Milltown Reservoir Sediments Operable Unit

of the Milltown Reservoir/Clark Fork River Superfund Site

Record of Decision

Part 2: Decision Summary

U.S. Environmental Protection Agency Region 8

10 West 15th Street
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1 Site Name, Location, and Brief Description

Site Name:	Milltown Reservoir Sediments Operable Unit of the Milltown Reservoir / Clark Fork River Superfund Site
CERCLIS Identification Number:	MTD980717565
Site Location:	Missoula County, Montana
Lead Agency:	U.S. Environmental Protection Agency
Support Agency:	State of Montana Department of Environmental Quality
Source of Cleanup Monies:	Potentially Responsible Party Enforcement
Site Type	Reservoir sediments impacted by historic mining wastes

The U.S. Environmental Protection Agency (EPA), in consultation with the Montana Department of Environmental Quality (DEQ), is authorizing the Selected Remedy described in this *Record of Decision* to address a reservoir with impounded metals and arsenic-enriched sediments mixed with mine wastes originating from more than 100 years of upstream mining activity. The subject site is the Milltown Reservoir Sediments Operable Unit (MRSOU). The Milltown Dam, and its associated powerhouse containing hydroelectric generating facilities, was built in 1907. The reservoir, located at the confluence of the Clark Fork and Blackfoot rivers, comprises approximately 540 acres with a topographical boundary defined as the area behind the dam inundated by the maximum pool elevation of 3,265.5 feet (NAV 1988 datum) as originally calculated by Montana Power Company, now NorthWestern Corporation. The approximate location of the Milltown Site is shown in Exhibit 2-1, *Milltown Reservoir Sediments Operable Unit Map*. The site also includes the plume of groundwater contamination coming from the sediments and the temporary water supply.

EPA is the lead agency for the MRSOU, and DEQ is the supporting agency. Numerous other entities, including the Trustees (State of Montana [State], the Confederated Salish and Kootenai Tribes [CSKT] and the U.S. Department of the Interior [DOI]) other government agencies, local governments, academic research groups, landowners and public interest groups have participated in the Superfund process up to the present. The responsible parties (RPs) are the Atlantic Richfield Company, a subsidiary of BP p.l.c., and NorthWestern Corporation, the facility owner. The site cleanup is expected to be funded by the RPs.

Metals and arsenic enriched sediment transported and deposited in the reservoir by active and historic fluvial processes of the Clark Fork River represent the source of groundwater and surface water contamination associated with this OU. Geochemical conditions within the reservoir have contributed to the formation of a plume of arsenic-contaminated

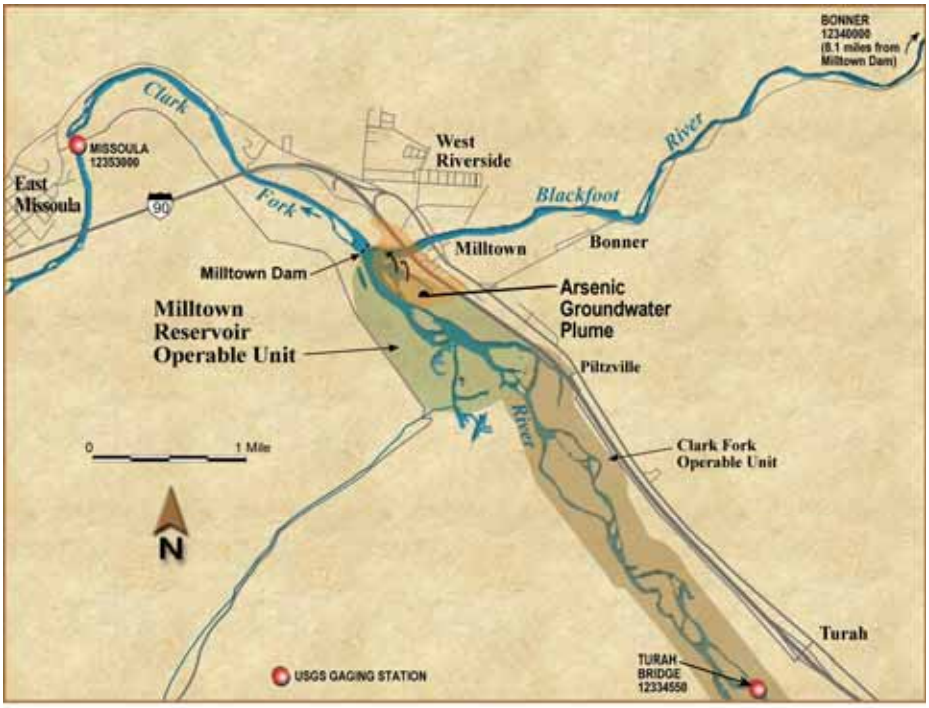

EXHIBIT 2-1
Milltown Reservoir Sediments Operable Unit Map
Showing Approximate Boundaries

