	8/10/2005	ND	8	19.4
B-9 0.0	8/10/2005	ND	26	52.2
B-9 5.0	8/10/2005	ND	41	38.2
B-9 10.0	8/10/2005	ND	22	33.3
B-10 0.0	8/10/2005	**18.2**	**515**	6,850.0
B-10 5.0	8/10/2005	ND	43.7	71.1
B-10 10.0	8/10/2005	6.1	ND	25.4
B-11 0.0	8/10/2005	**21**	**378**	8,890.0
B-11 5.0	8/10/2005	ND	47	99.9
B-11 10.0	8/10/2005	ND	ND	ND
B-14 0.0	8/10/2005	5.34	104	617.0
B-14 5.0	8/10/2005	ND	38	43.3
B-14 10.0	8/10/2005	ND	17	21.2
B-15 0.0	8/10/2005	6.41	266	2,390.0
B-15 5.0	8/10/2005	ND	40	52.0
B-15 10.0	8/10/2005	4.22	31	497.0
20-Acre Soils Sampling				
G-1	8/10/2005	15.8	203	1540
G-2	8/10/2005	**23.5**	358	2830
G-3	8/10/2005	**20.3**	330	2490
G-4	8/10/2005	**29.1**	322	3100
G-5	8/10/2005	**27.9**	390	3390
G-6	8/10/2005	17.1	212	2100
G-7	8/10/2005	**25.1**	370	3380
G-8	8/10/2005	**24.9**	334	3400
G-9	8/10/2005	5	76.9	634
G-10	8/10/2005	**24.3**	312	3470
G-11	8/10/2005	**23.9**	286	2300
G-12	8/10/2005	**23**	360	3150
G-13	8/10/2005	**27.3**	410	3250
G-14	8/10/2005	**27.2**	378	2920
G-15	8/10/2005	**25.8**	275	2940

Note: Bold Sampling Results indicate at or above Site Specific Soil Screening Guidlines (SSSG) for Peru Hill mill, and/ or at or above HUD guidelines for Lead and Arsenic in wipe samples.

Table 3 -continued				
2007 Confirmation Soil Sampling Results				
Surface Soil Sample Number	Sample Collection Date	Analyte (mg/kg) ?		
		Arsenic	Lead	Zinc
NMED Residential SSL (mg/kg):		N/A	400.0	23000.0
NMED Industrial/Occupational SSL (mg/kg):		70.0	1000.0	69000.0
Northeast Corner of Original Property Soils Sampling				
LC-05-019.3-007	7/22/2007	ND	11	
LC-05-019.3-008	7/22/2007	ND	6.1	
LC-05-019.3-009	7/22/2007	ND	4.6	
LC-05-019.3-010	7/22/2007	ND	6.4	
LC-05-019.3-011	7/22/2007	ND	6.1	
LC-05-019.3-012	7/22/2007	ND	8.4	
LC-05-019.3-013	7/22/2007	ND	5.3	
LC-05-019.3-014	7/22/2007	ND	6	
LC-05-019.3-015	7/22/2007	ND	5.9	
LC-05-019.3-016	7/22/2007	ND	5.3	
LC-05-019.3-017	7/22/2007	ND	9.2	
LC-05-019.3-018	7/22/2007	ND	7.8	
LC-05-019.3-019	7/22/2007	ND	8.1	
LC-05-019.3-020	7/22/2007	ND	7.4	
LC-05-019.3-021	7/22/2007	ND	8.9	
LC-05-019.3-022	7/22/2007	ND	7.1	
LC-05-019.3-023	7/22/2007	ND	14	
LC-05-019.3-024	7/22/2007	ND	9.9	
LC-05-019.3-025	7/22/2007	ND	21	
LC-05-019.3-026	7/22/2007	ND	10	
LC-05-019.3-027	7/22/2007	2.6	22	
LC-05-019.3-028	7/22/2007	ND	24	
LC-05-019.3-029	7/22/2007	ND	24	
40-Acre Henderson Property Soils Sampling				
LC-05-019.3-001	7/22/2007	11	330	
LC-05-019.3-002	7/22/2007	3.9	97	
LC-05-019.3-003	7/22/2007	18	310	
LC-05-019.3-004	7/22/2007	ND	8.2	
LC-05-019.3-005	7/22/2007	ND	4.5	
LC-05-019.3-006	7/22/2007	ND	77	
Follow-up Mill Area Soils Sampling				
LC-05-019.3-EC-001-0707	7/28/2007	9.2	860	
LC-05-019.3-EC-002-0707	7/28/2007	5.6	1200	
LC-05-019.3-EC-003-0707	7/28/2007	11	610	

Table 3 -continued				
2007 Confirmation Soil Sampling Results				
Surface Soil Sample Number	Sample Collection Date	Analyte (mg/kg) ?		
		Arsenic	Lead	Zinc
LC-05-019.3-EC-004-0707	7/28/2007	4.6	400	
LC-05-019.3-EC-005-0707	7/28/2007	ND	190	
LC-05-019.3-OB-001-0707	7/28/2007	5.7	210	
LC-05-019.3-OB-002-0707	7/28/2007	3.6	110	
LC-05-019.3-OB-003-0707	7/28/2007	6.3	250	
LC-05-019.3-SBM-001-0707	7/28/2007	4.1	330	
LC-05-019.3-SBM-002-0707	7/28/2007	6.3	260	
LC-05-019.3-SBM-003-0707	7/28/2007	ND	42	
LC-05-019.3-SBM-004-0707	7/28/2007	5.4	**1200**	
LC-05-019.3-CP-001-0707	7/28/2007	ND	14	
LC-05-019.3-CP-002-0707	7/28/2007	6.5	190	
LC-05-019.3-CP-003-0707	7/28/2007	ND	36	
LC-05-019.3-CP-004-0707	7/28/2007	3.1	120	
LC-05-019.3-CP-005-0707	7/28/2007	6.4	210	
2nd Follow-up Mill Area Soils Sampling				
019.3-01	8/21/2007	14	410	
019.3-02	8/21/2007	ND	320	
019.3-03	8/21/2007	ND	400	
019.3-04	8/21/2007	ND	240	
019.3-05	8/21/2007	ND	360	
019.3-06	8/21/2007	ND	190	
019.3-07	8/21/2007	ND	210	
019.3-08	8/21/2007	ND	41	
019.3-09	8/21/2007	ND	49	
019.3-10	8/21/2007	ND	490	
019.3-11	8/21/2007	ND	9	
019.3-12	8/21/2007	ND	510	
019.3-13	8/21/2007	ND	170	
019.3-14	8/21/2007	ND	130	
019.3-15	8/21/2007	ND	260	
3rd Follow-up Mill Area Soils Sampling				
019.3-EC-001	8/21/2007	ND	140	
019.3-EC-002	8/21/2007	3.6	230	
019.3-SBM-004	8/21/2007	ND	**790**	
4th Follow-up Mill Area Soils Sampling				
019.4-SBM-004	8/21/2007	ND	57	

Note: Bold Sampling Results indicate at or above Site Specific Soil Screening Guidlines (SSSG) for Peru Hill mill, and/ or at or above HUD guidelines for Lead and Arsenic in wipe samples.

Table 4					
2005 Wipe Sample Results					
Sample Location	Sample Number	Sample Collection Date	Analyte (mg/kg) ?		
			Arsenic	Lead	Zinc
Barite Building					
Concrete	SC-1	8/9/2005	ND	ND	1.19
	SC-2	8/9/2005	ND	ND	
	SC-3	8/9/2005	ND	ND	
Steel	SI-1	8/9/2005	ND	ND	1.51
	SI-2	8/9/2005	ND	6.79	
	SI-3	8/9/2005	ND	2.89	
Aluminum	SAL-1	8/9/2005	ND	ND	
	SAL-2	8/9/2005	ND	ND	3.41
	SAL-3	8/9/2005	ND	ND	3.23
Tank (South of Ball Mill Building)					
Interior	TNK-1	8/9/2005	ND	ND	ND
	TNK-2	8/9/2005	ND	ND	ND
	TNK-3	8/9/2005	ND	ND	ND
Tanks (East of Ball Mill Building)					
Interior	A-1/A-2 Comp	8/10/2005	**72.7**	**980**	5,580
	B-1/B-2 Comp	8/10/2005	**127**	**3,680**	21,500
Railroad Car					
Interior	RC-1	8/9/2005	ND	ND	ND
	RC-2	8/9/2005	ND	ND	ND
	RC-3	8/9/2005	ND	ND	1.04
Ball Mill Building					
Tin Siding	AL-1	8/9/2005	ND	ND	6.37
	AL-2	8/9/2005	ND	ND	4.89
	AL-3	8/9/2005	ND	ND	7.16
Catwalk	CW-1	8/9/2005	ND	1.03	5.39
	CW-2	8/9/2005	ND	1.06	7.26
	CW-3	8/9/2005	ND	ND	ND
I-Beams	W-1	8/9/2005	ND	ND	ND
	W-2	8/9/2005	ND	ND	1.39
	W-3	8/9/2005	ND	ND	3.77
Wood	WD-1	8/9/2005	ND	12.9	56.9
	WD-2	8/9/2005	ND	ND	2.65
	WD-3	8/9/2005	ND	2.72	7.78
Concrete	C-1	8/9/2005	ND	ND	4.36
	C-2	8/9/2005	ND	ND	4.88
	C-3	8/9/2005	ND	ND	2.39
Concrete Pad (South of Ball Mill Building, West of Tank)					
Interior	W-1	8/10/2005	**18.9**	**9,930**	8,460
	W-2	8/10/2005	**30.9**	535	14,000

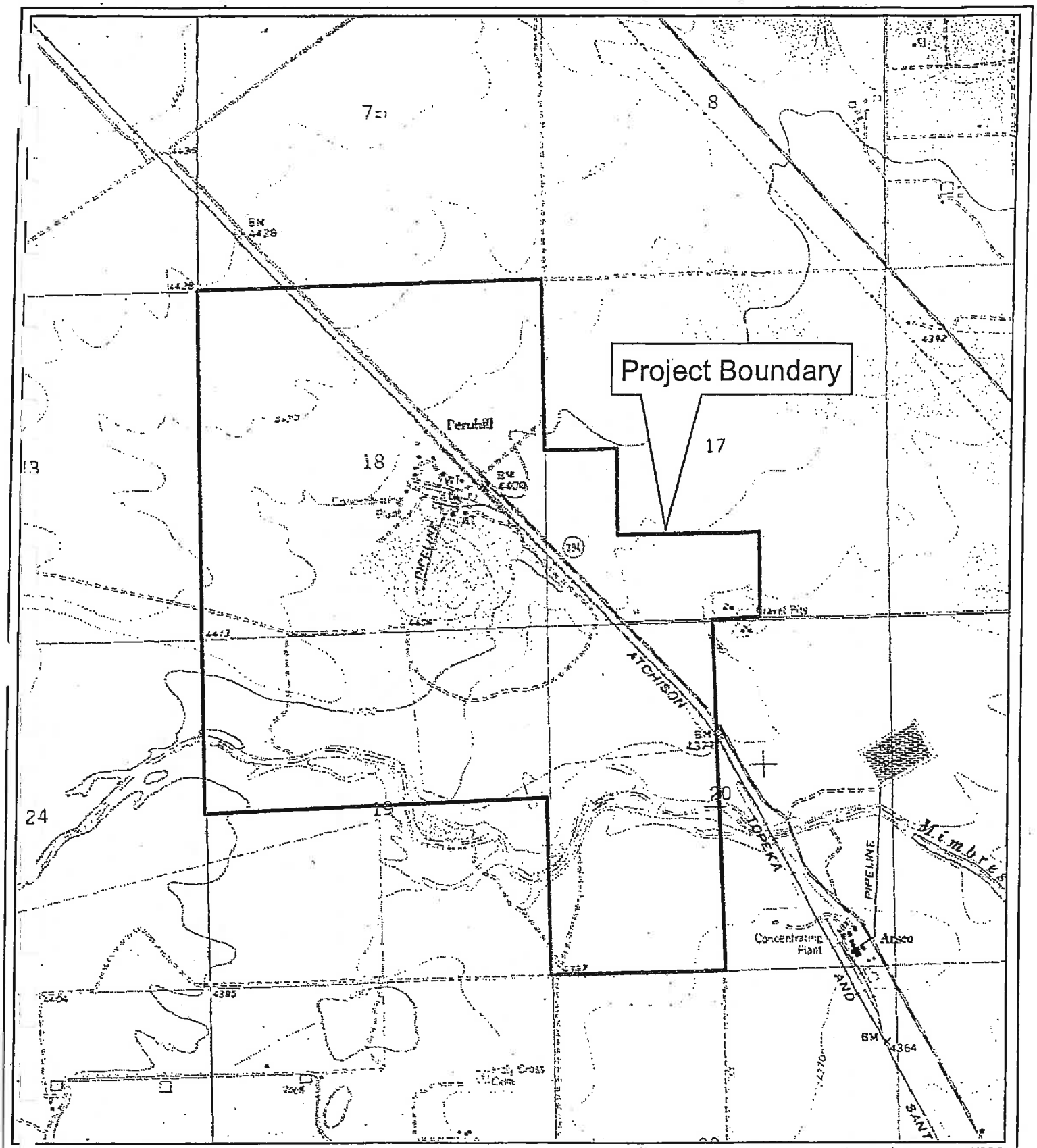
Table 4 -continued					
2005 Wipe Sample Results					
Sample Location	Sample Number	Sample Collection	Analyte (mg/kg) ?		
			Arsenic	Lead	Zinc
Concrete Pad (South of Dirt Road)					
	SW-1	8/10/2005	**37.2**	**2,400**	24,000
	SW-2	8/10/2005	12	**11,100**	3,710

Table 4 -continued					
2007 Wipe Sample Results					
Sample Location	Sample Number	Sample Collection	Analyte (mg/kg) ?		
			Arsenic	Lead	Zinc
Barite Building					
Concrete	LC-05-019.3-CN-001	7/28/2007	ND	**0.028**	
	LC-05-019.3-CN-002	7/28/2007	ND	0.0027	
	LC-05-019.3-CN-003	7/28/2007	ND	**0.021**	
Steel	LC-05-019.3-ST-001	7/28/2007	ND	**0.026**	
	LC-05-019.3-ST-002	7/28/2007	ND	0.0043	
	LC-05-019.3-ST-003	7/28/2007	ND	**0.0093**	
Aluminum	LC-05-019.3-AL-001	7/28/2007	ND	0.003	
	LC-05-019.3-AL-002	7/28/2007	ND	**0.009**	
	LC-05-019.3-AL-003	7/28/2007	ND	**0.021**	
Electrical Room					
Walls	LCS-05-019.3-EL-001	7/28/2007	ND	0.0016	
	LCS-05-019.3-EL-002	7/28/2007	ND	0.0021	

Barite Building					
Concrete	19.4-Con-1L and 19.4-Con-1A	11/7/2007	0.01	**0.022**	
	19.4-Con-2L and 19.4-Con-2A	11/7/2007	ND	0.0079	
	19.4-Con-3L and 19.4-Con-3A	11/7/2007	ND	**0.08**	
Steel	19.4-ST-1L and 19.4-ST-1A	11/7/2007	ND	**1.7**	
	19.4-ST-2L and 19.4-ST-2A	11/7/2007	ND	0.018	
	19.4-ST-3L and 19.4-ST-2A	11/7/2007	ND	**4**	
Aluminum	19.4-AL-1L and 19.4-AL-1A	11/7/2007	ND	**0.038**	
	19.4-AL-2L and 19.4-AL-2A	11/7/2007	ND	**0.076**	
	19.4-AL-3L and 19.4-AL-3A	11/7/2007	ND	**0.042**	

Note: Bold Sampling Results indicate at or above Site Specific Soil Screening Guidlines (SSSG) for Peru Hill mill, and/ or at or above HUD guidelines for Lead and Arsenic in wipe samples.

FIGURES



Source(s): Topo map – USGS

USGS 7.5 Minute Topographic Map:
Deming West Quadrangle, 1964, rev. 1972;
Contour Interval 10 Feet

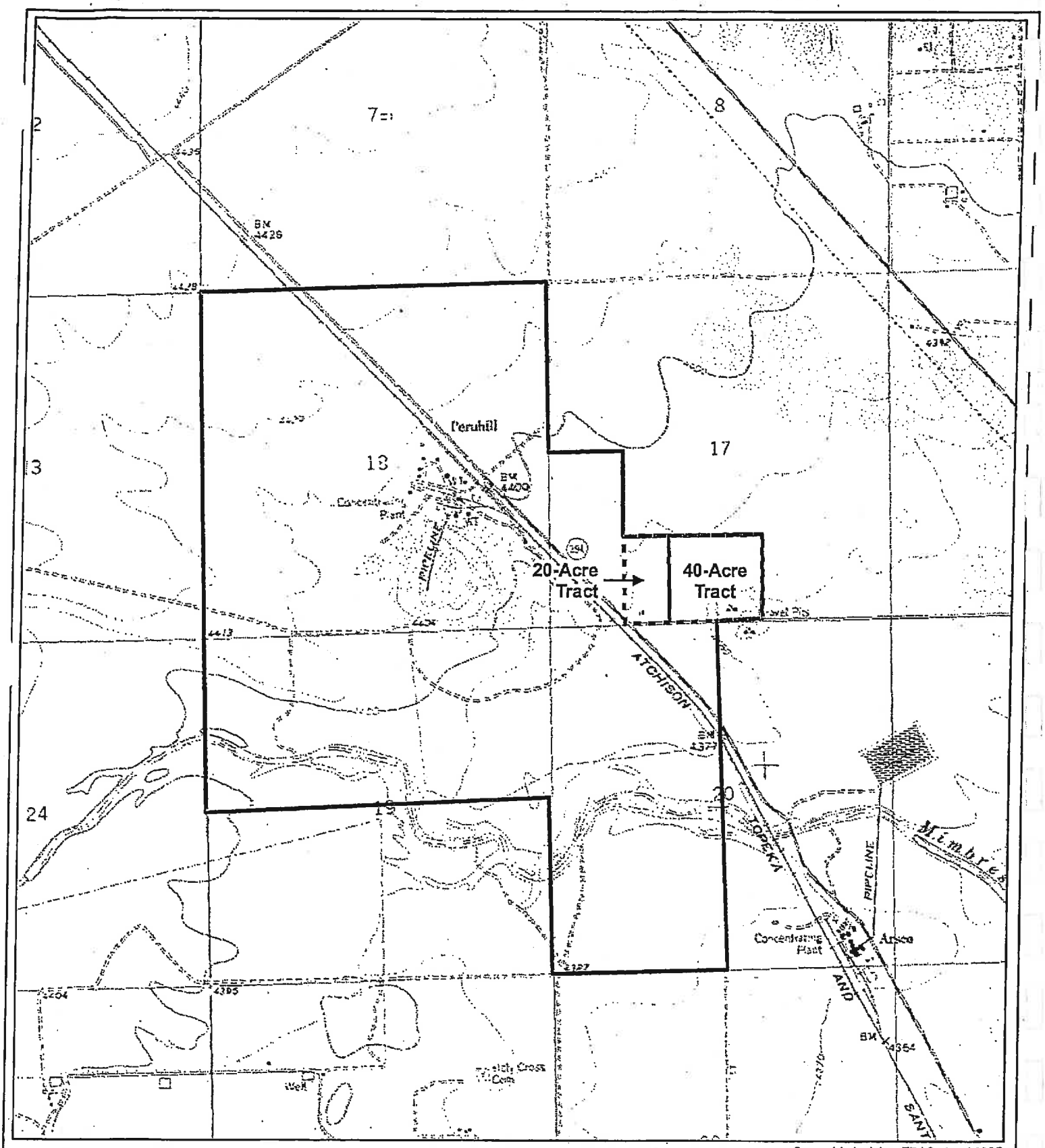
NORTH

0 1,000 2,000 4,000

Peru Hill Mill

Site Location Map

Figure 1



Source(s): Aerials – EDAC, dated 2005

NORTH

0 1,000 2,000 4,000

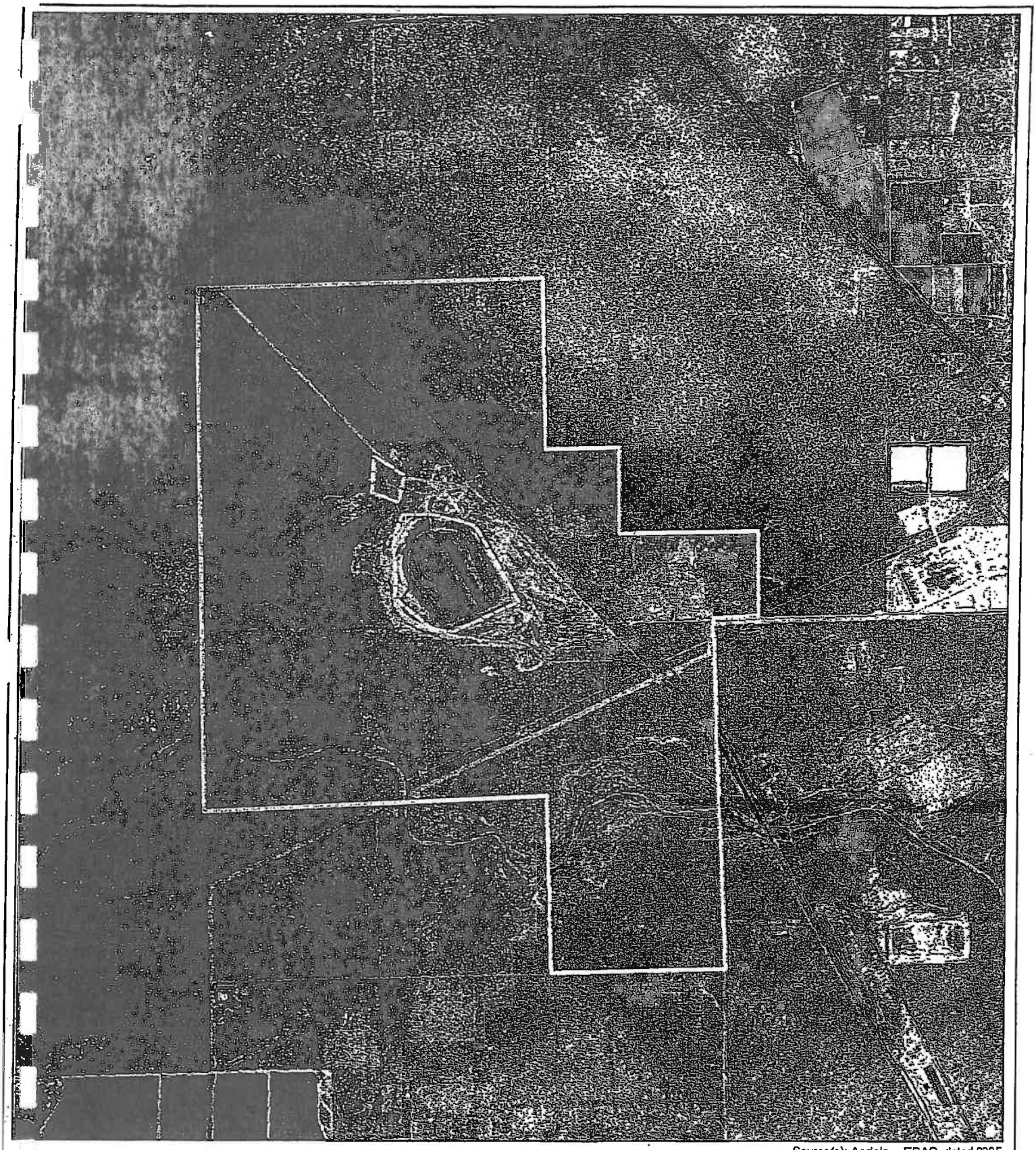
Legend

Project Boundary

Enviromental Easement

Peru Hill Mill

Additional Properties Location Map



Source(s): Aerials – EDAC, dated 2005

Legend

Project Boundary

Enviromental Easement

NORTH

0 1,000 2,000 4,000

Feet

Peru Hill Mill

Environmental Easement Map

INTERA

Figure 1.2

COMPLETION EXHIBIT "A"
STATE OF NEW MEXICO ENVIRONMENT DEPARTMENT
VOLUNTARY REMEDIATION PROGRAM
DESCRIPTION OF SITE FOR WHICH VOLUNTARY REMEDIATION IS COMPLETE,
VRP No. 53023002 - Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel

I. Tract of Land Comprising the Site.

The Application to which this exhibit is attached is valid for the property known as the **Peru Hill Mill (VRP No. 53023002 - Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel)**, a 1360 +/- acre Peru Hill Mill parcel, adjoining 20 +/- acre (recently purchased) parcel located at 3370 Peru Mill Road, N.W., and 40 +/- acre former Henderson property located adjacent to the eastern boundary of the 20 +/- acre parcel and Arrowhead Road (1420 +/- acres total area) in the City of Deming, Luna County, New Mexico. Said 1420 +/- acre voluntary remediation site is more particularly described as follows:

1360 +/- acre Peru Hill Mill Parcel

The West Half of the Southwest Quarter (W ½ , SW ¼) of Section Seventeen (17), the North Half (N ½) of Section Nineteen (19), the West Half (W ½) of Section Twenty (20), and all of Section Eighteen (18), Township Twenty-three (23) South, Range Nine (9) West.

20 Acre Parcel – (Additional)

The West Half of the Southeast Quarter of the Southwest Quarter (W ½, SE ¼, SW 1/4), Section Seventeen (17), Township Twenty-three (23) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico.

40 Acre Henderson Parcel – (Additional)

The West Half of the Southwest Quarter of the Southeast Quarter (W ½ of SW ¼ of SE ¼) of Section Seventeen (17) and the East Half of the Southeast Quarter of the Southwest Quarter (E ½ of SE ¼ of SW ¼) of Section Seventeen (17), Township Twenty-three (23) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico.

II. Environmental Site Conditions.

The Conditional Certificate of Completion and Covenant Not to Sue to which this exhibit is attached is valid for the following environmental conditions at the aforementioned property:

Metals, specifically arsenic and lead, in soils, tailings and groundwater associated with former milling operations; Petroleum hydrocarbon contamination in soils associated with former milling operations and an underground storage tank (no further action status); and PCBs in soils near leaking transformers (removed) associated with former Peru Hill Mill activities on the site.

The site meets the Method 2 performance standard for the following metals:

> Aluminum, antimony, barium, beryllium, cadmium, Chromium III, chromium VI, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

The site meets the Method 3 (site-specific) performance standard for arsenic.

The environmental conditions associated with the above-referenced site are described by the attached table of pertinent documents, including at a minimum, the Voluntary Remediation Application, Agreement, Work Plan, Periodic Reports, and Final Completion Report, as listed in Table 1 on the following page.

Table 1: Peru Hill Mill Pertinent Documents

No.	Title	Author	Date
1	*Removal Assessment Report for Peru Hill Mill Deming, Luna County, New Mexico*	Ecology and Environment Inc.	December 10, 1998
2	*Phase II Site Investigation Report, Peru Hill Mill Facility, Deming, New Mexico*	INTERA, Incorporated	February 2002
3	*Voluntary Remediation Program Application*	City of Deming	February 26, 2002
4	*Voluntary Remediation Agreement*	City of Deming	April 30, 2003
5	*Voluntary Remediation Program Ap. Addendum*	City of Deming	February 23, 2006
6	*Ground Water Monitoring Report, Peru Hill Mill, Deming, New Mexico*	INTERA, Incorporated	July 2002
7	*Voluntary Remediation Program, Soil Sampling Plan for Remedial Action Confirmatory Sampling, Peru Hill Mill, Deming, New Mexico*	INTERA, Incorporated	July 2002
8	*Voluntary Remediation Completion Report, The Former Peru Hill Mill Facility, Deming, New Mexico*	INTERA, Incorporated	January 27, 2009
9	*Derivation and Application of Soil Screening Levels for Peru Hill Mill, Deming, New Mexico*	Neptune and Company, Inc.,	November 15, 2002
10	*Quality Assurance Project Plan, Peru Hill Mill, Deming, New Mexico.* Santa Fe, New Mexico	New Mexico Environment Department	August 21, 2001
11	*Screening Site Inspection, Peru Hill Mill, Deming, New Mexico*	New Mexico Environment Department	April 3, 1992
12	*Peru Hill Mill UST Inspection Removal Report,* Deming, New Mexico	New Mexico Environment Department	February 19, 2002
13	*Preliminary Assessment, Peru Hill Mill, Deming, New Mexico*	New Mexico Environmental Improvement Division	August 31, 1990
14	*Phase I Environmental Site Assessment Peru Hill Mill Property, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	May 21, 2001
15	*Report for Environmental Subconsulting Services, Peru Hill Mill Building Demolition, Peru Hill Mill, Deming, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	September 17, 2001
16	*Final Closure/Remediation Plan Peru Hill Mill Tailings and Surrounding Areas Former Peru Hill Mill Site, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	May 7, 2002
17	*Abandoned Underground Storage Tank Removal Report, Peru Hill Mill, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	April 8, 2002
18	*Phase I 20-Acres of Vacant Land, Arrowhead Road, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	November 22, 2005
19	*Final Closure/Remediation Plan Addendum Peru*	Zia Engineering & Environmental	October 11, 2006

	Hill Mill Tailings and Surrounding Areas, Former Peru Hill Mill Site, Luna County, New Mexico	Consultants, Inc.	
20	*Phase I ESA Henderson Property Approximately 40-Acres, Arrowhead Drive, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	January 4, 2007
21	*Brief History of Peru Hill Mill Remediation Project, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	March 28, 2008

CITY OF DEMING

DESCRIPTION SITE 1

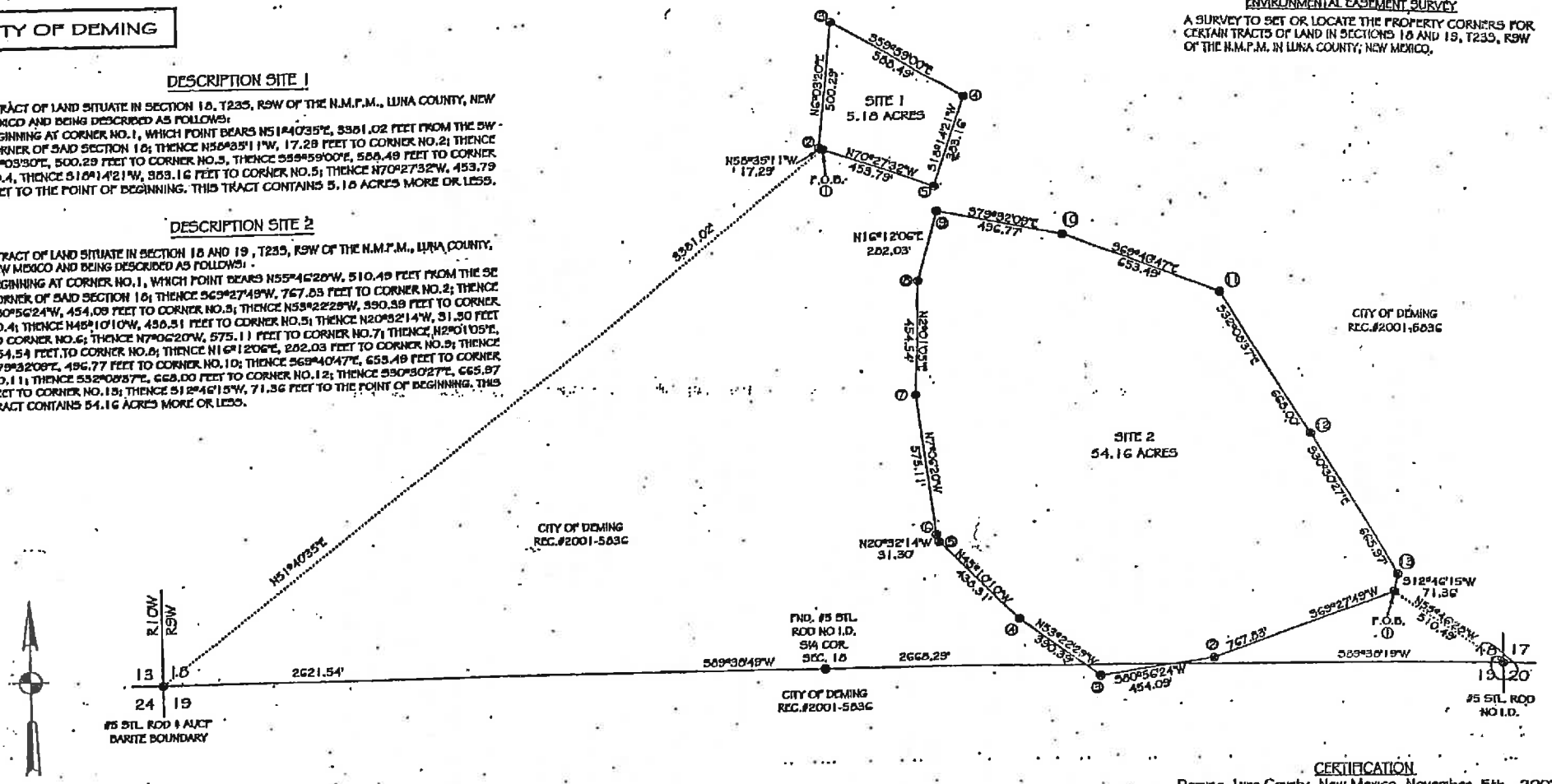
A TRACT OF LAND SITUATE IN SECTION 18, T23S, R9W OF THE N.M.P.M., LUNA COUNTY, NEW MEXICO AND BEING DESCRIBED AS FOLLOWS:
BEGINNING AT CORNER NO.1, WHICH POINT BEARS N51°40'35"E, 3361.02 FEET FROM THE SW CORNER OF SAID SECTION 18; THENCE N58°35'11"W, 17.28 FEET TO CORNER NO.2; THENCE N6°03'30"E, 500.29 FEET TO CORNER NO.3, THENCE S59°59'00"E, 586.49 FEET TO CORNER NO.4, THENCE S16°14'21"W, 383.16 FEET TO CORNER NO.5; THENCE N70°27'32"W, 453.79 FEET TO THE POINT OF BEGINNING. THIS TRACT CONTAINS 5.18 ACRES MORE OR LESS.

DESCRIPTION SITE 2

A TRACT OF LAND SITUATE IN SECTION 18 AND 19 , T23S, R9W OF THE N.M.P.M., LUNA COUNTY, NEW MEXICO AND BEING DESCRIBED AS FOLLOWS:
BEGINNING AT CORNER NO.1, WHICH POINT BEARS N55°46'26"W, 510.49 FEET FROM THE SE CORNER OF SAID SECTION 18; THENCE S69°27'49"W, 767.53 FEET TO CORNER NO.2; THENCE S80°56'24"W, 454.09 FEET TO CORNER NO.3; THENCE N53°22'25"W, 390.39 FEET TO CORNER NO.4; THENCE N45°10'10"W, 456.31 FEET TO CORNER NO.5; THENCE N20°32'14"W, 31.30 FEET TO CORNER NO.6; THENCE N7°06'20"W, 575.11 FEET TO CORNER NO.7; THENCE N2°01'05"E, 454.54 FEET,TO CORNER NO.8; THENCE N16°12'06"E, 282.03 FEET TO CORNER NO.9; THENCE S79°32'09"E, 456.77 FEET TO CORNER NO.10; THENCE S69°40'47"E, 653.49 FEET TO CORNER NO.11; THENCE S32°00'37"E, 668.00 FEET TO CORNER NO.12; THENCE S30°30'27"E, 665.97 FEET TO CORNER NO.13; THENCE S12°46'15"W, 71.36 FEET TO THE POINT OF BEGINNING. THIS TRACT CONTAINS 54.16 ACRES MORE OR LESS.

ENVIRONMENTAL EASEMENT SURVEY

A SURVEY TO SET OR LOCATE THE PROPERTY CORNERS FOR CERTAIN TRACTS OF LAND IN SECTIONS 18 AND 19, T23S, R9W OF THE N.M.P.M. IN LUNA COUNTY, NEW MEXICO.



GRAPHIC SCALE

0 200 400

(IN FEET)
1 inch = 400 ft.

BASIS OF BEARING
S69°38'49"W ALONG THE SOUTH LINE OF THE SW¼ OF SECTION 18 AS DEFINED BY GPS OBSERVATION.

DOCUMENTS USED FOR THIS SURVEY
CITY OF DEMING DEED REC.#2001-5836

EASEMENT CORNERS 2" STL. POST OR AS INDICATED

GUARRELL SURVEYING
913 S. DIAMOND AVE
P.O. BOX 908
DEMING, NM
(505)546-8021
FAX (505)546-3856

CERTIFICATION

Deming, Luna County, New Mexico, November 5th, 2007
I Frank L. Guarrell, New Mexico Professional Surveyor No. 9829 do hereby certify that this Boundary Survey Plat and the actual survey on the ground upon which it is based were proformed by me or under my direct supervision, that this survey meets the Minimum Standards for Surveying in New Mexico: and that it is true and correct to the best of my knowledge and belief. I further certify that this is a Boundary Survey Plat of an existing tract or tracts, it is not a land division or subdivision as defined in the New Mexico subdivision act.

Professional Land Surveyor | 9829

COMPLETION EXHIBIT "B"
STATE OF NEW MEXICO ENVIRONMENT DEPARTMENT
VOLUNTARY REMEDIATION PROGRAM
AFFIDAVIT OF COMPLETION OF VOLUNTARY REMEDIATION

The City of Deming, New Mexico (the Participant) has implemented voluntary remediation actions pursuant to the Voluntary Remediation Act, Sections 74-4G-1 et seq. NMSA 1978, and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3), at the tract of land and for the associated environmental site conditions described in Exhibit "A" to this affidavit that pertains to the Peru Hill Mill (the Site), **VRP NO. 53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel**, located at **3370 Peru Mill Road, in Deming, Luna** County, New Mexico. The Site was owned by the Participant at the time the application to participate in the Voluntary Remediation Program was filed. The Participant has submitted and received approval from the State of New Mexico Environment Department (NMED) Voluntary Remediation Program (VRP) on all plans and reports required by the Voluntary Remediation Agreement. The plans and reports were prepared using a prudent degree of inquiry regarding environmental issues relevant to the Site, consistent with accepted industry standards to identify all hazardous substances, waste and contaminated media of regulatory concern. The voluntary remediation actions will include the following post care activities, engineering controls, remediation systems, or affirmation of future non-residential use:

Maintaining the site for industrial / commercial site use only, through zoning or other affirmation of non-residential use protection.

The voluntary remediation actions for the Site will achieve a final site condition acceptable for **Commercial/Industrial** land use as determined by the standards, guidelines, and policies of the NMED. Specifically, where applicable standards are prescribed by law or regulation, the voluntary remediation activities have achieved applicable standards. Where applicable standards are not prescribed by law or regulation, voluntary remediation activities have been performed in order to achieve a final site condition such that no contaminant presents a significant risk of harm to human health, safety, or the environment during any foreseeable period of time. Such level of cleanup has been attained by reducing the risk from exposure to individual carcinogens or suspected carcinogens to an individual lifetime cancer risk of less than one cancer incident in 100,000 exposed persons (1 X 10 E-5); and by reducing the risk from exposure to individual noncarcinogenic contaminants to a hazard quotient of less than 1. The Participant has not performed voluntary remediation activities pursuant to the Voluntary Remediation Agreement that were fraudulent nor involved misrepresentation nor knowing failure to disclose material information. Further information concerning the voluntary remediation at this Site may be found at the NMED under **VRP No. 53023002.**

The preceding is true and correct to the best of my knowledge and belief.

City of Dowmey
Participant

By: Richard F McEntuff

Print Name: Richard F. McEntuff
Administrator

STATE OF NM

COUNTY OF Luna

BEFORE ME, on this 10 day of December 2009, personally appeared Richard F. McEntuff, known to me to be the person and agent of said entity whose name is subscribed to the foregoing instrument, and he/she acknowledged to me that he/she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 10 day of Dec, 2009.

Patricia M Ciccotelli
Notary Public in and for the State of New Mexico

My commission expires 6/30/2014
(SEAL)

STATE OF NEW MEXICO ENVIRONMENT DEPARTMENT
VOLUNTARY REMEDIATION PROGRAM
COVENANT NOT TO SUE

This Covenant is entered into this 4th day of March, 2010 by the Secretary of Environment, the administrative head of the New Mexico Environment Department ("NMED"), an agency of the executive branch of the government of the state of New Mexico, through Mr. Ron Curry, Secretary, and **Mr. Richard McInturff, Administrator of the City of Deming** and an authorized Representative of the City of Deming ("Recipient").

I. RECIPIENT'S REPRESENTATIONS AND WARRANTIES

Recipient represents and warrants:

A. It is the current owner of the real property described in Exhibit "A", attached hereto.

B. It has reviewed and understands the Voluntary Remediation Agreement and Conditional Certificate of Completion for VRP Site No. **53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel**, relating to the site described in Exhibits "A" and "B", including requirements regarding maintenance of engineering controls, post-closure care, and affirmation of future non-residential land use.

C. It did not contribute to the site contamination that is the subject of Voluntary Remediation Agreement No. **53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel**, and has at no time been an officer, director, parent, subsidiary, affiliate, partner, managing agent, or employee of a party who did contribute to the site contamination.

II. RECIPIENT'S OBLIGATIONS

Recipients shall comply with all requirements regarding institutional controls set forth in the Conditional Certificate of Completion for VRP Site No. **53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel,**.

Recipient shall provide NMED access to the real property described in Exhibit "A" for the purpose of allowing NMED to collect samples and or to oversee sampling activities at the monitoring wells at the VRP Site to ascertain compliance with the requirements regarding the institutional controls set forth in the Revised Conditional Certificate of Completion for VRP Site No. **53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel.**

III. NMED'S COVENANT NOT TO SUE

NMED, pursuant to NMSA § 74-4G-8 and 20 NMAC 6.3.600, hereby covenants not to sue for any direct liability, including future liability for claims based upon the contamination covered by Voluntary Remediation Agreement for VRP Site No. **53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel,** and over which NMED has authority. Except as may be provided under federal law or as may be agreed to by a federal government entity, the Covenant Not to Sue shall not release or otherwise apply to claims by the federal government for claims based on federal law. Except as may be agreed to by another department or agency of the state, the Covenant Not to Sue shall not release or otherwise apply to claims of any other office, department, or agency of the State. Except as may be agreed to by a third party, the Covenant Not to Sue shall not release or otherwise affect a person's liability to third parties. This Covenant Not to Sue shall remain in effect unless and until NMED issues a Notice of Rescission in accordance with NMSA § 74-4G-9, 20 NMAC 6.3.700, and Section V, below.

IV. TRANSFER OF COVENANT NOT TO SUE

This Covenant Not to Sue is assignable to and assumable by a New Purchaser of title to the real property described in Exhibits "A" and "B", above, provided that the New Purchaser executes and delivers to NMED a statement in which the New Purchaser:

A. Represents and warrants to NMED that it:

1. Is the new purchaser of the real property described in Exhibit "A", attached hereto;

2. Has reviewed and understands the Voluntary Remediation Agreement and revised Conditional Certificate of Completion for VRP Site No. **53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel,**, relating to the site described in Exhibits "A" and "B" including requirements regarding the institutional controls, and affirmation of future non-residential land use;

3. Did not contribute to the site contamination that is the subject of Voluntary Remediation Agreement for VRP Site No. **53023002 – Peru Hill Mill Parcel, 20-Acre Parcel and the 40-Acre Henderson Parcel,** and has not been an officer, director, parent, subsidiary, affiliate, partner, managing agent, or employee of a party who did contribute to the site contamination; and

B. States that it assumes and agrees to comply with Recipient's obligations set forth in Section II of this Covenant Not to Sue.

Following such transfer of this Covenant Not to Sue, the New Purchaser shall be required to comply with Recipient's obligation's set forth in Section II of this Covenant Not to Sue. NMED's Covenant Not to Sue shall remain in effect unless and until NMED issues a Notice of Rescission in accordance with NMSA § 74-4G-9, 20 NMAC 6.3.700, and Section V, below.

V. RESCISSION OF COVENANT NOT TO SUE

A. Grounds for Rescission

NMED may rescind this Covenant Not to Sue if NMED, in its sole discretion, determines that:

1. Based on reasonable evidence, contamination addressed in the Voluntary Remediation Agreement still poses, following remediation, an unreasonable threat to human health or the environment, or that the performance standard described in 20 NMAC 6.3.10 has not been met;

2. The Voluntary Remediation Agreement was performed in a manner that fails to comply substantially with the terms and conditions of the Agreement or Voluntary Remediation Work Plan;

3. Any monitoring requirements, engineering controls, remediation systems, post-closure care, or affirmation of future non-residential land use upon which the final remedy is dependent are not being implemented satisfactorily;

4. The Voluntary Remediation Agreement is the result of fraud;

5. Contamination was present at the site at the time the Voluntary Remediation Agreement was signed or the Voluntary Remediation Agreement was approved, but the Department was not properly informed of the type, extent or magnitude of the contaminants;

6. One or more of the representations and warranties set forth in Section I or Section IV, above, was false, misleading, or incomplete when made;

7. The Recipient or any transferee has failed to comply with Recipient's obligations described in Section II, above, to NMED's satisfaction.

B. Procedure for Rescission

NMED shall issue a Notice of Rescission by mailing a Notice by certified mail, return-receipt

requested, to the last known address of the Recipient, and if applicable, to any transferee of this Covenant Not to Sue. The Notice shall state NMED's basis for Rescission.

C. Effect of Notice of Rescission

A Notice of Rescission shall be effective on the date it is issued by NMED. The Notice of Rescission shall render this Covenant Not to Sue void as of the date of its issue. Following issuance of a Notice of Rescission, NMED may pursue administrative or judicial enforcement actions or other claims based on the contamination that was the subject of this Covenant Not to Sue.

VI. RESERVATION OF RIGHTS

NMED expressly reserves the right to take any action, including any enforcement action, to address any contamination not covered by the Voluntary Remediation Agreement, including any release of a contaminant that occurs after issuance of the Certificate of Completion, or any release of a contaminant not covered by the Voluntary Remediation Agreement. The Secretary's Covenant Not to Sue shall not apply to any such release.

VII. APPLICABLE LAW

This Covenant Not to Sue shall be governed by and construed in accordance with the laws of the State of New Mexico.

VIII. COMPLETE AGREEMENT

This Covenant Not to Sue contains the entire agreement of the Parties.

IX. AMENDMENT

This Covenant may be amended only by a writing signed by both parties. Notwithstanding this section, this Covenant may be transferred through transferee's execution and delivery of a Statement to NMED as described in Section IV, above.

X. AUTHORITY TO SIGN

The persons signing below represent and warrant that they have authority to bind the party on whose behalf they are signing this Covenant.

RECIPIENT

By _____
(Signature)

Print Name Richard McInturff

City of Deming

By: **Richard McInturff**

STATE OF New Mexico

COUNTY OF Luna

BEFORE ME, on this 8th Day of March, personally appeared Richard McInturff, known to me to be the person and agent of said entity whose name is subscribed to the foregoing instrument, and he/she acknowledged to me that he/she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 8th Day of March 2010

_____
Notary Public in and for the State of New Mexico

My commission expires 12-06-13

STATE OF NEW MEXICO
NOTARY PUBLIC
MARY JO VALDEZ

NMED

By _____
Secretary or Designee
New Mexico Environment Department

STATE OF NEW MEXICO
COUNTY OF SANTA FE

BEFORE ME, on this 14th day of May, 2010, personally appeared Marcy Leavitt, known to me to be the person and agent of said department whose name is subscribed to the foregoing instrument, and he/she acknowledged to me that he/she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 14th day of May, 2010.

_____
Notary Public in and for the State of New Mexico

My commission expires 12-05-11
(SEAL)

OFFICIAL SEAL
Catherine Velazquez
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 12-05-11

Attachments: Exhibit "A", Completion Site Description
Exhibit "B", Affidavit of Completion

COMPLETION EXHIBIT "A"
STATE OF NEW MEXICO ENVIRONMENT DEPARTMENT
VOLUNTARY REMEDIATION PROGRAM
DESCRIPTION OF SITE FOR WHICH VOLUNTARY REMEDIATION IS COMPLETE,
VRP No. 53023002 – Environmental Easements

I. Tract of Land Comprising the Site.

The Application to which this exhibit is attached is valid for the property known as the **Peru Hill Mill** (***VRP No. 53023002 – Environmental Easements)***, located in the City of Deming, Luna County, New Mexico. Specifically, this exhibit describes the Environmental Easements that have been placed around two tailings piles that were expanded and capped to prevent the airborne release and subsurface infiltration of heavy metals that were included in waste rock created by the former Peru Hill Mill ore processing facility and excavated from adjacent parcels, being covered by a separate conditional certificate of completion. The Environmental Easements (Page 4 of this exhibit) are more accurately described as follows:

Environmental Easement / Site 1 (see attached survey)

A tract of land situate in Section 18, T23S, R9W of the N.M.P.M, Luna County, New Mexico and being described as follows:

> Beginning at corner No. 1, which point bears N51°840'35"E, 3381.02 ft. from the SW corner of said section 18; thence N58°35'11"W, 17.29 ft. to corner NO. 2; thence N6°03'30"E, 500.29 ft. to corner NO. 3; thence S59°59"00"E, 588.49 ft. to corner NO. 4; thence S18°14'21"W, 383.16 feet to corner NO. 5; thence N70°27'32"W, 453.79 ft. to the point of beginning. This tract contains 5.18 acres more or less.

Environmental Easement / Site 2 (see attached survey)

A tract of land situate in section 18 and 19, T23S, R9W of the N.M. P.M., Luna County, New Mexico and being described as follows:

> Beginning at corner NO. 1, which point bears N55°46'28"W, 510.49 ft. from the SE corner of Said Section 18; thence S69°27'49W, 767.83 ft. to corner NO. 2; thence S80°56'24"W, 454.09 ft. to corner NO. 3; thence N53°22'29"W, 390.39 ft. to corner NO. 4; thence N45°10'10"W, 438.31 ft to corner NO. 5; thence N20°32'14"W, 31.30 ft to corner NO. 6; thence N7°06'20"W, 575.11 ft. to corner NO. 7; thence N2°01'05"E, 454.54 f. to corner NO.8; thence N16°12"06"E, 282.03 ft. to corner NO.9; thence S79°32'09"E, 496.77 ft. to corner NO. 10; thence S69°40'47"E, 653.49 ft. to corner NO. 11; thence S32°08'37"E, 668.00 ft. to corner NO. 12; thence S30°30'27"E, 665.97 ft. to corner NO. 13; thence S 12°46"15"W, 71.36 ft. to the point of beginning. This tract contains 54.16 acres more or less.

II. Environmental Site Conditions.

The Conditional Certificate of Completion and Covenant Not to Sue to which this exhibit is attached is valid for the Metals (primarily arsenic and lead and potentially aluminum, antimony, barium, beryllium, cadmium, chromium III, chromium VI, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc), in soils, tailings and groundwater associated with former milling operations at the following environmental conditions at the aforementioned property.

The environmental conditions associated with the above-referenced site are described by the attached table of pertinent documents, including at a minimum, the Voluntary Remediation Application, Agreement, Work Plan, Periodic Reports, and Final Completion Report, as listed in Table 1 on the following page.

Groundwater monitoring should be performed at the interval provided in Exhibit "B", and Water Quality Control Commission standards should be met for the following analytes:

> Aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium III, chromium VI, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, and zinc.

A Sampling and Analysis Plan and a Quality Assurance Project Plan should be submitted and approved prior to the sampling events.

