

First Five-Year Review Report
for
Kerr-McGee Chemical Corp. (Soda Springs)
Superfund Site
Caribou County, Idaho

September 2002

Prepared By:

United States Environmental Protection Agency
Region 10
Seattle, Washington

Approved By:

Date:

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Five-Year Review Summary Form

Site Identification

Site Name: Kerr-McGee Chemical Corporation (Soda Springs)

EPA ID: IDD041310707

Location: US EPA, Region 10; State of Idaho; Caribou County
(1 mile north of Soda Springs, ID)

Site Status

NPL Status: Final

Remediation status: Construction Completed, September 26, 2001

Operable Unit(s): One OU, entire site

Site has Not been put into reuse

Review Status

Lead Agency: US EPA

Author: Neil Thompson, Project Manager
US EPA, Region 10

Review Period: 3/01/02 - 9/12/02

Date of Site Inspection: June 19, 2002

Type of Review: Post SARA

Review Number: 1st Five-Year Review
Triggering Action: Actual RA Start at Site
Triggering Action date: 7/17/97
Due Date (5 years): 7/17/02

Five-Year Review Summary Form, cont'd.

Issues:

Several erosion channels (rills) were cut into the cap during the 2002 spring snow melt events:

Four to five channels developed on the south side of the cap. The channels were a maximum of one foot in depth within the uppermost topsoil layer of the engineered cap. The erosion did not extend into the two foot soil layer between the flexible membrane liner and the topsoil layer.

The erosion channels have been filled with replacement topsoil. The cap should be increasingly more stable as the cover crop of grass continues to mature and fill in. The initial seeding occurred in August 2001 and was well established but will continue to thicken as the plants grow and mature. The seed used is a perennial crested wheat grass. The cap had an abundance of weed varieties, not noxious varieties, which are expected to be controlled, but do provide erosion protection for the topsoil.

Erosion of the topsoil is not expected to be a continuing problem since there is another capped landfill onsite with a similar cap which has had no historical erosion problems.

Recommendations and Follow-up Actions:

Maintenance of the cap is planned as part of the Long-term Operation and Maintenance Plan. Weed control spraying and over seeding in the erosion channel areas and soil borrow areas is planned to promote the cover grass growth. Both of these actions were completed after the site inspection.

Protectiveness Statement:

Because the remedial actions are protective, the site is protective of human health and the environment.

**First Five-Year Report
Kerr-McGee Chemical, Soda Springs Plant
Soda Springs, Idaho**

I. INTRODUCTION

The purpose of the Five-Year Review is to determine whether the remedy at the site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA § 121 and the National Contingency Plan (NCP). CERCLA § 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The Agency interpreted this requirement further in the NCP; 40 CFR § 300.430(f)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Environmental Protection Agency (EPA), Region 10, conducted this Five-Year Review of the remedy implemented at the Kerr-McGee Chemical, Soda Springs Plant (Site), Superfund site located about one mile north of Soda Spring, Idaho. This review was conducted by the Remedial Project Manager (RPM) for the site from March 2002 through September 2002. This report documents the results of this review.

This is the first Five-Year Review for the Kerr-McGee, Soda Springs, Site. The triggering action for this statutory review is the initiation of the remedial action on July 17, 1997. The Five-Year Review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. SITE CHRONOLOGY

The following is a brief summary of site events:

Event	Date
Initial Discovery of Problem	November 1, 1979
NPL Listing	October 4, 1989
Remedial Action/Feasibility Study Completed	September 25, 1995
ROD Signature	September 28, 1995
Consent Decree with PRP	August 21, 1997
ROD Amendment	July 13, 2000
Remedial Design Start	December 16, 1996
Remedial Design Completed	July 17, 1997
Remedial Action Start (Construction Start)	July 17, 1997
Construction Complete (PCOR)	September 26, 2001

III. BACKGROUND

Location and Land Use

The Kerr-McGee Chemical (KMC) site is located about one mile north of Soda Springs, Idaho, on State Route 34. The site has expanded from its original 50 acres to about 110 acres in size. The area surrounding the site is agricultural, primarily grain crops. Directly across the highway is a large Monsanto Corporation phosphate processing plant. The entire area north of Soda Springs is rural in nature. (See Figure 1-1).

Site History

The Kerr-McGee Chemical LLC, formerly Kerr-McGee Chemical Corporation, operated a vanadium production facility in Caribou County. The vanadium plant began operation in March 1964 and was closed in 1999 and dismantled by February 2002. The KMC, Soda Springs Plant, was placed on the National Priorities List (NPL) on October 4, 1990. The Remedial Investigation and Feasibility Studies were completed by KMC on

June 15, 1995. The Record of Decision (ROD) was signed on September 28, 1995, and a Consent Decree was entered on September 30, 1996, which implemented the remedy required by the ROD. Construction of the remedy was completed in August 2001.