groundwater that has impacted the drinking water supply of the community of Milltown, located adjacent to the reservoir. Concentrations of copper and other metals in the reservoir sediments represent a potential and actual threat to resident aquatic life within the reservoir and immediately downstream, particularly when sediments within the reservoir are scoured as a result of the movement of ice or change in flow conditions induced by high flows or reservoir drawdown. The dam impounding the sediments does not meet current fish passage and safety (earthquake and flood) requirements. The catastrophic release of contaminated sediments would cause significant environmental harm. Endangered Species Act (ESA) and Federal Power Act requirements for dam operation would likely require extensive dam improvements.

2 Site History and Enforcement Activities

During the 1860s, placer mining began in the Butte-Silver Bow Creek area (headwaters of the Clark Fork River Basin). This was followed shortly by mining shallow underground deposits for gold, silver, copper, and other metals. The mine wastes and mill tailings, which contained various amounts of unrecovered metals and arsenic, were generally released to the local creeks, which conveyed the mining and milling wastes downstream in minor amounts. Mining and milling of deeper copper and silver ores in Butte and Anaconda began during the late 1880s. With the introduction of electricity in the early 1900s, milling practices improved and new mining practices significantly increased ore production and metals recovery rates, and substantially increased annual mine and mill tailings volume. In the Butte area, most mine and milling wastes were directly disposed into Silver Bow Creek well into the 20th century. Most of these Butte facilities originated with or came to be controlled by the Anaconda Company. These wastes subsequently mixed with other stream sediments and were carried down Silver Bow Creek and into the upper Clark Fork River by annual high flows and periodic floods. Ore processing wastes from the Anaconda Company's operations 30 miles to the west in Anaconda, Montana, also entered Warm Springs Creek and related tributaries in large quantities and were transported to the upper Clark Fork River as well.

Milltown Dam Construction, 1906

The fluvial transport rate, mixing with other sediments, and subsequent deposition of the contaminated mixed waste and sediments into the downstream floodway of the upper Clark Fork River varied depending on weather and hydrologic conditions. During snowmelt runoff and major thunderstorms, more wastes were transported and subsequently deposited downstream as a result of higher stream flows. In 1908, the largest flood event on record for the upper Clark Fork drainage occurred as a result of rain on snow and frozen ground. It is estimated that this major flood event remobilized large quantities of metals and arsenic-contaminated sediments and mine-mill wastes from the upper Clark Fork River channel and flood plain and transported large quantities to the recently constructed Milltown Reservoir. Much of the arsenic and metals contaminated sediment was deposited in the reservoir backwater area created by the dam.

Between 1918 and 1959, a series of settling ponds (known as Warm Springs Ponds) were built near the end of Silver Bow Creek, just upstream of Warm Springs Creek, to better control the contaminated sediments entering the upper Clark Fork River. As a result, the amount of contaminated sediments from the Butte and Anaconda area reaching the Milltown Dam and reservoir after 1918 was significantly less. However, substantial quantities of waste continued to be washed downstream to the reservoir from previously

deposited areas downstream of Warm Springs Ponds, the Anaconda Area, and output from the ponds.

Historically, backwater conditions created by impoundment of water in the reservoir caused sediments carried by the Clark Fork and Blackfoot Rivers to settle. Diminishing flow velocities as the river water enters the backwater areas results in the deposition of more coarse grained, heavier sediments first, at the head of the reservoir. The finer portion of the sediment is transported and settle closer to the dam (the mouth of the reservoir). Under annual peak runoff and storm events where flow velocities through the reservoir increase substantially, hydraulic conditions at the confluence of these rivers becomes more dynamic and sediments may actually be scoured from the reservoir. These different conditions create a "dynamic equilibrium" relative to sediment storage within the reservoir and have contributed to the highly variable metal and arsenic concentrations observed vertically and horizontally throughout the sediments. Higher metals concentrations are typically associated with the finer fraction of sediment (clay and silt portion). Older, deeper sediments also tend to have higher levels of metals and arsenic than the more recently deposited surficial sediments.

