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CIMARRON MINING CORPORATION SUPERFUND SITE

Ground Water Remedial Action

Five-Year Review

Carrizozo, Lincoln County, New Mexico

**United States
Environmental Protection Agency
Region 6
Superfund Division**

July 1998

918765



Section 1 Introduction

1.1 Authority Statement

The U.S. Environmental Protection Agency (EPA) Region 6 has completed a statutory, Type 1a, 5-Year Review for the Cimarron Mining Superfund site, Operable Unit No.1 (OU1), ground water remedial action. This review was conducted pursuant to the Comprehensive Environmental Response Compensation and Liability Act, CERCLA Section 121(c), NCP section 300.430(f)(4)(ii), Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-02A (July 26, 1994), and OSWER Directive 9355.7-03A (December 21, 1995).

This is the first 5-year review for the Cimarron Mining (OU1) site. The purpose of this report is to determine whether the ground water remedial action for the site remains protective of human health and the environment, to determine if the ground water remedial action is functioning as designed, and to determine if remedial action levels have been met.

The site was functionally divided into two operable units by EPA and the New Mexico Environment Department (NMED); The Cimarron Mining Corporation site (OU1) and the Sierra Blanca Operable Unit (OU2). Since no hazardous substances above health-based levels remain on-site at Sierra Blanca (OU2), the Five-Year Review requirements of Section 121(c) of the Superfund Amendments and Reauthorization Act of 1986, 42 U.S. C. Par. 9621(c), for this operable unit of the site are not applicable, no institutional controls are necessary, and the property has no restricted use.

1.2 Trigger Dates

The frequency of conducting a 5-year review is based upon the Trigger Date which is defined as the remedial action onsite construction date. For the purpose of the Cimarron Mining Site (OU1), the ground water remedial action began January, 1993, at the time the groundwater extraction system became fully operational.

1.3 Elements of the 1a Review

The Type 1a review is a modified version of the Type I review and is applicable for a site where remedial action is ongoing. Because ground water remediation is ongoing, this level of review is appropriate for the Cimarron Mining Site (OU1).

A Type 1a review emphasizes only relevant protectiveness factors which are analyzed at a level commensurate with the activities at the site. It requires a review of the Record of Decision and a review of monitoring information. The Type 1a review for the Cimarron

Mining Site (OU1) includes a summary of the following:

- . Site History
- . Remedial Action Objectives
- . Summary of Site Remedial Activities
- . Conclusions and Recommendations
- . Statement on Protectiveness

Section 2.0 Site Description

The Cimarron Mining Site (OU1) is located approximately 1/4 mile east of Carrizozo, Lincoln County, New Mexico and approximately 100 miles south-southeast of Albuquerque. The site is about 10.6 acres in size, and is located in the NE 1/4 Section 2, Township 8S, Range 10E, on the north side of Highway 380. The facility consisted of a conventional agitation mill, which resulted in unpermitted discharge of contaminated liquids, the stockpiling of contaminated liquids, and the stockpiling of tailings and other waste sediment. Access to the site is restricted by an 8-foot fence. Approximately 1500 people live within a two mile radius of the site. Figure 1-1 shows the locations of both OU1 and OU2.

