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Agency

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Emergency and
Remedial Response

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September 1991

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Superfund Record of Decision:

McAdoo Associates, PA

50272-101

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Third Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 9-acre McAdoo Associates site is an inactive strip and deep mining facility located in Kline Township, Schuylkill County, Pennsylvania. The site consists of two locations: the 8-acre McAdoo-Kline Township (MKT) location, and the 1-acre McAdoo-Blaine Street (MBS) location. The MKT location is situated at the site of an old (subsurface and surface strip) coal mine, and land adjacent to this location is industrial, abandoned, or contains reclaimed mine areas. The shallow aquifer at the MKT location consists of ground water-filled mine workings and other subsurface voids beneath the MKT location, collectively called the "mine pool". The mine pool discharges at the Silverbrook discharge to the upper reaches of the Little Schuylkill River. Both the mine pool and the river have been severely affected by acid mine drainage. The MBS location is adjacent to a residential area and a mine spoil reclamation site, and is presently covered with gravel and used for vehicle storage. From the 1880's to the 1960's, strip and deep mining of anthracite coal occurred at the MKT location. Two rotary kiln furnaces and an upright liquid waste incinerator were installed onsite between 1975 and 1976 to reclaim metals from waste sludges, reportedly using waste solvents as fuels. In 1979, EPA ordered the MKT location to

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - McAdoo Associates, PA
Third Remedial Action - Final
Contaminated Media: None
Key Contaminants: None

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 55
	20. Security Class (This Page) None	22. Price

Abstract (Continued)

close because of numerous environmental compliance problems. At the time of closure, the location contained an incinerator, a garage and offsite trailer, 6,790 drums of hazardous waste, four above-ground 15,000-gallon storage tanks, three above-ground 10,000-gallon tanks, and miscellaneous debris. The MBS location was used for the storage of waste oil and hazardous waste in 5 underground tanks. Activities at the MBS location were stopped by EPA in 1979. As a result of Federal investigations, all drums and site features were removed from the MKT location between 1981 and 1988. A 1984 Initial Remedial Measure (IRM) for the MBS location provided for removal of underground tanks and contaminated soil, and a 1985 ROD addressed remediation of soil contamination at the MKT location. This ROD addresses sediment, ground water, and surface water at the MKT location, and ground water at the MBS location. EPA has determined that no further remedial action other than that already implemented at the site is required to ensure protection of human health and the environment; therefore, there are no contaminants of concern.

The selected remedial action for this site is no further action because previous interim remedial activities were adequate to protect human health and the environment.

Ground water monitoring at the MKT and MBS locations will be performed, including expanding the ongoing water quality monitoring program at the MKT location, and installing four ground water monitoring wells at the MBS location. The estimated present worth cost for this no action remedy with ground water monitoring is $503,540, which includes an annual O&M cost of $434,000 for 30 years.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

RECORD OF DECISION
MCADOO ASSOCIATES SITE

DECLARATION

NAME AND LOCATION

McAdoo Associates Site: Kline Township and Blaine Street locations
McAdoo Borough, Kline Township, Schuylkill County, Pennsylvania
Operable Unit 2

STATEMENT OF BASIS AND PURPOSE

This decision document represents the selected remedial action for the McAdoo Associates Site. Ground water, surface water, and sediments associated with the McAdoo-Kline Township (MKT) location, and ground water associated with the McAdoo-Blaine Street (MBS) location, (both hereinafter considered the site), are addressed in this Record of Decision (ROD). This ROD is in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, (CERCLA) 42 U.S.C. §§ 9601 et. seq., and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). It should be noted that soil conditions at both the MBS and MKT locations were previously addressed and remediated by RODs completed in 1984 and 1985, respectively.

This decision is based upon the contents of the Administrative Record File for the McAdoo Associates Site (index attached).

The Commonwealth of Pennsylvania does not concur with the selected remedy.

DESCRIPTION OF THE REMEDY

The EPA has determined that no further remedial action other than that already implemented at the site is required to ensure protection of human health and the environment. However, ground-water monitoring at the MKT and MBS locations will be performed for 30 years to ensure the effectiveness of the remedial actions already executed.

The major components of the monitoring program include:

- Expansion of the ongoing long-term (30 years) water quality monitoring program as needed at the MKT location (originally included as part of the 1985 ROD) to include additional sampling of all existing monitoring wells. Samples from these wells shall be analyzed for volatile organic compounds and nine inorganic analytes.

- Installation of four ground-water monitoring wells at the MBS location and the long-term monitoring (30 years) of ground-water quality at the MBS location. Samples from these wells shall be

analyzed for volatile and semi-volatile organic compounds and Total Analyte List inorganics.

DECLARATION STATEMENT

The EPA has determined that no further remedial action is necessary for the McAdoo Associates site. The previous response actions implemented (drum and soil removal, soil excavation and capping) eliminate the need to conduct any additional remedial action. Because this remedy will result in hazardous substances remaining onsite, a review will be conducted in accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), within five years after the commencement of the monitoring. The review will be conducted to ensure that human health and the environment continue to be adequately protected and to determine the effectiveness of remedies already implemented at the McAdoo Associates Site.

W Wisniewski

Edwin B. Erickson
for Regional Administrator
Region III

9-30-91
Date

RECORD OF DECISION
MCADOO ASSOCIATES SITE, PA
TABLE OF CONTENTS

DECISION SUMMARY
MCADOO ASSOCIATES SITE

SITE NAME, LOCATION, AND DESCRIPTION

The McAdoo Associates site addressed in this Record of Decision includes the McAdoo-Kline Township (MKT) location and the McAdoo-Blaine Street (MBS) location (see Figure 1).

The MKT location is located in Kline Township, Schuylkill County, in eastern Pennsylvania. The MKT location lies approximately 1.5 miles south of McAdoo Borough due east of U. S. Route 309, and immediately south of the ramp to the I-81 interchange (see Figure 2). The MKT location consists of approximately 8 acres and is situated at the site of an old (subsurface and surface strip) coal mine. Land use in the vicinity of the MKT location is industrial (a cogeneration plant is located nearby) or abandoned or reclaimed mine areas. Residential areas are located at a greater distance north (approximately 900 to 1900 feet) and south (over 1 mile) of the MKT location (see Figure 3).

The shallow "aquifer" at the MKT location consists of ground water filled mine workings and other subsurface voids beneath the MKT location, collectively called the "mine pool". The mine pool discharges at the Silverbrook discharge to the upper reaches of the Little Schuylkill River, the nearest surface water body to the MKT location (Figure 3). The Little Schuylkill River and mine pool have been severely affected by acid mine drainage from the former mining activities in the area, and there is little to no aquatic life in the upper reaches of the river as a consequence of this mine drainage.

Residential wells in the vicinity of the MKT location tap the deeper aquifer located within the Pottsville and Mauch Chunk Formations. The Pottsville and Mauch Chunk Formations consist of interbedded sandstones, siltstones and shales. There appears to be no hydrologic connection between the mine pool and deeper aquifers in the area, based on the results of the 1991 focused Remedial Investigation/Feasibility Study (RI/FS) and previous studies.
The approximately 1-acre MBS location is located in the Borough of McAdoo, also in Kline Township, Schuylkill County, approximately 3 miles from the MKT location (see Figure 4). The MBS location is situated near a residential area (McAdoo Borough) and mine spoil reclamation site. The MBS location is presently covered with gravel and used for vehicle storage. Residential population in the immediate vicinity of the MBS location is approximately 2,500 (1990 census).

Water supply in this area is provided by surface water reservoirs and water supply wells operated by the Honey Brook Water Company. These sources are located over 1000 feet southwest of the MBS