Table 1: Peru Hill Mill Pertinent Documents

No.	Title	Author	Date
1	*Removal Assessment Report for Peru Hill Mill Deming, Luna County, New Mexico*	Ecology and Environment Inc.	December 10, 1998
2	*Phase II Site Investigation Report, Peru Hill Mill Facility, Deming, New Mexico*	INTERA, Incorporated	February 2002
3	*Voluntary Remediation Program Application*	City of Deming	February 26, 2002
4	*Voluntary Remediation Agreement*	City of Deming	April 30, 2003
5	*Voluntary Remediation Program Ap. Addendum*	City of Deming.	February 23, 2006
6	*Ground Water Monitoring Report, Peru Hill Mill, Deming, New Mexico*	INTERA, Incorporated	July 2002
7	*Voluntary Remediation Program, Soil Sampling Plan for Remedial Action Confirmatory Sampling, Peru Hill Mill, Deming, New Mexico*	INTERA, Incorporated	July 2002
8	*Voluntary Remediation Completion Report, The Former Peru Hill Mill Facility, Deming, New Mexico*	INTERA, Incorporated	January 27, 2009
9	*Derivation and Application of Soil Screening Levels for Peru Hill Mill, Deming, New Mexico*	Neptune and Company, Inc.,	November 15, 2002
10	*Quality Assurance Project Plan, Peru Hill Mill, Deming, New Mexico.* Santa Fe, New Mexico	New Mexico Environment Department	August 21, 2001
11	*Screening Site Inspection, Peru Hill Mill, Deming, New Mexico*	New Mexico Environment Department	April 3, 1992
12	*Peru Hill Mill UST Inspection Removal Report,*	New Mexico Environment	February 19, 2002

	Deming, New Mexico	Department	
13	*Preliminary Assessment, Peru Hill Mill, Deming, New Mexico*	New Mexico Environmental Improvement Division	August 31, 1990
14	*Phase I Environmental Site Assessment Peru Hill Mill Property, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	May 21, 2001
15	*Report for Environmental Subconsulting Services, Peru Hill Mill Building Demolition, Peru Hill Mill, Deming, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	September 17, 2001
16	*Final Closure/Remediation Plan Peru Hill Mill Tailings and Surrounding Areas Former Peru Hill Mill Site, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	May 7, 2002
17	*Abandoned Underground Storage Tank Removal Report, Peru Hill Mill, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	April 8, 2002
18	*Phase I 20-Acres of Vacant Land, Arrowhead Road, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	November 22, 2005
19	*Final Closure/Remediation Plan Addendum Peru Hill Mill Tailings and Surrounding Areas, Former Peru Hill Mill Site, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	October 11, 2006
20	*Phase I ESA Henderson Property Approximately 40-Acres, Arrowhead Drive, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	January 4, 2007
21	*Brief History of Peru Hill Mill Remediation Project, Deming, Luna County, New Mexico*	Zia Engineering & Environmental Consultants, Inc.	March 28, 2008

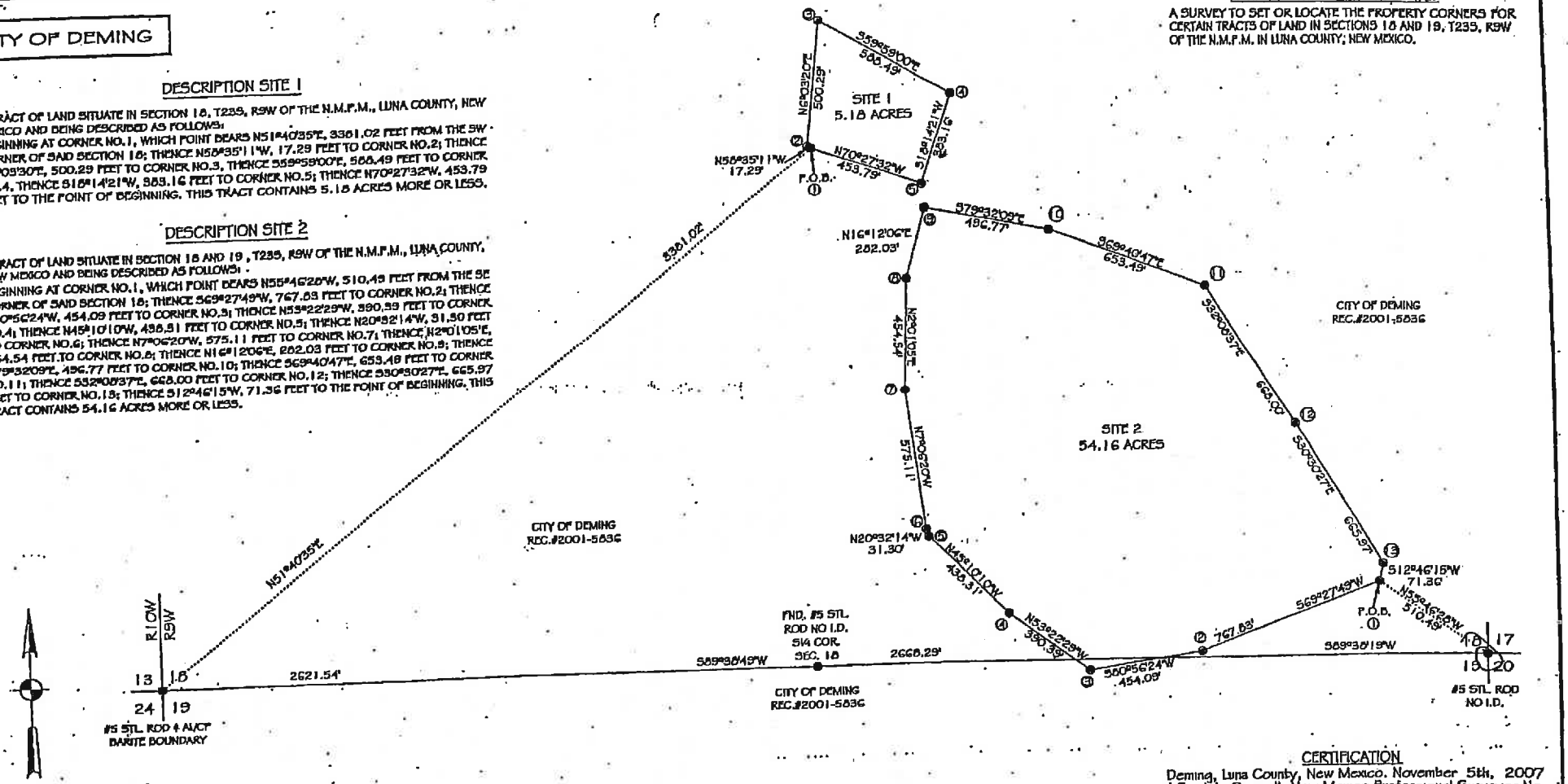
CITY OF DEMING

DESCRIPTION SITE 1

A TRACT OF LAND SITUATE IN SECTION 18, T23S, R9W OF THE N.M.P.M., LUNA COUNTY, NEW MEXICO AND BEING DESCRIBED AS FOLLOWS:
BEGINNING AT CORNER NO.1, WHICH POINT BEARS N51°40'35"E, 3361.02 FEET FROM THE SW CORNER OF SAID SECTION 18; THENCE N55°35'11"W, 17.29 FEET TO CORNER NO.2; THENCE N6°09'30"E, 500.29 FEET TO CORNER NO.3, THENCE S89°59'00"E, 566.49 FEET TO CORNER NO.4, THENCE S16°14'21"W, 383.16 FEET TO CORNER NO.5; THENCE N70°27'32"W, 453.79 FEET TO THE POINT OF BEGINNING. THIS TRACT CONTAINS 5.18 ACRES MORE OR LESS.

DESCRIPTION SITE 2

A TRACT OF LAND SITUATE IN SECTION 18 AND 19 , T23S, R9W OF THE N.M.P.M., LUNA COUNTY, NEW MEXICO AND BEING DESCRIBED AS FOLLOWS:
BEGINNING AT CORNER NO.1, WHICH POINT BEARS N55°46'28"W, 510.45 FEET FROM THE SE CORNER OF SAID SECTION 18; THENCE S69°27'49"W, 767.63 FEET TO CORNER NO.2; THENCE S60°56'24"W, 454.09 FEET TO CORNER NO.3; THENCE N53°22'29"W, 390.39 FEET TO CORNER NO.4; THENCE N45°10'10"W, 436.31 FEET TO CORNER NO.5; THENCE N20°32'14"W, 31.30 FEET TO CORNER NO.6; THENCE N7°06'20"W, 575.11 FEET TO CORNER NO.7; THENCE N2°01'05"E, 454.54 FEET.TO CORNER NO.8; THENCE N16°12'06"E, 282.03 FEET TO CORNER NO.9; THENCE S79°32'09"E, 496.77 FEET TO CORNER NO.10; THENCE S69°40'47"E, 653.49 FEET TO CORNER NO.11; THENCE S32°00'37"E, 668.00 FEET TO CORNER NO.12; THENCE S30°30'27"E, 665.97 FEET TO CORNER NO.13; THENCE S12°46'15"W, 71.36 FEET TO THE POINT OF BEGINNING. THIS TRACT CONTAINS 54.16 ACRES MORE OR LESS.



GRAPHIC SCALE

0 200 400

(IN FEET)
1 inch = 400 ft.

BASIS OF BEARING
S89°38'49"W ALONG THE SOUTH LINE OF THE SW¼ OF SECTION 18 AS DEFINED BY GPS OBSERVATION.

DOCUMENTS USED FOR THIS SURVEY
CITY OF DEMING DEED REC.#2001-5836

EASEMENT CORNERS 2" STL. POST OR AS INDICATED

QUARRELL SURVEYING
913 S. DIAMOND AVE
P.O. BOX 908
DEMING, NM
(505)546-6021
FAX (505)546-9836

CERTIFICATION

Deming, Luna County, New Mexico. November 5th, 2007
I Frank L. Quarrell, New Mexico Professional Surveyor No. 9829 do hereby certify that this Boundary Survey Plat and the actual survey on the ground upon which it is based were proformed by me or under my direct supervision, that this survey meets the Minimum Standards for Surveying in New Mexico: and that it is true and correct to the best of my knowledge and belief. I further certify that this is a Boundary Survey Plat of an existing tract or tracts, it is not a land division or subdivision as defined in the New Mexico subdivision act.

Professional Land Surveyor 9829

COMPLETION EXHIBIT "B"
STATE OF NEW MEXICO ENVIRONMENT DEPARTMENT
VOLUNTARY REMEDIATION PROGRAM
AFFIDAVIT OF COMPLETION OF VOLUNTARY REMEDIATION

The City of Deming, New Mexico (the Participant) has implemented voluntary remediation actions pursuant to the Voluntary Remediation Act, Sections 74-4G-1 et seq. NMSA 1978, and the New Mexico Voluntary Remediation Regulations (20 NMAC 6.3), at the tract of land and for the associated environmental site conditions described in Exhibit "A" to this affidavit that pertains to the tailings piles protected by **Environmental Easements** at the **Peru Hill Mill** (the Site), **VRP No. 53023002,** located at **3370 Peru Mill Road,** in **Deming, Luna** County, New Mexico. The Site was owned by the Participant at the time the application to participate in the Voluntary Remediation Program was filed. The Participant has submitted and received approval from the State of New Mexico Environment Department (NMED) Voluntary Remediation Program (VRP) on all plans and reports required by the Voluntary Remediation Agreement. The plans and reports were prepared using a prudent degree of inquiry regarding environmental issues relevant to the Site, consistent with accepted industry standards to identify all hazardous substances, waste and contaminated media of regulatory concern. The voluntary remediation actions will include the following post care activities, engineering controls, remediation systems, or affirmation of future non-residential use:

1. The City of Deming will conduct an inspection of the Site no less than once every six months (bi-annually) for signs of potential erosion and also for signs of damage by wildlife (burrowing animals) to the engineered cap for a minimum period of 10 years following construction of the cap. During periods of heavy precipitation, inspections will occur more frequently to verify the integrity of the drainage system and review the cap for signs of potential erosion. Inspections will be accomplished by walking throughout the closed areas and producing written reports with photographs that document observations made by the inspector.

2. The City of Deming will conduct sampling of the four Site ground water monitoring wells in 2016 and 2021. Copies of all ground water monitoring reports will be provided by the City of Deming to the New Mexico Environment Department not less than 30 days after receipt of analytical data from the laboratory. The last sampling event performed should demonstrate that ground water meets Water Quality Control Commission (WQCC) standards.

3. The City of Deming will employ a series of preventive and corrective maintenance procedures to preserve the integrity of the VRP Site. If the erosion layer of the cap has been eroded or damaged, or if other problems resulting from settlement, subsidence, or displacement are detected, the cover will be repaired using similar on-site material by the City of Deming. If erosion occurs to an extent necessitating repair of the cap due to concentrated surface runoff, a review of erosion/runoff control structures will occur to determine if, due to subsidence or other altered field conditions, revisions or additions to the structures are required. It is currently proposed that active maintenance be for a period not less than 10 years following completion of the cap.

4. Security measures have been implemented at the Site and include: rehabilitation of the original boundary barbed wire fencing, installation of a gate and lock system at the entrance to the Site in October 2007, and regularly scheduled patrolling of the Site by the City of Deming police enforcement agency. The City of Deming has installed a fence system located around the foot of the capped area to further minimize access and potential damage to the cover/cap system. The fence system will be regularly inspected and maintained by the City of Deming as part of the ongoing monitoring plan for the Site.

5. If the requirements for conditional closure outlined above for the tailings piles protected by environmental easements (Exhibit A) created by the City of Deming are not met, the City understands that the final closure provided for the remainder of the land included in the Peru Hill Mill Site Description in Exhibit A, may be rescinded per 20.6.3.700 NMAC.

The voluntary remediation actions for the Site will achieve a final site condition acceptable for **Commercial/Industrial** land use as determined by the standards, guidelines, and policies of the NMED. Specifically, where applicable standards are prescribed by law or regulation, the voluntary remediation activities have achieved applicable standards. Where applicable standards are not prescribed by law or regulation, voluntary remediation activities have been performed in order to achieve a final site condition such that no contaminant presents a significant risk of harm to human health, safety, or the environment during any foreseeable period of time. Such level of cleanup has been attained by reducing the risk from exposure to individual carcinogens or suspected carcinogens to an individual lifetime cancer risk of less than one cancer incident in 100,000 exposed persons (1 X 10 E-5); and by reducing the risk from exposure to individual noncarcinogenic contaminants to a hazard quotient of less than 1. The Participant has not performed voluntary remediation activities pursuant to the Voluntary Remediation Agreement that were fraudulent nor involved misrepresentation nor knowing failure to disclose material information. Further information concerning the voluntary remediation at this Site may be found at the NMED under **VRP No. 53023002.**

The preceding is true and correct to the best of my knowledge and belief.

City of Deming
Participant

By: [signature]

Print Name: Richard F. McInturff

STATE OF NM

COUNTY OF Luna

BEFORE ME, on this 20 day of Jan. 2010, personally appeared Richard F. McInturff, known to me to be the person and agent of said entity whose name is subscribed to the foregoing instrument, and he/she acknowledged to me that he/she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 20 day of Jan., 2010.

Patricia L. Ciccotelli
Notary Public in and for the State of New Mexico

My commission expires 6/30/2011
(SEAL)

STATE OF NEW MEXICO ENVIRONMENT DEPARTMENT
VOLUNTARY REMEDIATION PROGRAM
COVENANT NOT TO SUE

This Covenant is entered into this 4th day of March, 2010 by the Secretary of Environment, the administrative head of the New Mexico Environment Department ("NMED"), an agency of the executive branch of the government of the state of New Mexico, through Mr. Ron Curry, Secretary, and **Mr. Richard McInturff, Administrator of the City of Deming** and an authorized Representative of the City of Deming ("Recipient").

I. RECIPIENT'S REPRESENTATIONS AND WARRANTIES

Recipient represents and warrants:

A. It is the current owner of the real property described in Exhibit "A", attached hereto.

B. It has reviewed and understands the Voluntary Remediation Agreement and Conditional Certificate of Completion for VRP Site No. **53023002 – Environmental Easements**, relating to the site described in Exhibits "A" and "B", including requirements regarding maintenance of engineering controls, post-closure care, and affirmation of future non-residential land use.

C. It did not contribute to the site contamination that is the subject of Voluntary Remediation Agreement No. **53023002 – Environmental Easements**, and has at no time been an officer, director, parent, subsidiary, affiliate, partner, managing agent, or employee of a party who did contribute to the site contamination.

II. RECIPIENT'S OBLIGATIONS

Recipients shall comply with all requirements regarding institutional controls set forth in the Conditional Certificate of Completion for VRP Site No. **53023002 – Environmental Easements,**

Recipient shall provide NMED access to the real property described in Exhibit "A" for the purpose of allowing NMED to perform inspections of the tailings piles and to ensure the institutional controls set forth in the Conditional Certificate of Completion for VRP Site No. **53023002 – Environmental Easements.**

III. NMED'S COVENANT NOT TO SUE

NMED, pursuant to NMSA § 74-4G-8 and 20 NMAC 6.3.600, hereby covenants not to sue for any direct liability, including future liability for claims based upon the contamination covered by Voluntary Remediation Agreement for VRP Site No. **53023002 – Environmental Easements**, and over which NMED has authority. Except as may be provided under federal law or as may be agreed to by a federal government entity, the Covenant Not to Sue shall not release or otherwise apply to claims by the federal government for claims based on federal law. Except as may be agreed to by another department or agency of the state, the Covenant Not to Sue shall not release or otherwise apply to claims of any other office, department, or agency of the State. Except as may be agreed to by a third party, the Covenant Not to Sue shall not release or otherwise affect a person's liability to third parties. This Covenant Not to Sue shall remain in effect unless and until NMED issues a Notice of Rescission in accordance with NMSA § 74-4G-9, 20 NMAC 6.3.700, and Section V, below.

IV. TRANSFER OF COVENANT NOT TO SUE

This Covenant Not to Sue is assignable to and assumable by a New Purchaser of title to the real property described in Exhibits "A" and "B", above, provided that the New Purchaser executes and delivers to NMED a statement in which the New Purchaser:

A. Represents and warrants to NMED that it:

1. Is the new purchaser of the real property described in Exhibit "A", attached hereto;

2. Has reviewed and understands the Voluntary Remediation Agreement and revised Conditional Certificate of Completion for VRP Site No. **53023002 – Environmental Easements**, relating to the site described in Exhibits "A" and "B" including requirements regarding maintenance of engineering controls, remediation systems, post-closure care, and affirmation of future non-residential land use;

3. Did not contribute to the site contamination that is the subject of Voluntary Remediation Agreement for VRP Site No. **53023002 – Environmental Easements**, and has not been an officer, director, parent, subsidiary, affiliate, partner, managing agent, or employee of a party who did contribute to the site contamination; and

B. States that it assumes and agrees to comply with Recipient's obligations set forth in Section II of this Covenant Not to Sue.

Following such transfer of this Covenant Not to Sue, the New Purchaser shall be required to comply with Recipient's obligation's set forth in Section II of this Covenant Not to Sue. NMED's Covenant Not to Sue shall remain in effect unless and until NMED issues a Notice

of Rescission in accordance with NMSA § 74-4G-9, 20 NMAC 6.3.700, and Section V, below.

V. RESCISSION OF COVENANT NOT TO SUE

A. Grounds for Rescission

NMED may rescind this Covenant Not to Sue if NMED, in its sole discretion, determines that:

1. Based on reasonable evidence, contamination addressed in the Voluntary Remediation Agreement still poses, following remediation, an unreasonable threat to human health or the environment, or that the performance standard described in 20 NMAC 6.3.10 has not been met;

2. The Voluntary Remediation Agreement was performed in a manner that fails to comply substantially with the terms and conditions of the Agreement or Voluntary Remediation Work Plan;

3. Any monitoring requirements, engineering controls, remediation systems, post-closure care, or affirmation of future non-residential land use upon which the final remedy is dependent are not being implemented satisfactorily;

4. The Voluntary Remediation Agreement is the result of fraud;

5. Contamination was present at the site at the time the Voluntary Remediation Agreement was signed or the Voluntary Remediation Agreement was approved, but the Department was not properly informed of the type, extent or magnitude of the contaminants;

6. One or more of the representations and warranties set forth in Section I or Section IV, above, was false, misleading, or incomplete when made;

7. The Recipient or any transferee has failed to comply with Recipient's obligations described in Section II, above, to NMED's satisfaction.

B. Procedure for Rescission

NMED shall issue a Notice of Rescission by mailing a Notice by certified mail, return-receipt requested, to the last known address of the Recipient, and if applicable, to any transferee of this Covenant Not to Sue. The Notice shall state NMED's basis for Rescission.

C. Effect of Notice of Rescission

A Notice of Rescission shall be effective on the date it is issued by NMED. The Notice of Rescission shall render this Covenant Not to Sue void as of the date of its issue. Following issuance of a Notice of Rescission, NMED may pursue administrative or judicial enforcement actions or other claims based on the contamination that was the subject of this Covenant Not to Sue.

VI. RESERVATION OF RIGHTS

NMED expressly reserves the right to take any action, including any enforcement action, to address any contamination not covered by the Voluntary Remediation Agreement, including any release of a contaminant that occurs after issuance of the Certificate of Completion, or any release of a contaminant not covered by the Voluntary Remediation Agreement. The Secretary's Covenant Not to Sue shall not apply to any such release.

VII. APPLICABLE LAW

This Covenant Not to Sue shall be governed by and construed in accordance with the laws of the State of New Mexico.

VIII. COMPLETE AGREEMENT

This Covenant Not to Sue contains the entire agreement of the Parties.

IX. AMENDMENT

This Covenant may be amended only by a writing signed by both parties. Notwithstanding this section, this Covenant may be transferred through transferee's execution and delivery of a Statement to NMED as described in Section IV, above.

X. AUTHORITY TO SIGN

The persons signing below represent and warrant that they have authority to bind the party on whose behalf they are signing this Covenant.

RECIPIENT

By _____
(Signature)

Print Name Richard McInturff

City of Deming

By: **Richard McInturff**

STATE OF New Mexico

COUNTY OF Luna

BEFORE ME, on this 8th Day of March, personally appeared Richard McInturff, known to me to be the person and agent of said entity whose name is subscribed to the foregoing instrument, and he/she acknowledged to me that he/she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 8th Day of March, 2010

_____
Notary Public in and for the State of New Mexico

My commission expires 12-06-13

NOTARY PUBLIC STATE OF NEW MEXICO MARY JO VALDEZ

NMED

By _____
Secretary or Designee
New Mexico Environment Department

STATE OF NEW MEXICO
COUNTY OF SANTA FE

BEFORE ME, on this 14th day of May, 2010, personally appeared Marcy Leavitt, known to me to be the person and agent of said department whose name is subscribed to the foregoing instrument, and he/she acknowledged to me that he/she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 14th day of May, 2010.

Catherine Velazquez
Notary Public in and for the State of New Mexico

My commission expires 12-05-11

(SEAL)

OFFICIAL SEAL
Catherine Velazquez
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 12-05-11

Attachments: Exhibit "A", Completion Site Description
Exhibit "B", Affidavit of Completion

Appendix B

USACE Jurisdictional Determination

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
Las Cruces Regulatory Field Office
505 S. Main St. Suite 142
Las Cruces, New Mexico 88001
575-556-9939

September 3, 2010

REPLY TO
ATTENTION OF:

Regulatory Division
New Mexico/Texas Branch

SUBJECT: Action No. SPA-2010-00314-ELP, Peru Mills Industrial Park

Mr. Richard McInturff
City of Deming
309 S. Gold
P.O. Box 706
Deming, NM 88031

Dear Mr. McInturff:

The U.S. Army Corps of Engineers (Corps) is in receipt of your letter dated August 27, 2010 concerning a proposal by the City of Deming to develop an industrial park in Deming, Luna County, New Mexico. The activity involves drainage construction for the industrial park. We have assigned Action No. SPA-2010-00314-ELP to this activity. To avoid delay, please include this number in all future correspondence concerning this project.

We have reviewed this project in accordance with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899 (RHA). Under Section 404, the Corps regulates the discharge of dredged and fill material into waters of the United States, including wetlands. The Corps responsibility under Section 10 is to regulate any work in, or affecting, navigable waters of the United States. Based on your description of the proposed work, other information available to us, and current regulations and policy, we have determined that this project will not involve any of the above activities. Therefore, it will not require Department of the Army authorization under the above laws. However, it is incumbent upon you to remain informed of any changes in the Corps Regulatory Program regulations and policy as they relate to your project.

The Corps based this decision on an approved jurisdictional determination (JD) that there are no waters of the United States on the project site. The basis for this approved JD is: that the project site contains upland drainage ditches or entirely uplands. The JD form is available at http://www.spa.usace.army.mil/reg/Jurisdictional_Determinations/jurisdictional_determinations.asp. This approved JD is valid for a period of no more than five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

You may accept or appeal this approved JD or provide new information in accordance with the Notification of Administration Appeal Options and Process and Request For Appeal (NAAOP-RFA). This form is available at http://www.spa.usace.army.mil/reg/Administrative%20Appeals/appeals_process.asp. If you elect to appeal this approved JD, you must complete Section II (Request For Appeal or Objections to an Initial Proffered Permit) of the form and return it to the Army Engineer Division, South Pacific, CESPD-PDS-O, Attn: Tom Cavanaugh, Administrative Appeal Review Officer, 1455 Market Street, Room 1760, San Francisco, CA 94103-1399 within 60 days of the date of this notice. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

If you have any questions concerning our regulatory program, please contact me at 575-556-9939 or by e-mail at richard.h.gatewood@usace.army.mil. At your convenience, please complete a Customer Service Survey on-line available at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Richard Gatewood
Regulatory Manager for
Southern New Mexico and West Texas

Copies furnished:

Angela Valdez, P.E.
Wilson & Company, Inc. Engineers & Architects
2600 American Road SE
Rio Rancho, New Mexico 87124

INFORMATION SHEET
DETERMINATIONS OF NO JURISDICTION FOR ISOLATED, NON-NAVIGABLE, INTRA-STATE WATERS RESULTING FROM U.S. SUPREME COURT DECISION IN SOLID WASTE AGENCY OF NORTHERN COOK COUNTY V. U.S. ARMY CORPS OF ENGINEERS

DISTRICT OFFICE: _Albuquerque – El Paso_____
FILE NUMBER: _2004 00544_____

REGULATORY PROJECT MANAGER: __James E. Mace_____ **Date:** _8/31/04_____

PROJECT REVIEW/DETERMINATION COMPLETED: **In the office** _y (Y/N) **Date:** _8/31/04____
At the project site __ (Y/N) **Date:** _____

PROJECT LOCATION INFORMATION:

State: __New Mexico_____
County: __Luna_____
Center coordinates of site by latitude & longitudinal coordinates: _UTM 13 252536E 3563616 N
Approximate size of site/property (including uplands & in acres): __0.09 acre_____
Name of waterway or watershed: __unnamed Mimbres tributary

SITE CONDITIONS:

Type of aquatic resource[1]	0-1 ac	1-3 ac	3-5 ac	5-10 ac	10-25 ac	25-50 ac	> 50 ac	Linear feet	Unknown
Lake									
River									
Stream									
Dry Wash	X								
Mudflat									
Sandflat									
Wetlands									
Slough									
Prairie pothole									
Wet meadow									
Playa lake									
Vernal pool									
Natural pond									
Other water (identify type) _____									

[1]Check appropriate boxes that best describe type of isolated, non-navigable, intra-state water present and best estimate for size of non-jurisdictional aquatic resource area.

Migratory Bird Rule Factors[1]:	If Known		If Unknown Use Best Professional Judgment		
	Yes	No	Predicted to Occur	Not Expected to Occur	Not Able To Make Determination
Is or would be used as habitat for birds protected by Migratory Bird Treaties?				X	
Is or would be used as habitat by other migratory birds that cross state lines?				X	
Is or would be used as habitat for endangered species?				X	
Is used to irrigate crops sold in interstate commerce?				X	

[1]Check appropriate boxes that best describe potential for applicability of the Migratory Bird Rule to apply to onsite, non-jurisdictional, isolated, non-navigable, intra-state aquatic resource area.

TYPE OF DETERMINATION: **Preliminary** __ **Or** **Approved** X_.

ADDITIONAL INFORMATION SUPPORTING NJD (e.g., paragraph 1 – site conditions; paragraphs 2-3 – rationale used to determine NJD, including information reviewed to assess potential navigation or interstate commerce connections; and paragraph 4 – site information on waters of the U.S. occurring onsite):

Site is unnamed isolated ephemeral arroyo – Coordination with EPA – no post-SWANCC 402 permits – Site is isolated

Appendix C

Biological Assessment Report

BIOLOGICAL EVALUATION
FOR THE PERU HILL MILL INDUSTRIAL PARK, LUNA COUNTY, NEW MEXICO

Biological Evaluation for the Peru Hill Mill Industrial Park, Luna County, New Mexico

Prepared for
City of Deming
PO Box 706
Deming, NM 88031

Prepared by
Carley Sweet and Karen Simpson

TRC
4221-A Balloon Park Road NE
Albuquerque, New Mexico 87109

TRC Project No. 178827

TRC Report No. 178827-B-01

September 2010

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1.0 Introduction

The City of Deming proposes to develop the Peru Hill Mill Industrial Park, which is located approximately 3.5 miles northwest of Deming in Luna County, southwestern New Mexico (Figure 1-1). The City of Deming intends to apply for a United States (U.S.) Economic Development Administration (EDA) grant to finance construction of the proposed project. This report presents the findings of a biological resource review and field survey conducted by TRC Environmental Corporation, Inc. (TRC) on behalf of the City of Deming to support its intended application to the EDA.

1.1 Project Area

The project area is located within the City of Deming Industrial Park owned by the City of Deming. The project area is accessible by major transportation routes, including railroads and U.S. Interstate 10 (I-10). The City of Deming Industrial Park is part of the Peru Hill Mill Property, a participant in the U.S. Environmental Protection Agency's Brownfields Program. The Peru Hill Mill Property previously was used as a zinc ore-processing mill. The Luna Energy Facility is located east of the project area, north of Arrowhead Drive, and consists of a 570-megawatt natural gas power plant. An existing 16-foot high-pressure gas line travels parallel to the transmission line within the project area and feeds the Luna Energy Facility.

The corresponding U.S. Geological Survey (USGS) 7.5 minute quadrangle map for the project area is West Deming, New Mexico (1964). The project area is an approximately 1,072-acre parcel located along the right-of-way of Arrowhead Road, between Sections 16 and 21 of Township 23 South, Range 9 West and in Township 23 South, Range 9 West, Sections 17-20 (Figure 1.1). The project area is bounded to the north and west by section fence lines that separate the property from New Mexico State Trust Land. The southern boundary is defined by the Mimbres River near the southwestern corner, an overhead electric transmission line, and a natural gas pipeline. The project extends east along the right-of-way along Arrowhead Road to where Arrowhead road intersects Highway 180.

Existing facilities in the project area include a water pumping facility owned by the City of Deming and cooling towers associated with the Luna Energy Facility. A corrugated metal barn constructed when the property was used for zinc processing currently is used as a heavy equipment shed. Other abandoned buildings from the zinc processing operation include a concrete shed adjacent to the heavy equipment shed, and a water storage tank adjacent to the water pump facility. Two tailings piles centrally located in the project area are excluded from the project study area. A groundwater well located adjacent to Peru Mill Road is located in the central portion of the project area, and remnants of an old trailer are located in the central eastern part of the project area. Photographs of the project area and existing facilities are provided in Appendix A: Project Area Photographs.

1.2 Methods

TRC conducted a search of publicly available literature sources to describe the environmental setting and potential biological resources of the project area. A pedestrian survey of the project area was conducted by Stephanie Owens, TRC Biologist, on May 18, 2010, and Carley Sweet, TRC Biologist, on August 17, 2010, to document and describe the vegetation, surface water features, wildlife, and other biological and environmental features present. Areas 50 feet north and south of Arrowhead Drive also were surveyed (Figure 1-1). Focused surveys for target species (i.e. threatened, endangered and sensitive species) were not conducted. Temperatures during the survey ranged from 63 to 93°F with winds at speeds of 5 to 15 miles per hour (mph).

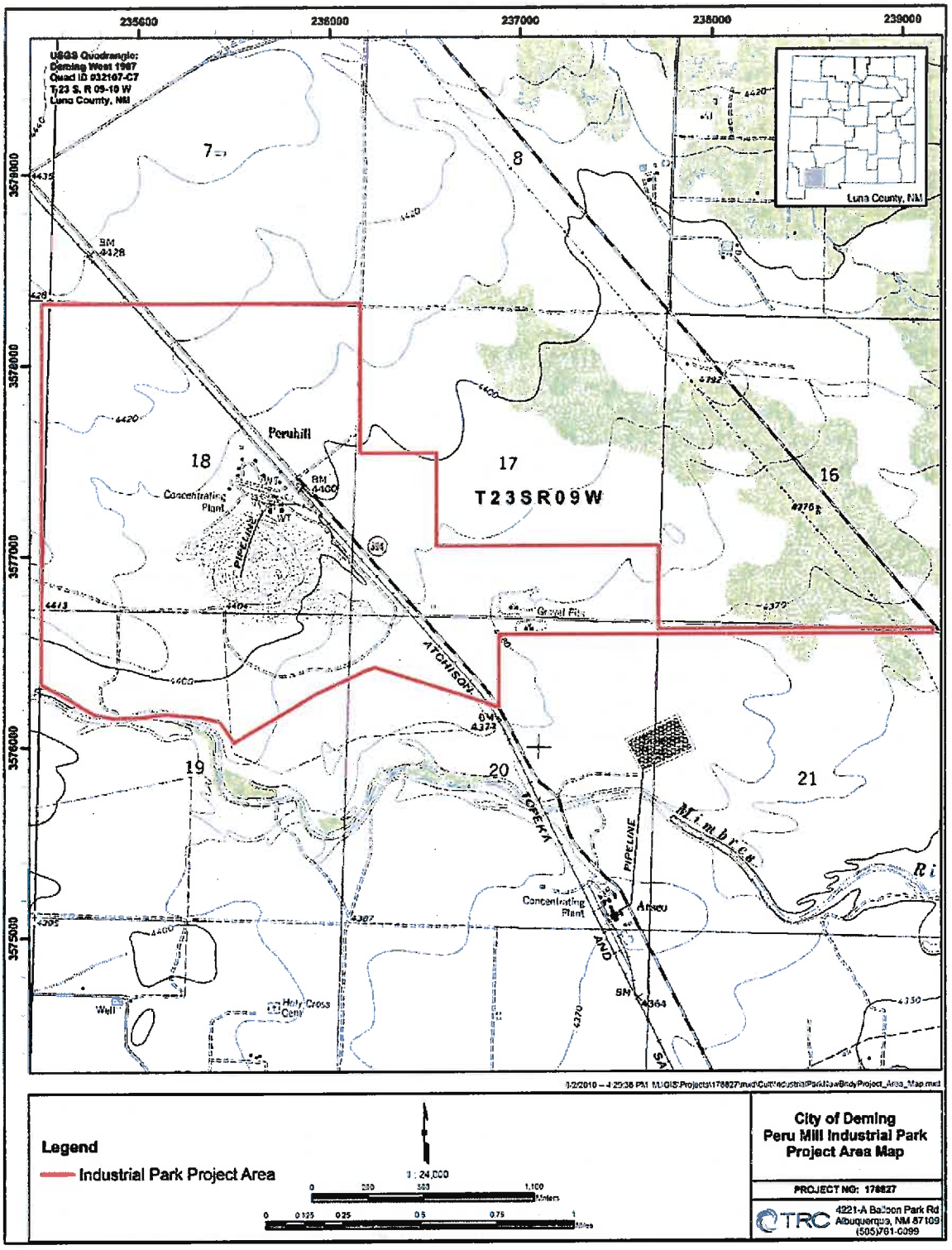

Figure 1.1 Project location map

2.0 Environmental Setting

2.1 Physiography and Climate

The project area is located within the Mexican Highland region of the Basin and Range physiographic province (USGS 2003), characterized by alluvial fans and internally drained basins generally below 4,500 feet that were formed from the sedimentation of collapsed tectonic faults during the Tertiary period (NRCS 2010a, Griffith and Omernik 2009). Elevation in the project area ranges from approximately 4,380 feet along the southern boundary to approximately 4,420 feet to the north. The climate is characterized by short winters and long, hot summers, with average annual temperatures around 65°F (Bailey 1980). Daytime temperatures in the summer often exceed 100°F, while the average temperature in January, the coldest month, is in the mid-50s. Diurnal temperature fluctuations range from 25° to 35°F (WRCC 2002).

Average annual precipitation in the project area ranges from 8 to 11 inches (NRCS 2010b), with most precipitation falling during a period of local intense rain storms beginning around July and continuing through October (Bailey 1980). Convective storms are generated from strong surface heating and orographic lifting of moist air from the Gulf of Mexico circulating from the southeast. Sixty to 80 percent of annual precipitation falls from May to October, the six warmest months of the year (WRCC 2002). Wind speeds are typically moderate; however sustained strong winds exceeding 30 mph accompanying spring storm fronts present the risk of blowing dust and soil erosion of unprotected fields (WRCC 2002).

2.2 Soils

Soils in the project area are generally deep, non-saline, well-drained sandy soils with a low water table (more than 80 inches deep). Soils in the northern, central and east ends of the project area and surrounding the main tailings pile to the southeast are from the Berino and Mohave series, which are deep, well drained sandy soils of valley floors and fan piedmonts from alluvium derived from igneous (Berino series) and sedimentary (Mohave series) parent material. Texture ranges from loamy sand and sandy loam in the top 5 to 8 inches, to sandy clay loams and clay loams for deeper soil layers. The available water capacity, defined as the capacity of soil to hold water available for use by most plants and expressed as inches of water per inch of soil, is rated moderate to high ranging from an average of 7.1 to 11.3 inches (NRCS 2010b).

Most of the western and central portions of the project area are characterized by Mohave sandy clay loam, 0 to 3 percent slopes. This soil type of alluvial fans and hillslopes is a deep, well-drained loam with high available water capacity (12.0 inches). Texture ranges from sandy clay loam in the top 8 inches to clay loam (NRCS 2010b).

The southern boundary of the project area to the west along the Mimbres River has soils from the Arizo and Vinton series, which are deep, well drained to excessively well drained loamy sand to extremely gravelly sand with a rare (Vinton) to occasional (Arizo) frequency of flooding. These alluvial soils have a very low-to-low available water capacity (2.2–4.3 inches) (NRCS 2010b). Other soils along the southern project boundary are from the Bluepoint-Onite association. These soils are deep, well drained to somewhat excessively drained soils ranging in texture from loamy sand to gravelly loamy sand, with low available water capacity (4.2 to 5.7 inches). The Bluepoint-Onite associate is alluvium derived from calcareous sandstone parent material, typically found on alluvial fans and stream terraces of valley floor remnants (Bluepoint series) and fan piedmonts of valley sides (Onite series) (NRCS 2010b).

Areas north and south of Arrowhead Drive are derived of the Dona Ana sandy loam, Dona Ana-Pintura complex (eroded), Mohave sandy loam and Mohave-Pintura complex (eroded). The Dona Ana soils are

very deep, well-drained soils that formed in alluvial sediments derived from sedimentary rocks and contain a moderate water capacity of 7.7 to 7.9 inches. Dona Ana soils are on alluvial fans and fan terraces and have slopes of 0 to 9 percent. The Mohave series is described above (NRCS 2010b).

A gravel pit is located in the central eastern portion of the project area.

2.3 Surface Waters

The project area is located within the Mimbres Watershed (EPA 2010), a closed basin drained by the Mimbres River that includes essentially all of Luna County. The Mimbres River is formed by snow-pack and runoff from the southwestern slopes of the Black Range. Only the upper reach of the river is perennial. As it flows southward, the river dissipates on the desert floor north of Deming. The river floods the Deming area approximately once a decade after periods of unusually heavy rainfall in the Cooke's and Black ranges (Wikipedia 2010). Porter Draw, an ephemeral drainage lacking a defined channel, flows from the western boundary of the project area southeast into the Mimbres River. A small ditch in the vicinity of the City of Deming water pumping facility was filled with water at the time of the field survey. In addition, three ponded areas were observed in the project area. Precipitation levels in the project area ranged from 0.03 to 0.25 inches over a period of five days prior to the survey, indicating that the area had received rainfall and therefore explaining why these areas contained water. Spadefoot toad tadpoles were observed swimming in one of the ponds and juvenile toads were observed around the pond, indicating that the wet area had been holding water for at least two days in order for the tadpoles to hatch (Appendix A: Project Area Photographs). None of the ponded areas appeared to contain hydrophitic vegetation to indicate that they were wetlands.

2.4 Vegetation

The project area is located within the Chihuahuan Basins and Playas ecoregion, which is dominated by desert shrubs and grasses adapted to low available moisture, high evapotranspiration rates, and extreme diurnal temperature fluctuations (Griffith and Omernik 2009). The project area is mostly desert grassland dominated by tobosa grass (*Hilaria mutica*), soapweed yucca (*Yucca palmilla*), broom snakeweed (*Gutierrezia sarothrae*) and Mormon tea (*Ephedra trifurca*); other shrubs include honey mesquite (*Prosopis glandulosa*), and creosote bush (*Larrea tridentata*). Many desert wildflowers were in bloom throughout the project area at the time of the survey, including blanketflower (*Gaillardia* sp.), white flower gilia (*Gilia longiflora*), scarlet globemallow (*Sphaeralcea coccinea*), silverleaf nightshade (*Solanum elaeagnifolium*), desert marigold (*Baileya multiradiata*) and hairyseed bahia (*bahia absinthifolia*).

The tobosa grassland contains patches, mainly in the southwestern portion of the project area, in which grass cover decreases and the dominant ground cover is broom snakeweed. Grassland vegetation in the vicinity of the tailings piles and existing facilities in the central-eastern portion of the project area is disturbed. The southeastern portion of the project area is dominated by soapweed yucca, Mormon tea, fourwing saltbush (*Atriplex canescens*), sand sage (*Artemisia filifolia*), and mixed grasses. Riparian vegetation along the Mimbres River along the southern border of the project area to the west consists of open, deciduous woodland dominated by desert willow (*Chilopsis linearis*). The ditch near the City of Deming water pump facility is lined with tamarisk (*Tamarix* sp.) and giant reed (*Arundo* sp.).

The northern portion of the project area was dominated by tobosa grass, silverleaf nightshade, Russian thistle (*Salsola tragus*), soapweed yucca and creosote bush. Dense patches of tobosa grass were found in the central portion of the project area where the soil classification changed from the Berino and Mohave classification to the Bluepoint-Onite association. Grassland vegetation in the eastern portion of the project area appears to be disturbed and is dominated in most areas by broom snakeweed. In some eastern and central portions of the project area, vegetation was found in sparse patches and the sandy soils

were exposed. Dominant vegetation in these areas consisted of broom dalea (*Psorothamnus scoparius*), broom snakeweed, honey mesquite and silverleaf nightshade. Vegetation north and south of Arrowhead Drive consists mainly of broom snakeweed, Russian thistle and mixed grasses.

2.4.1 Noxious weeds

The New Mexico Department of Agriculture coordinates the management of noxious weeds under the New Mexico Noxious Weed Act (76-7D-1 to 76-7D-6 NMSA 1978). Noxious weeds are defined as plant species that are deemed harmful to the economy or the environment, and are listed on the New Mexico Noxious Weed List. Tamarisk (*Tamarix* sp.), also known as saltcedar, is listed a Class C species on the New Mexico Noxious Weed List. Class C species are widespread, established species that are targeted for local management based on the feasibility of control and level of infestation. The distribution of tamarisk in the project area is limited to the artificial ditch near the City of Deming water pumping facility. An unknown type of starthistle (*Centaurea* sp.) was observed on the east side of Peru Mill Road in the central portion of the project area. The plant could not be more specifically identified due to the season and its condition. A further study would determine if the starthistle is one listed on the New Mexico Noxious Weed List. No other species included on the New Mexico Noxious Weed List were detected in the project area.

2.5 Wildlife

The project occurs in the Chihuahuan Desert, a biologically diverse and unique ecosystem that stretches across southeastern Arizona and southern New Mexico to the Edwards Plateau of western Texas, and extends south to central Mexico. Typical mammal species include ungulate grazers such as the pronghorn antelope (*Antilocapra americana*), and mule deer *(Odocoileus hemionus),* other herbivores such as desert cottontail *(Sylvilagus audubonii),* and black-tailed jack rabbit *(Lepus californicus),* and rodents including kangaroo rats (*Dipodomys*), deer mice (*Peromyscus*), woodrats, (*Neotoma floridana),* pocket gophers (*Geomyidae*), and ground squirrels (*Sciuridae*). Predators include coyote (*Canis latrans*), grey desert fox (*Urocyon cinereoargenteus*), swift fox *(Vulpes velox),* bobcat *(Lynx rufus),* and mountain lion *(Puma concolor*), while typical omnivores include raccoon (*Procyon lotor),* badger *(Mustelidae*), skunk (*Mephitis mephitis)*, and javelina (*Tayassuidae).* Common bird species include the greater roadrunner (*Geococcyx californianus),* scaled quail, (*Callipepla squamata*), cactus wren (*Campylorhynchus brunneicapillus*), black-throated sparrow (*Amphispiza bilineata*), Scott's oriole *(Icterus parisorum*), and raptors including the great horned owl *(Bubo virginianus)*, burrowing owl *(Athene cunicularia),* and red-tailed hawk *(Buteo jamaicensis).* Chihuahuan Desert herpetofauna are more strongly associated with the region, compared with common mammal and bird species, which generally have more widespread distribution. Lizards species centered in the region include Texas horned lizard (*Phrynosoma cornutum*), Texas banded gecko (*Coleonyx brevis*) and reticulated gecko (*C. reticulatus*), greater earless lizard (*Cophosaurus texanus*), several species of spiny lizards (*Scelpoprus* spp.), and several species of whiptails (*Cnemidophorus* spp.). Representative snakes include the Trans-Pecos ratsnake (*Elaphe subocularis*), Texas blackheaded snake (*Tantilla atriceps*), and whipsnakes (*Masticophis* spp.) (WWF 2001).

Various migratory birds and raptors were observed in the project area during the biological field investigation, including mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), ash-throated flycatcher (*Myiarchus cinerascens),* western kingbird (*Tyrannus verticalis*), Cassin's sparrow (*Aimophila casinii*), western meadowlark (*Sturnella neglecta*), loggerhead shrike (*Lanius ludovicianus*), black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), hooded oriole (*Icterus cucullatus*), yellow grosbeak (*Pheucticus chrysopeplus*), Chihuahuan raven *(Corvus cryptoleucus),* turkey vulture *(Cathartes aura),* and Swainson's hawk *(Buteo swainsoni*). One nesting mourning dove was flushed from its nest in the central portion of the project area. One egg was observed in the nest. An active great-horned owl (*Bubo virginianus*) nest is located in the southeast corner of the heavy equipment shed; two adult owls were observed with one downy-

feathered young. An abundance of owl pellets and whitewash in the shed indicate that owls have probably occupied the site for several seasons.

Western burrowing owls (*Athene cunicularia hypugaea*) were observed in the western and northern portions of the project area, and in a kangaroo rat mound complex located northeast of Peru Mill Road and south of Arrowhead Drive (Appendix A: Project Area Photographs).

Black-tailed jackrabbits (*Lepus californicus*), Texas horned lizard (*Phrynosoma cornutum*), little striped whiptail (*Cnemidophorus inornatus*), New Mexico whiptail (*Cnemidophorus inornatus*) and juvenile toads of the genus *Spea* also were observed in the project area during the survey. Bat droppings were observed in openings to a small concrete building adjacent to the heavy equipment shed, indicating use of the building by bats for roosting. Observations of cattle droppings provide evidence of cattle grazing in the project area.

3.0 Threatened, Endangered, and Sensitive Species

A list of threatened, endangered, and sensitive species with potential to occur in Luna County is provided as Table 3.1. The list was compiled from information provided by the U.S. Fish and Wildlife Service (USFWS) (USFWS 2010a), the Biota Information System of New Mexico (BISON-M 2010), the New Mexico Rare Plant Technical Council (NMRPTC 1999), and the New Mexico Administrative Code (19.21.2.8 NMAC and 19.33.6.8 NMAC). The list includes: three species of invertebrates; two species of fish; three species of herpetofauna (reptiles and amphibians); 19 species of birds; two species of mammals; and two species of plants. Table 3.1 also summarizes the habitat requirements, range, and population distribution for each species, which were used to determine which wildlife species could potentially occur in the project area. The following subsections describe the species with potential to occur in the project area; species not likely to occur are excluded from further consideration.

3.1 Invertebrates

Three threatened, endangered, and sensitive invertebrate species occur in Luna County (Table 3.1). All three species are excluded from further consideration because they are not likely to occur in the project area due to specific and limited distribution and/or habitat factors such as vegetation, elevation, or soil type that do not match the conditions of the affected environment in the project area.

3.2 Fish

Two species of special status fish are listed in Luna County (Table 3.1): the federally threatened beautiful shiner (*Cyprinella formosa*), now extirpated from New Mexico (BISON-M 2010); and the Rio Grande sucker (*Catostomus plebius*), a USFWS Species of Concern. The Rio Grande sucker normally occupies middle elevation streams (i.e. 6,500 to 8,000 feet) of the Mimbres drainage, but may occur in downstream reaches following flood events. No permanent water sources providing fish habitat are located within the project area, therefore fish will not be affected by the proposed action.

