UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, MONTANA OFFICE
FEDERAL BUILDING, 301 S. PARK, DRAWER 10096
HELENA, MONTANA 59626-0096

Ref: 8MO

ENFORCEMENT/ACTION MEMORANDUM

DATE: JUN 21 1988

SUBJECT: Request for Non-Time-Critical Removal Action Approval at Mouat Industries Site, Columbus, Stillwater County, Montana.

FROM: Ron Bertram, Remedial Project Manager
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THROUGH: John F. Wardell, Director
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Site ID # 65

I. Purpose

The purpose of this Action Memorandum is to request approval for a non-time-critical removal action at the Mouat Industries site (Site) in Columbus, Montana. The removal action is intended to mitigate potential threats to human health and the environment from chromium contamination in groundwater. This memorandum also provides supplemental documentation of previous removal actions at the Site. This removal action is expected to be the final response action for the Site. FMC Corporation, Monte Vista Company (MVC), Mouat Industries, Inc., Timberweld Manufacturing Co. (Timberweld), Atlantic Richfield Company (ARCO), and the Town of Columbus (Town) have been identified as the potentially responsible parties (PRPs). The proposed removal action relies on natural attenuation processes to remediate the groundwater contamination, and continued groundwater monitoring and institutional controls. Through previous studies it has been documented that there is only limited, if any, threat to human health or the environment from exposure to media other than groundwater.

This Action Memorandum also is a public document that provides the public with information on the response action to be taken at the Site. The proposed removal action is described and compared

6. **Montana Safety Act.** Sections 50-71-201, 202 and 203, MCA, state that every employer must provide and maintain a safe place of employment, provide and require use of safety devices and safeguards, and ensure that operations and processes are reasonably adequate to render the place of employment safe. The employer must also do every other thing reasonably necessary to protect the life and safety of its employees. Employees are prohibited from refusing to use or interfering with the use of safety devices.

7. **Employee and Community Hazardous Chemical Information Act.** Sections 50-78-201, 202, and 204, MCA, state that each employer must post notice of employee rights, maintain at the work place a list of chemical names of each chemical in the work place, and indicate the work area where the chemical is stored or used. Employees must be informed of the chemicals at the work place and trained in the proper handling of the chemicals.

with alternative actions in an Engineering Evaluation/Cost Analysis (EE/CA) prepared in the Spring of 1996. The proposed action is consistent with criteria set forth within the National Contingency Plan (NCP). The NCP presents the following factors for consideration in evaluating the appropriateness of initiating a removal action:

- Actual or potential exposure to nearby human populations, animals, or food chains from hazardous substances or pollutants or contaminants.
- Actual or potential contamination of drinking water supplies or sensitive ecosystems.
- Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate.
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.
- Threat of fire or explosion.
- The availability of other appropriate federal or state response mechanisms to respond to the release.
- Other situations or factors that may pose threats to public health or welfare or the environment.

The first two factors presented above are relevant to the situation at the Site because of the potential threat to users who might rely on groundwater for part or all of their water supply. Human populations that rely on groundwater for industrial, domestic, and irrigation needs may be at greater risk as a result of elevated chromium in groundwater. There are no nationally significant or precedent-setting issues for this site.

Authority for this non-time-critical removal action is based on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and regulations found at 40 CFR § 300.415. Those regulations pertain to removal actions for the abatement, prevention, minimization, stabilization, mitigation, or elimination of the release or threat of release, or the threat resulting from the release of hazardous substances. Such measures can apply to the actual or potential exposure to hazardous substances or pollutants or

contaminants by nearby populations, animals, or food chains, and to drinking water supplies or sensitive ecosystems, or other conditions, situations, or factors.

Regulations at 40 CFR § 300.415(b)(3) state that removal actions such as the Mouat groundwater removal action shall begin as soon as possible to abate, prevent, minimize, stabilize, mitigate, or eliminate the threats to public health or welfare or the environment, after evaluation, public comment, and selection of an appropriate response action. The Mouat groundwater removal action will be implemented through appropriate enforcement action upon approval of the Recommended Action.

II. Site Conditions and Background

The Site (CERCLIS No. MTD021997689) is located in the Town of Columbus, Stillwater County, Montana, north of the town airport and the town golf course. Adjacent land use is primarily industrial. As a result of past chromium ore processing operations, releases of chromium (in the hexavalent oxidation state) into the environment have occurred. Remediation of chromium-containing soils has been successfully completed; however, groundwater that contains hexavalent chromium above state standards is still present below and downgradient of the site. This Action Memorandum describes the non-time-critical removal action intended to remediate the contaminated groundwater.

A. Site Description

1. Removal site evaluation

The Town of Columbus has owned the property where the Site is located since 1933. Under a leasing agreement with the town, Mouat Industries constructed and then operated a chromium processing plant on the site from 1957 until about 1963. The operation processed chromite ore mined from the Stillwater Complex in south-central Montana into high-grade sodium dichromate that was purchased by General Electric for use as a corrosion inhibitor at the Hanford Project in Richland, Washington. Process wastes included sodium sulfate solutions which contained sodium chromate and sodium dichromate. Both of these chromium compounds are characterized by a hexavalent (Cr VI) oxidation state. Cr VI leached from the sodium sulfate waste piles into the underlying soils and into groundwater. Sodium dichromate spills also occurred during normal operation of the facility, which added to the Cr VI contamination.

Between September 1961 and April 1962, FMC Corporation provided operational support to Mouat Industries for pilot-scale chromium processing at the site. In May 1963, the Monte Vista Company (MVC) purchased the chrome processing plant and acquired the

leasehold interest in a portion of the site from William Mouat and Mouat Industries. MVC held the lease until it expired in 1973. MVC did not conduct ore processing operations at the facility during this period. In 1974, MVC removed the chrome chemical plant machinery, buildings, and equipment from the site.

Activities were conducted at the site by Anaconda Minerals Company in 1969 and 1973 to 1974. In 1969, some waste materials were collected from the site and placed inside a building that had been used for sodium dichromate production. In 1973, in response to concerns raised by the town, Anaconda agreed to remove approximately 100 tons of material from the site and to treat some contaminated soils in place. Anaconda removed the material stored inside the building (approximately 468 tons) to Butte, Montana, and attempted to treat soil in place by spreading acid and ferrous sulfate over a portion of the site to chemically change the Cr VI to its more stable trivalent state (Cr III). Anaconda's presence at the site ended in 1974.

In 1975, Timberweld Manufacturing Company (Timberweld), a laminated wood products facility, leased a portion of the site. During the same year, Timberweld covered the area occupied by the chromium processing plant and sodium sulfate waste piles with approximately two feet of gravel. In 1976, yellow mineral deposits, characteristic of sodium chromate, were evident at the gravel surface. In 1990, the U.S. Environmental Protection Agency (EPA) installed a fence around the area used by Timberweld to restrict public access to the chromium-containing soils. Timberweld continues to conduct business operations and activities on a portion of the site.

In 1973, Anaconda Minerals performed sampling activities at the site. The presence of chromium in soils, surface water, and groundwater was identified. In 1977, HKM Associates, under a grant funded by EPA for the Mid-Yellowstone Areawide Planning Organization, conducted groundwater sampling. Sampling results confirmed the presence of Cr VI in groundwater.

A Preliminary Assessment/Site Inspection was conducted by EPA in 1979 and 1980. Various other entities also conducted multimedia sampling during the late 1970s and 1980s. As a result of elevated chromium analytical results, the site was proposed for inclusion on the National Priorities List (NPL) by the EPA in October 1984. In June 1986 the site was placed on the NPL.

The primary problem at the site is hexavalent chromium contamination of groundwater. The problem of chromium contaminated soils has successfully been addressed by a previous removal action (discussed later). Also, surface waters on the golf course exceed water quality standards for hexavalent chromium and trivalent chromium has been found in ditch bottom sediments on the golf course.

2. Physical location

The Site is located in an industrial area of Columbus, Montana, in Stillwater County (Figures 1 and 2, Attachment 1). It is located approximately six-tenths of a mile north of the Yellowstone River and is within the river's historic floodplain. Residential areas are located within a 1/2-mile radius of the site. The land surface at and near the site slopes gently southeastward toward the Yellowstone River. Hydrogeologic investigations indicate the local groundwater flow direction is also southeast.

The Site and adjacent areas are zoned as commercial/industrial. A residential area is located to the southwest of the site but it is outside the portion of the chromium plume which exceeds the MCL of 0.1 mg/l total chromium. The residential area is included within the Superfund Overlay District which provides groundwater use restrictions (discussed later). The Town of Columbus Master Plan indicates that the area will continue to function as a commercial/industrial zone.

Current land use consists of the following:

- Timberweld occupies land along the west edge of the Site. Timberweld uses part of the area for storage and employee parking and the remainder for normal business activities.
- Immediately south of the Site is the Town of Columbus' municipal airport runway. The large open area in which the runway is located consists of mowed "prairie hay" (grasses typical of the area).
- The Town of Columbus' municipal golf course adjoins the airport to the south.
- A chromite stockpile owned by the American Metallurgy Corporation is located to the east of the site.
- Several commercial businesses are located to the west of the Site.
- Private residences are located to the north and west, upgradient of the Site.

Terrestrial ecosystems in the vicinity include upland forests, successional fields, agricultural land, commercial/industrial areas, a municipal airport, and a municipal golf course. Aquatic ecosystems include the Yellowstone River and a moderate-size pond, with associated drainage ditches, located on the golf course. Immediately to the east of the golf course are a series of wastewater treatment lagoons.

3. Site characteristics

The Site is owned by the Town of Columbus, a local government. Timberweld also owns a small western portion of the site and leases a portion of the property owned by the Town. Timberweld operates a laminated wood products business on the property they own and lease from the Town.

The geologic strata at the Site consist of 0.5 to 3 feet of imported gravel overlying 3 to 11 feet of fine-grained sand and clay (upper Quaternary alluvium), 10 to 25 feet of poorly sorted gravel, sand, and cobbles (lower Quaternary alluvium), and bedrock. The bedrock is a nearly flat-lying shale (either the Judith River Formation or, in the western portion of the site, the Bearpaw Shale), which is relatively impermeable and acts as a barrier to downward migration of groundwater and contaminants (e.g., chromium).

Groundwater is present at a depth of 3 to 11 feet below the land surface; thus, the primary saturated aquifer at the Site is the lower Quaternary alluvial aquifer. This aquifer is generally unconfined, but may be confined in places by the overlying clay and silt layers of the upper Quaternary alluvium. The saturated thickness of the aquifer ranges from 13 to 27 feet at the Site but thins to 7.5 to 16 feet downgradient of the site, near the Yellowstone River.

The groundwater gradient is to the southeast at approximately 0.003 feet per feet (ft/ft), which is consistent with the observed direction of contaminant migration. The gradient and direction of groundwater flow do not exhibit significant temporal variability.

Based on grain size analysis and a pumping test (both of which were considered to provide only a qualitative estimate of the hydraulic conductivity of the aquifer) conducted at the Town of Columbus municipal well, the hydraulic conductivity of the lower gravel aquifer was estimated at 0.11 to 0.62 feet per minute (ft/min). Aquifer hydraulic conductivities estimated from slug tests performed at each RMIS-series well ranged from 0.017 to 0.36 ft/min, with a median of 0.075 ft/min. The estimated groundwater velocity is 470 feet per year (ft/yr), which was calculated by using a gradient of 0.003, the median hydraulic conductivity, and an estimated effective porosity of 0.25 (typical for alluvium). It may, however, be as low as 90 or as high as 2,800 ft/yr, given the potential range in hydraulic conductivity and porosity.

Two previous removal actions have been completed at this NPL site (discussed in detail in the section on previous actions).

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

Chromium is the identified chemical of potential concern (COPC) at the Site. Hexavalent chromium is a hazardous substance as defined by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sec. 101(14), and designated as such under 40 CFR 117 and 40 CFR 302. Through a series of sampling and analysis efforts, the following COPCs were identified and documented:

- Cr VI in groundwater and surface water;
- Cr III in surface and subsurface soils, both onsite and offsite; and
- Cr III in sediments and surface water.

A baseline risk assessment performed by EPA in the autumn of 1995 identified Cr III and Cr VI in surface water and sediments of the *golf course pond and ditches as COPCs and chemicals of potential* ecological concern (COPECs).

Contaminant release mechanisms present at the Site include physical entrainment and infiltration/percolation.

The primary receiving medium for contaminants released from the site was subsurface soil. Contaminants would then infiltrate downward to the water table and contaminate groundwater, the secondary receiving medium. Soils contaminated with chromium were the subject of a removal action completed in 1994. Soils were either treated, fixated and disposed of onsite in the form of blocks or transported off site for disposal in appropriate land disposal units (discussed in detail in the section on previous actions). The soil removal action rendered the chromium in soils non-toxic and immobile and eliminated the source of chromium contamination of groundwater. Currently, the only potential threat is from chromium in the groundwater medium. Institutional controls which are part of a Superfund Overlay District have been implemented to limit human consumption of groundwater. At the golf course pond and associated ditches, contaminated groundwater discharges to the surface. Hexavalent chromium in the groundwater is apparently reduced to trivalent chromium within the pond and ditch sediments, resulting in entrainment of chromium within the sediments. The trivalent chromium in sediments was a concern as a possible threat to ecological receptors. All affected media have been characterized through numerous sampling and analysis events.

The following documents/reports present noteworthy analytical data collected to date:

Historical Data Assessment and Evaluation Report, Mouat Industries Site, prepared for Mouat Industries Site PRP Group by Baker Environmental, Coraopolis, PA, April 1995.

Report of Sampling Activities, Mouat Industries Site, Prepared by Ecology and Environment, Inc., November 1992.

Report of Sampling Activities, Quarter 2, Mouat Industries, prepared by Ecology and Environment, Inc., March 1993.

Report of Sampling Activities, Mouat Industries, prepared by Ecology and Environment, Inc., April 1993.

Report of Sampling Activities, Fourth Quarter, Mouat Industries Site, prepared by Ecology and Environment, Inc., June 1993.

Groundwater Monitoring Program Completion Report for Work Tasks 1, 2, and 3, U.S. Bureau of Reclamation, February 1992.

Alternatives for Remediating Chromium Contaminated Groundwater in the Vicinity of the Mouat Industries Site, U.S. Bureau of Reclamation, March 1993.

Quarterly Groundwater Monitoring Investigation at the Mouat Industries Site, U.S. Bureau of Reclamation, November 1994.

Analytical Results for Additional Sampling in Support of a Risk Assessment, Baker Environmental, Coraopolis, PA. August, 1995.

These and other reports and data are included in the Administrative Record for the Site.

There are no site features or characteristics, weather conditions, human events, or other conditions that would either cause, spread, or accelerate the release of chromium at the Site.

Chromium in the groundwater medium at the Site exists in the dissolved state (Cr VI). It has been demonstrated that Cr VI would not, under naturally occurring conditions, be reduced to Cr III because of the highly oxidized groundwater existing at the Site. Factors that can impact the geochemistry of chromium (e.g., iron and total organic carbon content) have been found to be low; therefore, it can be concluded that chromium would not be precipitated. An evaluation of sorption phenomena also indicate that these would not permanently retain chromium in groundwater. They would, however, delay or retard the movement of dissolved

chromium with respect to the groundwater flow rate, suggesting that chromium may be present in the groundwater for some time to come in the future. However, chromium concentrations in the groundwater will also decline by natural dispersion and dilution mechanisms. Chromium concentrations in groundwater have been declining in recent years, and the area within which elevated concentrations are found has been decreasing. Figure 3 (Attachment 1) illustrates the most recent configurations of the plume of dissolved chromium in groundwater.

5. NPL status

The Mouat Industries site was proposed for inclusion on the NPL in October 1984 by the EPA. The site received a Hazard Ranking System score of 31.66. In June 1986, the site was placed on the NPL. The proposed removal action will address any threats to human health or the environment that remain after the two previous response actions completed at the site. The removal action is scheduled to begin during the autumn of 1996. This removal action is expected to be the final response action for the Site.

6. Maps, pictures, and other graphic representations

The following Figures and Tables are included as Attachment 1 to this Action Memorandum:

Figure 1 Site Location Map

Figure 2 Interpretative Map of Area with Total Chromium in Groundwater $\geq$ 0.1 mg/l, January 1995 - Mouat Industries NPL Site

Figure 3 Iso-Concentration Lines for Total Chromium at 0.5 mg/L in Groundwater

Figure 4 Site Contours at Soil Removal Action Completion

Figure 5 Site Cross Sections A-A and B-B

Figure 6 Superfund Overlay District Map

Figure 7 Proposed Long-Term Monitoring Sampling Locations

Table 1 Summary of Analytical Results for Treated Material Samples

Table 2 Summary of Analytical Results for Confirmatory Grid Samples

Table 3 Comparative Analysis of Response Action Alternatives

Table 4 Summary of Comparisons of the Response Action Alternatives to the Nine Evaluation Criteria in the NCP

B. Other Actions to Date

1. Previous actions

Anaconda Minerals performed limited cleanup activities in 1969 and again in 1973 to 1974. In 1969, some waste materials were stockpiled inside the building used for sodium dichromate production, and portions of the site were graded. Between 1973 and 1974, Anaconda Minerals removed the materials stored inside the building to Butte, and attempted to treat a portion of the contaminated soil. The treatment consisted of reacting the Cr VI contaminated soil with acid and ferrous sulfate solution to reduce the chromium to the trivalent oxidation state.

In 1990, after evidence of chromium contamination appeared at the surface of a gravel-covered area at the Timberweld facility, the EPA installed about 1,400 feet of security fence around the Site to restrict public access to chromium-containing soils. Notices of Potential Liability Pursuant to CERCLA Section 107 were sent to the PRPs on March 19, 1990. The PRP responses indicated no interest in fencing the site; therefore, EPA completed the job using federal funds. During the same year, the Town of Columbus modified the drainage in the area to control the flow of stormwater onto the Site.

In 1991, after collecting additional soil and groundwater samples that indicated elevated levels of chromium in these media, EPA determined that chromium had been released into the environment at the Site, and that further releases were likely. EPA also determined that the Site posed a threat to public health or welfare or the environment, and that a removal action was necessary to abate the release and threat of release of hazardous substances at and from the Site. After efforts to negotiate an Administrative Order on Consent with the PRPs failed, EPA issued a Unilateral Administrative Order (UAO) on November 12, 1991 to FMC Corporation, MVC, Mouat Industries, Timberweld, and the Town of Columbus to conduct a removal action at the Site. The UAO required that approximately 20,000 cubic yards of chromium-contaminated soil be excavated and treated.

Work on a response action under the UAO was commenced in December 1991 by FMC Corporation. On March 31, 1992, a report was submitted to the EPA containing a sampling and analysis plan for site characterization. On April 10 1992, EPA approved a sampling and analysis plan for site characterization to delineate the vertical and areal extent of chromium-contaminated soil. Drilling and sampling activities were initiated on April 13, 1992

and completed on July 6, 1992. Results from those sampling activities are contained in a report which was submitted to the EPA in August 1992.

In conjunction with the site characterization study submitted in 1992, work was initiated on treatment process development, treatment facility design, equipment and material procurement, site preparation, and Response Action Work Plan development. Design, construction, and testing of the soil treatment facility were completed in November 1992. Full-scale treatment testing was conducted on site soils between November 1992 and February 1993. Between March 1993 and June 1993, the treatment facility was modified to incorporate a second treatment train and a pretreatment screening station.