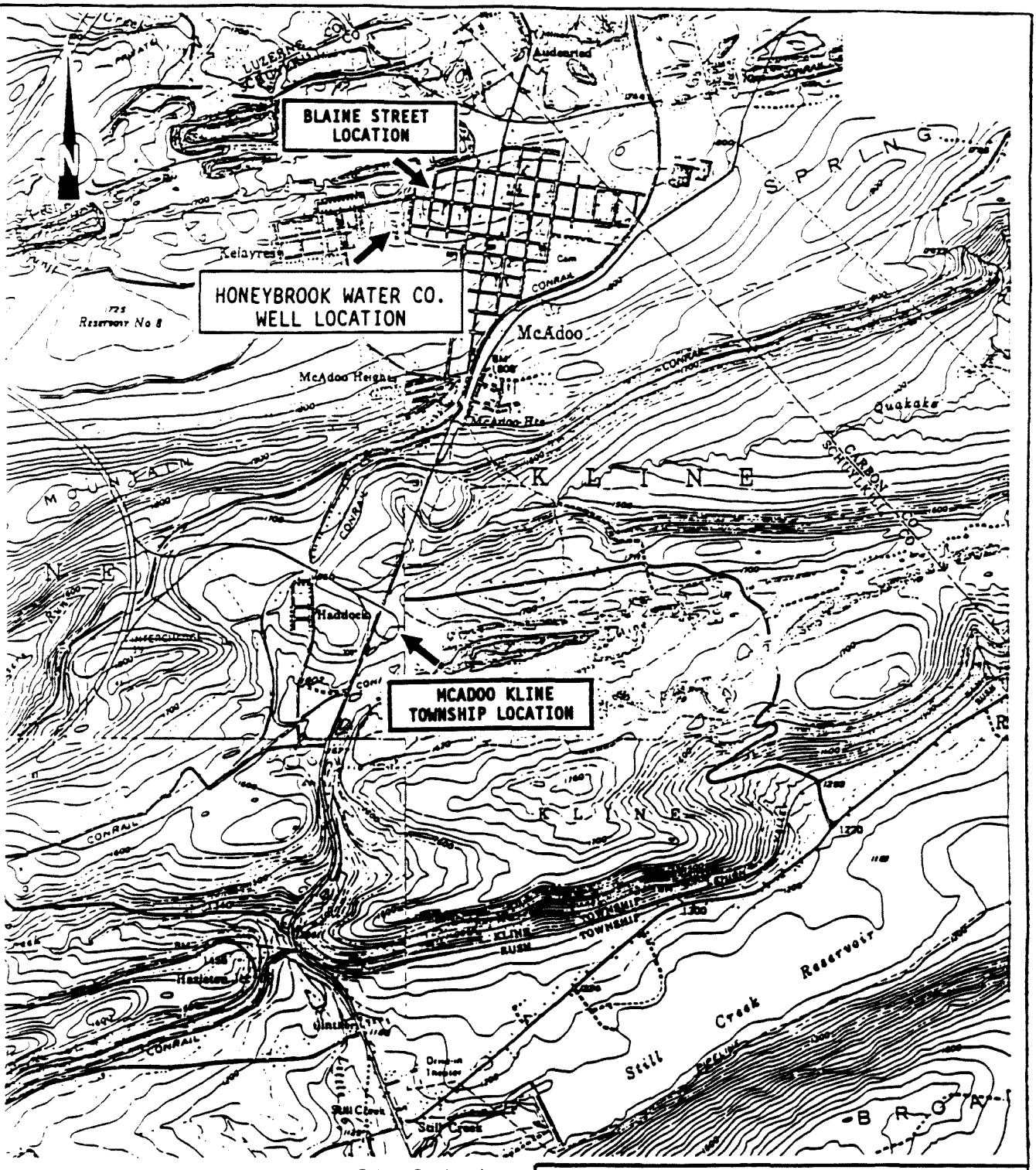


FIGURE 1
GENERAL LOCATION MAP
MCADOO-KLINE TOWNSHIP AND
BLAINE STREET LOCATIONS
MCADOO, PENNSYLVANIA

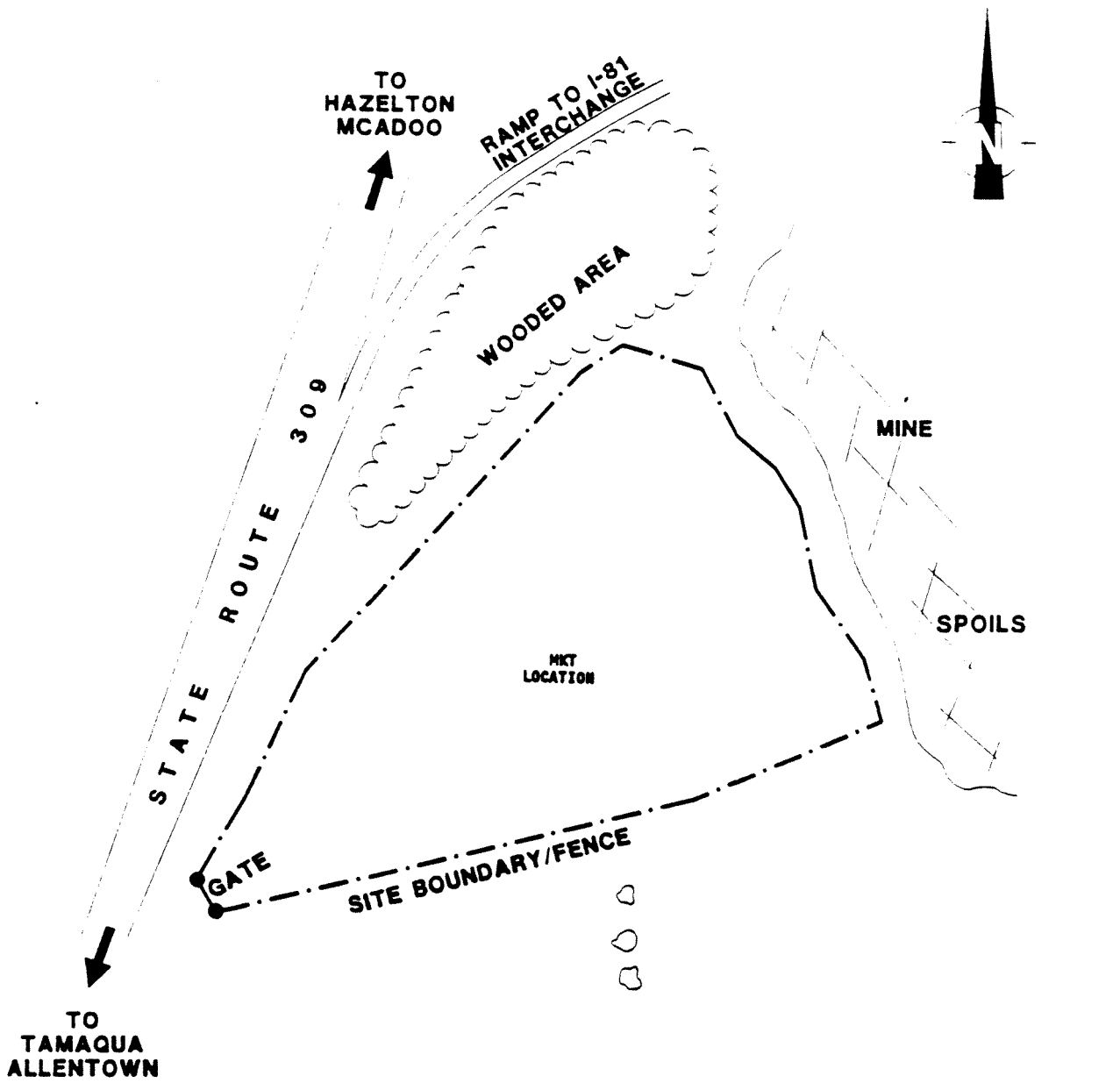


FIGURE 2
SITE MAP
MCADOO-KLINE TOWNSHIP LOCATION
MCADOO, PENNSYLVANIA

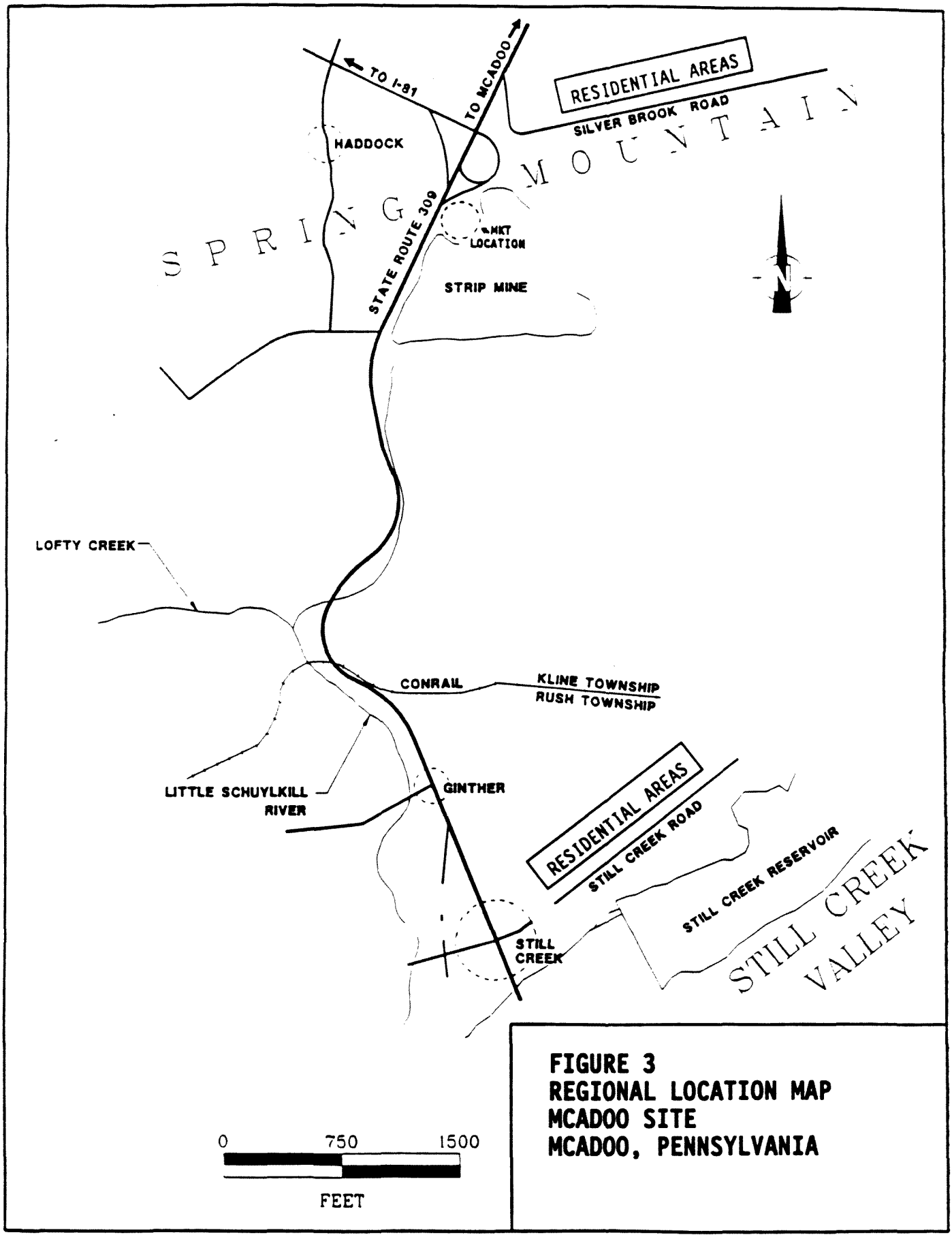


FIGURE 3
REGIONAL LOCATION MAP
MCADOO SITE
MCADOO, PENNSYLVANIA

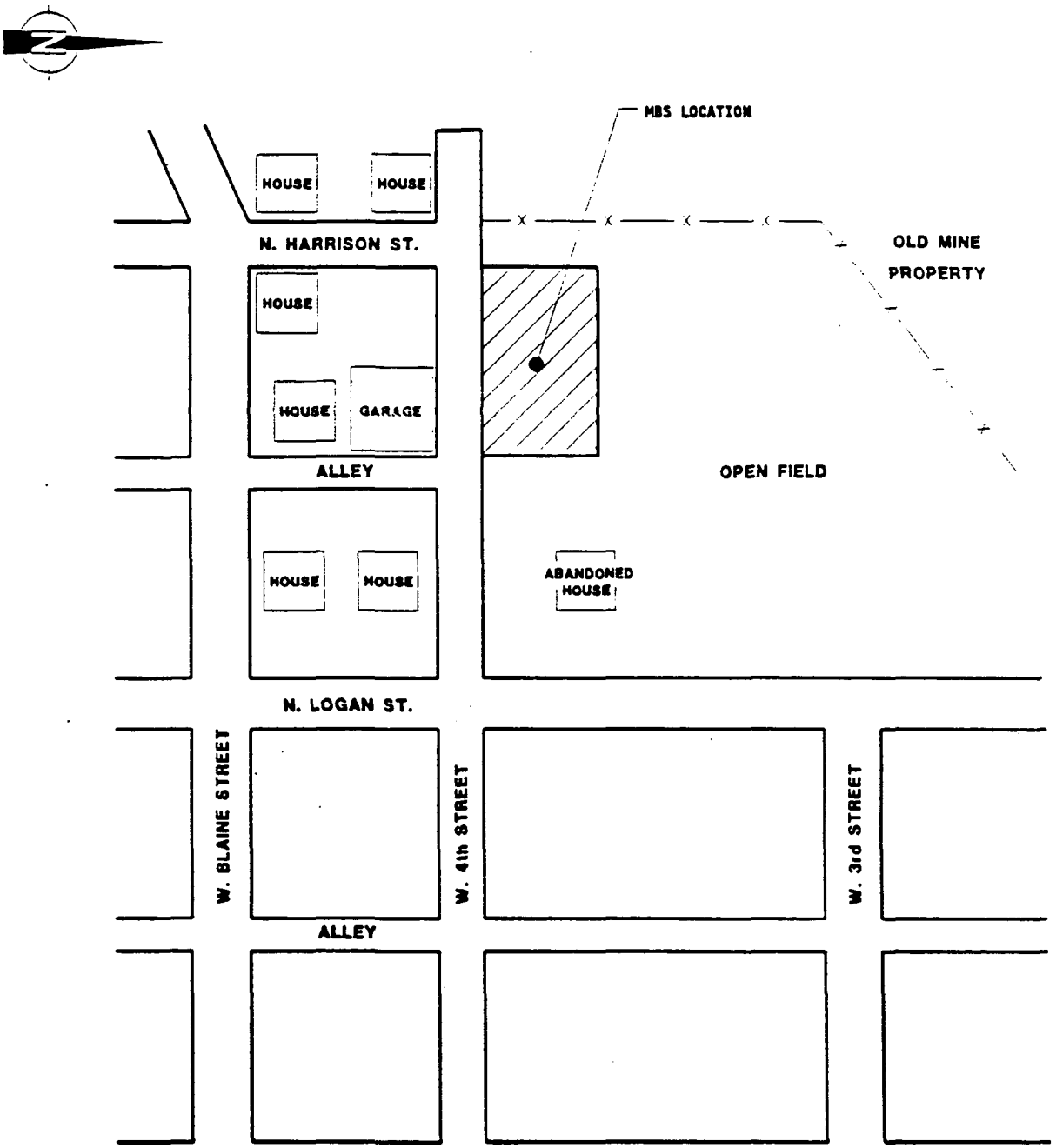


FIGURE 4
SITE MAP
MCADOO-BLAINE STREET LOCATION
MCADOO, PENNSYLVANIA

NOT TO SCALE

location. The water supply wells are screened in the deep aquifer within the Mauch Chunk Formation underlying the region.

The nearest surface water body to the MBS location is a small unnamed drainage stream located approximately 400 feet northeast of the location. Drainage from the MBS location is to the northeast away from the water supply areas.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The original use of the MKT location was the strip and deep mining of anthracite coal, which occurred sporadically from the 1880's to the 1960's. The 1-1/2 acre tract comprising the western portion of the MKT location was acquired in January 1975 by McAdoo Associates. Two rotary kiln furnaces and an upright liquid waste incinerator were installed on the property between 1975 and 1976, and reportedly were operated to reclaim metals from waste sludges, reportedly using waste solvents as fuels. The MKT location was ordered closed in 1979 as a result of numerous environmental compliance problems. At the time of closure in April of 1979, the MKT location was inventoried and found to contain: an incinerator, a garage and an office trailer; 6,790 drums of hazardous waste; four above ground 15,000-gallon storage tanks and three above ground 10,000-gallon tanks; and miscellaneous pallets, bricks and debris.

The MBS location was used for the storage of waste oil and hazardous waste in 5 underground tanks located at the location prior to incineration at the MKT facility previously discussed. Activities at the MBS location were discontinued in 1979.
Because both locations were operated as one facility involving the same ownership and waste, they were combined and collectively called the McAdoo Associates site for evaluation in the Hazard Ranking System (HRS) scoring process. The site received a score of 63.03 and the McAdoo Associates site was placed on the National Priorities List (NPL) in September 1983.