Table 3.1 List of Threatened, Endangered, and Sensitive Species in Luna County, New Mexico

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
INVERTEBRATES				
Cooke's Peak Woodlandsnail *(Ashmunella macromphala)*	SOC, t	Feeds on decaying organic matter under rocks and debris on the very steep northern slope of Cooke's Peak from about 6,900 to 7,000 feet in elevation.	Known only from Cooke's Peak, Luna County, about 15 miles north of the project area.	No – Project area is outside known distribution.
Florida Mountainsnail *(Oreohelix florida)*	SOC	This species was described from recent shells collected near the central peak on the west side of the Florida Mountains.	Endemic to the Florida Mountains of southwestern New Mexico; believed to be extinct.	No – Project area is outside known distribution.
Shortneck Snaggletooth *(Gastrocopta dalliana dalliana)*	SOC	Feeds on algae and detritus in an array of habitats ranging from Sonoran desert shrublands to montane forest. In New Mexico, this species has been taken from a wooded canyon at 5,900 feet in elevation.	Living specimens in New Mexico are known only from Indian Creek Canyon on the northern slope of Animas Peak, Hidalgo County.	No – Project area is outside known distribution.
FISH				
Beautiful Shiner *(Cyprinella formosa)*	T	Mid-water column species living in pools of small to medium streams and along shorelines of larger streams, near beds of aquatic vegetation or other cover.	Extirpated from New Mexico. Formerly occurred in perennial reaches of the Mimbres drainage in northwest Luna County.	No – Extirpated from New Mexico.
Rio Grande Sucker *(Catostomus plebius)*	SOC	Small to large, middle elevation (6,500 to 8,000 feet) streams, feeding on plankton and invertebrates in swiftly flowing riffle areas over rocks and gravel bottoms.	Normally occurs in the Mimbres River in Grant County, but may occur further downstream during and immediately following flood periods.	No – Lack of permanent aquatic habitat.
HERPETOFAUNA				
Chiricahua Leopard Frog *(Rana chiricahuensis)*	T	Variety of permanently moist, heterogeneous aquatic habitats including springs and seeps, ponds, marshes, stock tanks, wells, intermittent rocky creeks, and mainstream river reaches.	Known to occupy dense riparian habitat along the Mimbres River in northwest Luna County.	No – Lack of suitable aquatic habitat; project area is outside known distribution.
Great Plains Narrowmouth Toad *(Gastrophryne olivacea)*	e	Grassland and desert-grassland habitats, including tobosa grasslands and swales. Breeds opportunistically in temporary aquatic habitats such as rain pools and ponds.	Known population exists in extreme south-central Luna County the vicinity of Hermanas.	Yes – Potential suitable habitat in the project area.
Reticulate Gila Monster *(Heloderma suspectum suspectum)*	e	Inhabits lower slopes of mountains and nearby outwash plains, especially in canyons and arroyos with periodic water; also frequents adjacent irrigated farmlands.	In New Mexico, Gila monsters occur regularly in the Gila Valley and from the Arizona border to the eastern slopes of the Peloncillo Mountains in Hidalgo County.	Yes – Potential suitable habitat in the project area.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
BIRDS				
Brown Pelican *(Pelecanus occidentalis carolinensis)*	e	Usually found in warmer water marine habitats in North America; rarely occurs inland. Reliable New Mexico records are all of solitary birds near large lakes and reservoirs.	Rare vagrants in New Mexico, primarily as immature wanderers in summer and fall. Recorded in 13 New Mexico counties, including Luna County.	Yes – Rare vagrant or migrant.
Neotropic Cormorant *(Phalacrocorax brasilianus)*	t	Larger bodies of open water such as lakes and reservoirs. Requires trees, shrubs, or dead snags near water for nesting in areas free from human disturbance.	In New Mexico, breeds only in the lower Rio Grande Valley near Elephant Butte and Caballo reservoirs. Nonbreeders occur north to Bernalillo, west to the Gila Valley, and east to the Tularosa and lower Pecos valleys.	Yes – Rare vagrant or migrant.
Bald Eagle *(Haliaeetus leucocephalus alascanus)*	t	Associated with open expanses of water (e.g. streams and lakes) in a variety of habitats. Roosts in trees at protected sites, such as groups of trees or canyons.	Statewide migrant and local winter resident in New Mexico. Winter roost and concentration areas include the Gila and lower Rio Grande valleys, and Elephant Butte and Caballo reservoirs. Breeds at only a few sites to the extreme north and west of the state.	Yes – Local winter resident or occasional migrant.
Common Black-Hawk *(Buteogallus anthracinus)*	SOC	Riparian woodlands along permanent lowland streams. Requires mature, well-developed stands (e.g., cottonwood bosques) for breeding.	Uncommon summer resident from March to October in New Mexico. Regularly occurs in the San Francisco, Gila, and Mimbres valleys; occasionally occurs in the middle Rio Grande valley.	Yes – Potential suitable habitat in the project area.
Northern Gray Hawk *(Buteo nitidus maxima)*	SOC	Lowland riparian woodlands.	Rare and local summer migrants in New Mexico. Reported in the Gila and Mimbres valleys. Breeds south of the U.S. border	Yes – Rare summer migrant.
Northern Aplomado Falcon *(Falco femoralis septentrionalis)*	E/NEP, e	Variable open habitats, including savannahs, desert grasslands, typically associated with yucca grasslands and adjacent shrubby habitats at lower elevations.	Largely extirpated in the U.S. historical breeding range along the U.S./Mexico border from southeast Arizona to Texas. Captive-bred birds are being released in south Texas and New Mexico (BISON-M 2010), including the Armendaris Ranch near Engle, New Mexico and White Sands Missile Range (Peregrine Fund 2010).	Yes – Potential suitable habitat in the project area.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
American Peregrine Falcon *(Falco peregrinus anatum)*	SOC, t	Occurs in a variety of habitats, from upper and lower montane areas to desert scrub and grasslands. Typically nests on ledges or in potholes on cliffs in wooded/forested habitats near large open areas for foraging	Permanent resident species in New Mexico that breeds locally in mountain areas and migrates statewide.	Yes – Uncommon spring and fall migrant.
Arctic Peregrine Falcon *(Falco peregrinus tundrius)*	SOC, t	Breeds in the Arctic tundra, and inhabits coastlines and mountains from Florida to South America in winter.	Very rare migrant throughout New Mexico.	Yes – Rare transient migrant.
Mountain Plover *(Charadrius montanus)*	SOC	Shortgrass prairies and dry playas during the breeding season. Regularly observed on turf farms and occasionally observed in other agricultural fields during late summer and fall migration.	Breeds in the Great Plains, from Montana south to eastern New Mexico; breeds locally in central-western New Mexico and migrates statewide.	Yes – Rare spring migrant.
Common Ground-dove *(Columbina passerina pallescens)*	e	Agricultural and undeveloped areas, including native shrublands and weedy areas, below 5,400 feet.	Local warm-season (April-September) visitor to the southernmost part of the state, including the lowermost Rio Grande and Pecos valleys.	Yes – Rare summer migrant.
Yellow-billed Cuckoo *(Coccyzus americanus)*	C	Lowland deciduous woodlands, willow and alder thickets, second-growth woods, deserted farmlands, and orchards.	Occurs statewide in New Mexico during migration. Reported as summer breeding season residents throughout the Gila National Forest and at the White Sands Missile Range.	Yes - Possible migrant.
Western Burrowing Owl *(Athene cunicularia hypugaea)*	SOC	Grasslands and open shrublands. Nests and roosts in abandoned burrows of fossorial mammals such as prairie dogs, ground squirrels, foxes, badgers, and armadillos.	Rare year-round residents and common breeding residents in southern New Mexico. Permanent resident at the White Sands Missile Range.	Yes – Observed in the project area.
Violet-crowned Hummingbird *(Amazilia violiceps ellioti)*	t	Well-developed riparian woodlands at low to moderate elevations, typically with cottonwood, sycamore, white oak and hackberry.	A Mexican highland species that reaches its northernmost distribution in Guadalupe Canyon in southeast Arizona and southwest New Mexico (Hidalgo County). Single birds have been documented in Anthony and Las Cruces, New Mexico.	No – Lack of suitable habitat in project area.
Lucifer Hummingbird *(Calothorax lucifer)*	t	Slopes and adjacent canyons in arid montane areas with flowering species such as agave and ocotillo.	In New Mexico, occurs in the Peloncillo Mountains and Guadalupe Canyon (Hidalgo County) and the lower Rio Grande Valley.	No – Lack of suitable habitat in project area.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
Southwestern Willow Flycatcher *(Empidonax traillii extimus)*	E, e	Dense riparian shrublands, including groves of willows, arrowweed, buttonbush, tamarisk, and Russian olive, often with a scattered overstory of cottonwood.	Occurs statewide in New Mexico during spring and fall migration. Breeds in the Chama, Rio Grande, Zuni, San Francisco, Gila, and probably the Hondo basins and in the San Juan and western Sangre de Cristo mountains.	Yes – Spring and fall migrant.
Bell's Vireo *(Vireo bellii)*	SOC, t	Dense shrublands or woodlands along lowland stream courses, with willows, mesquite, and seepwillow.	Local summer resident in New Mexico in the lower Rio Grande, lower Gila, lower San Francisco, and lower Pecos valleys.	Yes – Spring and fall migrant.
Gray Vireo *(Vireo vicinior)*	t	Oak woodlands with a well-developed grass component in southern New Mexico; arid juniper woodlands on foothills and mesas to the north.	Widespread and locally common summer residents in southern New Mexico, northward to the San Juan and upper Rio Grande valleys. Rare and local during migration.	Yes – Spring and fall migrant.
Baird's Sparrow *(Ammodramus bairdii)*	SOC, t	Grassland species ranging from desert grasslands in the south to mountain meadows up to 11,800 feet in the San Juan and Sangre de Cristo mountains. Breeds in shortgrass prairie in the northern Great Plains.	Regular migrants and local winter residents in New Mexico, primarily in the eastern plains and southern lowlands. Rare winter residents around White Sands National Monument.	Yes – Spring and fall migrant.
Varied Bunting *(Passerina versicolor)*	t	In New Mexico, prefers dense stands of mesquite and associated growth in canyon bottoms.	In New Mexico, occurs in Guadalupe Canyon (Hidalgo County) and near Carlsbad Caverns National Park (Eddy County). Vagrants have been observed in Luna, Sierra, and Otero counties.	No – Lack of suitable habitat in project area.
MAMMALS				
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	SOC	Occurs in a variety of xeric to mesic habitats, including desert scrub, sagebrush, chaparral, and deciduous and coniferous forests. Townsend's big-eared bats do not move or forage far from their day roosts (i.e. caves and mine tunnels), and often rest in abandoned buildings during nighttime foraging	Occurs throughout much of western North America, from British Columbia to Mexico, and eastward to Texas, with isolated populations further east. Known to occur in the Gila National Forest and White Sands Missile Range.	Yes – Foraging and nighttime roosting.
Desert Pocket Gopher *(Geomys arenarius)*	SOC	Most common in soft alluvial soils of arroyo bottoms and flood plains. Also occupies irrigation ditches, borrow pits, roadsides, and agricultural lands with sandy or loamy soils.	Occurs in Doña Ana, Otero, Luna, and Socorro counties as isolated populations in sandy or loamy soils of the White Sands area, the lower Rio Grande Valley, and the eastern half of the Deming Plain.	Yes – Potential suitable habitat in the project area.

Common Name† (*Scientific Name*)	Status*	Habitat**	Distribution**	Potential to Occur?
PLANTS				
Desert Night-blooming Cereus *(Cereus greggii* var. *greggii)*	SOC	Mostly in sandy to silty gravelly soils in gently broken to level terrain in desert grassland or Chihuahuan desert scrub. Typically found growing up through and supported by shrubs, especially creosote bush and mesquite (NMRPTC 2010).	In New Mexico, occurs in Doña Ana, Grant, Hidalgo, and Luna counties. A population has been documented about 10 to 15 miles north of the project area (NMRPTC 2010).	Yes – Potential suitable habitat in the project area.
Sand Prickly Pear *(Opuntia arenaria)*	SOC, e	Sandy areas, particularly semi-stabilized sand dunes among open Chihuahuan desert scrub, often with honey mesquite and a sparse cover of grasses; from 3,800 to 4,300 feet in elevation (NMRPTC 2010).	In New Mexico, southern Doña Ana, Luna, and Socorro counties. Documented Luna County populations are located near the U.S./Mexico border about 30 miles south of the project area (NMRPTC 2010).	No – Project area is outside known distribution and above elevation range.

Notes:

†List compiled from BISON-M (2010), NMRPTC (1999), USFWS (2010a), and the New Mexico Administrative Code (19.21.2.8 NMAC and 19.33.6.8 NMAC).

***Status: E=Federal Endangered; E/NEP=Federal Endangered /Nonessential Experimental Population; T=Federal Threatened; C=Federal Candidate; SOC=Federal Species of Concern; e=State Endangered; t=State Threatened**

****Habitat and distribution information compiled from BISON-M (2010) unless otherwise specified.**

3.3 Herpetofauna

Three species of herpetofauna (amphibians and reptiles) are listed in Luna County (Table 3.1). One species of amphibian and one species of reptile potentially could occur in the project area based on suitable habitat and population distribution.

3.3.1 Great Plains Narrowmouth Toad

The Great Plains narrowmouth toad (*Gastrophryne olivacea*) is a state endangered species. This toad spends most of its lifecycle underground, emerging during periods of high humidity or rain with mild temperatures from March to September to breed in temporary aquatic habitats such as rain pools and ponds. The Great Plains narrowmouth toad occupies grasslands, historically dominated by tobosa grass (*Hilaria mutica*). Tobosa grasslands and swales were once widespread in southern Luna County, but due to farming and ranching this vegetation type now occurs in patches, generally along roadsides (BISON-M 2010). Specimens collected from extreme south-central Luna County were all from roadside ditches flooded by agricultural irrigation in heavily grazed desert scrub dominated by mesquite, creosote bush (*Larrea tridentata*), and desert grasses (Degenhardt et al. 1996).

The project area supports tobosa grassland vegetation, which is historic habitat for the Great Plains narrowmouth toad in Luna County. An artificial ditch near the City of Deming water pumping facility and the temporary ponded areas throughout the project area provide potential breeding habitat for emergent toads. It is possible that the Great Plains narrowmouth toad could occur in the project area; however, the nearest population of Great Plains narrowmouth toads occurs in the vicinity of Hermanas, New Mexico, approximately 30 miles south of the project area (BISON-M 2010, Degenhardt et al. 1996). Due to the far proximity of the nearest population, it is unlikely that the Great Plains narrowmouth toad would occur in the project area.

3.3.2 Reticulate Gila Monster

The reticulate Gila monster (*Heloderma suspectum suspectum*) is a state endangered species. The species inhabits desert grasslands and sometimes pine-oak forests on the lower slopes of mountains and nearby outwash plains (BISON-M 2010) from 3,870 to 6,400 feet in elevation (Degenhardt et al. 1996), favoring rocky foothills over open flats (BISON-M 2010). Gila monsters may dig their own burrows, use other animal burrows, or take cover under boulders, rock crevices, and downed vegetation for thermal shelter. Cover often includes boulders, rock crevices, downed vegetation, and litter (BISON-M 2010).

In southwestern New Mexico, Gila monsters regularly occur in the Gila Valley and from the Arizona border east to the eastern slopes of the Peloncillo Mountains. Gila monsters also have been found in irrigated farmlands adjacent to their typical habitats (BISON-M 2010), including agricultural areas near Silver City and Cotton City (Degenhardt et al. 1996), located approximately 40 miles northwest and 65 miles southwest of the project area, respectively. A species distribution map provided in Degenhardt et al. (1996) shows a population of reticulate Gila monsters in central Luna County due north of the project area.

The project area is located in the Deming Plain, a glacial outwash plain, dominated by desert grassland vegetation providing potential suitable habitat for the reticulate Gila monster. Animal burrows, particularly the kangaroo mound complexes located in the project area, provide suitable thermal shelters. Mountain ranges and ridges with associated preferred habitat for the Gila monster (e.g. rocky foothill terrain) in the vicinity of the project area include Black Mountain approximately 4 miles to the northwest, Fluorite Ridge and the Cooke Range approximately 10 miles to the northeast, the Florida Mountains approximately 12 miles to the southeast, and Red Mountain approximately 6.5 miles to the southwest. The reticulate Gila monster potentially could occur in the project area.

3.4 Birds

Nineteen species of birds are listed in Luna County (Table 3.1). Sixteen species, including six species of raptors, potentially could occur in the project area based on the presence of suitable habitat and species population distribution.

3.4.1 Brown Pelican

The brown pelican (*Pelecanus occidentalis carolinensis*) is a state endangered species. Brown pelicans are usually found in warmer water marine habitats in North America. Brown pelicans feed exclusively on fish, which they catch by diving headfirst into the water. A transient visitor to New Mexico, reliable records of brown pelicans in New Mexico include solitary birds near large lakes or along major rivers including the San Juan, Gila, Rio Grande, and Pecos drainages, most often observed as immature wanderers during the summer and fall (BISON-M 2010). The nearest suitable habitat is Caballo Reservoir, located approximately 50 miles northeast of the project area, and brown pelicans potentially could occur flying over the project area.

3.4.2 Neotropic Cormorant

The neotropic cormorant (*Phalacrocorax brasilianus*) is a state threatened species. Neotropic cormorants occur in larger bodies of open water such as lakes and reservoirs. In New Mexico, neotropic cormorants occur from the Gila Valley and Hidalgo County to the west, to the lower Pecos River valley in the east. The only locations in New Mexico where neotropic cormorants are known to breed are Caballo and Elephant Butte reservoirs (BISON-M 2010), located approximately 50 miles and 110 miles northeast of the project area, respectively. Neotropic cormorants potentially could occur flying over the project area.

3.4.3 Bald Eagle

The bald eagle (*Haliaeetus leucocephalus alascanus*) is a state threatened species and is protected by the federal Bald and Golden Eagle Protection Act. Bald eagles migrate throughout New Mexico year-round, and are associated with open expanses of water (e.g. large streams, rivers and lakes) in a variety of habitats. They generally do not breed in New Mexico, with the exception of a few documented nests sites in the extreme northern and western portions of the state. Roosting habitat is generally provided by trees in protected sites, such as groups of trees or canyons. Bald eagles are local winter residents, and important roosting and winter concentration areas are located in the Gila and lower Rio Grande valleys, and at Caballo and Elephant Butte reservoirs (BISON-M 2010), located approximately 50 miles and 70 miles northeast of the project area, respectively. Bald eagles potentially could occur in the project area as local or seasonal migrants throughout the year.

3.4.4 Common Black-Hawk

The common black-hawk (*Buteogallus anthracinus*) is a USFWS Species of Concern. Common-black hawks are an uncommon summer resident (March to October) in New Mexico that occur in the San Francisco, Gila, and Mimbres valleys. Their habitat is riparian woodlands, especially of cottonwood, and they require mature, well-developed stands for breeding (BISON-M). The desert-willow riparian habitat along the Mimbres River along the southern boundary of the project area does not provide suitable breeding habitat for common black-hawks; however, common black-hawks potentially could occur in the project area for foraging or migration.

3.4.5 Northern Gray Hawk

The northern gray hawk (*Buteo nitidus maxima*) is a USFWS Species of Concern. They are rare and local summer migrants to New Mexico lowland riparian woodlands, and have been reported in the Gila and Mimbres valleys (BISON-M 2010). Northern gray hawks potentially could occur in the project area.

3.4.6 Northern Aplomado Falcon

The northern aplomado falcon (*Falco femoralis septentrionalis*) is a federal and state endangered species, formerly extirpated from New Mexico. The historic breeding range in the U.S. was along the U.S./Mexico border from southeastern Arizona to Texas (BISON-M 2010). Captive breeding and reintroduction programs have established breeding populations of aplomado falcons at the Armendaris Ranch near Engle, New Mexico and at the White Sands Missile Range (Peregrine Fund 2010), approximately 75 and 90 miles northeast of the project area, respectively. Aplomado falcons in New Mexico are managed by the USFWS as nonessential experimental population (NEP) under section 10(j) of the Endangered Species Act. The NEP includes all reintroduced falcons and their offspring plus lone dispersers found within the NEP area (71 FR 143, p.42300), which is geographically defined as all of Arizona and New Mexico (71 FR 143, p.42298). The NEP designation grants partial Endangered Species Act protection to the aplomado falcon by prohibiting intentional take and providing short-term protective measures from natural predators and human-related sources of mortality to facilitate successful reintroduction efforts (71 FR 143, p.42303) (FR 2006); unintentional or incidental take as a result of otherwise legal activities is authorized by the NEP designation (USDOD and USFWS 2007).

The northern aplomado falcon is an intermediate sized falcon, larger than a kestrel and smaller than a peregrine, with rufous underparts, a long banded tail, and a distinctive black and white facial pattern that serves as a unique field identifier (USFWS 2010b). Aplomado falcons inhabit various open habitats including desert grassland associations, rangelands, and savannahs, with scattered trees and shrubs such as mesquite and yucca (USFWS 2010b, NatureServe 2009). Essential habitat elements are scattered trees and shrubs, relatively low ground cover, abundant prey, and available suitable nest sites (USFWS 2010b). Aplomado falcons feed primarily on birds including mourning doves, meadowlarks, mockingbirds, and blackbirds. In addition, insects (beetles, cicadas, grasshoppers) are important prey, while other small prey such as lizards, snakes, and small mammals constitute a lesser part of their diet (NatureServe 2009, USFWS 2010b). Aplomado falcons nest from March to June, using the nests of other raptors and corvids such as red-tailed hawk, Swainson's hawk, and Chihuahuan raven (USDOD and USFWS 2007).

Young et al. (2005) developed a habitat suitability model for northern aplomado falcons and classified highly suitable habitat as homogenous grasslands of tobosa (*Hilaria mutica*) or grama grass (*Bouteloua* sp.) with moderate to high percent cover and low woody vegetation density, which resembles the desert grassland vegetation found on much of the project area and on adjacent New Mexico State Trust lands to the north and west. In addition, three of the seven species that comprise 68 percent of the avian diet of Chihuahuan desert aplomado falcons (Montoya et al. 1997 in Young et al. 2005), northern mockingbirds, western kingbirds, and mourning doves, were abundant in the project area during the biological survey. An inactive stick nest was observed in a honey mesquite, and Chihuahuan ravens and a Swainson's hawk were observed in the project area. Aplomado falcons could disperse to the project area from reintroduced populations to the northeast or from natural populations in Chihuahua, Mexico approximately 35 miles to the south. In addition, aplomado falcons are relatively tolerant of human presence and have been found nesting in well-managed grazed lands (USDOD and USFWS 2007). Northern aplomado falcons potentially could occur in the project area for foraging, breeding, and migration.

3.4.7 American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) is a USFWS Species of Concern and a state threatened species. Peregrine falcons are medium-sized raptors that migrate statewide, breeding locally in mountainous areas that provide suitable nest sites, typically cliff ledges in wooded habitats near large open areas for foraging (BISON-M 2010). Peregrine falcons can occur in a variety of habitats, but prefer open habitats for hunting such as grasslands and open water where their prey, mostly other birds such as pigeons, doves, and waterfowl, are vulnerable to attacks from above (BISON-M 2010). No protected

cliffs occur in the project area for nesting, but peregrine falcons potentially could occur in the project area for hunting or migrating.

3.4.8 Arctic Peregrine Falcon

The arctic peregrine falcon (*Falco peregrinus tundrius*) is a USFWS Species of Concern and a state threatened species. This falcon is very similar to the American peregrine falcon except that it is slightly smaller and paler. The Arctic peregrine falcon breeds on the North American tundra, and is a rare migrant to New Mexico (BISON-M 2010). It is possible but unlikely that arctic peregrine falcons could occur in the project area for hunting or migrating.

3.4.9 Mountain Plover

The mountain plover (*Charadrius montanus*), is a USFWS Species of Concern. Mountain plovers breed in shortgrass prairies and playas of the Great Plains, from Montana to eastern New Mexico; they also breed locally in central-western New Mexico. Non-breeding mountain plovers in New Mexico regularly occur on turf farms, and are occasionally observed in other agricultural areas (BISON-M 2010). Mountain plovers potentially could occur in the project area during migration.

3.4.10 Common Ground-dove

The common ground-dove (*Columbina passerina pallescens*) is a state endangered species. The common ground-dove is a small, chunky, gray-brown dove, smaller than a mourning dove, with black tail edges and a scaly appearance to the breast and head (NatureServe 2009). Habitat includes shrubby riparian habitat, desert shrublands dominated by mesquite or prickly pear, and early successional habitats such as abandoned agricultural fields and open areas near rural developed areas (NatureServe 2009). Southern New Mexico is at the northern periphery of the species range, and common ground-doves may now only be a rare summer (April to September) visitor to the lowermost Rio Grande and Pecos River valleys (BISON-M 2010).

A reliable water source is important for the common ground-dove, which must drink frequently (NatureServe 2009). This is provided on the project area by an inundated ditch near the city's water pump facility, and the ponded areas throughout the project area could serve as water sources for the common ground-dove. This dove feeds primarily on small seeds gathered from roadsides, fields, weed patches, and grassy areas (NatureServe 2009). Potential suitable habitat for common ground-doves occurs throughout the project area, and common ground-doves potentially could occur in the project area during summer.

3.4.11 Yellow-billed Cuckoo

The yellow-billed cuckoo (*Coccyzus americanus*) is a candidate species for listing as a federal threatened or endangered species. Candidate species are taxa for which the USFWS has sufficient scientific information to propose that they be added to list of endangered and threatened species, but the listing action has been precluded by other higher priority listing activities (USFWS 2010a). Yellow-billed cuckoos are summer residents in New Mexico, breeding in dense riparian woodlands with thick undergrowth that support abundant insect prey populations, especially caterpillars (NatureServe 2009). Yellow-billed cuckoos have been recorded during the summer breeding season (March to August) in the Gila National Forest and at the White Sands Missile Range, located approximately 38 miles north and 90 miles northeast of the project area, respectively. Non-breeding habitat includes lowland deciduous woodlands, willow and alder thickets, second-growth woods, deserted farmlands, and orchards (BISON-M 2010). The desert willow riparian habitat along the Mimbres River provides potential suitable habitat for foraging and migration, and yellow-billed cuckoos potentially could occur in the project area.

3.4.12 Western Burrowing Owl

The western burrowing owl (*Athene cunicularia hypugaea*) is a USFWS Species of Concern. Burrowing owls inhabit grasslands and open shrublands, and sometimes occupy areas of human disturbance including vacant lots, golf courses, and airports (BISON-M 2010). Burrowing owls nest in abandoned mammal burrows or natural cavities surrounded by sparse vegetation, most often in burrows of large colonial rodents such as prairie dogs (Klute et al. 2003). They may also use burrows of ground squirrels, foxes, coyotes, and badgers (BISON-M 2010, Klute et al. 2003). Western burrowing owls are locally common summer breeding residents in New Mexico, and rare, local permanent residents throughout southeastern New Mexico (BISON-M 2010; also see Figure 3 in Klute et al. 2003), including the White Sands Missile Range (BISON-M 2010) located approximately 90 miles northeast of the project area.

Western burrowing owls were observed in the western, northern, and eastern portions of the project area, where kangaroo rat (*Dipodomys sp.*) mound complexes were observed. Suitable open foraging habitat exists throughout the project area. The kangaroo rat complex in the eastern portion of the project area was clearly being utilized by the burrowing owls. Feathers, whitewash and burrowing owl tracks were observed around the burrows. It is likely that western burrowing owls breed in the project area, and it is possible that burrowing owls are year-round residents in the project area.

3.4.13 Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a federal and state endangered species. Southwestern willow flycatchers breed in dense groves of riparian shrubs and low trees, including willows, buttonbush, tamarisk, and Russian olive, often with a scattered overstory of cottonwood (BISON-M 2010). The Middle Rio Grande in New Mexico is an important breeding area for southwestern willow flycatchers in the state, and includes designated critical habitat around Elephant Butte Reservoir located approximately 70 miles northeast of the project area (USFWS 2010c). Southwestern willow flycatchers occur throughout New Mexico during migration between their North American breeding habitat and wintering grounds in southern Mexico and Central America (Sogge et al. 2010). Migrating willow flycatchers occur statewide in New Mexico (BISON-M 2010) and use a wider array of forest and shrub habitats than their breeding and wintering habitats, although riparian vegetation is thought to be preferred (Sogge et al. 2010). The project area supports riparian vegetation along the Mimbres River, and migrating southwestern willow flycatchers potentially could occur in the project area.

3.4.14 Bell's Vireo

The Bell's vireo (*Vireo bellii*) is a USFWS Species of Concern and a state threatened species. They breed in dense riparian shrublands or woodlands along lowland stream courses, with willows, mesquite, and seepwillow. Bell's vireos are local summer residents in New Mexico in the lower Rio Grande, lower Gila, lower San Francisco, and lower Pecos valleys (BISON-M 2010). Bell's vireo potentially could occur in the project area during spring and fall migration.

3.4.15 Gray Vireo

The gray vireo (*Vireo vicinior*) is a state threatened species. They inhabit arid juniper woodlands on foothills and mesas to the north, and oak woodlands with a well-developed grass component in the southern part of their New Mexico range. Gray vireos breed in close ecological proximity to solitary and Bell's vireos. Gray vireos are widespread and locally common summer residents in southern New Mexico, northward to the San Juan and upper Rio Grande valleys (BISON-M 2010). Gray vireos potentially could occur in the project area during spring and fall migration.

3.4.16 Baird's Sparrow

Baird's sparrow (*Ammodramus bairdii*) is a USFWS Species of Concern and a state threatened species. This grassland sparrow, distinguishable from other sparrows by the buffy-orange color on its streaked face and crown, breeds in the northern Great Plains. Baird's sparrows are regular migrants through New Mexico, and rare winter residents near White Sands National Monument about 90 miles northeast of the project area (BISON-M 2010). Potential suitable habitat (i.e. desert grassland) exists throughout the project area, and Baird's sparrows potentially could occur in the project area in winter and during migration.

3.5 Mammals

Two species of mammals are listed in Luna County (Table 3.1). Both species could potentially occur in the project area based on suitable habitat and population distribution.

3.5.1 Townsend's Big-eared Bat

The Townsend's big-eared bat (*Corynorhinus townsendii*) is a USFWS Species of Concern. This medium-sized bat occurs in a variety of xeric to mesic habitats, including desert scrub, sagebrush, and deciduous and coniferous forests. Townsend's big-eared bat populations are strongly correlated with the availability of caves or cave-like roosting habitat (e.g. old mines), used for diurnal roosting, breeding, and hibernation. During nocturnal foraging, Townsend's big-eared bats may rest in abandoned buildings (BISON-M 2010). The project area has no diurnal roosting habitat (i.e. caves and cave-like structures) for Townsend's big-eared bats; however, a small concrete block building adjacent to the heavy equipment shed may provide nocturnal roosting habitat for Townsend's big-eared bat, and bat droppings were observed in crumbling holes that provide access to the building for bats. The cooling towers also may provide nocturnal roosting habitat for Townsend's big-eared bat. Townsend's big-eared bat potentially could occur in the project area for nocturnal foraging and roosting.

3.5.2 Desert Pocket Gopher

The desert pocket gopher (*Geomys arenarius*) is a USFWS Species of Concern. Desert pocket gophers are most common in soft alluvial soils of arroyo bottoms and floodplains, and other habitats such as agricultural lands with sandy or loamy soils. The desert pocket gopher does not tolerate soil with high clay or gravel content. Isolated populations in Luna County are known from the White Sands area and the eastern half of the Deming Plain (BISON-M 2010). Sandy soils characterize most of the project area, and desert pocket gophers potentially could occur in the project area.

3.6 Plants

Two species of plants are listed in Luna County (Table 3.1). One species potentially could occur in the project area based on suitable habitat and species distribution.

3.6.1 Desert Night-blooming Cereus

The desert night-blooming cereus (*Cereus greggii* var. *greggii*) is a USFWS Species of Concern. This slender cactus of desert grasslands and Chihuahuan desert scrub typically is found growing up through shrubs for support, most commonly creosote bush and mesquite. The desert night-blooming cereus grows in sandy to gravelly soils on level to gently broken terrain and flowers nocturnally in June. Agricultural use and land development have negatively impacted this species, and overharvesting by private and commercial collectors have eliminated entire populations. Two Luna County populations are documented: one population in the southwestern corner of the county; and one population approximately 10 to 15 miles due north of the project area (NMRPTC 2010).

The sandy soils and level topography of the project area provide suitable substrate for the desert night-blooming cereus. Creosote bush and mesquite in the project area could provide structural support and protection for this species. It is possible that the desert night-blooming cereus could occur in the project area. A focused botanical survey would be required to detect the presence of the desert night-blooming cereus within the project area.

4.0 Mitigation Measures

4.1 Threatened, Endangered and Sensitive Species

4.1.1 Herpetofauna

The project area does not have suitable habitat for the Chiricahua leopard frog (*Rana chiricahuensis*); therefore, no mitigation is recommended. The Great Plains narrowmouth toad (*Gastrophryne olivacea*) is not likely to occur in the project area; therefore, no mitigation is recommended.

The reticulate Gila monster (*Heloderma suspectum suspectum*) potentially could occur in the project area. Because Gila monsters use underground burrows for thermal shelter, ground-disturbing activities associated with the proposed project have the potential for negative impacts to the Gila monster. Several kangaroo mound complexes were located in the project area, and the project area has the potential to support other burrowing animals including foxes, badgers, coyotes, and jackrabbits.

Surveys for underground burrows are recommended prior to conducting ground-disturbing activities in order to avoid direct project impacts to reticulate Gila monsters. Burrows should be inspected for recent signs of activity, and the species occupying each active burrow should be determined, if possible.

4.1.2 Birds

All 16 species of threatened, endangered and sensitive bird species discussed in Section 3.0 are also protected by the Migratory Bird Treaty Act (MBTA). Mitigation measures recommended for MBTA species, as discussed in Section 4.2, are generally sufficient for avoiding impacts to threatened, endangered and sensitive birds in the project area.

The western burrowing owl (*Athene cunicularia hypugaea*) uses underground burrows for roosting and nesting, and may occur in the project area year-round. Ground disturbing activities associated with the proposed project have the potential for negative impacts to the burrowing owl. Several kangaroo mound complexes are located in the project area, and the project area has the potential to support other burrowing animals including foxes, badgers, coyotes, and jackrabbits. Active burrowing owl nest burrows were observed in kangaroo mound complexes in the eastern and northern portions of the project area.

Surveys for burrowing owls and potential burrow sites are recommended prior to conducting ground-disturbing activities in order to avoid direct project impacts to western burrowing owls. Burrows should be inspected for recent signs of nesting or roosting activity by burrowing owls, including nest decoration (e.g. feathers, scat, insect parts, and grass clippings), fresh whitewash, and recent pellets at burrow entrances.

4.1.3 Mammals

Townsend's big-eared bat (*Corynorhinus townsendii*) potentially could use a small concrete building adjacent to the heavy equipment shed and the water cooling towers located in the eastern portion of the project area, adjacent to Arrowhead Drive, as a roosting site during nighttime foraging. The project is not expected to affect the water cooling towers; however, if the concrete building is removed as a result of project activities, demolition during the day would avoid direct impacts to Townsend's big-eared bat.

The project area has potential suitable habitat for desert pocket gophers (*Geomys arenarius*); however, pocket gopher mound complexes were not observed in the project area. Ground disturbing activities potentially could impact desert pocket gophers. Mitigation measures are not likely to be required for this USFWS Species of Concern.

4.1.4 Plants

The desert night-blooming cereus (*Cereus greggii* var. *greggii*) potentially could occur in the project area. Prior to conducting vegetation clearing, an inspection of shrubs suitable of providing structural support and protection to this cactus, particularly mesquite, could be conducted to determine if the desert night-blooming cereus occurs in the project area. Individual plants, if they are located, could be relocated to areas of the project area where the vegetation community will not be disturbed.

4.2 Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA), which prohibits the unauthorized "take" of listed native species. Take is defined as "any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof" (16 U.S.C. 703). Migratory birds include diverse species such as sparrows, warblers, flycatchers, hummingbirds, waterfowl, shorebirds, raptors, and more. For a complete list of protected migratory birds, see "General Provisions; Revised List of Migratory Birds," 75 Federal Register 39 (1 March 2010), pp. 9282-9314.

Scheduling project construction outside the breeding season of most migratory birds (typically March to July for many southwestern terrestrial species) is generally the easiest way to avoid prohibited take of species protected under the MBTA. For project activities occurring during the breeding season, pre-construction clearance surveys for nesting migratory birds are recommended to avoid incidental take under the MBTA. Most non-nesting adult birds are highly mobile and thus able to avoid direct impacts from project activities.

An active great-horned owl (*Bubo virginianus*) nest is located in the heavy equipment shed north of the main tailings pile. The project is not expected to affect the shed; however, if the building is removed because of project activities, demolition should occur in late summer or fall, after young have fledged and prior to the initiation of a new nest, to avoid direct impacts to the great-horned owl. Great-horned owls can start breeding as early as November in the southern portion of their range, continuing through early February, with the young typically fledging from late April through June (BISON-M 2010).

4.3 Noxious Weeds

One New Mexico Noxious Weed List Class C species, tamarisk (*Tamarix* sp.), was identified in the project area. Tamarisk is limited to the artificial ditch near the City of Deming water pumping facility, and does not appear capable of invading the dry soils of the surrounding desert grassland ecosystem. An unidentified starthistle plant was observed adjacent to Peru Mill Road in the central portion of the project area. Due to the season and condition of the plant, the TRC biologist was unable to determine if this plant is a species that is listed on the New Mexico Noxious Weed List. Standard best management practices, such as washing vehicles and equipment before they enter the project area, will be used to prevent the introduction of noxious weed species to the project area. No other noxious weeds or potential noxious weeds were observed in the project area.

5.0 Agency Consultation

Letters describing the proposed project and requesting comments were sent to:

Eric Hein, Terrestrial Ecosystems Branch Chief
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office (NMESFO)
2105 Osuna Road NE
Albuquerque, NM 87113

Terra Manasco
Assistant Chief, Conservation Services Division
New Mexico Department of Game and Fish
One Wildlife Way
PO Box 25112
Santa Fe, NM 87504

Copies of the response letters received are provided in Appendix B.

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APPENDIX A

Project Area Photographs

Photo 1 Groundwater well located in the central-eastern portion of the project area, surrounded by Soapweed yucca (*Yucca palmilla*) and grasses.

Photo 2 Remnants of a housing trailer in the central-eastern portion of the project area, looking northeast. Russian thistle (*Salsola tragus*) and soapweed yucca (*Yucca palmilla*) are visible in the background.

Photo 3 Concrete block building utilized by roosting bats.

Photo 4 Occupied great-horned owl (*Bubo virginianus*) nest in the rafters of the heavy equipment shed. Two adults were observed with one downy-feathered young.

Photo 5 Ponded area due to recent rains in the central portion of the project area, directly east of Peru Mill Road. Russian thistle (*Salsola tragus*), broom snakeweed (*Gutierrezia sarothrae*) and silverleaf nightshade (*Solanum elaeagnifolium*) are visible around the area.

Photo 6 Ponded area due to recent rains in the central-eastern portion of the project area, looking northwest. Russian thistle (*Salsola tragus),* soapweed yucca (*Yucca palmilla*) and hairyseed bahia (*bahia absinthifolia*) are visible around the area.

Photo 7 Ponded area near (or possibly in) gravel pit in the central-eastern portion of the project area, looking north. Russian thistle (*Salsola tragus)* and broom snakeweed (*Gutierrezia sarothrae*) are visible around the area.

Photo 8 Juvenile spadefoot (*spea*) toads near a ponded area.

Photo 9 Tamarisk (*Tamarix* sp.), a Class C noxious weed, growing in a ditch near the City of Deming water pumping facility.

Photo 10 View of vegetation in the northern portion of the project area, looking southwest. Dominant vegetation shown here is silverleaf nightshade (*Solanum elaeagnifolium*) and Russian thistle (*Salsola tragus*).

Photo 11 View of northeastern portion project area, looking northwest, where tobosa grass (*Hilaria mutica*) becomes dominant (tobosa grass in background).

Photo 12 View of central and eastern portions of the project area, looking east. Broom snakeweed (*Gutierrezia sarothrae*) is the dominant species.

Photo 13 View of an area in the eastern project area, looking northeast. Vegetation was sporadic in this area, exposing soils. Broom dalea (*Psorothamnus scoparius*) is observed in the background, Russian thistle in the foreground (*Salsola tragus*).

Photo 14 View of central-eastern portion of project area, looking northeast. Dominant vegetation in this area included Hairyseed bahia (*bahia absinthifolia*) as shown here.

Photo 15 Mimbres River channel at southwestern corner of project area, looking downstream (west).

Photo 16 Desert willow (*Chilopsis linearis*) riparian woodland along the Mimbres River.

Photo 17 View south of Arrowhead Drive. Vegetation shown here includes broom snakeweed (*Gutierrezia sarothrae*) and Russian thistle (*Salsola tragus*).

Photo 18 View of inactive nest in honey mesquite (*Prosopis glandulosa*) in northern part of project area, looking northeast.

Photo 19 View of burrowing owl perched on Mormon tea *(Ephedra sarothrae)* in the eastern parcel of project area, looking northeast.

Photo 20 View of kangaroo rat *(Dipodomys* sp.) mound complex in the eastern parcel of the project area. Complex was being actively used by western burrowing owls (*Athene cunicularia hypugaea*). View looking northwest.

Photo 21 View of kangaroo rat (*Dipodomys* sp.) mound complex utilized by nesting western burrowing owls (*Athene cunicularia hypugaea*) in the northern portion of the project area. View looking northwest.

Photo 22 View of Texas horned lizard (*Phrynosoma cornutum*) in the central portion of the project area.

Appendix B

Project Notification Letters and Response

TRC
7761 Shaffer Parkway
Suite 100
Littleton, CO 80127

303.792.5555 PHONE
303.792.0122 FAX

www.TRCsolutions.com

August 25, 2010

Terra Manasco
Assistant Chief, Conservation Services Division
New Mexico Department of Game and Fish
One Wildlife Way
PO Box 25112
Santa Fe, NM 87504

Re: Proposed Industrial Park Development, City of Deming, Luna County, New Mexico (Project No. 176130)

Ms. Manasco:

The City of Deming, Luna County, New Mexico proposes to develop an industrial park for renewable energy generation. The project area is an approximately 985-acre site located approximately 3.5 miles northwest of Deming that previously was used as a zinc processing mill. The site is part of the Peru Hill Mill Property, a participant in the U.S. Environmental Protection Agency's Brownfields Program. A map of the project area is attached. The City of Deming is applying for an Economic Development Grant from the Department of Commerce to fund site improvements to the project area.

TRC Environmental Corporation (TRC) recently completed a biological resource survey of approximately 625 acres of the project area on behalf of Sundrop Fuels, a potential tenant of the City's proposed Peru Mill Industrial Park. We requested an informal consultation with your staff in order to identify any state-managed species that may occur in the project area, and determine what mitigation measures, if any, may be necessary to avoid or minimize impacts to state-managed biological resources in the proposed area. You responded in a letter dated July 30, 2010, and provided recommendations to minimize or eliminate impacts to wildlife. This letter is to inform you of the increased project area (by an additional 360 acres, located to the immediate northeast of the previously surveyed area) and to request any additional information, concerns or recommendations your office may have concerning the project.

If you require additional information or wish to discuss the project, please feel free to contact me at (303) 395-4044 or ksimpson@trcsolutions.com.

Sincerely,

KE Simpson

Karen E. Simpson
Project Manager and Senior Scientist
TRC Environmental Corporation

TRC
7761 Shaffer Parkway
Suite 100
Littleton, CO 80127

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August 25, 2010

Eric Hein
Terrestrial Ecosystems Branch Chief
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office (NMESFO)
2105 Osuna Road NE
Albuquerque, NM 87113

Re: Proposed Industrial Park Development, City of Deming, Luna County, New Mexico (Project No. 178827)

Mr. Hein:

The City of Deming, Luna County, New Mexico proposes to develop an industrial park for renewable energy generation. The project area is an approximately 985-acre site located approximately 3.5 miles northwest of Deming that previously was used as a zinc processing mill. The site is part of the Peru Hill Mill Property, a participant in the U.S. Environmental Protection Agency's Brownfields Program. A map of the project area is attached. The City of Deming is applying for an Economic Development Grant from the Department of Commerce to fund site improvements to the project area.

TRC Environmental Corporation (TRC) recently completed a biological resource survey of approximately 625 acres of the project area on behalf of Sundrop Fuels, a potential tenant of the City's proposed Peru Mill Industrial Park. We requested an informal consultation with your staff in order to identify federally protected species that may occur in the project area, and determine what mitigation measures, if any, may be necessary to avoid or minimize impacts to state managed biological resources in the proposed area. You responded via email dated June 14, 2010, and stated the Service did not have any comments regarding the project. This letter is to inform you of the increased project area (by an additional 360 acres immediately to the northeast of the previously surveyed area) and to request any additional information, concerns or recommendations your office may have concerning the project.

If you require additional information or wish to discuss the project, please feel free to contact me at (303) 395-4044 or ksimpson@trcsolutions.com.

Sincerely,

KE Simpson

Karen E. Simpson
Project Manager and Senior Scientist
TRC Environmental Corporation

GOVERNOR
Bill Richardson

DIRECTOR AND SECRETARY
TO THE COMMISSION
Tod Stevenson

Robert S. Jenks, Deputy Director

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

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M.H. "DUTCH" SALMON, Commissioner
Silver City, NM

THOMAS "DICK" SALOPEK, Commission
Las Cruces, NM

July 20, 2010

TRC Environmental Corporation
Stephanie M. Owens
7761 Shaffer Parkway, Suite 100
Littleton, CO 80127

Re: Proposed Industrial Park Development, City of Deming, Luna County, New Mexico (Project No. 176130); NMDGF # 13413

Dear Stephanie M. Owens,

The Department of Game and Fish (Department) has reviewed your request for information regarding the above-referenced project, and provides the following recommendations to minimize or eliminate impacts to wildlife.

There is a large metal building at the old concentrator plant. This building currently has both a nesting pair of Great Horned Owls and Barn Owls occupying the building. If the build is to be removed or refurbished the construction should take place before or after the nesting season. Burrowing owls where also observed at the site. We recommend that a preliminary survey be conducted during the times burrowing owls are likely to occur which is from April – September before any ground disturbing activities occur. We have enclosed a copy of our recommended survey protocol for your use. Should burrowing owls be documented in the project area we recommend you contact the Department or the USFWS for further recommendations regarding relocation or avoidance of impacts.

For your convenience, we have enclosed a copy of New Mexico Wildlife of Concern for Luna County (Biota Information System of New Mexico, BISON-M, New Mexico Dept. of Game and Fish electronic database). Species accounts, habitat associations and county species lists (use the "Database Query" option) can be accessed from the BISON-M database via the World-wide Web at http://www.bison-m.org. The Department recommends that you contact the U.S. Fish and Wildlife Service for current listing of federally listed species.

Thank you for the opportunity to review and comment on your project. If you have any questions, please contact Patrick Mathis, Southwest Area Habitat Specialist at (575) 532-2108 or patrick.mathis@state.nm.us.

Sincerely,

Terra Manasco
Assistant Chief, Conservation Services Division
Technical Guidance Section

TLM/pm

xc: Wally Murphy, Ecological Services Field Supervisor, USFWS
Luis Rios, SW Area Operations Chief, NMDGF
Pat Mathis, SW Area Habitat Specialist, NMDGF

NEW MEXICO WILDLIFE OF CONCERN
COUNTY LUNA

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/ifw2es/NewMexico/SBC.cfm. For information on state-listed plants, contact

Common Name	Scientific Name	NMGF	US FWS	critical habitat
Great Plains Narrowmouth Toad	Gastrophryne olivacea	E		
Chiricahua Leopard Frog	Rana chiricahuensis	s	T	
Reticulate Gila Monster	Heloderma suspectum suspectum	E		
Brown Pelican	Pelecanus occidentalis	E		
Neotropic Cormorant	Phalacrocorax brasilianus	T		
Bald Eagle	Haliaeetus leucocephalus	T	T	
Common Black-Hawk	Buteogallus anthracinus	T	SOC	
Aplomado Falcon	Falco femoralis	E	Exp	
Peregrine Falcon	Falco peregrinus	T	SOC	
Mountain Plover	Charadrius montanus	s	SOC	
Common Ground-Dove	Columbina passerina	E		
Yellow-billed Cuckoo	Coccyzus americanus	s	C	
Mexican Spotted Owl	Strix occidentalis lucida	s	T	Y
Burrowing Owl	Athene cunicularia		SOC	
Violet-crowned Hummingbird	Amazilia violiceps	T		
Lucifer Hummingbird	Calothorax lucifer	T		
Southwestern Willow Flycatcher	Empidonax traillii extimus	E	E	Y
Loggerhead Shrike	Lanius ludovicianus	s		
Bell's Vireo	Vireo bellii	T	SOC	
Gray Vireo	Vireo vicinior	T		
Botteri's Sparrow	Aimophila botterii	s		
Baird's Sparrow	Ammodramus bairdii	T	SOC	
Varied Bunting	Passerina versicolor	T		
Long-legged Myotis Bat	Myotis volans interior	s		
Fringed Myotis Bat	Myotis thysanodes thysanodes	s		
Western Red Bat	Lasiurus blossevillii	s	SOC	
Pale Townsend's Big-eared Bat	Corynorhinus townsendii pallescens	s	SOC	
Desert Pocket Gopher	Geomys arenarius	s	SOC	
Ringtail	Bassariscus astutus	s		
Western Spotted Skunk	Spilogale gracilis	s		
Hooded Skunk	Mephitis macroura milleri	s		
Cook's Peak Woodlandsnail	Ashmunella macromphala	T	SOC	
Fairy Shrimp	Streptocephalus moorei	s		

Appendix D

City of Deming Zoning Map

Appendix E

Cultural Resources Assessment Report

NMCRIS Nos.
117756, 117801, and 118572

A CLASS I AND CLASS III CULTURAL RESOURCE SURVEY OF 436.8 HA (1079.6 AC) FOR THE CITY OF DEMING INDUSTRIAL PARK, LUNA COUNTY, NEW MEXICO

NMCRIS Nos.
117756, 117801, and 118572

A Class I and Class III Cultural Resource Survey of 436.8 ha (1079.6 ac) for the City of Deming Industrial Park, Luna County, New Mexico

Prepared for:
City of Deming
309 South Gold
Deming, New Mexico 88030

Prepared by:
Kenneth L. Brown
Marie E. Brown
Timothy G. McEnany

Submitted by:
Howard C. Higgins, Ph.D., RPA
Principal Investigator

TRC Report No. 178827-C-02

TRC
4221-A Balloon Park Rd. NE
Albuquerque, NM 87109

September 2010

Abstract

This report presents the findings of a Class I (records search) and Class III (100 percent) pedestrian cultural resource survey by TRC Environmental, Inc. for the City of Deming industrial park about 5.6 km (3.5 mi) north of Deming in Luna County, southwestern New Mexico. The City of Deming plans future development in the industrial park, which is ideally suited because of access to railroads and Interstate 10. The project Area of Potential Effect (APE) is about a 433.8-ha (1071.9-ac) parcel that is bounded on the west, north, and east by fences and on the south by the Mimbres River and Arrowhead Drive. In addition, a 3-ha (7.7-ac) buffer was surveyed for a diversion channel of Porter Draw. Therefore, the total surveyed area consists of 436.8 ha (1079.6 ac) of which 3 ha (7.7 ac) is buffer. Cultural resources within the APE were inventoried under three separate surveys that have been funded by Sundrop Fuels (Brown and Brown 2010a) and the City of Deming (Brown and Brown 2010b; McEnany et al. 2010).

The Class III cultural resource surveys recorded 13 new archaeological sites—LA 166764 through LA 166772 and LA 167608 through LA 167611—one historic structure constructed prior to 1965, and 73 isolated occurrences (IOs). Of the 13 sites, three (LA 166766–LA 166768) are prehistoric, nine (LA 166764, LA 166765, LA 166770–LA 166772, LA 167608 –167611) are historic, and one (LA 166769) is both prehistoric and historic. The historic components date to the early twentieth through late twentieth century and the prehistoric components are either Archaic (LA 166767 and LA 166769) or unknown. LA 166766, LA 166767, LA 166769, and LA 167608 are recommended eligible for inclusion on the National Register of Historic Places (NRHP) under Criteria D, information potential concerning the prehistoric or historic occupation of the Deming area. LA 166772 is recommended eligible under Criterion C, as an excellent intact example of a riveted water tank and tower dating to the 1920s or 1930s.

The 73 IOs consist of prehistoric and historic artifacts, primarily chipped stone items (e.g., projectile points, chipping debris), bottles, glass fragments, tin cans, and other metal objects. Most of the IOs were fully documented and are not likely to yield important information beyond what has already been recorded. The IOs were recorded according to the west parcel (west of the Southern Railroad and SR 394) and the east parcel, which is east of the Southern Railroad. A few IOs, however, such as a U.S. Army button and prehistoric projectile points, are worthy of collection and further research. No further work is recommended for the remaining IOs. No active acequias or *descansos* are in or near the project APE. No buildings or additional structures, other than the water tank and tower (Structure 4, LA 166772), with construction dates prior to 1965 are in the project APE or within 30 m (100 ft) of it.

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1.0 Introduction

This report presents the findings of a Class I (records search) and Class III (100 percent) pedestrian cultural resource survey by TRC Environmental, Inc. for the City of Deming industrial park about 5.6 km (3.5 mi) north of Deming in Luna County, southwestern New Mexico (Figure 1.1). The City of Deming plans future development in the industrial park, which is ideally suited because of access to railroads and Interstate 10. The project Area of Potential Effect (APE) is about a 433.8-ha (1071.9-ac) parcel that is bounded on the west, north, and east by fences and on the south by the Mimbres River and Arrowhead Drive. In addition, a 3-ha (7.7-ac) buffer was surveyed for a diversion channel of Porter Draw. Therefore, the total surveyed area consists of 436.8 ha (1079.6 ac) of which 3 ha (7.7 ac) is buffer. Cultural resources within the APE were inventoried under three separate surveys that have been funded by Sundrop Fuels (Brown and Brown 2010a) and the City of Deming (Brown and Brown 2010b; McEnany et al. 2010). All three surveys were done under New Mexico State Survey permit NM-10-028-S.

The three surveys consist of: 1) the 262.9-ha (649.7-ac) parcel west of the Southwest Railroad and Peru Mills Road (SR 394); 2) the Porter Draw 61-m (200-ft) wide corridor diversion channel along the west project boundary with an additional 3-ha (7.7-ac) buffer south of the Mimbres River; and 3) the 170.9-ha (422.2-ac) parcel east of the Southwest Railroad and Peru Mills Road (SR 394) (Figure 1.1).

The western 262.9-ha (649.7-ac) parcel west of the Southwest Railroad was formerly used as a zinc processing mill and is part of the Peru Hill Mill Property, a participant in the U.S. Environmental Protection Agency's (EPA) Brownfield Program. The City of Deming has a water well on the property. TRC conducted this portion of the survey, which was funded by Sundrop Fuels, from May 19 to 26, 2010.