Today the Milltown Dam is operated as a "run-of-river" dam, meaning the outflow from the dam equals the inflow into the reservoir from the Clark Fork and Blackfoot rivers. Aerial photographs from 1940, 1964, and 1991 suggest that the Clark Fork River channels within the reservoir, and the adjacent sediment deposits, have been relatively stable with little net deposition or erosion in recent times. The reservoir is estimated to contain approximately 6.6 million cubic yards of sediments distributed upstream over various backwater areas. The area creating the contaminated groundwater plume is Area 1 (Area 1; see Exhibit 2-2, *Key Sediment Accumulation Areas*), which consists of the most heavily contaminated sediments. It is located between the Blackfoot and Clark Fork channels adjacent to the community of Milltown.

Milltown Dam Construction, 1906

Since 1982, numerous investigations and clean-up studies have been conducted on the MRSOU. The Atlantic Richfield Company prepared major portions of the final MRSOU *Remedial Investigation* and *Feasibility Studies* (RI/FS), and completed a Dry Removal Sediment Scour Evaluation that modeled sediment scour from the reservoir under several removal variations associated with the remedy. EPA, in consultation with DEQ, provided oversight of the RI/FS activities conducted by the Atlantic Richfield Company. EPA produced the *Human Health Risk Assessment* (July 1993), the original *Ecological Risk Assessment* (July 1993), and the *Ecological Risk Assessment Addendum* (April 2000) (EPA 1993a, 1993b, and 2000). EPA also produced the MRSOU *Original Proposed Plan* (April 2003), and *Revised Proposed Plan* (May 2004).