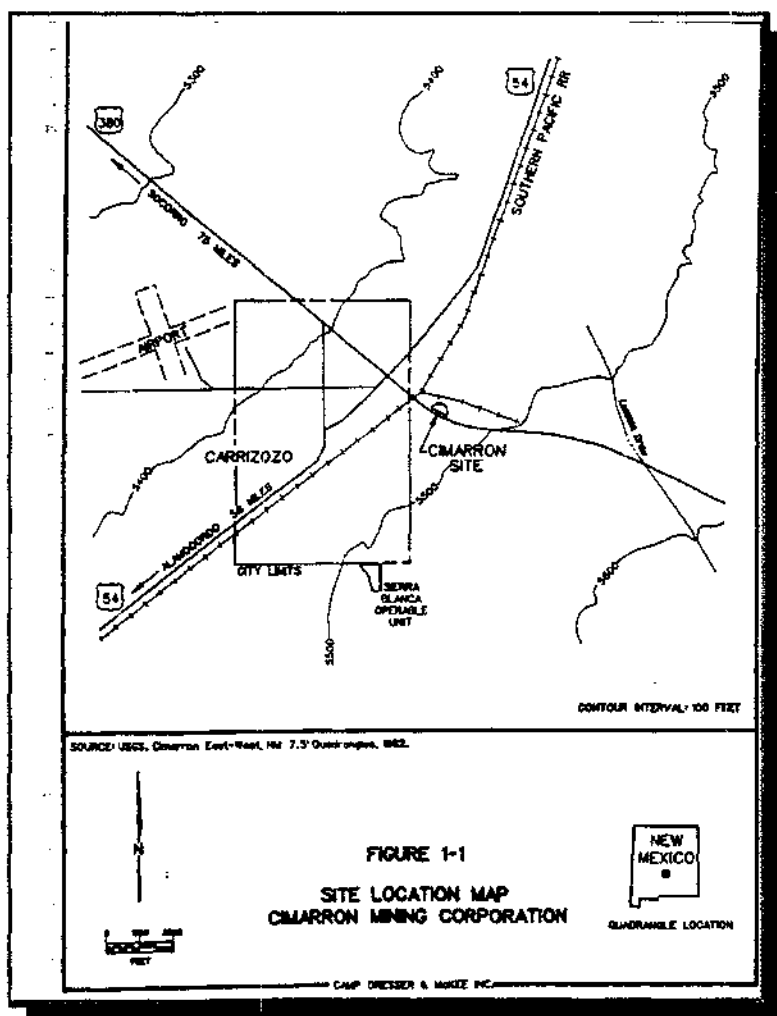


FIGURE 1-1

2.1 Operating History

The Cimarron Mining Corporation site is an inactive milling facility originally owned by Zia Steel Inc., and used to recover iron from ores transported to the site. The iron recovery process took place between the late 1960s and 1979 and involved crushing of the ore material, formation of a pumpable slurry by mixing with fresh and recycled water, and collection of the ferric (iron) portion using a magnetic separator. Cyanide was not used in this original process, and tailings were transported from the site and used as fill material. In 1979, the site was sold to Southwest Minerals Corporation, which apparently began using cyanide soon thereafter to extract precious metals from ore. Details on the operation between 1979 and 1981 are not available other than a 1980 New Mexico Environmental Improvement Division (NMEID) sample analysis report, which noted the presence of cyanide contamination.

Southwest Minerals, a subsidiary of Sierra Blanca Mining and Milling Company, operated without the required permits necessary for conducting cyanide processing at the site. In mid-1981, the operation was expanded by adding several large mixing tanks, cyanide solution tanks, thickeners, and associated pumping and conveying equipment. NMEID sent a certified notice of violations to Cimarron Mining Corporation on June 22, 1982, for discharging into a non-permitted discharge pit and, in July 1982, the site ceased operation. No legal action was taken by the state; the company filed for bankruptcy in July 1983, and a court assigned bankruptcy trustee was appointed for the site.

NMEID field inspections of the site in February 1980, June 1982, and in May and June 1984 revealed the presence of cyanide and elevated metals in shallow ground water, soil and mill tailings.

An Expanded Site Inspection (ESI) was conducted from January to October 1987, by EPA's Field Investigation Team (FIT). The objective of the ESI was to collect additional data for the Hazard Ranking System (HRS) and facilitate RI/FS planning.

On-site activities performed during the ESI included surface and subsurface soil sampling, visual inspection of process tanks, sampling of remnant materials in the tanks, quantifying waste volumes, sampling and geologically describing subsurface soil borings during installation of monitoring wells, sampling ground water in the monitoring wells and in nearby water supply wells, testing in-situ permeability at the monitor wells, and identifying adjacent land uses.