The second survey, along the west boundary of the above parcel, is for a proposed diversion channel of Porter Draw to the Mimbres River. The proposed diversion channel APE is 1398 m (4587 ft) long and 61 m (200 ft) wide. In addition, a 515-m (1689-ft) buffer was surveyed beyond the south end for a total length of 1913 m (6276 ft), or 11.7 ha (28.8 ac). Except for the buffer at the south end, the APE for the proposed diversion channel is within the western parcel described above (Figure 1.1). TRC conducted the diversion channel survey on May 26, 2010. Survey for the diversion channel was funded by the City of Deming.

The third surveyed parcel, consisting of 170.9 ha (422.2 ac) east of the Southern Railroad, includes the Arrowhead Drive right-of-way. This surveyed portion, funded by the City of Deming, was inventoried from August 10 through 14, 2010.

The Class III cultural resource surveys recorded 13 new archaeological sites—LA 166764 through LA 166772 and LA 167608 through LA 167611—one historic structure constructed prior to 1965, and 73 isolated occurrences (IOs). Of the 13 sites, three (LA 166766–LA 166768) are prehistoric, nine (LA 166764, LA 166765, LA 166770–LA 166772, LA 167608 –167611) are historic, and one (LA 166769) is both prehistoric and historic. The historic components date to the early twentieth through late twentieth century and the prehistoric components are either Archaic (LA 166767 and LA 166769) or unknown. LA 166766, LA 166767, LA 166769, and LA 167608 are recommended eligible for inclusion on the National Register of Historic Places (NRHP) under Criteria D, information potential concerning the prehistoric or historic occupation of the Deming area. LA 166772 is recommended eligible under Criterion C, as an excellent intact example of a riveted water tank and tower dating to the 1920s or 1930s.

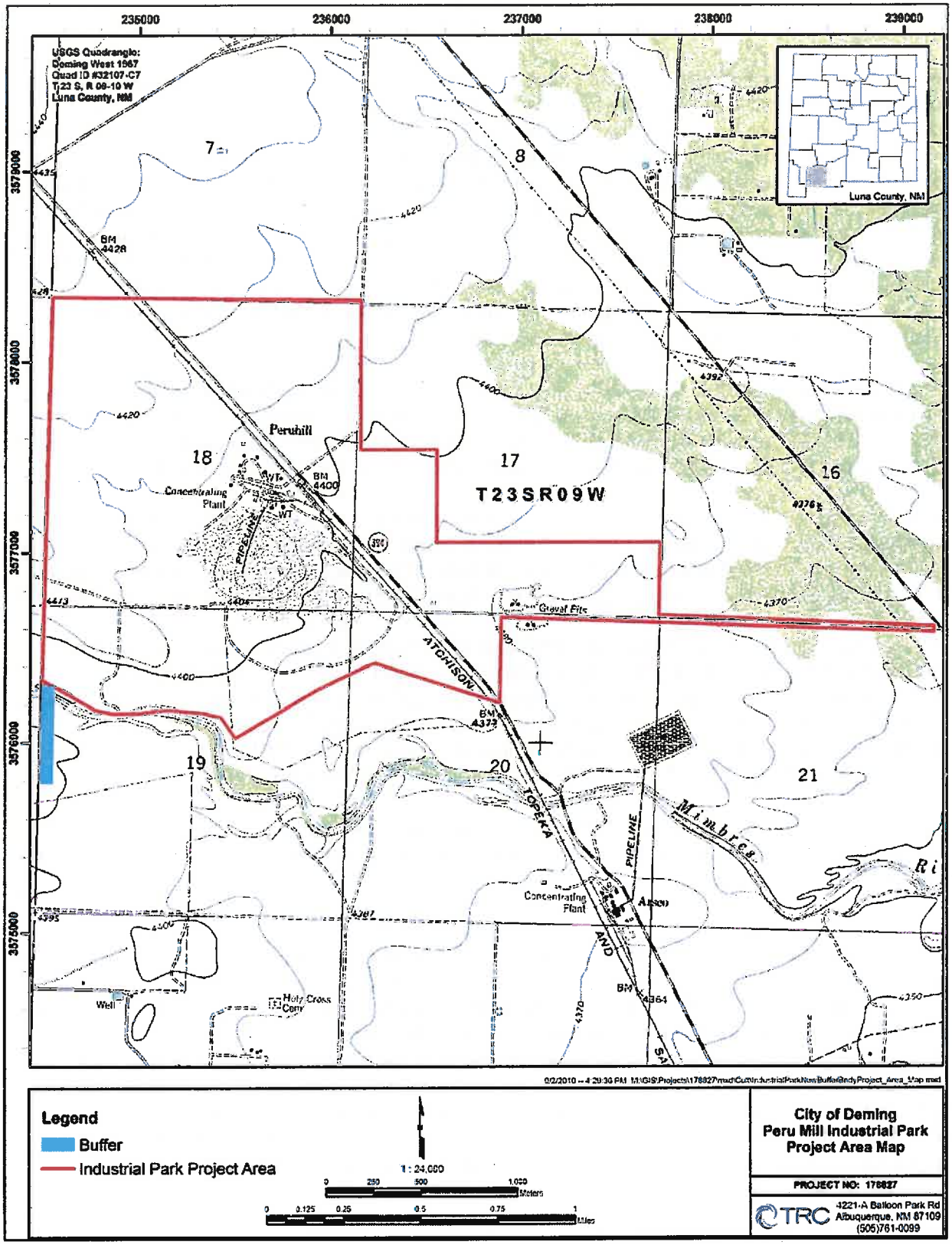

Figure 1.1 City of Deming Industrial Park Location Map

The 73 IOs consist of prehistoric and historic artifacts, primarily chipped stone items (e.g., projectile points, chipping debris), bottles, glass fragments, tin cans, and other metal objects. Most of the IOs were fully documented and are not likely to yield important information beyond what has already been recorded. A few IOs, however, such as a U.S. Army button and prehistoric projectile points, are worthy of collection and further research. No further work is recommended for the remaining IOs. No active acequias or *descansos* are in or near the project APE. No buildings or additional structures, other than the water tank and tower (Structure 4, LA 166772), with construction dates prior to 1965 are in the project APE or within 30 m (100 ft) of it.

In the event that bones or prehistoric or historic archaeological materials are uncovered during construction or earth-disturbing activities, the City of Deming will cease work immediately, protect the remains from further disturbance, and notify the appropriate land management agency. If bones are found, the City of Deming will immediately notify local law enforcement and the Office of the Medical Investigator (OMI) pursuant to 18-6-11.2C (Cultural Properties Act NMSA 1978). In accordance with 18-6-11.2C and/or 36 CFR 800.13(b) (Protection of Historic Properties), the City of Deming will notify the State Historic Preservation Officer (SHPO) or the State Archaeologist immediately at (505) 827-6320. In either case, the appropriate land management agency and the SHPO will determine the necessary steps to evaluate significance, document, protect or remove the material or remains, in compliance with the law.

This undertaking complies with the provisions of the National Historic Preservation Act (NHPA) of 1966, as amended through 1992, and applicable regulations. This undertaking also complies with the provisions of the New Mexico Cultural Properties Act (18-6-17 NMSA 1978) and the New Mexico Prehistoric and Historic Sites Preservation Act (18-8-1 through 18-8-9 NMSA 1978), and applicable regulations. This report is consistent with applicable federal and state standards for cultural resource management. Howard C. Higgins was Principal Investigator, Kenneth L. Brown was the Project Manager, and Ardale Delena and Timothy G. McEnany were the field supervisors and were assisted by David Montaño and Lanny Noll. The field surveys required 146.75 person-hours and site recordation 50.75 person-hours, totaling 197.5 person-hours of field time.

2.0 Project Location and Description

The 433.8-ha (1071.9-ac) City of Deming industrial park APE, about 5.6 km (3.5 mi) north of Deming in Luna County, New Mexico (Figure 1.1), is bounded on the west, north, and east by fences, and on the south by the Mimbres River and Arrowhead Drive. The industrial park is in portions of Sections 16 through 21 in Township 23 South, Range 9 West, on the Deming West (1978, 32107-C7) United States Geological Survey (USGS) 7.5-minute quadrangle. Table 2.1 summarizes the project APE legal locations and Table 2.2 summarizes their UTM coordinates.

Table 2.1 Project APE legal locations

T23S, R9W					
Section 16	**Section 17**	**Section 18**	**Section 19**	**Section 20**	**Section 21**
South section line	SW¼ SW¼ SW¼	W½	N½	NW¼ NW¼	North section line
	S½ SE¼	SE¼	NW¼ west boundary	SE¼ NW¼	
	SE¼ SW¼	NE¼		NE¼ NW¼	
	NW¼ SW¼	NE¼ NE¼ SE¼			
	NE¼ SW¼ SW¼	NE¼ NE¼ NW¼			
		SW¼ SW¼ NW¼			
		SW¼ west boundary			

Table 2.2 Project area landmark UTM coordinates

Description	UTM Coordinates (Zone 13)	
	Easting	Northing
West Parcel		
Northwest end	234527	3578341
Northeast end	234946	3578341
Southwest end	234495	3576303
Southeast end	236810	3576226
Diversion Channel		
North end APE	234516	3577701
South end APE/North end Buffer	234493	3576303
South end Buffer	234434	3575791
East Parcel		
Northwest	234983	3578325
Northeast	237736	3577130
Southwest	236881	3576244
Southeast	239175	3576605

The west parcel was formerly used as a zinc-processing mill, and is part of the Peru Hill Mill Property, a participant in the U.S. Environmental Protection Agency's Brownfield Program (Figures 2.1–2.9). The west parcel was first developed in 1928 by the Peru Mining Company, a subsidiary of Illinois Zinc Company. The mill was constructed primarily for the processing of zinc sulfide ore. The Peru Mining Company operated the mill until 1967. Barite of America (BOA) purchased the mill in 1979 to process barite. BOA operated the mill until 1985 when the company filed for bankruptcy. Barite Limited retained the title to the property until it passed through bankruptcy to SMS Financial, at which time it was

acquired by the City of Deming for an Industrial Park. The project area is an EPA Brownfield site. The New Mexico Environmental Department has issued the City of Deming a release stating no hazardous levels of materials are on site. The east parcel is flat terrain that has had portions disturbed by previous quarrying activities (Figures 2.10–2.12).

Figure 2.1 West parcel overview from the northeast corner looking south

Figure 2.2 West parcel overview from the northwest corner looking south

Figure 2.3 West parcel overview from the east side looking southeast

Figure 2.4 West parcel overview from the southeast corner looking north

Figure 2.5 West parcel overview from the southwest corner looking north

Figure 2.6 Diversion channel overview, south end looking north

Figure 2.7 Diversion channel overview, south end looking south

Figure 2.8 Diversion channel overview looking south, Mimbres River in foreground

Figure 2.9 Diversion channel overview north end looking east

Figure 2.10 East parcel overview from Arrowhead Drive looking east

Figure 2.11 East parcel overview from Arrowhead Drive looking west from Section 17 corner

Figure 2.12 East parcel overview from Section 18 looking east-southeast

3.0 Natural Environment

3.1 Physiography and Geology

The City of Deming industrial park is in southwestern New Mexico within the Mexican Highland Section of the Basin and Range province which extends into adjacent areas of Arizona and Chihuahua (Hawley 1986a:24, 1986b:26). The Mexican Highland Section includes large areas of basin-and-range topography and structure and contains a complex of internally drained basins. Mountains consist of Precambrian cores overlain by Paleozoic sedimentary deposits. Basin deposits can exceed 1524 m (5000 ft) in thickness and exhibit several distinct basin-fill facies, such as coarse-grained river deposits, piedmont alluvium, fine-grained lake and playa sediments, and aeolian deposits. In addition, locally extensive basalt fields occur on basin plains (Hawley 1986b:26). "A number of the basin-floor depressions were occupied by perennial lakes during Pleistocene glacial-pluvial intervals" (Hawley 1986b:26). The project area is on the Deming Plain, "the broad arid plain lying between the Rio Grande and Gila Valleys, with Deming as its center" (Bailey 1913:16).

3.2 Soils

The Deming industrial park APE contains five major soils—Arizo and Vinton (AV), Berino and Mohave (BA), Bluepoint-Onite association (BO), Mohave sandy clay loam, 0 to 3 percent slopes (MU), and DUMP. These soils are discussed in more detail below.

3.2.1 Arizo and Vinton soils (AV)

The Arizo and Vinton soils (AV) consist of 45 percent Arizo and 40 percent Vinton soils and have 0 to 5 percent slopes. These soils occur on valley floor remnants, stream terraces, and alluvial fans. The Arizo soil formed in alluvium derived from igneous, metamorphic, and sedimentary rock. This soil is excessively drained, with occasional flooding. Permeability is moderately high-to-high and available water capacity is very low. The typical Arizo profile consists of sandy loam (0–4 in) underlain by extremely gravelly sand (4–60 in). The Vinton soil formed in mixed alluvium derived from limestone, sandstone, and shale. The soil is well drained, with rare flooding. Permeability is high and available water capacity is low. The typical Vinton profile consists of loamy sand (0–48 in) underlain by extremely gravelly sand (48–60 in) (Natural Resources Conservation Service [NRCS] 2010:12–13). LA 166764 is associated with Arizo and Vinton soils.

3.2.2 Berino and Mohave soils (BA)

The Berino and Mohave soils (BA) consist of 65 percent Berino and 30 percent Mohave soils and have 0 to 3 percent slopes. These soils occur on valley floors and fan piedmonts, are well drained and are not subject to flooding. Berino soil formed in alluvium derived from igneous and sedimentary rock. Permeability is moderately high-to-high and available water capacity is moderate. The typical Berino profile consists of loamy sand (0–5 in) underlain by sandy clay loam (5–40 in) which is underlain by loamy sand (40–60 in). Mohave soil has moderately high permeability and high water capacity. The typical Mohave profile consists of sandy loam (0–8 in) underlain by clay loam (8–60 in) (NRCS 2010:13–14). LA 166769, LA 167608, LA 167609, LA 167611, and part of LA 166772 are associated with Berino and Mohave soils (BA).

3.2.3 Bluepoint-Onite (BO)

The Bluepoint-Onite association (BO) consists of 50 percent Bluepoint and 35 percent Onite soils and has 0 to 5 percent slopes. These soils formed in alluvium derived from calcareous sandstone and are not subject to flooding. The Bluepoint soil occurs on alluvial fans, stream terraces, and valley floor remnants

and is somewhat excessively drained soil. Permeability is high to very high permeability and available water capacity is low. The typical Bluepoint profile is loamy sand (0–6 in) underlain by loamy fine sand (6–60 in). The Onite soil, occurring on fan piedmonts and valley sides, is well drained. Permeability is high and available water capacity is low. The typical Onite profile consists of loamy sand (0–8 in), sandy loam (8–27 in), and gravelly loamy sand (27–60 in) (NRCS 2010:16–17). None of the sites is associated with the Bluepoint-Onite association (BO).

3.2.4 DUMP

DUMP material consists of mine tailings, spoil dirt, and severely disturbed terrain resulting from mining activities. The terrain is not natural but is the result of large-scale earth moving activities (NRCS 2010:19–20). Part of LA 166772 is directly associated with DUMP materials.

3.2.5 Mohave sandy clay loam, 0 to 3 percent slopes (MU)

Mohave sandy clay loam, 0 to 3 percent slopes (MU), occurs on alluvial fans and hill slopes. This well drained soil formed in alluvium derived from limestone, sandstone, and shale and is not subject to flooding. Permeability is moderately high and available water capacity is high. The typical profile consists of sandy clay loam (0–8 in) underlain by clay loam (8–60 in) (NRCS 2010:23). LA 166765 through LA 166768, LA 166770, LA 166771, LA 167610, and part of LA 166772 are associated with Mohave sandy clay loam (MU).

3.3 Water

The Mimbres River drains a closed basin that includes essentially all of Luna County. The river is formed by snow-pack and runoff on the southwestern slopes of the Black Range. Only the upper reach of the river is perennial. As it flows southward, the river dissipates on the desert floor north of Deming. About once a decade, during periods of unusually heavy rainfall in the Cooke's and Black ranges, the river floods the Deming area. Deming and the surrounding area are underlain by an aquifer with good water. The aquifer is slowly recharged by water from the mountains (Wikipedia 2010a, 2010b). Porter Draw, a small intermittent tributary of the Mimbres River, drains the northwestern portion of the project area and the remainder is drained by the river.

3.4 Climate

Deming has an arid continental climate characterized by low rainfall, warm summers, and mild winters. At an altitude of 1320 m (4331 ft), Deming is relatively warm throughout much of the year. The average high temperature is 82°F (27.5°C), with July as the hottest month, and the average low is 30.5°F (-0.8°C), with December as the coldest month. Maximum highs during the summers are primarily in the 90s, rarely reaching 100°F (37.4°C) or higher. Year-round humidity is low (City of Deming 2010a). The frost-free season averages about 220 days (Beck and Haase 1969:7).

The average annual precipitation is 229 mm (9 in). August is the wettest month and April and June are the driest. Precipitation primarily falls in July and August as brief, and often heavy, thundershowers, some of which are accompanied by hail. Winter snowfall is light and infrequent. Dust storms generally occur during late winter and spring when soils are dry and winds are moderate to strong. Throughout most of the year, however, the winds are light to moderate, averaging 16 km (10 mi) per hour and prevail from the west (City of Deming 2010a).

3.5 Vegetation

The City of Deming industrial park lies within the Lower Sonoran Zone (Bailey 1913:16). The vegetation of the project area is variously classified as Grassland Savanna (Gross and Dick-Peddie 1979:117), Desert

Grassland (Castetter 1956:256; Dick-Peddie 1993a, 1993b:103), and Chihuahuan Desertscrub (Brown and Lowe 1994). As used by Dick-Peddie (1993:106), Desert Grassland is a transitional vegetation that includes all desert shrub-grassland areas. Much of the Desert Grassland was previously grassland. As the result of intensive grazing, however, forbs and shrubs replaced palatable grasses. Due to its transitional nature, this plant community includes a large number of grass, forb, and shrub species. Black grama (*Bouteloua eriopoda*) is the dominant grass. Other grasses include sideoats grama (*B. curtipendula*), tobosa (*Hilaria mutica*), burrograss (*Scleropogon brevifolius*), bush muhly (*Muhlenbergia porteri*), and Indian ricegrass (*Oryzopsis hymenoides*). Forbs include burweed (*Ambrosia acanthicarpa*), gourds (*Cucurbita* spp.), fleabane (*Erigeron* spp.), and red globemallow (*Sphaeralcea coccinia*). Major shrubs include Mormon tea (*Ephedra torreyana*), broom snakeweed (*Gutierrezia sarothrae*), cholla (*Opuntia* spp.), yucca (*Yucca* spp.), fourwing saltbush (*Atriplex canescens*), and rabbitbrush (*Chrysothamnus nauseosus*) (Dick-Peddie 1993:106–107, 116–120). Vegetation noted during the present survey includes soaptree yucca, honey mesquite, snakeweed, sunflower, Russian thistle, nightshade, prickly pear, fourwing saltbush, slender blanketflower, desert globemallow, desert marigold, and tobosa grass. Ground visibility averaged about 60 percent throughout the project APE.

3.6 Fauna

Prior to historic settlement, a variety of vertebrate fauna—various lizards, snakes, birds, rodents, carnivores—was present in the area. Deer (*Odocoileus* spp.), pronghorn (*Antilocapra americana*), cottontail (*Sylvilagus* spp.), black-tailed jackrabbit (*Lepus californicus*), ground squirrels (*Spermophilus* spp.), turkey (*Meleagris gallopavo*), and other upland gamebirds were important meat resources for the prehistoric and early historic inhabitants of the area. Many animals were also exploited as raw material sources (e.g., pelts, hides, feathers, bones) for tools, clothing, ornaments, and ceremonial uses. Wildlife observed during the survey includes great horned owls, burrowing owls, jackrabbits, a rattlesnake, and a hawk.

3.7 Cultural Environment

The City of Deming industrial park development will create jobs for the City of Deming and Luna County. The cultural environment is rural with a nearby electrical power station, railroads, Interstate 10, scattered residences and associated access roads, transmission and distribution power lines, and liquid petroleum and gas lines. The area is also used for grazing. Impacts to the project area include ore milling activities, hazardous materials remediation, municipal water well, access roads, fences, trails, grazing, rodent activity, and wind and water erosion. Although these disturbances may enhance the visibility of archaeological sites, the integrity of shallowly buried sites is adversely affected by these activities. No evidence of vandalism or looting of historic or archaeological resources was noted in the project area.

4.0 Culture History

The prehistoric occupation of southwestern New Mexico is divided into three major periods—Paleoindian (10,000–6000 B.C.), Archaic (6000 B.C.–A.D.200), and Formative (A.D.200–1450). The latter includes the Mimbres branch of the Mogollon culture. The following brief overview of the culture history of the project area is based in part on Kearns et al. (2001) and Cordell (1979, 1984, 1997). Reports by Wase et al. (2000), MacNeish and Beckett (1987), and others are used.

4.1 Paleoindian Period (ca. 10,000–6000 B.C.)

Recent work at Pendejo Cave in southern New Mexico suggests the earliest human habitation in North America was as early as 37,000–55,000 years ago (Chrisman et al. 1996). This research remains controversial and most archaeologists recognize the Clovis complex as the earliest cultural manifestation in the American Southwest (Kearns et al. 2001:21). The earliest well-documented human occupation in New Mexico, the Paleoindian period (10,000–6000 B.C.), is divided into three subperiods—Clovis (10,000–9000 B.C.), Folsom (9000–8000 B.C.), and Plano (8000–6000 B.C.)—named for different cultural groupings. Stylistically distinct projectile points associated with late Pleistocene and early Holocene megafauna characterize these complexes. In addition, Paleoindian chipped stone assemblages exhibit a very refined and standardized technology. Clovis was associated with the hunting of mammoths and other late Pleistocene fauna. Folsom and Plano cultures were associated with the hunting of now-extinct forms of bison. By the end of the period, only modern fauna remained. In addition to hunting megafauna, the early Holocene hunters and foragers also exploited a variety of floral and smaller faunal resources (Cordell 1979:20, 1997:96, 99; Martin and Plog 1973:159–160).

The diagnostic artifact for Clovis components is the large lanceolate Clovis spear point, which exhibits a single short basal flute on both faces. The Clovis tool kit also includes spurred end scrapers; large unifacially flaked side scrapers; keeled scrapers on large blades; flake knives; backed worked blades; gravers; perforators; shaft straighteners; and bone points and foreshafts (Gunnerson 1987:10). Surface finds and a few excavated assemblages occur throughout North America.

The diagnostic artifact for Folsom assemblages is the small, finely made lanceolate Folsom projectile point, which has a single flute on each face, extending almost the entire length of the point. Technologically, the Folsom point developed from the preceding Clovis point form. Unlike Clovis points, however, "though heavily utilized and often damaged by impact fractures, Folsom points were frequently recovered, repaired, and re-used. For this reason, they often show evidence of extensive resharpening" (Boldurian and Cotter 1999:116). The tool kit also includes unfluted Midland points, knives, pointed scrapers, choppers, drills, gravers, spokeshaves, abrading stones, awls, and needles (Gunnerson 1987:13). Folsom assemblages are indicative of a hunting and gathering subsistence economy that focused on the seasonal availability of animal and plant resources.

Plano complexes are characterized by a variety of projectile point types that include laterally thinned, indented base, and constricted base series. Plano complex projectile points lack flutes and consist, instead, of large lanceolate forms with basal grinding and large parallel flaking (Wheat 1972; Wormington 1957). The Plainview complex contains laterally thinned points—Plainview, Meserve, Milnesand, and Frederick—and is generally considered the earliest Plano complex. The indented base series includes Firstview, Alberta, and Cody complex points, such as Eden and Scottsbluff. Agate Basin and Hell Gap points comprise the constricted base series (Cordell 1979:21).

Southwest New Mexico and southeastern Arizona has been an important region for the study of Paleoindian sites. In New Mexico, sites in the Gila and San Francisco River drainages, north of the project area, contain sites such as Tularosa Cave, Cordova Cave, the Wet Legget Site, and Bat Cave in the

Plains of San Augustin. In Arizona, the Cienega site was found north of the Gila River and the San Pedro River drainage contains the Murray Springs, Whitewater Creek, Naco, Lehner Ranch, and Adobe sites (Cordell 1984). Despite the finding of these sites in nearby areas, few Paleoindian sites or artifacts have been recorded in the vicinity of the project area (Railey and Holmes 2000:18; Wase et al. 2000:1.32). Folsom and Plano period sites and artifacts, including Cody and Agate Basin, are more common but few of these Paleoindian sites have been excavated and studied (Carmichael 1986; Elyea 1989; Hart 1994; Moore 1996:40; Wase et al. 2000:1.32–33).

Terminal Pleistocene environments in southwestern New Mexico were characterized by mixed juniper-oak woodland with grassland understory. Much of the country was open savanna with numerous lakes (now playas) and perennial streams that would have attracted herds of Pleistocene fauna. Paleoindian camps are commonly located along the shores of these former lakes (Anschuetz et al. 1990:20; Wase et al. 2000:1.33). None of the sites has evidence of Paleoindian affiliation. However, LA 166766 and LA 166768 have undetermined prehistoric affiliations.

4.2 Archaic Period (6000 B.C.–a.d. 200)

At the end of the Pleistocene, the juniper-oak woodland environment was gradually replaced by the Chihuahuan Desertscrub and grassland communities. The Archaic period (6000 B.C.–A.D. 200) was characterized by a continuation of the hunting and foraging economy of the preceding Paleoindian period but with technological adaptations to the changing climatic conditions. Around 6000 B.C., the North American climate changed to a much warmer and drier Altithermal pattern that caused widespread faunal and floral changes. Human populations apparently adapted to these changes and their material culture became diversified. Archaic point styles are smaller than those of the preceding Paleoindian period, with shouldered hafting elements appearing ca. 3200 B.C. Maize horticulture first appeared in the Southwest between 1500 and 1000 B.C. (Cordell 1997:129), and became a major reliable food source during the late Archaic (Berry and Berry 1986; Huckell 1990; Matson 1991; Wase et al. 2000:1.35; Wills 1988).

Although this period saw a continuation of the mobile hunting and gathering pattern of the Paleoindian period, there was a shift towards resource diversification. In other words, the Archaic adaptation was a "diffuse" economy (Judge 1982:49). The resource base included a variety of plants and the modern suite of fauna. Archaic populations probably had a primary dependence on plant foods, a seasonally mobile settlement pattern, and a flexible social structure in which group size and composition varied in response to changing economic opportunities. Areas where the density and distribution of key plant resources were predictable on a seasonal basis were reoccupied (Judge 1982:49). A greater dependence on plant foods is reflected in a higher frequency of grinding tools during the Archaic.

The Chihuahua tradition, an Archaic sequence proposed by MacNeish and Beckett (1987), represents an Archaic adaptation to the Chihuahuan desert of south-central New Mexico and northern Mexico. The Chihuahua Archaic is defined by the Archaic remains recovered from rock shelters and a few open-air sites in southern New Mexico that represent a diversified and mobile subsistence strategy based on the seasonal exploitation of diverse floral and faunal resources (Kearns et al. 2001:23; MacNeish 1993; Sebastian and Larralde 1989). The Chihuahua Archaic consists of four phases—Gardner Springs (6000–4300 B.C.), Keystone (4300–2500 B.C.), Fresnel (2500–900 B.C.), and Hueco (900 B.C.–A.D. 200) (MacNeish and Beckett 1987).

The Gardner Springs phase (Early Archaic) (6000–4300 B.C.) is poorly known in the project area. Sites are found on the desert floor, near playas, in foothills, and in rock shelters. It is currently characterized by burned caliche or fire-cracked rock features, ground stone tools, stemmed dart points, and an increasing use of local lithic materials. Projectile point styles include Jay, Bajada, and Uvalde dart points. Other artifacts include unifacial basin and slab metates, cobble manos, snub-nosed scrapers, and pebble

choppers. Most of the data for this phase are from Fresnal, Pendejo and Todsen rock shelters (Kearns et al. 2001:23; MacNeish and Beckett 1987).

The Keystone phase (Middle Archaic) (4300–2500 B.C.) is characterized by open-air residential sites with multiple, shallow, semi-subterranean circular structures of jacal and brush. Burned rock features, unifacial and bifacial basin and slab metates, and stemmed dart points—Bat Cave, Lerma, Pelona, Akmagre-Gypsum—are also present. Excavated habitation sites include Keystone Dam Site 33 and Vista del Sol in the El Paso area (Kearns et al. 2001:23; MacNeish and Beckett 1987).

The Fresnal phase (Late Archaic) (2500–900 B.C.) corresponds to a more mesic environment and is represented a greater number of known sites. Residential architecture is similar to that of the earlier Keystone phase. The introduction of cultigens—maize and pumpkin—occurred during the Fresnal phase. Dart point types include San Jose, Pelona, Augustin, Chiricahua, La Cueva, Fresnal, Armijo, and Todsen. The presence of cultigens, *Olivella* shells, and a wide variety of dart point types reflects greater regional trade and interaction (MacNeish and Beckett 1987). Pit structures and thermal features have been excavated in the La Mesa coppice dune field near Santa Teresa (O'Leary 1987).

The Hueco phase (Late Archaic) (900 B.C.–A.D. 200/900) exhibits both Archaic characteristics and emerging Formative traits (Kearns et al. 2001:23; Hill and Staley 1999). Dart points decrease in frequency, reflecting the adoption of the bow and arrow (Roney 1985). The ground stone assemblage includes trough metates, unifacial, and bifacial one- and two-hand manos. Regional trade also increased during the Hueco phase (MacNeish and Beckett 1987). Numerous cultigens and intensive processing activities appear at extensive sedentary villages along the floodplain of the Santa Cruz River in southern Arizona (Mabry 1998a; 1998b) and along the Rio Casas Grandes at Cerro Junaquena in northern Chihuahua (Hard and Roney 1998; Kearns et al. 2001:23). LA 166767 has a 1000 BC–AD 100 affiliation and LA 166769 has a 5500–3000 BC affiliation. In addition, LA 166766 and LA 166768 have undetermined prehistoric affiliations.

4.3 Formative Period: Mogollon Tradition (a.d. 200–1450)

The Mimbres Mogollon/Pueblo tradition (A.D. 200–1450), which succeeds the Chihuahuan Archaic period, is centered in the Mimbres River Valley of southwestern New Mexico, extending south to Deming and into northern Chihuahua, Mexico. It has been the focus of archaeological research for nearly a century (Haury 1992; Kearns et al. 2001:25; LeBlanc 1992). The Mimbres Mogollon is characterized by agriculture, sedentary villages with storage facilities, and the manufacture of utilitarian and trade ware ceramics. Settlements had access to arable land and water resources. As the population increased over time, advances included irrigation technology to enhance agricultural production. The population apparently increased until A.D. 1150 (Akins et al. 1999). The Mimbres Mogollon is divided into Early Pithouse (AD 200–550), Late Pithouse (AD 550–1000), and Pueblo (AD 1000–1450) periods (Kearns et al. 2001 26). LA 166766 and LA 166768 have undetermined prehistoric affiliations.

4.3.1 Early Pithouse Period (A.D. 200–550)

The Early Pithouse period, which probably developed from the preceding Hueco phase, is characterized by the appearance of undecorated brownware pottery and pithouse architecture. Pottery includes Alma Plain, Alma Rough, and San Francisco Red (LeBlanc 1980). Occasionally, fugitive red slips were applied to vessels but they do not exhibit the highly polished surfaces of the true San Francisco Red of the Late Pithouse period (Anyon and LeBlanc 1984:21–22; Schutt 1994:15). LeBlanc (1980:119) suggests the earlier redware was a possible local variant of San Francisco Red. Pithouses are semi-subterranean, curvilinear structures consisting of a pole frame covered by mud-coated brush with most structures exhibiting long entryways (Haury 1992; LeBlanc 1980; Wheat 1955). Sites tend to occur on relatively isolated or inaccessible high ridges, mesas, and knolls (Anyon and LeBlanc 1984:22; Cordell 1984:114,

1997:203–205). "Villages of up to 50 pithouses are known for this period, and are typically situated on elevated, defensible locations adjacent to fertile bottomlands" (Railey and Holmes 2000:21). A variety of extramural hearths and storage facilities are common in villages. Flexed, bundle, and extended pit burials occur in both intramural and extramural contexts (Wheat 1955). In addition to agriculture, subsistence strategies included the hunting of deer, rabbits, and other game and the gathering of wild foods, including agave and the seeds of weedy annuals (Akins et al. 1999; Brown 1999; Kearns et al. 2001:26).

4.3.2 Late Pithouse Period (A.D. 550–1000)

The Late Pithouse period "is marked by the abandonment of defensive locations on isolated knolls and the establishment of new villages on lower river terraces in the midst of good farmland" (Railey and Holmes 2000:21). Hunting and gathering remained important subsistence strategies throughout the Late Pithouse period (Cordell 1984:74, 114–115, 1997:205–208). An elaboration of burial practices and the construction of water control features also occurred during the Late Pithouse period (Anyon and LeBlanc 1984:22; McGraw and McCray 1995:4). In the Mimbres area, the Late Pithouse period consists of three phases—Georgetown (A.D. 550–650), San Francisco (A.D. 650–750), and Three Circle (A.D. 750–1000) (Anyon et al. 1981; Haury 1936). Haury (1936) based these phases on changing architectural and pottery styles.

The Georgetown phase (A.D. 550–650) is marked by the presence of circular and D-shaped pithouses with basin-shaped fire pits and inclined lateral entrance ramps. Communal structures are present. The pottery is unpainted and consists of San Francisco Red, Alma Plain, Alma Neck-banded, and Alma Scored (Anyon and LeBlanc 1984:22; Schutt 1994:15). Georgetown sites occur in a variety of topographic settings, including the first terrace above rivers. Burials are usually extramural but also occur in abandoned pithouses (LeBlanc and Whalen 1980:18).

The San Francisco phase (A.D. 650–750) is characterized by rectangular pithouses with rounded corners and plastered walls. Associated pottery includes the first painted types—Mogollon Red-on-brown and San Lorenzo Red-on-brown but production of San Francisco Red and Alma brownwares continued. Communal structures are larger than those of the preceding phase were (Anyon and LeBlanc 1984:22; Schutt 1994:15–17).

The Three Circle phase (A.D. 750–1000) is distinguished by rectangular pitstructures with squared corners and commonly, with masonry-lined walls (Anyon and LeBlanc 1984:22; Schutt 1994:17). New pottery types—Three Circle Red-on-white and Mimbres Boldface Black-on-white (Styles I and II)—are present (Anyon 1980:145–146), as are Alma Plain and San Francisco Red. Villages increased in size and pithouses decreased in size. In addition, there was a population expansion along secondary drainages (Cordell 1984:74, 114–115; Schutt 1994:17). By A.D. 1000, intramural family cemeteries were more common then extramural inhumations (Kearns et al. 2001:26; Shafer 1999).

4.3.3 Pueblo Period (A.D. 1000–1450)

The Pueblo period is divided into three phases: Classic Mimbres or Mimbres (A.D. 1000–1150), Black Mountain or Animas (A.D. 1150–1300), and Cliff or Salado (A.D. 1300–1450). The Classic Mimbres phase (A.D. 1000–1150) corresponds to the Early Pueblo period. The data suggest Classic Mimbres developed in situ. The Classic Mimbres is marked by the abrupt change from semi-subterranean pithouses to surface masonry pueblos. The shift from separated dwellings to contiguous ones is suggestive of major organizational changes (Anyon et al. 1981:212, 219; Anyon and LeBlanc 1984:23; Schutt 1994:18). "The common building form in the Classic was a series of contiguous, single-story rectangular rooms with walls made of unshaped river cobbles set in abundant adobe or mud mortar" (Cordell 1984:294). In addition, site sizes are variable, with both large and small sites increasing in frequency. The larger sites generally have a number of storage rooms, kivas, plazas, and slab-lined fire pits and frequently they were built along major drainages over Late Pithouse sites. The small sites, occurring along the main river

valleys between the larger sites, are probable seasonal field houses or temporary sites, lack plazas and kivas, and are not built over earlier sites (Anyon and LeBlanc 1984:23; Schutt 1994:18). Ceremonial structures include very large, rectangular, semi-subterranean kivas and small pithouses remodeled for use as kivas. Although the villages were not planned constructions, room clusters were loosely arranged around an open plaza. Classic Mimbres pueblos, therefore, were aggregated, rather than nucleated, settlements (Cordell 1984:295–299).

Classic Mimbres pottery types include Mimbres Black-on-white (Style III) and Mimbres Polychrome. The production of Alma Plain and redware, however, continued (Schutt 1994:16). Trade is indicated by the presence of shell, turquoise, and exotic ceramic tradewares, but it was limited. The large Classic Mimbres population increase—estimated at two and a half times that of the preceding period—probably "resulted in a change toward more intensive and extensive exploitation of the environment. Agriculture was intensified by the construction of check dam systems and perhaps irrigation" (Anyon and LeBlanc 1984:23).

The end of the Classic Mimbres also marks the termination of the Mimbres Mogollon cultural sequence. Undoubtedly, considerable resource stress was a major factor in the collapse of the Mimbres Mogollon system (Anyon and LeBlanc 1984:23). Natural resources—firewood, wild game, and wild plant foods—were depleted over time and when crop failures resulting from several years of drought began in A.D. 1150, few backup resources were available. Consequently, many Mimbres sites were abandoned (Cordell 1984:74, 294–297, 1997:207–208).

The Black Mountain (Animas) (A.D. 1150–1300) and Cliff (Salado) (A.D. 1300–1400) phases are generally regarded as non-Mogollon cultural manifestations. The Black Mountain phase represents an occupation by Pueblo peoples shortly after the Mogollon abandoned the area. The phase is characterized by adobe, rather than cobble-walled, pueblos and by a settlement shift to drier portions of the Mimbres area. In addition, the ceramic assemblage is entirely new and includes polychromes—Chupadero Black-on-white, Three Rivers Red-on-terracotta, El Paso Polychrome, and Casas Grandes polychromes (Anyon and LeBlanc 1984:23–24). The presence of ceramic types "relatable to Casas Grandes (Playas Red Incised, El Paso Polychrome, and Ramos Polychrome) are viewed as marked departures from the Mimbres Classic and as evidence of a close tie between the Mimbres Valley and the important Chihuahuan area of Casas Grandes" (Cordell 1984:117, 1997:208). For reasons that are yet unclear, the population of the area dropped markedly at ca. A.D. 1300 and apparently coincided with the collapse of Casas Grandes itself (Anyon and LeBlanc 1984:25).

The Cliff phase, a local manifestation of the Salado culture of Arizona, is the closest Postclassic occupation to the project area. The majority of Cliff phase sites occur on the Gila River and its tributaries near Cliff, northwest of Silver City. Cliff phase sites are few and consist of small structures of puddle adobe, some enclosed by freestanding walls (Nelson and LeBlanc 1986). Some sites have been recorded on the upper Mimbres River (Schutt 1994:18). Pottery assemblages primarily consist of plainware and textured wares. Corrugated wares are absent and Gila Polychrome occurs in low frequencies (Anyon and LeBlanc 1984:25). Chupadero Black-on-white, El Paso polychrome, and Ramos Polychrome are rare but their association with Cliff phase sites indicates that the trade networks were still operational. Cremations were secondarily interred in jars, a practice from earlier periods (Kearns et al. 2001:27). As the Puebloan culture began to decline at ca. A.D. 1400, eventually disappearing from the area, nomadic Apachean groups arrived, claiming the area as their own.

4.4 Historic Period (A.D. 1540–Present)

The 1540–1542 *entrada* of Francisco Vasquez de Coronado was the first official European entry into present-day New Mexico. After the "failure" of the Coronado expedition, the Spanish ignored New

Mexico for almost 40 years. Beginning, however, with the Rodriguez-Chamuscado expedition of 1581, Spanish interest in New Mexico was renewed. Juan de Oñate, leading a group of colonists into the Rio Grande Valley in 1598, founded the first European settlement—San Gabriel—in New Mexico. This was the beginning of a permanent Spanish presence in the region. Santa Fe was founded in 1610 as the Spanish capital of New Mexico (Athearn 1992:3–4; Jenkins and Schroeder 1974:17, 19). The Spanish presence radically altered Puebloan culture in terms of economy, religion, politics, and society. Endemic disease, slavery, the Spanish system of land grants and village establishment, as well as raiding by the Navajo, Ute, Apache, and Comanche, all drastically reduced traditionally held areas. The Pueblo Revolt of 1680 was partly a reaction to these stresses and temporarily removed Spanish rule. In 1692, an army under de Vargas reasserted Spanish claims on New Mexico that held until Mexican independence from Spain in 1821.

Governor Juan Bautista de Anza passed through the area in 1780 while on an unsuccessful search for a route between Santa Fe and the mines of Sonora, Mexico. Throughout most of this period, however, the Spanish exerted little influence in, and generally ignored, southwestern New Mexico, except along the Rio Grande. Lacking large Puebloan populations, the area was not attractive for intensive missionary efforts. The environmental nature of the area discouraged agricultural pursuits. Mineral wealth, the goal of Coronado's *entrada*, was elusive and was not found until almost the end of the Spanish Colonial period. In addition, southwestern New Mexico belonged to the Chiricahua Apache and the Spanish were never able to dislodge them from the area (Christiansen 1980:24). Consequently, the Spanish "remained on the fringes of the area and never made a concerted effort to occupy southwestern New Mexico" (Christiansen 1980:24).

Reportedly, an Apache had found copper deposits in the Santa Rita area in 1798 (Christiansen 1980:26) or 1800 (Sherman and Sherman 1975:188) and news of the find had been given to Spanish authorities. Copper ore production at Santa Rita began in 1804 (Myrick 1990:185). The Janos or Ore Road from Santa Rita to Chihuahua passed west of present-day Deming. In 1807, Lt. Zebulon Pike and his exploration party were the first Anglos to enter the project area, as prisoners, on their way to Mexico via the Camino Real. Pike recorded that the Santa Rita mine was producing 20,000 mule loads of copper each year (Pratt and Scurlock 1991:93).

Mexico obtained its independence from Spain with the signing of the Treaty of Córdova on August 24, 1821. New Mexico, therefore, became part of the Mexican nation. The Mexican Period (1821–1846) in southwestern New Mexico, however, was little different from that of the Spanish Colonial. Mexico, engaged in political struggles, had little time for southwestern New Mexico, an area perceived as harsh, unfriendly, and poor. The latter perception, however, was soon to change with the arrival of the Americans.

The establishment of the Republic of Texas in 1836 and its annexation by the United States in 1844 led to poor relations between Mexico and the United States and eventually resulted in the outbreak of war in 1846. New Mexico was captured by General Steven Watts Kearny's military force. The Treaty of Guadalupe Hidalgo, which ended the war in 1848, ceded most of Mexico's northern territory, including New Mexico, to the United States. The Territory of New Mexico was created in 1850 (Jenkins and Schroeder 1974). The arrival of the Americans had a major impact on southwestern New Mexico. With the Americans came mines, forts, towns, railroads, and the subjugation of the Apache.

During the Mexican War, Colonel Philip St. George Cooke and the Mormon Battalion marched down the Rio Grande and southwest, probably passing through the area near present-day Deming (Baxter 1986:108–109). The wagon road established during Cooke's march was used until ca. 1860 (Wase et al. 2000:1.45). A stage route was established through southwest New Mexico in response to the 1857 Pacific Wagon Road Act. The route was from El Paso to Fort Yuma, in Arizona (Pratt and Scurlock 1991:157).

The Butterfield Overland Mail Company used the road as part of its route between St. Louis, Missouri and Stockton, California from 1857 to 1869 (Wase et al. 2000:1.46).

Livestock has been an important commodity in New Mexico since the Spanish came in 1598. Originally, sheep were most important, but cattle became more important with an influx of Texas cattlemen after the Civil War. The discovery of gold in California also opened a large market for beef. Beginning in 1848, Texas cattle were driven through what would become Deming. In 1852, Eugene Lietendorf drove cattle through this area from Illinois to California. At Pyramid, 14.4 km (9 mi) south of Lordsburg, he dug wells to water his cattle. This later became a water stop for the southern overland route to California (Pratt and Scurlock 1991:155; Wase et al. 2000:1.51). Responding to the renewed demand for beef after the Civil War, John Slaughter used the same trail in 1879 to drive cattle west to Arizona and California. The trail was named after him. After the arrival of the railroad in 1880, cattle drives were no longer required. The open range was replaced by fenced, privately owned ranches. Ranching continued to expand through the early 1920s (Wase et al. 2000:1.51–53).

In 1912, New Mexico became a state. The Mexican Revolution had a direct impact on southwestern New Mexico. Pancho Villa's troops crossed into the United States and raided the community of Columbus and adjacent Camp Furlong on March 9, 1916. Within a week, 6000 U.S. troops were along the border and soon, under General John J. Pershing, the troops crossed into Mexico. The American "punitive expedition" was ineffective, but it spurred development in the region with the building of the Deming armory and establishment of Camp Cody, an 809 ha (2000 ac) facility near Deming. The camp was named after Buffalo Bill Cody. The 30,000 National Guardsmen stationed at Camp Cody were from Iowa, Minnesota, Nebraska, North Dakota, and South Dakota and were identified as the Thirty-fourth (or Sandstorm) Division. The camp's structures burned in 1939 (Kearns et al. 2001:29; Pratt and Scurlock 1991:259–260, 283; Wase et al. 2000:1.54).

By the 1920s, automobiles were spurring development in New Mexico. Between 1921 and 1931, highway expenditures in New Mexico quintupled and by 1932, the state had 5700 miles of improved highways (Roberts and Roberts 1988:172–173). The highway system was influential in promoting tourism that included the nearby City of Rocks State Park, Rock Hound State Park, and Gila Cliff Dwellings National Park. Highways, in conjunction with the railroads, facilitated transportation of people and goods through southwestern New Mexico (Wase et al. 2000:1.54).

In 1927, the first Army Air Force landing field in New Mexico was built south of Lordsburg. Charles Lindbergh dedicated the airfield in 1932. Hotels and motels sprang up (Wase et al. 2000:1.59). The local economy revived during World War II, partly due to the need for copper and the establishment of a military airfield at Deming and prisoner of war camps at Ulmoris, east of Lordsburg. Since the war, copper mining has ebbed in southwestern New Mexico. Cattle ranching, however, remains important (Kearns et al. 2001:29; Wase et al. 2000:1.54, 1.59).

4.4.1 Mansos

The Mansos, based on early Spanish accounts, ranged from south of El Paso to possibly as far north as Hatch, and as far west as the Florida Mountains south of Deming. Forbes (1959:107) concludes that the Jano and Jocome, two other groups mentioned by the Spanish, were linguistic relatives of the Manso. By combining these groups, the Manso range may have extended as far west as southeastern Arizona and into northern Chihuahua (Beckett and Corbett 1992:3). The Mansos are the most likely descendants of the Jornada Mogollon. The earliest descriptions of the Mansos are from the expeditions of Chamuscado-Rodriguez in 1581–1582, Espejo in 1582–1583, and Benavides in 1630. These Spanish explorers reported that the Mansos lived in rancherias, in straw houses or huts of branches (e.g., wickiups), and may have numbered a thousand people. They reportedly ate maize, mesquite, jerked venison, and fish, which they caught with nets in the Rio Grande and in oxbow lakes. The Mansos hunted with the bow and arrow and

clubs and used flint knives for cutting. They wore little clothing (Benavides 1965; Hammond and Rey 1966). In the El Paso area, remnant Manso groups were reduced to mission communities by the late 1600s, and the last Spanish Colonial record of an independent Manso group dates to 1711 (Beckett and Corbett 1992). The Mansos were probably extinct as a tribe by the mid-1700s (Wase et al. 2000:1.42). None of the sites have Mansos occupations.

4.4.2 Chiricahua Apache

The project area is within the former territory of the Chiricahua Apache. One of the most controversial issues among anthropologists and archaeologists in the Southwest concerns the arrival of the Navajo and Apache—Southern Athapaskan groups—in the region. One hypothesis suggests Apachean groups arrived in the Southwest and Southern High Plains via the High Plains shortly before the arrival of Spaniards in the area in 1540 (Carlson 1965; Gunnerson 1956, 1974; Gunnerson and Gunnerson 1971, 1988:1–2; Hester 1962; Schaafsma 1981; Wilcox 1981). A date of ca. A.D. 1525 has been postulated. If this interpretation is correct, the southward Apachean migration coincided with the maximum of the "Little Ice Age." Apachean peoples may have followed bison herds along the front range of the Rocky Mountains (Gunnerson 1956; Gunnerson and Gunnerson 1988:2). Other researchers suggest the Navajo and other Apache groups arrived at different times and by different routes, such as an intermontane route through Colorado or Utah and the Great Basin or west of the Continental Divide (Hall 1944; Harrington 1940; Huscher and Huscher 1942; Opler 1975; Steward 1936:62; Worcester 1951). Because the Chiricahua and the Western Apache exhibit many Great Basin characteristics and few Plains traits, it is probable that these Apacheans entered the Southwest via an intermontane route (Opler 1983a:385).

Glottochronological data suggest Apachean linguistic differentiation began ca. A.D. 1300. Prior to that time, the Apacheans were a single group or very closely related groups (Opler 1983a:381, 385). Based on linguistic data, Opler (1983a:385) suggests the first Apachean groups entered the Southwest ca. A.D. 1400. During the sixteenth and early seventeenth centuries, the ancestral Chiricahua and Mescalero migrated south, down the Rio Grande valley. Eventually, both groups diverged and the Chiricahua established their territory west of the Rio Grande, in southwestern New Mexico, southeastern Arizona, and adjacent northern Mexico. The hunter-gatherers encountered by Coronado in southeastern Arizona in 1540 were probably Chiricahua Apache (Opler 1983a:384–385, 1983b:401–402). The Mescalero established their territory east of the Rio Grande, in southeastern New Mexico and northwestern Texas and adjacent portions of northern Mexico (Opler 1983a:385, 1983c:419). The Rio Grande formed the boundary between Chiricahua and Mescalero territory.

The Chiricahua consist of three bands—Eastern, Central, and Southern. "To the Eastern Chiricahua belonged almost all the Chiricahua territory west of the Rio Grande in New Mexico" (Opler 1983b:401), including the project area. Portions of the Eastern Chiricahua have been known as Mimbreños, Coppermine, Warm Spring, and Mogollon Apaches (Opler 1983b:401). In 1626, Fray Alonso de Benavides referred to the Apache west of the Rio Grande as Xila (Gila) Apache (Hodge et al. 1945:84–85). While accompanying an inspection of all presidios in New Spain in 1766–1768, Nicolás de Lafora noted a group of Gileños who were based mainly in the Los Mimbres Mountains. Other Gileños reportedly gathered mescal and hunted in the Burro and other mountains in southwestern New Mexico (Kinnaird 1958:78).

During Juan Bautista de Anza's tenure as governor of New Mexico from 1777 to 1787, the Spanish attempted to contain and subdue the Chiricahua. Military strikes against the Chiricahua occurred in the Mogollon, Mimbres, and Burro mountains, as well as the Chiricahua, Socorro, Florida, and Hatchet mountains. In general, the military campaigns were unsuccessful and lapsed during the first quarter of the nineteenth century, when Mexico was in the throes of wresting its independence from Spain and

establishing itself as a federal republic. Conciliatory efforts during this period led to shaky peace treaties and permission for mining operations in Chiricahua territory (Opler 1983b:403).

Following the Treaty of Guadalupe Hidalgo in 1848, which ended the Mexican War and ceded nearly all of present-day New Mexico to the United States, Americans were eager to exploit the mineral wealth of southwestern New Mexico. In addition, the United States wanted

> to link the newly acquired lands with the west coast by safe military and commercial roads, to provide lands for veterans of the Mexico War who chose to remain in the West after being mustered out, and to encourage new settlements where agriculture, stock-raising, and trade might flourish. These aims were incompatible with the unrestricted presence of nomadic Indians jealous of their extensive hunting and gathering territories [Opler 1983b:403].