Full-scale treatment commenced on June 28, 1993. The soil treatment process included soil screening, chemical addition for chromium reduction, and portland cement addition for soil fixation. The treated soils were formed into blocks for curing, testing, and placement. Operations were conducted 24 hours per day, seven days per week until October 31, 1993. During that period approximately 14,000 cubic yards of chromium-containing soil were treated, creating approximately 7,000 blocks. The treatment process rendered the contaminants non-toxic and immobile.

Each block of treated soil was sampled and analyzed for compliance with the treatment standard of less than 0.5 mg/l total chromium in the Toxicity Characteristic Leaching Procedure (TCLP) extract. Analytical results (Table 1) show that all blocks met the standard of less than 0.5 mg/l total chromium in the TCLP extract. The maximum chromium concentration in TCLP extract was 0.47 mg/l, and most values were less than 0.1 mg/l. EPA's oversight contractor, the U.S. Bureau of Reclamation, also reported that

> "...all EPA split samples for 28-day cure treated soils ... met performance criteria ... for TCLP extractable total chromium, total chromium in [the more aggressive] multiple extraction testing, and unconfined compressive strength. Moreover, the close correspondence between EPA and FMC split samples indicates that the FMC data base was appropriate for guiding remedial site operations ..."

Furthermore, all of the data for leaching the treated soil blocks fit very well within the thermodynamic framework of the geochemistry of the Site. The groundwater within the alluvial aquifer is supplied by infiltration of precipitation and thus is of an oxidizing nature. The pH of the groundwater is also neutral to slightly basic. The neutral to basic pH and oxidizing state of the groundwater combine to create a geochemical environment that is conducive for the formation of chromium

oxide, Cr_2O_3, which is a stable, solid form of trivalent chromium that has a very low solubility. Consequently, there is no reason to believe that chromium will be released to the aquifer from the treated blocks under the range of natural conditions expected for this site. Corrosion of the treated soil blocks may release some silica, alumina, calcium, and, possibly, iron, but not chromium.

In response to the Town of Columbus' concerns about final site configuration and future land use considerations, an Addendum to the Response Action Work Plan was submitted on June 17, 1994. Offsite disposal of the remaining affected soils began on July 7, 1994. Removal operations were conducted 10 hours per day, seven days per week until October 1, 1994. In 1994 approximately 19,400 cubic yards of chromium-containing soils were transported and disposed of at RCRA permitted hazardous and non-hazardous offsite disposal areas depending on the concentration of chromium.

During both actions conducted in 1993 and 1994, chromium-containing soils were excavated to an elevation of 3,564 feet above sea level or to the clay-gravel interface, whichever was lower (except in those areas of the site where soil sample analytical results indicated that the cleanup criteria were met at a lesser excavation depth). After the excavation of soils containing chromium above the cleanup concentration, the excavation was backfilled with the treated soil blocks or excavated soils for which sample analyses indicated the chromium to be below the cleanup criteria. Additional excavations were made in otherwise unaffected areas of the site east of the primary excavation areas for placement of treated soil blocks that would not fit into the primary excavation.

After block and soil placement were completed, the site was graded to modest slopes to promote precipitation runoff. The western portion of the site was surfaced with a gravel cover to allow vehicular and storage use of the area. The eastern portion was covered with soil and seeded to establish a vegetative cover. Work was completed on the site as of December 31, 1994, with the exception of seeding operations conducted in 1995. Figures 4 and 5 (Attachment 1) illustrate the site configuration following the soil removal actions. Confirmatory soil sampling (Table 2, Attachment 1) indicates that the 1993 and 1994 actions were effective in removal of chromium-containing soils.

Based on the results of the confirmatory soil sampling following excavation of contaminated site soils, along with the results of the leaching analyses of treated soil blocks and the associated geochemical assessment noted previously, further leaching of chromium into groundwater is not expected to occur. The soil removal action has effectively eliminated chromium contamination in soils at the site, and eliminated the source of chromium

contamination into underlying groundwater. Only the residual hexavalent chromium contamination in groundwater downgradient of the site, and associated contamination at surface water bodies that receive groundwater discharge, remains. This residual contamination will be addressed by the proposed removal action.

The cost of the 1990 removal action to fence the area that displayed evidence of chromium at the surface was about $22,000. The subsequent soil removal action in 1993 and 1994 was performed by FMC under a UAO, and its cost is not known.

In addition to the previous removal actions conducted at the Site as noted previously, a series of public announcements and meetings have taken place to keep the public informed on the status of site restoration. Fact sheets, press releases, and other public announcements were released in April and July 1986, March and June 1987, May 1989, March and July 1990, July and September 1992, December 1993, and May 1996. Public meetings were held in September and November 1992, January 1993, January 1994, November 1995, and June 1996. Following review of the EE/CA by EPA and the Montana Department of Environmental Quality (MDEQ), the document was revised and a final EE/CA was issued for public review in May 1996. The final EE/CA, and an accompanying EE/CA fact sheet, specified the alternative that will be implemented to address groundwater contamination at the Site. A 30-day comment period began following the issuance of the final EE/CA. A public meeting was held in Columbus, Montana, on June 5, 1996 to discuss the EE/CA and the preferred removal action and to solicit public comment.

2. Current actions

Comments received on the final EE/CA are addressed in the Responsiveness Summary, included as Attachment 4 to this Action Memorandum.

An Administrative Record has been established and is available for public review pursuant to the requirements set forth in the NCP. Information repositories have been established at the EPA Montana Office in Helena and at the Stillwater County Library in Columbus.

C. State and Local Authorities' Role

1. State and local actions to date

CERCLA requires EPA to provide state and local officials timely opportunities to review and comment on response actions. The State submitted comments on the draft groundwater EE/CA and subsequent draft Action Memorandum. The State has also provided State Applicable or Relevant and Appropriate Requirements (ARARs) for consideration during development of the response actions.

Institutional controls over land use and groundwater use have been established by the Town. A zoning ordinance was approved in March 1995 which created a Superfund Overlay District (Figure 6, Attachment 1). The ordinance became enforceable in April 1995. Requirements of the Superfund Overlay District are enforced by the zoning authority of the Town. The Superfund Overlay District covers the entire site and area above the chromium plume with a reasonable buffer area.

The land use restrictions apply only to the block placement areas and surrounding protective buffer areas (Figure 6, Attachment 1). The land use restrictions encompass the following:

- o prohibit excavation into the blocks of treated soil;
- o limit vehicle loads on the graveled portions of the block placement area;
- o prohibit any use of the soil-covered block placement area unless those areas are paved or covered with gravel;
- o require the property owner to maintain the site cover, drainage facilities, and fences; and
- o establish specifications for construction on the block placement area.

The Town of Columbus has also modified the drainage in the block placement area to reduce the amount of stormwater entering the site.

The groundwater use restrictions apply to the entire Superfund Overlay District. Those restrictions prohibit new wells or other groundwater extraction systems, prohibit groundwater use from existing wells or other groundwater extraction systems, except for lawn irrigation use, use of the existing golf course pond, and groundwater monitoring. Excavation below the groundwater table (static groundwater level) for any purpose is prohibited except for temporary excavation work necessary for construction purposes including placement of footings and utilities. Such temporary excavation work requires a permit from the Town of Columbus. The restrictions on groundwater use can be lifted by the Town of Columbus after response action objectives are met (the MCL for chromium in groundwater and the WQB-7 standards for chromium in groundwater have not been exceeded for a period of three consecutive years).

2. Potential for continued state/local response

The State has reviewed and commented on the proposed response action and is expected to continue to be involved in the remainder of the superfund activities at the Site. Of particular

concern to the State is the possibility that the fixated blocks of chromium-containing soils are buried near or below the groundwater surface contrary to state solid waste requirements and that chromium could leach from the blocks in the long term future.

It is anticipated that the Town of Columbus will continue to enforce the Superfund Overlay District until groundwater concentrations meet the objectives of the removal action.

III. Threats to Public Health or Welfare or the Environment, and Statutory and Regulatory Authorities

The NCP presents factors for consideration in evaluating the appropriateness of initiating a removal action. Conditions at the Site meet two of these requirements for a removal action:

- Actual or potential exposure to nearby human populations, animals, or food chains from hazardous substances or pollutants or contaminants.
- Actual or potential contamination of drinking water supplies or sensitive ecosystems.

A. Threats to Public Health or Welfare

The Agency for Toxic Substances and Disease Registry (ATSDR) conducted a preliminary Health Assessment in 1989 at the Site and determined that a public health concern existed. In April 1991, ATSDR reviewed the updated analytical results and the current conditions at the Site. ATSDR recommendations read in part:

> "Although the restriction of access to the contaminated soils should reduce the likelihood of Timberweld employees contacting the contaminated soils, there is still a potential for exposure while surface contamination is present. This is of concern since sodium chromate is an irritant and is caustic to the skin and mucous membranes."
>
> "Also, there are private wells, for irrigation purposes, located downgradient of the facility and on-site monitoring wells indicate elevated concentrations of chromium. ATSDR feels there is adequate justification for the proposed [soil] removal at Mouat Industries in Columbus, Montana."

Under current exposure scenarios coupled with the prohibition on groundwater use imposed by the Superfund Overlay District, there are currently no threats to public health or welfare. However, in the unlikely event that the groundwater use restrictions of the Superfund Overlay District were lifted before groundwater cleanup and domestic use of the groundwater resource were to occur, an increased risk would probably be realized. This

potential risk has not been quantified to date because this scenario is very unlikely. Chromium concentrations in groundwater beneath and downgradient of the site do exceed the state standard for drinking water quality, although the concentrations have been declining with time. Chromium is classified as a hazardous substance under CERCLA Sec. 101(14).

B. Threats to the Environment

It is believed that some contaminated groundwater beneath the municipal golf course discharges into the golf course pond and some of the associated ditches. Because groundwater is in hydraulic communication with the golf course pond and some of the associated ditches, media within these features have been affected by chromium contamination. Ecological receptors within the affected surface waters and sediments of the municipal golf course are therefore potentially at risk because of contaminated groundwater flowing beneath this area.

The results of the baseline risk assessment are as follows:

- Ecological receptors in the surface water or sediments of the Yellowstone River are not at risk.

- Within the golf course pond, Cr III and Cr VI in the surface water did not present a risk; however, Cr III concentrations in the pond sediments exceeded two of three benchmark values.

These data suggest a potential risk to bottom-feeding fish and bottom-dwelling invertebrates. In the golf course ditches, both sediment and water quality criteria are exceeded, suggesting potential hazard to ecological receptors. However, the manmade ditches were engineered to provide golf course drainage and are not likely to provide a habitat of sufficient quality to support aquatic receptors evaluated in the Baseline Risk Assessment.

IV. Endangerment Determination

Actual or threatened releases of chromium-contaminated groundwater from this site, if not addressed by implementing the removal action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. Proposed Actions and Estimated Costs

Three removal action alternatives were evaluated in the EE/CA: (1) no action, (2) natural attenuation with institutional controls and groundwater monitoring, and (3) groundwater pump and treat. Through the alternative evaluation process, natural attenuation with institutional controls and groundwater

monitoring was chosen for the Mouat site as the most appropriate removal action. This alternative is expected to remedy the groundwater below and downgradient of the site in a similar time frame as the groundwater pump and treat alternative, but with significantly lower overall costs. Specific evaluation criteria for each of the alternatives are described in the following sections. The threat to groundwater receptors (primarily ecological receptors under current exposure scenarios) is expected to be reduced through natural attenuation in a matter of years. Alternatives other than natural attenuation were determined to be less desirable for several reasons as noted below.

A. Proposed Actions

1. Proposed action description

The proposed alternative, natural attenuation with groundwater monitoring and institutional controls, includes semiannual groundwater monitoring and continued prohibitions on land and groundwater use within the Superfund Overlay District until groundwater standards are met.

The natural attenuation alternative was chosen as the most appropriate removal action at the Mouat site based on an evaluation of (1) criteria provided for in the EE/CA guidance document, namely effectiveness, implementability, and cost, and (2) criteria provided for in the NCP. Table 3 (Attachment 1) presents a summary of the comparative analysis for each of the three alternatives with respect to the EE/CA criteria, and Table 4 (Attachment 1) presents the same with respect to the NCP criteria. Review of these two tables clearly demonstrates that the selected alternative best meets the above two sets of criteria. Detailed analysis of the natural attenuation and other alternatives is presented in the EE/CA, included as Attachment 3 to this Action Memorandum.

Natural attenuation includes a variety of natural processes that can singularly or through cumulative effects, decrease the overall concentrations of contaminants with time. With respect to the Site, the primary natural attenuation processes in groundwater include adsorption and precipitation, dispersion and dilution, and chemical alteration. Each of these processes is described in the EE/CA (Attachment 3). Based on physical and chemical conditions encountered at the Site, dispersion appears to be the predominant process affecting chromium transport, with lesser effects attributable to the retardation of chromium due to adsorption. Thus, the expected effects of dispersion and adsorption on the chromium plume would be the slow release of dissolved chromium into downgradient portions of the aquifer at low concentrations.

The primary difference between the no-action alternative and the natural attenuation with institutional controls alternative is that the latter includes groundwater monitoring. Groundwater monitoring will be performed semiannually for the duration of the removal action at selected wells. These selected wells are referred to as the Monitoring Plan Well Network. The proposed wells include one upgradient well, five wells within the plume, three wells laterally adjacent to the plume, and three wells near the leading edge of the plume (as defined by the groundwater standard of 0.1 mg/l). Three of the wells within the plume are immediately downgradient of the block placement area, and will serve to verify that chromium is not leaching from the buried blocks into the groundwater. A surface water sample will also be collected to evaluate changes in surface water within the golf course ditches. The total number of semiannual sampling locations is 13. Figure 7 (Attachment 1) shows the Monitoring Plan Well Network for long-term monitoring sampling. As outlined in the EE/CA, all samples will be analyzed for total chromium. Proposed sampling procedures and related quality assurance/quality control procedures are outlined in Appendix G of the EE/CA. A complete groundwater monitoring and sampling and analysis plan, based on Appendix G of the EE/CA, will be developed as an attachment to the Administrative Order that implements the proposed removal action. The Monitoring Plan Well Network monitoring is anticipated to be performed by the PRPs under an appropriate Administrative Order.

Groundwater monitoring and hence operation of the removal action will be conducted for at least five years and then terminated once groundwater standards are met. The EE/CA stipulates that the following conditions must be met for the termination of the action:

- All groundwater monitoring wells within the Monitoring Plan Well Network must exhibit total chromium concentrations equal to or less than 0.1 mg/L for two consecutive sampling events.

- All remaining wells not included in the Monitoring Plan Well Network would then be sampled to verify that total chromium in these wells is equal to or below 0.1 mg/L.

The EE/CA states that only if the above conditions are met would groundwater monitoring and groundwater use restrictions be terminated, and then only with the written permission of EPA and the Montana Department of Environmental Quality (MDEQ). EPA has decided to modify the groundwater monitoring plan outlined in the EE/CA to make it more consistent with EPA guidance. Region VIII guidance states that monitoring continue until "...ground-water protection standards have not been exceeded for a period of three consecutive years." The groundwater monitoring plan developed for attachment to the Administrative Order will incorporate this

Region VIII recommendation, and thus, supersede the monitoring plan outlined in the EE/CA.

The groundwater monitoring will be conducted as follows:

A. The Monitoring Plan Well Network will remain as outlined above; 12 wells as shown in Figure 7 (Attachment 1) and one surface water sample from golf course ditches. The well samples will be analyzed for total chromium and the surface water sample will be analyzed for hexavalent and trivalent chromium.

B. The Monitoring Plan Well Network will be sampled semiannually for a minimum of 5 years.

C. The Monitoring Plan Well Network will continue to be monitored semiannually until both of the following conditions are met:

1). It has been demonstrated that the MCL for chromium in groundwater and the WQB-7 standards for chromium in groundwater have not been exceeded for a period of three consecutive years.

2). It has been demonstrated that all remaining wells not included in the Monitoring Plan Well Network but within the Superfund Overly District do not exceed the MCL for chromium in groundwater and the WQB-7 standards for chromium in groundwater as determined by a single sample taken after Item 1 above is satisfied.

D. Following completion of the Monitoring Plan Well Network monitoring outlined above, EPA will monitor the four wells nearest to the block placement area (RMIS-1, RMIS-4, MIS-15, and MIS-16) on an annual basis for a period of 30 years including the period of monitoring required for the Monitoring Plan Well Network. The samples will be analyzed for total chromium. This monitoring effort is not considered a part of the response action, but is intended to fullfil the post-closure monitoring of the treated block placement area.

Chromium concentrations in surface water in the golf course pond and ditches exceed WQB-7 standards for chromium. The exceedances are the result of chromium contaminated groundwater which discharges into the pond and ditches. The chromium levels do not pose a human health risk as has been stated elsewhere in this document, however, the surface water exceedances preclude compliance with all ARARs identified for the Site. As the level of chromium in groundwater attenuates, the levels of chromium in the surface water will decrease. When response action objectives are met for groundwater (the MCL for chromium in groundwater and the WQB-7 standards for chromium in groundwater have not been exceeded for a period of three consecutive years), EPA will

review chromium levels in surface water to determine if further action is warranted. If chromium levels in surface water achieve WQB-7 standards as expected, no further response action would be warranted and the Site could be considered for "site completion".

The proposed action also contemplates continued Town of Columbus enforcement of institutional controls currently in place as part of the Superfund Overlay District. These controls include both land use and groundwater use restrictions as previously described. The restrictions on groundwater use can be lifted by the Town of Columbus after response action objectives are met (the MCL for chromium in groundwater and the WQB-7 standards for chromium in groundwater have not been exceeded for a period of three consecutive years).

This particular removal action alternative would not generate waste byproducts requiring offsite disposal, would not impact ecological receptors, and would not interfere with current land use activities.

2. Contribution to remedial performance

It is anticipated that the proposed removal action will be the final response action for this site. This removal action, along with past removal actions, is expected to mitigate all potential threats to human health and the environment from chromium contaminants at the site. Since no further remedial action is expected at this site, site completion will be achieved without a Record of Decision (ROD).

3. Description of alternative technologies

As mentioned earlier, two other alternatives were evaluated in addition to the natural attenuation with institutional controls alternative. These alternatives were no action and groundwater pump and treat. A comparative analysis of each of these alternatives is included in Tables 3 and 4 (Attachment 1). Table 3 (Attachment 1) presents a summary of the comparative analysis for each of the three alternatives with respect to the EE/CA criteria, and Table 4 (Attachment 1) presents the same with respect to the NCP criteria.

4. EE/CA

The identification, screening, and evaluation of removal alternatives was previously performed in the EE/CA. Attachment 3 includes the EE/CA in its entirety. *The EE/CA Approval Memorandum*, documenting the need for an EE/CA, is included in Attachment 2. Additionally, written and oral comments received by EPA on the EE/CA are included in the Responsiveness Summary (Attachment 4). These and other documents relevant to the Site

are available for review in the administrative record file at locations previously noted.