With regard to the MKT location, all of the drums and all site features, with the exception of one 15,000 gallon tank were removed between January 1981 and October 1982. The remaining tank was removed in November 1988. An RI/FS was conducted at the MKT location by an EPA contractor in 1984, and a Record of Decision (ROD) was issued on June 28, 1985, that addressed remedial action of soil contamination at the MKT location. However, the 1985 ROD deferred the decision regarding any remedial action of ground water and/or surface water (and related sediment) pending additional evaluation.

The selected remedial action for soil at the MKT location described in the 1985 ROD included the removal of remaining tanks and debris; limited excavation of contaminated soils with off-site disposal at

a RCRA facility; the capping of the MKT location; diversion of surface water; maintenance of diversion ditches and site cover; and long term ground-water monitoring. All soil related remedial measures have been completed with the exception of the construction of the site cover, which will be completed during Fall 1991.

With regard to the MBS location, based on subsequent EPA investigations of the tanks and tank contents, EPA issued a ROD for Interim Remedial Measures (IRM) on June 5, 1984, calling for cleaning and removal of underground tanks, the removal of contaminated soil, and the sampling of subsurface soil. The remedial work was completed by EPA in 1985. It should be noted that the MBS location 1984 IRM ROD included provisions that a supplemental ROD would be prepared after the remedial action was complete to include recommendations for further site action, if any.

Because of the outstanding issues related to the site, a supplemental focused RI/FS was conducted by EPA during late 1990/early 1991 to further evaluate the ground water, surface water, and sediment at the MKT location, and to evaluate the remedial action performed at the related MBS location.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The public participation requirements of CERCLA §§ 113(k)(2)(B)(i-v), 117 and 121(f)(1)(G), 42 U.S.C. §§ 9613(k)(2)(B)(i-v), 9617 and 9621(f)(1)(G) have been met by the following activities.

In July 1991, the focused RI/FS study reports prepared by an EPA contractor for this operable unit were released to the public along with the Proposed Plan developed by EPA. These documents were made available to the public in both the administrative record file and an information repository at the McAdoo-Kelayres Library (Kelayres Road, McAdoo, PA 18237), and USEPA Region III (841 Chestnut Building, Philadelphia, PA 19107). The notice of availability for these two documents was published in the Hazelton Standard Speaker on July 22, 1991. A 30-day public comment period began on July 22, 1991 and ended on August 21, 1991.