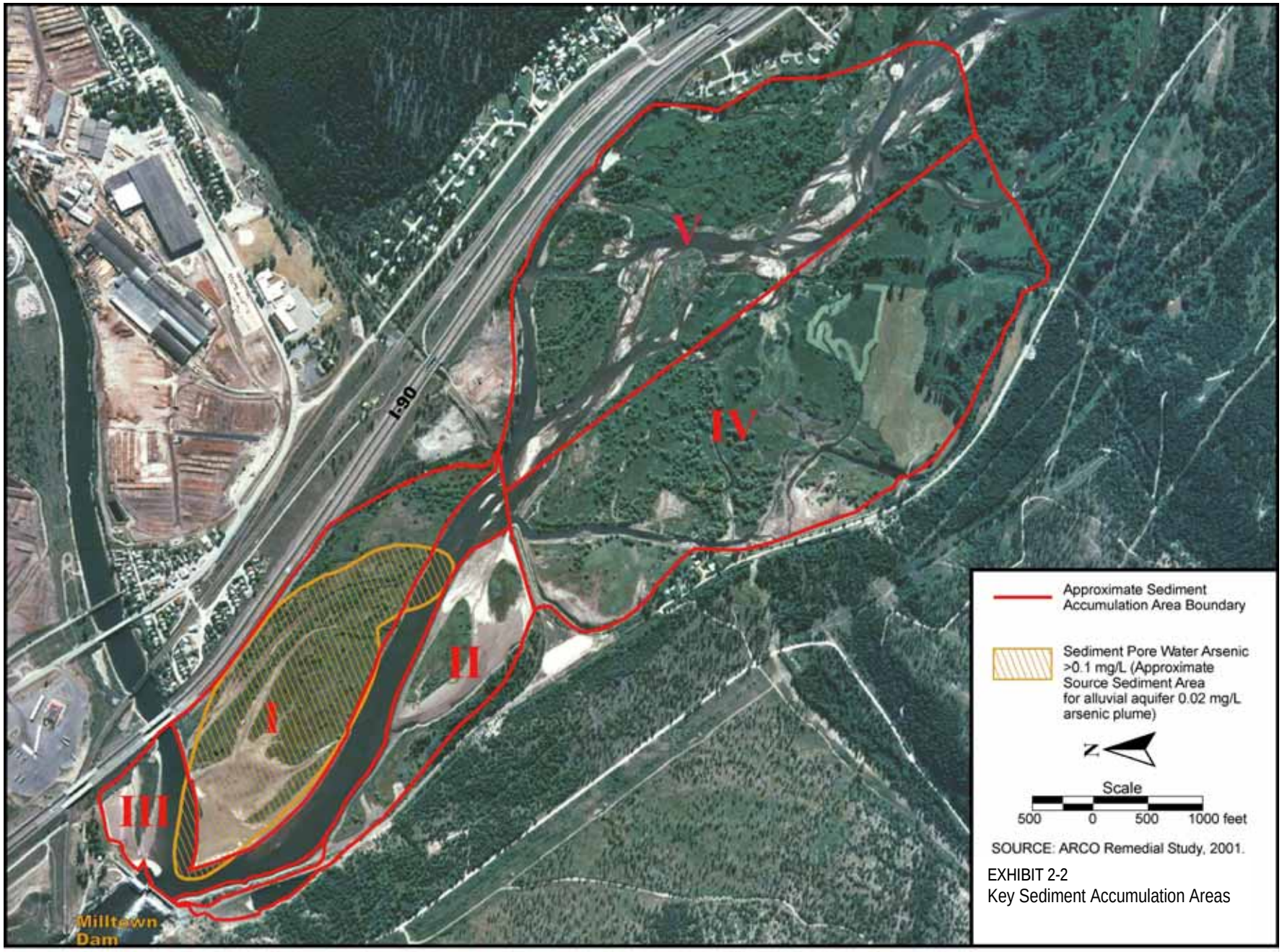

EXHIBIT 2-2
Key Sediment Accumulation Areas

Key documents relevant to the MRSOU include the following:

- *Final Report: Arsenic Source and Water Supply Remedial Action Study, Milltown, Montana—* 1984. Woessner and Moore, prepared for the Solid Waste Bureau, Montana Department of Health and Environmental Sciences, Helena, Montana.
- *Baseline Ecological Risk Assessment—1993a. Milltown Reservoir Operable Unit, Milltown Reservoir Superfund Site*. Prepared by Environmental Toxicology International for EPA Region 8. Seattle, Washington. *Ecological Risk Assessment Addendum—2000*. Prepared by CH2M HILL for EPA.
- *Baseline Human Health Risk Assessment—1993b. Milltown Reservoir Operable Unit, Milltown Reservoir Superfund Site*. Prepared by Environmental Toxicology International for EPA Region 8. Seattle, Washington.
- *Continuing Releases Risk Assessment Milltown Reservoir Operable Unit, Milltown Reservoir Superfund Site—1993c.* Prepared by Environmental Toxicology International for EPA Region 8. Seattle, Washington.
- *Milltown Reservoir Sediments Operable Unit—1995. Final Remedial Investigation Report*. Prepared by Titan Environmental Corporation for the Atlantic Richfield Company. Bozeman, Montana.
- *Milltown Reservoir Sediments NPL Site: Milltown Reservoir Operable Unit—Feasibility Study Report*—1996. Prepared by Pioneer Technical Services, Inc. for the Atlantic Richfield Company. Butte, Montana.
- *Milltown Reservoir Sediments Site Draft Focused Feasibility Study*—2000. Prepared by EMC2, Bozeman, Montana, for the Atlantic Richfield Company.
- *Milltown Reservoir Sediments Site Combined Feasibility Study—2002.* Prepared by EMC2, Bozeman, Montana.
- *Draft Conceptual Restoration Plan for the Clark Fork River and Blackfoot River near Milltown Dam*, as amended, prepared by Water Consulting Inc. and Dave Rosgen, February 2003, amended June 2004 (DCRP).
- *Milltown Reservoir Sediments Site Proposed Plan—2003*. Prepared by EPA.
- *Milltown Reservoir Sediments Revised Proposed Plan—2004.* Prepared by EPA
- *Milltown Reservoir Dry Removal Scour Evaluation – Final Technical Memorandum* prepared by Envirocon and EMC2 for the Atlantic Richfield Company – May, 2004
- *Milltown Reservoir Dry Removal Scour Evaluation – Addendum 1* – October 2004. Prepared by Envirocon and EMC2 for the Atlantic Richfield Company.

