# RESTORATION PLAN FOR THE NEW MEXICO ASARCO FACILITIES



New Mexico Office of Natural Resources Trustee 4910-A Alameda NE Albuquerque, NM 87113

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# Contents

List of Fig	ures	3		
Section 1. Introduction, Purpose, and Authority 4				
1.1	Overview of the ASARCO Facilities	5		
	1.1.1 The Blackhawk Mine Site	5		
	1.1.2 The Stephenson-Bennett Mine Site	7		
	1.1.3 The Deming Mill Site	8		
	1.1.4 The Doña Ana Metals Survey Site	9		
	1.1.5 The Magdalena Mine Site 1	10		
1.2	NRDA Restoration 1	11		
1.3	Public Participation 1	12		
Section 2.	<b>Restoration Alternatives</b>	2		
2.1	Restoration Projects	2		
	2.1.1 Proposed Blackhawk Restoration Project 1	3		
	2.1.2 Supplemental Stephenson-Bennett and Doña Ana Metals			
	Survey Restoration Projects	15		
2.2	Purpose of the Proposed Project 1	5		
2.3	Probability of Success of the Proposed Project 1	5		
2.4	Performance Criteria for the Proposed Project 1	5		
2.5	Benefits of the Proposed Project 1	5		
2.6	Evaluation of the Alternatives 1	6		
2.7	Project Costs 1	6		
Section 3.	Public Comment	6		

References
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# Figures

1	Location of the ASARCO Facilities	5
2	Location of the Blackhawk Mine	6
3	Location of the Stephenson-Bennett Mine	8
4	Location of the Deming Mill	9
5	Location of the Doña Ana Metals Survey Site	10
6	Location of the Magdalena Mine	11

# 1. Introduction, Purpose, and Authority

The *Restoration Plan for the New Mexico ASARCO Facilities* (RP) has been prepared by the New Mexico Office of Natural Resources Trustee (ONRT)<sup>1</sup> to address the restoration actions arising from a bankruptcy settlement for natural resource damages resulting from releases of hazardous substances from five ASARCO LLC (formerly the American Smelting and Refining Company) facilities. The ASARCO facilities include: the Blackhawk Mine (in Grant County), the Stephenson-Bennett Mine (in Doña Ana County), the Deming Mill (in Luna County), the Doña Ana Metals Survey site (in Doña Ana County), and the Magdalena Mine (in Socorro County). Two of the facilities are owned by ASARCO (the Deming Mill and the Magdalena Mine) and the other three were operated but not owned by ASARCO (the Blackhawk Mine, the Stephenson-Bennett Mine, and the Doña Ana Metals Survey site). All facilities started operations more than fifty years ago and none are currently active. Operational activities at the facilities resulted in the release of hazardous substances which injured groundwater, surface water and terrestrial natural resources under State trusteeship authority.

As a result of the settlement with ASARCO, the ONRT received \$1.12 million for settlement of natural resource damages; this amount is composed of \$1,029,598 for resources restoration and \$88,251 for reimbursement of costs. In addition, the State of New Mexico was awarded \$2.6 million for cleanup work associated with the ASARCO sites: \$290,000 for remedial work associated with the Blackhawk Mine site and the Stephenson-Bennett Mine site, and the remainder, \$2,310,000, will be available in a bankruptcy custodial trust for cleanup of the Deming Mill and Magdalena Mine sites.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as the Federal "Superfund" law) provides that the governor of each state is to designate responsible officials as Trustees for natural resources under the jurisdiction of state government. Accordingly, the Governor of New Mexico designated the State Natural Resources Trustee as Trustee for natural resources under the jurisdiction of the State of New Mexico. Under CERCLA the Trustee is required to use money received for restoration settlement to plan and implement restoration actions designed to compensate the public for natural resource injuries, and requires that before settlement monies can be used for restoration activities, a Restoration Plan must be developed for which there must be adequate public notice and opportunity for public comment. This RP was developed in accordance with those requirements. Public notice comments and ONRT's response to these comments are presented in Section 3 of this plan.