In addition, a public meeting was held on August 8, 1991 to discuss the Proposed Plan. At this meeting, representatives from EPA and PADER answered questions about the Proposed Plan and the status of the site. All comments which were received by EPA during the public comment period, including those expressed at the public meeting, are addressed in the Responsiveness Summary, which is attached to this Record of Decision.

SCOPE AND ROLE OF OPERABLE UNIT

This is the third action to be implemented by EPA for the McAdoo Associates site. As stated previously, soil contamination has been previously addressed by RODs prepared for the McAdoo Associates site (MKT and MBS locations) in 1985 and 1984, respectively. Therefore this ROD is intended to address only the surface water, sediment, and ground water at the MKT location, and ground water at the MBS location. These are the only remaining environmental concerns at the site.

SITE CHARACTERISTICS

As stated above, the scope of this operable unit was to evaluate the surface water, sediment, and ground water at the MKT location and ground-water at the MBS location. To evaluate these elements, a focused RI/FS was completed for the site during late 1990/early 1991. The primary objectives for the focused RI/FS were to collect sufficient data to:

- characterize potential contamination of the ground water, surface water, and surface channel sediments in the vicinity of the MKT location;
- determine if contamination poses a threat to human health or the environment;
- identify and characterize all migration pathways, routes of entry, and receptors for contaminants detected (if any) in the ground water (especially related to nearby residential wells), surface water, or channel sediment in the vicinity of the MKT location;
- determine the need for remedial actions at the MKT location to address existing or potential threats posed by contaminants in the ground water beneath, or in the surface water or channel sediments downstream of, the MKT location;
- fully evaluate the results of the IRM ROD at the MBS location; and
- provide support for the identification, development, and evaluation of appropriate remedial technology alternatives.

To provide the data necessary to accomplish the objectives of the focused RI/FS, a thorough compilation, characterization, and evaluation of existing information and data was completed. This included detailed evaluation of regional and local geology and hydrogeology, and review of all available information for the MBS location.

In addition, numerous field activities were performed at the MKT location, including two rounds of ground-water sampling of 7 on-site monitoring wells and 7 off-site residential wells, surface water and sediment sampling from 10 locations, and a complete ecological assessment of the Little Schuylkill River in the vicinity of the MKT location. Evaluation of contaminant transport pathways and potential risk to human health and environment is based collectively on the efforts of this 1991 focused RI as well as previous efforts by others (including the EPA 1984 RI/FS, and other studies completed by the Responsible Parties consultants during 1987 through 1990). A detailed description of the findings of the 1991 focused RI follows.

MCADOO-KLINE TOWNSHIP (MKT) LOCATION

SURFACE WATER/SEDIMENT INVESTIGATION

Ten surface water/sediment locations downstream of the MKT location were sampled in December 1990 to evaluate current surface water and sediment quality (Figure 5). Sample locations included three background locations along Lofty Creek that had not been affected by either the MKT location or acid mine drainage (AMD), and seven locations along the Little Schuylkill River, including the Silverbrook Discharge (Location 2 - Mine Pool outlet). Surface water samples were analyzed for Target Compound List (TCL) organics (including volatile and semivolatile organics and pesticides and PCBs) and Target Analyte List (TAL) inorganics (metals and cyanide), as well as basic water quality parameters (pH, temperature, alkalinity, TDS, TSS, etc.). Sediments were analyzed for TCL/TAL parameters, pH, total organic carbon, and grain size. It should be noted that the Little Schuylkill River downstream of the MKT location has been, and continues to be, severely affected by AMD originating from the Silverbrook discharge, and former coal mining activities in the area.

The results of the surface water sampling are summarized in Table 1. With regard to organics, only low concentrations (ranging from 8 to 32 micrograms per liter [ug/l]) of carbon disulfide, chloromethane and bis (2-ethylhexyl) phthalate were detected in the surface water. However, it is not certain that these compounds originated from the MKT location. Of the three compounds detected, the carbon disulfide was detected in field blanks (indicating potential laboratory contamination). Bis (2-ethylhexyl) phthalate was not detected in samples collected closest to the MKT location, rather was only detected in downstream samples and background samples (indicating other potential sources). Only chloromethane was detected at a surface-water sample location near the MKT location, however, this compound was not detected in any other media (soils, sediment, or ground water) at the MKT location.

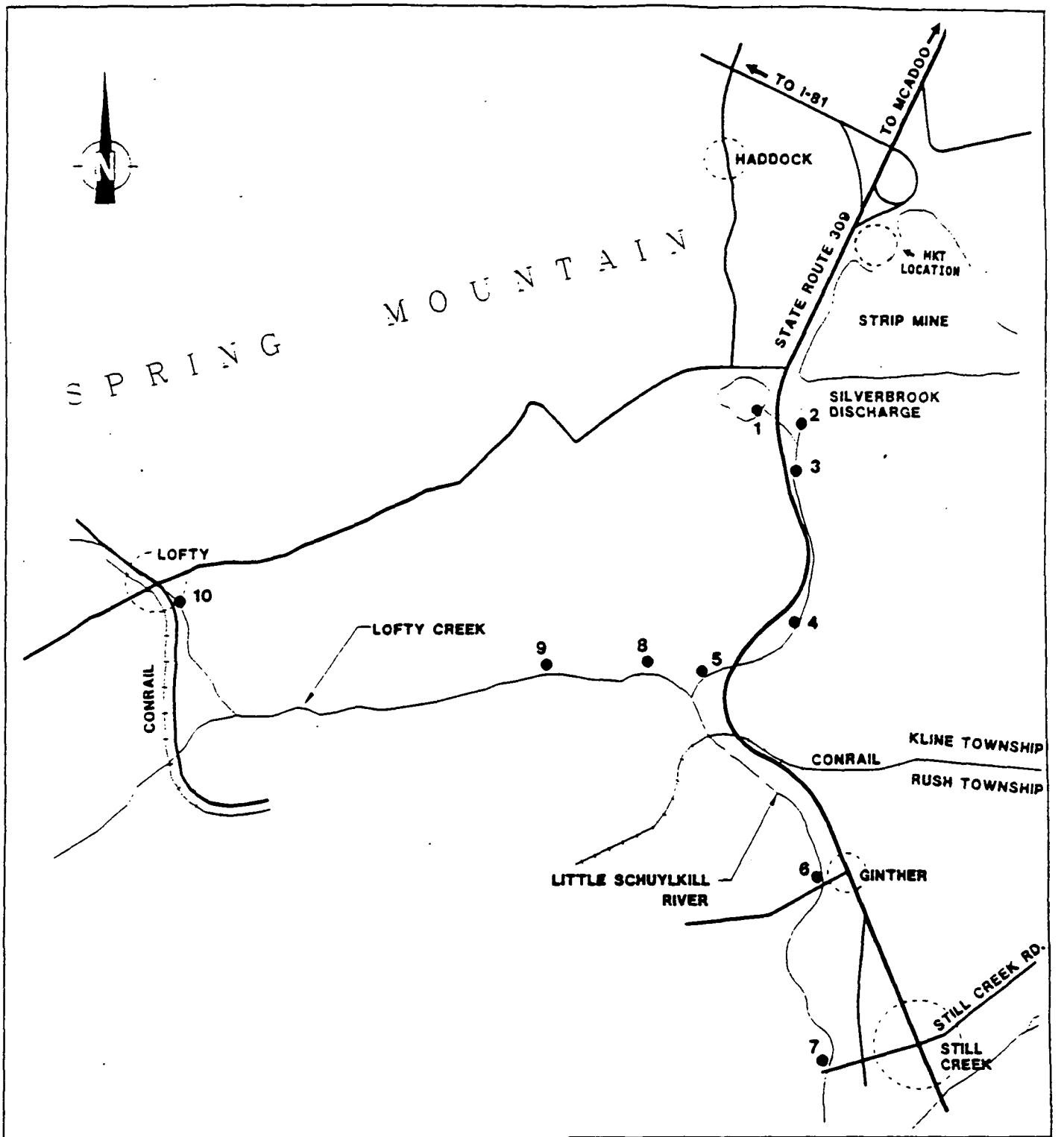


FIGURE 5
SURFACE WATER/SEDIMENT SAMPLING LOCATIONS
MCADOO-KLINE TOWNSHIP LOCATION
MCADOO, PENNSYLVANIA

Table 1

Surface Water Data Summary (a)
Organic and Inorganic Compounds

MKT LOCATION

COMPOUNDS (b)	CRQL (c)	SW-1	SW-2	SW-3	SW-4	SW-5	SW-5 (DUP)	SW-6	SW-7	SW-8	SW-9	SW-10	FIELD BLANK	RINSE. BLANK
Volatiles														
carbon disulfide	5	4B											8	
chloroform	5												8	
chloromethane	10		32											
Semi-Volatiles														
bis (2-ethylhexyl) phthalate	10				16L	3L			8L	10				
Inorganics														
Aluminum	200	947	4730	4390	3570	3470	3490	1840	1780	322	283	285		
Antimony	6							56P						
Barium	200	29P	27P	26P	27P	29P	28P	26P	25P	23P	23P	15P		
Beryllium	5		3P	2P	2P	2P	2P	1P						
Calcium	5000	5930	7380	11500	9120	8980	8940	5260	5580	1260P	1180P	1010P		
Cobalt	50	16P	59	41P	38P	36P	37P	14P	18P					
Copper	25			16P	13P	14P	12P	13P	11P					
Iron	100	1170	10900	4860	3760	4320	3950	1800	1560	122	91P	187		
Lead	3		3B	2B	2B	1B	2B	1B						
Magnesium	5000	2750P	6440	5790	4850P	4760P	4750P	2770P	2820P	770P	718P	632P		
Manganese	15	353	1250	1050	871	847	841	464	441	74	73	67		
Nickel	40		59	47	41	38P	33P		23P					
Potassium	5000	740P	1190P	569P	566P	436P	734P		529P					
Selenium	5	2B						1B						
Sodium	5000	12700	10500	10900	9170	9180	8990	6950	7220	4030P	4170P	4560P	198B	216B
Thallium	10												2K	
Vandium	50													
Zinc	20	68	210	174	150	146	145	88	87	35	33	29		
Cyanide	10													