2.1 Chronology of Key Historical Activities and Enforcement Activities

Following is the chronology of key historical activities and enforcement activities, as shown on Exhibit 2-3, *Site History Timeline*:

- 1864 to 1970s: Essentially uncontrolled releases of mining and milling wastes continued in the Clark Fork River basin. Periodic flooding events cause sediments to be deposited in Milltown Reservoir after 1907.
  - 1907: Milltown Dam constructed to provide hydroelectric power.
  - 1908: Largest flood on record for Clark Fork River, caused by a rain-on-snow event. Mining and milling wastes washed downstream with sediments into the Milltown Reservoir.
  - 1929: Ownership of Milltown Dam transferred to Montana Power Company.
  - 1977: Atlantic Richfield Company merges with the Anaconda Company.
- 1980s: Mining in Butte and Anaconda ceases and environmental investigations begin.
  - 1981: Arsenic was found by local public health authorities in Milltown drinking water wells. Levels exceeded Federal drinking water standard (then 0.05 mg/l, lowered in 2001 to 0.01 mg/l arsenic).
  - 1982: Three sites are proposed for addition to the National Priority List (NPL): the Silver Bow Creek/Butte Area Site, the Anaconda Smelter Site, and the Milltown Reservoir Site.
  - 1983: Milltown Reservoir Site was added to the Superfund list as the first Montana NPL Site; Atlantic Richfield Company suspends all mining activity in Butte after shutting down the Anaconda smelter.
  - 1984: Response Action installed a new drinking water system for Milltown. No institutional controls (ICs) put in place.
  - 1986: Rehabilitation and upgrades to spillway and dam. The work by NorthWestern Corporation predecessor, the Montana Power Company, extended through 1990 and resulted in 14,500 cubic yards of waste (reservoir sediments) and debris being transported and encapsulated in the Upland Disposal Site. An earlier disposal site was also constructed onsite by Montana Power Company.
  - 1989: United States sues Atlantic Richfield Company for reimbursement of costs at the three sites; litigation is ongoing, although stayed and partially settled.
- 1990s and 2000s: Remediation investigations and studies
  - 1991: RI/FS order on consent issued to Atlantic Richfield Company.