<sup>&</sup>lt;sup>1</sup> Under Section 107(f) of the CERCLA, 42 USC § 9607(f), Section 311 of the Clean Water Act (CWA), 33 USC § 1321, and other applicable law, including Subpart G of the National Contingency Plan (NCP), 40 CFR §§ 300.600-300.615, the governor of each state appoints a Trustee for natural resources. The New Mexico Natural Resources Trustee, acting through the New Mexico Office of Natural Resources Trustee (collectively, "ONRT"), is the designated natural resource Trustee for the State of New Mexico. ONRT derives additional authority from the New Mexico Natural Resources Trustee Act, NMSA 1978, §§ 75-7-1 to- 45 (1993).

The RP identifies the restoration alternative selected by ONRT to compensate the public for the injuries to groundwater, surface water and terrestrial resources resulting from the release of hazardous substances from the ASARCO facilities.

According to the guidance provided by federal natural resource damage assessment (NRDA) regulations [43 CFR § 11.82(d)], the selected restoration action is to be feasible, safe, cost-effective, address injured natural resources, consider actual and anticipated conditions, have a reasonable likelihood of success, and be consistent with applicable laws and policies. The selected restoration actions also must not conflict with any ongoing cleanup projects.

The restoration actions identified in this document are based on conceptual plans that do not yet include full implementation design details. At this time the ONRT will commence planning and implementation of the selected restoration project.

#### 1.1 Overview of the ASARCO Facilities

The locations of the five ASARCO facilities are shown on Figure 1 below.



**Figure 1.** ASARCO Facilities: Blackhawk Mine (1), Stephenson-Bennett Mine (2), Deming Mill (3), Doña Ana Metals Survey site (4), and Magdalena Mine (5)

#### 1.1.1 The Blackhawk Mine Site

The Blackhawk Mine site (Blackhawk Site) is located in Grant County approximately 0.5 miles south-southwest of the town of Hanover along the west side of State Highway 356, as shown in Figure 2. The Blackhawk Site is approximately 50-acres in size and includes three former tailing impoundments covering approximately 33 acres and a few other abandoned mining structures (State of New Mexico, 2006). To the east of the site is Hanover Creek and

to the southeast is the Chino Mine (also known as the Santa Rita Mine). This area of Grant County has been heavily mined since the 1800s and continues to this day.

The Blackhawk Site encompasses an area which has been used for the disposal of ore processing materials since the early 1900s (State of New Mexico, 2010b); however, the Blackhawk mine started producing ore between 1925 and 1928 and a mill to process the ore was built in 1928. The mill processed zinc, lead, copper and silver ores from both the on-site mines and other mines in the area. Mine and ore processing tailings were placed in three on-site tailings impoundments. Mining and mill operations ceased in 1950.

Site characterization and removal activities were conducted at the site starting in 1994. Two tailing impoundments (identified as Tailing Impoundments #1 and #2, located in the northeast portion of the site) were removed and disposed off-site. The material in a third impoundment (identified as Tailing Impoundment #3, located in the southwest portion of the site) was left in place, but consolidated and re-contoured for stability, and was covered with a 1-foot cap and reseeded with grasses. In 1996, ASARCO and the New Mexico Environment Department (NMED) signed an Administrative Order on Consent (AOC) to complete investigations and remediation of the site; however, ASARCO was not able to complete a feasibility study by the time bankruptcy was filed in 2005.

Milling, ore processing, and disposal of tailings material at the Blackhawk Site have resulted in injuries to natural resources including groundwater, surface water, and terrestrial habitat resources. Contaminants of concern associated with the Blackhawk Site include lead, zinc, manganese, cadmium, sulfate and total dissolved solids. Additional questions regarding characterization, removal actions, and other details about the Blackhawk Site can be directed to the NMED, Ground Water Quality Bureau, Santa Fe, NM, telephone 505-827-2900.