5. ARARs

Attachment 5 includes a complete discussion of federal and state ARARs relevant to the proposed action. The ARARs of greatest significance are the following:

- Federal drinking water Maximum Contaminant Levels (MCLs);
- state water quality standards; and
- Class II landfill construction and monitoring requirements.

Action specific ARARs address the disposal of treated soil blocks at the Site. The treated soil blocks are considered to constitute a Class II landfill under Montana solid waste regulations. Consequently, ARARs include requirements to maintain a minimum separation between landfill wastes and state waters, to demonstrate that landfill leachate will not adversely affect state waters or to provide for a landfill liner and leachate collection system, to provide for an adequate cover to minimize infiltration as part of landfill closure, and related requirements. The treated soil blocks have been partially emplaced below the local groundwater table, with no liner, and cover consists of gravel or revegetated soil and probably does not meet minimum permeability requirements. Consequently, an ARAR waiver is necessary.

EPA has determined, based on leachate data from the treated soil blocks and on confirmatory soil analyses, along with appropriate geochemical considerations regarding the environment of the treated soil blocks, and when monitored and maintained by a program of appropriate institutional controls, monitoring, and maintenance to be established and/or continued as part of this removal action, that the subsurface emplacement of treated soil blocks at the Site is equivalent to that required by the Montana solid waste regulations through use of another method or approach. Accordingly, EPA invokes the ARAR waiver provision provided by CERCLA Sec. 121(d)(4)(D) and C.F.R. 300.430(f)(1)(ii)(C)(4). In determining that this ARAR waiver may properly be invoked in this limited context, EPA has considered that the purpose behind this solid waste regulation is to ensure that the leaching of chromium from the treated soil blocks does not further contaminate underlying groundwater or surface water bodies receiving groundwater discharge so that human health or the environment are adversely affected. The institutional controls and long-term monitoring to be instituted and/or continued under this removal action can attain these specific goals at an equivalent level of performance.

6. Project schedule

The projected time needed to perform the removal action is approximately 5 years. This includes a moderate duration of time that accounts for possible decreases in the rate at which chromium concentrations in groundwater are attenuated. This also includes at least five years of groundwater monitoring to verify that chromium is not leaching from the treated blocks into the groundwater.

The schedule for groundwater monitoring will be set in the Administrative Order (AO) to implement the selected removal action. Although the schedule for groundwater monitoring will not begin until an AO is in place, the actual process of natural attenuation of chromium concentrations in groundwater is ongoing.

B. Estimated Costs

The estimated costs for the natural attenuation with institutional controls alternative is $96,000 over the initial five year duration of the removal action. Yearly costs would be about $19,200. Tables 3 and 4 (Attachment 1) provide cost estimates for the other two alternatives. These comparative cost estimates only address the initial five years of groundwater monitoring to demonstrate that MCLs and state water quality standards have been met. Since it is anticipated that the removal action will be completed by the PRPs under an Administrative Order, these costs will not be borne by EPA or the Fund.

VI. Expected Change in the Situation Should Action Be Delayed or Not Taken

Because the removal action relies on natural attenuation processes to decrease the concentrations of chromium in groundwater, delaying or not taking further action should not be detrimental. However, delaying or not taking further action would result in an overall lack of groundwater characterization. However, without groundwater monitoring it is possible that concentrations of chromium above state standards could migrate without detection toward unacceptable locations such as the Yellowstone River. Delaying or not taking action would also be inconsistent with the ARAR that requires 30 years of monitoring of the treated block placement area.

VII. Outstanding Policy Issues

None.

VIII. Enforcement

Efforts to negotiate an Administrative Order on Consent (AOC) with the PRP group for the previous removal actions at the site were unsuccessful. EPA issued a UAO (CERCLA-VIII-92-05) to FMC Corporation, Monte Vista Company, Mouat Industries, Inc., Timberweld Manufacturing Co., and the Town of Columbus following failure to negotiate an AOC for the soil removal. Only FMC Corporation complied with the terms of the UAO. EPA does not believe efforts to negotiate an AOC to implement this action would be fruitful. Therefore, EPA expects to issue a UAO to implement the proposed removal action. The enforcement strategy is not part of this Action Memorandum for purposes of NCP consistency.

IX. Recommendation

This decision document represents the selected removal action for the Mouat Industries site, in Columbus, Stillwater County, Montana, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the site.

Conditions at the site meet NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed removal action.

The undersigned approves the Action Memorandum, which substantiates the need for removal action based on criteria specified in the NCP.

Approve: _____ **Date:** 6/21/96

Max H. Dodson, ~~Assistant~~ Regional Administrator
Office of Ecosystems Protection and Remediation, 8EPR
USEPA Region VIII

Disapprove: _____ **Date:** _____

Max H. Dodson, Assistant Regional Administrator
Office of Ecosystems Protection and Remediation, 8EPR
USEPA Region VIII

ATTACHMENT 1

FIGURES AND TABLES

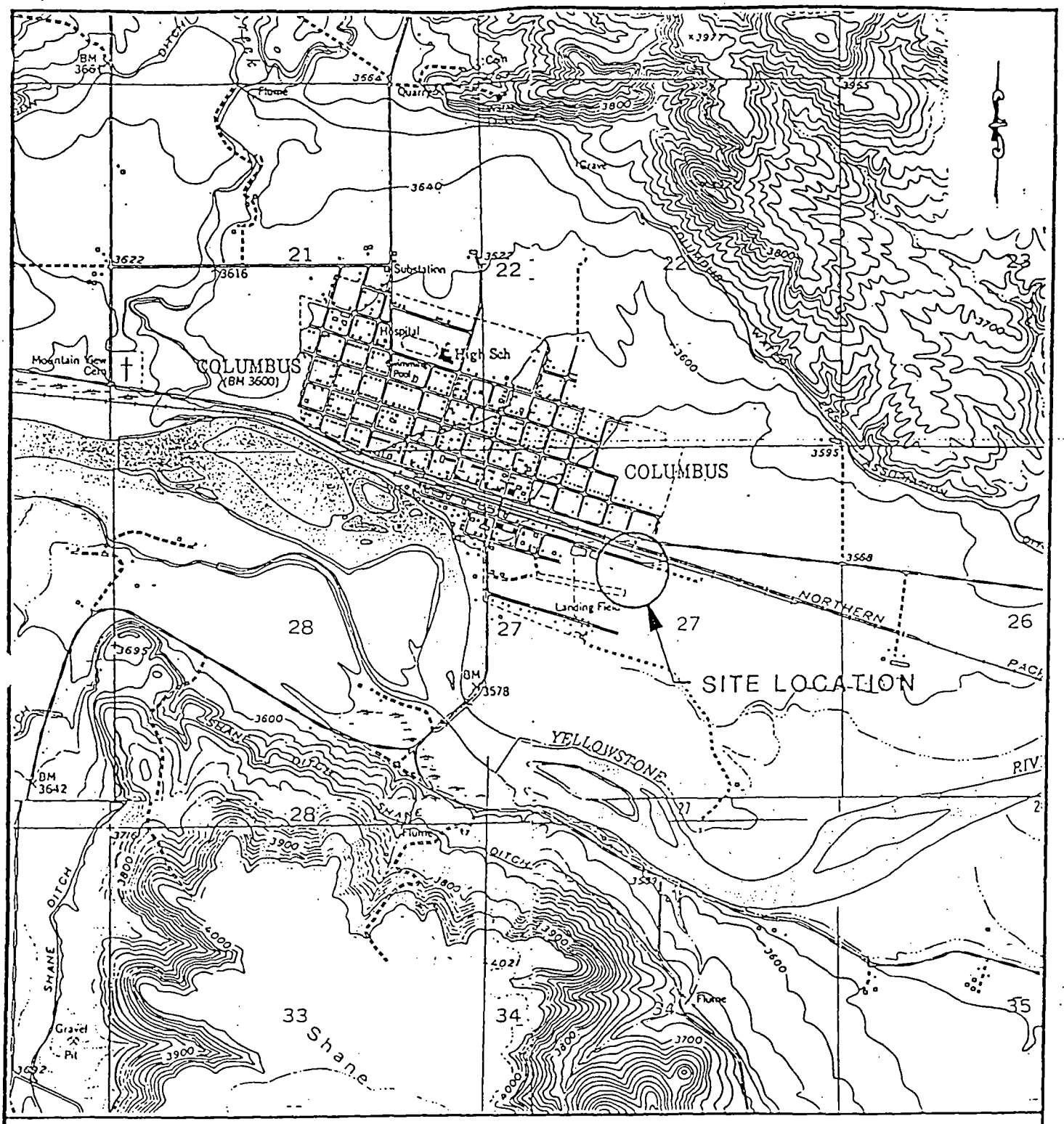

FIGURE 1

MOUAT INDUSTRIES - SITE LOCATION MAP

COLUMBUS, MONTANA

SCALE:	1" = 2000'	DATE:	3/30/95
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DSN/DWN:	EHR/CEB	CHK:	

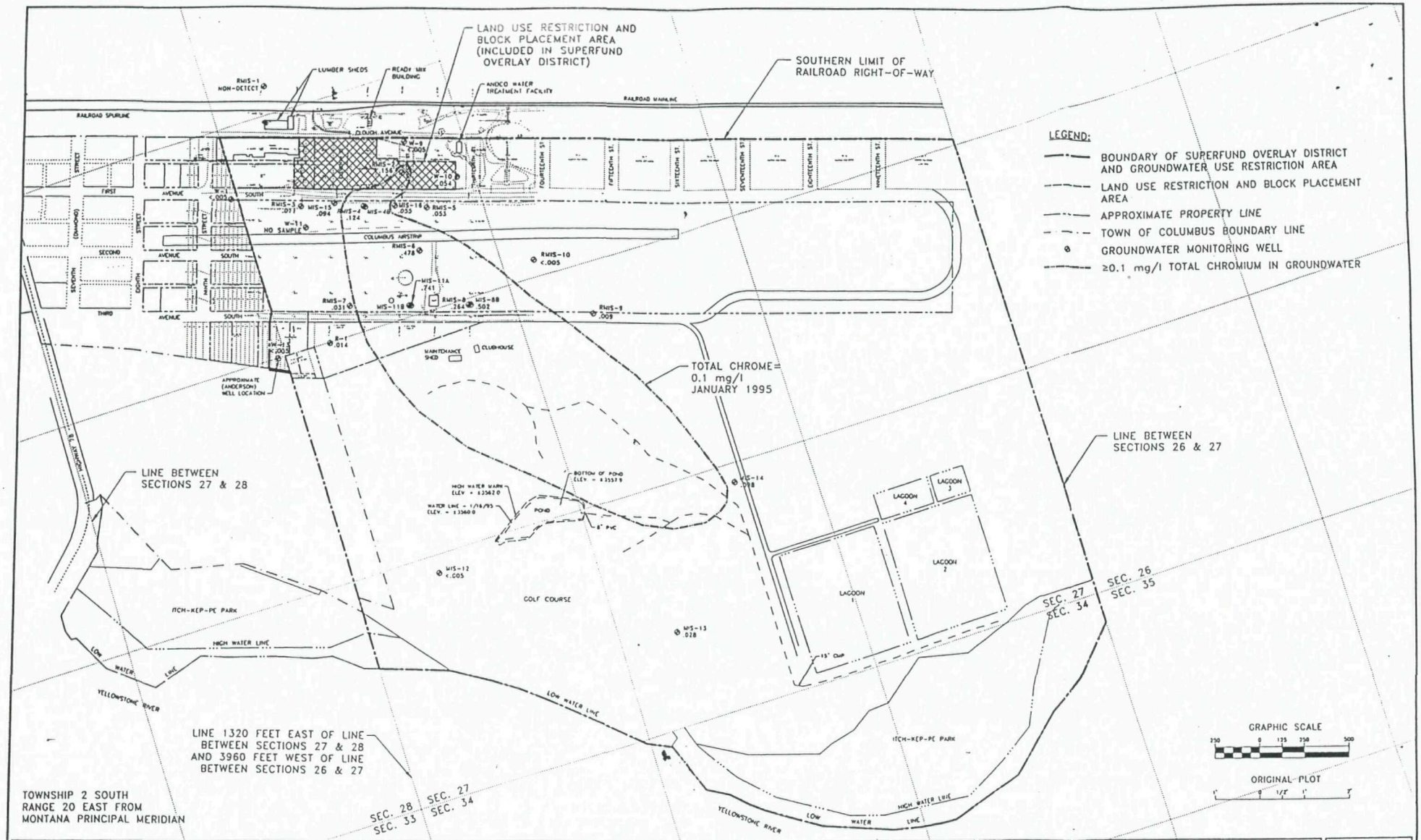
Baker Environmental, Inc.

BAKER ENVIRONMENTAL, INC.
CORAOPOLIS, PENNSYLVANIA

REFERENCE:
USGS 7.5 MINUTE MINUTE QUADRANGLES, COLUMBUS WEST, COLUMBUS EAST, SHANE RIDGE AND WHITEBIRD SCHOOL

2000 0 1000 2000 4000

1 inch = 2000 ft



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S.O. NO.: 18978
FILE: 18978L49

NORTH

FMC CORPORATION
PHILADELPHIA, PENNSYLVANIA

Baker Environmental, Inc.
Coraopolis, Pennsylvania

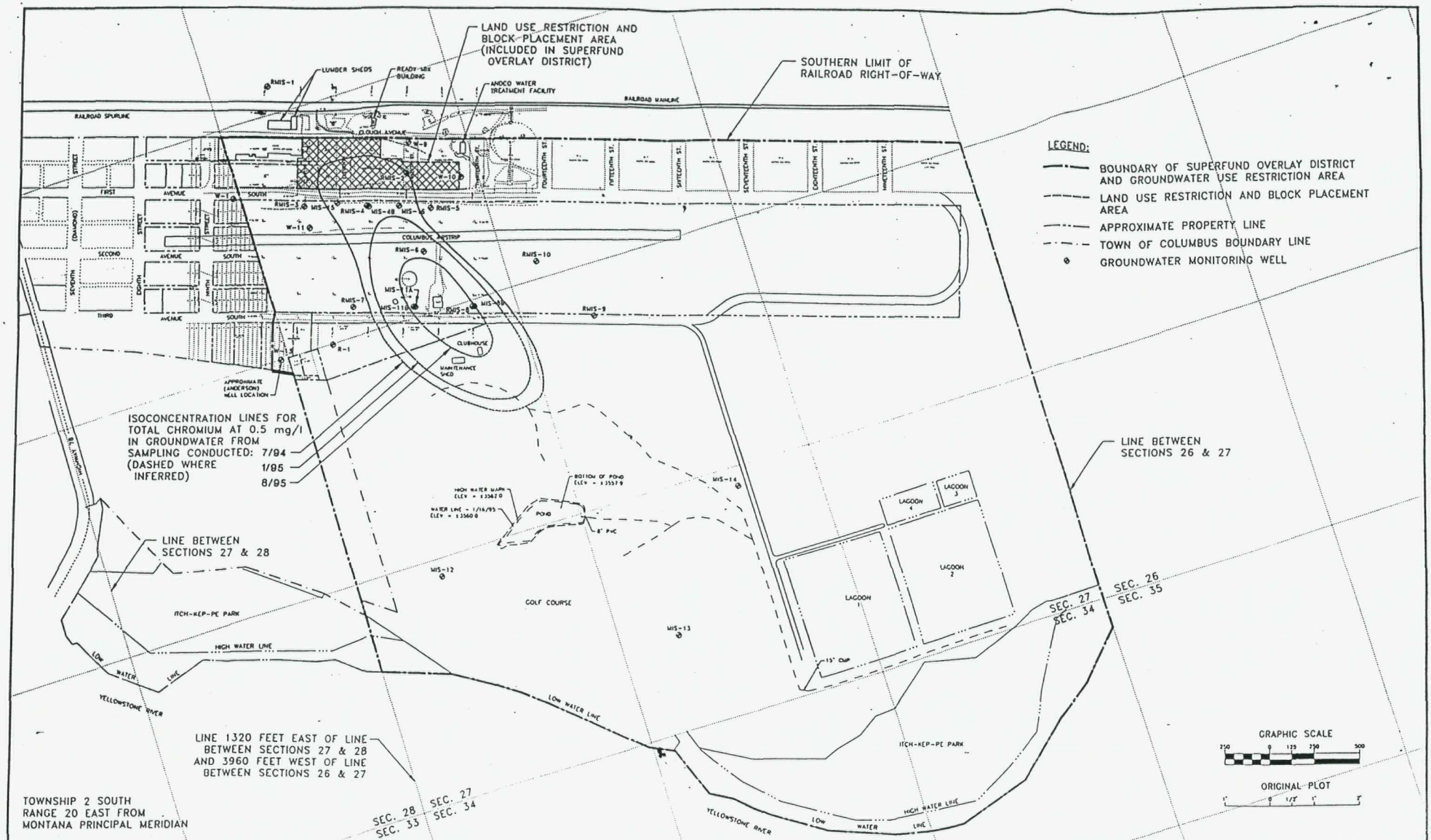
Baker
Baker Environmental, Inc.

