Project Description
The Berg Lumber Mill Site [also known as the Lewistown Groundwater Investigation] is a 31-acre site resting upgrade from Big Spring Creek located on the outskirts of Lewistown. This remediation project assessed the extent of illegal industrial contaminant disposal and proceeded to remove the material from the site. Auxiliary benefits to the area included the improvement of water quality within Big Spring Creek, a recreational destination for local residents.

History
1972 – A sawmill was constructed by George Berg along Joyland Road in Lewistown.

2001 – April: A former Berg Lumber employee complained to the Montana Department of Environmental Quality [MT DEQ] of improper disposal of petroleum hydrocarbons, Pentachlorophenol, and transformer fluids, as well as the open burning of a sawdust pile. This resulted in a Phase I Environmental Assessment [EA] being undertaken by the Enforcement Division of MT DEQ. Pioneer Technical Services completed this EA in October 2001.

2004 – August: A Phase II EA was conducted, which consisted of soil and groundwater sampling and analysis.

2007 – August: Further soil sampling and the installation of a monitoring well to assess the extent and magnitude of contaminated soils and groundwater are undertaken.

2008 – June: $10,502 was allocated by the Department of Natural Resources and Conservation [DNRC], so that a grant proposal could be prepared for a DNRC Re-

Figure 12-1 – This photo displays a portion of the surface detritus that remains on the Berg Lumber Mill site. This will be removed throughout the course of this project. [Photo: H. Janssen, August 2010]

Figure 12-2 – These structures left on the Berg Lumber Mill Site are laced with lead-based paint and insulated with asbestos-based insulation. They will require removal. [Photo: H. Janssen, August 2010]
source and Development Grant [RDG]. An EPA Brownfields Grant was also prepared using these funds.

2009 – April: A $300,000 DNRC Resource and Development Grant [RDG] was approved for site clean-up. Per grant requirements, ownership of the Berg property was transferred from the estate of George Berg to the City of Lewistown in June 2009. In September 2009, an additional $200,000 for site clean-up was approved by the EPA Brownfields program. This was provided in the form of a 128A grant, which is specifically designed for clean-up that serves to restore communities and the ecological systems that support them. In December 2009, AMEC Geomatrix [Missoula] received a contracting award for environmental and engineering services related to the remediation of this site.

2010 – Shumaker Trucking and Excavating [Great Falls] was awarded the remediation contract for the site.

**Chronology**

A Phase I EA occurred at the site in April 2001. This was followed in August 2004 by a Phase II EA to determine the extent of pollution at the site. In April 2010, it was determined that in addition to soil and groundwater contamination, the presence of asbestos and lead-based paint would require the removal of several existing structures on the property [Figure 12-2].

Design and planning work for the project began in February 2010, at the behest of the City of Lewistown City Planner, Duane Ferdinand.

Present work consists of removing the DEQ estimated 10,000yds³ of contaminated soil. Samples taken from the most-affected areas have not measured contamination to a depth exceeding 12”. Soil is presently excavated and placed on semi-trailers [capacities range from 32-40 yds³ per trailer]. It is hauled to the High Plains Landfill in Great Falls, a distance of 115

*Figure 12-3 – A pile of rubbish on the Berg Lumber Mill Site awaiting disposal at the High Plains Landfill in Great Falls. [Photo: H. Janssen, November 2010]*

*Figure 12-4 – Contaminated soils were stockpiled while awaiting transit to the High Plains Landfill. [Photo: H. Janssen, November 2010]*
miles, one-way. Owing to the distance involved in disposing of this waste in a landfill certified to accept such material, five trucks make this journey, twice per day. Roughly 320-400 yds.$^3$ of waste are removed and disposed of each day, with excavation activities at the site continuing throughout the workday.

**Project Design**

Project Design and planning was conducted jointly by Duane Ferdinand, the City of Lewistown Planning Director, and AMEC Geomatrix [Missoula].

**Pre-Project Planning & Testing**

Project sampling and planning was first conducted by Pioneer Technical Services [Butte] with a second Environmental Assessment conducted in 2004.

**Figure 12-5 – Topsoil was loaded into semitrailers for transit and disposal. Each semitrailer was capable of transporting 32-40yds$^3$ of soil per trip. There is an estimated 10,000 yds$^3$ of contaminants at the Berg site that will require disposal. [Photo: H. Janssen, November 2010]**

**Current Project**

Remediation activities will continue in spring 2011, with impacted soils continuing to be excavated and disposed of at the High Plains Landfill. The City of Lewistown Planning Director will determine future site use, which will become either a public fishing access to Big Spring Creek or, alternately, a public park.

**Cost and Source of Funds**

Total project cost for the Berg Lumber Mill site remediation equaled $510,502.

In 2008, the Montana DNRC allocated $10,502 for the purposes of drafting an EPA Brownfields proposal and an RDG grant. The DNRC approved a $300,000 RDG grant, while the EPA Brownfields program provided an additional $200,000 in the form of a 128 A Grant.

RDG grant and Brownfields assessment work was conducted by Tetra Tech EMI [Helena] in 2008. For their services they received $9,167, reflecting 121 hours of billed labor. Their services included administrative support [4 hrs.], editorial review [3 hrs.], a staff geologist [31 hrs.], and a senior scientist [83 hrs.]. The wage rate range was $53-80/hr.

AMEC Geomatrix [Missoula] began planning work and testing in February 2010. The following figures reflect their labor from February to November 2010: AMEC Geomatrix has received $86,315 to date. Labor provided by AMEC consists of a CAD/Graphics employee [46hrs.], Senior engineer II [151 hrs.], Project engineers [518 hrs.], Senior engineer I [19 hrs.], administrative project support [24 hrs.], a staff engineer [20 hrs.], and a professional level XIII engineer [49 hrs.]. $80,464 was billed for 826 labor hours.
The average AMEC hourly wage on this project equals $97.38/hour, including overhead and indirect costs.

$250 was provided to Pace Laboratories [Milwaukee, WI] for the processing of 6 test samples.

**Project Labor**
Shumaker Trucking and Excavating [Great Falls] was awarded the contract for remediation activities in 2010 for $243,990. All contractors’ wages are based upon Davis-Bacon prevailing wages. The labor supplied by Shumaker has thus far consisted of Truck Driver 2 [318 hrs.], Excavator Operator 2 [54 hrs.], Loader Operator 2 [52 hrs.], and a project Superintendent [104 hrs.]. To date Shumaker has received $60,214 for their labor, materials, and indirect costs for work performed at the Berg Lumber site. This figure reflects 528 hours of labor.

Asbestos abatement at one of the surface structures was undertaken by Schroeder Contracting [Billings]. For this service, Schroeder received $3,000. This employed two employees for a total of 40 hours. Schroeder employee wages range from $18-20/hr.

Contaminated soil was disposed of at the High Plains Landfill [Great Falls] at a cost of $7/ton.

**Project Oversight**
Project oversight is being conducted by Duane Ferdinand, the City of Lewistown Planning Director, and AMEC Geomatrix.

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*Figure 12-6 – Contaminated soil being secured for transit to the landfill. This action is mandated by state regulations and prohibits the impacted soils from becoming airborne while in transit. [Photo: H. Janssen, November 2010]*
Figure 12-7 – A historic warehouse that will be removed from the site owing to its contamination with lead-based paint and asbestos has sat neglected for many years. [Photo: H. Janssen, August 2010]

Figure 12-8 – One of several piles of rubbish on the Berg Lumber Mill Site property awaiting disposal. [Photo: H. Janssen, August 2010]

Figure 12-9 – Topsoil being removed from the Berg Lumber Mill Site. Contaminated topsoil was removed to a depth that has not yet exceeded 12” throughout the property. [Photo: H. Janssen, November 2010]
Project Description
The reclamation project undertaken by the City of Lewistown required the removal of contaminated soils, the removal of a railroad roundhouse, and the elimination of surface junk materials.