The discovery of gold in California in 1848 did not help the situation. Clashes between impatient immigrants—eager to reach the gold fields of California—and the Chiricahua were frequent. The resulting U.S. military policy sought to punish the Chiricahua for protecting their hunting grounds or for retaliating against mistreatment. Military posts were established in New Mexico to control the Indians. When Americans wanted to reopen the Santa Rita copper mines, Fort Webster was established nearby for protection in 1852. The influx of prospectors into Eastern Chiricahua territory heightened after the discovery of gold at Pinos Altos (Opler 1983b:403–404). "As mining and agricultural communities multiplied, the Apache presence in their traditional territories was less and less welcome" (Opler 1983b:404). The needs of the Chiricahua increased as their movements were restricted and as game became depleted. Consequently, the Chiricahua became more aggressive. Prominent Eastern Chiricahua leaders in southwestern New Mexico included Mangas Coloradas and Victorio.

As one government response to the situation, Congress voted for an appropriation in 1855 to concentrate the Eastern Chiricahua, provide them with necessities, and encourage them to farm. Although the plan ended in disaster when the military attacked a group of Eastern Chiricahua, Michael Steck, a sympathetic Chiricahua agent, continued with plans for a Chiricahua reservation. Steck selected a reservation site on a tributary of the Gila River, 24 km (15 mi) south of the Mogollon Mountains. In 1860, he received authorization to settle as many Eastern Chiricahua as possible on the reservation. Unfortunately, success was thwarted by the outbreak of the Civil War and the invasion of New Mexico Territory by Confederate forces. Several other failed attempts to settle the Chiricahua on a reservation—Bosque Redondo (1865), Tularosa Valley Reservation (1871), Chiricahua Reservation (southeastern Arizona Territory, 1872), Cañada Alamosa (Hot Springs) Reservation (1874)—occurred after the war. In 1876 and 1877, the Chiricahua were forced onto the San Carlos Apache Reservation in Arizona. Desertions from San Carlos soon followed (Opler 1983b:404–406).

Fugitive Chiricahua often fled to Mexico, making the rugged Sierra Madre range their base of operation. As a result, the Chiricahua also had to contend with pursuit by Mexican forces. In October 1880, while fleeing American forces, Victorio and most of his followers were killed in a battle with Mexican soldiers. In April 1882, another Chiricahua group trying to elude pursuing American forces fell into a Mexican ambush, suffering high casualties, especially among women and children (Opler 1983b:406).

Most of the Chiricahua fugitives returned to the San Carlos Reservation in 1883 and 1884. Fearing arrest in May 1885, Geronimo and Mangus headed for Mexico with their families. Running low on supplies and ammunition, the fugitives surrendered in March 1886. While on their way back to San Carlos, however, Geronimo and Naiche escaped with close family members. In retaliation, the returning fugitives who had not fled were sent to Florida for confinement in Fort Marion. Later the same year, in response to public clamor seeking the removal of all Chiricahua from Arizona Territory, the Chiricahua at San Carlos,

including those who had served or were serving as U.S. Army scouts, were also moved to Fort Marion. Discouraged by the news of the removal of their people, Geronimo and Naiche finally surrendered on September 3, 1886. Although General Miles promised to send both men to Fort Marion, they and 15 others were imprisoned at Fort Pickens, Florida (Opler 1983b:407–408).

Due to crowded and unsanitary conditions, the removal of a desert mountain people to a hot and humid lowland climate, recent privations, enforced idleness, and fears and uncertainties concerning the future, more than 20 percent of the Chiricahua sent to Florida had died by the end of 1889. During this initial confinement period (1886–1889), the Chiricahua at both Florida forts were sent, in separate moves, to Mount Vernon Barracks in Alabama. In 1894, the Chiricahua were transferred to a reservation at Fort Sill, Oklahoma. The Chiricahua were granted full freedom in 1913. A small contingent decided to remain in Oklahoma and is known as the Fort Sill Apache. A majority of the tribe elected to move to the Mescalero Apache Reservation in Otero County, New Mexico (Opler 1983b:408–409).

The Fort Sill Apache never organized formally (Opler 1983b:410). On the other hand, "The descendants of the three Apache tribes—the Chiricahua, the Mescalero, and the Lipan—who have been housed on the [Mescalero] reservation have amalgamated politically and economically and, after some initial resistance, have intermarried freely" (Opler 1983b:409). Due to skillful management of its natural resources, the Mescalero Apache Reservation is one of the most prosperous reservations in the country (Julyan 1996:226). Recent economic development also includes a ski resort and a casino.

During the Apache military campaign, to circumvent Apache sabotage of telegraph lines, the Army established a heliograph communications system in 1886. New Mexico had 14 stations. Most stations were on peaks and were manned by two or three operators and one to five guards. After the Apaches were subdued, the stations were abandoned, but they were reestablished in 1890 with 51 stations before being abandoned permanently (Couchman 1990:216–219; Pratt and Scurlock 1991:138–139; Wase et al. 2000:1.46). None of the sites have discernible Apache affiliations, but LA 166766 and LA 166768 have undetermined Native American affiliations.

4.4.3 Luna County

Luna County, named in honor of Solomon Luna, a prominent New Mexico sheep rancher, businessman, and political figure during the Territorial period, was created on March 16, 1901 from the western portion of Doña Ana County and the eastern portion of Grant County. Creation of the new county was in large part due to rivalry between Deming and Silver City. The first county offices were in the Bank of Deming for nine years (Beck and Haase 1969:49; Miller 1978:6; Whisenhunt 1979:25). A two-story brick courthouse, designed by W. B. Corwin, was completed in 1910. The building has a tall clock tower and a Greek portico (City of Deming 2010b; Whisenhunt 1979:25). The county contains four important mining districts—the Cook's Peak, the Floridas, the Tres Hermanas, and the Victorio districts. The first county extension agent in New Mexico was in Luna County (Miller 1978:7).

In 1909, water for irrigation was found by tapping into the aquifer of the Mimbres drainage and the land was ripe for exploitation. "Land companies were organized and expensive machinery was sold to farmers unacquainted with western agricultural methods" (Miller 1978:7). After a brief period of prosperity, which lasted until ca. 1914 or 1915, many farms were abandoned as unprofitable. Luna County had 340 farms in 1910 and although the number had fallen to 287 by 1920, the number of farms with more than 1000 acres under cultivation had increased from eight to 44. In 1940, the county had 170 farms and the three largest crops were beans, cotton, and sorghum. By 1978, 14,000 acres were under cultivation, with pinto beans, cotton, and feed crops as the main agricultural crops. The extent of irrigation is primarily based on the amount of water obtainable from subsurface pumping (Miller 1978:7). Today, "Luna County is known as the 'Chile Capital of the World.' Its secondary crops are cotton, onions, and sorghum" (DeMarco 2002).

Luna County is primarily cattle country. The county had 30,647 head of cattle in 1910. By 1920, the number had risen to 93,144, of which 92,132 were beef cattle. Poor market conditions and disastrous droughts resulted in a decline in the 1930s. In 1940, the county had 70 ranches with an average shipping yield of 12,000 head per year (Miller 1978:7).

4.4.4 Deming

From the end of the Mexican War until the Gadsden Purchase of 1853, the future site of Deming was a port of entry on the U.S.-Mexican border. The Butterfield Trail and the Butterfield Stage passed north of present-day Deming from 1858 to 1881. The Butterfield Stage was the longest overland route of its day, extending from Tipton, Missouri to San Francisco, California (McLemore and Dunbar 2000:67). Deming, the county seat of Luna County, was founded in 1881 and named after Mary Ann (or Anne) Deming Crocker, the wife of Charles Crocker, one of the four promoters of the Southern Pacific (SP) Railway system, which reached this point late in 1880 (May 1978:12–13; Whisenhunt 1979:25). A roundhouse and repair shops were built and a city of tents and shanties was erected. In early 1881, the Atchison, Topeka, and Santa Fe Railway (AT&SF) reached Deming, completing its junction with the Southern Pacific (Miller 1978:6). Prior to completion of the AT&SF line, the cost of the 193-km (120-mi) stagecoach ride from Rio Mimbres (near Deming) to San Marcial on the Rio Grande was $20.00 (Myrick 1990:11). With the influx of settlers in 1882, substantial buildings were constructed. The storerooms of the town's first mercantile, E. Germain and Company, consisted of old boxcars. In 1887, the population was 1600 and the town had a public and a private school, two Protestant churches, and four hotels. By 1891, Deming had four churches and two newspapers. The "City Club" had been organized to establish a library and to promote the town's social, commercial, and scientific development (Miller 1978:6–7). A five-room school was built in 1892 due to Deming's growth. Deming High School was built in 1911 and razed in 1961 for an addition onto Deming Junior High School (Anonymous 1978:20). In 1911, "Deming was a small place known as the windmill city. Every house had a windmill and the water was most delicious—99.99% pure. Many people came here to cure ailments such as tuberculosis. Deming had board sidewalks and dirt streets" (Haas 1978:89).

Deming, along with Columbus, was the chief cattle shipping point in southern New Mexico. It was also a cattle-shipping point for Mexico. In 1885, 13 carloads of beef cattle brought overland from Corralitos, Mexico were shipped to Kansas City from Deming (Miller 1978:7). Although Deming's current economy primarily consists of agriculture, tourism (mostly in the form of snowbirds), light industry, and ranching (DeMarco 2002), former military installations in the Deming area were important contributors to the local economy. "These installations bolstered the economy of the community for short periods and their withdrawals, of course, had the inevitable reverse effect" (Gustafson 1990).

4.4.4.1 Military Installations

At different times during the first half of the twentieth century, Deming was chosen as the site for military installations—three camps and an army air field. In 1914, World War I began and Mexico was in the midst of a 10-year revolution. Because of a possibility of war with Mexico and because of Deming's proximity to the U.S.-Mexico border, joint maneuvers of the State Guard and U.S. Army were held in Deming from July 11 to 21, 1914. The annual summer camp of the State Guard was usually in Las Vegas, New Mexico. The encampment, Camp Brookes, was west of town and north of the AT&SF roundhouse and consisted of 20 streets. The Deming Chamber of Commerce supplied the camp with water via 2 inch pipes and provided each street with a shower bath. The joint maneuvers were conducted by over 1,000 soldiers—750 state guardsmen, 133 men of Battery C of the Sixth U.S. Artillery, and 180 men of the 1st Battalion of the Sixth U.S. Infantry. The U.S. Army units were from Fort Bliss. The guardsmen included 62 local men of the then recently formed Company I. The maneuvers focused on scouting, patrolling, small target practice, and parading. A bugle call at 1 P.M. on July 21 signaled the dismantling of the

camp. The success of Camp Brookes probably contributed to the later selection of Deming for Camp Deming and Camp Cody (Gustafson 1990; Krol 2010).

In July 1916, 7,800 troops from Delaware, Arkansas, Wyoming, and New Hampshire arrived in Deming and began constructing Camp Deming just northwest of town. Permanent construction included Brigade Headquarters, a field hospital, latrines, and showers. In addition, a temporary post office and a YMCA were set up (Anonymous 2010). The official opening of Camp Deming was on December 29, 1916. Although the outpost was to be used by the National Guard during the Mexican crisis, its mission was short-lived. The camp was abruptly closed in February 1917 (Anonymous 2010; Krol 2010).

Although the loss of Camp Deming resulted in a recession in town, it was cured with the June 1917 selection of Deming as a site for an army training facility, only one of four in the far West. One reason for its selection was its proximity to the railroad. The United States had declared war on Germany on April 6, 1917. Accepting the Deming City Government's offer of free land if selected for a new camp, the U.S. War Department established a 2000 acre military facility just northwest of Deming to train soldiers during World War I. The new installation, named Camp Cody in honor of William "Buffalo Bill" Cody who had died earlier that year, was 4 km (2.5 mi) long and 2 km (1.25 mi) wide and was between the SP and AT&SF Railway lines. The SP laid track in the camp area for unloading building materials and eventually, troops. At the height of construction, the work force consisted of 3,000 men. The camp, which was designed for 36,000 soldiers, consisted of National Guardsmen from Iowa, Nebraska, Minnesota, and the Dakotas who formed the 34th Infantry Division, which was known as the Sandstorm Division (Anonymous 2010; Krol 2010; Kromeke 2010).

When completed, the camp had three main streets and 18 cross streets. In total, 19 km (12 mi) of streets had been graded and topped with 8 cm (3 in) of gravel. Due to heavy truck traffic, crude oil was eventually poured on the main streets. Buildings included Division Headquarters, a headquarters for each regiment, office buildings for each brigade, an 800-bed base hospital, 12-bed regimental hospitals, 120 mess houses, 1,200 shower bath houses, 6,000 8-men framed tents, 11 large warehouses, a post office, five YMCA buildings, a library, and a Knights of Columbus. The tents had wood floors, electric lights, and wood-burning stoves. Other facilities included two 100,000-gallon wooden water tank towers and a 100 acre remount station (Anonymous 2010; Krol 2010). Water was supplied by the United Land and Water Company (Noyes 1986). The remount station, equipped to handle 10,000 horses and mules, was in the northern portion of the camp and included corrals, a veterinary hospital, an immense loading platform, and a hose shoeing school (Gustafson 1995).

Trash from the mess houses was burned in special incinerators. Even tin cans were discarded into the incinerators and disappeared (Anonymous 1917). Initially, the camp did not have a sewer system. Installation of a modern sewage system began in July 1918. The system was designed to begin at the west end of the camp and flow eastward. A 2.5-million-gallon septic tank was built on the east end of the camp. The tank was 30.5 m (100 ft) long and 24.5 m (80 ft) wide and was divided into 12 sections. A huge spillway was built to empty into the Mimbres River. The system, however, was never used because armistice was declared shortly before the project was completed and orders were issued to abandon the system, which cost about 500,000 dollars (Gustafson 1995; Krol 2010). "The huge spillway is one of the few visible remains from the Camp Cody era" (Gustafson 1995).

The camp closed in June 1919 (Gustafson 1995; Kromeke 2010). Some buildings were moved and the rest were salvaged, dismantled, or destroyed. The buildings of the main hospital, however, remained intact and were used for several months for wounded soldiers returning from the war (Anonymous 2010). The American Smelting and Refining Company (ASARCO) mill site is on part of the old camp, in the vicinity of the former huge warehouses (Krol 2010). The present project area is north of Camp Cody, across the Mimbres River.

The Deming Army Air Field was established in 1942, during World War II, to train bombardiers. The installation contained the 388th Base Headquarters and Air Base Squadron, which included the 321st, and the 322nd Bombardier Training Groups. The 321st consisted of the flying units and the 322nd consisted of the ancillary units—a signal service company, guard squadron, ordnance company, medical detachment, veterinary detachment, quartermaster platoons, and an Army Air Force band (Bossie 2006). The facility was a sub-base of Biggs Army Air Field in El Paso, Texas (Parrish 2010). More than 5,000 men were stationed at the base. By the time the Bombardier School closed in September 1946, about 12,000 cadets had gone through the program (Bossie 2006). The Deming Army Air Field was also a duty station for the Women Airforce Service Pilots (WASP) who flew AT-6s, B-25s, B-26s, and P-47s at the airfield (Parrish 2010). After closing, the facility became the Deming Municipal Airport, which is south of Interstate 10. In 2005, some of the old buildings, including three hangers, still remained (Bossie 2006).

4.4.4.2 Holy Cross Sanatorium

At the end of the World War I, most of the Camp Cody was taken down, but the hospital remained and was used as a convalescent hospital for wounded soldiers. In 1922, the hospital was transferred to the Deming Chamber of Commerce. Soon after, the Sisters of the Holy Cross acquired the hospital and on May 12, 1923 dedicated the facility as the Holy Cross Sanatorium for people suffering from tuberculosis. The complex, which was renovated by Trost & Trost of El Paso, consisted of more than 500 acres with 28 buildings and also included 320 acres for a farm, garden, and recreational building. Because the number of patients and the incidence of tuberculosis had declined, the sanatorium closed in 1938, leaving only six Sisters to care for the grounds. The facility was destroyed in 1939 by a fire that started in the Administration Building, cutting off telephone service. When the fire department arrived, it was too late. Only the concrete skeleton of the boiler room remains (Krol 2010). The site of the old hospital complex is south of the present project area.

4.4.5 Railroads

One reason for justifying the Gadsden Purchase of 1853 was it offered the lowest crossing of the Continental Divide at an elevation of 1397 m (4584 ft) with a few 1.5 percent grades (Myrick 1990:63). The Southern Pacific Railroad reached the Deming on December 15, 1880, eventually forming the western portion of the second transcontinental railroad when the AT&SF reached Deming on March 8, 1881 (Myrick 1990:xv, 12, 60). This southern route is still a major railroad route across the southern United States. In March 1882, the Silver City, Deming and Pacific Railroad Company was formed and began construction on a 75 km (47 mi) narrow-gauge line to Silver City. The line was completed in May 1883. Proposed continuations of the line to Clifton (west) and to Santa Rita and Georgetown (east) never materialized. In 1884, the line was sold to the AT&SF. The line was changed to standard gauge in 1886. Eventually, it became an important component of the transportation network of the copper industry (Myrick 1990:193–194).

Railroad grades also extended south from Deming. In ca.1890, the Deming, Sierra Madre and Pacific Railroad planned a railroad from Deming through Mexico to the Pacific Coast. Before its financial collapse, the railroad built a grade south from Deming to the international boundary near Las Palomas. In 1901 and early 1902, an El Paso & Southwestern railroad grade was built south from Deming to Hermanas as part of one of its routes linking the copper mine at Bisbee with the outside world (Myrick 1990:92–94).

4.4.6 Mining

The history of the region was determined by geologic activity millions of years ago during a series of mountain-building events. "As molten rock forced its way up through the fractured crust, the viscous material deposited much copper, silver, and gold that would make this one of the country's richest

mineralized areas" (Berry and Russell 1995:3). As a result, much of New Mexico's mining history centers on the southwest corner of the state (Myrick 1990:185).

The first hint of mineral wealth in southwestern New Mexico occurred in 1798 (Christiansen 1980:26) or 1800 (Sherman and Sherman 1975:188), when an Apache found copper in the Santa Rita area—about 56 km (35 mi) north of Deming. News of the find was passed on to Lieutenant Colonel Manuel Carrasco, commandant of a Spanish presidio. Lacking finances to develop the mine, Carrasco sold his interest in the property to Don Francisco Manuel Elguea, a wealthy Chihuahua banker (Sherman and Sherman 1975:189) or merchant (Christiansen 1980:26), in 1804. Elguea moved to the mine, which he named Santa Rita del Cobre—Saint Rita of the Copper—and built a triangular presidio to protect his mining interests from the Chiricahua. The presidio had thick adobe walls and a tower in each corner. Using Indian slaves and convict labor—Elguea operated a penal colony under a Spanish crown grant—Elguea mined the rich copper deposits. The copper was transported across the rugged Sierra Madres to Mexico City by burro train and was used for New Spain's copper coinage (Sherman and Sherman 1975:189).

Following the death of Elguea in 1809, his widow leased the mine during the next 13 years to various parties, such as Sylvester Pattie and his son (James). After a massacre of Chiricahua at the Santa Rita Presidio in 1837, Mangas Coloradas led Apache raids against Santa Rita. These raids were so intense that the Spaniards abandoned the mine and fled south. Three years later, Siqueiros—a Spaniard—took over the mine until the outbreak of the Civil War, when the Confederate Army briefly occupied the old presidio. After the Confederate retreat from New Mexico, the mine was operated intermittently by various men—Sweet, LaCosta, Brand, and Flesh—until 1870. Martin B, Hayes obtained clear title to the property in 1873 (Sherman and Sherman 1975:189). The Santa Rita Mining Company acquired the mine ca. 1899. In 1909, the company was sold to the Chino Copper Company (Myrick 1990:186).

Although extensive underground mining activity had occurred from 1873 to 1910, the Chino Copper Company—later known as the Chino Mines Division of the Kennecott Copper Corporation—did not purchase the former company until the presence of large reserves of copper ore, suitable for open mining had been firmly established. Open pit mining operations, using steam shovels, began in 1910 (Myrick 1990:186–187). Currently, the Santa Rita pit—now owned by the Phelps Dodge Company—is the third largest open pit mine in the United States. It is also one of the oldest copper mines in the county (Myrick 1990:185; Sherman and Sherman 1975:189).

The western portion (west of the Southern Railroad and Peru Hill Mille Road [SR 394]) of the City of Deming Industrial Park is a 262.9-ha (649.7-ac) parcel. This parcel is a brownfield site, having been remediated for hazardous materials. It is the location of a former mill operation, which primarily processed zinc sulfide ore. The area formerly contained abandoned ore milling facilities that included buildings, water wells, and tailings. Peru Mining Company (PMC), a subsidiary of Illinois Zinc Company, began the first milling operation in 1928. PMC operated the facility until 1967. The mill was vacant until purchased by Barite of America (BOA) in 1979. BOA operated the mill primarily for barite until 1985, when the company filed for bankruptcy. Barite Limited retained title to the property until SMS Financial, a financial title and holding company, acquired it through bankruptcy (McKinney et al. 2008:1). Subsequently, the City of Deming acquired the property for an industrial park.

The ore processed at PMC was shipped by rail from four nearby mines that included Hanover, Pewabic, Kearney, and Copper Flat. The mill was operated as a flotation concentration plant where ore was crushed, ground, mixed with water and pumped to flotation cells. Chemicals were added to separate the minerals from the mixture whereupon the minerals were skimmed and pumped to holding drums to be filtered and dewatered. The remaining ore and slurry were pumped to tailings on site. The containment for the liquid tailings failed, with a resulting spill on the west side of the tailings pile. The spill eliminated vegetation in the spill area and the subsequent wind erosion removed the top soil down to the undulating

hardpan. The predominantly westerly winds eroded the tailings pile and spread it over a large area east of the PMC boundary (McKinney et al. 2008:1).

The City of Deming acquired the property and had the tailings remediated for hazardous materials. The New Mexico Environment Department recently issued the City of Deming a release, creating the area as a brownfield site with no hazardous levels of materials (Wayne Pilz, personal communication 2010).

LA 167609 and LA 167611 date from about 1900 to 1920, LA 167608 dates from about 1900 to 1930, LA 167610 dates from about 1935 to 1945, LA 166764 has a 1938–1952 affiliation, LA 166765 has a ca. 1920 affiliation, LA 166769 has a 1915–1930 affiliation, and LA 166770 and LA 166771 have 1905–1915 affiliation. LA 166772 is associated with the milling facilities that span 1928–1985. All of these components are associated with residential, railroad, military, and mining activities in the area since the late nineteenth century.

5.0 Previous Research

An electronic review of site records maintained by the Archaeological Records Management Section (ARMS) of the Museum of New Mexico in Santa Fe on May 14 and August 9, 2010 identified 11 previously recorded sites within 0.5 km (0.3 mi) of the project APE (Table 5.1). None is within the project APE. The ARMS search also identified eight previous surveys with no recorded sites within 0.5 km (0.3 mi) of the project APE (Table 5.2).

Table 5.1 Previously recorded sites within 0.5 km (0.3 mi) of the project APE

LA No.	Affiliation	Reference	NMCRIS
12788	Casas Grandes, AD 600–1400 Anglo, AD 1846–1912	Bussey and Beckett 1975	11634
15392	Mogollon, AD 600–1000	Brethauer 1977 O'Brien and Rogge 1988a Bruder et al. 1989 O'Brien and Rogge 1988b Fowler 1990 Bruder 1993 Dames & Moore 1988	11596 21148 24372 31120 31454 38418 74518
18808	Mogollon, AD 1175–1400	Mimbres Foundation 1976	None
18809	Mogollon, AD 1175–1400 Historic, AD 1945–1993	Mimbres Foundation 1976	None
18810	Mogollon, AD 1175–1400	Mimbres Foundation 1976	None
18812	Mogollon, AD 1175–1400	Mimbres Foundation 1976	None
18815	Prehistoric, 9500 BC–AD 1993	None	None
134706	Archaic, 3000 BC–AD 200	Russell 2002a Kirkpatrick and Russell 2002 Kirkpatrick 2002	77031 77469 99300
135139	Archaic, 1800 BC–AD 700	Russell 2002b Russell 2002c HSR n.d.	78031 79355 79822
136070	Prehistoric, 9500 BC–AD 1880	Fuller 2002	79204
159879	Reserved	Harris et al. 2008	110686

Table 5.2 Previous surveys with no recorded sites within 0.5 km (0.3 m) of the project APE

NMCRIS	Reference
11402	Weyer 1978
18529	Stein et al. 1980
31532	Nelson 1990
72462	Martinez and Paskus 2000
77318	Martinez 2002
78984	Lukowski et al. 2002
79204	Fuller 2002
92966	Mendez 2002

An examination of the current listings of the National Register of Historic Places (NRHP) and State Register of Cultural Properties (SRCP) indicated no registered properties are within 1.6 km (1 mi) of the project APE. In addition, no national or state monuments are in the project vicinity. Because the project only involves municipal land, traditional cultural property (TCP) consultation with concerned tribal entities is not required.

6.0 Field Methods

The project APE was surveyed using parallel transects spaced no greater than 15 m (50 ft) apart. The built environment includes structures with construction dates prior to 1965 that are within 30 m (100 ft) of the project APE. The following criteria were used to identify an archaeological site: (1) 10 or more artifacts of two or more artifact classes or types within a 20 by 20 m (66 x 66 ft) area, or (2) the presence of a structure, feature, or midden. Resources not meeting these criteria are recorded as isolated occurrences (IOs)—single artifacts, small clusters of less than 10 artifacts, clusters of artifacts derived from a single behavioral event (e.g., a pot drop), and *descansos.* Cultural resources were documented using standard procedures and forms. A datum, consisting of a rebar and aluminum cap with "TRC Do Not Disturb" and stamped with a field site number was placed in each site. Location information was recorded with a Trimble GeoExplorer3 GPS unit using the Western U.S., 1927 North American Datum (NAD). After post-field differential correction, the GPS unit data has an error of less than 1 m (3.3 ft). Historic structures were recorded on the Historic Cultural Properties Inventory (HCPI) Base (Form 1) and Detail (Form 2) forms.

The project area, archaeological sites, and selected artifacts were photographed with a Pentax digital camera with 3.2 megapixels and a 2.8X zoom lens. The terrain is flat and vegetation primarily consists of a medium-density cover of slender blanketflower, mesquite, soaptree yucca, desert globemallow, prickly pear (sparse), desert marigold, wild flowers, tobosa grass, and other grasses. Ground surface visibility averaged 60 percent. Atmospheric conditions during the survey were warm and sunny to partly cloudy and breezy, with temperatures in the 90s to low 100s.

A three-person crew conducted the Class III (100 percent) pedestrian cultural resource survey of the western 262.9-ha (649.7-ac) parcel from May 19 to 26, 2010. Ardale Delena served as field supervisor and was assisted by crewmembers David Montaño and Lanny Noll. Surveying the western parcel required about 54.25 person hours and the recording of nine sites, one structure (water tank and tower), and 52 isolated occurrences required 25.75 person hours, for a total of about 80 person hours (Brown and Brown 2010a).

The same crew conducted the Class III pedestrian cultural resource survey of the Porter Draw diversion channel on May 26, 2010. The diversion channel APE of Porter Draw to the Mimbres River is about 1398 m (4587 ft) long and 61 m (200 ft) wide. In addition, a 515-m (1689-ft) buffer (3 ha [7.7 ac]) was surveyed beyond the south end for a total length of 1913 m (6276 ft), or 11.7 ha (28.8 ac) (Brown and Brown 2010b).

A four-person crew conducted the Class III pedestrian cultural resource survey of the eastern 170.9-ha (422.2-ac) parcel from August 10 to 14, 2010. Timothy McEnany served as field supervisor and was assisted by crewmembers Ardale Delena, David Montaño and Lanny Noll. Surveying the eastern parcel required about 85 person hours and the recording of four sites and 21 IOs required 25 person hours, for a total of about 110 person hours (McEnany et al. 2010).

7.0 Survey Results

Thirteen new sites and 73 IOs were recorded during the Class III cultural resource survey. In addition, one historic building with a construction date prior to 1965 was recorded within the project APE. The sites, IOs, and building are discussed separately below. All are in UTM Zone 13. No active acequias or *descansos* were found in or near the project APE.

7.1 LA 166764

Field Number: West Deming 1
Site Type: historic artifact scatter with features
Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1341 m (4400 ft)
Dimensions: 79 x 24 m (259 x 79 ft)
NRHP Recommendation: not eligible

Topographic Location: floodplain
Vegetation: grasses, sagebrush, Mormon tea
No. of Components: 1
Cultural Affiliation: Euro-American
Features: rock concentration (1), historic trash concentrations (2)
Artifacts: glass, metal cans, historic ceramics

7.1.1 Site Description

LA 166764, a small, low-density historic artifact scatter with a rock concentration and two trash concentrations, is on City of Deming land on the Mimbres River floodplain (Figures 7.1, 7.2, Appendix A). The river is 30 m (98 ft) south. The site is just south of an east-west fence line. A sparse scatter of artifacts is between the trash concentrations. The local plant community is desert scrubland and includes various grasses, sagebrush, snakeweed, Mormon tea, soaptree yucca, and prickly pear cactus. Ground visibility is 85 percent. The soil is classified as the Arizo and Vinton soils. The cultural material is surficial. An estimated 75 to 99 percent of the site remains intact.

7.1.2 Features

The site contains three identified features—a rock concentration (Feature 1) and two historic trash concentrations (Features 2 and 3). Feature 1, a 5 x 4 m (16 x 13 ft) rock concentration, consists of 65 quartzite and basalt cobbles (Figures 7.1 and 7.3). The average size of the rocks is 10 x 20 cm (4 x 8 in). Six rocks appear to be burned. No charcoal or ash, however, was observed on the surface and none was noted in a trowel probe. No artifacts are in the rock concentration or in the immediate vicinity. The function of the feature is unknown.

Feature 2, an 8 x 6 m (26 x 20 ft) historic trash concentration, is 14 m (46 ft) northwest of Feature 1 (Figures 7.1 and 7.4). The trash concentration essentially consists of glass fragments (see below). Feature 3, a 13 x 12 m (43 x 39 ft) historic trash concentration, is about 45 m (148 ft) north of Feature 2 (Figures 7.1 and 7.5). The concentration contains 100s of pieces of metal and glass (see below). Both trash concentrations contain diagnostic artifacts (see below) and represent separate trash disposal episodes.

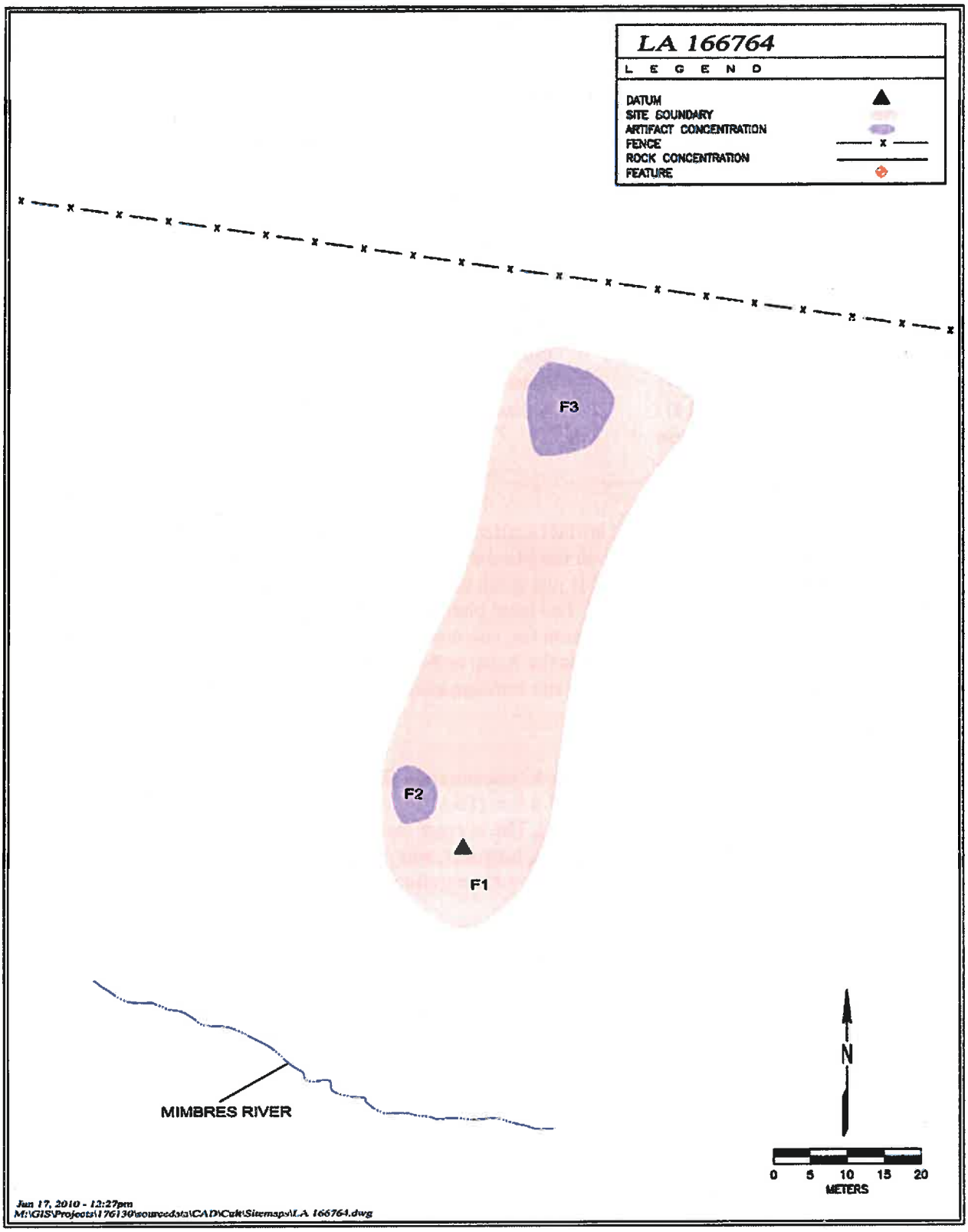

Figure 7.1 LA 166764 site map

Figure 7.2 LA 166764 overview looking south

Figure 7.3 LA 166764, Feature 1 looking north

Figure 7.4 LA 166764, Feature 2 looking north

Figure 7.5 LA 166764, Feature 3 looking east

7.1.3 Artifacts

Only a very sparse scatter of artifacts was noted between both trash concentrations and probably represents displacement of artifacts from both. The Feature 2 concentration primarily consists of glass (Table 7.1) and the Feature 3 concentration contains mostly metal cans and glass (Table 7.2).

Table 7.1 Feature 2 artifacts, LA 166764

Description	Count
Clear bottle bases, with the Owens-Illinois Glass Co. diamond IO maker's mark (1929–1954)	11
Brown (amber) bottle base, with the Owens-Illinois Glass Co. diamond IO maker's mark (1929–1954)	1
Clear bottle base, square, with "B93" within horizontal diamond, "ST LOUIS, USA" below	1

Description	Count
Clear bottle base fragment, oval, with "O-1/64-9"	1
Clear bottle base fragment, round, with "D-8/72 9/8"	1
Brown (amber) bottle base fragment, with Obear-Nester Glass Co. "N" in a square maker's mark (ca. 1915–1980), and with "9-8/72 (maker's mark) 9/9"	1
Brown (amber) bottle base, round, with "ROMA WINE CO. INC/O/124/LA/LODI/CALIF"	1
Clear bottle fragment with "DESTELLERIA SERRALES/PONCE, PUERTO RICO. DES PAT. 101032"	1
Clear bottle necks	9
Brown (amber) bottle necks	3
Clear glass fragments	165
Brown (amber) glass fragments	95
Green glass fragments	2
Amethyst glass fragments	2
Total	**294**

Table 7.2 Feature 3 artifacts, LA 166764

Description	Count
Hole-in-top cans, 2⅝-in diam., 3¾ inches high	3
Sanitary cans, 3⅜ in diam., 4⅝ inches high	32
Meat cans, 4 inches long, 2 inches wide, 3¼ inches high	9
Flour can, 5 in diam., 4 inches high	1
Coffee cans, 4½ in diam., 7⅞ inches high	3
Cooking oil can, 4 inches long, 1⅞ inches wide, 5½ inches high	1
Beer cans, 2⅝ in diam., 5 inches high	8
Motor oil cans, 4 in diam., 5½ inches high	2
Small metal drum, 10½ in diam., 19½ inches high	1
Misc. can, 2 inches long, 1 inch wide, 3¼ inches high	1
Paint can lid, 12 in diam.	1
Bottle bases, with the Owens-Illinois Glass Co. diamond IO maker's mark (1929–1954)	5
Bottle bases, round, with Hazel-Atlas Glass Co. maker's mark (1923–1964)	2
Bottle base, packer jar, with "BALL" – Ball Bros. Co., also with "PAT 105231"	1
Bottle bases, oval, with "PENNICK FORD/PAT 90963"	3
Bottle base, with "1/M/3"	1
Bottle base, with "DESIGN PAT/...0915"	1
Bottle base, with "W" in a "P" and with "38" above and "PAT ...07812-4" below	1
Bottle base, with "M"(?) over "M" in a circle and with "8" on left side and "2" on right	1
Bottle base, with "I" in inverted triangle, with "471-W" above	1
Bottle base, with "D-9/6-J-32/M-32-58118"	1
Clorox bleach bottle bases, with "CLOROX/20-2" in a large horizontal diamond	2
Jelly jar, with "BC" on base	1
Bottle necks, whiskey	4
Clear glass fragments	350
Brown (amber) glass fragments	250
Porcelain fragments	12
Earthenware fragments	10
Total	**708**

As indicated in Table 7.1, most of the Feature 2 trash concentration consists of clear (colorless) glass (n = 189, 64.3%). Sun-colored amethyst (SCA) glass—the result of the solarization of manganese used as a decolorizer in the production of glass—primarily dates from ca. 1890 to ca. 1920 (Lockhart 2006a:52, 54). By the mid-1910s, selenium and other decolorants were replacing manganese (Lockhart 2006a:49). In general, green glass dates from ca. 1865 to the present, amber glass dates from 1880 to the present, and colorless glass (not decolorized with manganese dioxide) dates after 1920 (Duran and McKeown 1980:1040; Fike 1987:13; IMACS 1992; Ward et al. 1977:240). Many of the colors extend over a large span of time. The paucity of SCA glass (n = 2) and the abundance of colorless glass, however, suggest Feature 2 primarily dates after 1930.

The presence of maker's marks on bottle bases also aids in dating the Feature 2 assemblage. Of the 17 bottle bases in the Feature 2 trash concentration, 12 (71%) exhibit an Owens-Illinois Glass Co. maker's mark—an I inside an oval or O (for Owens) superimposed on an elongated diamond (known as the diamond IO mark [Lockhart 2004:24] or Diamond O-I mark [Society for Historical Archaeology 2009])—dating from 1929 to 1954 (Lockhart 2004:25; Toulouse 1971:403). One of these specimens has a 1939 date code and was made in the Alton, Illinois plant (Lockhart 2004, 2006b; Toulouse 1971:395, 403). One bottle base has an Obear-Nestor Glass Co. maker's mark—an N inside a square—that dates from ca. 1915 to 1980 (Toulouse 1971:374; Whitten 2010). In addition, one bottle fragment has a design patent number that was issued on September 1, 1936 to Edwin W. Fuerst, assignor to Owens-Illinois Glass Co. (Design Patent No. 101032) (Appendix C). The patent term was for 14 years, expiring in 1950. Although limited, the data suggest the Feature 2 assemblage dates between ca. 1937 and 1952.

The Feature 3 trash concentration contains metal and glass (Table 7.2). Of the 708 artifacts, 62 (8.8%) are metal and the rest (n = 646, 91.2%) are glass. The metal artifact assemblage contains three hole-in-top cans—also known as vent hole or matchstick filler hole cans—which were introduced ca. 1900 and are closed with a drop of solder. Although used for other products, the most frequent user of this type of can, by far, has been the evaporated milk industry, which was still using this type of can as late as ca. 1985 (Rock 1984:101, 104, 1987:18, 21). The majority of the cans are the sanitary type, which were first brought on the market in 1904 and became common after 1920 (Rock 1987:14, 22). Many major coffee companies had changed to using key-wind open vacuum packed coffee cans by 1919 and by the 1930s, nearly all had done so (Rock 1987:32). Commercial production of beer cans began in 1935 (Rock 1987:29). The metal data suggest Feature 3 dates after 1935.

Only colorless and amber glass was recorded in the Feature 3 glass assemblage, suggesting the feature primarily dates after 1930. Five bottle bases exhibit the Owens-Illinois Glass Co.'s diamond IO mark dating from 1929 to 1954 and two bases have a Hazel-Atlas Glass Co. maker's mark—"H" over an "A"—dating from 1923 to 1964 (Toulouse 1971:239; Whitten 2010). Two of the Owens-Illinois specimens have a date code indicative of manufacture in either 1932 or 1942 and both bottles were made in the Fairmont, West Virginia plant, which began operation in 1930 (Lockhart 2004, 2006b; Toulouse 1971:395). The Clorox trademark—a horizontal diamond with "CLOROX" in the center—first appeared on bleach bottle bases in 1929 (Sandelin 1998). A packer jar has a design patent number that was issued on July 6, 1937 to Fred J. Petty, assignor to Ball Brothers Company (Design Patent No. 105231) (Appendix C). The patent term was for seven years, expiring in 1944. "BALL" is on the base. Three syrup bottle bases have a design patent number that was issued on October 31, 1933 to Joseph B. Vanderbilt (Design Patent No. 90963) (Appendix C). The patent term was for 14 years, expiring in 1947. The bottle design is oval and includes two handles, one on either side of the neck. "PENNICK [sic] FORD" is also on the bases. As recorded for the specimens, Penick has two Ns instead of one. This is either a recording error or a manufacturing error. Penick & Ford, Ltd. produced syrups and molasses for private labels, such as Vermont Maid Syrup, Brer Rabbit Syrup, and Brer Rabbit Molasses. In 1931, it was the nation's third largest producer of corn products (Turk 2005). The glass data suggest the Feature 3 trash concentration dates between ca. 1938 and 1946.

Although overlapping in time, the composition of the trash concentrations differs. Whereas Feature 2 essentially consists of glass, Feature 3 contains metal cans and glass indicative of household refuse. The meaning of this discrepancy is unclear, other than representing two distinct trash disposal episodes, possibly by different people. The features are 45 m (148 ft) apart. Based on the artifacts from both features, the site probably dates between ca. 1937 and 1952.

7.1.4 Preliminary Evaluation

LA 166764 is a small, low-density historic artifact scatter with a rock concentration and two trash concentrations. Both trash concentrations differ in content and represent two distinct trash disposal episodes. The artifacts suggest that Feature 2, which consists only of glass, dates between ca. 1937 and 1952 and Feature 3, which consists of glass and metal cans and represents household refuse, dates between ca. 1938 and 1946. The site is surficial and is not likely to provide additional information concerning the 1930s and 1940s occupation of the Deming area. The site, therefore, is recommended ineligible for listing on the NRHP.

7.1.5 Project Impact

Although development within the industrial park may include the entire APE, LA 166764 is recommended ineligible for inclusion on the NRHP.

7.2 LA 166765

Field Number: West Deming 2
Site Type: historic artifact scatter with feature
Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1346 m (4416 ft)
Dimensions: 65 x 52 m (213 x 171 ft)
NRHP Recommendation: not eligible

Topographic Location: flat in valley
Vegetation: grasses, soaptree yucca, mesquite
No. of Components: 1
Cultural Affiliation: Euro-American
Features: brick and rock concentration (1)
Artifacts: glass, metal, historic ceramics

7.2.1 Site Description

LA 166765, a historic artifact scatter with a brick and rock concentration, is in an open flat area on City of Deming land in the Mimbres River valley (Figures 7.6, 7.7, Appendix A). The river is to the south and the western fence line of the city property is about 35 m (115 ft) west. Brick fragments are scattered north-south through the site. The local plant community is desert scrubland and includes various grasses, mesquite, snakeweed, Mormon tea, soaptree yucca, desert marigold, and desert globemallow. Ground visibility is 80 percent. The soil is classified as Mohave sandy clay loam, 0 to 3 percent slopes (MU). The cultural material is surficial. An estimated 75 to 99 percent of the site remains intact.

7.2.2 Features

The site contains one identified feature, a brick and rock concentration near the southern edge of the site. The concentration consists of 17 plain 4 x 2 in brick fragments and basalt and quartzite cobbles (Figures 7.6 and 7.8). The bricks are scattered northward. The concentration is 6 m (20 ft) long and 3 m (10 ft) wide. No artifacts are associated with the concentration.

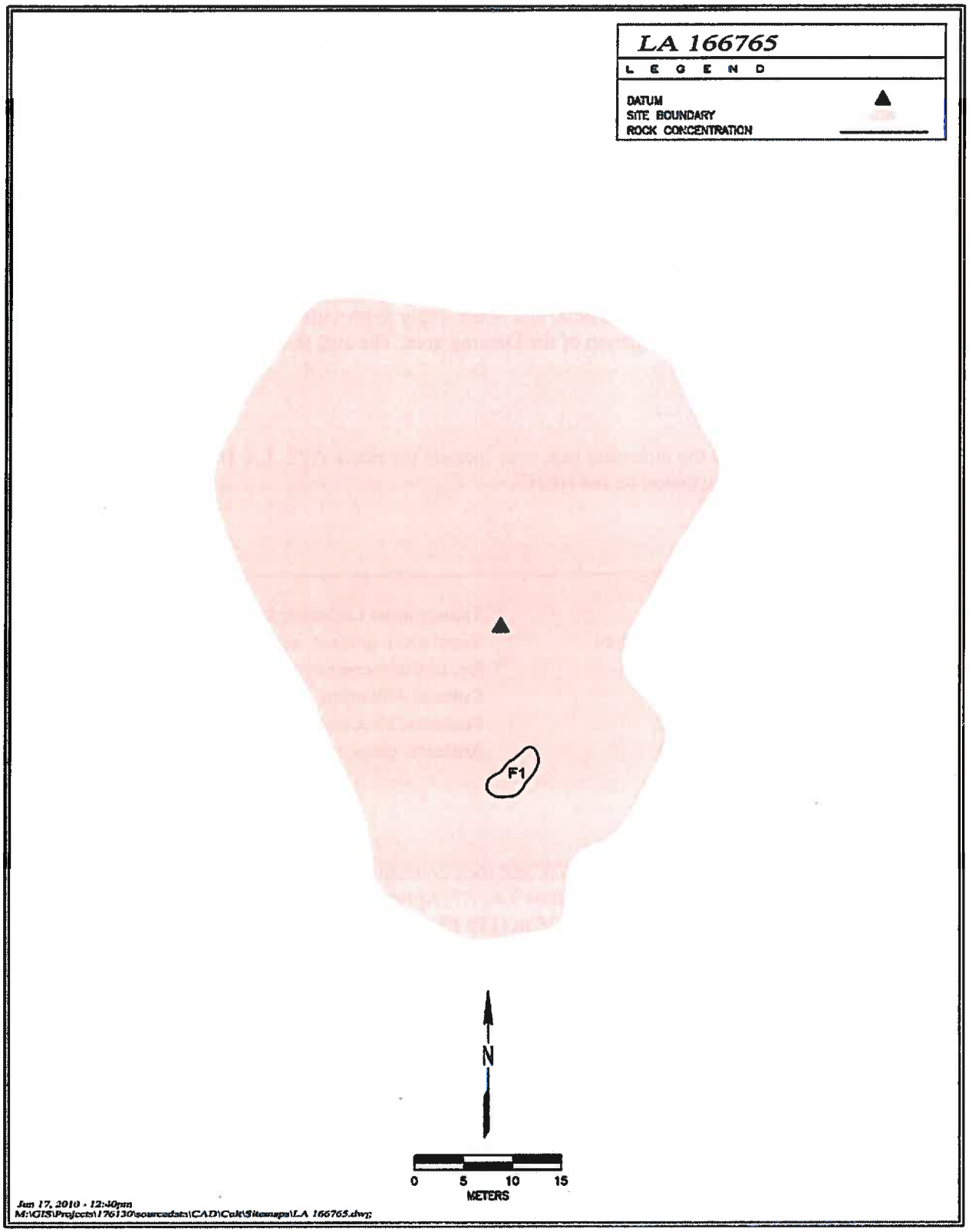

Figure 7.6 LA 166765 site map

Figure 7.7 LA 166765 overview looking east

Figure 7.8 LA 166765, Feature 1 looking north

7.2.3 Artifacts

The surface artifact assemblage consists of glass, historic ceramics, and metal, mostly cans and nails. All artifacts observed on the surface were recorded (Table 7.3). Of the 111 glass fragments, 49 (44.1%) are SCA glass, which primarily dates from ca. 1890 to ca. 1920. In general, green glass dates from ca. 1865 to the present and colorless glass (not decolorized with manganese dioxide) dates after 1920. The end date

for the production of SCA glass and the beginning date for colorless glass overlap, suggesting the site dates ca. 1920. The lower incidence of colorless glass (n=25, 33.8%) compared to SCA glass suggests the production of colorless glass was not yet dominant, dating the glass assemblage to ca. 1920. None of the glass or historic ceramic fragments had a maker's mark.

The metal assemblage contains an 1897 U.S. Liberty V nickel, indicating the site probably does not date prior to 1897 (Figures 7.9 and 7.10). As indicated previously, hole-in-top—vent hole or matchstick filler hole—cans were made for a long period of time—ca. 1900 to ca. 1985. By ca. 1920, evaporated milk was available almost exclusively in this type of can (Rock 1984:101). Sanitary cans were first produced in 1904 and became common after 1920. Pocket tobacco cans date from ca. 1905/1907 to the 1970s (Polk 2005; Rock 1987:75). The key-opened coffee can dates to ca. 1910, and as stated previously, many of the major coffee companies had changed to this style of can by 1919 (Rock 1987:29, 70). Considered as a whole, the can assemblage suggests the site dates to ca. 1920.

Figure 7.9 U.S. Liberty V nickel, obverse

Figure 7.10 U.S. Liberty V nickel, reverse

The only nails in the metal assemblage are wire. Although the first wire nail made in the United States was in 1873, it was not until the 1880s that large-scale production of wire nails began. The majority of nails in 1886, however, were still machine cut but by the 1890s, wire nail production far exceeded that of cut nails (IMACS 1992). As a result, the relative percentages of wire and cut nails can be used for

determining a building's general period of construction. Buildings dating before 1886 will only have cut nails. If the percentages of both cut and wire nails are about 50 percent, the building dates ca. 1890 and 75 percent wire nails suggests a date of ca. 1895. Buildings with wire nail percentages greater than 75 percent date after ca. 1900 (cf. IMACS 1992). The presence of only wire nails indicates the site dates after 1900, and probably after 1910. In general, the LA 166765 artifact assemblage represents household/ residential trash that dates to ca. 1920.

Table 7.1 Surface artifacts, LA 166765

Description	Count
Sun-colored amethyst (SCA) glass fragments	49
Clear (colorless) glass fragments	25
Green glass fragments	35
Green bottle base fragments	2
White porcelain fragments	21
1897 U.S. Liberty V nickel (Figures 7.9 and 7.10)	1
Hole-in-top cans, 2 in diam., 3 inches high	15
Sanitary cans	11
Coffee can, 6 in diam., 5 inches high	1
Tobacco can	3
Kerosene can, 12 inches sq., 15 inches high	1
Metal bottle cap, whiskey	1
Table knife	1
Cast iron stove inserts	4
Metal bed frame, end piece	1
Curtain rod, 6 in fragment	1
Cabinet latch	1
Wire nails, 10d	22
Metal washers, 1⅛ in diam., with ½ in diam. hole	2
Steel bar, 14 inches long, 2½ inches wide, ½ inch thick	1
Tin sheet metal, 24 x 8 inches	1
Metal cable, 14 inches long	1
Chicken wire fencing, 12 ft long, with 4 x 2 inch opening	1
Total	**201**

7.2.4 Preliminary Evaluation

LA 166765 is a historic artifact scatter with a brick and rock concentration. No artifacts are associated with the concentration. The historic artifacts represent household/residential trash that dates to ca. 1920. The site is surficial and is not likely to provide additional information concerning the early twentieth-century occupation of the Deming area. The site, therefore, is recommended ineligible for listing on the NRHP. However, the 1897 U.S. Liberty V nickel may be worthy of collection by the City of Deming.