INTERPRETATIVE MAP OF AREA WITH TOTAL CHROMIUM IN GROUNDWATER ≥0.1 mg/l JANUARY, 1995
MOUAT INDUSTRIES NPL SITE
COLUMBUS, MONTANA

SCALE: AS SHOWN

DATE: OCTOBER 9, 1995

FIGURE NO.
2



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1		DSN/DWN: EHR/CEB	NORTH		FMC CORPORATION PHILADELPHIA, PENNSYLVANIA	ISO-CONCENTRATION LINES FOR TOTAL CHROMIUM AT 0.5 mg/l IN GROUNDWATER IN JULY 994, JAN. & AUG. 1995 MOUAT INDUSTRIES NPL SITE COLUMBUS, MONTANA	FIGURE NO.
2		CHK:			Baker Environmental, Inc. Coraopolis, Pennsylvania	SCALE: AS SHOWN	3
3		S.O. NO.: 18978				DATE: OCTOBER 9, 1995	
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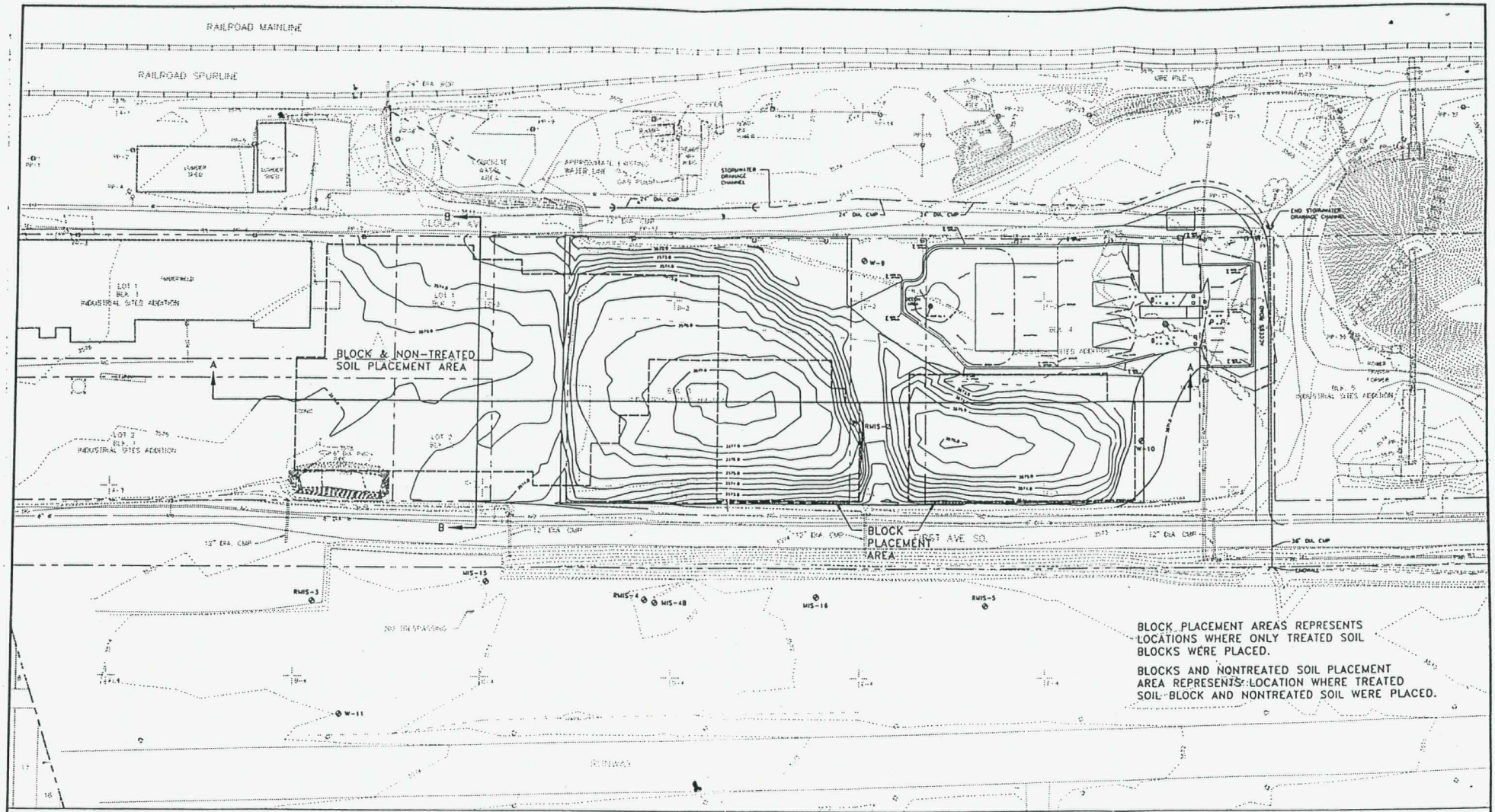

ON ORIGINAL

GRAPHIC SCALE

(IN FEET)

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S.O. NO.: 18978
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NORTH

FMC CORPORATION
PHILADELPHIA, PENNSYLVANIA

Baker Environmental, Inc.
Coraopolis, Pennsylvania

Baker
Baker Environmental, Inc.

SITE CONTOURS AT SOIL REMOVAL ACTION COMPLETION

MOUAT INDUSTRIES NPL SITE
COLUMBUS, MONTANA

SCALE: AS SHOWN

DATE: OCTOBER 9, 1995

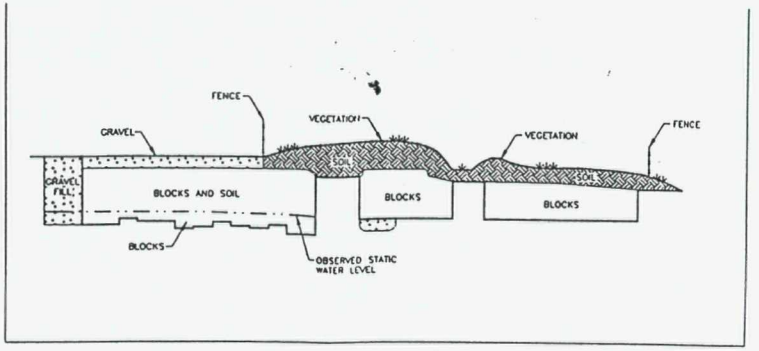
FIGURE NO.
4

HORIZONTAL GRAPHIC SCALE
(SITE CROSS SECTIONS ONLY)

(IN FEET)

VERTICAL GRAPHIC SCALE
(SITE CROSS SECTIONS ONLY)

(IN FEET)



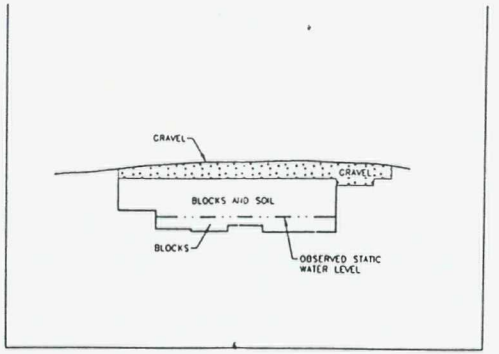
SECTION A-A (FACING NORTH)

HORIZONTAL GRAPHIC SCALE
(SITE CROSS SECTIONS ONLY)

(IN FEET)

VERTICAL GRAPHIC SCALE
(SITE CROSS SECTIONS ONLY)

(IN FEET)



SECTION B-B (FACING WEST)

NOTES:

1. A MAXIMUM OF ONE LAYER OF BLOCKS ARE PLACED BELOW THE WATER TABLE.
2. ALL EXCAVATED, UNTREATED SOIL WITH TCLP CHROMIUM RESULTS BETWEEN 0.1 mg/L AND 0.5mg/L WAS PLACED ABOVE THE OBSERVED STATIC WATER TABLE.
3. THE GRAVEL SURFACE AREA IS NOT FENCED. THE VEGETATED AREA IS ENCLOSED WITHIN A SECURITY FENCE.
4. SEE FIGURE 2-2 FOR LOCATION OF SECTIONS.

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3/4 3/4 3/4 3/4 3/4 3/4

0" 1/2 1" 1/2 2" 1/2 3"

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3		S.O. NO.:	18978			Baker Environmental, Inc. Coraopolis, Pennsylvania
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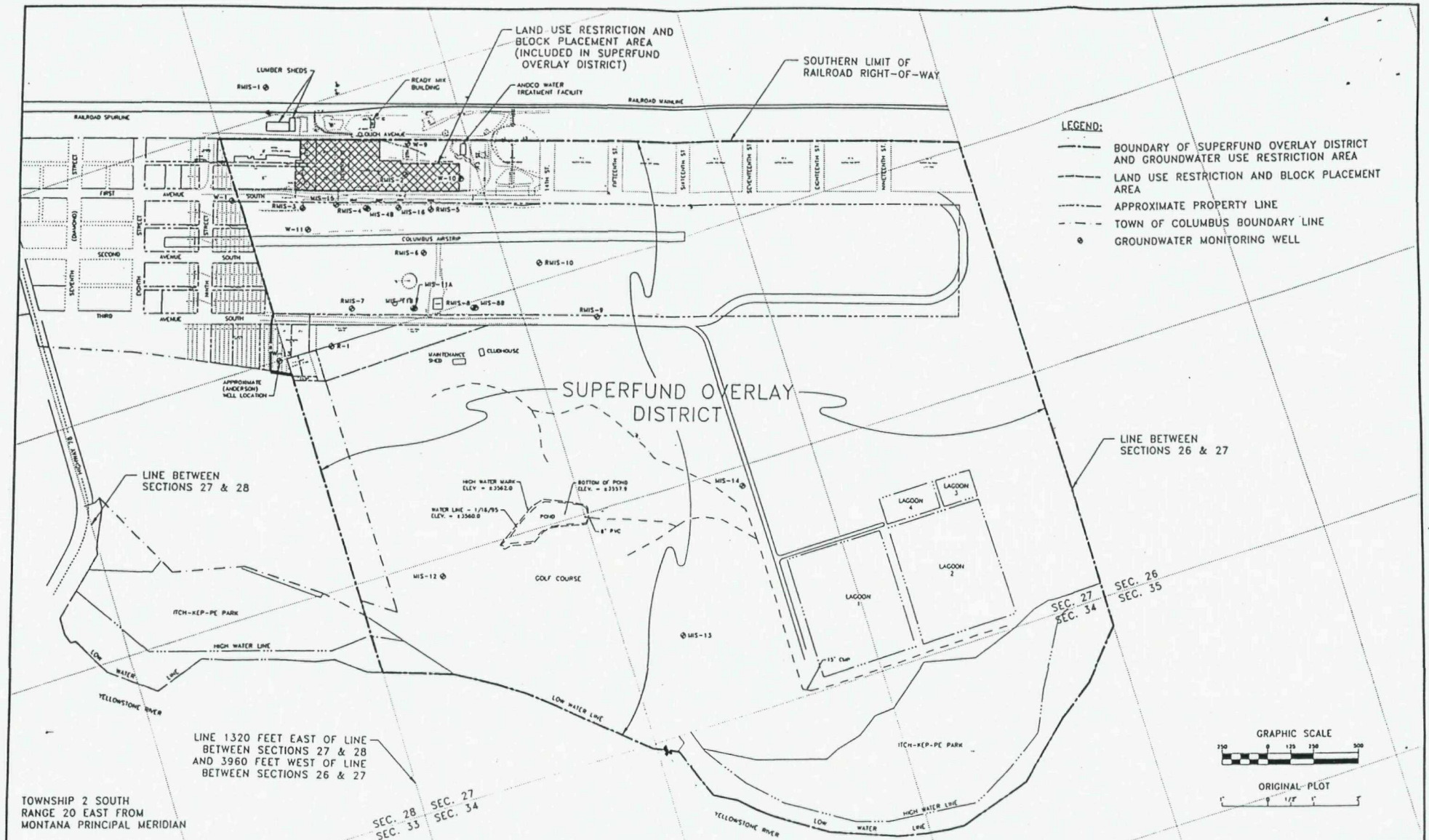
Baker
Baker Environmental, Inc.

SITE CROSS SECTIONS A-A AND B-B
MOUAT INDUSTRIES NPL SITE
COLUMBUS, MONTANA

SCALE: AS SHOWN DATE: MARCH 5, 1998

FIGURE NO.
5



TOWNSHIP 2 SOUTH
RANGE 20 EAST FROM
MONTANA PRINCIPAL MERIDIAN

REVISIONS	DSN/DWN: EHR/CEB	NORTH	FMC CORPORATION PHILADELPHIA, PENNSYLVANIA	Baker Environmental, Inc.	SUPERFUND OVERLAY DISTRICT MOUAT INDUSTRIES NPL SITE COLUMBUS, MONTANA	FIGURE NO. 6
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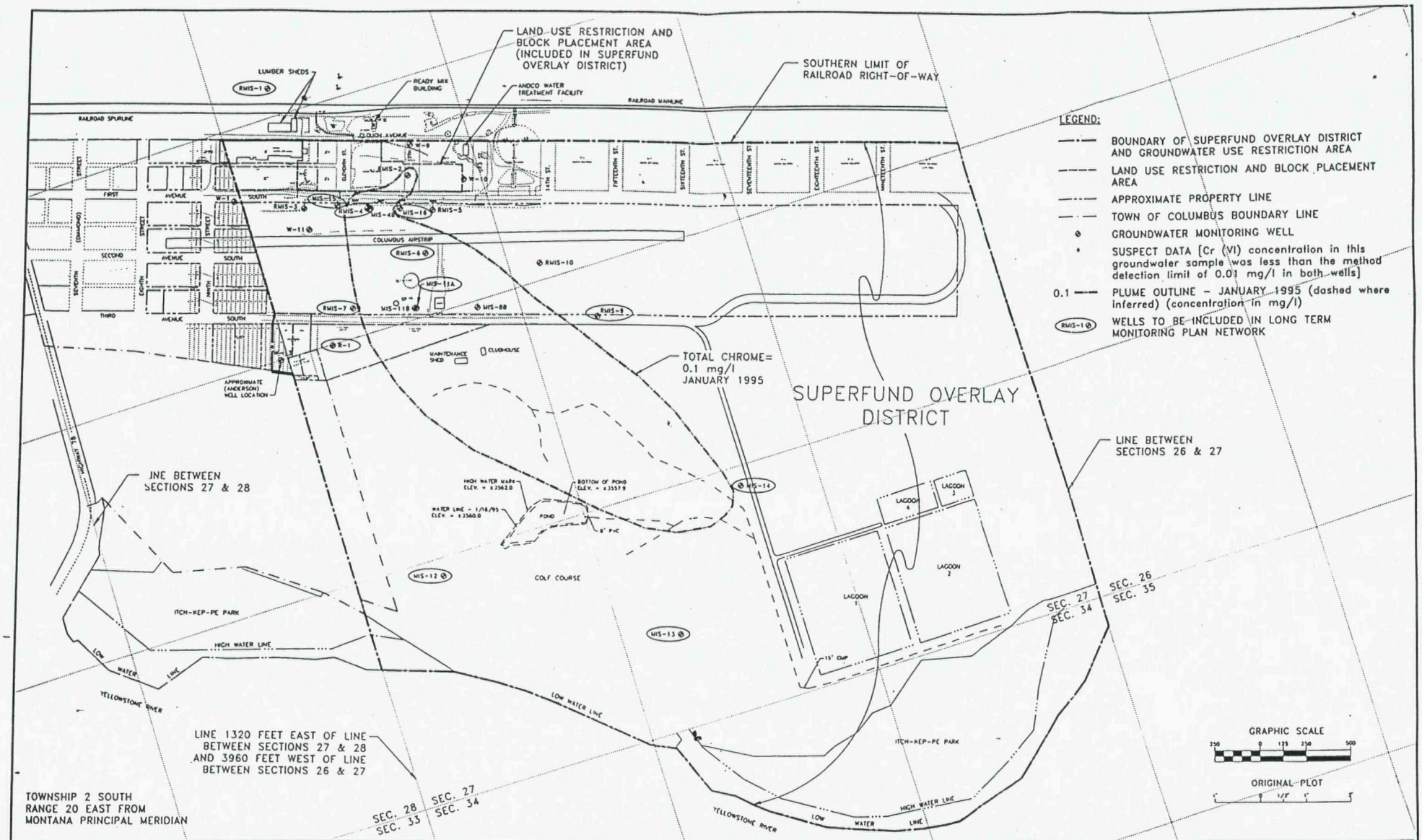

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S.O. NO.: 18978
FILE: 18978L22

FMC CORPORATION
PHILADELPHIA, PENNSYLVANIA

Baker Environmental, Inc.
Coraopolis, Pennsylvania

Baker Environmental, Inc.

PROPOSED GROUNDWATER MONITORING NETWORK FOR THE LONG TERM MONITORING PLAN
MOUAT INDUSTRIES NPL SITE
COLUMBUS, MONTANA

SCALE: AS SHOWN
DATE: OCTOBER 18, 1995

FIGURE NO. 7

TABLE 1
Summary of Analytical Results for Treated Material Samples
Mouat Industries Site

Sample Identification	Sample Date	Sampler	TCLP Chromium (mg/l)	Estimated Hex Cr (mg/kg)	Comments
MS-TS-06/28/93-28	07/25/93	Stoddard, Peg,Walter	0.02	1.34	28 day com. bat. 1001-1004
MS-TS-121-CN1	07/27/93	Bruggman	0.09	2.57	
MS-TS-127-BN1	07/27/93	Bruggman	0.04	1.7	
MS-TS-101-CE3	07/27/93	Bruggman	0.12	3.1	
MS-TS-102-CN3	07/27/93	Bruggman	0.05	1.87	
MS-TS-112-CE1	07/27/93	Brost, Whitmer, Walt	0.1	2.75	
MS-TS-167-BEI	07/27/93	Brost, Whitmer, Wal	0.01	1.17	
MS-TS-144-CE3	07/27/93	Bruggman	< 0.01	< 0.99	
MS-TS-140-CE3	07/27/93	Brost, Whitmer, Wal	0.06	2.05	
MS-TS-143-CE3	07/27/93	Bruggman	0.02	1.34	
MS-TS-100-CE1	07/27/93	Bruggman	0.06	2.05	
MS-TS-150-BE1	07/27/93	Bruggman	0.01	1.17	
MS-TS-84-BE3	07/27/93	Bruggman	0.04	1.7	
MS-TS-06/29/93-28	07/27/93	Brost,Whitmer,Wal,Br	0.02	1.34	28 day composite 1005-1206, 1008-1013
MS-TS-160-CE1	07/27/93	Bruggman	0.18	4.16	
MS-TS-67-CN3	07/27/93	Bruggman	0.03	1.52	
MS-TS-99-CN1	07/27/93	Bruggman	0.06	2.05	
MS-TS-166	07/28/93	Stoddard, McDonald	0.34	6.97	
MS-TS-51	07/28/93	McDon,Sjong,Stoddard	< 0.01	0.99	
MS-TS-47	07/28/93	McDon,Sjong,Stoddard	0.07	2.22	
MS-TS-57	07/28/93	McDon,Sjong,Stoddard	< 0.01	0.99	
MS-TS-63	07/28/93	Stoddard,Sjong,MCDon	0.17	3.98	
MS-TS-53	07/28/93	McDon,Sjong,Stoddard	< 0.01	0.99	
MS-TS-45	07/28/93	Stoddard,Sjong,MCDon	0.11	2.93	
MS-TS-55	07/28/93	Stoddard,McDon,Sjong	< 0.01	0.99	
MS-TS-75	07/28/93	Stoddard, McDonald	0.02	1.34	
MS-TS-111	07/28/93	Stoddard, McDonald	< 0.01	0.99	
MS-TS-133	07/28/93	Stoddard, McDonald	0.01	1.17	
MS-TS-151	07/28/93	Stoddard, McDonald	0.17	3.98	
MS-TS-155	07/28/93	Stoddard, McDonald	0.1	2.75	
MS-TS-138	07/28/93	Stoddard, McDonald	< 0.01	0.99	
MS-TS-201	07/28/93	McDon,Sjong,Stoddard	0.42	8.37	
MS-TS-191	07/28/93	Stoddard, McDonald	0.26	5.56	
MS-TS-81	07/28/93	Stoddard, McDonald	0.11	2.93	
MS-TS-145	07/28/93	McDon,Sjong,Stoddard	0.21	4.68	
MS-TS-06/30/93-28	07/28/93	MCDonald	0.01	1.17	Split sample given to Berril gold
MS-TS-07/01/93-28	07/29/93	McDonald, Sjong	0.01	1.17	
MS-TS-61	07/30/93	MCDon, Kump, Sjong	< 0.01	0.99	
MS-TS-162	07/30/93	MCDon, Kump, Sjong	0.15	3.63	
MS-TS-153	07/30/93	MCDon, Kump, Sjong	0.13	3.28	
MS-TS-171	07/30/93	McDon, Kump, Sjong	0.33	6.79	
MS-TS-132	07/30/93	MCDon, Kump, Sjong	0.01	1.17	
MS-TS-163	07/30/93	MCDon, Kump, Sjong	0.24	5.21	
MS-TS-107	07/30/93	McDon. Kump, Sjong.	< 0.01	0.99	
MS-TS-173	07/30/93	McDon, Kump, Sjong	0.35	7.14	
MS-TS-195	07/30/93	MCDon, Kump, Sjong	0.05	1.87	
MS-TS-117	07/30/93	MCDon, Kump, Sjong	0.01	1.17	
MS-TS-85	07/30/93	MCDon, Kump, Sjong	< 0.01	0.99	
MS-TS-52	07/30/93	MCDon, Kump, Sjong	0.25	5.39	
MS-TS-07/02/93-28	07/30/93	MCDon, Kump, Sjong	0.01	1.17	
MS-TS-95	07/30/93	MCDon, Kump, Sjong	0.04	1.7	
MS-TS-07/06/93-28	08/04/93	Stoddard,Bruggman	0.02	1.34	
MS-TS-07/07/93-28	08/04/93	Stoddard, Brugman	0.04	1.7	28 day composite 1051-1065, 2003-2006
MS-TS-07/08/93-28	08/05/93	Stodd,Sjong,Walt,McD	0.04	1.7	28 day composite 01044-01050
MS-TS-44	08/06/93	Sjong, MCDonald	0.02	1.34	
MS-TS-42-A	08/06/93	Sjong, MCDonald	0.3	6.27	
MS-TS-54	08/06/93	Sjong, MCDonald	0.22	4.86	
MS-TS-07/09/93-28	08/06/93	Sjong, Mcdonald	0.06	2.05	
MS-TS-70	08/06/93	Sjong, MCDonald	0.08	2.4	
MS-TS-42-B	08/06/93	Sjong, MCDonald	0.34	6.97	
MS-TS-07/10/93-28	08/07/93	MCDonald, Sjong	0.08	2.4	
MS-TS-07/11/93-28	08/08/93	McDonald, Sjong	0.08	2.4	
MS-TS-07/12/93-28	08/09/93	Braggman	0.03	1.52	28 day com; 1151-1173,2047-2056,2058-2068
MS-TS-07/13/93-28	08/10/93	Stoddard,Herrick,Wal	0.04	1.7	28 day composite
MS-TS-07/14/93-28	08/11/93	Stoddard	0.05	1.87	28 day composite
MS-TS-40	08/12/93	Bruggman,Walter	< 0.01	0.99	Total Unfiltered HNO3 to pH <2.0
MS-TS-105	08/12/93	Bruggman,Walter	0.24	5.21	
MS-TS-07/15/93-28	08/12/93	Stoddard	0.05	1.87	28 day composite