Brewery Flats is 58 acres in size and rests one mile south of Lewistown, upgradient from Big Spring Creek.

History
1900 through 1984 – This site functioned as a Milwaukee Railroad site.

1989 – George Berg acquired the site through a bankruptcy acquisition.

2000 – George Berg declares bankruptcy

2001 – The City of Lewistown purchases the property.

Chronology
1986 – Polychlorinated Biphenyls [PCBs] were found in fish tissue samples from the adjacent Big Spring Creek.

1994 through 1996 – Subsequent soil samples taken by the Montana Bureau of Mines and Geology indicated levels of PCBs in five tests.

1998 – The Montana Department of Environmental Quality [MT DEQ] collected 26 sediment samples from Big Spring Creek, all of which indicated detectable concentrations of PCBs. An additional 33 soil and water samples were also collected in 1998 from the floodplain. These also indicated elevated levels of PCBs.
1999 – Brewery Flats underwent two separate environmental investigations, one at the behest of the EPA and another as a Brownfields Assessment investigation.

2000 – April: The Montana Department of Natural Resources and Conservation [DNRC] provided $50,000 to the City of Lewistown for the purposes of identifying the source and extent of contaminants on the property.

2001 – December: Owing to the bankruptcy claims from both Mr. Berg and the Chicago Milwaukee Railroad Company, no party could be identified as liable for site cleanup. As property ownership is a necessary requirement for Brownfields clean-up funds, the property was purchased by the City of Lewistown. Brewery Flats Development, a local non-profit working to restore the site, provided the requisite $1,000 for purchase.

2001 through 2003 – Additional soil and groundwater tests were conducted [totaling $289,000] as preparation for a Brownfields Voluntary Cleanup Plan [VCP]. These tests indicated elevated concentrations of Manganese [Mn], as well as Iron [Fe] in the groundwater directly beneath the Brewery Flats property, and directly upgradient from Big Spring Creek.

2002 – May: A second MT DEQ Reclamation and Development Grant [RDG] for $297,740 was awarded.

2003 – November: On-site cleanup commences.

2004 – The City of Lewistown was awarded a grant for $148,877 from the EPA Brownfields State Response Program.

2005 – May: The City was provided with a third, and final, RDG in the amount of $300,000. The allotment of these funds was contingent on a VCP being approved prior to the expenditure of any funds.

2005 – August: A VCP was finally approved by MT DEQ. Cleanup resumed from October 2005 through May 2006, when reseeding was completed.

The total amount of contaminated soils that were removed throughout the duration of this project equaled 9,007 tons [roughly 67,000 yds³]. 3.7 acres of land were revegetated, and 85 tons of former railroad materials were removed.
Current Project
There are no further activities proposed at this remediated site.

Current activities at Brewery Flats consist of recreational users enjoying the graveled walking paths that were installed along the property [Figure 13-6], as well as the return of recreational fishing along the shores of Big Spring Creek.

Project Cost and Funding Source
Over the 11 years that this project was ongoing, total expenditures equaled $1,008,317. This figure reflects a FWP fish sampling project in 1986 for $2,500, a Montana Bureau of Mines and Geology expense for soil sampling between 1994 and 1996 equaling $2,800, DEQ sampling in 1998 for $13,000, an EPA site inspection in 1999 for $178,400, several DNRC Reclamation and Development Grants [RDGs] in 2000, 2002, and 2005 totaling $647,740, and a final EPA Brownfields State Response expenditure of $148,877. Additionally, the City of Lewistown independently spent $15,000 throughout the course of this project on investigations and remediation support for the site.

Project Design
Project Design and engineering was conducted by Tetra Tech EMI [Helena] for a total of $300,823. This figure comprises 3,337 hours of billed labor, reflecting $214,572 of the total amount received. The services provided by Tetra Tech represent a wage range of $18-105/hour, and include the services of Geochemists, Soil Scientists, Engineers, Drafting employees, clerical assistants, and procurement officers. The average hourly wage received by Tetra Tech EMI employees was $64/hr.

Tetra Tech EMI subcontracted laboratory work to Energy Laboratories [Helena] totaling $29,456. Tetra Tech EMI also subcontracted drilling labor to Boland Drilling [Great Falls] equaling $5,650, and consulting to Westec Environmental Services [Helena] for $3,785.

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Pre-Project Planning & Testing
EPA funded soil and water testing was provided by URS Corp. [San Francisco] in 1999 for $191,957. URS consultant labor hours comprise $68,329 for 1,783 labor hours. Subcontractors hired by URS Corp. received $92,990 for engineering and planning services. The remaining $30,638 is reflected in indirect costs and materials.
Montana Bureau of Mines and Geology [MBMG] conducted 15-20 soil samples between 1994 and 1996 to determine and identify the source of organic compounds. Each test requires one day to analyze and costs approximately $200 per sample. The soil samples were collected by a Lewistown High School Environmental Science class, and MBMG participated in a cost-sharing arrangement with the City. Total invoices to MBMG equaled $2,800. In 1998, MT DEQ processed 33 separate soil and water samples for $13,000. This sampling included the excavation of five test pits to the groundwater table.

**Project Labor**

Sierra Rock and Dirt [Great Falls] was responsible for the removal and disposal of all contaminated soils, outbuildings, surface wastes, and reseeding work at the site. For their services, they received $411,534. Sierra Rock and Dirt labor was provided at Davis-Bacon prevailing wages. The tasks performed consisted of Operator 2 [625 hours at $18.38-23.88/hour], Driver 2 [2,021 hours at $19.55-25.05/hour], and Laborer 2 [68 hours at $16.18-21.68/hour]. The total amount paid to Sierra Rock and Dirt for labor on the Brewery Flats project was $55,089, or 13.3% of the total amount received.

**Project Oversight**

Project oversight was provided by Tetra Tech EMI [Helena], as well as the City of Lewistown Planning Director, Duane Ferdinand.

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Figure 13-6 – The remediated Brewery Flats area is now a city recreation site, with graveled paths and benches throughout its 58 acres. [Photo: H. Janssen, August 2010]

Figure 13-7 – City of Lewistown Planning Director, Duane Ferdinand, stands in a remediated field at the Brewery Flats recreation site. [Photo: H. Janssen, August 2010]
Figure 13-8 – The lone remaining structure on the Brewery Flats site has been utilized by the Central Montana Education Center [a branch of Montana State University Northern] for practical construction training. This structure may be transformed into an educational center in the future, for use by local school students and visitors. [Photo: H. Janssen, August 2010]

Figure 13-9 – Signage on site lists all departments and organizations that contributed to the remediation activities at Brewery Flats. [Photo: H. Janssen, August 2010]
Project Description
The former Champion Millsite rests along the southern banks of the Clark Fork River, near downtown Missoula.

This 39-acre site was used to process timber logs from the early 1900s until 1990. Originally operated as the Polley Lumber Company, this site changed owners several times, until its owners, Idaho Timber, ceased operations in 1990.