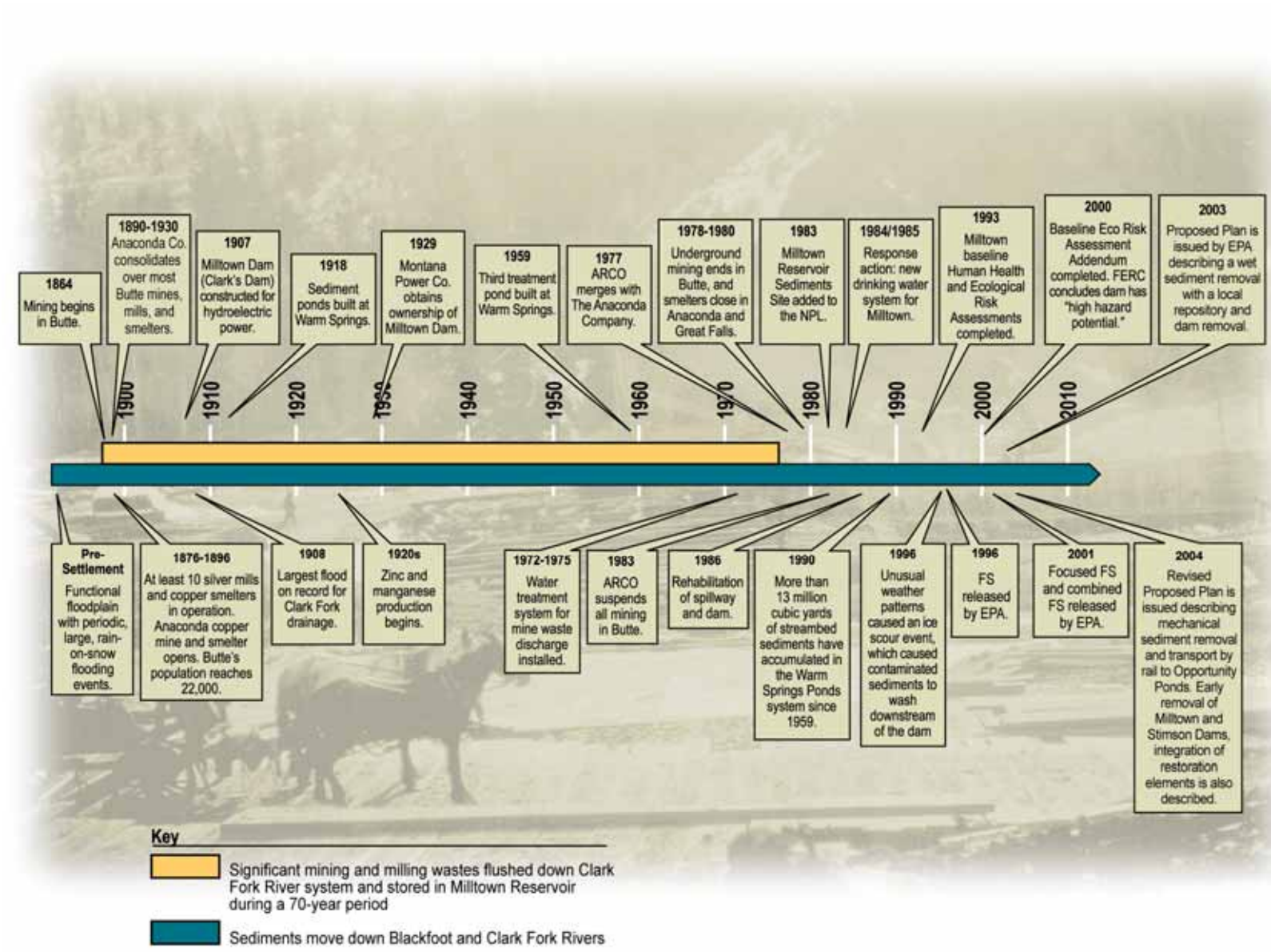

EXHIBIT 2-3
Site History Timeline

- 1993: Milltown Remedial Investigation, *Baseline Human Health, Ecological,* and *Continued Releases Risk Assessments* completed. Groundwater contamination recognized as the principal problem to be remedied.
- 1995 Final *Remedial Investigation* Report completed by Titan Environmental Corporation on behalf of the Atlantic Richfield Company.
- 1996: Draft *Feasibility Study* (regarding groundwater) released by Atlantic Richfield Company. That same year, unforeseen climatic conditions cause an ice scour event, which sends high levels of metals contamination down river. EPA expanded the scope of the *Feasibility Study* and conducted further risk assessments.
- 1998 / 1999: Bull trout listed under the ESA.
- 2000: Milltown Reservoir Baseline *Ecological Risk Assessment Addendum* released for public review. The Federal Energy Regulatory Commission (FERC) re-classifies dam as "High Hazard Potential," and initiates dam safety review.
- 2001: *Focused Feasibility Study* released by Atlantic Richfield Company and approved by EPA that examines alternatives for addressing surface water quality. The *Combined Feasibility Study* is prepared later in the year and submitted to and approved by EPA. This report combines key alternatives from the original 1996 *Feasibility Study* with those of the *Focused Feasibility Study*. NorthWestern Corporation purchases Montana Power assets including Milltown Dam and Reservoir.
- 2002: *Combined Feasibility Study* released to the public. Remedy recommendation submitted to National Remedy Review Board and the National Sediment Review Panel.
- 2003, February: Draft Conceptual Restoration Plan (DCRP) for the Clark Fork River and Blackfoot River near Milltown Dam, prepared by Water Consulting Inc. and Dave Rosgen, is released by the State of Montana, in consultation with other Trustees.
- 2003, April: *Proposed Plan* for the MRSOU is released to the public for comment. General elements included the following: isolate and remove the most heavily contaminated sediments (2.6 million cy), dredge 85 percent of the sediments and transport to a new local waste disposal repository by slurry pipeline, remove the Milltown Dam and radial gate, design / build a new flood plain and channel for the Clark Fork River, stabilize and re-vegetate the new flood plain and channel, continue the water replacement program, monitor the arsenic groundwater plume, and perform long-term maintenance on the sediment repositories.
- 2004, Spring: Milltown Reservoir *Dry Removal Scour Evaluation—Final Technical* Memorandum. Provides predictions on the amount of sediment that will be scoured and transported downstream for various cleanup options.
- 2004, Spring: *Revised Proposed Plan* for the MRSOU is re-released to the public for comment. The *Revised Plan* reflects responses to the initial public comments by

proposing a total bypass channel, mechanical removal of sediments, disposal of sediments at Opportunity Ponds, and early removal of the Milltown and Stimson Dams.