Hexavalent Chromium was calculated using: Hex Cr = 0.99223 + (17.578 x TCLP)

TABLE 1 (continued)
Summary of Analytical Results for Treated Material Samples
Mouat Industries Site

Sample Identification	Sample Date	Sampler	TCLP Chromium (mg/l)	Estimated Hex Cr (mg/kg)	Comments
MS-TS-07/16/93-28	08/13/93	Kump,MCDon,Sjong	0.05	2.05	
MS-TS-07/17/93-28	08/14/93	Kump,MCDon,Sjong	0.06	2.05	
MS-TS-07/18/93-28	08/15/93	Sjong,MCDonald	0.06	2.05	
MS-TS-07/19/93-28	08/16/93	Gaustad,MCDonald	0.06	2.05	
MS-TS-01831	08/16/93	Walter	< 0.01	0.99	
MS-TS-07/20/93-28	08/17/93	Walter	0.04	1.7	28 day composition
MS-TS-07/21/93-28	08/18/93	Stoddard,Walter,Brug	0.05	1.87	EPA
Block 4308	08/18/93	Stoddard,Walter,Brug	0.04	1.7	
MS-TS-07/22/93-28	08/19/93	Stodd,Brugg,Walter	0.05	1.87	
MS-TS-07/23/93-28	08/20/93	Stoddard,Walker	0.06	2.05	
MS-TS-07/24/93-28	08/21/93	McDon,Sjong,Rubis	0.06	2.05	
MS-TS-07/25/93-28	08/22/93	McDononald, Sjong	0.03	1.52	
MS-TS-07/26/93-28	08/23/93	Sjong,McDon, Kump,	0.06	2.05	
MS-TS-07/27/93-28	08/24/93	Sjong	0.06	2.05	
MS-TS-07/28/93-28	08/25/93	Bruggman,Walter	0.07	2.22	28 day composite
MS-TS-07/29/93-28	08/26/93	Stodd,Bruggman,Walt	0.08	2.4	28 day composite
MS-TS-07/30/93-28	08/27/93	Stoddard,Walter,Brug	0.07	2.22	28 day composite
MS-TS-07/31/93-28	08/28/93	Stod,Brug,Wal,Her	0.06	2.05	28 day composite
MS-TS-08/01/93-28	08/29/93	Stod,Brug,Wal,Her	0.02	1.34	
MS-TS-08/02/93-28	08/30/93	Sjong,MCDonald	0.04	1.7	
MS-TS-08/03/93-28	08/31/93	Sjong,McDonald	0.06	2.05	
MS-TS-08/04/93-28	09/01/93	Bubis,McDon,Sjong	0.07	2.22	
MS-TS-08/05/93-28	09/02/93	McDonald	0.09	2.57	
MS-TS-08/06/93-28	09/03/93	Stoddard,Walter,Brug	0.04	1.7	28 day composite
MS-TS-08/07/93-28	09/04/93	Stoddard,Walter,Brug	0.08	2.4	28 day composite
MS-TS-08/08/93-28	09/05/93	Stoddard,Walter,Brug	0.06	2.05	28 day composite
MS-TS-08/09/93-28	09/06/93	Stoddard,Walter,Brug	0.05	1.87	
MS-TS-08/10/93-28	09/07/93	Sjong,MCDonald	0.04	1.7	
MS-TS-08/11/93-28	09/08/93	Sjong,McDonald,Eman	0.04	1.7	
MS-TS-08/12/93-28	09/09/93	Sjong,McDon,Bubis	0.04	1.7	
MS-TS-08/13/93-28	09/10/93	Bruggman,Walters	0.06	2.05	28 day composite, Billings lab
MS-TS-08/14/93-28	09/11/93	Walter	0.03	1.52	28 day composite
MS-TS-08/15/93-28	09/12/93	Stoddard,Walter,Brug	0.06	2.05	28 day composite
MS-TS-08/16/93-28	09/13/93	Stoddard,Walter,Brug	0.03	1.52	28 day composite
MS-TS-08/17/93-28	09/14/93	McDonald,Stodard	0.03	1.52	
MS-TS-08/18/93-28	09/15/93	MCDonald	0.05	1.87	Split of 28 day composite for EPA
MS-TS-08/19/93-28	09/16/93	Sjong,MCDonald,Kump	0.06	2.05	
MS-TS-08/20/93-28	09/17/93	McDonald,Sjong	0.06	2.05	
MS-TS-08/21/93-28	09/18/93	Walter,Duff,Sjong	0.07	2.22	28 day composite
MS-TS-08/22/93-28	09/19/93	Kostelecky,Walter,Sj	0.08	2.4	28 day composite
MS-TS-08/23/93-28	09/20/93	Walter,Whitmer,Brugg	0.07	2.22	28 day composite
MS-TS-08/24/93-28	09/21/93	Kostelecky,Walter	0.06	2.05	
MS-TS-08/25/93-28	09/22/93	Kostelecky,McDonald	0.07	2.22	
MS-TS-08/26/93-28	09/23/93	MCDonald,Kump,Brugg	0.08	2.4	
MS-TS-08/27/93-28-E	09/24/93	Walter,Bruggman	0.06	2.05	
MS-TS-08/28/93-28	09/25/93		0.06	2.05	
MS-TS-08/29/93-28	09/26/93		0.05	1.87	
MS-TS-08/30/93-28	09/27/93		0.05	1.87	
MS-TS-08/31/93-28	09/28/93		0.09	2.57	
MS-TS-09/01/93-28	09/29/93	Kostalecky, Bruggman	0.09	2.57	28 day composite
MS-TS-09/02/93-28	09/30/93	Kostelecky,Sjong	0.08	2.4	
MS-TS-09/03/93-28	10/01/93	McDonald,Sjong	0.07	2.22	
MS-TS-09/04/93-28	10/02/93	McDonald,Sjong	0.07	2.22	
MS-TS-09/05/93-28	10/03/93	McDonald,Sjong	0.11	2.93	
MS-TS-03790	10/04/93	Bruggman	0.22	4.86	Missing pink copy, frank will send
MS-TS-09/06/93-28	10/04/93	Bruggman,Walter	0.08	2.4	28 day composite
MS-TS-09/07/93-28	10/05/93	Bruggman,Walter	0.1	2.75	28 day composite
MS-TS-09/08/93-28	10/06/93	Kostelecky,Walter	0.11	2.93	
MS-TS-09/09/93-28	10/07/93	Kostelecky,Bruggman	0.41	8.2	28 day composite
MS-TS-Fe8/PC29-28	10/07/93	Kostelecky,Bruggman	0.23	5.04	28 day composite
MS-TS-06599	10/07/93		0.05	1.87	Done directly by Energy
MS-TS-09/10/93-28	10/08/93	Kostelecky,Bruggman	0.34	6.97	
MS-TS-09/11/93-28	10/09/93	McDonald	0.1	2.75	
MS-TS-09/12/93-28	10/10/93	McDonald,Bubis	0.08	2.4	
MS-TS-09/13/93-28	10/11/93	MCDonald,Sjong	0.09	2.57	
MS-TS-09/14/93-28	10/12/93	Bruggman,Walter	0.08	2.4	28 day composite
MS-TS-09/15/93-28	10/13/93	Kostelecky,Walter	0.1	2.75	28 day composit
MS-TS-07296	10/13/93	Energy	0.06	2.05	sample done by energy labs directly

Hexavalent Chromium was calculated using: Hex Cr = 0.99223 + (17.578 x TCLP)

TABLE 1 (concluded)
Summary of Analytical Results for Treated Material Samples
Mouat Industries Site

Sample Identification	Sample Date	Sampler	TCLP Chromium (mg/l)	Estimated Hex Cr (mg/kg)	Comments
MS-TS-09/16/93-28	10/14/93	Kostelecky,Bruggman	0.12	3.1	28 day composite
MS-TS-09/17/93-28	10/15/93	Kostelecky,Brost	0.12	3.1	28 day composite
MS-TS-09/18/93-28	10/16/93	Kostelecky,Brost	0.11	2.93	
MS-TS-09/19/93-28	10/17/93	Sjong,McDonald	0.12	3.1	
MS-TS-09/20/93-28	10/18/93	Sjong,MCDonald	0.13	3.28	
MS-TS-09/21/93-28	10/19/93	MCDonald,Robertson	0.27	5.74	
MS-TS-09/22/93-28	10/20/93	Walter,Bruggman	0.35	7.14	28 day composite for Energy Labs
MS-TS-09/23/93-28	10/21/93	Walter,Bruggman	0.18	4.16	Re-analyzed, first analysis was .55
MS-TS-09/24/93-28	10/22/93	Walter,Bruggman	0.18	4.16	
MS-TS-09/25/93-28	10/23/93	Walter,Bruggman	0.24	5.21	
MS-TS-09/26/93-28	10/24/93	McDonald,Risher	0.1	2.75	
MS-TS-09/27/93-28	10/25/93	McDonald,Robertson,	0.09	2.57	
MS-TS-09/28/93-28	10/26/93	MCDonald,Risher	0.14	3.45	
MS-TS-09/29/93-28	10/27/93	Sjong,Walter	0.08	2.4	
MS-TS-09/30/93-28	10/28/93	Sjong	0.06	2.05	28 day composite for EPA
MS-TS-10/01/93-28	10/29/93	Bruggman,McDonald	0.04	1.7	28 day composit
MS-TS-Fe9/PC31-28	10/29/93	Bruggman,McDonald	0.04	1.7	
MS-TS-10/02/93-28-A	10/30/93	Whitmer, McDonald	0.07	2.22	Treated soil to be analyzed by Energy
MS-TS-10/03/93-28	10/31/93	Walter,Whitmer	0.04	1.7	28 day composite
MS-TS-10/04/93-28	11/01/93	Walter	0.04	1.7	
MS-TS-10/05/93-28	11/02/93	Walter	0.07	2.22	
MS-TS-10/06/93-28	11/03/93	Walter	0.09	2.57	Split with Burrill Gold
MS-TS-10/07/93-28	11/05/93	Walter	0.05	1.87	
MS-TS-10/09/93-28	11/06/93	Herrick, Whitmer	0.06	2.05	
MS-TS-10/10/93-28	11/07/93	Walter	0.12	3.1	28 day composite
MS-TS-10/11/93-28	11/08/93	Walter	0.05	1.87	
MS-TS-10/12/93-28	11/09/93	Walter	0.06	2.05	
MS-TS-10/13/93-28	11/10/93	Walter	0.07	2.22	
MS-TS-10/14/93-28	11/11/93	Kump	0.18	4.16	
MS-TS-10/14/93-28	11/11/93	Kump	0.47	9.25	
MS-TS-10/15/93-28	11/12/93	Newton	0.14	3.45	28 day composite for Energy Labs
MS-TS-10/16/93-28	11/13/93	Newton	0.1	2.75	28 day composite for Energy Labs
MS-TS-10/17/93-28	11/14/93	Walter	0.06	2.05	
MS-TS-10/18/93-28	11/15/93	Jim Walter	0.04	1.7	28 day composite for Energy
MS-TS-10/19/93-28	11/16/93	Kump	0.12	3.1	
MS-TS-10/20/93-28	11/17/93	Walter	0.02	1.34	
MS-TS-10/21/93-28	11/18/93	Herrick	0.003	1.04	
MS-TS-10/22/93-28	11/19/93	Herrick	0.02	1.34	
MS-TS-10/23/93-28	11/20/93	Herrick	0.03	1.52	28 day composite
MS-TS-10/24/93-28	11/21/93	Walter	0.08	2.4	28 day composite
MS-TS-10/28/9328test	11/22/93	Whitmer	0.02	1.34	28 day composite, need to crush, extracted II/26
MS-TS-10/28/93-28	11/22/93	Whitmer	0.03	1.52	28 day composite, need to crush, extracted II/26
MS-TS-10/30/93-28	11/22/93	Whitmer	0.03	1.52	28 day composite, need to crush, extracted II/26
MS-TS-10/29/93-28	11/22/93	Whitmer	0.03	1.52	28 day composite, need to crush, extracted II/26
MS-TS-10/25/93-28	11/22/93	Kump	0.06	2.05	28 day composite
MS-TS-10/26/93-28	11/22/93	Whitmer	0.07	2.22	28 day composite, need to crush
MS-TS-10/27/93-28	11/22/93	Whitmer	0.04	1.7	28 day composite, need to crush, extracted II/26
MS-TS-3493	05/20/94	Walter	0.02	1.34	

1) TCLP - Toxcity Characteristic Leaching Procedure
2) mg/l - milligram per liter
3) mg/kg - milligram per kilogram
4) Calc Hex Cr - Calculated Hexavalent Chromium

Hexavalent Chromium was calculated using: Hex Cr = 0.99223 + (17.578 x TCLP)

TABLE 2
Summary of Analytical Results for Confirmatory Grid Samples
Mouat Industries Site

Sample Identification	Sample Date	Sampler	TCLP Chromium (mg/l)	Estimated Hex Cr (mg/kg)	Data Qualifier	COMMENTS (Sample Location, Sample Depth, etc.)
MS-S-B.6-V-N-3	09/04/94	Wilks	< 0.01	< 0.99		
MS-S-B.6-V-W-2	09/04/94	Wilks	< 0.01	< 0.99		
MS-S-B.7-V-N-2	09/02/94	Davison, Kump	< 0.01	< 0.99		
MS-S-B.8-V-E-1	09/02/94	Davison, Kump	0.1	2.75		
MS-S-B.8-V-N-2	09/04/94	Wilks, Herrick	< 0.01	< 0.99		
MS-S-B.8-V-S-1	09/02/94	Davison, Kump	0.05	1.87		
MS-S-C.6-1	08/31/94	Bruggman, Kump	0.01	1.17		(10')
MS-S-C.6-V-W-1	08/31/94	Bruggman, Kump	0.01	1.17		
MS-S-C.7-1	08/31/94	Bruggman, Kump	0.02	1.34		4'
MS-S-C.8-1	09/07/94	Walter, Bruggman	0.02	1.34		4'
MS-S-C.8-V-E-1	09/15/94	Bruggman, Walter	0.04	1.7		
MS-S-D.10-V-N-1	09/17/94	Wilks,Wieringa,Kump	0.05	1.87		
MS-S-D.11-V-N-1	09/17/94	Wilks,Wieringa,Kump	0.01	1.17		
MS-S-D.12-1	09/15/94	Bruggman, Walter	0.04	1.7		2'
MS-S-D.13-1	09/15/94	Bruggman, Walter	0.07	2.22		2'
MS-S-D.14-1	09/16/94	Wilks,Herman,Kump	0.07	2.22		2'
MS-S-D.15-1	09/16/94	Wilks,Herman,Kump	0.14	3.45		2'
MS-S-D.16-1	09/17/94	Wilks,Wieringa,Kump	0.06	2.05		2'
MS-S-D.17-1	09/17/94	Wilks,Wieringa,Kump	0.1	2.75		2'
MS-S-D.18-1	09/18/94	Wilks,Wieringa,Kump	0.02	1.34		2'
MS-S-D.19-1	09/18/94	Wilks,Wieringa,Kump	0.04	1.7		2'
MS-S-D.20-1	09/20/94	Bruggman	0.05	1.87		2'
MS-S-D.5-2	07/29/94	Wilks, Herman	0.06	2.05		10'
MS-S-D.5-V-N-2	07/22/94	Herman, Wilks	0.01	1.17		C.5
MS-S-D.5-V-W-3	07/25/94	Davison, Bruggman	0.01	1.17		
MS-S-D.9-V-N-1	09/08/94	Bruggman	< 0.01	< 0.99		
MS-S-E.11-V-E-2	09/12/94	Bruggman	0.02	1.34		
MS-S-E.12-2	09/14/94	Bruggman, Walter	0.15	3.63		6'
MS-S-E.12-V-N-1	09/11/94	Kump, Herman	0.41	8.2		
MS-S-E.13-V-N-1	09/13/94	Bruggman, Walter	0.29	6.09		
MS-S-E.14-3	09/17/94	Wilks,Wieringa,Kump	0.2	4.51		8'
MS-S-E.14-V-N-1	09/13/94	Bruggman, Walter	0.38	7.67		
MS-S-E.15-3	09/17/94	Wilks,Wieringa,Kump	0.22	4.86		8'
MS-S-E.15-V-N-2	09/19/94	Bruggman	0.38	7.67		Should be MS-S-E.15-V-N-3
MS-S-E.16-1	09/17/94	Wilks,Wieringa,Kump	0.13	3.28		2'
MS-S-E.16-V-N-4	09/19/94	Bruggman	0.15	3.63		
MS-S-E.17-1	09/17/94	Wilks,Wieringa,Kump	0.38	7.67		2'
MS-S-E.18-1	09/18/94	Wilks,Wieringa,Kump	< 0.01	< 0.99		2'
MS-S-E.19-1	09/18/94	Wilks,Wieringa,Kump	0.02	1.34		2'
MS-S-E.20-1	09/20/94	Bruggman	0.1	2.75		2'
MS-S-E.5-2	07/29/94	Wilks, Herman	0.08	2.4		10'
MS-S-E.5-V-W-2	07/25/94	Davison, Bruggman	0.02	1.34		
MS-S-E.7-1	07/27/94	Davison, Bruggman	0.01	1.17	U	7'
MS-S-F.10-3 (H)	08/30/94	Bruggman	0.26	5.56		8'
MS-S-F.14-1	09/01/94	Bruggman, Kump	< 0.01	< 0.99		F.16; 7'
MS-S-F.15-1	09/02/94	Davison, Kump	0.01	1.17		F.17; 6'
MS-S-F.16-1	09/02/94	Davison, Kump	0.14	3.45	U	F.18; 6'
MS-S-F.21-1	07/30/93	Kump, Risher	< 0.01	< 0.99		G.20; 10-13'
MS-S-F.21-V-3	07/20/93	McDonald	0.06	2.05		North wall of G.20
MS-S-F.22-1	07/29/93	McDonald, Kump	0.05	1.87		G.21; 10-13'
MS-S-F.22-V-2	07/29/93	McDonald, Kump	0.04	1.7		East wall of G.21, Reported as F.22-V-1
MS-S-F.22-V-N-1	07/30/93	Kump, McDonald	0.07	2.22		North wall of G.21
MS-S-F.5-V-W-4	08/09/94	Bruggman	< 0.01	< 0.99		
MS-S-G.10-1	08/23/94	Bruggman, Davison	0.01	1.17		6'
MS-S-G.19-V-2	07/25/93	Stoddard, Walter, Br	0.33	6.79		West Wall of H.18
MS-S-G.20-2	07/20/93	McDonald	0.02	1.34		G.19; 7'
MS-S-G.20-2 Dup	07/20/93	McDonald	0.02	1.34		G.19; 7'
MS-S-G.20-V-2	07/20/93	McDonald	0.04	1.7		North Wall of G.19
MS-S-G.21-3	07/30/93	Kump, McDonald	0.01	1.17		H.20; 10-13'