The first acknowledgement of environmental degradation at the site occurred when an Underground Storage Tank [UST] leak was reported in 1985. This leak severely impacted soils in the area, and resulted in approximately 13,000 yds$^3$ of impacted soils being removed. An Environmental Site Assessment conducted by Hydrometrics Inc. in 1988 found additional contamination associated with chemical byproducts of log treatment existing throughout the property. Site remediation has consisted of removing these byproducts, as well as the impacted soils.

Present remediation activities are aimed toward eventual development of the area for residential, commercial, and recreational uses.

History
Early 1900s – The Polley Lumber Company undertook timber treatment and mill work consisting of planning and sawmill activities. A log holding-pond was created as a timber hold for logs floated down the Clark Fork River. Timber was staged here until it could be processed in one of the several mill houses. This holding pond was downsized over the first several decades.
1950s – Ownership changed hands to the Thornton Lumber Company and portions of the pond were filled with wood waste, sawdust, native sand and gravel, and miscellaneous metal wastes.

1956 – The Western Montana Lumber Company purchased the facilities.
1959 – Modern Plumbing & Building purchased the site, although it was operated under lease by International Lumber from 1956 to 1975.

1977 – Champion International Corporation acquired the property lease, operating a stud mill and glue finger-joint stock bed truck factory.

Late 1980s – Champion sold the lease to Montana Wood Specialties, which operated the site until early 1990.

1990 – Idaho Timber leased the property.

2007 – The Idaho Timber lease was purchased by the Millsite Revitalization Project LLC [MRP].

Chronology
The main area of environmental impact and concern is associated with the retention pond, which was kept as a fire protection reservoir until 1970, when the millsite was connected to municipal water and the holding pond became obsolete. The remaining basin was backfilled with wood waste and other materials.

Additional environmental concerns stem from underground storage tank [UST] releases associated with on-site fuel storage. This fuel was used for facility operations.

1985 – The first reported instance of a UST release, when 600 gallons of leaded gasoline were released during a pressure test at the refueling area. This tank, as well as three additional USTs, was removed at this time.

1988 – An Environmental Site Assessment was conducted on the property by Hydrometrics Inc., on behalf of Champion. This assessment identified ten sites of environmental concern throughout the 39-acre property. Several soil tests from these areas of concern showed elevated levels of petroleum hydrocarbons, volatile organic compounds, and priority pollutant metals. These tests indicated that petroleum impacts were present owing to residual hydrocar-
bons associated with diesel fuels, oils, and lubricants. Elevated concentrations of antimony, arsenic, copper, lead, and zinc were also reported at this time.

1992 – The property begins to incur significant deterioration and devaluation owing to owner neglect, vandalism, and fires.

1998 – The US EPA supplied the City of Missoula with a $200,000 Brownfields Assessment grant to determine the degree and extent of contamination.

2000 – At the behest of the International Paper Company, additional tests were conducted to determine the adverse human health risks associated with site wastes.

2000 – August: The City of Missoula and International Paper Company began joint remediation design plans for the site. At this time, the property was also annexed into the city. It is presently, 2011, located within Urban Renewal District II.

2004 – A second Assessment grant is provided by the US EPA to the City.

2004 – The City received an EPA Revolving Loan Fund [RLF] totaling $1 million. This RLF required a 20% match, which was provided by the Missoula Area Economic Development Corporation [MAEDC]. In 2007, a total of $1,525,000 was loaned to co-borrowers MRP and the Missoula Redevelopment Agency. In 2010, $833,000 in American Recovery

Current Project
The City of Missoula received an EPA Brownfields’ Assessment Pilot Grant to consider site cleanup needs in 1998. The City received additional funds in 2004 for further site assessment, as well as funds to hire a professional environmental consultant for the purposes of developing a Voluntary Cleanup Plan [VCP] for the site. The Montana Department of Environmental Quality [MT DEQ] is tasked with overseeing implementation and execution of the VCP.

2007 – The Millsite Revitalization Project LLC [MRP] purchased the Idaho Timber Lease from the City through the issuance of Tax Increment Urban Renewal Revenue Bonds. The property was re-zoned at this time, from industrial to mixed use, permitting future residential and commercial development.

Figure 14-5 – Foundations from previously existing structures were removed and disposed of as part of the remediation activities. [Photo: Property of Western Excavating]
and Reinvestment Act [ARRA] grant funds was provided for site remediation.

Present work at the Champion site is being undertaken by MRP and began in spring 2007. The primary activities consist of methane abatement, which will entail the removal of an estimated 30,000 yds$^3$ of wood waste, as well as contaminated soil extraction and disposal [13,000 yds$^3$, to date]. The site is being readied for future construction of 700+ residential units, commercial space, and a 14-acre park along the river shore.

**Cost and Source of Funds**

$2,358,000 in public funds were provided for remediation activities at this site. Additional funds, of an undisclosed amount, have been contributed by the Millsite Revitalization Project LLC to offset project expenses.

Public funds have arrived via two separate US EPA Revolving Loan Fund [RLF] grants totaling $1,525,000, with the remaining funds arriving from Missoula Area Economic Development Corporation RLF requisite matches.

A final $833,000 was designated for use at the Former Champion Sawmill site through 2010 American Reinvestment and Recovery Act [ARRA] grants. As of February 2011, $833,918 were still allocated for sawmill remediation activities. $1,065,627 in RLF funds can still be provided for Brownfields remediation activities throughout the City. These figures reflect the remaining RLF amount, as well as interest gained from the RLF fund and ARRA grant monies.

**Pre-Project Planning and Project Design**

The City of Missoula received two separate Brownfields Assessment grants in 1998 and 2004, totaling $400,000. Roughly $163,000 of these funds are reflected in city staff wages and environmental consultation.

These expenditures consist of environmental consultation, the City’s Brownfields Coordinator’s salary, as well as wages for the Missoula Area Eco-
Figure 14-7 – When a parking lot structure was constructed on the property, for use by the neighboring Ogren Park Allegiant Field, a methane abatement system was also installed to help remediate the damaging effects of buried wood wastes. [Photo: Property of Western Excavating]

nomic Development Corporation [MAEDC], which is responsible for review of loan documents and other planning. MAEDC’s contract with the city is for $15,000 per year and originated in 2006. Estimated office labor hours provided by MAEDC are roughly 520 hours per year.

Project engineering and design has been supplied principally by Amec Geomatrix. Amec has received $506,813 for 4,867 logged hours. Of these funds, they have subcontracted $71,121 for laboratory fees, drilling, excavating, and consulting services.

Additional engineering services have been provided by WGM [Missoula]. They have received $50,909 for 556 hours of labor.

The law firm of Hogan and Hartson [Denver] has assisted MRP to the tune of $404,983 for 909 billed hours. Two additional law firms have assisted MRP for $78,603.

Project Labor
Project labor has been principally supplied by Western Excavating [Missoula], which has received $1,010,574. Primary labor activities at the site have required heavy equipment operators, general laborers, and dump truck drivers. These positions have registered a total of 3,540 hours.