(a) Sampling dates: 12/12/90
(b) Only elements detected are summarized.
(c) All units ug/l (total metals)

B - Not detected above levels measured in blanks
L - Analyte present. Value reported is biased low, actual value expected to be higher.
P - Analyte present. Quantitation may not be accurate.
K - Analyte present. Reported value may be biased high, actual value expected to be lower.

There were a variety of inorganics present in the surface water samples collected from the Little Schuylkill River and Lofty Creek. Inorganics present in the samples from the Little Schuylkill River at high concentrations relative to concentrations detected in background samples from Lofty Creek include aluminum, antimony, beryllium, calcium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, and zinc. In general, the concentrations of inorganics in the surface water decreases downstream as a result of dilution and chemical precipitation associated with changing pH. The elevated levels of inorganics in the surface water is likely a result of the combination of AMD and leaching of inorganics from the MKT location into the mine pool. Several of these elements were detected at high concentrations in the soil at the MKT location, including aluminum, iron, nickel, and zinc. However, most of these elements, especially antimony, beryllium, iron, aluminum, calcium, sodium, potassium, and manganese, also occur naturally in high concentrations in the coal and coal refuse in Pennsylvania Eastern Province coals; therefore their presence in the surface water is not unexpected. Although it is not possible to quantify the extent of inorganic contribution from the MKT location to the mine pool, and subsequently the surface water (as compared to the contribution from AMD), based on available data, AMD remains the primary controlling factor for inorganics in the surface water.

The results of the sediment sampling are summarized in Table 2 (see Figure 5 for sample locations).

With respect to organic compounds, the results indicate there are no volatile organic compounds present in the sediments of the Little Schuylkill River or Lofty Creek. However, some semi-volatile compounds (namely polynuclear aromatic hydrocarbons [PAHs]) are present in the sediments from nearly every station sampled. All of these PAHs were previously detected in soils at the MKT location. However, the presence of PAHs in some, but not all, of the samples collected, including background sample stations, indicates the prevalence of these compounds in the environment from various sources. The source of the PAHs in the Little Schuylkill River may be from MKT location run-off as well as run-off from other areas draining into this basin, including PA Rt. 309. The source of PAHs present in background samples from Lofty Creek is unknown.

A wide range of inorganics were detected in sediment samples from the Little Schuylkill River and Lofty Creek. Inorganics present in sediment from the Little Schuylkill River at high concentrations, relative to concentrations measured in background sediment samples from Lofty Creek, include aluminum, arsenic, beryllium, calcium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc. Some of these elements were detected at high concentrations in the soil at the MKT location. However, the presence of some of the inorganics, at concentrations

Table 2

Sediment Data Summary (a)
Organic and Inorganic Compounds

COMPOUNDS (b)	CRQL (c)	MKT LOCATION SED-01	SED-02	SED-03	SED-04	SED-05	SED-05 (DUP)	SED-06	SED-07	SED-08	SED-09	SED-10	FIELD BLANK	RINSE. BLANK	TRIP BLANK
Volatiles															
chloroform	5													6	
Semi-Volatiles															
phenol	330							140L							
2-chlorophenol	330							140L							
phenathrene	330	96L			210L	260L	330L								
fluoranthene	330	240L	150L		530L	540L	820L	200L	130L		89L	140L			
pyrene	330	250L	170L		550L	600L	880L	290	180L		120L	170L			
benzo(a) anthracene	330	140L			290L	340L	530L	120L	87L			110L			
chrysene	330	150L			280L	320L	530L	120L	90L			110L			
bis (2 ethyl hexyl) phthalate	330				170L	200L	130L								
benzo(b) fluoranthene	330	130L			210L	240L	390L	85L	77L			79L			
benzo(k) fluoranthene	330	110L			230L	230L	430L	93L	79L			83L			
benzo(a) pyrene	330	84L			190L	200L	380L								
indeno(1,2,3-cd) pyrene	330	85L			190L	190L	300L								
benzo(g,h) perylene	330				200L	200L	290L								
Inorganics															
Aluminum	40	1820	1660	1420	3340	3190	2080	1770	1280	1170	773	684	56P		
Arsenic	2	6J	4	2P	9	11	5	3	2	2P	1P	1P			
Barium	40	157	14P	8P	31P	77	20P	16P	37P	5P	3P	8P			
Beryllium	1	0.41P				0.42P	0.25P	0.22P							
Cadmium	1		3		9	7	5	2	2						
Calcium	1000	4100	262P	99P	212P	6160	3040	342P	278P	51P	25B	38B			
Chromium	2	20		6	18	333	9	10	8						
Cobalt	10				4P	20		5P							
Copper	5	19	14	18	32	28	14	20	12	11	7	2P			
Iron	20	11400	31500	8570	110E3	90600	57700	31700	18200	2830	1770	2370			
Lead	0.6	76	20	10	95	44	135	20	20	8	5B	5B	1P		
Magnesium	1000	893P	243P	65P	536P	2490	417P	290P	242P	78P	70P	50P			
Manganese	3	1810	48	17	332	4250	213	411	208	102	84	75			
Mercury	0.2	0.12	0.22	0.62	0.17	0.44	0.14		1.1			0.75			
Nickel	8	6P			7P	9P									
Potassium	1000	257P	294P	311P	314P	145P	148P	156P	139P	153P	113P	75P			
Selenium	1	0.35P	3	1P	3	2	1		0.81P						
Silver	2							4	3	4	2P				
Sodium	1000	99P	58P	69P	68P	37P	36P	44P							
Thallium	2			0.33B						0.32B		4			
Vandium	10	11P				100		4P	8P						
Zinc	4	470	18	9	128	124	71	41	30	14	8	9			
Cyanide	2				2	3	3								

(a) Sampling date: 12/12/90
(b) Only compounds detected are summarized.
(c) All units ug/kg except blanks which are ug/l.

B - Not detected above levels measured in blanks.
L - Analyte present. Value reported is biased low, actual value expected to be higher.
P - Analyte present. Quanitation may not be accurate.

detected, are not exclusively the result of former MKT location activities. Most of these elements are found in coal and coal waste. Table 3 is a listing of the inorganic background concentrations developed during the 1991 focused RI/FS as related to former mining activities and AMD. Comparison to Table 3 values show that most of the inorganics present in the sediment are within expected background ranges for the area.

In summary, there are few, if any, MKT location-related contaminants (organics and inorganics) present in the surface water and sediments in the Little Schuylkill River.

ECOLOGICAL INVESTIGATION

The ecological investigation included a characterization and evaluation of aquatic and terrestrial habitats along the Little Schuylkill River. The aquatic and terrestrial habitats were identified, measured (where appropriate), and described at six stations (Stations 1, 2, 4, 5, 6, and 8 - see Figure 5). The results of the ecological investigation revealed that the aquatic community of the Little Schuylkill River is severely affected by AMD (i.e. there is very little aquatic life), although the aquatic community appears to be less affected at present relative to the results of a PADER study conducted in 1984. The terrestrial community was not affected.

In summary, no ecological impairment directly attributable to MKT location-related contaminants was identified.

GROUND-WATER INVESTIGATION

The ground-water investigation consisted of two elements: an on-site ground-water investigation and an off-site ground-water investigation. The on-site ground-water investigation included the characterization of MKT location hydrogeology and two rounds of MKT location monitoring well sampling. The off-site ground-water investigation included the characterization of regional hydrogeology and two rounds of off-site residential well sampling. The results of each element follows.