The vanadium plant was built by Kermac Nuclear Fuels Corporation (Kermac) in 1963 with full production beginning in March 1964. Later that year Kermac merged with Kerr-McGee Corporation. The vanadium plant was closed in January 1999 because of economic considerations and fully dismantled by June 2002.

The vanadium processing created three different waste streams which were liquified for transport and were originally discharged to unlined ponds on the property. (See Figure 1-2). The three waste streams ponds are identified as:

Calcine Ponds
Scrubber Pond
S-X Pond

Calcine is a generic term for the fine-grained, black, sandy material which is the major by-product of the vanadium production. Calcine tailing was originally impounded on the west side of the plant for the first ten years of operation. Then in 1973, this impoundment was covered with topsoil and seeded to prevent wind blown fugitive dust. The calcine tailings were then shifted to diked ponds on the eastern side of the plant.

History of Contamination

The waste by-products of vanadium production; calcine, roaster, and S-X solids were transported to the three different ponds using water. The carrier water interacted with the solids in the unlined ponds and contaminants leached into the local groundwater. Five contaminants of concern (COCs) were identified through the risk assessment process. The COCs are:

Manganese
Molybdenum
Vanadium
Tributyl phosphate (TBP)
Total Petroleum Hydrocarbon (TPH)

The groundwater beneath and downgradient from the site exists predominantly within the basalt sequences. The underlying Salt Lake Formation bounds the hydrogeology about 230 feet below ground surface. The basalt sequence is comprised of five basalt flows. At KMC the hydraulic conductivities are all relatively similar. Water quality and aquifer test data indicate that the entire thickness of saturated basalt is in relatively good

vertical hydraulic connection over the entire KMC site. Faults in the basalt flows represent zones of increased transmissivity and help to explain the flow of contaminants downgradient. Groundwater monitoring wells are screened at two levels; shallow (15-40 feet below ground surface [bgs]); and deeper (125-150 feet bgs). The regional groundwater flow is north to south; however the flow at KMC tends towards the west because of groundwater pumping by the Monsanto plant west of KMC. Once the contaminants enter a fault in the basalt formation the flow follows the easier pathway which is southerly. Groundwater monitoring also indicates some of the groundwater reaches the surface water (Ledger Creek, Big Spring, and Finch Spring). These surface waters are not currently drinking water sources. The groundwater contaminate plume has not changed since the ROD, however, there has been a reduction in the contaminant concentrations.

The contaminants impacted both the groundwater and surface water under the facility and downgradient for a distance of about one-half mile. Neither of these sources has been utilized as a potable water source.

There were no remedial actions taken prior to the EPA ROD was signed.

Basis of Taking Action

The basis for taking action and cleaning up this site is from the human health risk associated with the contaminated groundwater originating from KMC. There was also some risk to health from the ingestion/direct contact with roaster reject material having high vanadium concentrations. Both of these sources are addressed in the ROD.

The following COCs were identified in the groundwater originating from the site. The COCs and risk based concentrations (RBCs) for a future residential risk scenario are (see also Table 1-1):

<u>COC</u>	<u>RBC ug/l</u>	<u>Highest conc ug/l (RI/FS to present)</u>	<u>Current conc ug/l</u>
Arsenic	50	150	150
Manganese	180	8770	2750
Molybdenum	180	165,000	61,700
Vanadium	260	28,600	24,300
TBP	180	4442	ND
TPH	730	9.5	6.8

IV. REMEDIAL ACTIONS

Remedial Action Objectives

The remedial action objectives (RAOs) for cleanup of KMC are:

- Prevent the transport of COCs to the groundwater from facility sources that may result in COC concentrations in ground water exceeding RBCs or Maximum Contaminant Limits (MCLs) for drinking water;
- Prevent ingestion by humans of groundwater containing COCs having concentrations exceeding RBCs or MCLs;
- Prevent transport of COCs from groundwater to surface water in concentrations that may result in exceedences of RBCs or MCLs in the receiving surface water body;
- Prevent the ingestion/direct contact with the roaster reject area material having vanadium concentrations in excess of 14,000 mg/kg.

Remedy Selection

The ROD for the KMC site was signed on September 28, 1995; and amended on September 13, 2000. The selected remedy addresses the three pathways of concern: groundwater, roaster reject, and windblown calcine. The ROD remedy selection for groundwater included elimination of uncontrolled liquid discharges from the site (the main source of groundwater impacts), recycling of solid sources (later amended), groundwater monitoring, and institutional controls.