- 2004, June: DCRP is amended by the State of Montana and made final after response to comments.
- 2004, August and October, The Milltown biological assessments for bull trout, bald eagle, and other protected species are released by EPA to U.S. Fish and Wildlife Service (USFWS) as required by ESA.
- 2004, December: EPA releases this *Record of Decision*. USFWS releases its Biological Opinion for the Milltown Project (USFWS 2004).

3 EPA, State, and Community Participation in the RI/FS Process

There is a rich history of stakeholder involvement at the MRSOU. Area residents first became involved in 1981 when the Missoula City-County Health Department found levels of arsenic above the Federal drinking water standard (50 ppb at the time) in drinking water wells. Now, more than 20 years later, local interest has never been higher.

Early community activities were led by the Missoula City-County Health Department and the Montana Department of Health and Environmental Science (MDHES, now DEQ). In 1989, the Milltown EPA Superfund Site (MESS) group was formed by concerned citizens who felt the State and EPA were unresponsive to community concerns about contaminated sediments being excavated by the Montana Power Company. MESS's membership was diverse and included residents of Milltown, Bonner, Bonner Junction, and Missoula, as well as representatives from local civic and environmental groups. Several MESS members formed the Milltown Technical Advisory Committee (MTAC). In 1991, MTAC applied for and received a Technical Assistance Grant (TAG), the first awarded in Montana. MTAC used TAG funds to hire technical advisors to review and comment on EPA's Site-related documents and to share this information with other community members. Other groups initially active at the MRSOU were the Clark Fork—Pend Oreille Coalition, the League of Women Voters, and the Montana Public Interest Research Group.

Over the years, EPA has worked closely with the local community members and organized groups as well as the TAG group. For example, through a broad-based group called the Milltown Endangerment Assessment Committee (MEAC), members of the public were actively involved in developing the *Human Health* and *Ecological Risk Assessments* (EPA 1993a, 1993b, and 1993c). Similarly, the public was informed and involved during the development of the *Continued Releases Risk Assessment* (1994). The TAG group (which changed its name from MTAC to the Clark Fork River Technical Assistance Committee [CFRTAC] in 1997) and other stakeholders (Clark Fork Coalition, Trout Unlimited, Bonner Development Group, Bonner-Milltown Community Forum, members of the public, the State of Montana, CSKT, City and County of Missoula, Mountain Water, U.S. Army Corps of Engineers [USACE], and the USFWS) regularly attended and participated in meetings of the Feasibility Study Development Group. These stakeholders reviewed and provided input into the *Ecological Risk Assessment Addendum* (EPA 2000) and the *Focused Feasibility Study* (Atlantic Richfield Company 2000b). Stakeholders were also involved in the development of the *Combined Feasibility Study* (Atlantic Richfield Company 2001c). In 2001 and 2002, EPA held public meetings and open houses, posted flyers, issued fact sheets and postcards, held numerous meetings (with property owners, community groups and local elected officials), made presentations and TV appearances, issued press releases and public service announcements, participated in media interviews, and posted comprehensive information on EPA's Milltown web page (http://www.epa.gov/region08/superfund/sites/mt/milltowncfr/home.html) about the various cleanup alternatives for the Site. In April 2003, EPA released the *Original Proposed Plan* for the site. During the public comment period

(April 15 through June 20, 2003), EPA received 4,029 comments. Of these, approximately 88 percent (3,578 out of 4,029) supported the *Original Proposed Plan* as written or with minor modifications. In response to significant community comments and a new sediment removal proposal from the Atlantic Richfield Company, EPA revised the *Original Proposed Plan*. Among the many important changes in the *Revised Proposed Plan* was a new disposal location for excavated sediments (Opportunity Ponds) and coordination with restoration Trustees, who would provide a more natural channel design for the Clark Fork River post-remediation. These changes were made in direct response to public comments on the *Original Proposed Plan*.

The *Revised Proposed Plan* was released for public comment (May 19 through June 21, 2004). EPA received 805 comments on the *Revised Proposed Plan*, with approximately 98 percent (785 out of 805) supporting the proposal as written or with minor changes. In addition to the two formal comment periods in 2003 and 2004, EPA conducted various outreach activities associated with the release of the two proposed cleanup plans. Specifically, EPA held public meetings and open houses, posted flyers, issued fact sheets and postcards, held numerous meetings, made presentations to various groups, issued press releases and public service announcements, participated in media interviews, and updated information about the cleanup proposals on the Milltown Reservoir web site.