ON-SITE GROUND-WATER INVESTIGATION

Regionally, the MKT location is within the Appalachian Mountain section of the Ridge and Valley Province, within a geologic structure referred to as the Silver Brook Syncline (Figure 6 - see Figure 3 for orientation of cross-section line). Locally, the MKT location is underlain by the Llewellyn and Pottsville Formations (Figure 7). The Llewellyn Formation consists of sandstones, siltstones, and shales, with interbedded coal. Of particular

Table 3

1991 RI Proposed* Inorganic Background Concentration Ranges
Former Mining Activity/Acid Mine Drainage Related

MKT LOCATION

Element	Site Soils/Sediments[a] (mg/kg)	Site Ground Water/Surface Water (mg/l)
aluminum	16,000-47,000	29-55[e]
antimony	0.9-1.2	---
arsenic	6-27	---
barium	40-200	---
beryllium	.5-6	0-.010[b]
cadmium	.3-27	0-.020[b]
calcium	120-700	119-194[e]
chromium	20-75	0-.010[b]
cobalt	0-7	---
copper	10-75	---
iron	4,400-12,000	15-122[e]
lead	10-15	---
magnesium	0-100	68-83[e]
manganese	3-620	4[c]
mercury	.15-.24	---
nickel	10-125	0-1.23[b]
potassium/sodium	2,300-10,000	17[d]
selenium	3-5	---
silver	---	---
thallium	5	---
vanadium	20-140	---
zinc	3-65	0.21-0.2[b]

* Given that no site specific background data regarding AMD were available, general background values for the site were derived for comparison purposes as part of the 1991 RI. The general background values were derived by a USEPA contractor based on the following references for studies conducted at other AMD and coal mining sites in Pennsylvania.

[a] Combination of National Research Council (1980), Glick and Davis (1984), and Davis (1984, personal communication)

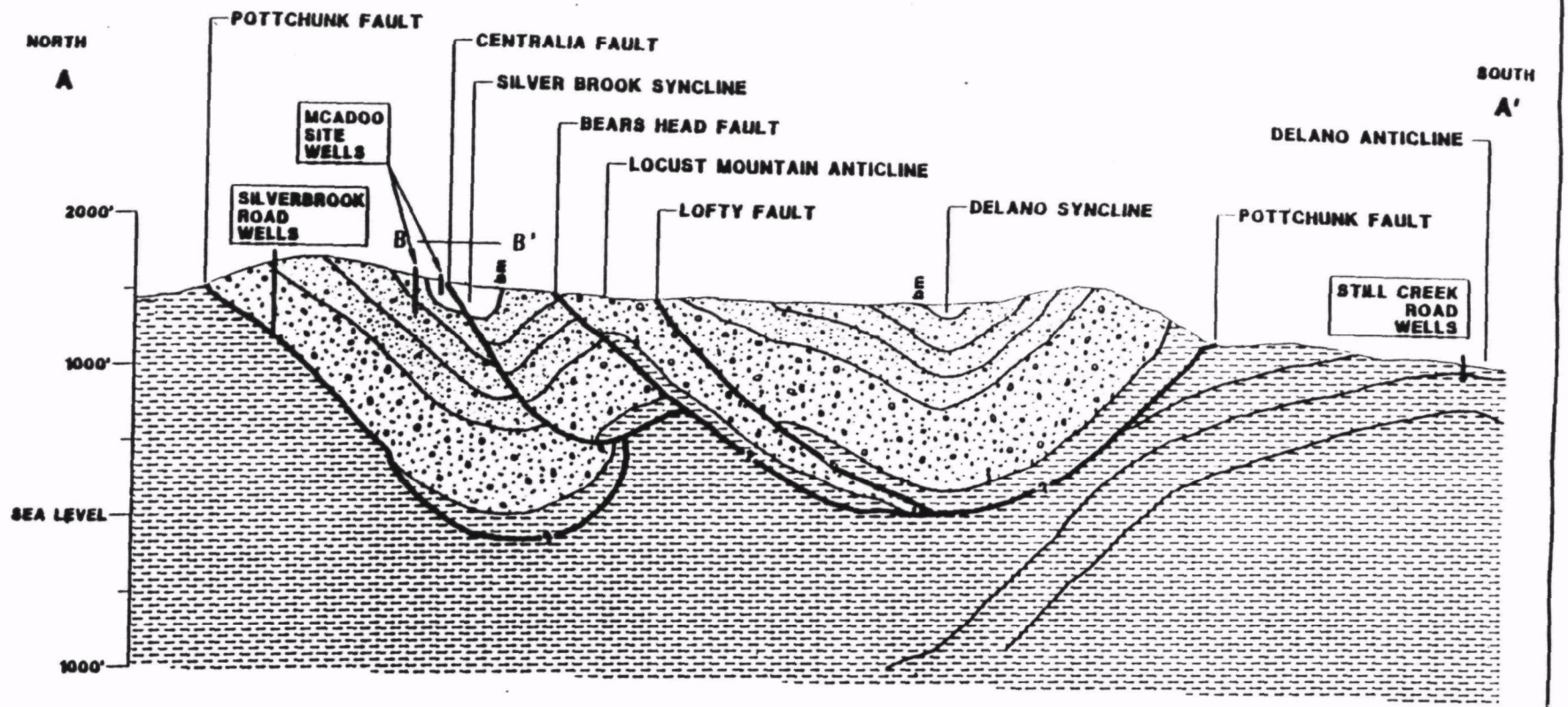
[b] Gorilla Quarry Results (USEPA, 1985)

[c] Coal Mine Drainage Tarrs, PA (Nriagu, 1978)

[d] Shamokin Creek, Weighscale, PA (Brownlow, 1979)

[e] Combination of Sources b and c

--- No Data Available



LEGEND:

- LLEWELLYN FORMATION (MW-3,5, & 9)
- POTTSVILLE FORMATION (MW-1,2,3B, & 4)
- MAUCH CHUNK FORMATION, UPPER MEMBER (SILVERBROOK ROAD-RESIDENTIAL WELLS)
- MAUCH CHUNK FORMATION, MIDDLE MEMBER (STILL CREEK ROAD-RESIDENTIAL WELLS)
- bm BUCK MOUNTAIN COAL SEAM

SOURCE: ADAPTED FROM U.S.G.S. MAPPING (WOOD & ARNDT, 1973)

FIGURE 6
REGIONAL GEOLOGIC CROSS-SECTION
MCADOO AREA, PENNSYLVANIA

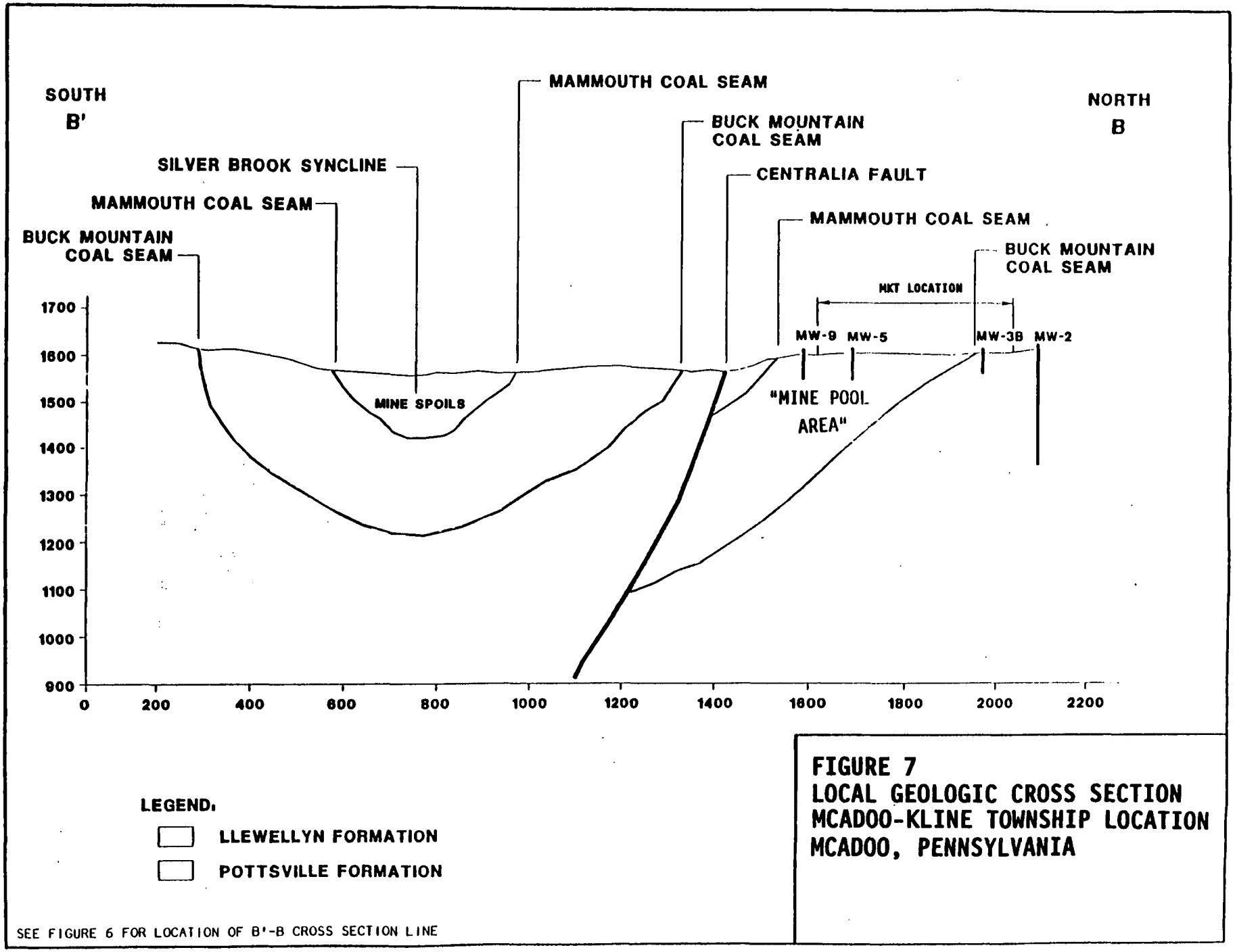


FIGURE 7
LOCAL GEOLOGIC CROSS SECTION
MCADOO-KLINE TOWNSHIP LOCATION
MCADOO, PENNSYLVANIA

importance are two major coal seams (Buck Mountain and Mammoth), both of which have been extensively mined in the vicinity of the MKT location. The Pottsville Formation consists of well-cemented sandstones and conglomerates, although this formation is reported to be fractured.