Based on the findings of the site investigations and the preparation of the HRS package, the Cimarron Mining Corporation site was proposed for addition to the National Priorities List (NPL) on June 24, 1988. On October 4, 1989, the site was formally placed on the NPL.

2.2 Early Regulatory Actions

In March 1989, EPA tasked the firm of Camp Dresser and McKee, an Alternative Remedial Contracts Support (ARCS) contractor, to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the site. A preliminary sampling program was conducted on June 19-23, 1989, to sample existing monitoring wells and known contaminated source areas. Results of the preliminary sampling program were utilized to refine the sampling plan for the RI field investigation.

The RI field work and feasibility study began in August 1989 and was completed in June 1990. The data generated was used to estimate the extent and magnitude of contamination at the Cimarron Mining site and to develop and evaluate remedial alternatives for the shallow ground water and contaminated surface areas.

Section 3.0 Remedial Action Objectives

3.1 Record of Decision

Remedial action objectives were proposed in order to protect human health and the environment. The objective specifies the contaminant(s) of concern, exposure route(s) and receptors, and an acceptable contaminant range for each exposure route. Preliminary remediation goals are based, where possible, on the baseline risk assessment and Federal and State ARARs.

As determined by the Endangerment Assessment, concentrations of cyanide and metals in soils, waste piles and sediment at the Cimarron site did not constitute the need for remedial action. Site ground water, however, has been impacted by cyanide and associated nitrate contamination to a degree that remedial action was considered appropriate. Although federal drinking water standards were not considered ARARs due to the characterization of the site ground water as Class IIIA, remediation of the upper ground water zone was considered necessary to protect potential underlying drinking water aquifers.

A total of six alternatives for the Cimarron Mining site remediation were analyzed in detail. The detailed evaluation process followed a structured format, designed to provide relevant information needed to adequately compare and evaluate feasible alternatives to allow selection of an appropriate remedy for the site by EPA through the Record of Decision (ROD) process. The remedy had to meet the following statutory requirements:

- o Be protective of human health and the environment
- o Attain ARARs (or provide grounds for a waiver)
- o Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and

- o Satisfy the preference for treatment that reduces toxicity, mobility, or volume as a principal element, or provide an explanation in the ROD as to why it does not.

The selected alternative for remediation of the Cimarron Mining Site was to extract contaminated shallow groundwater and discharge it to the City of Carrizozo sewage treatment plant. The risk assessment showed that soil contamination at the site was below action levels and the ground water contaminant of concern was cyanide. This alternative also included the filling in of the cinder block trenches and discharge pit, plugging the abandoned water supply well and inspection and maintenance of the existing fence.

3.1.1 Pump and Discharge Ground Water System

The system uses a total of seven (7) extraction wells and pumps to transport the flow of ground water to a sewer tap located approximately 200 feet south of the site. The sewer conveys the Cimarron ground water several miles to the City of Carrizozo's publically owned treatment works (POTW). The estimated flow of ground water from the extraction wells is approximately 6 gallons per minute (gpm). The discharge to the POTW complies with the pretreatment standard of 5mg/l of cyanide as cited in 40 CFR413.24 Subpart B and deemed relevant for this action. Biological activity within the existing lagoons at the POTW, coupled with effluent chlorination, photodecomposition, and dilution with other municipal sewage, constitutes treatment to further reduce the cyanide concentration.

Section 4.0 Summary of Site Remediation Activities

The ground water remediation system is operated by the U.S. Army Corps of Engineers, Albuquerque District under an interagency agreement with the Environmental Protection Agency (EPA).