**Figure 2.** Approximate location of the Blackhawk Mine, Grant County.

## 1.1.2 The Stephenson-Bennett Mine Site

The Stephenson–Bennett Mine site (Stephenson-Bennett Site) is an abandoned mine and mill facility located in the western foothills of the Organ Mountains, approximately 1.5 miles south-southwest of the town of Organ in Doña Ana County. Figure 3 shows the location of the Stephenson-Bennett Site. The site consists of underground mine workings and a former limestone quarry area used as a repository immediately west of the site. The closest communities to the Stephenson-Bennett Site are Butterfield Park and Baylor Canyon Estates subdivision.

Silver, lead, and zinc were produced at the mine over a period from approximately 1849 through 1934 (State of New Mexico, 2010a). In the 1960s, after the mine was abandoned, the U.S. Army Corps of Engineers excavated materials from the quarry area to construct flood control dams in Las Cruces, located approximately 10 miles west-southwest of the site.

Site characterization and removal activities were conducted at the site starting in 1993. A soil and sediment removal action was conducted in 1997-1998 by the U.S Environmental Protection Agency (EPA) from the mine area, an arroyo (referred to as the Stephenson-Bennett Arroyo), and nearby residential areas. The excavated soil and sediments were disposed of in a repository at the former limestone quarry area, which was capped with an engineered cover system consisting of a geosynthetic textile-clay liner, covered with 2-3 feet of soil and rock overburden, and reseeded with grasses (Ecology and Environment, 1998). In 2000, the NMED conducted an Integrated Assessment of the site and off-site areas (i.e., Stephenson-Bennett Arroyo and nearby residential areas) to evaluate the effectiveness of removal action conducted in 1997-1998. The NMED determined that soils in some residential areas, at the toe of the repository, and along the arroyo still had lead concentrations exceeding the established cleanup standard and that these areas should be further characterized to determine if further remedial actions are warranted.

Mine tailings and milling operations at the Stephenson-Bennett Site resulted in injuries to terrestrial habitat resources. Contamination associated with waste derived from mine and milling operations has migrated off-site most likely during heavy precipitation events (transported by the Stephenson-Bennett Arroyo). Contaminants of concern associated with the site include arsenic, cadmium, lead, molybdenum, and zinc. Additional questions regarding characterization, removal actions, and other details about the Stephenson-Bennett Site can be directed to the NMED, Ground Water Quality Bureau, Santa Fe, NM, telephone 505-827-2900.



**Figure 3.** Approximately location of the Stephenson-Bennett Mine, Doña Ana County

# 1.1.3 The Deming Mill Site

The Deming Mill and Tailings site (Deming Site) is located in Luna County approximately one mile northwest of Deming. The site consists of an inactive lead and zinc mill, a tailings impoundment, and other areas where tailings have come to be located (Figure 4).

From 1948 to 1979, the mill used a floatation process to produce lead zinc and copper zinc concentrates from lead and zinc ores. During operation, tailing slurry was transported across the Mimbres River by a pipeline and disposed of in the tailings impoundment (NMED, date unknown).

Site characterization and cleanup activities were conducted at the site starting in 1993 and included the remediation of the mill site, pipeline spill area, and the tailings impoundment (ASARCO, 1995; Martinez, 2000). Remediation of the mill site consisted of contaminated soil removal, capping with soil, and re-vegetation. Contaminated soils within the spill area were removed and disposed of at the tailing impoundment. The tailing impoundment was then capped with soil and re-vegetated. Removal activities were conducted in the windblown tailings area in 2007 and excavated materials were again deposited onto the tailing impoundment (and re-capped and re-vegetated).

Milling, ore processing, and disposal of tailing materials at the Deming Mill Site resulted in injuries to terrestrial habitat resources. Contaminants of concern include arsenic, cobalt, copper, manganese, lead, and zinc. Additional questions regarding characterization, removal actions, and other details about the Deming Mill Site can be directed to the NMED, Ground Water Quality Bureau, Santa Fe, NM, telephone 505-827-2900.