The hydrogeology at the MKT location is controlled by the local geology. The shallow "aquifer" at the MKT location consists of ground water filled mine workings and other subsurface voids, collectively called the "mine pool". The only known discharge for the mine pool is the Silverbrook discharge to the south, which forms the upper reaches of the Little Schuylkill River. The mine pool is located within the Llewellyn Formation (Figure 7), and ranges in depth from approximately 50 to 200 feet below ground surface at the MKT location. Horizontal ground-water flow at the MKT location is generally toward the south, in the general direction of the Silverbrook discharge (Figure 8). A schematic hydrogeologic cross-section for the MKT location depicting subsurface conditions is given in Figure 9. Based on water level readings obtained from wells screened in the underlying Pottsville Formation (MW-1, MW-2, MW-3B and MW-4), the vertical ground-water gradient at the MKT location is upward, indicating that ground-water is flowing from the Pottsville Formation into the mine pool, and subsequently flowing out the Silverbrook discharge. Consequently it follows that the mine pool at the MKT location is not hydrologically connected to other aquifers in the area.

The 7 on-site monitoring wells that were installed during the 1984 RI (see Figure 8) were sampled in December 1990 and February 1991 to evaluate current ground-water quality at the MKT location. Four of the wells (MW-1, MW-2, MW-3B, and MW-4) are screened in the Pottsville Formation, and wells MW-5 and MW-9 are reported to be screened in the mine pool. Wells MW-1 and MW-2 are considered upgradient of the MKT location and not affected by AMD. Ground-water samples were analyzed for TCL and TAL (total and dissolved) parameters. A summary of organic and inorganic sampling results from the two sampling events are given in Tables 4 and 5, respectively.

The 1991 focused RI results indicate that low levels of organic compounds are present in the mine pool ground water at the MKT location. Low levels of 1,1 dichloroethane, 1,1 dichloroethene, and 1,1,1 trichloroethane were detected in the sample collected from MW-5 (and duplicate) in both sampling events, with toluene and xylenes detected in the second round only at very low "J" flagged values (Note - a "J" qualifier denotes that an analyte is present, but the reported value may not be accurate or precise). Also, 1,1 dichloroethane, 1,1 dichloroethene, 1,2 dichloropropane, and bis (2-ethylhexyl) phthalate were detected in the first sample collected from MW-9. Additionally, 1,1,1 trichloroethane and 1,2 dichloroethane were detected in the second sample from MW-9, although the phthalate was not. A "J" flagged value of 1,1,1