At the public meetings, EPA and DEQ representatives presented information, answered questions, and accepted public comments for the record. EPA's response to all significant comments received during the public comment period (oral, written, and e-mail) on the *Original* and *Revised Proposed Plans* are included in the *Responsiveness Summary*, which is Part 3 of this *Record of Decision*.

Since 1991, EPA has awarded a total of $500,000 in TAG funds to the CFRTAC. CFRTAC continues to be heavily involved in Site cleanup discussions and decisions and effectively communicates technical information to its membership and the general public.

In July 2002, EPA awarded $40,000 in Superfund Redevelopment assistance for use at the MRSOU. With this funding as a catalyst, a community-based Redevelopment Steering Committee formed, and developed an application process for stakeholders interested in serving on the Redevelopment Working Group. In July 2003, the Missoula County Commissioners appointed some 20 people, representing a broad range of interests (business, parks and recreation, environmental issues, fisheries, public health, historic preservation, etc.) to serve on the Redevelopment Working Group. Technical support to this group is provided by staff from Missoula County, EPA, DEQ, Montana Fish, Wildlife and Parks (FWP), Montana Natural Resource Damages Program (NRDP), DOI/ National Park Service's Rivers and Trails Program, and the CSKT. The Redevelopment Working Group has been meeting regularly for the past year, examining opportunities for redevelopment. The group hopes to build upon past community development goals and area residents' visions for the future. The group is drafting plans to capitalize on redevelopment opportunities brought about by MRSOU remediation and restoration. The Redevelopment Working Group distributed its first newsletter in fall 2004, and plans to hold public meetings on possible redevelopment and land use ideas in early 2005.

4 Scope and Role of OU or Response Action

The Clark Fork Basin Superfund complex is made up of four contiguous sites broken into operable units (OUs) for easier management, as shown on Exhibit 2-4, *Regional Location Map*:

- Silver Bow Creek / Butte Area Site—1982
  - Butte Priority Soils OU
  - Lower Area One / Emergency Response Action OU
  - Mine Flooding / Berkeley Pit OU
  - Westside Soils OU
  - Butte Active Mine Area OU
  - Rocker OU
  - Streamside Tailings OU
  - Warm Springs Ponds OUs (Active and Inactive)
  - Numerous Removal OUs
- Montana Pole Site—1987
- Anaconda Smelter Site—1982
  - Smelter Demolition Removal OU
  - Mill Creek Temporary Relocation Removal OU
  - Mill Creek Final Relocation Remedial OU
  - Anaconda Yards Removal OUs
  - Arbiter and Beryllium Wastes Removal OUs
  - Old Works Removal OU
  - Old Works / East Anaconda Development OU
  - Flue Dust OU
  - Anaconda Community Soils OU
  - Anaconda Warm Springs Creek Removal OU
  - Anaconda Regional Water, Waste, and Soils OU
- Milltown Reservoir / Clark Fork River Site—1982
  - Milltown Water Supply OU
  - MRSOU
  - Clark Fork River OU

EXHIBIT 2-4
Regional Location Map

The combined sites include more than 140 miles from the headwaters of Silver Bow Creek north of Butte to the Milltown Dam near Missoula.

The MRSOU is one of three OUs within the Milltown Reservoir / Clark Fork River Superfund Site. The other OUs are the Milltown Water Supply and Clark Fork River. Although contiguous, the two main OUs within the site have been divided such that actions in one site or OU are not dependent on activities in other areas. The MRSOU Selected Remedy is meant to comprehensively address the human health and environmental risks and other response action issues identified for this area. It does not address natural resource damage claims related to the establishment of baseline conditions at the MRSOU—these were previously, and will be, addressed by the State, Federal, and Tribal natural resource damage Trustees. This *Record of Decision* describes the interaction between the remedy and restoration decisions, and the coordinated implementation of the two plans.

Silver Bow Creek Showing Slickens Deposits

Washoe Smelter in Anaconda during Operation

Butte – Berkeley Pit

Tailings deposits along the Upper Clark Fork River