7.2.5 Project Impact

Although development of the industrial park may include the entire APE, LA 166765 is recommended ineligible for inclusion on the NRHP.

7.3 LA 166766

Field Number: West Deming 3
Site Type: chipped stone artifact scatter with feature
Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1345 m (4413 ft)
Dimensions: 62 x 14 m (203 x 46 ft)
NRHP Recommendation: eligible, Criterion D

Topographic Location: flat in valley
Vegetation: grasses, desert marigold, soaptree yucca
No. of Components: 1
Cultural Affiliation: Unknown prehistoric
Features: hearth (1)
Artifacts: cores, chipping debris

7.3.1 Site Description

LA 166766, a small, low-density prehistoric chipped stone artifact scatter with a thermal feature, is in an open flat area on City of Deming land in the Mimbres River valley (Figures 7.11, 7.12, Appendix A). The river is to the south. The local plant community is desert scrubland and includes various grasses, snakeweed, Mormon tea, soaptree yucca, and desert marigold. Ground visibility is 80 percent. The soil is classified as Mohave sandy clay loam, 0 to 3 percent slopes (MU). The cultural material is surficial. An estimated 75 to 99 percent of the site remains intact.

7.3.2 Features

Only one feature, a 1.4 x 1.1 m (4.6 x 3.6 ft) hearth, was identified (Figures 7.11 and 7.13). The hearth consists of 21 quartzite and basalt cobbles, most of which are burned. The average cobble diameter is 10 to 15 cm (4–6 in). No charcoal or ash was observed on the surface and none was noted in a trowel probe. The hearth, however, appears to be intact. The hearth probably represents a short-term campsite.

7.3.3 Artifacts

All artifacts observed on the surface (n = 37) were recorded in the field (Table 7.4). Only chipped stone is present. The assemblage primarily consists of chipping debris (n = 30, 81.1%) but also includes two cores and five utilized flakes. No diagnostic artifacts were found. All of the chipping debris is flakes, of which 16 (53.3%) are cortical. Only seven flakes (23.3%) are less than 2 cm in greatest dimension and five (16.7%) are larger than 4 cm. Most (n = 18, 60%) are between 2 and 4 cm. The high frequency of flakes at least 2 cm in greatest dimension (n = 23, 76.7%) and the high incidence of cortical flakes is indicative of stone tool production, as opposed to tool maintenance. This is also indicated by the presence of two basalt cores. Most of the chipped stone assemblage consists of basalt (n = 31, 83.8%) but also includes chert (n = 5) and chalcedony (n = 1). All of the identified raw materials are available locally.

7.3.4 Preliminary Evaluation

LA 166766 is a small, low-density prehistoric chipped stone artifact scatter with a hearth. The site represents a short-term campsite, which included stone tool production. Although no diagnostic artifacts were found and no charcoal or ash was noted in a trowel probe of the hearth, the hearth may contain datable material and food remains. The site, therefore, may provide important information concerning prehistoric subsistence, stone tool technology, population movements, and campsite strategies in the Deming area. LA 166766, therefore, is recommended eligible for inclusion on the NRHP under Criterion D, information potential.

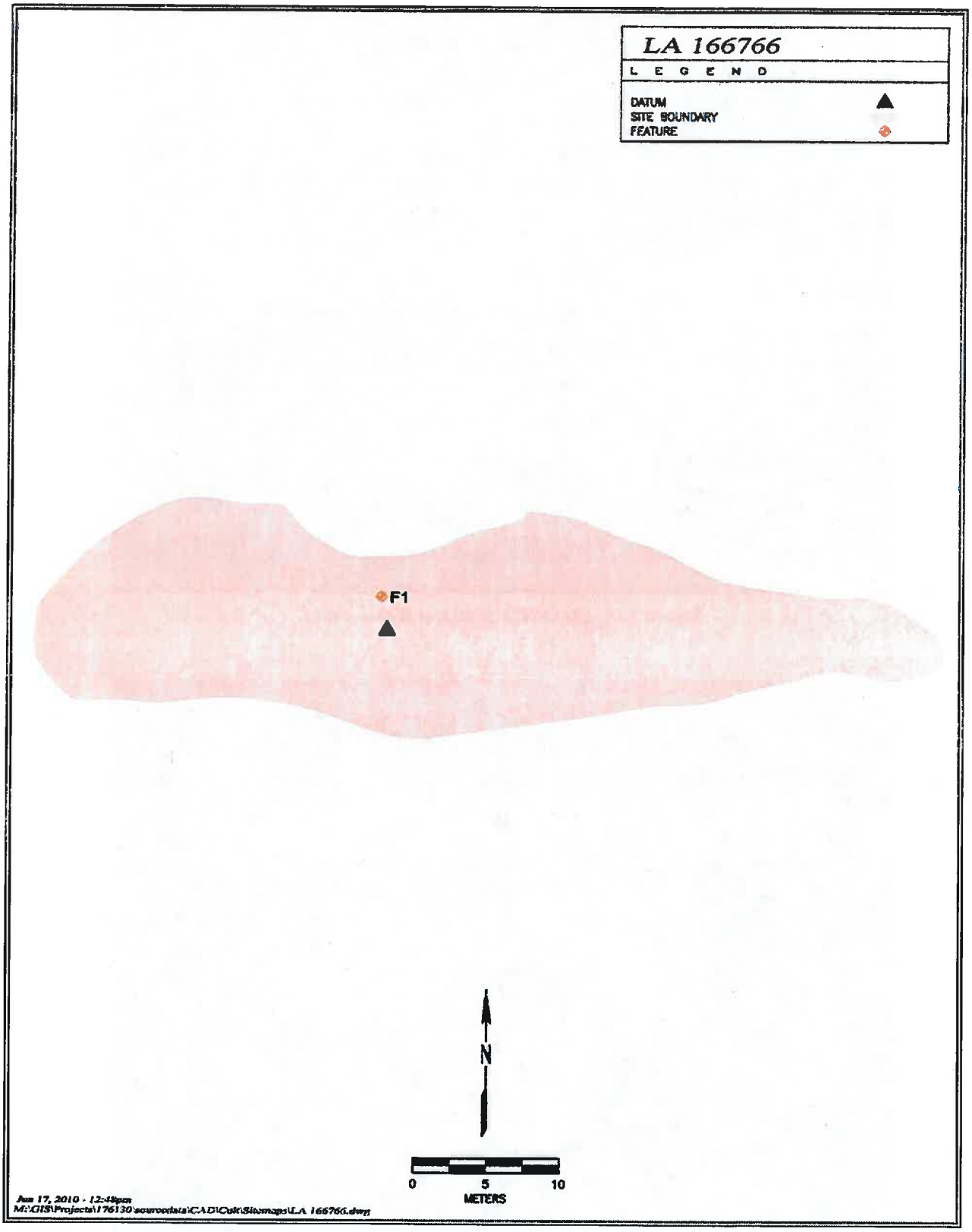

Figure 7.11 LA 166766 site map

Figure 7.12 LA 166766 overview looking east

Figure 7.13 LA 166766, Feature 1 looking west

Table 7.2 Surface artifact assemblage, LA 166766

Type	Raw Materials			Total
	Basalt	Chert	Chalcedony	
Cortical flake:				
<2 cm	4			4
2– 4 cm	9	1	1	11
>4 cm	1			1
Non-cortical Flake:				
<2 cm	3			3
2– 4 cm	4	3		7
>4 cm	4			4
Core	2			2
Utilized flake	4	1		5
Total	**31**	**5**	**1**	**37**

7.3.5 Project Impact

Because development of the industrial park may include the entire APE, development will have an adverse effect on LA 166766, which is recommended eligible for inclusion on the NRHP. Pending concurrence, excavation of the hearth and surrounding area is recommended for LA 166766.

7.4 LA 166767

Field Number: West Deming 4
Site Type: chipped stone artifact scatter with feature
Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1344 m (4409 ft)
Dimensions: 115 x 68 (377 x 223 ft)
NRHP Recommendation: eligible, Criterion D

Topographic Location: flat in valley
Vegetation: tobosa and other grasses, soaptree yucca, desert marigold
No. of Components: 1
Cultural Affiliation: Archaic
Features: burned rock concentration (1)
Artifacts: projectile point base, bifaces, scraper, chipping debris

7.4.1 Site Description

LA 166767, a low-density prehistoric chipped stone artifact scatter with a burned rock concentration, is in an open flat area on City of Deming land in the Mimbres River valley (Figures 7.14, 7.15, Appendix A). The river is to the south. The local plant community is desert scrubland and includes tobosa and other grasses, soaptree yucca, and desert marigold. Most of the ground cover is tobosa grass. Ground visibility is 80 percent. The soil is classified as Mohave sandy clay loam, 0 to 3 percent slopes (MU). The cultural material is surficial. An estimated 75 to 99 percent of the site remains intact.

7.4.2 Features

Only one feature, a burned rock concentration, was identified. The main concentration is 1.5 m (5 ft) in diameter but cobbles are scattered to the north and east (Figures 7.14 and 7.16). The entire feature, therefore, covers a 5 x 4 m area (16 x 13 ft). The concentration consists of more than 100 quartzite and basalt cobbles that have an average diameter of 5 cm (2 in). Most of the cobbles are burned. No charcoal or ash was observed on the surface and none was noted in a trowel probe. The concentration's core, however, appears to be intact. The feature probably represents a short-term campsite.

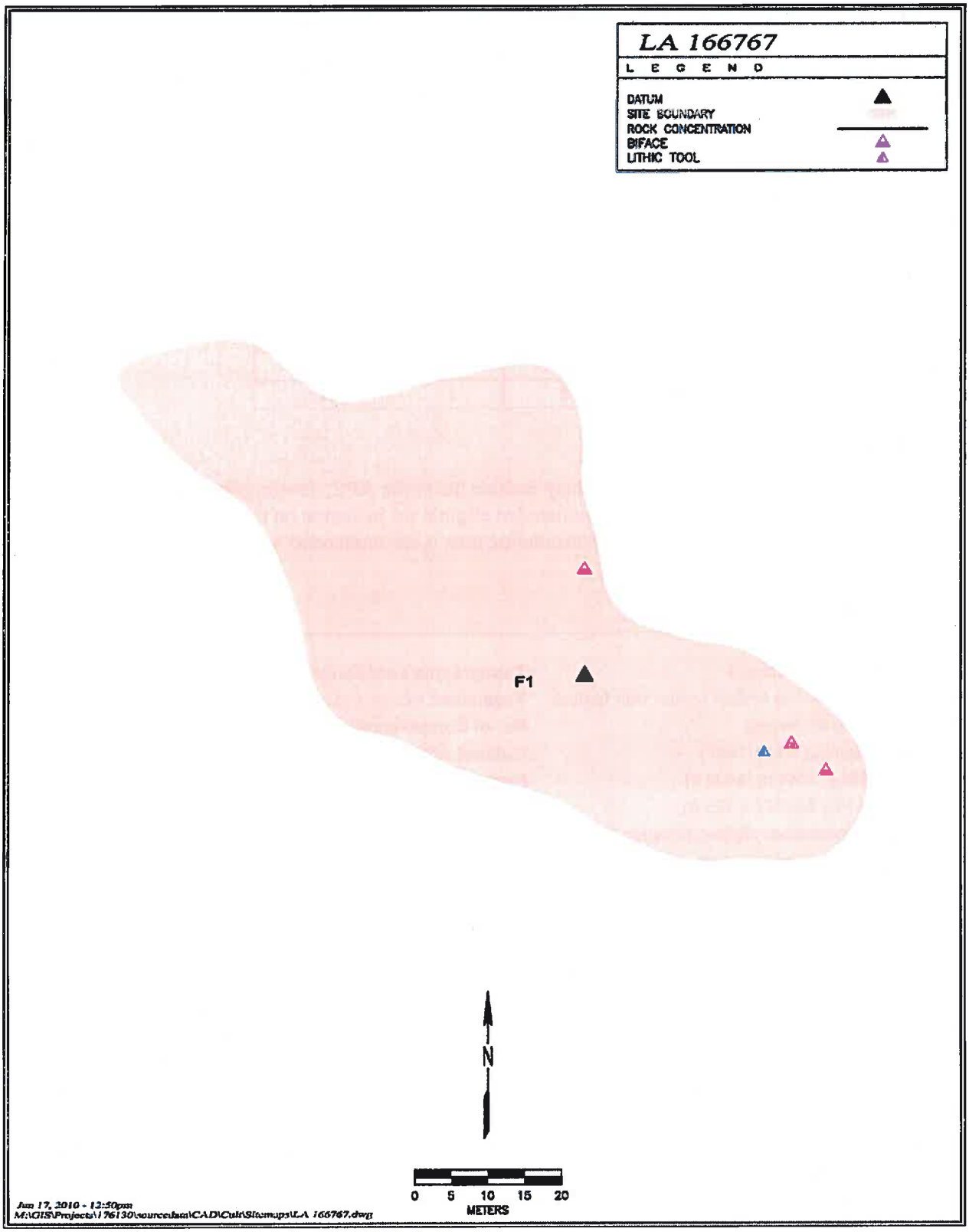

Figure 7.14 LA 166767 site map

Figure 7.15 LA 166767 overview looking north

Figure 7.16 LA 166767, Feature 1 looking west

7.4.3 Artifacts

All artifacts observed on the surface (n = 62) were recorded in the field (Table 7.5). Only chipped stone is present. The assemblage primarily consists of chipping debris (n = 52, 83.9%) but also includes two projectile points, four bifaces, a scraper, two retouched flakes, and a utilized flake. All of the chipping debris is flakes, of which 34 (65.4%) are cortical. Only 11 flakes (21.2%) are less than 2 cm in greatest dimension and 11 (21.2%) are larger than 4 cm. Most (n = 30, 57.7%) are between 2 and 4 cm. The high

frequency of flakes at least 2 cm in greatest dimension (n = 41, 78.9%) and the high incidence of cortical flakes is indicative of stone tool production, as opposed to tool maintenance. Most of the chipped stone assemblage consists of basalt (n = 23, 37.1%) and chalcedony (n = 20, 32.2%) but rhyolite (n = 10, 16.1%) and chert (n = 9, 14.5%) account for almost a third of the assemblage. The identified raw materials are available locally.

Table 7.3 Surface artifact assemblage, LA 166767

Type	Raw Materials				Total
	Basalt	Chalcedony	Rhyolite	Chert	
Cortical flake:					
<2 cm	1	3		1	5
2–4 cm	6	8	5	1	20
>4 cm	4	1	3	1	9
Non-cortical Flake:					
<2 cm	2	2		2	6
2–4 cm	5	3		2	10
>4 cm	1			1	2
Projectile point		1	1		2
Biface	1	1	1	1	4
Scraper	1				1
Retouched flake	1	1			2
Utilized flake	1				1
Total	**23**	**20**	**10**	**9**	**62**

The projectile points consist of a nearly complete dart point and a point fragment. The nearly complete specimen, a Maljamar-like point (Justice 2002:182–186; Leslie 1978:140–142) found on the western edge of the site, is made of rhyolite and has slightly convex edges, corner notches, barbs, a rounded base, and a flattened cross section (Figure 7.17). The extreme tip is missing. The specimen is 4.1 cm long, 2.8 cm wide, and 35 mm thick. The flaking is non-patterned. Maljamar points date from ca. 1000 B.C. to A.D. 100 (Justice 2002:185). The second projectile point specimen is the base of an indeterminate Archaic dart or spear point (Figure 7.18). The specimen is made of chalcedony and has straight sides, a slightly concave base, and a flattened cross section. The fragment is 3 cm long, 2.5 cm wide, and 3 mm thick. The lateral edges on one surface exhibit parallel to slightly diagonal parallel flaking that terminates in a hinge fracture, leaving an elongated raised area along the middle of the surface. The projectile points represent hunting activities.

7.4.4 Preliminary Evaluation

LA 166767 is a low-density Archaic chipped stone artifact scatter with one feature, a burned rock concentration. The site represents a short-term hunting camp, which included stone tool production. The artifact assemblage includes a nearly complete Maljamar-like dart point—dating from ca. 1000 B.C. to A.D. 100—and an indeterminate Archaic spear or dart point base. Although no charcoal or ash was noted in a trowel probe of the feature, the burned rock concentration may contain datable material and food remains. The site, therefore, may provide important information concerning Archaic subsistence, stone tool technology, population movements, and campsite strategies in the Deming area. LA 166767, therefore, is recommended eligible for inclusion on the NRHP under Criterion D, information potential.

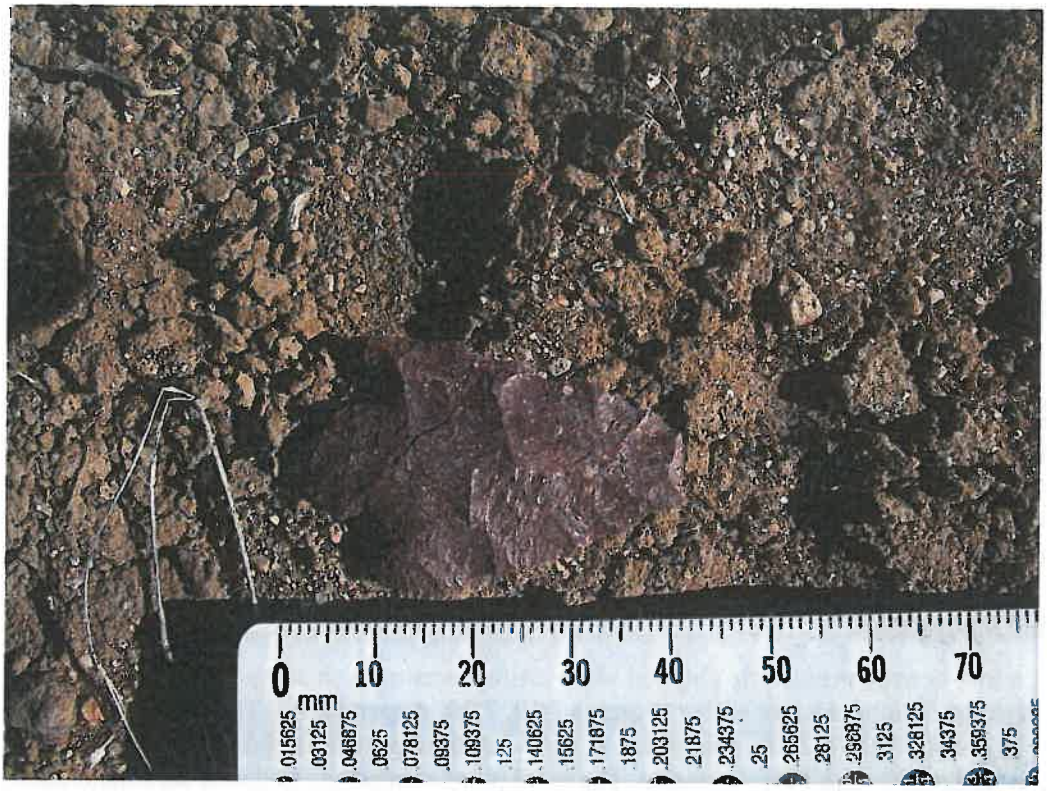

Figure 7.17 Maljamar-like projectile point

Figure 7.18 Dart/spear point base

7.4.5 Project Impact

Because development of the industrial park may include the entire APE, development will have an adverse effect on LA 166767, which is recommended eligible for inclusion on the NRHP. Pending concurrence, excavation of the burned rock concentration and surrounding area is recommended for LA 166767.

7.5 LA 166768

Field Number: West Deming 5
Site Type: chipped stone artifact scatter
Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1344 m (4409 ft)
Dimensions: 82 x 78 m (269 x 256 ft)
NRHP Recommendations: not eligible
Topographic Location: flat in valley
Vegetation: tobosa and other grasses, soaptree yucca, desert marigold, desert globemallow
No. of Components: 1
Cultural Affiliation: Unknown prehistoric
Features: none
Artifacts: bifaces, scrapers, cores, chipping debris

7.5.1 Site Description

LA 166768, a low-density prehistoric chipped stone artifact scatter, is in an open flat area on City of Deming land in the Mimbres River valley (Figures 7.19, 7.20, Appendix A). The river is to the south and Porter Draw is about 100 m (328 ft) southwest. A north-south two-track is about 20 m (66 ft) east. A large tailings pile is about 250 m (820 ft) northeast. The local plant community is desert scrubland and includes tobosa and other grasses, soaptree yucca, desert marigold, and desert globemallow. Most of the ground cover is tobosa grass. Ground visibility is 80 percent and gravel is exposed in some areas. The soil is classified as Mohave sandy clay loam, 0 to 3 percent slopes (MU). The cultural material is surficial. An estimated 75 to 99 percent of the site remains intact.

7.5.2 Features

No features were found.

7.5.3 Artifacts

All artifacts observed on the surface (n = 71) were recorded in the field (Table 7.6). Except for a colorless alcohol bottle base, which is considered intrusive, only chipped stone (n = 70) is present. The assemblage primarily consists of chipping debris (n = 59, 84.3%) but also includes five cores, two bifaces, three scrapers, and a utilized flake. No diagnostic artifacts were found. All of the chipping debris is flakes, of which 25 (42.2%) are cortical. Only 10 flakes (16.9%) are less than 2 cm in greatest dimension and 16 (27.1%) are larger than 4 cm. Most (n = 33, 55.9%) are between 2 and 4 cm. The high frequency of flakes at least 2 cm in greatest dimension (n = 49, 83%) and the high incidence of cortical flakes is indicative of stone tool production, as opposed to tool maintenance. This is also indicated by the presence of five cores. Basalt (n = 35, 50%) is the most common raw material but chalcedony (n = 14, 20%), chert (n = 12, 17.1%), and rhyolite (n = 9, 12.9%) are also present. The identified raw materials are available locally.

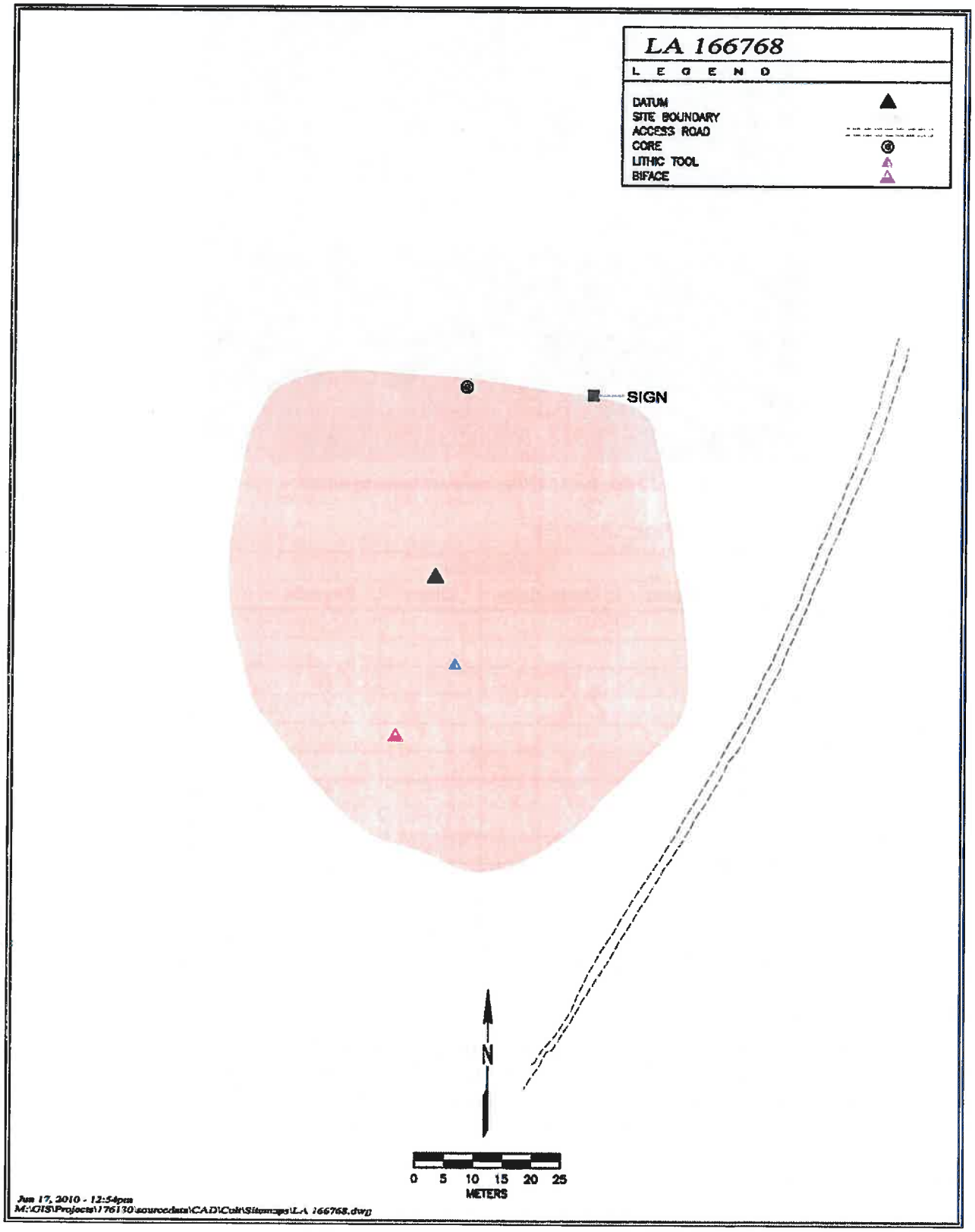

Figure 7.19 LA 166768 site map

Figure 7.20 LA 166768 overview looking south

Table 7.4 Surface artifact assemblage, LA 166768

Type	Raw Materials				Total
	Basalt	Chalcedony	Chert	Rhyolite	
Cortical flake:					
<2 cm	2		1	1	4
2– 4 cm	8	3	3	2	16
>4 cm		2	2	1	5
Non-cortical Flake:					
<2 cm	5	1			6
2– 4 cm	7	7	2	1	17
>4 cm	7	1	1	2	11
Core	4		1		5
Biface			1	1	2
Scraper	2			1	3
Utilized flake			1		1
Total	**35**	**14**	**12**	**9**	**70**

7.5.4 Preliminary Evaluation

LA 166768 is a low-density prehistoric chipped stone artifact scatter. No features or diagnostic artifacts were found. All observed artifacts were recorded. The site is surficial and is not likely to provide additional information concerning the prehistoric occupation of the Deming area. The site, therefore, is recommended ineligible for listing on the NRHP.

7.5.5 Project Impact

Although development of the industrial park may include the entire APE, LA 166768 is recommended ineligible for inclusion on the NRHP.

7.6 LA 166769

Field Number: West Deming 6
Site Type: prehistoric and historic artifact scatter with features

Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1343 m (4407 ft)

Dimensions: 99 x 96 m (325 x 315 ft)

NRHP Recommendation: eligible, Criterion D

Topographic Location: floodplain
Vegetation: various grasses, mesquite, soaptree yucca, desert marigold, desert globemallow

No. of Components: 2
Cultural Affiliation: Archaic, Euro-American
Features: burned rock concentration (1), historic artifact concentration (1)
Artifacts: projectile point, bifaces, scrapers, cores, chipping debris

7.6.1 Site Description

LA 166769, a large prehistoric chipped stone and historic artifact scatter with features, is in an open area on City of Deming land on the Mimbres River floodplain north of the river (Figures 7.21–7.23, Appendix A). Porter Draw is about 200 m (656 ft) south of the site. A large zinc tailings pile is about 100 m (328 ft) north. Most of the prehistoric artifacts are in the northwest portion of the site. The historic artifacts are primarily in the eastern three-quarters of the site. Both components, however, do overlap. The local plant community is desert scrubland and includes various grasses, mesquite, soaptree yucca, desert marigold, and desert globemallow. Ground visibility is 80 percent. The soil is classified as Berino and Mohave soils (BA). The cultural material is surficial. The northern portion of the site has been mechanically disturbed by the former zinc mill activities. Pine trees line the edge of the disturbed area along the north edge of the site. An estimated 50 to 75 percent of the site remains intact.

7.6.2 Features

Two features—a burned rock concentration (Feature 1) and a historic artifact concentration (Feature 2)—were identified. The burned rock concentration is 3 m (10 ft) in diameter and is associated with the prehistoric component (Figures 7.21 and 7.24). The concentration consists of 20 basalt and quartzite cobbles, most of which are burned. The average cobble diameter is 5 cm (2 in). No charcoal or ash was observed on the surface and none was noted in a trowel probe. The hearth, however, appears to be mostly intact. The hearth probably represents a short-term campsite.

The historic artifact concentration (Feature 2) is 11 x 9 m (36 x 30 ft) and consists of hundreds of glass—SCA, green, colorless—and historic ceramic fragments, as well as other artifacts (Figure 7.25). Although the composition of the artifact concentration suggests a single dumping episode is represented, the size of the concentration indicates disturbance.

7.6.3 Artifacts

All prehistoric artifacts observed on the surface (n = 87) were recorded in the field (Table 7.7). The artifact assemblage primarily consists of chipping debris (n = 75, 86.2%) but also includes a projectile point, four cores, two bifaces, two scrapers, and three utilized flakes. Except for one piece of shatter, all of the chipping debris is flakes (n = 74), of which 27 (36.5%) are cortical. Only eight flakes (10.8%) are less than 2 cm in greatest dimension and 20 (27%) are larger than 4 cm. Most (n = 46, 62.2%) are between 2 and 4 cm. The high frequency of flakes at least 2 cm in greatest dimension (n = 66, 89.2%) and the relatively high incidence of cortical flakes is indicative of stone tool production, as opposed to tool maintenance. This is also indicated by the presence of four cores. Basalt (n = 45, 51.7%) and chert (n = 26, 29.9%) are the most common raw materials but chalcedony (n = 9, 10.3%) and rhyolite (n = 7, 8%) are also present. The identified raw materials are available locally.

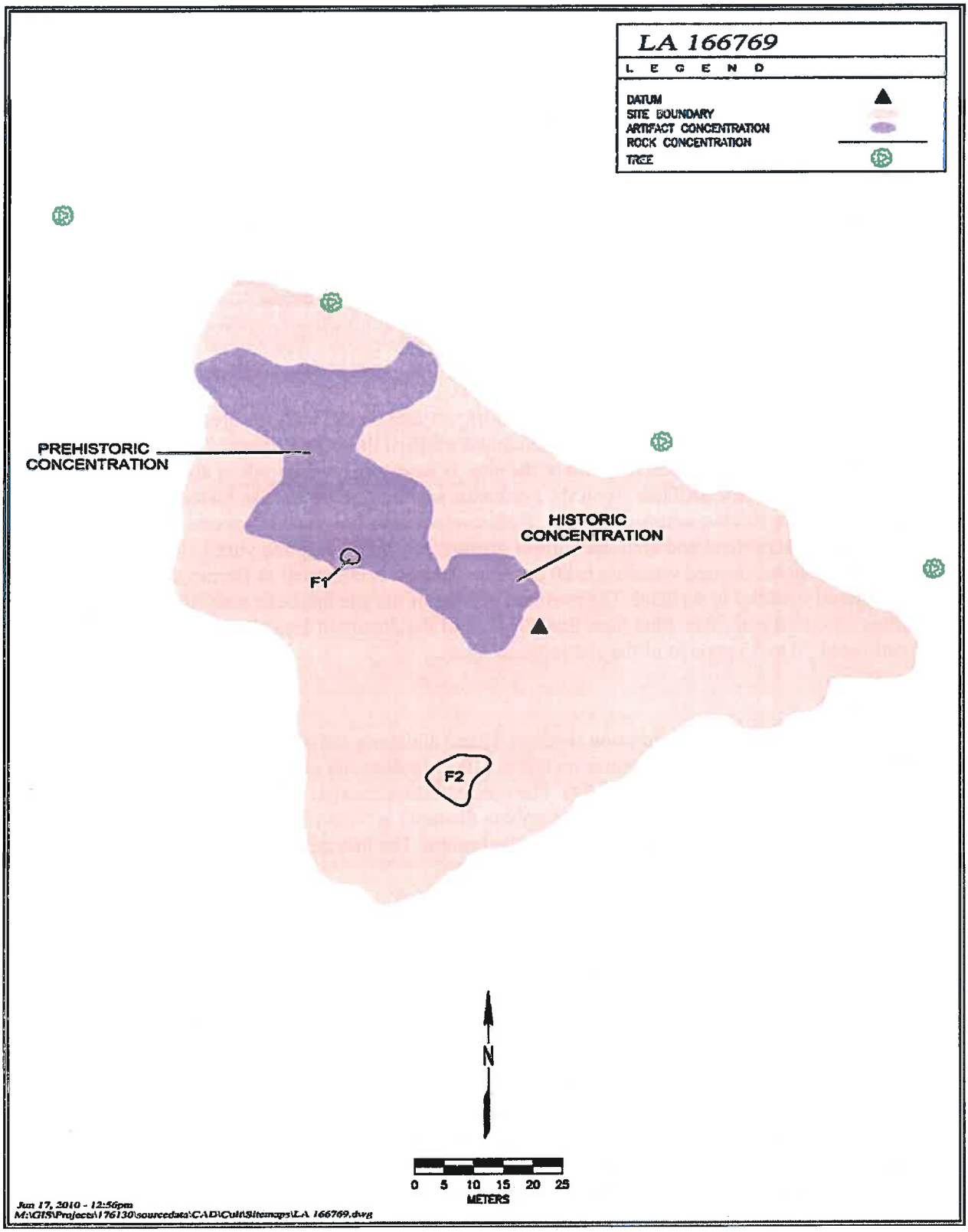

Figure 7.21 LA 166769 site map

Figure 7.22 LA 166769 overview looking north

Figure 7.23 LA 166769 overview looking southwest

Figure 7.24 LA 166769, Feature 1 looking north

Figure 7.25 LA 166769, Feature 2 looking north

The projectile point consists of a complete Jay-like basalt dart point (Figure 7.26). The specimen has a contracting stem, slight shoulders, straight base, and convex blade edges and is 3.5 cm long and 2 cm wide. The blade has been heavily resharpened, suggesting extended use or reuse. Therefore, although Jay points are associated with the Early Archaic, its presence at the site may be due to later recycling. The projectile point represents hunting activities.

Figure 7.26 LA 166769, Jay-like basalt dart point

Table 7.5 Prehistoric surface artifact assemblage, LA 166769

Type	Raw Materials				Total
	Basalt	Chert	Chalcedony	Rhyolite	
Cortical flake:					
<2 cm		1			1
2– 4 cm	6	7	2		15
>4 cm	6	2	1	2	11
Non-cortical Flake:					
<2 cm	3	3	1		7
2– 4 cm	17	9	3	2	31
>4 cm	8			1	9
Shatter		1			1
Core	3			1	4
Projectile Point	1				1
Biface		1		1	2
Scraper		1	1		2
Utilized flake	1	1	1		3
Total	**45**	**26**	**9**	**7**	**87**

Because the site contains thousands of historic artifacts, only an arbitrary representative sample (n = 1102) was recorded in the field (Table 7.8). The artifacts represent household refuse. The ceramic cup represented by a base was made by J & G Meakin of Hanley, Staffordshire, England. J & G Meakin is part of the Wedgwood Group (Kovel and Kovel 1986:266). Except for glass color, the artifacts are generally undiagnostic. SCA glass primarily dates from ca. 1890 to ca. 1920, green glass dates from ca. 1865 to the present, and colorless glass (not decolorized with manganese dioxide) dates after 1920. The abundance of SCA glass, which is a better age indicator than green glass, and the lower frequency of colorless glass, which overlaps with the end date for SCA glass, tentatively suggests the historic

component dates between ca. 1915 and 1930. The artifacts, however, may represent several discrete trash disposal episodes over an extended period of time.

Table 7.6 Arbitrary representative sample of historic surface artifacts, LA 166769

Description	Count
Sun-colored amethyst (SCA) glass fragments	162
Sun-colored amethyst (SCA) bottle base	1
Green glass fragments	345
Green bottle base, with "S. W. C. C."	1
Green bottle base	1
Clear (colorless) glass fragments	97
Clear (colorless) bottle base, 5 in diameter	1
Clear (colorless) bottle base, 2½ in diameter	1
Clear (colorless) bottle base, with "FULL PINT"	1
Medicine bottle neck, ½ in diam., 2 inches long	1
White porcelain fragments	431
Blue earthenware fragments	13
Cup base, manufactured by J & G Meakin of Hanley, England	1
Chamber pot fragment, white earthenware	1
Sewer pipe fragments	10
Porcelain insulator fragment	1
Railroad spikes	4
Wire nails, 8 inch	3
Metal door hinges	2
Metal roofing fragment	1
Rusty gas cap, 2¼ in diameter	1
AC spark plug	1
Brick, complete	1
Brick halves	6
Concrete slab fragments	14
Wooden barrel stave	1
Total	**1102**

7.6.4 Preliminary Evaluation

LA 166769 is a large prehistoric chipped stone and historic artifact scatter with features. A burned rock concentration (Feature 1) is associated with the prehistoric component, which represents a short-term hunting camp and included stone tool production. The artifact assemblage includes a complete Jay-like dart point, which dates to the Early Archaic. Although no charcoal or ash was noted in a trowel probe of the feature, the burned rock concentration may contain datable material and food remains. The Archaic component, therefore, may provide important information concerning Archaic subsistence, stone tool technology, population movements, and campsite strategies in the Deming area. Consequently, LA 166769 is recommended eligible for inclusion on the NRHP under Criterion D, information potential.

The historic component consists of thousands of artifacts—primarily glass and historic ceramics—and includes an artifact concentration (Feature 2). Although the limited glass data tentatively suggest the historic component dates between ca. 1915 and 1930, the artifacts may represent several discrete household trash disposal episodes over an extended period of time. The historic cultural material is surficial and is not likely to provide additional information concerning the early twentieth-century

occupation of the Deming area. The historic component, therefore, is recommended non-contributing to the NRHP eligibility of LA 166769.

7.6.5 Project Impact

Because development of the industrial park may include the entire APE, development will have an adverse effect on LA 166769, the prehistoric component of which is recommended eligible for inclusion on the NRHP. Pending concurrence, excavation of the burned rock concentration and surrounding area is recommended for LA 166769. The historic component, however, is recommended non-contributing to the NRHP eligibility of LA 166769.

7.7 LA 166770

Field Number: West Deming 7
Site Type: historic artifact scatter
Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1348 m (4423 ft)
Dimensions: 9 x 8 m (30 x 26 ft)
NRHP Recommendation: not eligible

Topographic Location: flat in valley
Vegetation: tobosa grass, soaptree yucca, Mormon tea, slender blanketflower
No. of Components: 1
Cultural Affiliation: Euro-American
Features: none
Artifacts: glass, cans

7.7.1 Site Description

LA 166770, a small historic artifact scatter, is in an open flat area on City of Deming land in the Mimbres River valley (Figures 7.27, 7.28, Appendix A). The site is in the west-central portion of the project area, near the west edge. The river is to the south. The local plant community is desert scrubland and includes tobosa and other grasses, Mormon tea, soaptree yucca, and slender blanketflower. Ground visibility is 80 percent. The soil is classified as Mohave sandy clay loam, 0 to 3 percent slopes (MU). Pea-size to 2 cm diameter gravel is present. The cultural material is surficial. An estimated 75 to 99 percent of the site remains intact.

7.7.2 Features

No features are present.

7.7.3 Artifacts

All artifacts observed on the surface (n = 91) were recorded in the field (Table 7.9). The artifact assemblage primarily consists of glass (n = 82, 90.1%) but also includes metal. Except for eight specimens, all of the glass fragments are SCA, which primarily dates from ca. 1890 to ca. 1920. Five fragments are green glass, which dates from ca. 1865 to the present. The green bottle base exhibits the American Bottle Co.'s AB-connected maker's mark dating from 1905 to 1909 (Lockhart et al. 2007:50–51, 55). Toulouse mistakenly identified the AB-connected mark as that of the Adolphus Busch Glass Manufacturing Co. (Toulouse 1971:26). The bottle was made by the Belleville, Illinois plant (Lockhart et al. 2007:55). The "AZ" on the base suggests it was made for a local Arizona bottler. The colorless bottle glass fragments may be intrusive. The glass data, especially the AB-connected maker's mark, suggest the site dates between 1905 and 1911, allowing a two year lag time between the end date for the maker's mark and the possible deposition of the specimen.

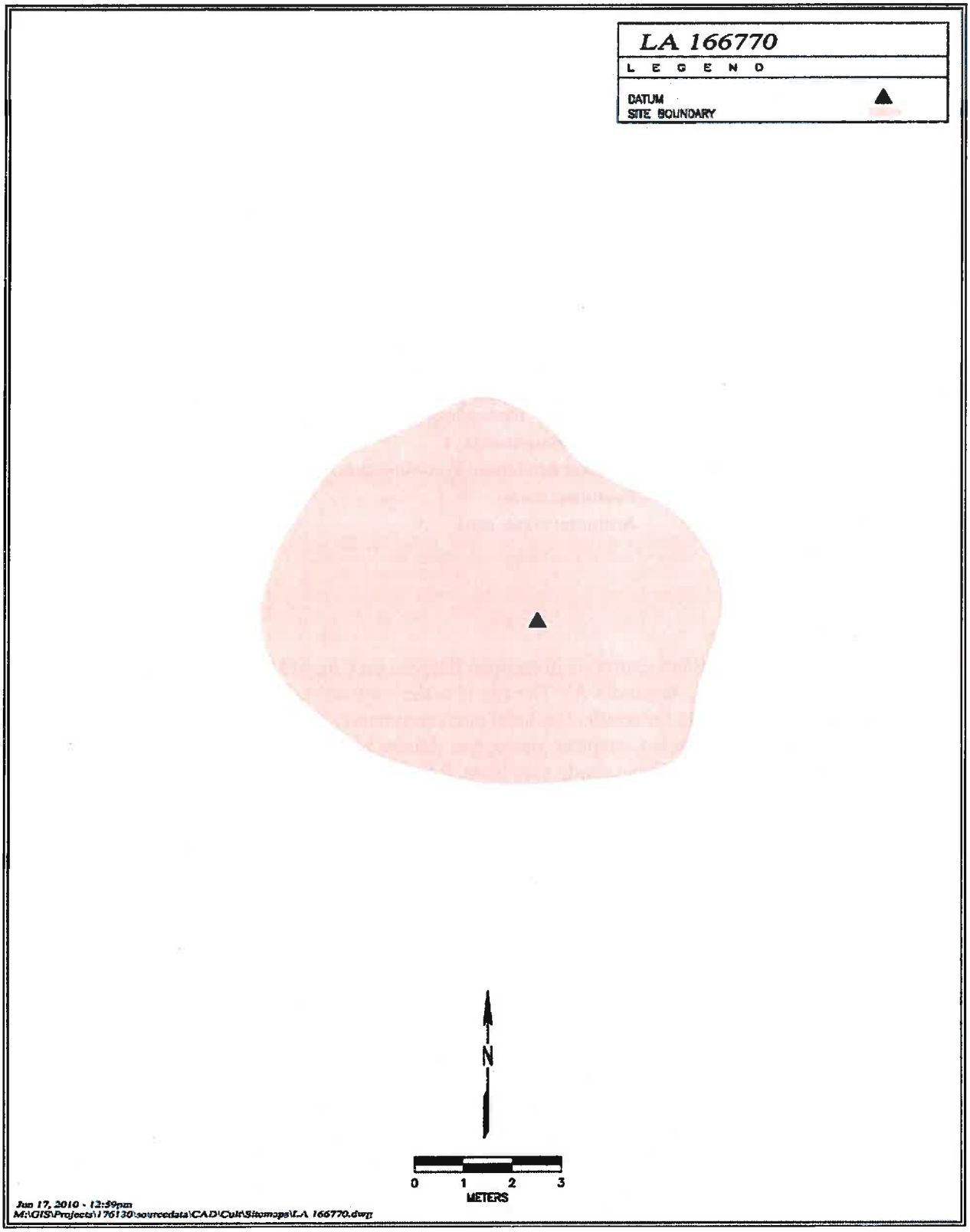

Figure 7.27 LA 166770 site map

Figure 7.28 LA 166770 overview looking south

Most of the can assemblage (n = 7) consists of hole-in-cap cans (n = 5, 71.4%), which generally date from 1820 to ca. 1930 (Rock 1987:12). As indicated previously, hole-in-top—vent hole or matchstick filler hole—cans date from ca. 1900 to ca. 1985. Sanitary cans, which were first brought on the market in 1904, became common after 1920 (Rock 1987:14, 22). The higher incidence of hole-in-cap cans, as compared to the other can types, suggests the metal assemblage dates between ca. 1904 and 1915.

Considered as a whole, the artifact assemblage represents a single trash disposal episode of household refuse. In general, the artifacts suggest the site dates between ca. 1905 and 1915.

Table 7.7 Surface artifact assemblage, LA 166770

Description	Count
Sun-colored amethyst (SCA) glass fragments	74
Green glass fragments	4
Lt. green bottle base, with American Bottle Co. AB-connected maker's mark (1905–1909), "AZ" on base	1
Clear (colorless) glass fragment	1
Clear (colorless) whiskey bottle neck	1
Clear (colorless) bottle base, with "DEM"	1
Hole-in-top can fragment	1
Hole-in-cap can fragments	5
Sanitary can	1
Metal table knife blade, 5 inches long	1
Table knife handle, with "USA"	1
Total	**91**

7.7.4 Preliminary Evaluation

LA 166770 is a small historic artifact scatter representing a single trash disposal event. No features were discerned. The historic artifacts represent household trash that dates between ca. 1905 and 1915. The site is surficial and is not likely to provide additional information concerning the early twentieth-century occupation of the Deming area. The site, therefore, is recommended ineligible for listing on the NRHP.

7.7.5 Project Impact

Although development of the industrial park may include the entire APE, LA 166770 is recommended ineligible for inclusion on the NRHP.

7.8 LA 166771

Field Number: West Deming 8
Site Type: historic artifact scatter
Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1348 m (4423 ft)
Dimensions: 10 x 7 m (33 x 23 ft)
NRHP Recommendation: not eligible

Topographic Location: flat in valley
Vegetation: tobosa grass, Mormon tea, soaptree yucca
No. of Components: 1
Cultural Affiliation: Euro-American
Features: none
Artifacts: glass, cans

7.8.1 Site Description

LA 166771, a small historic artifact scatter, is in an open flat area on City of Deming land in the Mimbres River valley (Figures 7.29, 7.30, Appendix A). The site is in the west-central portion of the project area, near the west edge. The river is to the south. The local plant community is desert scrubland, which primarily consists of tobosa grass but also includes Mormon tea, soaptree yucca, and slender blanketflower. Ground visibility is 80 percent. The soil is classified as Mohave sandy clay loam, 0 to 3 percent slopes (MU). Pea-size to 2 cm diameter gravel is present. The cultural material is surficial. An estimated 75 to 99 percent of the site remains intact.

7.8.2 Features

No features are present.

7.8.3 Artifacts

All artifacts observed on the surface (n = 53) were recorded in the field (Table 7.10). The artifact assemblage primarily consists of glass (n = 40, 75.5%). Most of the glass assemblage is brown glass, which dates from 1880 to the present. Aqua glass dates from 1880 to 1920 and SCA glass primarily dates from ca. 1890 to ca. 1920. One bottle exhibits the American Bottle Co.'s AB-connected maker's mark dating from 1905 to 1909. The bottle was made in the Belleville, Illinois plant (Lockhart et al. 2007:50–51, 55). Two identical SCA jars exhibit two 1903 patent dates that have been embossed on the interior side of the base (Figures 7.31 and 7.32). Hole-in-cap cans generally date from 1820 to ca. 1930 (Rock 1987:12). Sanitary cans were first brought on the market in 1904 and became common after 1920 (Rock 1987:14, 22). In general, the artifacts suggest the site dates between ca. 1905 and 1915. The artifact assemblage represents a single trash disposal episode of household refuse.

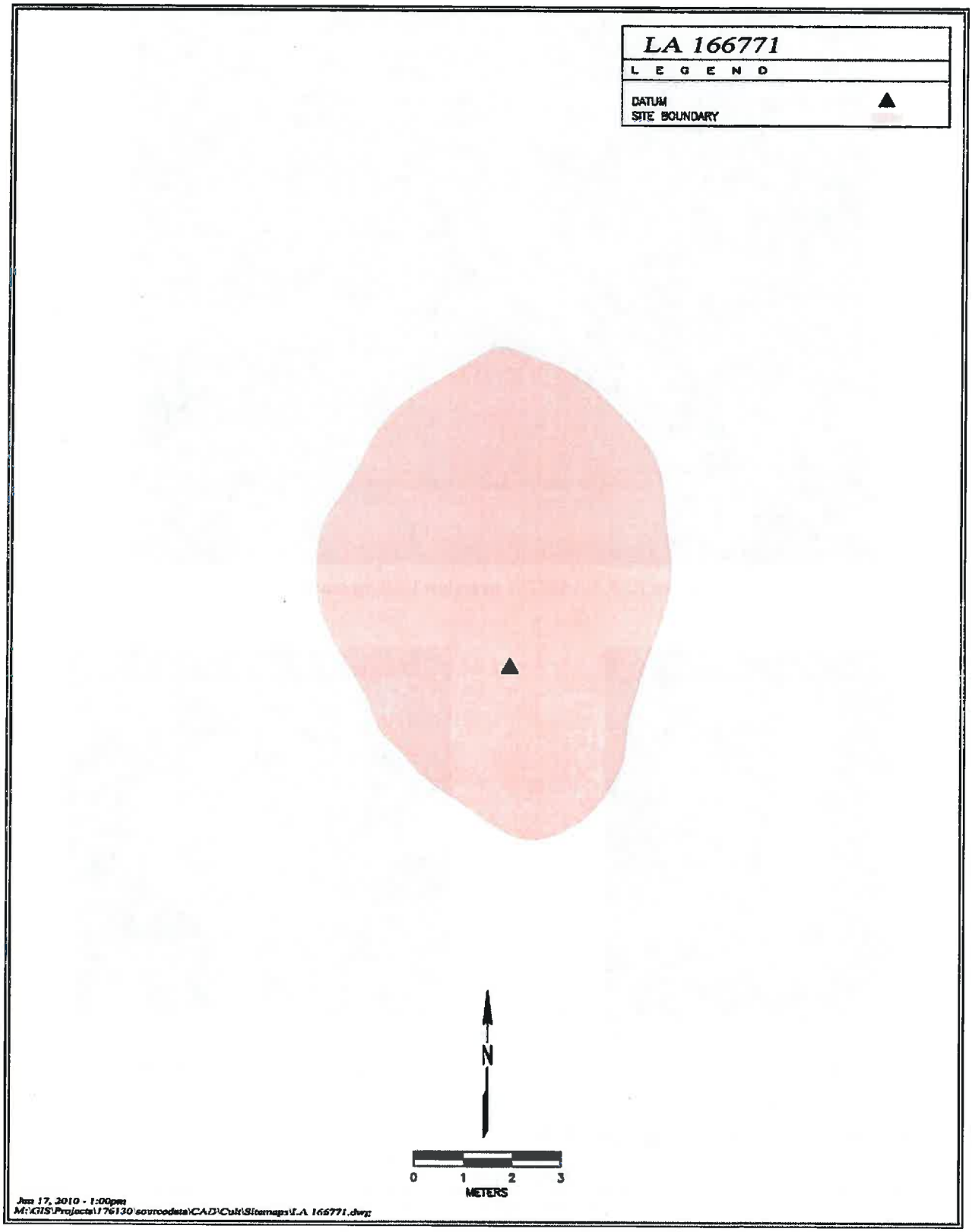

Figure 7.29 LA 166771 site map

Figure 7.30 LA 166771 overview looking south

Figure 7.31 SCA jar, side

Figure 7.32 SCA jar, bottom

Table 7.8 Surface artifact assemblage, LA 166771

Description	Count
Sun-colored amethyst (SCA) jars, base – 1¾ in diam., top – 2⅛ in diam., 3 inches high, embossed in interior of base: "NO. 71/PAT. IN U.S./DEC. 22, 1903/JULY 17, 1903"	2
Bottle, with American Bottle Co. AB-connected maker's mark (1905–1909) and "C3" on base, 3 in diam., 12 inches high	1
Aqua glass fragments	12

Description	Count
Brown (amber) glass fragments	24
Whiskey bottle, with "ONE PINT" on side and "B2" on bottom	1
Hole-in-cap cans	2
Sanitary cans, 4¼ in diam., 5 inches high	4
Sanitary cans, 4¼ in diam., 5 inches high, opened with a knife	2
Can fragments	5
Total	53

7.8.4 Preliminary Evaluation

LA 166771 is a small historic artifact scatter representing a single trash disposal event. No features were discerned. The historic artifacts represent household trash that dates between ca. 1905 and 1915. The site is surficial and is not likely to provide additional information concerning the early twentieth-century occupation of the Deming area. The site, therefore, is recommended ineligible for listing on the NRHP.