Project Oversight
Project Oversight began in 2004 and has been provided jointly by the Missoula City Brownfields Coordinator [who has registered 2,744 hours of oversight for $66,142], the Montana Department of Environmental Quality [which has registered 3,187 hours for $115,377], Olympus Technical Services [Helena] [which has logged 146 hours for $14,415], and AMEC Geomatrix [whose oversight is included in the above project design figure].
Figure 14-8 – Much of the contaminated waste that resulted from leaking underground fuel tanks was removed off site. [Photo: Property of Western Excavating]

Figure 14-9 – The first reported fuel leak at this site was reported in 1985. [Photo: Property of Western Excavating]

Figure 14-10 – Roughly 13,000 yds³ of impacted soils were removed from the site during remediation activities, and there are an estimated 30,000 yds³ of wood waste that still require extraction and disposal. [Photo: Property of Western Excavating]

Figure 14-11 – This photo depicts the excavation of a drain line from a factory that previously operated at the site. Historic industrial timber operations are the reason that this site is undergoing remediation activity. [Photo: Property of Western Excavating]
Project Description

The Milltown Reservoir Sediment Site is located at the confluence of the Clark Fork and Bitterroot Rivers, six miles east, and upstream, of Missoula. This site is part of a much larger Superfund project which includes 120 miles of the Clark Fork River upstream of Milltown.

The remediation project undertaken at the site consists of the removal of the Milltown dam, the extraction and disposal of 2,300,000 yds³ of contaminated sediments, and the re-establishment of the historical floodplain.

Arsenic [As] and copper [Cu] present in the sediments have contaminated local drinking water and become a detriment to downstream aquatic wildlife. These sediments are resultant from historic mining operations that occurred upstream, in Butte.

History

Pre 1830s – This area of the frontier was frequented by the Salish, Kootenai, and Pend d’Oreille tribes.

1830s – White trappers and explorers begin arriving.

1860 – Mullan Road begins to be constructed by Lieutenant John Mullan. This serves to increase the community size of what would one day be known as “Missoula.”

1864 – Gold [Au], Silver [Ag], and Copper [Cu] are discovered in Butte.

1880 – Marcus Daly creates the Anaconda Copper Mining Co.

1882 – Northern Pacific Railroad, in conjunction with Marcus Daly, creates the Montana Improvement Company [which became the Big Blackfoot Milling Company].

1883 – Copper smelters are constructed in Anaconda to process ore.

1892 – William Clark creates the Western Lumber Company to provide timber for mining operations in Butte and Anaconda.

1905 – William Clark begins construction of the Milltown Hydroelectric dam at the confluence of the Blackfoot and Clark Fork Rivers. This dam was con-

Figure 15-1 – Contaminated soils were removed from the floodplain and placed on railcars to be sent to Opportunity, a trip requiring roughly 8 hours. [Photo: H. Janssen, August 2010]
structured to power a lumber mill, Missoula’s new streetlights, as well as the streetcars of Missoula. The dam is owned by the Clark Montana Realty Co.

1908 – The Milltown Hydroelectric dam is completed.

1908 – The largest Pacific Northwest flood on record, measuring 48,100 cfs at the new dam, sweeps mine tailings from Butte and Anaconda down the Clark Fork River.

1909-1910 – Milltown dam is reconstructed after being destroyed by the flood.

1929 – Dam ownership is transferred to the Montana Power Co.

1955 – Open-pit mining begins at the Berkeley pit, in Butte.


1980 – Federal Superfund legislation is enacted.

1996 – A large ice jam on the Blackfoot River threatens to demolish the Milltown dam.

2000 – June: An earthquake, registering 4.5 on the Richter scale, has its epicenter 20 miles east of the dam, threatening the dam.


2004 – The Clark Fork Coalition, a non-profit that works to restore water quality in the Clark Fork River basin, sends 10,000 postcards to the United States Environmental Protection Agency [US EPA] requesting the dams’ removal.

2006 – April: The turbines at the dam are powered down.

2007 – Remediation work, led by the US EPA, begins.

2008 – The powerhouse is removed and both the Clark Fork and Blackfoot Rivers flow freely for the first time since 1908.

2009 – The final trainload of contaminated soils leaves Milltown destined for Opportunity. The total amount of impacted soils sent east to Opportunity exceeds 3,000,000 tons.

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Figure 15-2 – The final remediation plan calls for the Clark Fork River to be returned to its original floodplain. This work will be one of the primary focuses of 2011 activity. [Photo: H. Janssen, August 2010]

Figure 15-3 – Envirocon was responsible for supervising and managing all remediation activities at the site. Above, drivers transport soils upriver to assist in restoring the river channel to its pre-dam path. [Photo: H. Janssen, August 2010]
**Chronology**

1980 – The Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] is passed. This law is commonly called the Superfund law. Its intent was to designate and cleanup sites contaminated with hazardous waste. The Butte to Milltown corridor becomes the largest complex of federal Superfund sites in the nation.


2003 – Remediation activities commence at the Milltown site. These activities consist of removing the Milltown dam, extracting and disposing of all impacted soils, restoring the Clark Fork River to its historic floodplain.

**Current Project**

2011 construction activities at the site will include completing the floodplain construction upstream from Duck Bridge, revegetating areas upstream from the former dam, re-constructing the floodplain in the former Powerhouse area, and general monitoring and maintenance activities.

Future project activities will also include an I-90 bridge mitigation plan and construction of an official overlook [which can be viewed in its undeveloped stage in Figure 15-5].

Montana Fish, Wildlife, and Parks [MT FWP] will also begin the design and construction phases of a State Park, which will rest at the confluence of the Clark Fork and Bitterroot Rivers.
Long-term ground and surface water monitoring is projected to extend until 2016.

Additionally, groundwater at the site, according to the US EPA, should be clean within a decade following the removal of the dam and the impacted sediments.

**Cost and Source of Funds**

A consent decree was signed in 2005 between the US EPA, ARCO, NorthWestern Energy, and various Montana state agencies.

Based upon EPA figures, it is estimated that remediation activities at Milltown cost roughly $105,000,000. This was roughly the settlement amount agreed upon by ARCO and NorthWestern Energy.

An additional $12,100,000 was collected by the EPA from ARCO for various claims the EPA had against ARCO. These funds were used to fund water quality monitoring, bridge mitigation and well replacement activities, as well as for oversight of ARCO and NorthWestern’s remedial work.

ARCO and NorthWestern contributed an additional $50,000 to the EPA for historic preservation activities. $310,000 was paid to the EPA for removal of the Stimson Dam, which was used by EPA to fund the removal activities.

NorthWestern Energy also paid $350,000 per year from 2005 through 2009 to wildlife management agencies and committees.

The State of Montana is presently using $2,500,000 it received from NorthWestern to implement its restoration plan. The City of Missoula has budgeted $300,000 for trail improvements, and Missoula County has contributed $125,000 in site related work.

An additional $10,400,000 was supplied by the Montana State Natural Resources Damages [NRD] Fund, with an auxiliary $3,900,000 coming from an NRD settlement with NorthWestern Energy.

The EPA has spent an additional $15,500,000 on bridge mitigation activities. These funds arrived from EPA/ARCO cost recovery funds, where ARCO is

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Figure 15-6 – *Trees that had been covered for the past century, by waters behind the dam, revealed their stumps after the dam was breached and the waters diverted.* [Photo: H. Janssen, August 2010]
Figure 15-7 – Roughly 230,000 yds$^3$ of “fill” materials were moved downstream from Duck Bridge, in order to help re-construct the historic floodplain. [Photo: H. Janssen, August 2010]

required to pay the EPA for the costs of conducting work within the entire Clark Fork River Basin.

**Project Design**
Project design has been conducted by 14 separate design firms: West Water Consultants [Corvallis], Geum [Hamilton], River Design Group [Whitefish], Envirotech [Missoula], EMC2 [Bozeman], Muth Consulting [Missoula], Piedmont Engineering [Belgrade], Orion Engineering [Missoula], PBS&J [Missoula], the US Army Corps of Engineers, CH2M-Hill [Billings], CDM [Helena], HDR [Missoula], and DJ&A [Missoula].