The remedy included:

- Elimination of uncontrolled liquid discharges from the facility,
- Excavation and disposal of S-X pond and scrubber pond solids in an on-site landfill,
- Reuse/recovery of calcine solids through the production of fertilizer
- Semi-annual groundwater monitoring to determine the effectiveness of source control, and;
- Establishment of institutional controls in affected off-site areas to prevent ingestion of groundwater for as long as the groundwater exceeds the RBCs.

A ROD Amendment was signed on September 13, 2000, which changed the remedy for the reuse/recovery of the calcine solids. The fertilizer process did not prove successful and the capping alternative for this waste material, which was included in the feasibility study, was subsequently selected as part of the remedy for this site. The final remedy selection included capping of the calcine, roaster reject, and rejected (off-spec) fertilizer.

Remedy Implementation

A Consent Decree was signed between EPA and KMC on August 21, 1997, in which KMC agreed to implement the ROD and pay past EPA costs for cleaning up the site. The Remedial Design (RD) was started on December 16, 1996, and completed on July 17, 1997, which implemented the ROD. The ROD Amendment required some additional design work to consolidate the calcine waste and rejected fertilizer into a containment area and then cap. The design of the calcine cap was received by EPA on February 18, 2000, and the design finalized on May 4, 2000.

The Remedial Action (RA) took place in two parts because of the ROD Amendment. The initial RA construction activity was the building of an on-site landfill for the S-X and scrubber pond solids. The construction process began on July 17, 1997, and was functionally completed on October 10, 1997. The process included the construction of a landfill with primary and secondary liner, leachate collection, and engineered cover. Some of the waste in the ponds was saturated so the leachate is collected from a sump in the bottom liner.

The second RA dealt with the calcine tailings waste stream. This waste stream ceased with the end of vanadium production in 1999 and the design and construction of the cap was initiated. The CERCLA engineered multi-layered cap over the calcine tailings was constructed in 2001 creating a low permeable cap.

The Roaster Scrubber Pond was located on the southeast corner of the facility, directly south of the recently capped calcine waste. The scrubber pond was operational for 22 years before the scrubbers were replaced by the baghouse. The sediments from the scrubber pond were removed and combined with the S-X waste sediment and contained on-site in a lined engineered landfill.

The S-X Pond was also located originally on the west side of the facility. The pond was taken out of service in 1995 and the location filled and planted. Sediments that were excavated from the pond were transported and contained in the on-site landfill with the Scrubber Pond sediments.

The construction of the cap over the calcine landfill began with the regrading of the

calcine pile beginning on May 8, 2001. The rejected fertilizer had been returned to the calcine pile in October 2000 in preparation of the capping action. The calcine waste containment area was covered with a medium weight plastic flexible membrane liner (FML), geocomposite, subsoil, and topsoil. Fencing and seeding were the last actions and were completed in August 2000. An EPA construction Preliminary Close Out Report was completed on September 26, 2001, documenting that all the landfill caps were operational and functional.

It is expected by EPA that these source controls will be effective in cleaning up the groundwater that was contaminated by the site. As soon as the groundwater is cleaned up to the RBCs, a Final Close Out Report will be issued.

Operation and Maintenance

KMC is conducting long-term operations and maintenance (O&M) at this site. Currently semi-annual groundwater monitoring is occurring with reports sent to EPA. The O&M of the capped waste areas is limited to cap protection, cover crop, fencing, and erosion control. After the first year of operation the scrubber/S-X landfill has not required any significant O&M to maintain the cap. Some O&M of the calcine cap was required because of first year erosion. Some over seeding and weed control was done on the cover crop. The cap on the calcine waste containment area is just completing its first growing season, so the long-term O&M has not yet been established.

The long-term groundwater sampling has been on-going since the ROD was signed and is continuing. This activity is adequately funded and a budget for the future is in-place by KMC. O&M of the capped landfill and calcine have not had enough time since startup to establish annual O&M costs. Again the O&M work on the caps is part of the KMC maintenance budget for the facility.

The visual inspection of the site for this Five-Year Review confirmed that the condition of the caps were still able to provide the protectiveness required by the ROD.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first Five-Year Review for the site.

VI. FIVE-YEAR REVIEW PROCESS

KMC was notified of the Five-Year Review process at the September 2001, Construction Completion site visit. It was determined that May 2002 would probably be a

good time to schedule the Five-Year Review inspection because the cover crop was not fully established in September (planted in August 2001). In March 2002, coordination within EPA, with the State of Idaho, Department of Environmental Quality (IDEQ) representative, and KMC Site Manager, was started. The Five-Year Review site inspection was scheduled on May 19, 2002, for June 19, 2002.