7.8.5 Project Impact

Although development of the industrial park may include the entire APE, LA 166771 is recommended ineligible for inclusion on the NRHP.

7.9 LA 166772

Field Number: West Deming 9
Site Type: zinc milling, barite processing

Land Status: City of Deming
Quadrangle: Deming West (1967)
Elevation (AMSL): 1343 m (4405 ft)
Dimensions: 987 x 726 m (3238 x 2382 ft)
NRHP Recommendation: eligible, Criterion C

Topographic Location: terrace
Vegetation: tobosa and other grasses, soaptree yucca, desert globemallow, desert marigold
No. of Components: 1
Cultural Affiliation: Euro-American
Features: structures, buildings, tailings
Artifacts: glass, metal cans, bricks, equipment

7.9.1 Site Description

LA 166772 is a very large historic 1920s to 1980s former mill operation, which primarily processed zinc sulfide ore. The site is bounded on the east by the Southwest Railroad and State Road (SR) 394 (Peru Mills Road) (Figures 7.33 and 7.34, Appendix A). The site consists of two concrete pads, two light poles, a historic artifact scatter, a large metal maintenance building, a concrete block building, a truck scales, a water tank on a tower, and abandoned water department equipment (Figure 7.35). The site is near Deming's new water wells. Most (about 80%) of the artifacts appear to be less than 50 years old. Small pieces of milled lumber and concrete fragments occur throughout the site area. A 2 x 30 m (6.6 x 100 ft) artifact concentration is in the southeast corner of the site. The artifact concentration extends eastward, beyond the property boundary, into the Southwest Railroad easement. Only artifacts within the industrial park were examined and recorded. The area surrounding the site is mechanically disturbed. The foundations and artifacts are related to the zinc milling operations. Dominant vegetation includes soaptree yucca, desert globemallow, desert marigold, tobosa grass, and other grasses. The soil is classified as Berino and Mohave soils (BA), tailings (DUMP), and Mohave sandy clay loam, 0 to 3 percent slopes (MU). Ground visibility averages 90 percent. Except for a water tank and tower, the remaining structures and buildings were constructed by Barite of America's (BOA) operation during the late 1970s and early 1980s. Except for a large maintenance building, concrete block building, and a weight station, all other

structures have been removed and only concrete foundations remain. Associated artifacts date mostly to the BOA operations. Therefore, LA 166772 is in poor condition and an estimated less than 10 percent remains intact.

The area formerly contained abandoned ore milling facilities that included buildings, water wells, and tailings. The first milling operation was begun in 1928 by Peru Mining Company, a subsidiary of Illinois Zinc Company. They operated the facility until 1967. The mill was vacant until purchased by BOA in 1979. BOA operated the mill primarily for production of barite until 1985 when the company filed for bankruptcy. Barite Limited retained title to the property until SMS Financial, a financial title and holding company, acquired it through bankruptcy (McKinney et al. 2008:1). Subsequently, the City of Deming acquired the property for an industrial park.

The ore processed at Peru Mining Company was shipped by rail from four nearby mines that included Hanover, Pewabic, Kearney, and Copper Flat. The mill was operated as a flotation concentration plant where ore was crushed, ground, mixed with water and pumped to flotation cells. Chemicals were added to separate the minerals from the mixture, whereupon the minerals were skimmed and pumped to holding drums to be filtered and dewatered. The remaining ore and slurry were pumped to tailings on site. The containment for the liquid tailings failed with a resulting spill on the west side of the tailings pile. The spill eliminated vegetation in the spill area and the subsequent wind erosion removed the top soil down to the undulating hardpan. The predominantly westerly winds eroded the tailings pile and spread it over a large area east of the Peru Mining Company boundary (McKinney et al. 2008:1).

The City of Deming acquired the property and had the tailings remediated for hazardous materials. The New Mexico Environment Department recently issued the City of Deming a release, creating the area as a brownfield site with no hazardous levels of materials (Wayne Pilz, personal communication 2010).

7.9.2 Features

Three features were identified at LA 166772 (Figure 7.33, Table 7.11). Feature 1 is a concrete pad with floor tile remnants, PVC pipes, and a drain. Feature 2 is a concrete pad with metal T-posts embedded in the concrete along its north, east, and south edges. Feature 3 is a rock concentration consisting of 100+ cobbles averaging 10 cm in diameter.

Figure 7.33 LA 166772 overview looking south

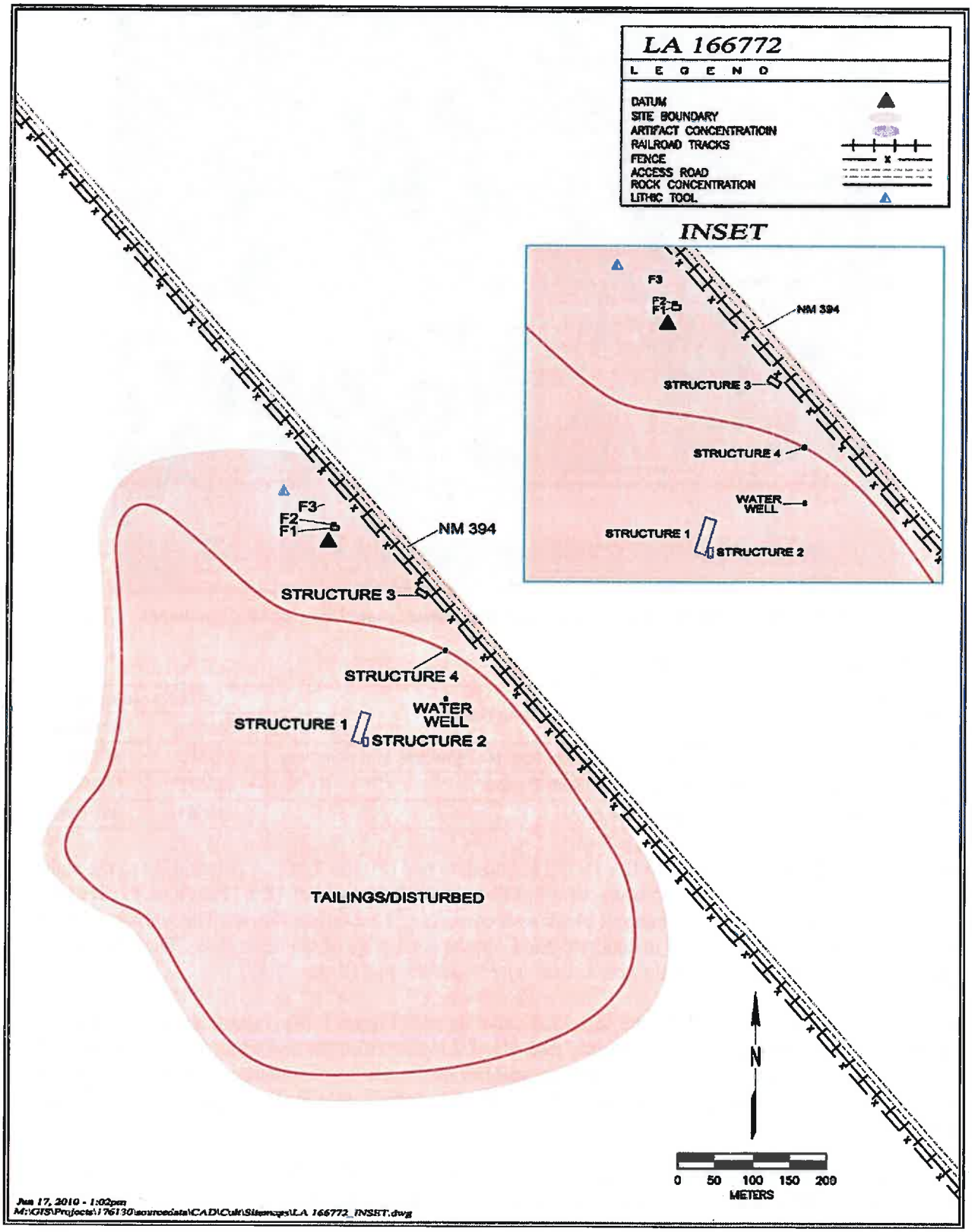

Figure 7.34 LA 166772 site map

Figure 7.35 LA 166772, abandoned water department machinery looking northeast

Table 7.9 Feature summary, LA 166772

Feature	Size	Description	UTM Coordinates	
			Easting	Northing
1	36 ft x 16 ft, 5 in	Concrete pad with floor tile remnants and plumbing	235567	3577548
2	23 ft, 8 in x 12 ft	Concrete pad with T-posts	235575	3577570
3	13 ft x 10 ft	100+ cobbles	235561	3577582

Feature 1 is a north-south oriented 36 ft x 16 ft 5 in concrete pad (Figure 7.36). A penetration in the slab for a 3 inch and 4 inch ABS pipe has been cut off at floor level. Remnants of 12 x 12 inch vinyl tiles are on the floor. A discernible exterior cement block wall consists of 16 x 6 inch blocks. The walls have been removed. An attached 14 ft x 7 ft 3 in concrete pad is on the west edge of the main floor. The structure has no discernible foundation. A light pole is associated with the pad (Figure 7.37).

Feature 2 is an east-west oriented 23 ft 8 in x 12 ft concrete pad (Figure 7.38). T-posts are embedded in the north, east, and south sides of the concrete pad, about 2 inches from the pad edge. The T-posts are 5 ft off center along the three pad edges. The concrete pad has no discernible foundation. A 6 ft x 3 ft 9 in pad on the northwest side probably represents a former entryway. A light pole is also associated with this pad (Figure 7.37).

Feature 3 is a 13 x 10 ft rock concentration consisting of more than 100 cobbles averaging 10 cm in diameter. Some exhibit possible burning. The cobble concentration appears to be entirely on the surface (Figure 7.39).

Figure 7.36 LA 166772, Feature 1 looking south

Figure 7.37 LA 166772, light pole

Figure 7.38 LA 166772, Feature 2 looking east

Figure 7.39 LA 166772, Feature 3 looking west

7.9.3 Structures

Four structures were noted at LA 166772 (Table 7.12).

Table 7.12 Structure locations, LA 166772

Structure	Description	UTM Coordinates Zone 13	
		Easting	Northing
1	Metal maintenance and processing building	235623	3577278
2	1-story concrete block building	235618	3577260
3	Truck scale and associated building	235699	3577462
4	Water tank and tower, ca. 1920s–1930s	235726	3577386

Structure 1, a 130 x 30 ft metal maintenance building, is 350 m (1150 ft) west of SR 394 (Peru Mills Road) (Figure 7.40). The building has a concrete pad with metal framing and siding. The pad is raised above grade with a 20 inch thick footing (Figures 7.44–7.47). The west wall has a 20 inch thick, 8.5 ft high concrete footing/wall (Figures 7.44 and 7.45). The building has a medium-pitched gabled roof with close eaves, exposed rafters, with a close rake. The roofing is ribbed metal with flat skylights on the east and west. No chimneys or vent pipes are present. The interior is steel side framing and trusses with exterior walls consisting of galvanized 12 inch wide panels screwed to the frame (Figure 7.45). Nearly all of the exterior metal sheathing is missing from the southwest wall (Figure 7.44). The structure has an open construction with chain link gates on the east, west, and north walls. The gates are mounted on exterior sliding tracks. The gates on the east and west wall are closer to the south end of the building. The gate at the north is centered and has a flood lamp centered above it. The gate frames are 2 inch pipe with chain link fencing attached (Figure 7.46). The only door entry, a one-leaf steel door with a single square window in the top center, is on the south side of the building. A small concrete pad is in front of the door (Figure 7.47). A 25 x 22 ft at-grade concrete pad is on the south end of the building (Figure 7.44). Four anchor points are on the pad, one near the center of each side. The anchor points are 2 ft x 2 ft, 4 in, with holes for four bolts, one near each corner of the anchor. This pad was probably for the former conveyor facility. Structure 1 was probably built by BOA during operations from 1979 through 1985 (John Strand, personal communication 2010). Structure 1 is less than 50 years old and, therefore, is recommended ineligible to the NRHP.

Structure 2 is a one-story, 10 ft high, 20 x 10.5 ft concrete block building about 350 m (1150 ft) west of SR 394 (Peru Mills Road) (Figures 7.40, 7.48–7.51). The building is on a concrete pad and has a low-pitched gabled roof with eaves, exposed rafters, and open rakes. The framing for the rafters (6 inch) and gabled ends is milled lumber. The gabled ends and roofing are corrugated metal. No chimneys or vents are present.

The south elevation has a two-leaf steel door. Each leaf is 7 x 3 ft with a steel frame. The east door has been welded shut (Figure 7.48). A small concrete entry pad is in front of the two-leaf door. The north elevation has a 7 ft high, 20 inch wide one-leaf steel door with a concrete threshold, steel frame, and padlock. A small concrete pad is in front of the door. An 8 ft high, 24 inch wide one-leaf steel security door with steel framing and sheet metal is adjacent to the east side of the door (Figure 7.48).

Figure 7.40 LA 166772, Structures 1 and 2 north and west elevations

Figure 7.41 LA 166772, Structure 1 east elevation

Figure 7.42 LA 166772, Structure 1 north elevation

Figure 7.43 LA 166772, Structure 1 west elevation

The north and south elevations each have a 48 x 48 inch window with a concrete slip sill. The glass has been replaced with a single sheet of steel plating. A security grate consisting of an exterior frame with three horizontal steel bars with welded steel mesh is bolted to the exterior of each window (Figures 7.48 and 7.50). No windows or doors are on the east elevation, but there is a 240–280 kV high voltage box (Figure 7.51). A former window on the west elevation, like those on the north and south elevations, has been enclosed with concrete blocks. The concrete slip sill is still in situ (Figure 7.49). Structure 2 was probably constructed during BOA's operations from 1979 through 1985 (John Strand, personal communication 2010). Structure 2 is less than 50 years old and, therefore, is recommended ineligible to the NRHP.

Figure 7.44 166772, Structure 1 south elevation

Figure 7.45 166772, Structure 1 interior framing

Figure 7.46 166772, Structure 1 gate

Figure 7.47 166772, Structure 1 door

Figure 7.48 LA 166772, Structure 2 south elevation

Figure 7.49 LA 166772, Structure 2 west elevation

Figure 7.50 LA 166772, Structure 2 north elevation

Figure 7.51 LA 166772, Structure 2 east elevation

Structure 3 is a scale and associated building for weighing trucks (Figures 7.52 and 7.53). The building is 24.75 ft long and 16.25 ft wide with a 3 ft high concrete foundation. A metal crawl space door is on the south elevation. The building has a flat roof and T111 siding. The roof has parapets on the north and south and extends 18 inches beyond the east and west elevations. The entry, a one-leaf metal door, is on the west elevation. A 6 x 4.5 ft concrete pad is in front of the door. In addition, a two-pane vertical sliding aluminum window is north of the door. A similar window is on the east elevation. The east elevation faces the truck scale, which has a gravel ramp on each end. The 70 x 9.75 ft scale was manufactured by Howe Richardson. The scale is embossed with "PATT 40810048/PART 40810042/ MULT=10//SUPER-CAST" and with the Howe Richardson trademark, which was filed for registration on February 23, 1965 (Zibb 2010). The scale is also marked with "WEIGHING SYSTEM/ 3.0059 AT 3K lbs/IO 9891/CERT 91-046" (Figure 7.54). The scale and associated structure appear to be fairly new and were probably installed during or after BOA's operation of the facility in the 1980s (John Strand, personal communication 2010). Structure 3 is less than 50 years old and, therefore, is recommended ineligible to the NRHP.

Figure 7.52 LA 166772, Structure 3 looking west

Figure 7.53 LA 166772, Structure 3 looking northeast

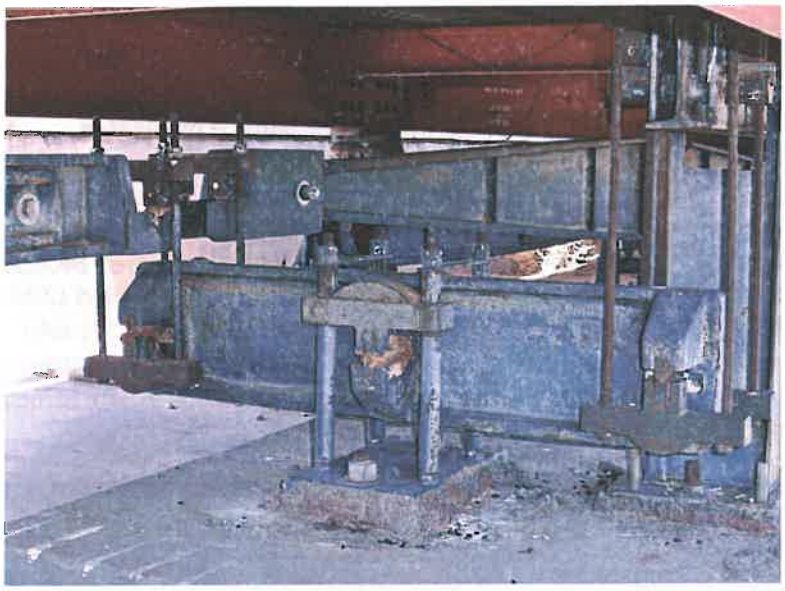

Figure 7.54 LA 166772, Structure 3 close up

Structure 4 is a riveted steel water tank atop a steel tower made of angle braces (Figures 7.55 and 7.56). The tower sits on 2 ft, 4 inch concrete footing pads with 12 to 14 inches of concrete exposed above ground. The base of the storage tank is 16 x 16 ft and its estimated height is 35 to 40 ft. The age of the water tank is not known, but it is still functional, with the exception of a broken pipe (Wayne Pilz, personal communication 2010). The tank has riveted panels. The water tank and tower, which were probably constructed during the late 1920s or early 1930s, is 100 percent intact. Riveted water tanks were generally constructed prior to the late 1940s and were state-of-the-art and better than they had to be when built. Today, many are being dismantled because they "look old." Multi-column tanks replaced the installation of riveted tanks in suburbs and subdivisions after World War II (Aquifer 2007). The water tank and tower are excellent examples of 1920s and 1930s water tanks and towers in rural New Mexico. The water tank and tower are the only elements associated with LA 166772 that are recommended eligible for inclusion on the NRHP under Criterion C, that embodies distinctive characteristics of a type, period, or method of construction.

Figure 7.55 LA 166772, Structure 4 looking northeast

Figure 7.56 LA 166772, Structure 4 looking northwest

7.9.4 Artifacts

Thousands of artifacts are associated with LA 166772 but only a arbitrary representative artifact sample of primarily diagnostic artifacts and artifacts probably greater than 50 years old (n = 656) was recorded in the field (Table 7.13). Of the artifacts present on the site, most are glass and historic ceramic fragments.

Table 7.10 Arbitrary representative artifact sample, LA 166772

Description	Count
Clear (colorless) glass fragments	86
Clear (colorless) bottle base, with the Pennsylvania Bottle Co. LP-in-a-keystone maker's mark (1940–1952), and with "H-213"	1
Clear (colorless) bottle base, with the Owens-Illinois Glass Co. I-in-an-oval maker's mark (1954+) with a "3" on either side, and with "DURAGLASS"	1
Clear (colorless) bottle base, with the Owens-Illinois Glass Co., diamond IO maker's mark (1929–1954) with "23" on left and "•3" on right, and with "3771-C"	1
Brown (amber) glass fragments	400
Brown (amber) jar, with the Owens-Illinois Glass Co., diamond IO maker's mark (1929–1954) with "4" on left, "7" on right, and "75" below, 1⅝-in diam., 3½ inches high	1
Green glass fragments	14
Blue glass fragments	3
Medicine bottle, with the Owens-Illinois Glass Co., diamond IO maker's mark (1929–1954) with "7" on left and "6" on right, 3½ x 1¼ inches, ¾ inches thick	1
Rose-colored glass candy dish fragment	1
White earthenware fragments	84
Orange earthenware fragments	3
Chinese coin (Figures 7.57 and 7.58)	1
Sanitary cans	2
Sardine can	1
Beer cans, opened with a church key	10
Aluminum cap	1
Metal nut, 1¼ in diam., with ¾ in diam. hole	1
Metal bolt, 5 inches long, ½ in thread	1
Tin roofing fragments	2
Shelf brace, 12 x 8 inches	1
Steel plates	3
Metal bucket, smashed, with "24-35-55 G. P. & F"	1
Truck seat springs	1
Sewer pipe fragments	10
Plastic pipe, 3 in diam., 2½ ft long	1
Paint brush	1
Brown electric insulator	1
Roofing slate fragments	2
Bricks, plain	14
Concrete slab fragments	6
Total	**656**

Five bottle bases with makers' marks are in the recorded artifact sample. One specimen exhibits a Pennsylvania Bottle Co. LP-in-a-keystone maker's mark dating from 1940 to 1952. The bottle was made in Wilcox, Pennsylvania. The initials stand for Lummis and Pennsylvania, the distributor and maker of

the bottles, respectively (Lockhart et al. 2008; Toulouse 1971:333). Three bottle bases exhibit the Owens-Illinois Glass Co., diamond IO maker's mark dating from 1929 to 1954. Based on plant and date codes—the numbers on the left (plant) and right (date) side of the maker's mark—one bottle was made in either 1933 or 1943 at the Los Angeles, California plant, one was made in either 1936 or 1946 by the Alton, Illinois plant, and one was made in 1937 by the Clarksburg, West Virginia plant which closed in 1944 (Lockhart 2004, 2006b; Toulouse 1971:395, 403–404). The final specimen has the Owens-Illinois Glass Co. I-in-an-oval maker's mark, which has been in use since1954 (Lockhart 2004:25, 2006b; Toulouse 1971:395, 403).

Commercial production of beer cans began in 1935, with flat top cans as the most popular (Rock 1987:29). The recorded artifact assemblage contains 10 beer cans, all of which have been opened with a "church key." Originally called the "Quick and Easy Opener," the "church key" was developed in 1935 by the Vaughn Novelty Company specifically to open flat top beer cans. By the late 1950s and early 1960s, beer cans with aluminum tops were the dominant variety and the aluminum pull tab was introduced at this time (Rock 1987:29–30, 112). The brown (amber) glass probably mainly represents beer bottles.

The one intriguing artifact, a Chinese coin, was found amongst the glass and can fragments. This coin may be attributed to the construction of the nearby Southwest Railroad or more distant Southern Pacific Railroad during the late nineteenth century (Figures 7.57 and 7.58). The use of Chinese labor for construction of the western railroads was common practice and the presence of a railroad construction camp in the vicinity would not be unexpected. However, late nineteenth century railroad construction camps, particularly those attributed to a Chinese presence, are not commonly recognized in the archaeological record. In this instance, the Chinese coin was in a severely disturbed context with little likelihood of having intact subsurface cultural deposits associated with the late nineteenth- or early twentieth-century use of the area. The coin is 25 mm in diameter. On the obverse is "Ch'ien Lung T'ung Pao", on the reverse right is "Manchu Ciowan – Board of Revenue Mint, Peking" and on the reverse left is "Manchu Boo – coin". The Dynasty was A.D.1644–1911, with the Reign Title Chien Lung A.D.1736–1795, Emperor Kao Tsung, A.D.1736–1795 (Chinese Coin 2010).

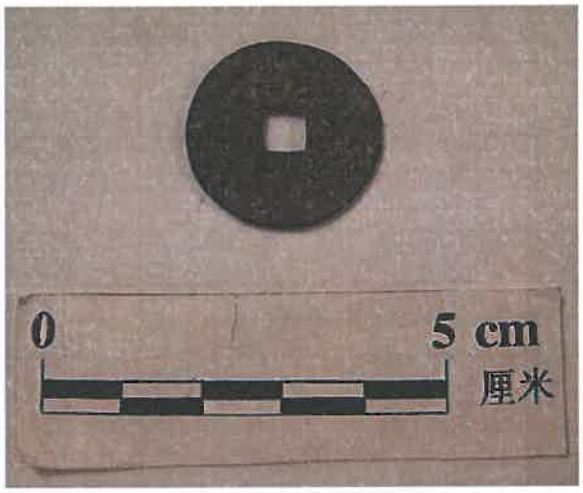

Figure 7.57 Chinese coin

Figure 7.58 Chinese coin

Although some of the recorded artifacts are probably related to the milling operations, most of the broken bottle glass, historic ceramics, and tin cans are attributable to local residential refuse disposal during the past 50 years. The machinery parts are attributed to the milling operations of BOA during the late 1970s and early 1980s. The absence of SCA and aqua glass and hole-in-cap cans and the content of the recorded artifact assemblage, except for the Chinese coin, suggest LA 166772 dates from the late 1920s to the present.

7.9.5 Preliminary Evaluation

LA 166772 is a very large late 1920s through mid-1980s milling site, which formerly contained ore milling facilities that included buildings, water wells, and tailings. It is unlikely the artifact assemblage will yield important information about early milling and industrial development in Deming during the early and mid-twentieth century. Only the riveted water tank and tower (Structure 4), which was probably constructed during the late 1920s or 1930s is the only remaining structure greater than 50 years old at LA 166772. The other structures were probably built during the 1970s and 1980s (John Strand, personal communication). The structures were documented. The water tank and tower were recorded on HCPI forms 1 and 2. The riveted water tank and tower are recommended eligible for inclusion on the NRHP under Criterion C. The remaining structures and remnants of structures and the artifact assemblage are recommended as non-contributing elements to the site's eligibility.

7.9.6 Project Impact

Development within the industrial park will have an adverse effect on LA 166772, the riveted water tank and tower (Structure 4) of which is recommended eligible for inclusion on the NRHP. Pending concurrence, avoidance of the water tank and tower is recommended. In addition, pending concurrence, Structures 1, 2, and 3, and their associated artifacts are recommended non-contributing to the NRHP eligibility of LA 166772.

7.10 LA 167608

FIELD NUMBER: East Deming 1
SITE TYPE: Artifact scatter/feature
LAND STATUS: City of Deming
QUADRANGLE: Deming NW
ELEVATION (AMSL): 4410
DIMENSIONS: 60 by 50 m (197 by 164 ft)
NRHP RECOMMENDATION: Eligible, Criterion D

TOPOGRAPHIC LOCATION: plain/flat
VEGETATION: Yucca, snakeweed, grass
NO. OF COMPONENTS: 1
CULTURAL AFFILIATION: Historic, 1900 to 1930
FEATURES: Depression
ARTIFACTS: Bottle glass, ceramic, tin cans

7.10.1 Site Description

LA 167608 is a historic artifact scatter, dating between 1900 and 1930, east of Peru Hill Mill Road (NM 394). LA 167608 is 10 m (30 ft) from the highway (Figures 7.59 and 7.60, Appendix A). The east NM 394 right-of-way is not fenced in the vicinity of LA 167608. A disturbed area 65 m (213 ft) long and 25 m (82 ft) wide is in the southern portion of the site. Feature1, a circular depression, is in the northern portion of the site. Local vegetation includes yucca, honey mesquite, snakeweed, blanketflower, sunflower, globemallow, grasses, Russian thistle, and nightshade. Ground visibility was 50 percent. The soil at LA 167608 is included within the Berino and Mohave (BA) soils unit (Neher and Buchanan 1967).

7.10.2 Features

One cultural feature, a mound of gravelly soil 7.5 m (25 ft) in diameter enclosing a depression, was discerned at LA 167608. The function of the mound of gravelly soil is not known. The depression is 5 m (16 ft) in diameter and 1.5 m (5 ft) deep (Figure 7.61).

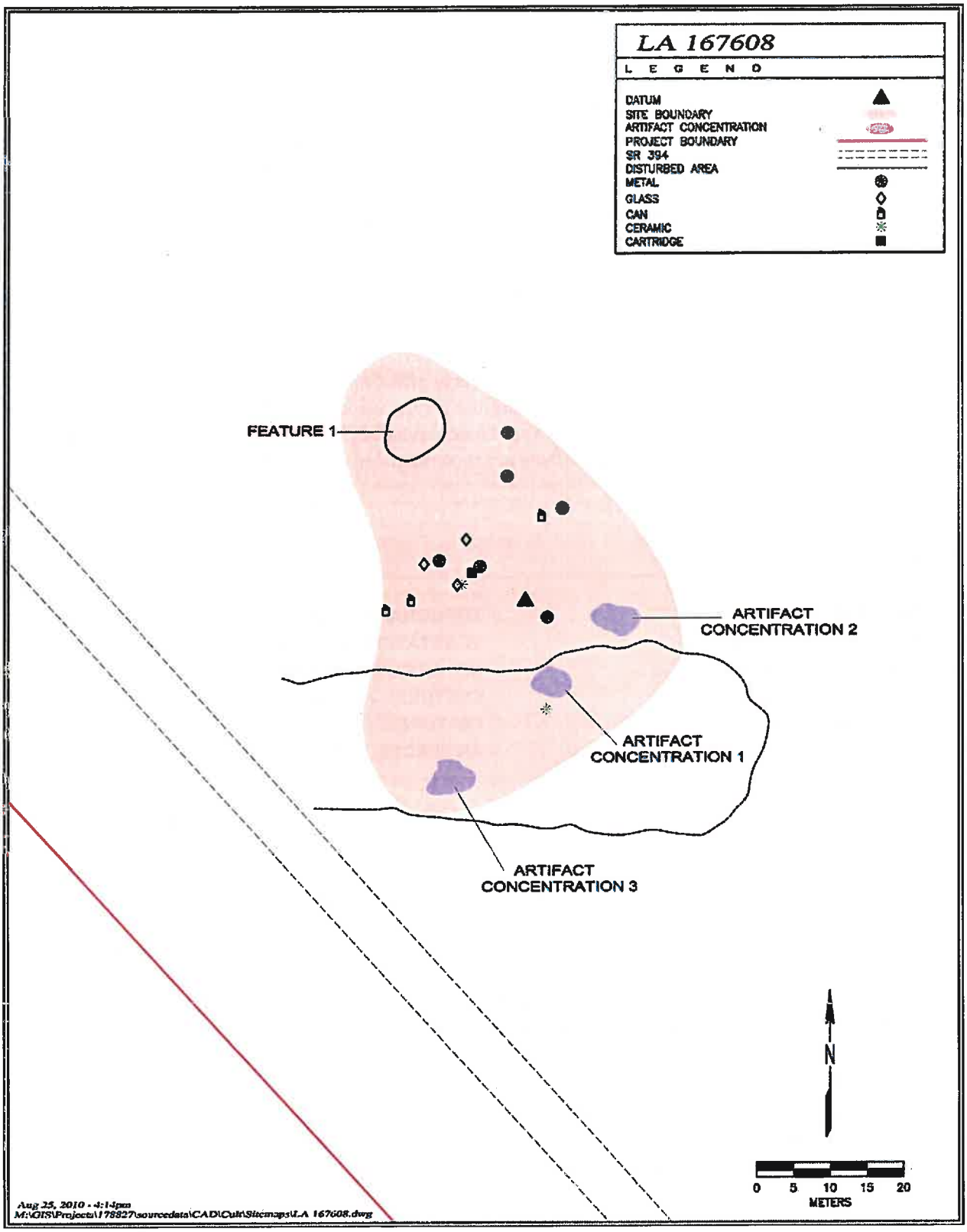

Figure 7.59 LA 167608 site map

Figure 7.60 LA 167608 overview from road, looking north-northeast

Figure 7.61 LA 167608 Feature 1, looking northwest

7.10.3 Artifacts

An estimated 5000 historic artifacts are present at LA 167608 (Table 7.11). The artifacts occur as a low to medium density scatter of glass shards, ceramic fragments, tin cans, and other materials south and southeast of Feature 1, the mound of gravelly soil. Three concentrations of artifacts were discerned, all in the southern portion of the site. All or most of the items in each artifact concentration were tabulated. Counts for abundant materials such as glass shards are estimates or minimum counts. A few unusual and/or temporally diagnostic items outside the artifact concentrations were mapped and, in some cases, drawn.

Artifact Concentration 1 is 5.5 m (18 ft) long and 4 m (13 ft) wide (Figures 7.60 and 7.62). It consists of about 250 items, mostly ceramic and glass fragments. Concentration 1 consists of at least 100 clear glass shards, 20 amethyst glass shards, 15 brown glass shards, and 80 unidentified ceramic fragments. Other items noted include a knife-opened can, a tobacco can, a whiskey or wine bottle base, two buttons, and a bottle green glass bottle with a crown-type finish. The oval base liquor bottle may have been manufactured around 1910 or later by the Buck Glass Company in Maryland, or possibly the Boldt Glass Company of Ohio (Axelson 2000).

Artifact Concentration 2 is northeast of Concentration 1 (Figures 7.60 and 7.63). Concentration 2 is 6.5 m (21 ft) long and 4 m (13 ft) wide and contains about 100 ceramic fragments, 35 of which may be ceramic plumbing pipe. One aqua glass bottle base fragment was noted. The letters "A" and part of a "B" or "P" are discernible on the base, possibly the trademark of the American Bottle Company used between 1905 and 1929 (Lockhart et al. 2007).

Figure 7.62 LA 167608 Artifact Concentration 1, looking southwest

Figure 7.63 LA 167608 Artifact Concentration 2, looking west

Artifact Concentration 3 is southwest of Concentration 2 (Figure 7.60). Concentration 3 is 6 m (20 ft) long and 4 m (13 ft) wide and contains at least 40 amethyst glass and 20 clear glass shards.

Referring to Table 7.11, the crown-type finish, used primarily for soda and beer bottles, was patented in the 1890s, but did not become common until after 1900. The finish is found on both mouth-blown bottles dating from the mid-1890s to 1915 (virtually always tooled not applied) and machine-made bottles beginning around 1910–1912 to the present (Axelson 2000). One measurable hole-in-top (milk) can dates from 1917 to 1929. Flat-sided, hinge-lid tobacco cans were first produced in 1910 (Berge 1980:261–262).

Table 7.11 Artifact summary, LA 167608

Artifact Description	Concentration			Other	Total
	1	2	3		
Ceramics					
Earthenware, white plate/dish base fragments				2	2
Porcelain electric fence insulator				1	1
Unknown	84	85		1	170
Glass					
Clear glass fragments	100		20		120
Clear glass bottle base	1			1	2
Clear glass whiskey/wine, oval, "B"					0
Amethyst glass fragments	20		40		60
Amethyst glass bottle base	1				1
Aqua glass bottle base/finish/fragment	1	1		1	3
Green glass crown-type bottle finish	1				1
Green glass base, "B"					0
Brown glass fragments	15				15
Brown glass medicine bottle neck	1				1
Medicine, small mentholatum jar, milk glass, "WICHITA"				1	1
Wine bottle neck				1	1
Metal					
Cans, unidentified	3	2		2	7
Cans, sanitary	1	1			2
Utensils (knife, fork, spoon)				2	2
Railroad spike				1	1
Baking powder can lid, ("PRICE'S), 12 oz"				1	1
Hole-in-top cans				3	3
Rectangular hole-in-cap can				1	1
Carriage bolt, 8 in long by ½-inch diameter				1	1
Stove top, two burner				1	1
Cartridge cases				2	2
Slide-on lid, 3-inch diameter				1	1
Hinge-lid tobacco cans	1			1	2
Offset-threaded can (thinner or solvent)				1	1
Metal band/strip, rivets	1				1
Other					
Buttons, unspecified	2				2
Button, shell				1	1
Total	**232**	**89**	**60**	**26**	**407**

One of the cartridges at LA 167608 is a Remington-Union Metallic .45 caliber casing. The Remington and Union Metallic companies merged in 1912. Mentholatum was first produced in 1894. The Mentholatum Company was founded by Alexander Hyde in Wichita Kansas. The Wichita factory closed in 1935. The Price's baking powder can lid, although incomplete, includes —"THE MOST PERFECT MADE/PRICE'S CREAM BAKING POWDER/12 OZ/BY WEIGHT".

7.10.4 Preliminary Evaluation

LA 167608 is a historic artifact scatter on the east side of Peru Hill Mill Road (NM 394). One cultural feature, Feature 1, a small circular mound and depression of unknown function was found. The depression may not be associated with the artifact scatter. The ground surface in the southern portion of LA 167608 has been disturbed due to undetermined activities. Overall, the site is in good condition. Subsurface cultural deposits may be present. Based on the limited number of diagnostic artifacts, LA 167608 evidently dates from about 1900 to 1930. The site is recommended eligible to the NRHP under Criterion D, for its potential to yield important information about the settlement and use of the northern Deming area from about 1900 to 1930. The historic remains may be associated with the nearby Camp Cody, located immediately south of the site.

7.11 LA 167609

Field Number: East Deming 2
Site Type: Artifact scatter
Land Status: City of Deming
Quadrangle: Deming NW
Elevation (AMSL): 4390
Dimensions: 40 by 20 m
NRHP Recommendation: Not eligible

Topographic Location: plain/flat
Vegetation: Yucca, grass
No. of Components: 1
Cultural Affiliation: Historic, 1900 to 1920
Features: Depression
Artifacts: Bottle glass, ceramic, other

7.11.1 Site Description

LA 167609 is a historic artifact scatter, dating from about 1900 to 1920, on the north side of Arrowhead Drive (Figures 7.64 and 7.65, Appendix A). Local vegetation includes yucca, snakeweed, grasses, Russian thistle and nightshade. Ground visibility varies from about 50 to 75 percent. The soil at LA 167609 is included within the Berino and Mohave (BA) unit (Neher and Buchanan 1967). Aerial photographs suggest the area in and around LA 167609 has been disturbed probably by gravel quarrying and other activities. Local vegetation includes yucca, Russian thistle, snakeweed, blazingstar, desert marigold, and nightshade. Arrowhead Drive is unpaved in the vicinity of LA 167609.

7.11.2 Features

No cultural features were identified at LA 167609 and no evidence for the presence of buried cultural features was discerned.

7.11.3 Artifacts

An estimated 75 historic artifacts occur at LA 167609 (Table 7.12). The artifacts occur as a low density dispersed scatter of glass shards, a few ceramic fragments, and other materials north of the fence line along Arrowhead Drive. Fifty artifacts were recorded in the field. Although some amethyst glass shards and one aqua glass bottle crown-type finish were present, several clear glass and green glass fragments were also noted. Unusual items include a horseshoe and a fence nail. The existing fence along Arrowhead Drive at LA 167609 has metal, not wooden, posts. Although the amethyst glass base fragment is probably from a bottle made by the Thatcher Manufacturing Company, the letters "T" and "CO" are usually also present. The "16' below the company code is probably the date code for 1916. Thatcher was one of the first companies licensed to use the Owens Automatic Bottle Machine. The Edwin M. Knowles China Company shard is from a vessel made in 1911 (Knowles China Company 2010). The Coca-Cola bottle base fragment may have been manufacture between 1915 and 1925 (Lockhart 2010).

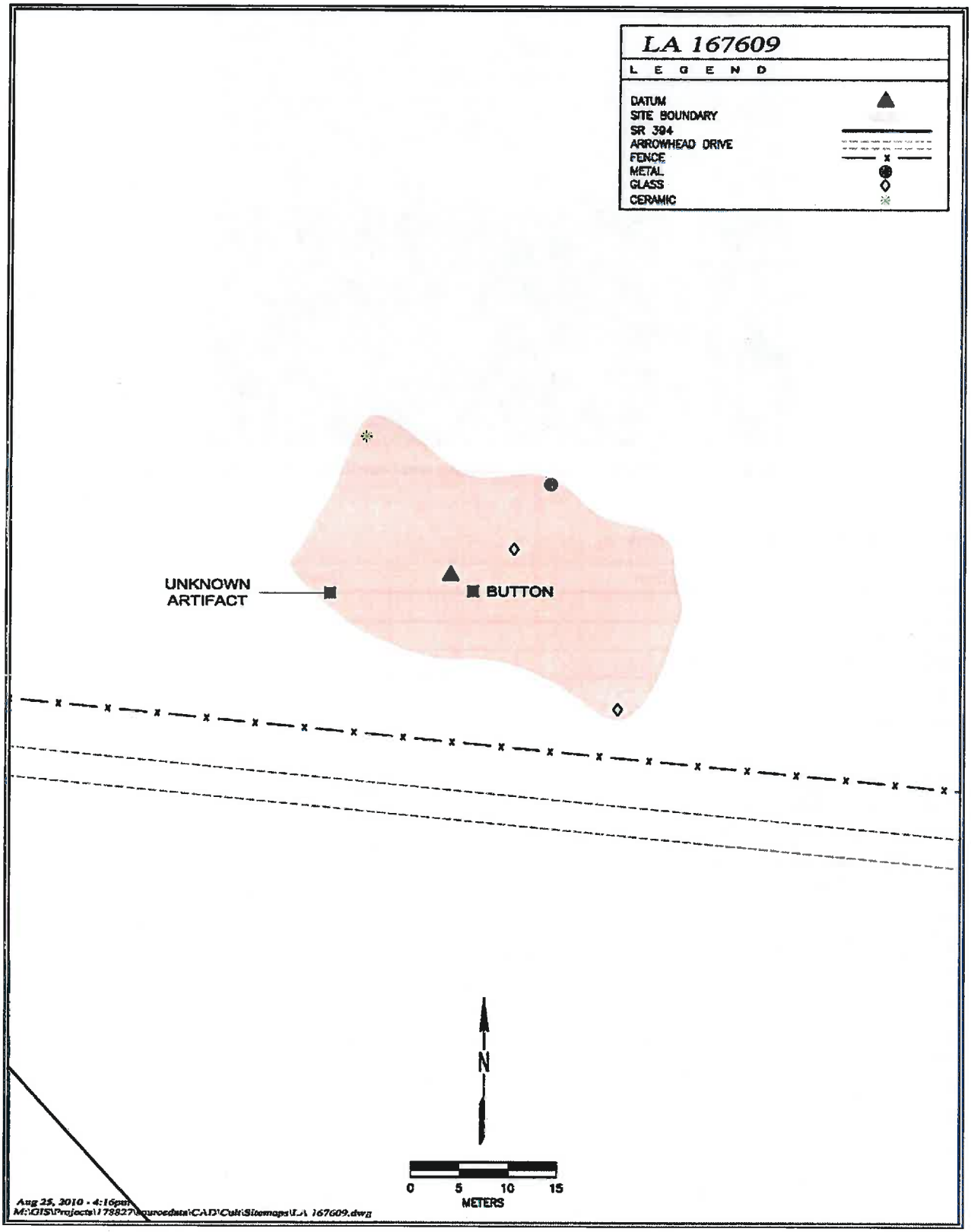

Figure 7.624 LA 167609 site map

Figure 7.65 LA 167609 overview, looking west-northwest from road

Table 7.12 Artifact summary, LA 167609

Description	Count
Ceramics	
Unknown fragment	1
Knowles China Company fragment	1
Glass	
Clear glass fragments	8
Green glass fragments	20
Amethyst glass fragments	7
Amethyst glass bottle base, "MFG, 16"	1
Coke bottle base fragment, "EL PASO"	1
Aqua glass crown finish fragment	1
Brown glass fragment	1
Metal	
Utensil (knife, fork, spoon)	1
Wood stove plate	1
Nails	2
Plumbing pipe ring	1
Horseshoe	1
Other	
Brick	1
Button	1
Unknown	1
Total	**50**

7.11.4 Preliminary Evaluation

LA 167609 is a historic artifact scatter of mostly glass and metal items. No cultural features were discerned. The ground at LA 167609 has been disturbed due to undetermined activities, but likely gravel quarrying. A large open pit east of the site may be a quarry remnant. Overall, the site is in fair to poor condition. Subsurface cultural deposits are not likely to be present. Based on the limited number of diagnostic artifacts, LA 167609 dates from about 1900 to 1920. Because of the disturbances to the site, and the probable absence of intact subsurface cultural deposits, LA 167609 is recommended ineligible for listing on the NRHP.

7.12 LA 167610

Field Number: East Deming 3
Site Type: Artifact scatter
Land Status: City of Deming
Quadrangle: Deming NW
Elevation (AMSL): 4405
Dimensions: 25 by 15 m
NRHP Recommendation: Not eligible

Topographic Location: plain/flat
Vegetation: Yucca, grass
No. of Components: 1
Cultural Affiliation: Historic, 1935 to 1945
Features: Depression
Artifacts: Bottle glass, ceramic, tin cans

7.12.1 Site Description

LA 167610 is a historic artifact scatter, consisting mostly of ceramic and metal items dating from about 1935 to 1945, on the west side of Peru Hill Mill Road (NM 394). LA 167610 is between the road and railroad tracks (Figures 7.66 and 7.67, Appendix A). Local vegetation includes mesquite, snakeweed, prickly pear, fourwing saltbush, desert marigold, globemallow, tobosa and other grasses, Russian thistle, and nightshade. Ground visibility is 20 percent. The soil at LA 167610 is classified as Mohave sandy clay loam, 0 to 3 percent slopes (MU) (Neher and Buchanan 1967).

7.12.2 Features

No cultural features were identified at LA 167610, and no evidence for buried cultural features was discerned.

7.12.3 Artifacts

The artifact assemblage consists of about 40 to 45 historic artifacts that occur as a low density dispersed scatter between the fence line along the west side of Peru Hill Mill Road and the Southwest Railroad grade. One small artifact concentration is adjacent to the highway. Thirty-two artifacts were recorded in the field (Table 7.13).

The most distinctive items noted at LA 167610 are parts of three hole-in-top (milk) cans embossed with "PUNCH HERE". These directions appear on milk cans dating from about 1935 to 1945. The complete or nearly complete milk cans without the phrase are the same size as those with the words. A few glass insulator fragments were noted along the east side of Peru Hill Mill Road, suggesting a utility line once was parallel to the road. The rails on the Southwest Railroad tracks by LA 167610 all have a date of 1912.

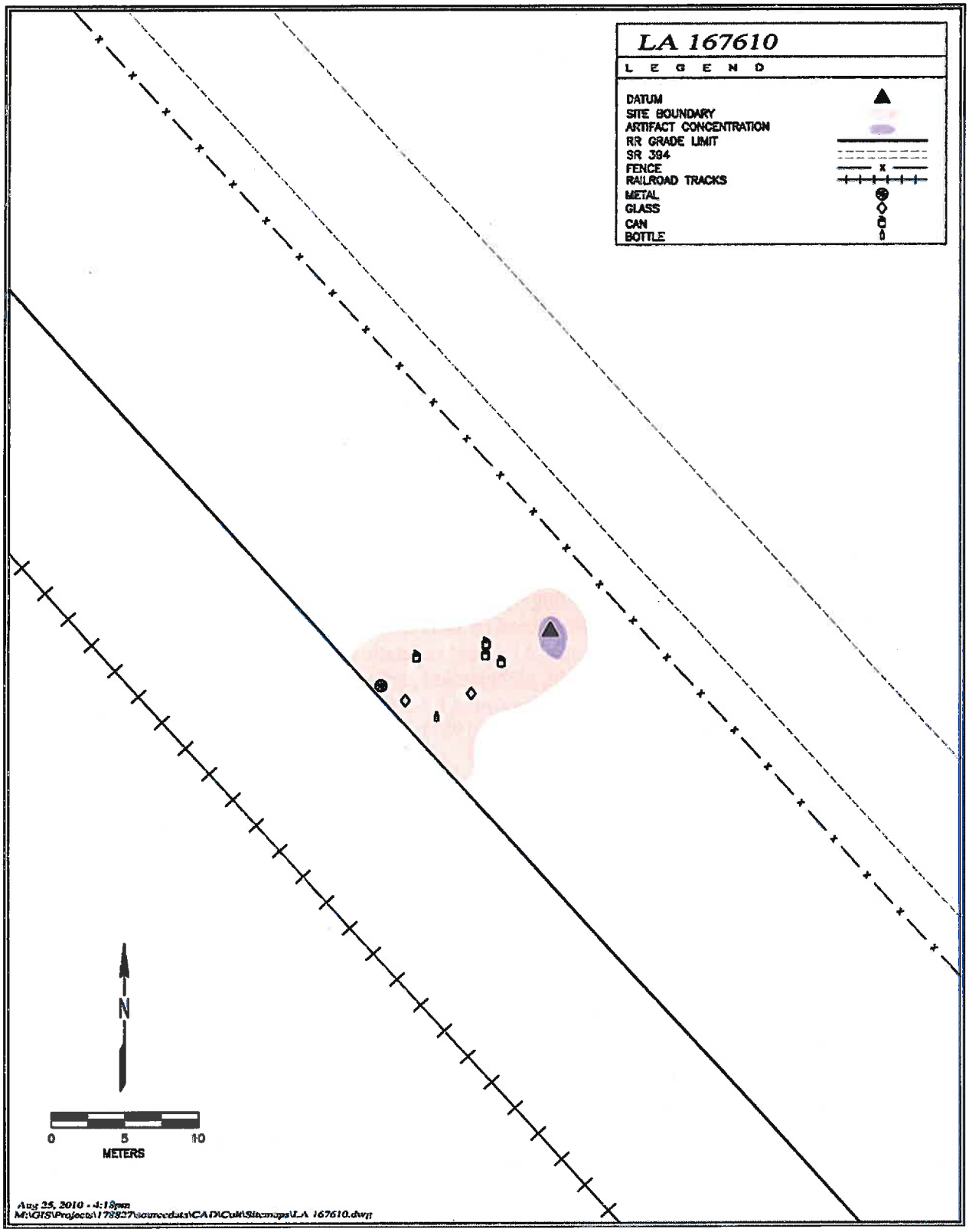

Figure 7.66 LA 167610 site map

Figure 7.67 LA 167610 overview, looking southwest

Table 7.13 Artifact summary, LA 167610

Description	Count
Ceramics	
Earthenware fragments	10
Base fragment	1
Porcelain	1
Glass	
Clear glass jar/jug fragment	1
Clear glass bottle, small, "PYREX"	1
Green glass insulator fragment	1
Metal	
Cans, unidentified	3
Hole-in-top can/fragments	8
Hole-in-top cans/fragment ("PUNCH HERE")	3
Railroad spike	1
Offset threaded can	1
Metal band/strip, ¾-inch wide	1
Total	**32**

7.12.4 Preliminary Evaluation

LA 167610 is a historic artifact scatter of mostly ceramic and metal items. No cultural features were discerned and the artifact concentration may be the result of roadside litter. Peru Hill Mill was a railroad siding on the Silver City Branch of the Southwest Railroad. Although the site is in good condition, subsurface cultural deposits are not likely to be present. The few diagnostic artifacts indicate a 1935 to 1945 site date. LA 167610 is recommended ineligible for listing on the NRHP because of the probable absence of subsurface cultural deposits and not likely to contribute important information, beyond what has already been gleaned from the surface artifacts, about the 1935 to 1945 occupation of the area.

7.13 LA 167611

Field Number: Deming East 4
Site Type: Artifact scatter
Land Status: City of Deming
Quadrangle: Deming NW
Elevation (AMSL): 4380
Dimensions: 65 by 20 m
NRHP Recommendation: Not eligible

Topographic LocatioN: plain/flat
Vegetation: Yucca, grass
No. of Components: 1
Cultural Affiliation: Historic, 1900 to 1920
Features: Depression
Artifacts: Bottle glass, ceramic, nails, other

7.13.1 Site Description

LA 167611 is a historic artifact scatter, dating from about 1900 to 1920, on the north side of Arrowhead Drive (Figures 7.68 and 7.69, Appendix A). Local vegetation includes yucca, mesquite, desert marigold, snakeweed, tobosa and other grasses, Russian thistle, and nightshade. Ground visibility is 20 percent. The soil at LA 167611 is included within the Berino and Mohave (BA) soils unit (Neher and Buchanan 1967). The site boundary may extend farther east onto private land, but the ground surface east of the observed artifacts is obscured by vegetation.