**Figure 4.** Approximate location of the Deming Mill, Luna County

#### 1.1.4 The Doña Ana Metals Survey Site

ASARCO operated a large metal smelting facility (smelter) located in El Paso, Texas. The smelter is located on the tri-regional juncture point for Texas, New Mexico, and the State of Chihuahua, Mexico, adjacent to the Rio Grande (Figure 5). Although the smelter is located in Texas, the area influenced by the smelter includes Doña Ana County, New Mexico. Sunland Park is the nearest community to the smelter located in Doña Ana County and lies about 3 miles north-northwest of the smelter. This area in New Mexico is referred to as the Doña Ana Metals Survey Site (also known as El Paso Metals Site) and is adjacent to the Rio Grande. The Rio Grande bisects the city into two parts, north and south. The northern sector is an industrial and commercial area while the area south of the Rio Grande is primarily residential, open desert, and undeveloped lots (Dulin, 2005).

The smelter was constructed in 1887. The smelter was originally built to process lead ores from the western states, but later also processed antimony, copper, cadmium, and zinc (Drexler, 2003). In 1910 a copper circuit was added to process ore from Arizona (Bernstein, 2004). In the 1930s, 1950s, and 1970s, facilities were added for cadmium, zinc, and antimony, respectively (Drexler, 2003). Roaster and reverberatory gases were emitted from a 828-foot stack and the converter gases were discharged from a 100-foot stack. The smelter ceased lead smelting operations in 1985 and suspended copper smelting in 1999.

Environmental concerns pertaining to plant discharges began in the early 1920s with various private and city disputes concerning damages to crops and human health from excessive smoke releases. By September 2004, the EPA had tested more than 3,600 residential

properties in Texas and New Mexico, and 1,082 of the properties had lead concentrations that were greater than the established soil screening level (Bernstein, 2004). By late 2007, soil removal and cleanup for lead and arsenic were completed for 24 properties identified in Sunland Park, New Mexico.

Ore processing at the smelter resulted in injuries to terrestrial habitat resources. Contaminants of concern include arsenic and lead. Additional questions regarding characterization, removal actions, and other details about the smelter and the Doña Ana Metals Survey Site can be directed to the NMED, Ground Water Quality Bureau, Santa Fe, NM, telephone 505-827-2900.



**Figure 5.** Approximate location of the Doña Ana Metals Survey Site and El Paso Smelter (the latter in Texas)

#### 1.1.5 The Magdalena Mine Site

The Magdalena Mine site (Magdalena Site; also known as Hop Canyon/Waldo Mill site) is located in Hop Canyon, west of Socorro, Socorro County, in a valley bounded by the Magdalena Mountains to the east and Magdalena Peak to the west (Figure 6). Hop Canyon contains an intermittent stream draining the valley to the north-northwest. The town of Magdalena is located approximately 1.2 miles northwest of the mill site, at the base of the valley. The site currently consists of an approximately 18-acre tailings impoundment, mill ruins, and a borrow pit (Schuman and McDonald, 1996).

The Waldo Mill was built in 1913 on the site of a former smelter (Schuman and McDonald, 1996). ASARCO purchased the mill and the nearby Graphic-Waldo Mine to the southeast in 1943 and operated it until 1950.

Site characterization and cleanup activities were conducted at the site starting in 1987. Windblown tailings have been transported as far as a mile north onto residential properties near the village of Magdalena. In 1993, ASARCO consolidated the tailings, an area of black material (fly ash), and soil contaminated by windblown tailings into the tailings impoundment. The impoundment was capped with top soil (Schuman and McDonald, 1996). In 2001, some additional remedial actions were taken, including constructing storm water controls in on-site drainages, removing soils from the drainages with lead contamination and repairing the tailings impoundment cap. A risk-based assessment focused on soils was conducted in 2007 and "hot spot" contaminated soils were removed.