The EPA project manager lead the review of the groundwater monitoring, design and construction document, and coordination with the parties involved. The EPA project manager was also the lead for this Five-Year Review Report.

Community Involvement

The local community has had no established interest in this site. The IDEQ has periodic announcements in the local newspaper concerning environmental issues. The IDEQ representative has received no feedback on this site. A notice to the community will be sent to those on the site mailing list indicating that this Five-Year Review has been completed and that the site is still protective.

Document Review

The Five-Year Review included the review of relevant documents including: ROD and ROD Amendment; design, construction, and O&M reports; and groundwater monitoring data. A list of the documents reviewed is attached (Attachment A).

Monitoring wells that were installed as part of the Remedial Investigation, have been sampled semi-annually since October 1991. Since the removal of the S-X Scrubber Pond and the Roaster Scrubber Pond, the concentration of the COCs in the groundwater have been generally decreasing. Table 1-1 shows the highest (ever recorded from the time of the RI/FS) and current (October 2001) concentrations for the five COCs. Now with the containment of the waste piles and all the cessation of process liquid discharges, the decreasing trends for contaminants in the groundwater should continue. For several of the COCs, the decrease in concentration in the groundwater is already significant when looking at all the monitoring data. There has been a steady downward trend in the concentration of COCs in the groundwater since the various RAs have taken place. The groundwater remedy also includes Monitored Natural Attenuation (MNA). Now that the contaminant sources are controlled, the natural processes in the groundwater; dilution, dispersion, adsorption, absorption, biodegradation, etc., are expected to help cleanup the groundwater to useable conditions. The groundwater and surface water have not met the cleanup goals, and monitoring will continue to document the condition of the groundwater.

The groundwater contamination discharges to four different surface streams. These streams are not currently domestic drinking water sources, but have been effected

by the KMC source. Currently Big Spring and Finch Spring still have concentrations of the KMC COCs above the risk based concentrations (RBCs).

Site Inspection

A site inspection was conducted on June 19, 2002. The inspection team consisted of the EPA RPM and OSC who both worked on the construction completion actions, two representatives from IDEQ, two KMC representatives, and two KMC consultants. The Site Inspection Checklist is attached as Appendix B. This inspection served two purposes: to assess the protectiveness of the remedy for the First Five-Year Review; and to check the calcine cover crop which was planted the previous fall for the construction completion. The groundwater monitoring data was evaluated by an EPA hydrogeologist.

No significant issues were identified regarding the constructed remedial actions at the site. A few O&M issues were noted with regards to the recently capped calcine wastes: some surface erosion and a broken section of fencing which had both been repaired before the inspection, and the need to over seed the cover crop of grasses in a couple of places where an insufficient number of plants per square foot had established themselves. The grass seeding/repair was completed in late June 2002 after the site inspection. These minor items in no way compromised the integrity of the cap or its function.

During the site inspection several erosion channels (rills) were identified that cut into the new cap placed over the calcine waste material during the 2002 spring snow melt events:

Four to five channels developed on the south side of the cap. The channels were a maximum of one foot in depth. The effect was to the uppermost topsoil layer of the engineered cap. The erosion did not extend into the two foot soil layer between the flexible membrane liner and the topsoil layer.

The erosion channels have been filled with replacement topsoil. The cap should be increasingly more stable as the cover crop of grass continues to mature and fill in. The initial seeding occurred in August 2001 and was well established but will continue to thicken as the plants grow and mature. The seed used is a perennial crested wheat grass. The cap had an abundance of weed varieties, not noxious varieties, which are expected to be controlled, but do provide erosion protection for the topsoil.

KMC and the IDEQ representatives were the only parties that were contacted as part of this Five-Year Review. No other party has ever shown an interest in this Superfund site.

Technical Assessment

The technical assessment is based on three questions. For this site, the First Five-Year Review comes at the same time as the construction complete. This is an important distinction between this site and those which have had years of O&M where site and cleanup conditions may have changed significantly.

Question A: Is the remedy functioning as intended by the decision documents?

The review of the documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD and ROD Amendment. The waste lagoons have all been taken out of service and the process flows into them have ceased. The cessation of the water carrier used to transport the waste solids to the various ponds had an immediate impact to the level of COCs measured in the groundwater. Capping the waste sludges, calcine, and off-spec fertilizer has also reduced the continued leaching of COCs from the wastes. The changes in the groundwater contamination and subsequent impacts to the surface waters are being monitored. The capping of the contaminated wastes has achieved the remedial objectives to minimize the migration of contaminants to groundwater and prevent direct contact with contaminants in the waste ponds and the calcine waste that was blown around the site by winds.