Hexavalent Chromium Calculation (Doc ID SO9501): Hex Cr = 0.9923 + (17.578)(TCLP Cr)

TABLE 2 (continued)
Summary of Analytical Results for Confirmatory Grid Samples
Mouat Industries Site

Sample Identification	Sample Date	Sampler	TCLP Chromium (mg/l)	Estimated Hex Cr (mg/kg)	Data Qualifier	COMMENTS (Sample Location, Sample Depth, etc.)
MS-S-G.21-V-2	07/20/93	McDonald	0.09	2.57		East Wall of H.20
MS-S-G.22-3	07/31/93	MCDonald, Rober, Ris	0.07	2.22		H.21; 10-13'
MS-S-G.22-V-E-2	07/28/93	Kump	0.02	1.34		North Wall of H.21
MS-S-G.22-V-S-1	07/30/93	Kump, McDonald	0.04	1.7		South Wall of H.21
MS-S-G.3-V-N-2	08/09/94	Bruggman	< 0.01	< 0.99		
MS-S-G.3-V-W-1	08/09/94	Bruggman	< 0.01	< 0.99		
MS-S-G.4-V-NW-1	08/10/94	Bruggman, Davison	< 0.01	< 0.99		
MS-S-G.6	08/19/94	Herman	0.09	2.57		8'
MS-S-G.7	08/19/94	Herman	0.05	1.87		8'
MS-S-G.F-22-5	07/30/93	Kump, McDonald	0.03	1.52		G,H.21; 5'
MS-S-H.16-2	08/04/93	Stodd,Sjong,Walt,MCD	0.13	3.28		I.15; 8'
MS-S-H.17-V-S-1	08/10/93	Stoddard,Herrick,Wal	0.17	3.98		I.16 South Wall
MS-S-H.19-V-W-2	09/28/94	Bruggman, Walter	< 0.01	< 0.99		
MS-S-H.2-1	07/20/94	Brost,Herrick,David	0.01	1.17		7'
MS-S-H.2-V-N-3	08/03/94	Davison, Bruggman	< 0.01	< 0.99	U	
MS-S-H.2-V-W-1	07/19/94	Brost,Herrick,David	< 0.01	< 0.99		
MS-S-H.20-2	07/20/93	McDonald	0.02	1.34		H.19; 7'
MS-S-H.21-1	07/30/93	Kump, McDonald	0.01	1.17		I.20; 8'
MS-S-H.21-V-2	07/20/93	McDonald	0.05	1.87		I.20 Southeast Wall
MS-S-H.22-V-1	07/22/93	MCDonald	0.06	2.05		I.21 East Wall
MS-S-I.13-V-S-1	10/22/93	Walter,Bruggman	0.45	8.9		
MS-S-I.14-2	07/19/93	Walter,Whitmer	0.21	4.68		J.13; 4'
MS-S-I.14-V-S-1	10/22/93	Walter,Bruggman	0.15	3.63		
MS-S-I.15-2	07/19/93	Stoddard,Walter,Bros	0.17	3.98		J.14; 4'
MS-S-I.16-1	07/19/93	Kump,McDon,Sjong	0.12	3.1		J.15; 4'
MS-S-I.16-2	10/06/93	Walter,Whitmer	0.09	2.57		7-9'; (dug to 3562')
MS-S-I.16-V-1	07/19/93	Kump,Mcdon,Sjong	0.41	8.2		J.15 South Wall
MS-S-I.16-V-2	07/19/93	Kump, McDon, Sjong	0.21	4.68		J.15 East Wall
MS-S-I.16-V-E-1	10/06/93	Walter,Whitmer	0.14	3.45		
MS-S-I.19-V-W-2	09/25/94	Emanuel, Kump	0.03	1.52		
MS-S-I.19-V-W-3	10/03/94	Emanuel	0.48	9.43		
MS-S-I.2-V-W-2	07/19/94	Brost,Herrick,David	< 0.01	< 0.99		
MS-S-I.20-V-2	07/20/93	McDonald	0.02	1.34		I.19 East Wall
MS-S-J.1-1	07/21/94	Wilks,Herman,Brost	< 0.01	< 0.99		7'; (3566')
MS-S-J.1-V-N-1	07/21/94	Wilks,Herman,Brost	< 0.01	< 0.99		
MS-S-J.1-V-SW-1	07/21/94	Wilks,Herman,Brost	0.03	1.52		
MS-S-J.12-2	08/12/93	Walter	0.08	2.4	U	K.11; 3'
MS-S-J.12-3	08/17/93	Crowell Herrick	< 0.01	< 0.99		K.11; 7.5', Depth Sample
MS-S-J.12-V-S-1	08/12/93	Walter	0.05	1.87		K.11 South Wall
MS-S-J.13-2	08/13/93	Stoddard,Evans,Walte	0.02	1.34		K.12, 3'
MS-S-J.13-3	08/17/93	Crowell Herrick	0.04	1.7		K.12; 8'; Depth Samples
MS-S-J.13-V-S-1	08/12/93	Walter	0.02	1.34		K.12 South Wall
MS-S-J.14-2	07/29/93	McDonald, Kump	0.09	2.57		K.13; 4'
MS-S-J.14-V-S	07/29/93	McDonald, Kump	0.04	1.7		K.13 South Wall
MS-S-J.15-2	07/29/93	McDonald, Kump	0.29	6.09		K.14; 4'
MS-S-J.15-V-2	07/30/93	Kump, McDonald	0.39	7.85		K.14 South Wall
MS-S-J.19-V-W-2	10/02/94	Emanuel	0.16	3.8		
MS-S-K.10-V-S-1	08/20/93	Stoddard	0.01	1.17		K.9, K.10; South Wall
MS-S-K.11-V-S-1	08/28/93	Walter	0.2	4.51		K.10, K.11; South Wall
MS-S-K.2-1	07/16/94	Herman, Wilks	0.08	2.4		6'
MS-S-K.2-V-SW-1	07/16/94	Herman, Wilks	0.01	1.17		
MS-S-K.2-V-SW-2	08/03/94	Davison, Bruggman	0.04	1.7	U	
MS-S-K.3-V-S-1	07/16/94	Herman, Wilks	0.02	1.34		
MS-S-K.5-V-S-1	09/27/93	Kostelecky,Walter	0.02	1.34	U	
MS-S-K.6-V-S-1	09/27/93	Kostelecky,Walter	0.11	2.93		
MS-S-K.9-V-E-1	08/26/93	Walter	0.03	1.52		2nd (0.02), 3rd (0.07), (L.8 SE wall)
MS-S-L.10-1	07/05/94	Herrick, Brost	0.03	1.52		3'
MS-S-L.10-V-S-1	07/05/94	Herrick, Brost	0.02	1.34		
MS-S-L.11-1	07/08/94	Herman,Wilks,Brost	0.18	4.16		3'

Hexavalent Chromium Calculation (Doc ID SO9501): Hex Cr = 0.9923 + (17.578)(TCLP Cr)

TABLE 2 (concluded)
Summary of Analytical Results for Confirmatory Grid Samples
Mouat Industries Site

Sample Identification	Sample Date	Sampler	TCLP Chromium (mg/l)	Estimated Hex Cr (mg/kg)	Data Qualifier	COMMENTS (Sample Location, Sample Depth, etc.)
MS-S-L.11-V-S-1	07/08/94	Herman,Wilks,Brost	0.11	2.93		
MS-S-L.12-1	07/08/94	Herman,Wilks,Brost	0.09	2.57		3'
MS-S-L.12-V-S-1	07/08/94	Herman,Wilks,Brost	0.09	2.57		
MS-S-L.8-V-S-1	07/01/94	Wilks, Herrick	0.13	3.28		
MS-S-L.9-V-S-1	07/01/94	Wilks, Herrick	0.01	1.17		
MS-S-MT-1	09/18/94	Wilks,Wieringa,Kump	0.03	1.52		Under Mud Tank; Grade

1) TCLP Cr - TCLP extractable chromium
2) mg/l - milligrams per liter
3) Hex Cr - hexavalent chromium
4) mg/kg - milligram per kilogram

Hexavalent Chromium Calculation (Doc ID SO9501): Hex Cr = 0.9923 + (17.578)(TCLP Cr)

TABLE 3

COMPARATIVE ANALYSIS OF
RESPONSE ACTION ALTERNATIVES
MOUAT INDUSTRIES SITE
COLUMBUS, MONTANA

	Response Action Alternatives		
Evaluation Criteria	1. No Action	2. Natural Attenuation with Monitoring and Groundwater and Land Use Controls	3. Groundwater Pumping and Treatment
Effectiveness			
• Protectiveness	Good	Good	Good
• Compliance with ARARs	Good	Good	Good
• Achievement of removal objectives	Good	Good	Good
Implementability			
• Technical feasibility	Good	Good	Fair
• Availability of needed resources	Good	Good	Fair
• Administrative feasibility	Poor	Good	Fair
Costs	-0-	$96,000	$1,080,000

Source: Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA, EPA 540-F-93-057, August 1993, Exhibit 7, page 36.

TABLE 4

SUMMARY OF COMPARISONS OF THE RESPONSE ACTION ALTERNATIVES TO THE NINE EVALUATION CRITERIA IN THE NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN

Evaluation Criteria	Response Action Alternatives		
	1. No Action	2. Natural Attenuation and Monitoring with Groundwater and Land Use Controls	3. Groundwater Pumping and Treatment
Threshold Criteria			
A. Overall protection of human health and the environment	Good	Good	Good
B. Compliance with ARARs	Good	Good	Good
Primary Balancing Criteria			
C. Long-term effectiveness and permanence	Good	Good	Good
D. Reduction in toxicity, mobility, or volume through treatment	Good (1)	Good (1)	Good
E. Short-term effectiveness	Good (1)	Good (1)	Good
F. Implementability	Good	Good	Fair
G. Cost	$0	$90,000	$1,008,000
H. State acceptance	Poor (2)	Good (2)	Good (2)
I. Community acceptance	Good	Good	Fair

(1) Treatment is natural attenuation

(2) Assessments of state and community acceptance are presumptive and will be finalized after the Proposed Plan has been made available for public review and comment.

Source: National Oil and Hazardous Substances Contingency Plan at 40 CFR 300.430(e)(9)(iii)

ATTACHMENT 2

APPROVAL MEMORANDUM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, MONTANA OFFICE
FEDERAL BUILDING, 301 S. PARK, DRAWER 10096
HELENA, MONTANA 59626-0096

DEC 14 1995

Ref: 8MO

November 16, 1995

APPROVAL MEMORANDUM

SUBJECT: Request for an Engineering Evaluation/Cost Analysis for the Mouat Industries Site, Columbus, Montana

Category of Removal: Expedited, Nontime-Critical Response Action

FROM: Robert L. Fox, Chief
Superfund Unit, 8MO

Thru: Max H. Dodson, Director
Ecosystems Protection & Remediation Division, EPR

TO: William P. Yellowtail
Regional Administrator, 8A

OBJECTIVE

The objective of this memorandum is to seek approval for the completion of an engineering evaluation/cost analysis (EE/CA) for the Mouat Industries site at Columbus, Montana. The EE/CA will be used to determine any remaining response actions necessary to alleviate potential health or ecological threats of contaminated groundwater, sediments, and surface water associated with chromium releases form the Mouat Industries site. (Chromium is considered a hazardous substance under CERCLA.) The Potentially Responsible Party (PRP) group has agreed to perform the EE/CA.

INTRODUCTION

A successful soils removal action was completed at the site in 1994. An evaluation of (1) the existing data; (2) the remaining groundwater, sediment, and surface water contamination, and (3) the potential risks to human and ecological receptors indicated that a typical Remedial Investigation/Feasibility Study (RI/FS) process was unnecessary and too complicated for the site conditions. Therefore, an expedited, nontime-critical response action and preparation of an EE/CA is recommended.

11/16/95

11/16/95

12/1/95

BACKGROUND

The site is located in a light industrial area of Columbus, Montana, in Stillwater County. It is located approximately six-tenths of a mile north of the Yellowstone River and is within the river's floodplain. Residential areas are located within a one-mile radius of the site. The Town of Columbus has owned the Mouat Industries property since 1933. In 1957, under a leasing agreement, Mouat Industries constructed and operated a chromium processing facility, which converted chromium ore to high-grade sodium dichromate. Processing waste products containing sodium dichromate, sodium sulfate, and hexavalent chromium (Cr VI) were generated and stored at the site. Currently, no residences are located on the site. Terrestrial ecosystems in the vicinity include upland forests, successional fields, and agricultural land. Commercial/industrial areas, a municipal airport, and a municipal golf course are located in the vicinity. Aquatic ecosystems in the vicinity include the Yellowstone River in addition to a small pond and associated drainage ditches on the golf course.

In June 1986, the site was placed on the National Priorities List.

In December 1991, under the direction of an EPA Unilateral Administrative Order (UAO), work began on a response action for the site by the PRPs. The UAO required excavation and treating soil that contained chromium above the specified action level and placing the treated soil back into the site excavations. After approximately 45 percent of the contaminated soil had been removed and treated, the remedy was changed to excavation and off-site disposal for the remainder of the contaminated soil. The site was capped with a 24 inch thick soil or gravel cover. The portion of the site which was capped with soil was planted with grasses. Work was completed on the site on December 31, 1994. Institutional controls for land use and groundwater use have been established. A zoning restriction was established to identify a special Superfund Overlay District implemented by the City of Columbus. The land use restrictions apply only to the capped area and surrounding protective buffer areas. The land use restrictions prohibit excavation into the 24 inch soil or gravel cover, limit vehicle loads on the graveled portions of the block placement area, and prohibit any use of the vegetated soil cover area unless those areas are covered with gravel or paved. The land use restrictions also require the property owner to maintain the site cover, drainage facilities, and fences, and establish specifications for construction on the block placement area. The groundwater use restrictions apply to the entire Superfund Overlay District. These restrictions prohibit new wells or other groundwater extraction systems, prohibit groundwater use from existing wells or other groundwater extraction systems, except for golf course irrigation, and

control excavation to or below the water table within the Superfund Overlay District.

THREAT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT

Contamination of groundwater, sediment, and surface water from chromium originating from the former chromium processing operations at the site could pose a potential threat to human health and the environment. Conceptually, the chromium, through physical entrainment, infiltration and percolation, moved into the soil and through infiltration and percolation, moved into the groundwater. Chromium, which was transported by the groundwater, has contaminated surface water and surface water sediments in the golf course pond and ditches. Although the original source of contamination has been contained as a result of the soil removal action, a chromium groundwater plume (chromium levels have exceeded Maximum Contaminant Levels by as much as 50 times) exists beneath and downgradient of the site. Institutional controls implemented in a special Superfund Overlay District ordinance by the Town of Columbus prohibits the use of groundwater from the contaminated plume. These institutional controls eliminate the potential pathway for direct human exposure to the groundwater contamination. The EE/CA will address the effectiveness of the institutional controls in preventing unrestricted use of the groundwater. Recreational users, golfers, and trespassing children are considered the most likely human receptors for potential exposure to surface water and sediment contamination. Both aquatic and terrestrial organisms will also be exposed to surface water and sediment contamination.

A preliminary human health risk assessment indicates that no adverse hazards to public health exist (below one in a million for carcinogenic risks and less than a hazard index of 1 for noncarcinogenic risks). These risks are based on existing land use and would change with changes in land use. A preliminary ecological risk assessment indicates that an insignificant hazard may exist to terrestrial ecological receptors. However, a potentially significant risk may exist to bottom-feeding fish and bottom-dwelling invertebrates in the golf course pond and ditches. The EE/CA will use the risk assessment in assessing response action alternatives.

PROJECTED COST

Because the PRP group will be voluntarily performing the EE/CA, associated costs are expected to be minimal. Oversight costs will be much less than those projected for overseeing an RI/FS. One of the purposes of proceeding with the EE/CA is to expedite and simplify the response process based on remaining site conditions.

REGIONAL RECOMMENDATION

Because of the need to provide a decision basis for determining what, if and, additional actions are needed at the Mouat Industries site and to ensure human health and the environment are protected from the release of chromium, a CERCLA hazardous substance, from the chromium processing activities to the soil, groundwater, surface water and sediments around the site, I recommend that you approve this Engineering Evaluation/Cost Analysis request. The existing site conditions and actions meet the criteria in Section 104 of CERCLA, the NCP (40 CFR. §300.415).

Approve: _____ Date: _____

Disapprove: _____ Date: _____

ATTACHMENT 3

ENGINEERING EVALUATION/COST ANALYSIS

The EE/CA is included in the Administrative Record for the Site. Because of its length, it is not included with the Action Memorandum.

ATTACHMENT 4

RESPONSIVENESS SUMMARY

This Responsiveness Summary provides EPA's responses to public comments received on the Mouat Industries Site EE/CA during the Public Comment period between May 11 and June 13, 1996, and at the Public Meeting held on June 5, 1996, in Columbus, Montana. In each case, the comment is first stated, and then EPA's response is provided.

The following comment was presented orally at the Public Meeting on June 5, and was also provided to EPA in writing:

COMMENT by Mary Westwood on behalf of Monte Vista Company:

June 5, 1996

TESTIMONY OF THE MONTE VISTA COMPANY FOR PRESENTATION AT MOUAT INDUSTRIES SITE RESPONSE ACTION PUBLIC HEARING TO BE HELD IN COLUMBUS, MONTANA, AT 7 P.M. ON JUNE 5, 1996

Ladies and Gentlemen:

My name is Mary Westwood and I am the Director of Governmental Relations for the Monte Vista Company. I am appearing today on behalf of Monte Vista Company to voice our support for Alternative 2, the Response Action recommended in the Engineering and Cost Analysis Report that would allow for Natural Attenuation with Groundwater Monitoring and Continuation of Institutional Controls. We believe that this alternative will provide the assurances which the people of Columbus deserve while minimizing the cost to those parties responsible for elevated levels of chromium in the groundwater.