Milling, ore processing and disposal of tailing materials have resulted in injuries to alluvial groundwater and terrestrial habitat resources. Contaminants of concern include arsenic, barium, cadmium, chromium, copper, manganese, lead, and zinc. Additional questions regarding characterization, removal actions, and other details about the smelter and the El Paso Metals Site can be directed to the NMED, Ground Water Quality Bureau, Santa Fe, NM, telephone 505-827-2900.



**Figure 6.** Approximate location of the Magdalena Mine, Socorro County

#### **1.2 NRDA Restoration**

NRDA is a process by which Trustees of natural resources determine what types of, and how many, restoration actions are necessary to compensate the public for injuries to natural resources. Restoration is the act of creating or improving natural resources and the services those resources provide to the public.

The resource restoration money recovered in NRDA settlements can only be used to restore, rehabilitate, replace, or acquire the equivalent of the natural resources injured, destroyed, or lost as a result of the release of hazardous substances [42 USC § 11.33]. The amount of restoration required to compensate for the resource injuries depends on the size of the area,

what types of resources are injured, the overall severity of the injuries, and the time period over which the resources are injured including any injury that remains after cleanup.

#### **1.3 Public Participation**

Public review of the restoration actions proposed in this RP was an integral part of ONRT's restoration planning process. The public comment period for the Draft RP and the proposed project was from May 21, 2010 through June 29, 2010. ONRT received four comment letters. Section 3 summarizes the comments received and provides ONRT's response.

# 2. Restoration Alternatives

The goal of ONRT is to restore, rehabilitate, replace, enhance, or acquire the equivalent of the natural resources and natural resource services that were injured as a result of contamination at sites. In accordance with both ONRT policy and CERCLA [USC 42 §9607 (f)(1)], restoration projects should have a strong relationship to the injured resources and the services they provide. In this particular case, the proposed restoration project and the supplemental restoration projects described below have a strong linkage to groundwater, surface water and terrestrial resources and the services they provide to the ecosystem and humans.

#### 2.1 Restoration Projects

A total of \$1.03 million has been allocated for restoration planning and implementation of restoration projects. ONRT has identified three restoration alternatives: the Blackhawk Restoration Project, the Stephenson-Bennett Restoration Project, and the Doña Ana Metals Survey Restoration Project. Because the settlement sum may not be sufficient to address all three projects, the ONRT prioritized the restoration needs and selected the Blackhawk Restoration Project as the proposed project. The determination to prioritize restoration at the Blackhawk Site was made based on two factors: 1) the Blackhawk Site has been susceptible to erosion and weathering and is in immediate need of repairs and improvements to its existing tailing impoundment, associated drainages, and barren slopes to prevent release of tailings and degradation of the site, and 2) the Stephenson-Bennett Site and the Doña Ana Metals Survey Site require further characterization to determine if restoration actions are warranted for these sites. Should funds remain after implementation of the restoration efforts at the Blackhawk site, ONRT will use these funds to implement the Stephenson-Bennett Restoration Project and/or the Doña Ana Metals Survey Project as supplemental projects based on findings and recommendations resulting from additional characterization conducted at these site.

The remaining ASARCO facilities, the Deming and Magdalena sites, were not considered for restoration actions under this RP. Remedial actions for the Deming Site and the Magdalena Site are to be addressed with the \$2,310,000 bankruptcy custodial trust set up for the cleanup of these sites, therefore there was no need for additional funding at this time.

# 2.1.1 Proposed Blackhawk Restoration Project

The proposed Blackhawk Restoration Project will focus on two main areas of concern at the Blackhawk Site: 1) erosion and drainage issues at Tailing Impoundment #3 and 2) the barren and eroding slopes resulting from removal activities at former Tailing Impoundments #1 and #2.

Repairs and improvements to Tailing Impoundment #3 will be addressed first. These consist of 1) repair of erosion features resulting from its existing thin soil cover (see Photo 1), 2) placement of a thicker and more protective soil cover (see Photo 2) followed by grass seeding, and 3) improvement of drainage channels along the north and south sides of the impoundment (see Photo 3).