4.1 Groundwater Monitoring

Periodic monitoring of the ground water system is conducted to ensure protection of public health and the environment throughout remedial action of the site. Currently, samples are collected once every two weeks from onsite monitoring well MW-4, from the site effluent, and from the POTW effluent. These three samples are sent offsite for cyanide analysis. A slight decrease in onsite concentration has been observed from MW-4 and no significant change has been noted in the site effluent and POTW effluent samples.

4.2 Ground Water Remediation System (GRS)

4.2.1 Objective

The objective of the GRS is to provide overall protection of human health and the environment by reducing the mobility and volume of cyanide in the shallow aquifer. The toxicity of the cyanide will be reduced through treatment at the publically owned treatment works (POTW).

4.2.2 Description

The ground water extraction system consists of seven (7) extraction wells to collect contaminated ground water. The extraction wells are located directly adjacent to the primary source(s) of ground water contamination (ie, the former cinder block trenches). The locations were chosen to allow removal of the primary source of cyanide contaminated ground water. The wells are installed deep enough to capture the entire vertical extent of the area of heaviest ground water contamination and provide adequate available drawdown for efficient well pumping. The positioning of the extraction wells with respect to nearby monitor wells enable monitoring of drawdown and ground water quality within the area influenced by the extraction wells.

A two-inch PVC extraction well discharge header, installed below grade, transports the contaminated ground water to a PVC sewer tap approximately 200 feet south of the site. The contaminated groundwater is then commingled with other public and private sewage and conveyed by gravity to the POTW.

4.2.3 Performance

The extraction wells are designed to transport approximately 6 gallons per minute (gpm) of contaminated groundwater to the POTW. However, due to the remoteness of the site and frequent power failures and lightning strikes, the system performance has only operated approximately 65% of the time over the past 5 years. Recent modifications to the system, such as the installation of an autodialer to alert USACE personnel of power failures and replacement of PVC piping and gages, will improve system performance.

Section 5.0 Conclusions and Recommendations

5.1 Conclusions

The existing groundwater extraction and treatment system at the Cimarron Mining Corporation Superfund site is successfully removing and treating contaminated ground water from the site. Increased performance and operating time is expected from recent modifications to the system.

5.2 Recommendations

Based on review of site conditions, EPA Region 6 recommends the following actions related to groundwater Remedial Action at the Cimarron Mining Corporation Superfund site:

- 1) continue to extract and treat contaminated ground water,
- 2) conduct a thorough assessment of cyanide groundwater contamination conditions in and around the source area to evaluate remedial action effectiveness, and
- 3) reduce sampling frequency for cyanide monitoring from every two weeks to quarterly.

5.3 Next Five Year Review

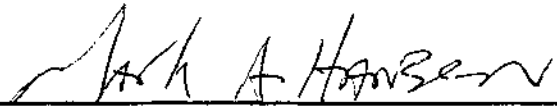
In the event that continued groundwater extraction and treatment is required at the site, the next Five Year Review will be prepared by EPA in June, 2003.


5.4 Long Term Monitoring

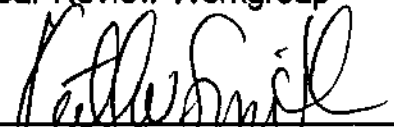
Review of bi-monthly cyanide data from groundwater monitoring well MW-4 indicates a slight decrease in concentration over the past five years. The cyanide concentration in the site effluent sample appears to have remained relatively constant. No cyanide has ever been detected in the POTW effluent. Based on this review, recommendation number 3, above, appears to be warranted.

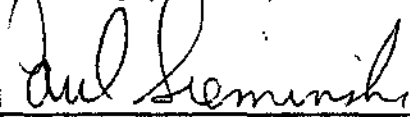
6.0 Statement of Protectiveness


I certify that the remedies selected for this site remain protective of human health and the environment.



 _____ 7-16-98
 Mark Hansen Date
 Remedial Project Manager


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 Carlos Sanchez Date
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 Site Attorney (68F-DL)


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 Myron O. Knudson, P.E. Date
 Director, Superfund Division