In that regard, Monte Vista protests the dissemination of erroneous information contained in the EE/CA Report concerning Monte Vista's activities on the site and asks that EPA publicly retract its statements regarding Monte Vista. From the beginning, Monte Vista has provided the U.S. Environmental Protection Agency with complete and accurate information regarding its role and the role of others on this site. At no time during its occupancy of the Mouat

Industries Site did Monte Vista process chrome ore or produce chrome chemicals at the site. All processing of chrome ore and production of chrome chemicals on the Columbus site took place while the property was under the control of the Mouat family, Mouat Industries, and FMC. Monte Vista urges EPA to publicly set the record straight in this matter.

As further testimony on this point, I have attached relevant excerpts from Monte Vista's February 8, 1994, Supplemental Response to Requests for Information Pursuant to Section 104 of CERCLA -- Mouat Industries Site at Columbus, Montana, which was prepared for Monte Vista by its attorneys. The full text of that Supplemental Response and documentary support for that text has been made a part of the administrative record in this case.

Thank you for your attention.

RESPONSE

EPA appreciates the support of Monte Vista for its recommended groundwater removal action at the Mouat Industries Site in Columbus, Montana.

EPA acknowledges that mistakes were made in the Engineering Evaluation/Cost Analysis, May 1996 Community Relations Plan and May 1996 Fact Sheet for the Mouat Industries Site. The publications state or imply that the Monte Vista Company conducted ore processing operations at the Mouat Industries Site. After obtaining further information on the history of activities at the site and review of information in the administrative record, EPA acknowledges that Monte Vista Company never conducted ore processing operations at the Mouat Industries Site. This does not release Monte Vista Company from liability at the site as an owner/operator under CERCLA.

The following comment was presented orally at the Public Meeting on June 5:

COMMENT by Doug Howard on behalf of the Town of Columbus, Montana:

I would like to make a comment on behalf of the Town. I guess this comment would be in regard to the monitoring that's going to be

required to complete the remedy. There is apparently some question as to who is going to assume responsibility for completing the monitoring and also for who is going to pay the cost. The Town of Columbus has worked, has tried to work closely with FMC Corporation throughout the time that this has been going on. As we've worked, tried to work with FMC, we've worked with the understanding that the Town would be collecting the samples and that FMC would be paying the costs of getting the samples analyzed and submitting the reports and whatever other paperwork is required to the EPA. We hope that that's still the understanding that FMC has and that they will work with us on that. Because we feel that as between the Town and FMC, at least, that that's FMC's responsibility.

RESPONSE

EPA thanks the Town for its comment. No response is necessary.

The following comment was provided in writing to EPA during the public comment period:

COMMENT by Pamela S. Sbar on behalf of Atlantic Richfield Company:

The following comments are submitted on behalf of Atlantic Richfield Company ("ARCO") on EPA's Engineering Evaluation/Cost Analysis Fact Sheet for the Mouat Industries Site, Columbus, May 1996 (the "Mouat Fact Sheet").

ARCO supports EPA's recommended response action set forth in the Mouat Fact Sheet of natural attenuation and monitoring with institutional controls. ARCO agrees with EPA that no significant threat to human health currently exists from exposure to contaminants in surface water or sediments in the vicinity of the Mouat site. Institutional controls currently in place at the site are effective, enforceable and reliable. Natural attenuation is occurring at the site, and will continue to lower chromium concentrations. EPA's recommended response action : 1) is protective of human health and the environment; 2) is the most technically feasible and cost effective of the proposed alternatives; 3) reduces the concentration of total chromium in groundwater to below state standards; and 4) complies with ARARs.

As we have discussed with EPA, ARCO continues to contest

any assertion that ARCO is potentially responsible party ("PRP") under Section 107 of CERCLA with respect to the Mouat site. Any cleanup activities conducted by Anaconda at the site improved site conditions, and did not exacerbate existing contamination. By submitting these comments, ARCO does not admit and expressly denies any liability it may have for the Mouat site. ARCO reserves its rights to contest any allegations of fact or law or conclusions in the EE/CA, action memoranda, or any previous Administrative Orders or deliverables submitted thereunder in the event that such allegations or conclusions purport to or are used in any way to provide a basis for ARCO's liability. ARCO incorporates by reference its previous correspondence to EPA setting forth the bases for ARCO's position that it is not a PRP and does not have liability for the Mouat site.

ARCO respectfully requests that EPA consider these comments and include these comments in the administrative record.

RESPONSE

EPA appreciates the support of ARCO for its recommended groundwater removal action at the Mouat Industries Site in Columbus, Montana.

No response is necessary to the remainder of the comment.

ATTACHMENT 5

IDENTIFICATION OF ARARS

IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE MOUAT INDUSTRIES NPL SITE

INTRODUCTION

40 C.F.R. § 300.415(i) and guidance and policy issued by the Environmental Protection Agency ("EPA") require that removal actions under CERCLA comply with substantive provisions of applicable or relevant and appropriate standards, requirements, criteria, or limitations ("ARARs") of state and federal environmental laws and state facility siting laws "to the extent practicable considering the exigencies of the situation." Because this removal action need not be completed any more quickly than a remedial action, EPA believes this removal action should achieve ARARs to the same extent as a remedial action. 40 C.F.R. § 300.430(e)(9)(iii)(B).

This document identifies ARARs that are expected to apply to the activities to be conducted under the Mouat Industries NPL Site removal action. The following ARARs or groups of related ARARs are each identified by a statutory or regulatory citation, followed by a brief explanation of the ARAR and a brief discussion as to how and to what extent the ARAR is expected to apply to the activities to be conducted under this removal action.

Substantive provisions of the requirements listed below are identified as ARARs pursuant to 40 CFR § 300.400. ARARs that are within the scope of this removal action must be attained during and at the completion of the removal action.[1] No permits are anticipated for the removal action for the Mouat site in accordance with Section 121(e) of CERCLA.

TYPES OF ARARs

ARARs are either "applicable" or "relevant and appropriate." Both types of requirements are mandatory for remedial actions under Superfund guidance.[2] Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental facility siting laws that specifically address a hazardous substance, pollutant, contaminant, removal action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal

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[1] 40 CFR Section 300.435(b)(2); Preamble to the National Oil and Hazardous Substances Pollution Contingency Plan, 55 Fed. Reg. 8755-8757 (March 8, 1990).

[2] CERCLA § 121(d)(2)(A), 42 U.S.C. § 6921(d)(2)(a). See also, 40 C.F.R. § 300.430(f)(1)(i)(A).

requirements may be applicable.[3]

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to hazardous substances, pollutants, contaminants, removal actions, locations, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.[4]

The determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant and (2) determination if a requirement is appropriate. In general, this involves a comparison of a number of site-specific factors, including an examination of the purpose of the requirement and the purpose of the proposed CERCLA action; the medium and substances regulated by the requirement and the proposed requirement; the actions or activities regulated by the requirement and the removal action; and the potential use of resources addressed in the requirement and the removal action. When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.[5]

ARARs are contaminant, location, or action specific. Contaminant specific requirements address chemical or physical characteristics of compounds or substances on sites. These values establish acceptable amounts or concentrations of chemicals which may be found in or discharged to the ambient environment.

Location specific requirements are restrictions placed upon the concentrations of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs relate to the geographical or physical positions of sites, rather than to the nature of contaminants at sites.

Action specific requirements are usually technology based or activity based requirements or limitations on actions taken with respect to hazardous substances, pollutants or contaminants. A given cleanup activity will trigger an action specific requirement.

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3 40 C.F.R. § 300.5.

4 40 C.F.R. § 300.5.

5 CERCLA Compliance with Other Laws Manual, Vol. I, OSWER Directive 9234.1-01, August 8, 1988, p. 1-11.

Such requirements do not themselves determine the cleanup alternative, but define how chosen cleanup methods should be performed.

Many requirements listed as ARARs are promulgated as identical or near identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by EPA and the state. The Preamble to the NCP provides that such a situation results in citation to the state provision and treatment of the provision as a federal requirement.

Also contained in this list are policies, guidance or other sources of information which are "to be considered" in the selection of the remedy and implementation of the response action. Although not enforceable requirements, these documents are important sources of information which EPA and the State of Montana Department of Environmental Quality (MDEQ) may consider during selection of the remedy, especially in regard to the evaluation of public health and environmental risks; or which will be referred to, as appropriate, in selecting and developing cleanup actions.[6]

This list constitutes MDEQ's and EPA's detailed description of ARARs for use at the Mouat Industries NPL Site in making removal action decisions. This list will be used in evaluating the compliance of the various removal alternatives with ARARs. However, the final determination of ARARs that will ultimately apply to the site and the final determination of compliance with ARARs or applicability of ARAR waivers will be presented in the Action Memorandum.

I. CONTAMINANT SPECIFIC ARARs

A. Federal and State Groundwater ARARs.

Compliance points for groundwater ARARs are throughout the Mouat Industries NPL Site.

1. State of Montana requirements.

a. ARM § 16.20.1002 and -1003 (applicable).

ARM § 16.20.1002 provides that groundwater is classified I through IV based on its present and future most beneficial uses, and states that groundwater is to be classified according to actual quality or use, whichever places the groundwater in a higher class. Class I is the highest quality class; class IV the lowest. Based upon its specific conductance, groundwater throughout the entire Mouat site is considered Class I groundwater.

ARM § 16.20.1003 sets the standards for the different classes of groundwater. Concentrations of dissolved substances in Class I or

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[6] 40 CFR Section 300.400(g)(3); 40 CFR Section 300.415(i); Preamble to the NCP, 55 Fed. Reg. 8744-8746 (March 8, 1990).

II groundwater may not exceed the human health standards listed in department Circular WQB-7. Concentrations of dissolved or suspended substances must also not exceed levels which render the waters harmful, detrimental or injurious to public health. Maximum allowable concentrations of these substances also must not exceed acute or chronic problem levels which would adversely affect existing beneficial uses or the designated beneficial uses of groundwater of that classification.

Contaminant	WQB-7 Standard
Chromium (hexavalent)	100µg/l
Chromium (trivalent)	100µg/l

b. ARM § 16.20.1011 (applicable).

This section provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless the board is satisfied that a change is justifiable for economic or social development and will not preclude present or anticipated use of such waters.

2. Federal requirements.

Safe Drinking Water Act, 42 U.S.C. § 300f, et seq., National Primary and Secondary Drinking Water Regulations, 40 C.F.R. Parts 141 and 142 (Relevant and Appropriate). The National Primary and Secondary Drinking Water Regulations (40 C.F.R. Parts 141 and 143) establish maximum contaminant levels (MCLs) for chemicals in drinking water distributed in public water systems. These are enforceable in Montana under the Public Water Safety Act, 75-6-101 et. seq., M.C.A. and ARM § 16.20.204. Safe Drinking Water Act MCLs are not applicable for the Mouat site removal action because contaminated groundwater found within the site is currently not a source for public water supplies. There is no known public use of groundwater underlying or coming into contact with contaminants from the Mouat site. These standards may be applicable in the future should EPA detect an exceedance at a public water outlet. The standard would be applicable at the outlet.

The drinking water standards are relevant and appropriate for groundwater *in situ* because that groundwater is a potential source of drinking water. The determination that the drinking water standards are relevant and appropriate for portions of the Mouat site removal action is fully supported by the regulations and guidance. The Preamble to the NCP clearly states that the MCLs are relevant and appropriate for groundwater that is a current or potential source of drinking water. See 55 Fed. Reg. 8750, March 8, 1990, and 40 C.F.R. § 300.430(e)(2)(i)(B). MCLs developed under the Safe Drinking Water Act generally are ARARs for current or potential drinking water sources. See, EPA Guidance On Remedial Action For Contaminated Groundwater at Superfund Sites, OSWER Dir.

#9283.1-2, December 1988.

In addition, maximum contaminant level goals (MCLGs) may also be relevant and appropriate in certain site-specific situations. See 55 Fed. Reg. 8750-8752. MCLGs are health-based goals which are established at levels at which no known or anticipated adverse effects on the health of persons occur and which allow an adequate margin of safety. According to the NCP, MCLGs that are set at levels above zero must be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCLGs are relevant and appropriate under the circumstances of the release. Where the MCLG for a contaminant has been set at a level of zero, the MCL promulgated for that contaminant must be attained.

The MCLGs and MCLs for chromium:

contaminant	MCL (mg/l)	MCLG (mg/l)
chromium	0.1	0.1

Resource Conservation and Recovery Act (RCRA) standards for groundwater found at 40 CFR Part 264, Subpart F, incorporated by reference pursuant to ARM § 17.54.702, may be relevant and appropriate if hazardous waste or something similar is placed or maintained in a solid waste management unit as a result of this response action. If so, they would be identified at a later date. The RCRA standards would be no more stringent than the MCLs or MCLGs identified above.

B. Federal and State of Montana Surface Water ARARs.

1. **State of Montana Surface Water Quality Requirements, Montana Water Quality Act, MCA § 75-5-101 et seq., and implementing regulations.** General. The Clean Water Act, 33 U.S.C. § 1251, et seq., provides the authority for each state to adopt water quality standards (40 CFR Part 131) designed to protect beneficial uses of each water body and requires each state to designate uses for each water body. Pursuant to this authority and the criteria established by Montana surface water quality regulations, ARM § 16.20.601, et seq., Montana has established the Water-Use Classification system. Under ARM § 16.20.608(1), waters of Yellowstone River drainage to the Laurel water supply intake have been classified "B-1." Ditches and certain other bodies of surface water must also meet these requirements.[7] Certain of the B-1 standards, codified at ARM § 16.20.618, as well as Montana's nondegradation requirements, are presented below.

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[7] As provided under ARM § 16.20.603(25), "'surface waters' means any waters on the earth's surface, including but not limited to, streams, lakes, ponds, and reservoirs; and irrigation and drainage systems discharging directly into a stream, lake, pond, reservoir or other surface water. Water bodies used solely for treating, transporting or impounding pollutants shall not be considered surface water."

a. **ARM § 16.20.618 (applicable).** Waters classified B-1 are, after conventional treatment, suitable for drinking, culinary and food processing purposes. These waters are also suitable for bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and use for agricultural and industrial purposes. This section provides also that concentrations of carcinogenic, bioconcentrating, toxic or harmful parameters which would remain in water after conventional water treatment may not exceed standards set forth in department circular WQB-7. WQB-7 provides that "whenever both Aquatic Life Standards and Human Health Standards exist for the same analyte, the more restrictive of these values will be used as the numeric Surface Water Quality Standard." For the primary Contaminants of Concern the Circular WQB-7 standards are listed below.

Contaminant	WQB-7 Standard
Chromium, hexavalent	11 µg/l
Chromium, trivalent	100 µg/l

The B-1 classification standards at ARM § 16.20.618 also include the following criteria: 1) dissolved oxygen concentration must not be reduced below the levels given in department circular WQB-7; 2) hydrogen ion concentration (pH) must be maintained within the range of 6.5 to 8.5; 3) the maximum allowable increase above naturally occurring turbidity is 5 nephelometric turbidity units; 4) temperature increases must be kept within prescribed limits; 5) no increases above naturally occurring concentrations of sediment, settleable solids, oils, floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife are allowed; 5) True color must be kept within specified limits.

Alternatively, site-specific criteria may be developed using the procedures given in the Water Quality Standards Handbook (US EPA, Dec. 1983), provided that other routes of exposure to toxic parameters by aquatic life are addressed. These standards set the contaminant specific requirement for ambient water quality in the stream.

b. **ARM § 16.20.633 (applicable).** Provides that surface waters must be free of substances attributable to industrial practices or other discharges that will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions which create a nuisance or render undesirable tastes to fish flesh or make fish inedible; (d) create concentrations or combinations of materials which are toxic or harmful to human,

animal, plant or aquatic life; (e) create conditions which produce undesirable aquatic life.

ARM § 16.20.633 also states that no waste may be discharged and no activities conducted which, either along or in combination with other waste activities, will cause violation of surface water quality standards; provided a short term exemption from a surface water quality standard may be authorized by the department under certain conditions.

c. ARM § 16.20.708 (applicable). Existing and anticipated uses of surface water and water quality to support those uses must be maintained.

2. Federal Surface Water Quality Requirements, Clean Water Act, 33 U.S.C. §§ 1251 et seq. (applicable). As provided under Section 303 of the Clean Water Act, 33 U.S.C. § 1313, the State of Montana has promulgated water quality standards. See the discussion above under State surface water quality requirements.

C. Federal and State Air Quality Requirements.

1. National Ambient Air Quality Standards, 40 CFR § 50.6 (PM-10) (applicable). This provision establishes standards for PM-10 particulates (the corresponding state standard is found at ARM § 16.8.821).

2. Montana Ambient Air Quality Regulations, ARM §§ 16.8.807, -.815, -.818, and -.821 (applicable).

a. ARM § 16.8.807. This provision establishes sampling, data collection and analytical requirements to ensure compliance with ambient air quality standards.

b. ARM § 16.8.809. Establishes sampling, data collection, recording, and analysis to ensure compliance with ambient air quality standards.

c. ARM § 16.8.821. PM-10 concentrations in ambient air shall not exceed a 24 hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

II. LOCATION SPECIFIC REQUIREMENTS

The statutes and regulations set forth below relate to the preservation of certain natural resources which may be adversely affected by the Mouat site removal action. They require that steps be taken to minimize the impact of the removal action upon any such resources.

A. Floodplain Management, 40 CFR § 6.302(b), and Executive

Order No. 11988 (applicable). These require that actions be taken to avoid, to the extent possible, adverse effects associated with direct or indirect development of a floodplain, or to minimize adverse impacts if no practicable alternative exists. If this removal action is found to potentially affect the floodplain, the action memo will contain a Statement of Findings which will set forth the reasons why the proposed action must be located in or affect the floodplain; a description of significant facts considered in making the decisions to locate in or affect the floodplain or wetlands including alternative sites or actions; a statement indicating whether the selected action conforms to applicable state or local floodplain protection standards; a description of the steps to be taken to design or modify the proposed action to minimize potential harm to or within the floodplain; and a statement indicating how the proposed action affects the natural or beneficial values of the floodplain.

B. Protection of Wetlands, 40 C.F.R. Part 6, Appendix A, Executive Order No. 11990 (applicable). This ARAR requires Federal agencies and the PRP to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. Wetlands are defined as those areas that are inundated or saturated by groundwater or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Compliance with this ARAR will be achieved through consultation with the U.S. Fish and Wildlife Service and the U.S. Corp of Engineers, to determine the existence and category of wetlands present at the site, and any avoidance or mitigation and replacement which may be necessary.

C. Floodplain and Floodway Management Act and Regulations, MCA 76-5-401, et seq., ARM § 36.15.601, et seq. (applicable). Sets forth conditions upon which certain uses or activities may occur in flood plain and flood fringe.

D. Natural Streambed and Land Preservation Act and Regulations, MCA 75-7-102 and ARM §§ 36.2.404, 405, and 406 (applicable). May be applicable if this removal action alters or affects a streambed or its banks. The adverse effects of any such action must be minimized.