**Project Labor**
ARCO paid Envirotech directly for construction work at the site. Because these payments arrived from a settlement, the amounts invoiced and the labor hours accrued are not public information. Approximately 2,300,000 yds$^3$ of impacted sediments [3,031,543.25 million tons] were removed from the historic floodplain and re-located to Opportunity via railcar [Figure 15-10]. Envirotech has logged 377,000 hours on the Milltown remediation project as of January 2011.

In addition to Envirotech, six other construction firms have worked on this project: Frontier West Construction [Missoula], Little Bear Construction [Clinton], TNT Excavating [Ovando], Helena Sand & Gravel [Helena], Spaulding Construction [Stevensville], and LS Jensen [Missoula].

**Project Oversight**
Project oversight was provided by the US EPA, Envirotech, Montana FWP, and MT DEQ, Spaulding Construction, Helena Sand & Gravel, and Missoula County.
Figure 15-8 – Logs that were covered with sediment while in the holding ponds are being retrieved from the river banks. This action exemplifies the type of ancillary work that has been necessary since the Milltown dams’ removal. [Photo: Property of The Missoulian]

Figure 15-9 – The Clark Fork River returns to its historic channel near Turah. Above, Envirosen employees remove a cofferdam. [Photo: Property of The Missoulian]

Figure 15-10 – In September 2009, the final load of contaminated soil was loaded into train cars and shipped back to Opportunity. This journey requires 8 hours and began in 2007. This final trainload will bring the total amount of toxic sediment shipped to Opportunity to roughly 3,000,000 tons. [Photo: Property of The Missoulian]

Figure 15-11 – Toxic “slicks,” such as this one, were commonplace along the banks of the Clark Fork River between Anaconda and the Milltown Dam. The dams’ removal and the subsequent remediation activities undertaken by the US EPA have removed much of the toxic sediment from the waterway and the river banks. [Photo: Property of The Missoulian]
Project Description

The old Milwaukee Roundhouse in Deer Lodge is 14.5 acres in size and rests along the western edge of the Clark Fork River. The site served as the central hub of the Milwaukee Railroad’s Rocky Mountain Division.

It was primarily used for railroad locomotive repairs. Usage resulted in widespread soil and groundwater contamination via the use of petroleum products and chlorinated solvents. The primary contaminants of concern are Arsenic [As] and lead [Pb].

A remediation project was undertaken by the Powell County planning office in 2005. A Voluntary Cleanup Plan [VCP] was developed by the Powell County office of planning, which called for the excavation and disposal of on-site contaminants for 7 of the 14.5 acres. The particular facets of remediation that the VCP detailed included the excavation of underground storage tanks.
[USTs], the removal of impacted soils, and the remediation of the drainage ditch leading into Tin Cup Joe Creek.

Excavation activities commencing in 2010 called for the removal and stockpile of 1-3’ of impacted soils into an on-site repository; however, once work began, contaminated soils were detected at depths exceeding 12’. Present work is being conducted from the north toward the south end of the property due to the proximity to recreational activities associated with the north-lying Clark Fork River. Bunker C fuel, which was used as an early 20th Century locomotive fuel is similar to asphalt, and was discovered in the soils of the southeast corner of the site. The excavation of this material required particular care and disposal and inflated the costs of remediation activities. Additional activities in 2010 included the erection of protective fencing to prohibit foot-traffic from entering the site.

History
1908 - The Milwaukee Roundhouse is constructed in Deer Lodge to function as the main locomotive repair site for trains traveling along the Milwaukee Railroad [Figure 16-1]. Bunker C fuel was used at the site and stored in underground and above ground storage tanks until 1935.

1912 - Locomotives traveling through the Roundhouse begin using electricity for power, nullifying the need for diesel and Bunker C fuels on site.

1961 - The Louisiana Pacific Lumber mill was established at the southern end of the property.

1980 - The site was abandoned by bankrupt owners and outbuildings were demolished in 1984.


2005 - The city of Deer Lodge took possession of the title and began pursuit of federal clean-up funding through the US Environmental Protection Agency [EPA].
Chronology
1988 - Fuel contamination was investigated by MT DEQ and a report detailing remediation options was prepared by Hydrometrics Inc. [Helena] for Powell County in 1989.

1990 - A site inspection was completed at the behest of the MT DEQ and a second report was completed in 1991; an expanded site inspection followed in 1993.

2005 - A supplemental inspection for Powell County and creation of a VCP addressing site cleanup was conducted.

Previous site investigations included the collection of soil samples [surface and subsurface], the installation of monitoring wells, collection of groundwater samples, and the collection of surface water.

These samples identified extensive soil contamination. Kirk Engineering [Twin Bridges] is contracted to design and oversee remediation activities.

2006 - A VCP draft is submitted to MT DEQ by Powell County to address remediation activities at the Milwaukee Roundhouse.

2010 - Kirk Engineering and Rabel Excavating [Gold Creek] begin remediation activities consisting of the excavation and re-placement of impacted soils and construction of an on-site repository.

Current Project
Remediation activities will continue at this site in 2011, with additional test pits being dug and samples being taken. Spring activities will include the continued excavation and re-placement of impacted soils as well as the removal of the remaining Bunker C. The long-term plan with the excavated soils is to remove them off site; however, this action cannot be completed until supplemental funding is acquired.

Figure 16-5 – 7,200 yds³ of impacted soils have been extracted and placed in a temporary, on-site repository. [Photo: H. Janssen, October 2010]
Cost and Source of Funds
Funding provided to Powell County for the Deer Lodge Milwaukee Roundhouse remediation project equaled $586,900.

Powell County funds arrived from a US EPA Brownfields Cleanup grant that provided $200,000 for cleanup. $386,900 was provided in the form of three separate Montana Department of Natural Resources [DNRC] Reclamation and Development Grants [RDG]. These funds are provided to reclaim, repair, or mitigate the effects of past uses and to promote the welfare of Montana’s citizens.

Information for US EPA fund expenditures was not forthcoming by this federal entity.

Pre-Project Planning & Testing
Tetra Tech [Helena] was responsible for heavy metal sampling in summer 2009. They received $68,744 for their services. This reflects 690 hours of billed labor. This expense was paid directly with US EPA funds, making a breakdown of the labor associated unattainable.

To date [January 2011], Kirk Engineering has received $233,549 for their engineering, design, reporting, and oversight services. This contract amount has been amended twice, and was originally approved in the amount of $44,980; however, owing to the length of time associated with this remediation project, and the extent of contamination far exceeding original studies conducted by previous firms, further engineering services were required.

Kirk Engineering received $23,888 for work conducted prior to 2006. Labor and oversight provided by Kirk Engineering between January 2006 and December 2010 reflects 2,927 total hours of labor, with a mean hourly wage of $80/hr. Kirk Engineering labor has consisted of Senior Engineers [1,500 hrs.], Principle Engineers I [99 hrs.], Principle Engineers II [139 hrs.], Principle Scientists [966 hrs.], Technical and Administrative Support [190 hrs.], Staff Scientists [5 hrs.], CADD developers [27 hrs.], and Civil Engineers [3 hrs.].

Subcontracting labor included: $971 for surveying work by Uncut Mountain [Bozeman]; $4,657 for asbestos abatement provided by Ingraham Environmental [Butte]; $14,060 to Greatwest Engineering [Helena] for assessing construction document bids; and, $5,680 to MSE Analytical Laboratory [Butte] and Energy Laboratories [Billings] for soil and groundwater sample processing. Additionally, MT DEQ was compensated $2,498 of Kirk Engineering’s total funds for their review of the VCP.