**Photo 1.** Obvious erosion on the east slope of Tailing Impoundment #3 (vegetation and soil cap have weathered away).



**Photo 2.** The trench shows the existing thin soil cover (i.e., cap) at Tailing Impoundment #3.



**Photo 3.** Run-off erosion demonstrating the need for improved drainages.

After completion of restoration activities on Tailings Impoundment #3, barren and eroding slopes associated with Tailing Impoundments #1 and #2 will be stabilized by re-grading, placement of additional soil cover, and re-vegetation, as appropriate (see Photo 4 below).



Photo 4. Barren eroding slope, north area.

Restoration actions will reduce water run-off contact with mine tailings containing elevated levels of lead and will protect groundwater, surface water and terrestrial resource quality by capturing run-off with improved drainages and soil covers with higher water storage capacities. Once the proposed restoration work is completed, the NMED will provide long-term monitoring and maintenance of the site to prevent the development of new significant erosional features. Groundwater and surface water will be monitored to track the effectiveness of the restoration project.

# 2.1.2 Supplemental Stephenson-Bennett and Doña Ana Metals Survey Restoration Projects

In the event that funds remain after completion of the restoration actions for the Blackhawk Site, ONRT has identified the Stephenson-Bennett Restoration Project and the Doña Ana Metals Survey Restoration Project as supplemental restoration projects. Pending further investigation, it is anticipated that restoration activities for the Stephenson-Bennett Site may require the removal and disposal, or stabilization, of lead and arsenic contaminated soils and sediments, with particular emphasis on areas where runoff has occurred in the past from the nearby Stephenson-Bennett Arroyo. Similarly, pending further characterization, restoration activities at the Doña Ana Metals Survey Site may require addressing lead and arsenic impacts from the site to groundwater, surface water and sediments.

If funds remain after the completion of the Blackhawk Restoration Project and additional characterization efforts demonstrate the need of further remedial actions at one or both supplemental restoration project locations, then the ONRT will prepare and submit for public comment a modification to this RP.

### 2.2 Purpose of the Proposed Project

The purpose of the proposed project is the protection of groundwater, surface water and terrestrial resources from future contamination. Improvements to the tailing impoundment, drainages, and slopes at the Blackhawk Site will minimize exposure to heavy metals and improve the quality of groundwater, surface water and terrestrial resources.

# 2.3 Probability of Success of the Proposed Project

The probability of success of the Blackhawk Restoration Project is high. The activities proposed for this project will reduce the potential of natural resource exposure to heavy metals.

# 2.4 Performance Criteria for the Proposed Project

Success for the Blackhawk Restoration Project will be measured through groundwater and surface water monitoring to verify that additional contamination has not been released. The monitoring will be conducted by NMED and will occur periodically.

# 2.5 Benefits of the Proposed Project

The expected environmental benefit of the Blackhawk Restoration Project is the prevention of groundwater, surface water and terrestrial resource contamination from exposure to heavy metals.

## **2.6 Evaluation of the Alternatives**

The proposed activities for the Blackhawk Restoration Project are feasible and are expected to benefit the groundwater, surface water and terrestrial resources in close proximity of the injured resources.

## 2.7 Project Costs

The current estimated cost to improve the soil cover and drainages, stabilize barren slopes, and conduct re-vegetation at the Blackhawk Site is approximately \$880,000. These costs include access, mobilization, project implementation, and contractor costs.

# 3. Public Comment

The public comment period for the Draft RP was from May 21, 2010 through June 29, 2010. Four comment letters were received by the ONRT. Commenters offered site-specific information and provided suggestions for additional restoration actions and methodologies to be employed as part of the Restoration Project. The commenters did not object to the selection of the Blackhawk Restoration Project and did not provide suggestions for additional restoration projects.

NMED will oversee the Blackhawk Restoration Project for ONRT. ONRT has referred the comment letters to the NMED for consideration as part of their planning and implementation of the Restoration Project.

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