E. Migratory Bird Treaty Act, 16 U.S.C. §§ 703 et seq. (applicable). This requirement establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds. Specific mitigative measures may be identified for compliance with this requirement.

F. Bald Eagle Protection Act, 16 U.S.C. §§ 668 et. seq.

(applicable). This requirement establishes a federal responsibility for protection of bald and golden eagles, and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that any cleanup of the site does not unnecessarily adversely affect the bald and golden eagles. Specific mitigative measures may be identified for compliance with this requirement.

G. Resource Conservation and Recovery Act and regulations, 40 CFR § 264.18 (a) and (b) (relevant and appropriate). Any discrete waste units created by site cleanup actions must comply with the siting restrictions and conditions found in these sections. These sections require management units to be designed, constructed, operated and maintained to avoid washout, if they are within or near the 100 year flood plain.

H. Solid Waste Management Act and regulations, MCA 75-1-201, et seq., ARM § 16.14.505(1). Sets forth requirements applying to the location of any solid waste management facility. Among other things, the location must have sufficient acreage, must not be within a 100-year floodplain, must be located so as to prevent pollution of ground, surface, and private and public water supply systems, and must allow for reclamation of the land.

III. ACTION SPECIFIC REQUIREMENTS

A. State and Federal Water Requirements.

1. Clean Water Act Point Source Discharges requirements, 33 U.S.C. § 1342. Section 402 of the Clean Water Act, 33 U.S.C. § 1342, et seq., authorizes the issuance of permits for the "discharge" of any "pollutant." This includes storm water discharges associated with "industrial activity." See, 40 CFR § 122.1(b)(2)(iv). "Industrial activity includes inactive mining operations that discharge storm water contaminated by contact with or that has come into contact with any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations, see, 40 CFR § 122.26(b)(14)(iii); landfills, land application sites, and open dumps that receive or have received any industrial wastes including those subject to regulation under RCRA subtitle D, see, 40 CFR § 122.26(b)(14)(v); and construction activity including clearing, grading, and excavation activities, see, 40 CFR § 122.26(b)(14)(x). Because the State of Montana has been delegated the authority to implement the Clean Water Act, these requirements are enforced in Montana through the Montana Pollutant Discharge Elimination System (MPDES). The MPDES requirements are set forth below.

a. Substantive MPDES Permit Requirements, ARM §§ 16.20.1318-1320 (applicable). These set forth the substantive requirements applicable to all MPDES and NPDES permits. The substantive requirements, including the requirement to properly operate and maintain all facilities and systems of treatment and

control are applicable requirements.

b. Technology-Based Treatment, ARM §§ 16.20.925 and 1320 (applicable). Provisions of 40 C.F.R. Part 125 for criteria and standards for the imposition of technology-based treatment requirements are adopted and incorporated in MDEQ permits. Although the permit requirement would not apply to on-site discharges, the substantive requirements of Part 125 are applicable, i.e., for toxic and nonconventional pollutants treatment must apply the best available technology economically achievable (BAT); for conventional pollutants, application of the best conventional pollutant control technology (BCT) is required. Where effluent limitations are not specified for the particular industry or industrial category at issue, BCT/BAT technology-based treatment requirements are determined on a case by case basis using best professional judgment (BPJ). See CERCLA Compliance with Other Laws Manual, Vol. I, August 1988, p. 3-4 and 3-7. See footnote 7, above, for a definition of "state waters."

2. Additional State of Montana requirements.

a. Water Quality Statute and Regulations (all applicable).

i. Causing of Pollution, M.C.A. Section 75-5-605. This section of the Montana Water Quality Act prohibits the causing of pollution of any state waters. Pollution is defined as contamination or other alteration of physical, chemical, or biological properties of state waters which exceeds that permitted by the water quality standards.[8]

ii. Placement of Wastes, M.C.A. Section 75-5-605. This provision states that it is unlawful to place or caused to be placed any wastes where they will cause pollution of any state waters. Any permitted placement of waste is not placement if the agency's permitting authority contains provisions for review of the placement of materials to ensure it will not cause pollution to state waters.

iii. Nondegradation, M.C.A. Section 75-5-303. This provision states that existing uses of state waters and the level of water quality necessary to protect the uses must be maintained and protected.

(a). ARM § 16.20.708. This provides that for any surface water, existing and anticipated uses and the water quality necessary to protect these uses must be maintained and protected unless degradation is allowed under the nondegradation rules at ARM § 16.20.711.

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[8] See MCA § 75-5-103(19).

(b). ARM § 16.20.1011. This provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless degradation may be allowed under the principles established in § 75-5-303, MCA, and the nondegradation rules at ARM § 16.20.706 et seq.

iv. Stormwater Runoff.

(a). ARM § 26.4.633. All surface drainage from a disturbed area must be treated by the best technology currently available.

(b). General Permits. Under ARM § 16.20.601, et seq., and ARM § 16.20.1301, et seq., including ARM § 16.20.1314, the Water Quality Division has issued general stormwater permits for certain activities. The substantive requirements of the following permits are applicable for the following activities: (1) for construction activities: General Discharge Permit for Storm Water Associated with Construction Activity, Permit No. MTR100000 (November 17, 1992); (2) for mining activities: General Discharge Permit for Storm Water Associated with Mining and with Oil and Gas Activities, Permit No. MTR300000 (May 18, 1993).[9] (3) for industrial activities: General Discharge Permit for Storm Water Associated with Industrial Activity, Permit No. MTR000000 (October 26, 1994).[10]

Generally, the permits require the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the environment. However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, an individual MPDES permit or alternative general permit may be required.

v. Surface Water, ARM § 16.20.633. Prohibits discharges containing substances that will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions which create a nuisance or render undesirable tastes to fish flesh or make fish inedible; (d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or

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9 This permit covers point source discharges of storm water from mining and milling activities (including active, inactive, and abandoned mine and mill sites) including activities with Standard Industrial Code 14 (metal mining).

10 Industrial activities are defined as all industries defined in 40 CFR 122, 123, and 124, excluding construction, mining, oil & gas extraction activities and stormwater discharges subject to effluent limitations guidelines. This includes wood treatment operations, as well as the production of slag.

aquatic life; or (e) create conditions which produce undesirable aquatic life.

B. RCRA Subtitle C Requirements (relevant and appropriate, possibly applicable). The presentation of RCRA Subtitle C requirements in this section assumes that there will be many solid wastes at the Mouat site, and that some of these may be left in place in "waste management areas" as a result of this removal action. Because of the similarity of these waste management areas to the RCRA "waste management unit," certain discrete portions of the RCRA Subtitle C implementing regulations will be relevant and appropriate for the Mouat site removal action. Also, although it is unlikely that hazardous wastes still exist at the Mouat site, it is possibille that such wastes may exist there. Therefore, RCRA Subtitle C and implementing regulations are hereby designated as applicable for any hazardous wastes that are actively "managed" as part of the Mouat site removal action or that were "placed" after 1980. Should hazardous wastes be discovered as part of any further investigation activity, EPA reserves the right to identify RCRA Subtitle C requirements in more detail at a later date.

1. 40 C.F.R. Part 264 Subpart F. General Facility Standards. This is potentially relevant and appropriate for hazardous or similar wastes at this site. Any waste management unit or similar area would be required to comply with the following requirements. These are not final cleanup standards for the Mouat site.

a. 40 C.F.R.§§ 264.92, .93, and .94. Prescribes groundwater protection standards.

b. 40 C.F.R. § 264.97. Prescribes general groundwater monitoring requirements.

c. 40 C.F.R. § 264.98. Prescribes requirements for monitoring and detecting indicator parameters.

2. Closure requirements.

a. 40 C.F.R. § 264.111. This provides that the owner or operator of a hazardous waste management facility must close the facility in a way that minimizes the need for further maintenance, and controls or eliminates the leaching or escape of hazardous waste or its constituents, leachate, or runoff to the extent necessary to protect human health and the environment.

b. 40 C.F.R. § 264.117. This provision incorporates monitoring requirements in Part 264, including those mentioned at Part 264.97 and Part 264.303. It governs the length of the post-closure care period, permits a lengthened security period, and prohibits any use of the property which would disturb

the integrity of the management facility.

c. 40 C.F.R. § 264.310. This specifies requirements for caps, maintenance, and monitoring after closure.

3. 40 C.F.R. § 264.301. Prescribes design and operating requirements for landfills.

a. 40 C.F.R. § 264.301(a). This provides for a single liner and leachate collection and removal system.

b. 40 C.F.R. § 264.301(f). This requires a run-on control system.

c. 40 C.F.R. § 264.301(g). This requires a run-off management system.

d. 40 C.F.R. § 264.301(h). This requires prudent management of facilities for collection and holding of run-on and run-off.

e. 40 C.F.R. § 264.301(i). This requires that wind dispersal of particulate matter be controlled.

C. Federal and State RCRA Subtitle D Requirements (relevant and appropriate).

40 CFR Part 257 establishes criteria under Subtitle D of the Resource Conservation and Recovery Act for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health or the environment. See 40 CFR § 257.1(a). This part comes into play whenever there is a "disposal" of any solid or hazardous waste from a "facility." "Disposal" is defined as "the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters." See 40 CFR § 257.2. "Facility" means "any land and appurtenances thereto used for the disposal of solid wastes." Solid waste requirements are listed herein because there may be disposal of solid wastes as a result of this removal action.

1. 40 CFR § 264.257 (incorporated by reference in Montana under ARM § 17.54.702). Criteria for Classification of Solid Waste Disposal Facilities and Practices. The activities to be performed for the Mouat site removal action are expected to comply with the following requirements.

a. 40 CFR § 257.3-1. Washout of solid waste in facilities in a floodplain posing a hazard to human life, wildlife,

or land or water resources shall not occur.

b. 40 CFR § 257.3-2. Facilities shall not contribute to the taking of endangered species or the endangering of critical habitat of endangered species.

c. 40 CFR § 257.3-3. A facility shall not cause a discharge of pollutants, dredged or fill material, into waters of the United States in violation of sections 402 and 404 of the Clean Water Act, as amended, and shall not cause nonpoint source pollution, in violation of applicable legal requirements implementing an areawide or statewide water quality management plan that has been approved by the Administrator under Section 208 of the Clean Water Act, as amended.

d. 40 CFR § 257.3-4. A facility shall not contaminate an underground source of drinking water beyond the solid waste boundary or beyond an alternative boundary specified in accordance with this section.

e. 40 CFR § 257.3-8(d). Access to a facility shall be controlled so as to prevent exposure of the public to potential health and safety hazards at the site.

2. State of Montana Solid Waste Requirements (all relevant and appropriate).

a. ARM § 17.50.505(1) and (2). Sets forth standards that all solid waste disposal sites must meet, including the requirements that (1) Class II landfills must confine solid waste and leachate to the disposal facility. If there is the potential for leachate migration, it must be demonstrated that leachate will only migrate to underlying formations which have no hydraulic continuity with any state waters; (2) adequate separation of group II wastes from underlying or adjacent water must be provided; and (3) no new disposal units or lateral expansions may be located in wetlands. ARM § 17.50.505 also specifies general soil and hydrogeological requirements pertaining to the location of any solid waste management facility.

b. ARM § 17.50.506. Specifies design requirements for landfills. Landfills must either be designed to ensure that MCLs are not exceeded or the landfill must contain a composite liner and leachate collection system which comply with specified criteria.

c. ARM § 17.50.513. Sets forth general operational and maintenance and design requirements for solid waste facilities using landfilling methods. Specific operational and maintenance requirements specified in ARM § 17.50.513 that are

relevant and appropriate are run-on and run-off control systems requirements, requirements that sites be fenced to prevent unauthorized access, and prohibitions of point source and nonpoint source discharges which would violate Clean Water Act requirements. ARM § 16.14.506 specifies design requirements for landfills. All landfills must contain a composite liner and leachate collection system which comply with specified criteria. Landfills must either be designed to ensure that MCLs are not exceeded or comply with further composite liner and leachate collection system criteria.

d. **ARM § 17.50.523.** Specifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle.

e. **ARM § 17.50.530.** Sets forth the closure requirements for landfills. Class II landfills must meet the following criteria: (1) install a final cover that is designed to minimize infiltration and erosion; (2) design and construct the final cover system to minimize infiltration through the closed unit by the use of an infiltration layer that contains a minimum 18 inches of earthen material and has a permeability less than or equal to the permeability of any bottom liner, barrier layer, or natural subsoils or a permeability no greater than 1 X 10-5 cm/sec, whichever is less; (3) minimize erosion of the final cover by the use of a seed bed layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth and protecting the infiltration layer from frost effects and rooting damage; (4) revegetate the final cover with native plant growth within one year of placement of the final cover.

f. **ARM § 17.50.531.** Sets forth post closure care requirements for Class II landfills. Post closure care must be conducted for a period sufficient to protect human health and the environment. Post closure care requires maintenance of the integrity of the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the cover and comply with the groundwater monitoring requirements found at ARM Title 16, chapter 14, subchapter 7.

D. **Air Requirements (all applicable).**

1. **ARM § 16.8.1401(2), (3), and (4).** Airborne particulate matter. There shall be no production, handling, transportation, or storage of any material, use of any street, road, or parking lot, or operation of a construction site or demolition project unless reasonable precautions are taken to control emissions of airborne particles. Emissions shall not exhibit an opacity exceeding 20% or greater averaged over 6 consecutive minutes.

2. **ARM § 16.8.1404(2).** Visible Air Contaminants.

Emissions into the outdoor atmosphere shall not exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

3. ARM § 16.8.1427. Nuisance or odor bearing gases. Gases, vapors and dusts will be controlled such that no public nuisance is caused within the Mouat site.

4. ARM § 26.4.761(2)(a), (e), (h), (j), and (k). Fugitive dust control measures such as 1) watering, stabilization, or paving of roads, 2) vehicle speed restrictions, 3) stabilization of surface areas adjoining roads, 4) restriction of travel on other than authorized roads, 5) enclosing, covering, watering, or otherwise treating loaded haul truck, 6) minimizing area of disturbed land, and 7) revegetation, must be planned and implemented, if any such measure or measures are appropriate for this removal action.

E. Air Quality Requirements (applicable).

Removal activities will comply with the following requirements to ensure that existing air quality will not be adversely affected by the Mouat removal action.

1. ARM § 16.8.818. Settled particulate matter shall not exceed a 30 day average of 10 grams per square meter.

2. ARM § 16.8.821. The concentration of PM-10 in ambient air shall not exceed a 24 hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

IV. TO BE CONSIDERED DOCUMENTS (TBCs)

The use of documents identified as TBCs is addressed in the Introduction, above. A list of TBC documents is included in the Preamble to the NCP, 55 Fed. Reg. 8765 (March 8, 1990). Those documents, plus any additional similar or related documents issued since that time, will be considered by EPA and MDEQ during the conduct of the RI/FS, during remedy selection, and during remedy implementation.

V. OTHER LAWS (NON-EXCLUSIVE LIST)

CERCLA defines as ARARs only federal environmental and state environmental and siting laws. Design, implementation, and operation and maintenance must nevertheless comply with all other applicable laws, both state and federal, if the remediation work is done by parties other than the federal government or its contractors.

The following "other laws" are included here to provide a reminder of other legally applicable requirements for actions being

conducted at the reservoir sediments operable unit. They do not purport to be an exhaustive list of such legal requirements, but are included because they set out related concerns that must be addressed and, in some cases, may require some advance planning. They are not included as ARARs because they are not "environmental or facility siting laws." As applicable laws other than ARARs, they are not subject to ARAR waiver provisions.

Section 121(e) of CERCLA exempts removal or remedial actions conducted entirely on-site from federal, state, or local permits. This exemption is not limited to environmental or facility siting laws, but applies to other permit requirements as well.

A. Other Federal Laws

1. Occupational Safety and Health Regulations. The federal Occupational Safety and Health Act regulations found at 29 CFR § 1910 are applicable to worker protection during conduct of response activities.

B. Other Montana Laws

1. Groundwater Act. Section 85-2-505, MCA, precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained so as to prevent waste, contamination, or pollution of groundwater.

2. Public Water Supply Regulations. If response action at the site requires any reconstruction or modification of any public water supply line or sewer line, the construction standards specified in ARM § 16.20.401(3) must be observed.

3. Groundwater Act. Section 85-2-516, MCA, states that within 60 days after any well is completed a well log report must be filed by the driller with the DNRC and the appropriate county clerk and recorder.

4. Water Rights. Section 85-2-101, MCA, declares that all waters within the state are the state's property, and may be appropriated for beneficial uses. The wise use of water resources is encouraged for the maximum benefit to the people and with minimum degradation of natural aquatic ecosystems.

Parts 3 and 4 of Title 85, MCA, set out requirements for obtaining water rights and appropriating and utilizing water. All requirements of these parts are laws which must be complied with in any action using or affecting waters of the state. Some of the specific requirements are set forth below.

Section 85-2-301, MCA, of Montana law provides that a person may only appropriate water for a beneficial use.

Section 85-2-302, MCA, specifies that a person may not appropriate water or commence construction of diversion, impoundment, withdrawal or distribution works therefor except by applying for and receiving a permit from the Montana Department of Natural Resources and Conservation. While the permit itself may not be required under federal law, appropriate notification and submission of an application should be performed and a permit should be applied for in order to establish a priority date in the prior appropriation system. A 1991 amendment imposes a fee of $1.00 per acre foot for appropriations of ground water, effective until July 1, 1993.

Section 85-2-306, MCA, specifies the conditions on which groundwater may be appropriated, and, at a minimum, requires notice of completion and appropriation within 60 days of well completion.

Section 85-2-311, MCA, specifies the criteria which must be met in order to appropriate water and includes requirements that:

1. there are unappropriated waters in the source of supply;

2. the proposed use of water is a beneficial use; and

3. the proposed use will not interfere unreasonably with other planned uses or developments.

Section 85-2-402, MCA, specifies that an appropriator may not change an appropriated right except as provided in this section with the approval of the DNRC.

Section 85-2-412, MCA, provides that, where a person has diverted all of the water of a stream by virtue of prior appropriation and there is a surplus of water, over and above what is actually and necessarily used, such surplus must be returned to the stream.

5. **Occupational Health Act, §§ 50-70-101 et seq., MCA.** ARM § 16.42.101 addresses occupational noise. In accordance with this section, no worker shall be exposed to noise levels in excess of the levels specified in this regulation. This regulation is applicable only to limited categories of workers and for most workers the similar federal standard in 29 CFR § 1910.95 applies.

ARM § 16.42.102 addresses occupational air contaminants. The purpose of this rule is to establish maximum threshold limit values for air contaminants under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. In accordance with this rule, no worker shall be exposed to air contaminant levels in excess of the threshold limit values listed in the regulation.

This regulation is applicable only to limited categories of workers and for most workers the similar federal standard in 29 CFR § 1910.1000 applies.

ENFORCEMENT SENSITIVE
Subject to State/EPA Confidentiality Agreement

Mouat Industries Site
June 24, 1996

ENFORCEMENT ADDENDUM

Subject to State/EPA Confidentiality Agreement

Mouat Industries Site

Columbus, Montana

This section of the document contains confidential information. A copy of the entire document is located in the Confidential Section of the Administrative Record kept at the U.S. Environmental Protection Agency Helena, Montana.