Project Labor
Rabel Excavating [Gold Creek] served as the lead contractor on this project. Their contract with Powell County is for $238,000. To date, January 2011, they have received $188,000 for their services. These funds reflect 1,267 hours of labor. Of this figure, $36,260 has been paid to Rabel employees for work conducted at the site, and Rabel employees’ wages range from $14-20/hr.

Services provided by Rabel Excavating consisted of general laborers and heavy equipment operators for Cat Excavators, Dump Trucks, Smooth Drum Rollers, Graders, Front Loaders, Skid Steers, Trench Compactors, and water Truck Drivers.

Rabel Excavating was responsible for all excavation work and the creation of the temporary on-site repository. To date, they have relocated 7,200 yds$^3$ of contaminated soils to the repository.

Project Oversight
Project oversight was provided primarily by Kirk Engineering, with ancillary oversight provided by the Powell County Planner, the US EPA, and MT DEQ.
Figure 16-6 – Powell County planner, Ron Hanson, stands on the former Milwaukee Roundhouse site. The graveled areas represent the exact location of pre-existing Chicago, Milwaukee, St. Paul, and Pacific rail lines. [Photo: H. Janssen, August 2010]

Figure 16-7 – This large concrete basin exemplifies the types of detritus that had been buried at the site and required removal and disposal. [Photo: H. Janssen, October 2010]

Figure 16-8 – Rabel Excavation employees installed fencing around the perimeter of the project site to prevent public access into areas where contaminated soils had been removed and not yet replaced, resulting in large open pits. [Photo: H. Janssen, October 2010]

Figure 16-9 – The Clark Fork River runs directly north of the project site. Its proximity to the impacted area was significant in expediting remedial actions. [Photo: H. Janssen, August]
Project Description
The Montana Pole and Treatment Plant [MPTP] is a 60-acre site located immediately west of Butte and adjacent to I-90. The site is bordered on the northeast site by Silver Bow Creek. This facility processed raw timbers for use in industrial and residential settings. The bulk of produced materials were railroad ties sold to the Burlington Northern Santa Fe Railroad. Primary contaminants of concern at the site consist of organic materials, specifically pentachlorophenol [PCP], polycyclic aromatic hydrocarbons [PAHs], and polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. Based on the degree and extent of on-site contamination, MPTP was designated by the United States Environmental Protection Agency [US EPA] as a federal Superfund site in 1987.

In 1988, the US EPA and the Montana Department of Environmental Quality [MT DEQ] entered into a cooperative treatment and oversight agreement.

History
1947 – April: The first load of treated timbers was shipped from MPTP.

1949 to 1951 – Major modifications occur at the plants’ facilities. This included installation of a 73’ long, 6’-diameter retort to help increase timber treatment efficiency.

1956 – A second retort, measuring 66’ long and 7’ in diameter is installed. These retorts were used to dry green timber and pressure treat timber with a PCP mixture. Water that was used to process the timbers was discharged into an unlined ditch which flowed toward and into adjacent Silver Bow Creek.

Unlined, on-site sediment ponds were also used for waste disposal purposes.

1969 – May: An explosion occurred at the site while a charge of poles was being treated. This explosion created a fire, which required many of the facilities to be rebuilt. Processing resumed in December 1969.

1978 – An on-site sawmill was built and fully operational by fall 1979.

1980 – In response to the Resource Conservation and Recovery Act’s implementation, a closed-loop process water system was constructed. This helped eliminate overland discharges of impacted water into unlined pools.

1984 – May: MPTP ceases operations.

Chronology
1983 – March: A citizen complaint filed with the MT DEQ indicated that an oily seep was discharging...
from the MPTP site into Silver Bow Creek.

1985 – July: US EPA commences Emergency Removal Actions. Since these activities have commenced, the US EPA and MT DEQ have been conducting pollution containment and removal activities at the site. This has included the installation of two groundwater interception and oil recovery systems, excavation of impacted soils, and on-site storage and treatment of contaminated soils [Figure 17-2].

1987 – July: The site is listed on the National Priorities List [NPL] by the EPA, leading to its designation as a federal Superfund site.

1988 – US EPA and MT DEQ enter into a cooperative agreement through which MT DEQ leads the remedial activities at the site.

1990 – June: ARCO is ordered to perform a Remedial Investigation/Feasibility Study at the site to assist in evaluating the nature and extent of contamination at the site. This site sampling occurs in the fall of 1990 and spring of 1991.

1996 – July: A $35,000,000 settlement is reached between MT DEQ, US EPA and the responsible parties for MPTP. These parties included the Atlantic Richfield Company, Burlington Northern Santa Fe Railway, the Montana Pole and Treating Plant Company, Torger L. Oaas [owner/operator of MPTP], and Montana Resources Incorporated. These funds were placed into an account with the State of Montana and gained interest under the guidance of the state Board of Investments. Since 1996, the amount has augmented greatly, with

Figure 17-2 – This is the Land Treatment Unit [LTU], where impacted soils are stored and treated. It is roughly 10 acres in size. A thick HDPE liner is on the bottom of the Unit, with sand atop the liner and perforated piping above the sand. This pipe retrieves water that drains the impacted soils and diverts it toward the leachate pond for treatment. [Photo: H. Janssen, August 2010]

Figure 17-3 – Tom Bowler, Site Operations manager, explains how the pumping wells function. There are 2 pumping wells on-site, functioning 24 hours per day. These pumps force groundwater to the water treatment facility, where water is separated from the contaminants. [Photo:
$26,279,055 spent to date and approximately $31,000,000 remaining.

**Current Project**

Impacted soils were excavated and either placed into large Soil Staging Piles [SSPs] or placed directly on the Land Treatment Unit [LTU]. The LTU was constructed to contain and treat impacted soils from the MPTP site. Treatment consists of natural occurring microorganisms processing the contaminant, organic materials, which can take several years’ time. The LTU measures nearly 10 acres in size, impacted soil depth throughout the LTU is 40-48”, and 160,000 yds³ of impacted soils have previously undergone treatment at the LTU. Once soils have been treated and samples indicate that they meet the site-specific cleanup goals, the soils are used as backfill at the site.

The entire area of impact has been excavated to groundwater, with the exception of the I-90 overpass area [see background of Figure 17-5], which is being treated in situ, as these soils serve to support bridge structures along the I-90 corridor. In situ treatment consists of injecting oxygenated water into the earth to expedite processes of bacterial breakdown. External bacteria were not introduced to aid this process.

MPTP is being treated as one Operable Unit, not separating groundwater treatment from soils treatment, as one element directly affects the other. Treatment of impacted soils is nearly complete, and groundwater treatment is on-going. To date roughly 2 billion gallons of water have been pumped and treated. Treated water is either discharged back into the groundwater, used to irrigate the LTU [speeding up the treatment process and aiding in dust control], or discharged into Silver Bow Creek [which presently houses biota for the first time since the 1890s]. It is projected that an additional 4 billion gallons will require treatment which may require 30 years.

Currently, five gallons of oil are extracted each year through the processes undertaken at the water treatment facility.

Tetra Tech [Butte] employs one full-time and one part-time worker to monitor the activities at the water treatment facility. There is a 24-hour alarm that will notify the parties responsible for oversight if the water treatment system malfunctions.