Figure 7.68 LA 167611 overview, looking south

7.13.2 Features

No cultural features were identified at LA 167611, and no evidence for the presence of buried cultural features was discerned.

Figure 7.69 LA 167611 site map

7.13.3 Artifacts

The artifact assemblage consists of about 40 to 50 historic artifacts. Thirty-two artifacts were recorded in the field (Table 7.14). Artifacts include a small concentration of wire nails near the edge of the survey area. Other items include an amethyst tall bottle with a patent medicine bottle finish, a galvanized metal bucket, a railroad spike, and an amethyst glass bottle stopper.

7.13.4 Preliminary Evaluation

LA 167611 is a historic artifact scatter consisting mostly of glass and metal items. No cultural features were discerned. The artifact concentration may extend farther east onto private land. The few diagnostic artifacts suggest a site date from about 1900 to 1920. Although the site is in good condition, subsurface cultural deposits are not likely to be present. LA 167611 is recommended ineligible for listing on the NRHP because it probably does not have subsurface cultural deposits and is not likely to yield important information, beyond what has already been gleaned from the artifacts, about the 1900 to 1920 occupation of the area.

Table 7.14 Artifact summary, LA 167611

Description	Count
Ceramics	
Unknown	7
Glass	
Clear glass fragments	4
Brown glass fragment	1
Green glass fragment	1
Blue glass fragment	1
Amethyst glass fragments	2
Amethyst glass base, no marks	1
Amethyst glass patent medicine finish	1
Amethyst glass bottle stopper	1
Metal	
Can, unidentified	2
Railroad spike	1
Mesh screen piece, ¼-inch	1
Nails, wire	8
Metal, galvanized pail/bucket	1
Total	**32**

7.14 Isolated Occurrences

A total of 73 isolated occurrences (IOs) were recorded (IO 17 – not used) during the cultural resource survey (Table 7.15). The IOs consist of prehistoric and historic items. Most were fully documented and are not likely to provide important information beyond what has been documented. The IOs are numbered sequentially within the west and east parcels, with duplicate numbering. They are differentiated on the IO location map (Appendix B) by color.

IO 13-west is a complete Fresno-like (Turner and Hester 1985:174) obsidian arrow point. The specimen is an unnotched, triangular form with convex serrated lateral edges and a convex base. It has a plano-convex cross section and is 2.2 cm long and 1.6 cm wide. IO 18-west is the contracting stem of a Nolan-like (Turner and Hester 1985:132) chert dart point. The specimen has a slight slanting shoulder on one edge

and is 3 cm long and 2.3 cm wide. The blade is missing. IO 30-west is the mid-section of a Maljamar-like (Justice 2002:182–186; Leslie 1978:140–142) basalt dart point. The lateral edges are serrated. The Nolan-like and Maljamar-like dart points are Archaic forms. The Fresno-like arrow point is a Formative form.

IO 3-west, a fragmented bottle, exhibits an American Bottle Company maker's mark—"A. B. Co."—dating from 1905 to 1913 (Lockhart et al. 2007:55). IO 5-west has a William Franzen & Son of Milwaukee, Wisconsin maker's mark dating from ca. 1900 to 1929 (Toulouse 1971:536; Whitten 2010). IO 22-west is a complete colorless bottle embossed with "P. J. Ritter Conserve Co." which was started in 1854 in Philadelphia (Imhof 2006) and in 1915, was making tomato catsup (Foust 1915:145). The base of the bottle also includes a maker's mark—an "F" in a circle of dots. This mark was probably used from ca. 1916 to 1919 by the Fairmont plant of the Owens Bottle Machine Co. In 1914, the Fairmont plant was making catsup bottles (9 oz), as well as grape juice (4 and 16 oz) and liquor bottles (Lockhart et al. 2010:53, 58). IO 35-west is an aqua soft drink bottle used by the Magnolia Bottling Co. of El Paso, Texas, which began business in 1908. The bottle style dates from ca. 1916 to ca. 1918 (Lockhart 2010:287, 304). In general, aqua glass dates from 1880 to 1920, brown (amber) glass dates from 1880 to the present, SCA (sun-colored amethyst/purple) glass dates from ca. 1890 to ca. 1920, and colorless glass (not decolorized with manganese dioxide) dates after 1920 (Duran and McKeown 1980:1040; Fike 1987:13; IMACS 1992; Lockhart 2006:52, 54; Ward et al. 1977:240). IO 34-west is a Prince Albert tobacco can. R. J. Reynolds Tobacco Company "introduced Prince Albert tobacco in an upright pocket tin in 1908" (Rock 1987:62). Hole-in-cap cans (IO 42-west) generally date from 1820 to ca. 1930 and sanitary cans (IO 42-west), which were first brought on the market in 1904, became common after 1920 (Rock 1987:12, 14, 22).

Three clusters of burned and unburned brick fragments were recorded. One metal button is from a military uniform. IO 2-east is an oil can dump. The oil cans are mostly the quart size can which first appeared in the 1930s. Five larger oil cans are also present. IO 10-east includes a concrete foundation and associated refuse. The refuse dates from the mid-1970s and later and includes plastic kids toys, a metal mail box, one coin purse, several tires and mattresses, a spoon, aluminum potted meat cans, and a Folgers instant coffee jar. The concrete foundation is likely associated with gravel pits in the area and supported a wood and corrugated metal structure, probably a mobile home. The structure evidently burned down (Figure 7.81). Other IOs include a small obsidian flake (IO 4-east) and a piece of flaked glass (IO 6-east) (Figure 7.82). The metal button (IO 5-east) was badly corroded and identifying marks were not discernible. In general, the historic IOs date to the first quarter of the twentieth century.

Several IOs—the U.S. Army button (IO 23-west) and projectile points (IOs 13-west, 18-west, 30-west, and 51-west)—are worthy of collection and further research. However, none of the IOs is recommended eligible for inclusion on the NRHP and no further work is recommended for the other IOs. In addition to the IOs, a 45-60 spent Union Metallic Cartridge Company (UMC) cartridge was noted. The 45-60 caliber was manufactured from 1879 to 1935 and was designed for the Winchester 1876 Centennial Model rifle (Barnes 2009:140).

Table 7.15 Isolated occurrences

IO #	Description
	West Parcel
1	Flake, chalcedony, non-cortical
2	Flake, chert, non-cortical
3	Fragmented bottle, with "A. B. Co. G5" on base
4	Scraper, chert, bifacial edge
5	Clear (colorless) bottle, complete, with "W. F. & S. NM MIL"
6	Flake, basalt, cortical

IO #	Description
7	Blue Ink bottle, complete, with "2" on base
8	Horseshoe (Figure 7.70)
9	Flake, basalt, cortical
10	Decorative clear (colorless) bottle fragments (n=2) (Figure 7.71)
11	Brown medicine bottle, 12-sided, 1 13/16 x 1 1/16 inches
12	Horseshoe (Figure 7.72)
13	Projectile point, obsidian, serrated edges, 2.2 x 1.6 cm, plano-convex cross section (Figure 7.73)
14	Rock concentration 1, 3 x 2 m, 38 pieces, average cobble diameter: 5–10 cm, recent (Figure 7.74)
15	Rock concentration 2, 80 cm diameter, recent (Figure 7.75)
16	Flake, white chert, non-cortical
17	**NOT USED**
18	Projectile point fragment, contracting stem (Figure 7.76)
19	Scraper, gray chert (Figure 7.77)
20	Flake, white chert, cortical
21	Flake, gray chert, cortical
22	Clear (colorless) bottle, complete, base with "P J RITTER CONSERVE CO" and "F" in a circle of dots with "7" above
23	Metal, U.S. Army button
24	Purple (SCA) glass fragments (n=8)
25	Flakes (n=2), basalt, non-cortical
26	Flake, brown chert, non-cortical
27	Flake, white chert, non-cortical
28	Purple (SCA) glass fragments (n=4)
29	Crockery fragment, brick fragments (n=5)
30	Projectile point fragment, basalt, mid-section, serrated edges (Figure 7.78)
31	Scraper fragment, gray chert
32	Flake, gray chert, non-cortical
33	Flake, red chert, non-cortical
34	Tobacco can, "Prince Albert"
35	Aqua bottle, complete, 7⅝ x 2⅜ inches, "PROPERTY OF/MAGNOLIA/BOTTLING CO." "REGISTERED/ 6½ FL. OZ." "EL PASO,/TEXAS" on base (Figure 7.79)
36	Flake, complete, brown chert, non-cortical
37	Flake, gray chert, non-cortical
38	Purple (SCA) glass fragments (n=2)
39	Flake, basalt, cortical
40	Ceramic jar sherd, redware
41	Flake, rhyolite, non-cortical
42	Hole-in-cap can, sanitary cans (n=4), whiteware plate fragments (n=6)
43	Model-T door (2 pieces), metal crank, metal sign, metal fragments (n=2)
44	Flake, brown chert, non-cortical
45	Sherd, brownware
46	Flake, brown chert, cortical
47	Flake, basalt, cortical
48	Flake, basalt, cortical
49	Flake, basalt, cortical
50	Flake, rhyolite, non-cortical

IO #	Description
51	Projectile point base, white chert
52	Flake, chalcedony, non-cortical
53	Depression, recent (Figure 7.80)
	East Parcel
1	Glass fragments (amethyst glass shard, blue glass shard, clear crown-type finish)
2	Oil can dump (approximately n=50 quart size cans and 5 tall oil cans) and clear glass bottle base
3	Glass fragments (soda bottle side/BIG CHIEF, rectangular clear base, round clear base/Hazel Atlas 56-0-9042
4	Obsidian flake
5	Metal button, US Army
6	Glass fragment flaked along one edge (Figure 7.82)
7	Glass and historic ceramic (earthenware sugar bowl with handle, amethyst glass shards (2), Coca-Cola base fragment, tire rubber fragment
8	Historic ceramic, porcelain, small bowl, pagoda and other symbols
9	Metal automobile hub cap/1950s–1960s?
10	Concrete foundation, metal pen/corral, recent refuse (tires, toys, mail box, glass) (Figure 7.81)
11	Burned brick fragments, 40–50 small pieces
12	Rectangular hole-in-cap can with key
13	Hole-in-cap can, flattened, 1-½ inch cap
14	Round slide-on can lid, 3-inch diameter
15	Oval can, seafood tin
16	Hinge-lid tobacco can, sanitary cans (3), white earthenware plate fragments (3), clear glass base fragment
17	Hole-in-top (milk) can, flattened, large size
18	Brick fragments, unburned, "HECHO EN MEXICO"
19	Glass insulator fragment
20	Brick fragments (n=22), unburned
21	Utility pole insulator bolt

Figure 7.70 IO 8-west, horseshoe

Figure 7.71 IO 10-west, decorative clear bottle fragments

Figure 7.72 IO 12-west, horseshoe

Figure 7.73 IO 13-west, Fresno-like serrated obsidian arrow point

Figure 7.74 IO 14-west, rock concentration 1 (recent)

Figure 7.75 IO 15-west, rock concentration 2 (recent)

Figure 7.76 IO 18-west, base of a Nolan-like chert dart point

Figure 7.77 IO 19-west, scraper, gray chert

Figure 7.78 IO 30-west, mid-section of a Maljamar-like basalt dart point

Figure 7.79 IO 35-west, aqua bottle

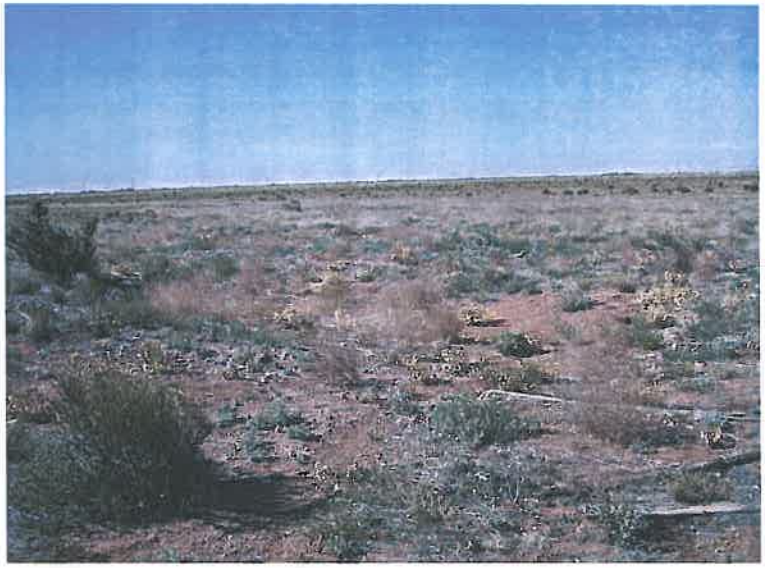

Figure 7.80 IO 53-west, depression looking south (recent)

Figure 7.81 IO 10, overview

Figure 7.82 IO 6, retouched green glass fragment

8.0 Cultural Resource Management

This report presents the findings of a Class I (records search) and Class III (100 percent) pedestrian cultural resource survey by TRC Environmental, Inc. for the City of Deming industrial park about 5.6 km (3.5 mi) north of Deming in Luna County, southwestern New Mexico (Figure 1.1). The City of Deming plans future development in the industrial park, which is ideally suited because of access to railroads and Interstate 10. The project APE is about a 433.8-ha (1071.9-ac) parcel that is bounded on the west, north, and east by fences, and on the south by the Mimbres River and Arrowhead Drive. Cultural resources within the APE were inventoried under three separate surveys that have been funded by Sundrop Fuels (NMCRIS 117801) and the City of Deming (NMCRIS 117756, NMCRIS 118572).

The Class III cultural resource surveys recorded 13 new archaeological sites—LA 166764 through LA 166772 and LA 167608 through LA 167611—one historic structure constructed prior to 1965, and 73 isolated occurrences (IOs) (Table 8.1). Of the 13 sites, three (LA 166766–LA 166768) are prehistoric, nine (LA 166764, LA 166765, LA 166770–LA 166772, LA 167608 –167611) are historic, and one (LA 166769) is both prehistoric and historic. The historic components date to the early twentieth through late twentieth century and the prehistoric components are either Archaic (LA 166767 and LA 166769) or unknown. LA 166766, LA 166767, LA 166769, and LA 167608 are recommended eligible for inclusion on the NRHP under Criteria D, information potential concerning the prehistoric or historic occupation of the Deming area. LA 166772 is recommended eligible under Criterion C, as an excellent example of a riveted water tank and tower dating to the 1920s or 1930s.

Table 8.1 Cultural resource management summary

Site No.	Type	Date	NRHP Recommendation	Project Impact Recommendation
LA 166764	Historic artifact scatter	ca. A.D. 1937–1952	Not eligible	None
LA 166765	Historic artifact scatter	ca. A.D. 1920	Not eligible	None
LA 166766	Prehistoric artifact scatter, feature	9500 B.C.–A.D. 1880	Criterion D	Adverse effect, Test Excavations
LA 166767	Prehistoric artifact scatter	1000 B.C.–A.D. 100	Criterion D	Adverse effect, Test Excavations
LA 166768	Prehistoric artifact scatter	9500 B.C.–A.D. 1880	Not eligible	None
LA 166769	Prehistoric and Historic artifact scatter	5500–3000 B.C. ca. A.D. 1915–1930	Criterion D	Adverse effect, Test Excavations
LA 166770	Historic artifact scatter	ca. A.D. 1905–1915	Not eligible	None
LA 166771	Historic artifact scatter	ca. A.D. 1905–1915	Not eligible	None
LA 166772	Historic structure, artifact scatter	A.D. 1928–1985	Criterion C	Adverse effect, Test Excavations, archival
LA 167608	Historic scatter with circular mound and depression	A.D. 1900–1930	Criterion D	Adverse effect, Test excavations
LA 167609	Historic scatter	A.D. 1900–1920	Not eligible	None
LA 167610	Historic scatter	A.D. 1935–1945	Not eligible	None
LA 167611	Historic scatter	A.D. 1900–1920	Not eligible	None

A total of 73 IOs were recorded (IO 17 – not used) (Table 7.15, Appendix B). The IOs consist of prehistoric and historic items. Most were fully documented and are not likely to provide important information beyond what has been documented. IO 13-west is a complete Fresno-like obsidian arrow point. The specimen is an unnotched, triangular form with convex serrated lateral edges and a convex

base. IO 18-west is the contracting stem of a Nolan-like chert dart point. The specimen has a slight slanting shoulder on one edge and the blade is missing. IO 30-west is the mid-section of a Maljamar-like basalt dart point. The lateral edges are serrated. The Nolan-like and Maljamar-like dart points are Archaic forms. The Fresno-like arrow point is a Formative form.

Several IOs—the U.S. Army button (IO 23-west) and projectile points (IOs 13-west, 18-west, 30-west, and 51-west)—are worthy of collection and further research (Table 7.15, Appendix B). However, none of the IOs is recommended eligible for inclusion on the NRHP and no further work is recommended for the other IOs. In addition to the IOs, a 45-60 spent Union Metallic Cartridge Company (UMC) cartridge was noted. The 45-60 caliber was manufactured from 1879 to 1935 and was designed for the Winchester 1876 Centennial Model rifle.

In the event that bones or prehistoric or historic archaeological materials are uncovered during construction or earth-disturbing activities, the City of Deming will cease work immediately, protect the remains from further disturbance, and notify the appropriate land management agency. If bones are found, the City of Deming will immediately notify local law enforcement and the Office of the Medical Investigator (OMI) pursuant to 18-6-11.2C (Cultural Properties Act NMSA 1978). In accordance with 18-6-11.2C and/or 36 CFR 800.13(b) (Protection of Historic Properties), the City of Deming will notify the State Historic Preservation Officer (SHPO) or the State Archaeologist immediately at (505) 827-6320. In either case, the appropriate land management agency and the SHPO will determine the necessary steps to evaluate significance, document, protect or remove the material or remains, in compliance with the law.

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Appendix A

Site Locations

LA 166764

Field Number: West Deming 1	**Topographic Location:** floodplain
Site Type: historic artifact scatter with features	**Vegetation:** grasses, sagebrush, Mormon tea
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Euro-American
UTM: Zone 13, 234740 E, 3576190 N	**Features:** rock concentration (1), historic trash concentrations (2)
Legal: T23S, R10W, Sec. 19, NE/SW/NW	**Artifacts:** glass, metal cans, historic ceramics
Elevation (AMSL): 1341 m (4400 ft)	**NRHP Recommendation:** not eligible
Dimensions: 79 x 24 m (259 x 79 ft)	

LA 166765

Field Number: West Deming 2	**Topographic Location:** flat in valley
Site Type: historic artifact scatter with feature	**Vegetation:** grasses, soaptree yucca, mesquite
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Euro-American
UTM: Zone 13, 234560 E, 3576782 N	**Features:** brick and rock concentration (1)
Legal: T23S, R10W, Sec. 18, SW/SW/SW	**Artifacts:** glass, metal, historic ceramics
Elevation (AMSL): 1346 m (4416 ft)	**NRHP Recommendation:** not eligible
Dimensions: 65 x 52 m (213 x 171 ft)	

LA 166766

Field Number: West Deming 3	**Topographic Location:** flat in valley
Site Type: chipped stone artifact scatter with feature	**Vegetation:** grasses, desert marigold, soaptree yucca
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Unknown prehistoric
UTM: Zone 13, 234837 E, 3576843 N	**Features:** hearth (1)
Legal: T23S, R10W, Sec. 18, SE/SW/SW	**Artifacts:** cores, chipping debris
Elevation (AMSL): 1345 m (4413 ft)	**NRHP Recommendation:** eligible, Criterion D
Dimensions: 62 x 14 m (203 x 46 ft)	

LA 166767

Field Number: West Deming 4	**Topographic Location:** flat in valley
Site Type: chipped stone artifact scatter with feature	**Vegetation:** tobosa and other grasses, soaptree yucca, desert marigold
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Archaic
UTM: Zone 13, 235117 E, 3576656 N	**Features:** burned rock concentration (1)
Legal: T23S, R10W, Sec. 19, NE/NE/NW, NW/NE/NW	**Artifacts:** projectile point base, bifaces, scraper, chipping debris
Elevation (AMSL): 1344 m (4409 ft)	**NRHP Recommendation:** eligible, Criterion D
Dimensions: 115 x 68 (377 by 223 ft)	

LA 166768

Field Number: West Deming 5	**Topographic Location:** flat in valley
Site Type: chipped stone artifact scatter	**Vegetation:** tobosa and other grasses, soaptree yucca, desert marigold, desert globemallow
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Unknown prehistoric
UTM: Zone 13, 235281 E, 3576676 N	**Features:** none
Legal: T23S, R10W, Sec. 19, NE/NE/NW; Sec. 18, SE/SE/SW	**Artifacts:** bifaces, scrapers, cores, chipping debris
Elevation (AMSL): 1344 m (4409 ft)	**NRHP Recommendation:** not eligible
Dimensions: 82 x 78 m (269 x 256 ft)	

LA 166769

Field Number: West Deming 6	**Topographic Location:** floodplain
Site Type: prehistoric and historic artifact scatter with features	**Vegetation:** various grasses, mesquite, soaptree yucca, desert marigold, desert globemallow
Land Status: City of Deming	**No. of Components:** 2
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Archaic, Euro-American
UTM: Zone 13, 235521 E, 3576647 N	**Features:** burned rock concentration (1), historic artifact concentration (1)
Legal: T23S, R10W, Sec. 19, NE/NW/NE, NW/NW/NE	**Artifacts:** projectile point, bifaces, scrapers, cores, chipping debris
Elevation (AMSL): 1343 m (4407 ft)	**NRHP Recommendation:** eligible, Criterion D
Dimensions: 99 x 96 m (325 x 315 ft)	

LA 166770

Field Number: West Deming 7	**Topographic Location:** flat in valley
Site Type: historic artifact scatter	**Vegetation:** tobosa grass, soaptree yucca, Mormon tea, slender blanketflower
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Euro-American
UTM: Zone 13, 234695 E, 3577873 N	**Features:** none
Legal: T23S, R10W, Sec. 18, NW/SW/NW	**Artifacts:** glass, cans
Elevation (AMSL): 1348 m (4423 ft)	**NRHP Recommendation:** not eligible
Dimensions: 9 x 8 m (30 x 26 ft)	

LA 166771

Field Number: West Deming 8	**Topographic Location:** flat in valley
Site Type: historic artifact scatter	**Vegetation:** tobosa grass, Mormon tea, soaptree yucca
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Euro-American
UTM: Zone 13, 234712 E, 3577779 N	**Features:** none
Legal: T23S, R10W, Sec. 18, NW/SW/NW	**Artifacts:** glass, cans
Elevation (AMSL): 1348 m (4423 ft)	**NRHP Recommendation:** not eligible
Dimensions: 10 x 7 m (33 x 23 ft)	

LA 166772

Field Number: West Deming 9	**Topographic Location:** terrace
Site Type: zinc milling, barite processing	**Vegetation:** tobosa and other grasses, soaptree yucca, desert globemallow, desert marigold
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming West (1967)	**Cultural Affiliation:** Euro-American
UTM: Zone 13, 235561 E, 3577532 N	**Features:** structures, buildings, tailings
Legal: T23S, R10W, Sec. 18, SE	**Artifacts:** glass, metal cans, bricks, equipment
Elevation (AMSL): 1343 m (4405 ft)	**NRHP Recommendation:** eligible, Criterion C
Dimensions: 987 x 726 m (3238 x 2382 ft)	

LA 167608

Field Number: East Deming 1	**Topographic Location:** plain/flat
Site Type: Artifact scatter/feature	**Vegetation:** Yucca, snakeweed, grass
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming NW	**Cultural Affiliation:** Historic, 1900 to 1930
Elevation (AMSL): 4410	**Features:** Depression
Dimensions: 60 by 50 m (197 by 164 ft)	**Artifacts:** Bottle glass, ceramic, tin cans
NRHP Recommendation: Eligible, Criterion D	
UTMs: 235542E, 3577803N	**Legal:** T23S, R9W, NE¼ SW¼ NE¼ Section 18

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LA 167609

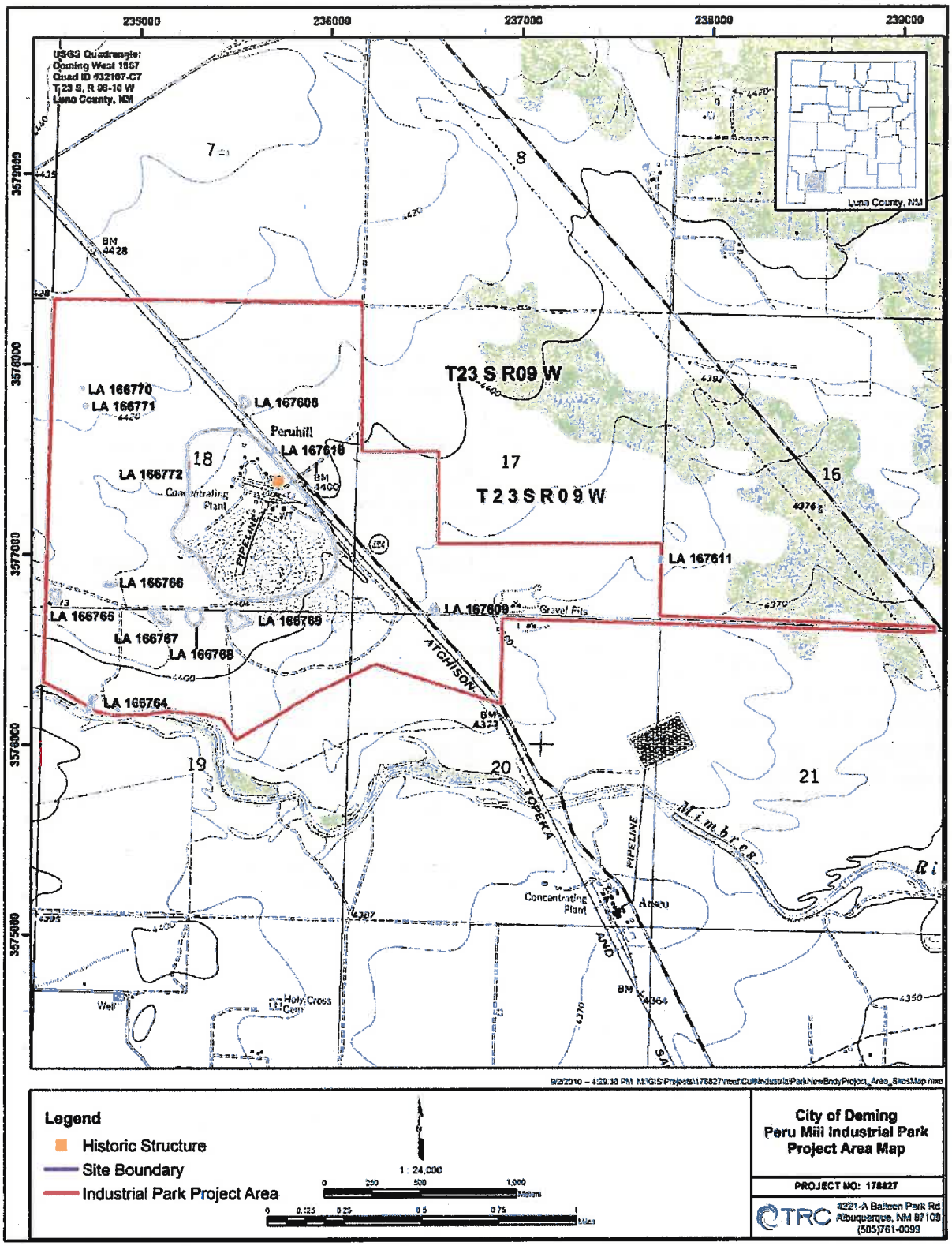
Field Number: East Deming 2	**Topographic Location:** plain/flat
Site Type: Artifact scatter	**Vegetation:** Yucca, grass
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming NW	**Cultural Affiliation:** Historic, 1900 to 1920
Elevation (AMSL): 4390	**Features:** Depression
Dimensions: 40 by 20 m	**Artifacts:** Bottle glass, ceramic, other
NRHP Recommendation: Not eligible	
UTMs: 236539E, 3576704N	**Legal:** T23S, R9W, SW¼ SE¼ SW¼, Section 17

LA 167610

Field Number: East Deming 3	**Topographic Location:** plain/flat
Site Type: Artifact scatter	**Vegetation:** Yucca, grass
Land Status: City of Deming	**No. of Components:** 1
Quadrangle: Deming NW	**Cultural Affiliation:** Historic, 1935 to 1945
Elevation (AMSL): 4405	**Features:** Depression
Dimensions: 25 by 15 m	**Artifacts:** Bottle glass, ceramic, tin cans
NRHP Recommendation: Not eligible	
UTMs: 235694E, 3577539N	**Legal:** T23S, R9W, SE¼ SW¼ NE¼, Section 18

LA 167611

Field Number: East Deming 4	**Topographic Location:** plain/flat
Site Type: Artifact scatter	**Vegetation:** Yucca, grass
Land Status: City of Deming	**No. oOf Components:** 1
Quadrangle: Deming NW	**Cultural Affiliation:** Historic, 1900 to 1920
Elevation (AMSL): 4380	**Features:** Depression
Dimensions: 65 by 20 m	**Artifacts:** Bottle glass, ceramic, nails, other
NRHP Recommendation: Not eligible	
UTMs: 237724E, 3576965N	**Legal:** T23S, R9W, NE¼ SE¼ SE¼E, Section 17



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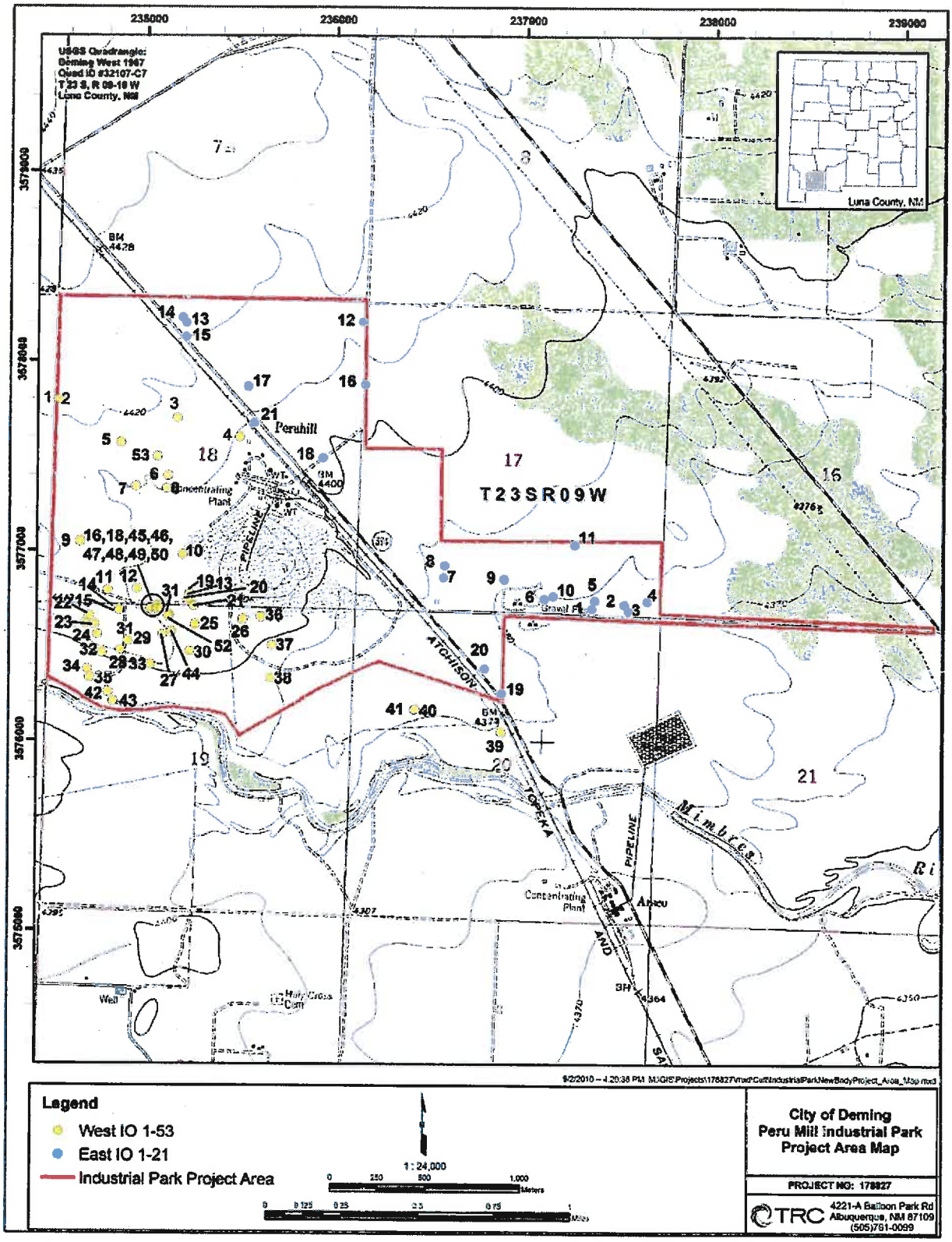
Appendix B

IO Locations

IO #	Description	UTM (Zone 13)	
		Easting	Northing
	West Parcel		
1	Flake, chalcedony, non-cortical	234542	3577795
2	Flake, chert, non-cortical	234550	3577795
3	Fragmented bottle, with "A. B. Co. G5" on base	235169	3577697
4	Scraper, chert, bifacial edge	235498	3577601
5	Clear (colorless) bottle, complete, with "W. F. & S. NM MIL"	234873	3577569
6	Flake, basalt, cortical	235122	3577396
7	Blue ink bottle, complete, with "2" on base	234951	3577340
8	Horseshoe	235114	3577327
9	Flake, basalt, cortical	234663	3577047
10	Decorative clear (colorless) bottle fragments (n=2)	235201	3576980
11	Brown medicine bottle, 12-sided, 1-13/16 x 1-1/16 inches	234807	3576791
12	Horseshoe	234962	3576799
13	Projectile point, obsidian, serrated edges, 2.2 x 1.6 cm, plano-convex cross section	235238	3576777
14	Rock concentration 1, 3 x 2 m, 38 pieces, average cobble diameter: 5–10 cm	234867	3576691
15	Rock concentration 2, 80-cm diameter	234869	3576686
16	Flake, white chert, non-cortical	235069	3576700
17	NOT USED	–	–
18	Projectile point fragment, contracting stem	235073	3576693
19	Scraper, gray chert	235239	3576772
20	Flake, white chert, cortical	235228	3576743
21	Flake, gray chert, cortical	235261	3576709
22	Clear (colorless) bottle, complete, base with "P J RITTER CONSERVE CO" and "F" in a circle of dots with "7" above	234712	3576655
23	Metal, U.S. Army button	234693	3576616
24	Purple (SCA) glass fragments (n=8)	234739	3576612
25	Flakes (n=2), basalt, non-cortical	235267	3576612
26	Flake, brown chert, non-cortical	235518	3576638
27	Flake, white chert, non-cortical	235098	3576558
28	Purple (SCA) glass fragments (n=4)	234756	3576560
29	Crockery fragment, brick fragments (n=5)	234915	3576524
30	Projectile point fragment, basalt, mid-section, serrated edges	235240	3576470
31	Scraper fragment, gray chert	234876	3576477
32	Flake, gray chert, non-cortical	234781	3576462
33	Flake, red chert, non-cortical	235034	3576401
34	Tobacco can, "Prince Albert"	234704	3576377
35	Aqua bottle, complete, 7⅝ x 2⅜ inches, "PROPERTY OF/MAGNOLIA/ BOTTLING CO." "REGISTERED/6½ FL. OZ." "EL PASO,/ TEXAS" on base	234716	3576331
36	Flake, complete, brown chert, non-cortical	235614	3576651
37	Flake, gray chert, non-cortical	235675	3576502
38	Purple (SCA) glass fragments (n=2)	235665	3576330
39	Flake, basalt, cortical	236883	3576047
40	Ceramic jar sherd, redware	236425	3576166
41	Flake, rhyolite, non-cortical	236430	3576168
42	Hole-in-cap can, sanitary cans (n=4), whiteware plate fragments (n=6)	234812	3576254
43	Model-T door (2 pieces), metal crank, metal sign, metal fragments (n=2)	234839	3576206
44	Flake, brown chert, non-cortical	235142	3576575
45	Sherd, brownware	235032	3576695
46	Flake, brown chert, cortical	235060	3576696
47	Flake, basalt, cortical	235069	3576708
48	Flake, basalt, cortical	235071	3576692
49	Flake, basalt, cortical	235069	3576690
50	Flake, rhyolite, non-cortical	235089	3576693
51	Projectile point base, white chert	235131	3576660
52	Flake, chalcedony, non-cortical	235126	3576653
53	Depression	235065	3577496
	East Parcel		
1	Glass fragments (amethyst glass shard, blue glass shard, clear crown-type	237363	3576698

IO #	Description	UTM (Zone 13)	
		Easting	Northing
	finish)		
2	Oil can dump (approximately n=50 quart size cans and 5 tall oil cans) and clear glass bottle base	237534	3576720
3	Glass fragments (soda bottle side/BIG CHIEF, rectangular clear base, round clear base/Hazel Atlas 56-0-9042	237556	3576686
4	Obsidian flake	237654	3576739
5	Metal button, US Army	237378	3576742
6	Glass fragment flaked along one edge	237111	3576749
7	Glass and historic ceramic (earthenware sugar bowl with handle, amethyst glass shards (2), Coca-Cola base fragment, tire rubber fragment	236579	3576860
8	Historic ceramic, porcelain, small bowl, pagoda and other symbols	236584	3576924
9	Metal automobile hub cap/1950s–1960s?	236898	3576852
10	Concrete foundation, metal pen/corral, recent refuse (tires, toys, mail box, glass)	237157	3576765
11	Burned brick fragments, 40–50 small pieces	237271	3577037
12	Rectangular hole-in-cap can with key	236147	3578206
13	Hole-in-cap can, flattened, 1-½ inch cap	235217	3578201
14	Round slide-on can lid, 3-inch diameter	235196	3578229
15	Oval can, seafood tin	235215	3578126
16	Hinge-lid tobacco can, sanitary cans (3), white earthenware plate fragments (3), clear glass base fragment	236160	3578875
17	Hole-in-top (milk) can, flattened, large size	235544	3577865
18	Brick fragments, unburned, "HECHO EN MEXICO"	235940	3577489
19	Glass insulator fragment	236889	3576250
20	Brick fragments (n=22), unburned	236796	3576382
21	Utility pole insulator bolt	235576	3577672


USGS Quadrangle:
Deming West 1967
Quad ID #32107-C7
T 23 S, R 09-10 W
Luna County, NM
Luna County, NM
T23SR09W
Peruhill
Concentrating Plant
PIPELINE
ATCHISON
TOPEKA
AND
SANTA FE
Mimbres
Concentrating Plant
Anku
Well
Holy Cross Cem
Gravel Pit
BM 4428
BM 4379
BM 4364
Legend
West IO 1-53
East IO 1-21
Industrial Park Project Area
1:24,000
0 250 500 1,000 Meters
0 0.125 0.25 0.5 0.75 1 Miles
City of Deming
Peru Mill Industrial Park
Project Area Map
PROJECT NO: 178827
TRC
4221-A Balloon Park Rd
Albuquerque, NM 87109
(505)761-0099

Appendix C

U.S. Patents

Sept. 1, 1936. E. W. FUERST Des. 101,032

BOTTLE

Filed July 22, 1936

FIG -1-

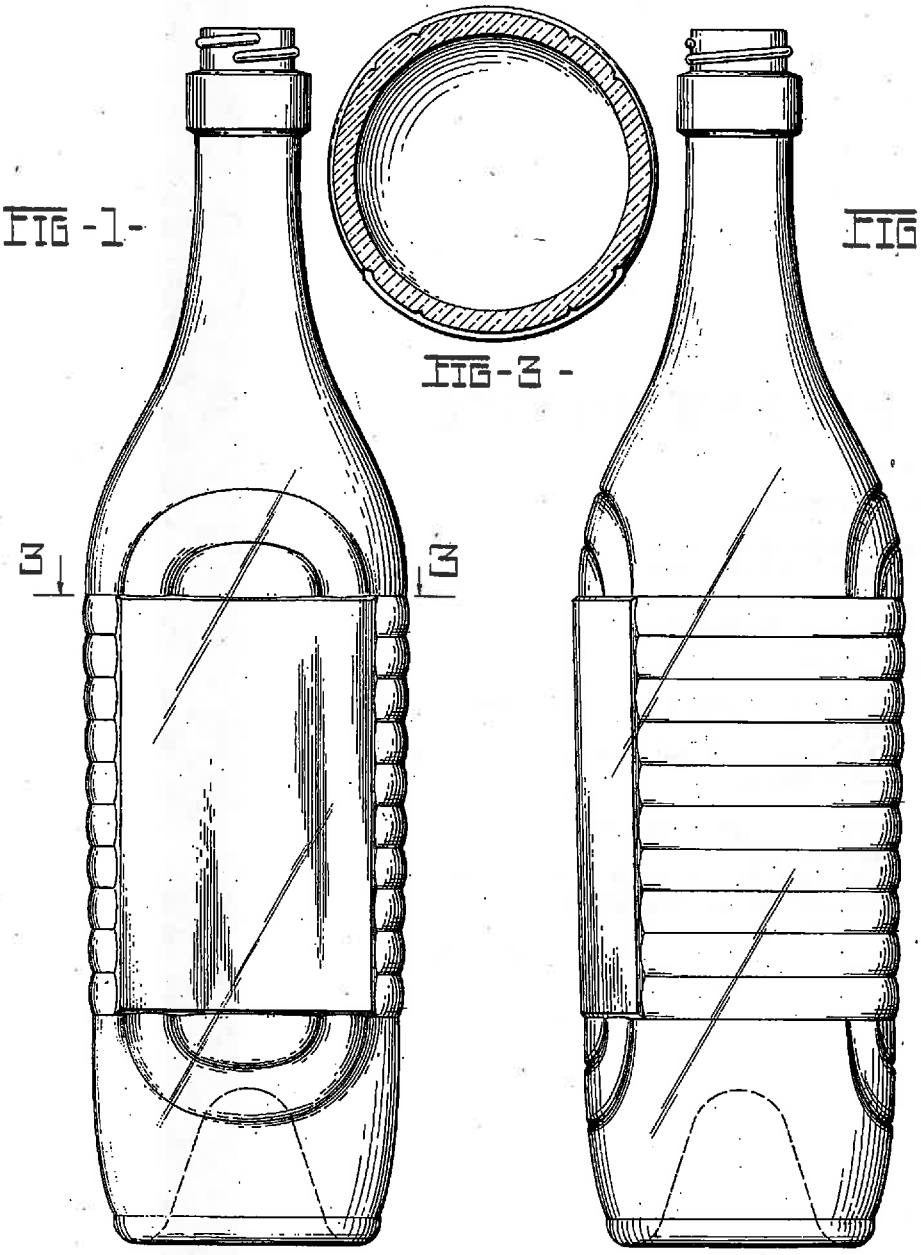


FIG-3 -

FIG-2-

INVENTOR.
Edwin W. Fuerst.
BY Rule & Hoge
ATTORNEYS.

Patented Sept. 1, 1936

Des. 101,032

UNITED STATES PATENT OFFICE

101,032

DESIGN FOR A BOTTLE

Edwin W. Fuerst, Toledo, Ohio, assignor to Owens-Illinois Glass Company, Toledo, Ohio, a corporation of Ohio

Application July 22, 1936, Serial No. 63,979

Term of patent 14 years

To all whom it may concern:

Be it known that I, Edwin W. Fuerst, a citizen of the United States, and residing at Toledo, in the county of Lucas and State of Ohio, have invented a new, original, and ornamental Design for a Bottle, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

In the drawing:

Fig. 1 is a side elevational view of a bottle showing my new design.

Fig. 2 is a side elevational view taken at a right angle to Fig. 1.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1.

I claim:

The ornamental design for a bottle substantially as shown.

Signed at Toledo, in the county of Lucas and State of Ohio, this 14th day of July, 1936.

EDWIN W. FUERST.

Oct. 31, 1933. J. B. VANDERBILT Des. 90,963

CONTAINER

Filed July 29, 1933

Fig. 1.

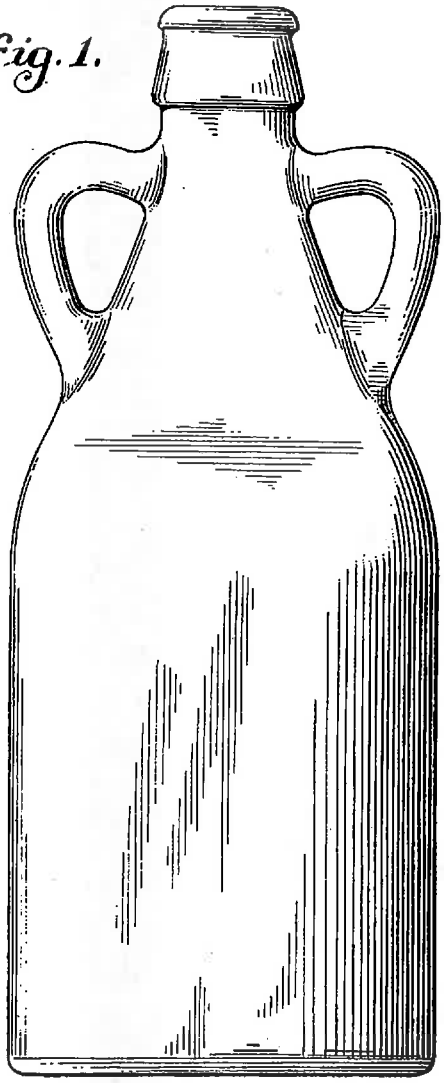
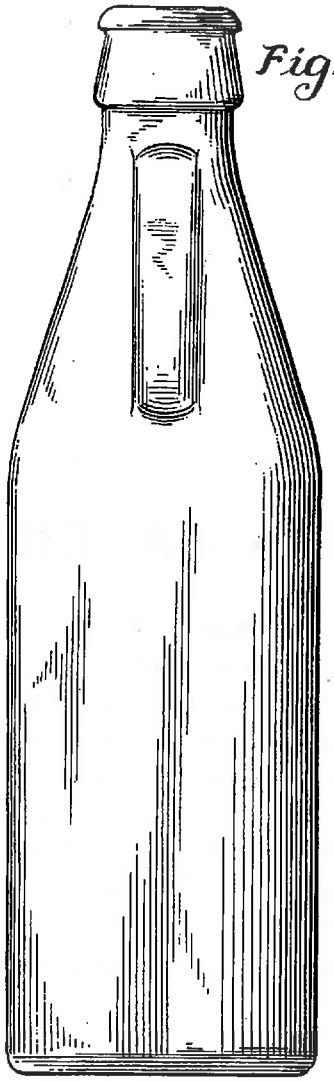


Fig. 2.



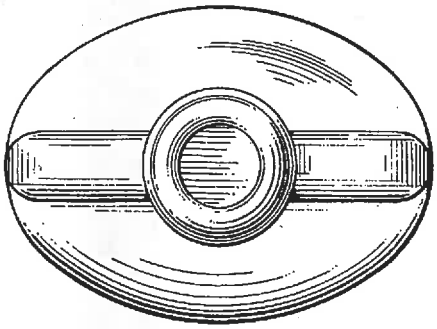


Fig. 3.

Inventor

Joseph B. Vanderbilt

By Mason Fenwick & Lawrence

Attorneys

Patented Oct. 31, 1933

Des. 90,963

UNITED STATES PATENT OFFICE

90,963

DESIGN FOR A CONTAINER

Joseph B. Vanderbilt, New York, N. Y.

Application July 29, 1933. Serial No. 48,876

Term of patent 14 years

To all whom it may concern:

Be it known that I, JOSEPH B. VANDERBILT, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new, original, and ornamental Design for a Container, as shown in the accompanying drawing and described in the following specification.

Figure 1 is a front elevation;
Figure 2 is a side elevation; and
Figure 3 is a top plan view.

This design is characterized by the distinctive appearance of the two grips or handles, one on each side, and positioned on the narrowing neck of the container.

I claim:

The ornamental design for a container as shown and described.

JOSEPH B. VANDERBILT.

July 6, 1937. F. J. PETTY Des. 105,231

PACKER JAR

Filed Dec. 1, 1936

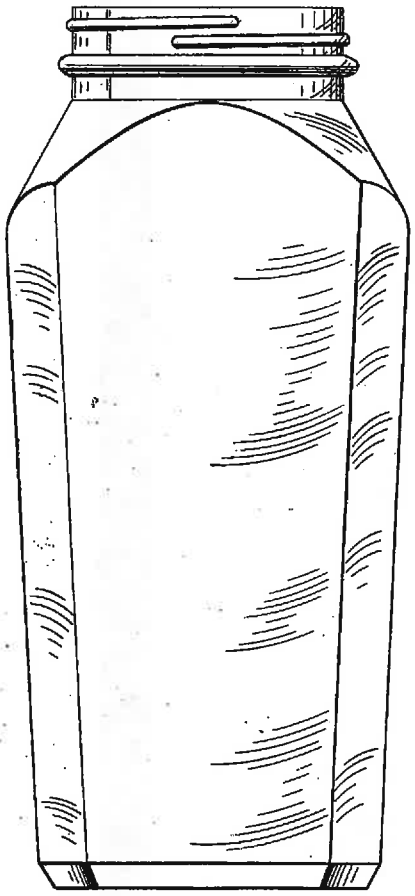


Fig. 1.

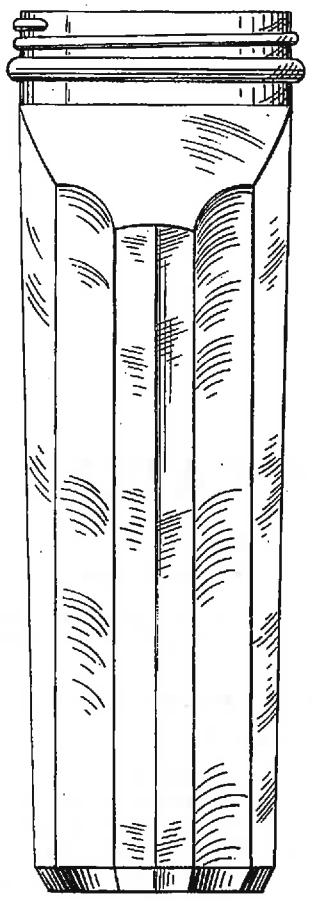


Fig. 2.

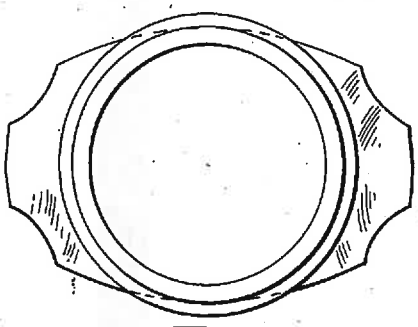


Fig. 3.

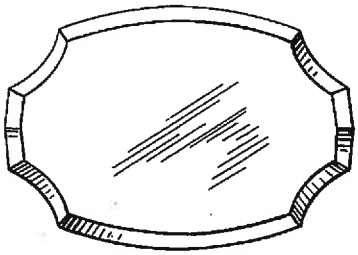


Fig. 4.

INVENTOR.
Fred J. Petty
By Green & McCallister
His Attorneys

Patented July 6, 1937

Des. 105,231

UNITED STATES PATENT OFFICE

105,231

DESIGN FOR A PACKER JAR

Fred J. Petty, Muncie, Ind., assignor to Ball Brothers Company, Muncie, Ind., a corporation of Indiana

Application December 1, 1936, Serial No. 66,241

Term of patent 7 years

To all whom it may concern:

Be it known that I, Fred J. Petty, a citizen of the United States and resiaing at Muncie, in the county of Delaware and State of Indiana, U. S. A., have invented a new, original, and ornamental Design for a Packer Jar, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof, wherein:

Figure 1 is a view in side elevation of a packer jar embodying my design; Figure 2 is a view in end elevation of the jar illustrated in Figure 1; Figure 3 is a top plan view of the packer jar; and, Figure 4 is a bottom plan view of said jar.

I claim:

The ornamental design for a packer jar substantially as shown.

FRED J. PETTY.