The O&M of the caps has already begun on the first containment landfill and some first-year repairs were done on the calcine waste pile cap in the spring 2002. The caps are being maintained for cap integrity; no burrowing animals were evident, no were there any deep-rooted plants that had established themselves on the cap. Only a small amount of leachate continues to be produced by the scrubber/S-X pond landfill and is pumped annually.

The capped landfill are too new to identify any optimization of the O&M or cap modifications.

Institutional controls have been put into place. The facility is fenced and the capped landfills are also fenced. KMC also has an agreement with the down-gradient landowner over the contaminated groundwater plume not to use the groundwater. Nothing was observed that would suggest that the institutional controls were ineffective or had been violated.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

There are no changes in the conditions of the site since the construction completion that would affect the protectiveness of the remedy.

Are there any Changes in Standards and To Be Considereds?

There is one change in the ARARs that could effect the site cleanup. The MCL for arsenic has been changed from 50 ug/l to 10 ug/l. There is are four on-site monitoring wells that currently have arsenic concentrations greater than 10 ug/l (KM-2, KM-3, KM-4, and KM-8). Only one of these wells currently has an arsenic concentration greater than the old MCL of 50 ug/l (KM-8). All of these wells have very high concentrations of COCs compared to the other monitoring wells. The cleanup of the groundwater is for all COCs and it is anticipated by groundwater modeling that the arsenic concentration will trend downward as the other COCs and will be less than the MCL when all cleanup goals are reached. If this does not prove to be the case, then arsenic will have to be further evaluated for this site.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No information has become available that suggest that the remedy is not protective of human health and the environment.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD and ROD Amendment. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. Most cleanup actions have been met and monitoring of the groundwater continues. No changes in standards or toxicity factors for the COCs except for arsenic have been made that would affect the protectiveness of the remedy. The MCL for arsenic has been changed from 50 ug/l to 10 ug/l and if arsenic is the only COC that fails to meet the ROD cleanup criteria, then the effectiveness of the remedy will have to be further evaluated. At this time, it is expected that the arsenic concentration in the groundwater will decrease to less than the new MCL. There is no other information that has surfaced that would impact the protectiveness of the remedy.

VIII. ISSUES

Two issues were identified during the review. The change in the MCL for arsenic and the minor O&M repair problems at the calcine cap location. The arsenic MCL issue will become very important should all of the contaminant concentrations decrease to their cleanup goals except for arsenic. This is not expect to happen, but future evaluations of the groundwater monitoring data will need to look at the arsenic issue.

This Five-Year Review came before the first growing season of the calcine cap cover crop. Some first winter erosion occurred and was fixed; a section of fence was damaged by the winter snows and has been repaired; and some over seeding and weed control was done in a few places in the cover crop of grasses.

Erosion of the topsoil is not expected to be a continuing problem since there is another capped landfill onsite with a similar cap which has had no historical erosion problems.

No other issues were identified.

IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The actions that were identified during the site inspection have already been taken care of as part of the normal O&M activities. No follow-up actions are identified as a result of this review.

X. PROTECTIVENESS STATEMENT

Because the remedial actions at this site are protective, the site is protective of human health and the environment.

XI. NEXT REVIEW

The next Five-Year Review for the KMC (Soda Springs) site is required by September 2007, five years from the date of this review.

APPENDICES

APPENDIX A

References

Global Environmental Technologies, LLC, Remedial Action, 2001 Annual Comprehensive Report of Ground Water Quality, Kerr-McGee Chemical LLC, Soda Springs, Idaho Facility, dated June 13, 2002.

KMC LLC and Global Environmental Technologies, Inc., Draft Remedial Action Completion Report, Kerr-McGee Chemical LLC, Soda Springs, Idaho Facility, dated November 2, 1998.

KMC LLC and Global Environmental Technologies, Inc., Draft Remedial Action Completion Report, Calcine Capping, Kerr-McGee Chemical LLC, Soda Springs, Idaho Facility, dated February 13, 2002.

U.S. Environmental Protection Agency, Record of Decision, Kerr-McGee, Soda Springs, dated September 28, 1995.

U.S. Environmental Protection Agency, Record of Decision Amendment, Kerr-McGee, Soda Springs, dated September 13, 2000.

U.S. Environmental Protection Agency, Preliminary Close Out Report, Kerr-McGee Superfund Site, Soda Springs, Idaho, dated September 26, 2001.