*Figure 17-4 – 180 separate monitoring wells were installed on-site to measure the extent of groundwater contamination. [Photo: H. Janssen, August 2010]*
Cost and Source of Funds
In July 1996, a $35,000,000 settlement was reached between MT DEQ, the US EPA, and responsible parties affiliated with the MPTP site.

The costs of remediation activities at the MPTP site through June 2010 have equaled $26,279,055. An additional $31,000,000 remains in the settlement account, which has been accruing interest since the settlement in 1996. Remaining funds are to be used to cover expenditures for continued remediation and associated site activities [EPA, MT DEQ, legal, construction, design, etc.] until site closure.

Project Design
Project design and engineering has been conducted by three separate firms over the life of the project to date: CDM [Helena], Tetra Tech EMI [Helena], and DJ&A [Missoula]. These three firms have received a total of $6,563,017 for their engineering, surveying, and design labors.

Pre-Project Planning & Testing
Test sampling at the site began in 1983 and continues at regular intervals to the present. Sampling services have been provided by seven different agency or company entities.

In 1989, CDM determined that the reliability of previously conducted studies was very limited due to sampling approaches, and a lack of records and documentation. Therefore, CDM re-conducted soil sampling and testing at MPTP.

An on-site residential unit was purchased for a payment of $110,000 to the owners for their property.

Project Labor
Project construction totaled $11,761,489, and all on-site construction labor was provided at Davis-Bacon wages.

Construction tasks have been divided among ten separate firms during the duration of the construction process.

Construction activities at the site have included: construction of the 10-acre LTU, the excavation of more than 200,000 yds³ of impacted soils, the
re-placement of 160,000 yds$^3$ of treated soils, in situ treatment of 40,000-60,000 yds$^3$ of impacted soils beneath the I-90 bridge, the construction of the water treatment facilities, removal of sludges and oils, and the proper disposal all associated solid wastes, in addition to numerous other activities.

Additional construction costs were accrued via the relocation of utilities and the railroad. These costs totaled $182,656 and were performed by Montana Western and the Montana Power Company.

**Project Oversight**

Project oversight is supplied by MT DEQ. The Montana Bureau of Mines and Geology [MBMG] also provided site operations and maintenance services, as well as additional oversight from 1995 until October 2010. Since that time, Tetra Tech Inc. has assumed operations and maintenance functions at the site. MBMG received $7,954,549 for their services. This figure reflects 67,995 hours of total on-site labor, as well as materials, analytical and laboratory services, repairs, maintenance, and the management of day-to-day activities.

As of June 2010, $647,826 had been paid to the US EPA for management assistance.

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**Figure 17-7** – Impacted soils are removed from the Land Treatment Unit [LTU] once the soils have been treated, meeting the site cleanup goals. The treated soil is then used as backfill to replace soil in areas where impacted soils had been excavated. [Photo: Property of MT DEQ]

**Figure 17-8** – The three processing tanks were removed from the ground, inerted, and then remotely sawed so that remnant materials could be removed. [Photo: Property of MT DEQ]
Figure 17-9 – This is a depiction of the three processing tanks once they have been breached. This action permits investigation of remaining contents prior to the tanks’ disposal. [Photo: Property of MT DEQ]

Figure 17-10 – Recovery trenches were dug to collect light non-aqueous phase liquids and groundwater south of the creek and north of the highway so as to prevent the spread of contamination whilst the Montana Department of Transportation was conducting repair work on an adjacent I-90 bridge. [Photo: Property of MT DEQ]

Figure 17-11 – This photo depicts the remediation activities that were conducted throughout Phase II of the project. [Photo: Property of MT DEQ]

Before and After Phase 2
Project Description
The Montana Department of Environmental Quality [MT DEQ] has undertaken remediation activities at this site to address a multiple release of petroleum fuels from underground storage tanks [USTs]. The site rests on the intersection of Pratten St. and First Avenue South in Columbus, and is 500 feet upgradient from Yellowstone River.

History
MT DEQ began monitoring activities at the Farmers Union Trading Company in Columbus, MT after a reported petroleum release on October 2, 1992. This initial leak occurred during the removal of seven USTs. The proximity to the river served as added incentive to ensure that the leakage was not permeating the soil and contaminating the groundwater flowing into the river.

A second release of 6,000 gallons of diesel fuel on May 13, 1993, of which 1,800 gallons were recovered, followed closely by a third release of fifty gallons of gasoline on July 29, 1993 resulted in MT DEQ’s Leaking Underground Storage Tanks [LUST] Section contacting the owners of the property, as these leaks posed both human health and environmental risks.

This contact resulted in the owners of the property expressing an inability or unwillingness to take necessary corrective action. Because the leaks affected a neighboring third-party [Montana Silversmiths] a Mutual Settlement Agreement was reached in June 1996 between MT DEQ and owners of the site: Farmers Union Trading Company, O’Day Equipment, and Stillwater Excavating. In June 1996, a settlement of $62,000 was reached. These funds were placed into a separate interest bearing account used for LUST Trust contractor and project management expenses throughout Montana.

Chronology
The initial action taken by MT DEQ in 1999 was to install groundwater monitoring wells to confirm the levels and extent of petroleum-contaminated soils present. This action enabled MT DEQ to determine the magnitude of necessary clean-up. MT DEQ recom-
mended in-situ remediation, at which time seven borings were installed. Four of these borings were created for the purpose of serving as injection points for air sparging [AS] units [Figure 18-2]. AS entails the injection of non-contaminated air into the subsurface saturation zone, whereby hydrocarbons are transferred from a dissolved state into vapor. This air is subsequently vented via the unsaturated zone. Two similar borings were installed for use in a Soil Vapor Extraction (SVE) process, the necessary compliment to the AS process, by which the vapor is vented out of the soil through the unsaturated zone. Figure 18-3 displays the SVE vent on a utility shed specifically constructed to house the necessary AS and SVE equipment. This vent releases the vapor into the atmosphere. A final monitor boring is utilized by MT DEQ to assess the efficiency of the overall system. The most recent data from this monitoring well, taken on June 21, 2009, indicates a lower level of concentrated petroleum hydrocarbons than historically recorded. In addition to the seven borings installed on-site, it was necessary for MT DEQ to contract with NorthWestern Energy to install a 150-amp electrical source to provide power to the AS and SVE units housed in the utility shed [Figure 18-4].

Current Project

Present work at the site consists of well-monitoring by MT DEQ, as well as the addition of a filter screen being added to the ventilation system release pipe.

Project Cost and Funding Source

The total cost to date [August 26, 2010] for remediation at the Farmers Union Trading Company site is $68,764. These funds reflect all undertakings at the site, with construction work having commenced in December 2009. This work is being funded by 2009 American Recovery and Reinvestment Act [ARRA] grant monies.

Project Design and Engineering

Soelter Surveying [Billings] was hired to survey the project area. Their responsibilities included taking pre-project readings and surveying in well locations on the property for a total of six labor hours for $326.
Engineering for this project totaled 208 hours for a private consulting firm [Billings]. Senior Project Engineers on this project received $29.07/hr. for a total of 21 hours, while Staff Engineers received $18.32/hr. for 120 hours. An Environmental Technician received $15.96/hr. for 67 hours of work, while an off-site office administrator logged one hour at $13.21/hr.

**Pre-Project Soil Sampling**

Energy Laboratories Inc. was responsible for analytical services for 16 different soil samples for the project area. The average pay, including salaried employees, for laboratory scientists is $17.57/hr. and the total amount paid to Energy Laboratories Inc. by MT DEQ was $4,635.

**Project Labor**

HazTech Drilling [Billings] received $11,405 for the work they undertook as a subcontractor in creating the voids for the Air Sparge units and the SVE treatment units to be installed. This reflects 58 total hours of drilling labor, which includes travel to and from the site. The Licensed Driller was compensated $40/hr. while the Skilled Drill Helper received $25/hr. Additionally, a Contract Administrator registered three hours at $40/hr. The remaining costs are attributable to rates charged per linear feet drilled, shop preparation, and support vehicles necessary for the project.

The construction of the 150-amp electrical source and the necessary utility pole totaled $12,173 paid to NorthWestern Energy by MT DEQ. This figure reflects 78 labor hours at an average wage rate of $88.87/hr. for a lineman, totaling $6,887. The remaining funds were for materials and transportation to and from the site.

**Project Oversight**

MT DEQ operating expenses to date are comprised of staff labor, benefits, and indirect costs totaling $9,553. This figure reflects 158 hours of employee labor and benefits. An additional $260 was paid to a temporary, non-benefitted employee for 15 hours of organizational, in-office work.
Figure 18-6 – Oil sheen entering Yellowstone River down-grade from project site, prior to work commencing in August 2007 [Photo: Property of MT DEQ]

Figure 18-7 – A remediation trench being excavated for installation of the SVE and AS systems. [Photo: Property of MT DEQ]

Figure 18-8 – Treatment shed installed to house the on-site Soil Vapor Extraction Unit and the Air Sparge System. [Photo: H. Janssen, August 2010]

Figure 18-9 – HazTech Drilling’s employees drilling for the installation of SVE and AS units. [Photo: Property of MT DEQ]
Project Description
The Former Elmo Cash Store [FECS] is located along Highway 93 in Elmo, Flathead Indian Reservation, Montana. Leaks from underground storage tanks [USTs] are documented to have occurred at this locale several times throughout the 1980s and 1990s.

Remediation activities at the site consisted of excavating and removing all impacted soils, all remaining USTs, as well as removing any remaining structures at the site.

The structures that existed on site were removed through processes of asbestos abatement, owing to the presence of asbestos in much of the historical building material.

History
Gasoline and diesel fuel tanks were installed at this location in the 1950s. They consisted of a 500-gallon gasoline tank, and a 1,000-gallon gasoline tank. Both of these tanks were removed in December 1994. Another tank, a 10,000 gallon dual tank [½ gasoline & ½ diesel fuel], was reported to have leaked into the surrounding groundwater in the late 1990s.

All of these tanks were buried at a depth of 4-6’ below ground surface. As depicted in Figure 19-1, this necessitated removal of affected soils to depths in excess of 15’.

The groundwater table at this site, which is a few hundred meters upgradient from Flathead Lake, is at roughly 10’; this fact served to complicate certain historical and contemporary remediation actions.

Chronology
1994, the first reports of a Leaking Underground Storage Tank [LUST] are sent to the Montana Department of Environmental Quality [MT DEQ].

1995, Shannon Environmental Services [Missoula] carries out soil sample testing at the site; they receive $10,896 for their work. These funds were paid by the State of Montana’s Petroleum Tank Release Compensation Board.
1996, NTL Engineering and Geoscience [Great Falls] conducts soil samples and digs test pit samples to measure the degree and extent of contamination. This action was in response to another notification sent to MT DEQ stating that contaminated soils were entering the piping and sewer systems at the location. NTL receives $5,636 for this work.

1999, Atlatl Inc. [Butte] completes several soil borings and measures concentrations of selected petroleum hydrocarbons in groundwater.

2005, a Montana-based environmental consulting firm recommends that the property undergo a Phase II ESA to determine the extent and magnitude of petroleum hydrocarbons in the soil and groundwater at the site.

2006, Geomatrix Inc. [Missoula] completes a Phase II ESA and recommends further evaluation of groundwater impacts and excavation and removal of impacted soils. Additionally, Geomatrix recommends the removal of the remaining storage tanks and associated fuel dispensers.

2006, Four monitoring wells were installed as part of the Phase II ESA [Figure 19-3]. These wells revealed volatile petroleum hydrocarbon levels in subsurface soils adjacent to the underground storage tanks [USTs].

2006, The US Environmental Protection Agency [US EPA] grants Brownfields’ status to the Former Elmo Cash Store, and provides $188,000 for site cleanup.

2007, Enviroprobe Services Inc. [Whitehall] installed four additional monitoring wells, at depths of 10-12 ½ feet below ground surface, in an attempt to determine the extent of impacts to groundwater. The well heights were surveyed by Carstens Engineering [Polson] to allow for a determination of groundwater flow and gradient at the site.

**Current Project**

Current activities at the FECS will consist of training CSKT Hazardous waste personnel in the training and management of all ground-monitoring wells. This process will be funded by using remaining funds from this project. As the site is owned by the Salish Kootenai Housing Authority, future residential development is probable.
Cost and Source of Funds
Total project cost was $267,335.

These funds were provided by a $188,000 US EPA Brownfields Cleanup grant, which required a $37,750 grant match. These funds were obtained through the Salish Kootenai Housing Authority [SKHA]. The remaining funds, $41,585, were provided in SKHA labor.

Pre-Project Planning & Testing
AMEC Geomatrix [Missoula] was responsible for all testing, engineering, and planning associated with the remediation activities. Their work on this site commenced in the summer of 2009. To date, December 2010, AMEC has received $93,560 for their services.

Labor involved in the engineering and planning processes involved Senior Engineering [269 hrs.], Project Engineers [370 hrs.], CAD/Graphics Design [38 hrs.], Staff Engineering [42 hrs.], and Administrative project support [38 hrs.]. Total labor hours billed by AMEC equal 758 hours. Hourly wages range from $55-120/hr, with this projects mean wage equaling $103.71/hr.

Several subcontractors were utilized for services such as: laboratory testing, project consulting, and landscape work. $21,541 was expended upon subcontractor services.

Project Labor
Project labor was supplied by Smith Paving [Polson] and the Salish Kootenai Housing Authority.

The housing authority received $59,991 above the original $37,750 originally pledged for the required Brownfields cleanup grant match, totaling $97,741.

Figures provided for six weeks of labor in 2010, totaled $27,336 for project labor. This sample set reflects 464 hours of labor.

Labor required on this project included a Backhoe operator [41 hrs.], an Excavator operator [109 hrs.], a Bulldozer operator [86 hrs.], a Dump Truck driver [207 hrs.], and general laborers [21 hrs.].

The wage range for these positions was $19.98-28.48/hr.

An additional $15,201 was expended for heavy equipment operation, ranging from $28-45.50/hour for heavy equipment use.

Project Oversight
Project oversight was provided by Marlene McDanal, CSKT Solid/Hazardous Waste Specialist. Additional support was provided by AMEC Geomatrix project engineers.
Figure 19-6 – Contaminated soils were hauled to an off-site location, where they will be capped to prevent contact with rainwater from re-contaminating the surrounding area. [Photo: Property of CSKT]

Figure 19-7 – The underground fuel tanks were buried 6’ below ground surface; thus, complete remediation entailed removing affected soils to depths of 15’ or more. [Photo: Property of CSKT]

Figure 19-8 – The tank was preserved throughout its extraction process, so that it could be repaired and then sold by CSKT. [Photo: Property of CSKT]

Figure 19-9 – The monitoring wells presently in use, are protected from several angles to prevent passing traffic from damaging the sensitive equipment. [Photo: H. Janssen, October 2010]