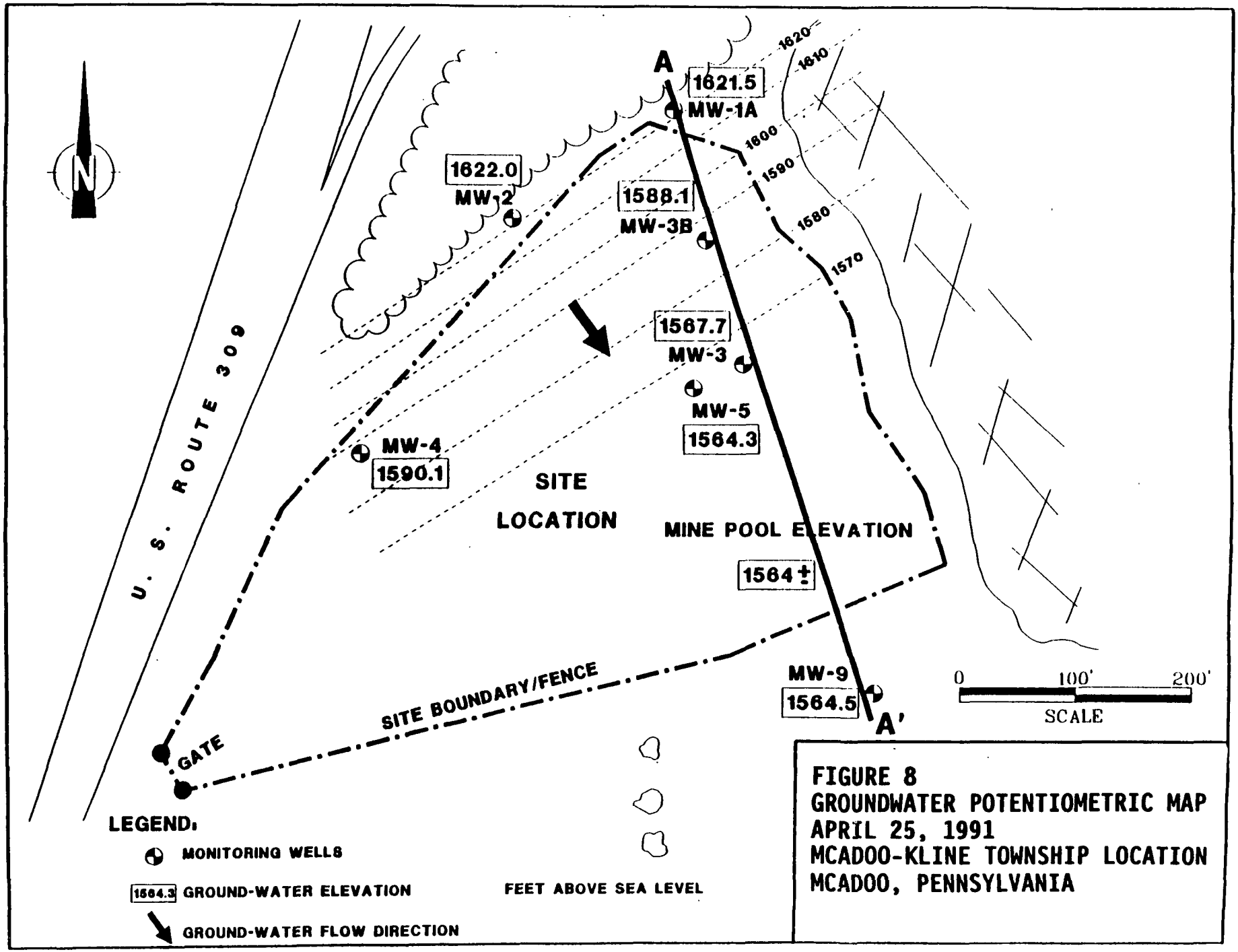


FIGURE 8
GROUNDWATER POTENTIOMETRIC MAP
APRIL 25, 1991
MCADOO-KLINE TOWNSHIP LOCATION
MCADOO, PENNSYLVANIA

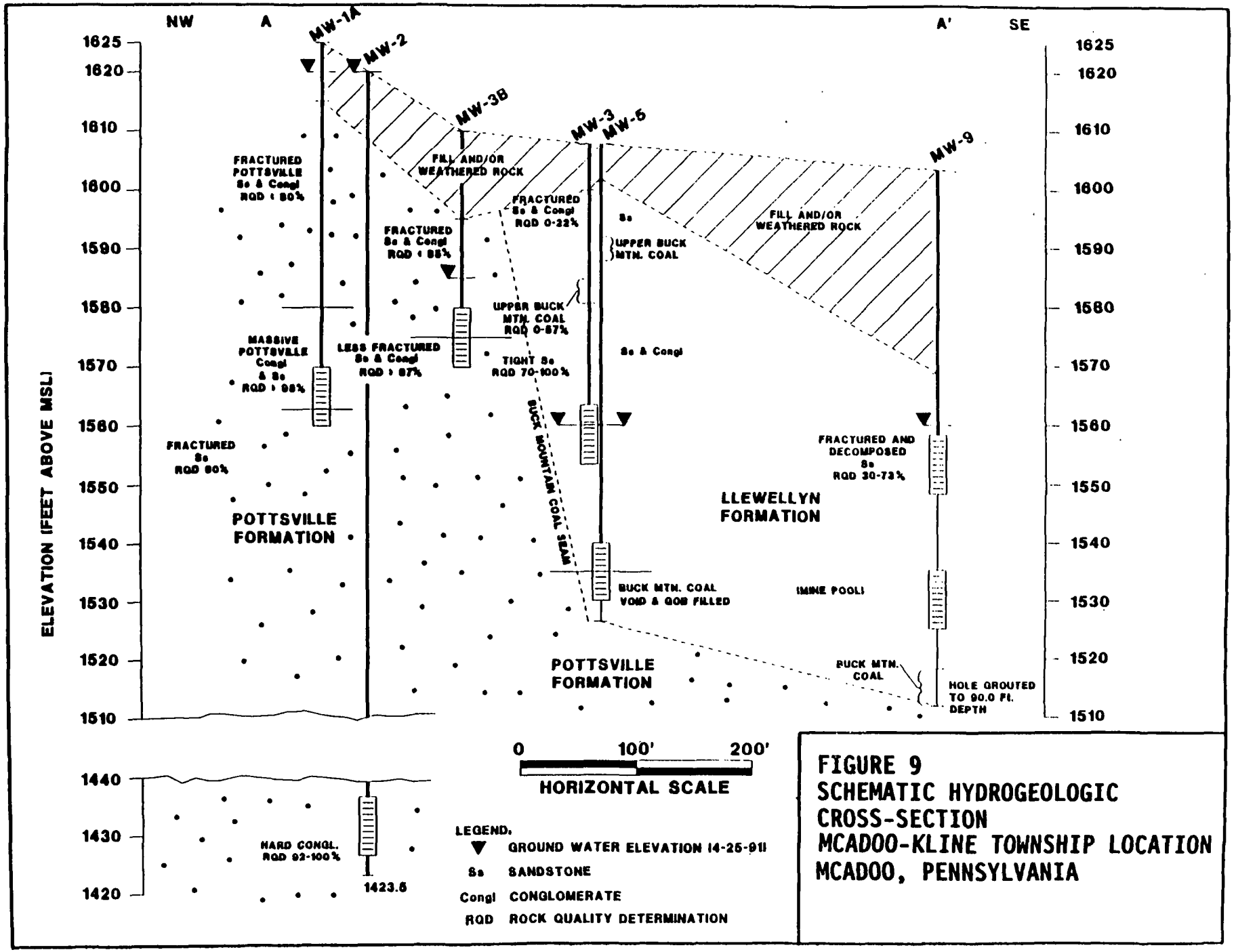


FIGURE 9
SCHEMATIC HYDROGEOLOGIC CROSS-SECTION
MCADOO-KLINE TOWNSHIP LOCATION
MCADOO, PENNSYLVANIA

Table 4

Ground-Water Data Summary (a)
Organic Compounds
Monitoring Wells

MKT LOCATION

COMPOUND (b)	CRQL(c)	MW-1	MW-2	MW-3	MW-3B	MW-4	MW-5	MW-5 (DUP)	MW-9	FIELD BLANK	RINSE BLANK	TRIP BLANK
Volatiles												
1,1 dichloroethene	5						5	3J	3J			
1,1 dichloroethane	5						18	21	4J			
chloroform	5									3J	4J	4J
1,1,1 trichloroethane	5						30J	27J				
1,2-dichloropropane	5								270J			
methylene chloride	5									4J		4J
Semi-Volatiles												
bis (2-ethylhexyl) phthalate	10								10			

(a) Sampling dates: 12/19/90 and 12/20/90
(b) Only compounds detected are summarized.
(c) All units ug/l
J Analyte present. Reported value may not be accurate or precise.

Table 4 (continued)

Ground-Water Data Summary (a)
Inorganics
Monitoring Wells

MKT LOCATION

ELEMENT (b)	CRDL (c)	MW-1		MW-2		MW-3		MW-3B		MW-4		MW-5		MW-5(DUP)		MW-9		FIELD BLANK		RINSE BLANK	
		T(d)	D(e)	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
Aluminum	200	188B	151B	282B	178B	191E3		6970	870	985		517		604		21500	18200			*	119P
Barium	200	98P	90P	87B	89P	112P	13B	213	178P	38	29	66P	48P	85P	47P	61B	24B				18P
Beryllium	5					23										3P	4P				
Cadmium	5	16	16	4P			2P									12	4P	.2P			
Calcium	5000	6530L	6190L	4300L	4270L	37E3L	9040L	8640L	8120L	11900	10200	10200	6950	11300	6540	17E3L	18E3L	90B			129L
Chromium	10			9P		45				19L			9L								
Cobalt	50				10B	179	38B	64B	49B			41P	31P	41P	33P	75B	91B	16B		15B	11B
Copper	25	18P	13P	30	18P	155		23P	13P							159	150				
Iron	100	297	31P	395	31P	69E3	347O	14800	38P	2440J	301L	43E3J	33700	43E3J	31600	2230	110	28B			
Lead	3	14L		30L	30	305L		19L	3B	8L		21		23		23L	12	4B			
Magnesium	5000	3500L	3270P	3470P	3330P	3757P	2470P	6890	5180	5870	5030	5540	4290	5760	3900P	8340	8370				
Manganese	15	219	200	212	216	2020	822	2290	1850	1850	1820L	6650	6300L	6550	4560	1770	1830				6P
Nickel	40	47B	45B	43B	33B	1836	79B	150	50B	62	29L	44	32P	46.1	18P	514	400			20P	
Potassium	5000	1870B	2260B	1990B	1480B	5480B	4460B	2160B	1320B	2140L	2380L	2440L		2280L	1500L	2480B	2660B			490B	350B
Silver	10				1P			1P		3J		2J	1J	2J	2J		21				
Vandium	50					9P															
Zinc	20	81	77	99	99	836	35B	145	109	101	23	74	39J	72	36	367	362				9P

(a) Sampling dates: 12/19/90 and 12/20/90
(b) Only elements detected are summarized.
(c) All units ug/l
(d) T - Total metals (unfiltered)
(e) D - Dissolved metals (filtered)

B - Not detected above levels measured in blanks.
L - Analyte present. Value reported is biased low, actual value expected to be higher.
P - Analyte present. Quantitation may not be accurate

Table 5

Ground-Water Data Summary (a)
Organic Compounds
Monitoring Wells

MKT LOCATION

COMPOUND (b)	CRQL(c)	MW-1	MW-2	MW-3	MW-3B	MW-4	MW-5	MW-9	MW-9 DUP	FIELD BLANK	RINSE BLANK	TRIP BLANK
Volatiles												
1,1 dichloroethene	5						3J	2J	2J			
1,1 dichloroethane	5						19	5	5			
chloroform	5				0.7B		0.6B			2J	2J	2J
1,1,1 trichloroethane	5			4J			43	150	140			
1,2-dichloropropane	5							400(d)	400(d)			
methylene chloride	5									3J	3J	3J
1,2 dichloroethane	5							1J	1J			
toluene	5						0.5J					
total xylenes	5						0.9J					

(a) Sampling date: 2/21/91
(b) Only compounds detected are summarized.
(c) All units ug/l
(d) Quantitated from Secondary Dilution
J Analyte present. Reported value may not be accurate or precise.

Table 5 (continued)

Ground-Water Data Summary (a)
Inorganics
Monitoring Wells

MKT LOCATION

ELEMENT (b)	CRDL (c)	MW-1		MW-2		MW-3		MW-3B		MW-4		MW-5		MW-9		MW-9 (DUP)		FIELD BLANK		RINSE BLANK	
		T(d)	D(e)	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
Aluminum	200	124B	124B	223	210	86400	191P	12300	534	1180	15.0B	1440	24.4B	22100	16300	24700	16400	18.7B	13.7B	36.2	16.2B
Arsenic	10					11.2		3.2P					3.1P	3.5J		4.2P					
Barium	200	89.5P	95P	92.1P	86.7P	5360	15.1P	254	191P	42.6P	32.1P	54.6P	37.6P	193P	14.6P	278	14.0P			1.3P	
Beryllium	5													7.3	5.8	7.7	4.3P				
Cadmium	5	3.3B	2.2B	2.3P	2.7B	2.6B	3.0B		2.0B			2.6B		2.7B		2.6B	3.1B			2.2B	
Calcium	5000	8440	8750	4870P	4800P	9840	6470	9470	9000	10300	9920	7890	5760	24800	24500	24600	24600	392B	31.9B	153P	22.9P
Chromium	10	3.2B	2.3B	3.7B		144		22.2	2.3B	7.1B		10.8B	3.5B	24.1	3.0B	48.1	2.2B	3.4B			2.1B
Cobalt	50	2.2P	5.3P	6.2P	8.0P	95.7	42.2P	87.8	69.7	6.5P	4.0P	195	50.3	166	158	166	157				
Copper	25	15.6P	20.6B	21.7B	55.2B	196J	38.1B	65.8B	33.9B	7.6B	74.1J	25.5B	28.4B	184J	145J	180J	167J	7.8B	7.1B	27.8B	2.7B
Iron	100	163B	21.3B	259	16.9B	136E3	130B	24900	340	2300	99.5B	42500	40500	12700	91.2B	19300	80.4B	13.5B	8.6B	44.3	8.8B
Lead	3	9.3K	6.5B	8.6K	11.8J	178K	4.0	45.5K	2.2B	9.2	9.1J	11.8	17.9J	16.1K	8.0B	16.6K	9.9J	1.3B	1.4B	1.7B	1.5B
Magnesium	5000	4710P	5000P	3950P	5000P	13500	2350P	8110	5540	5370	5130	3800P	3620P	12000	10700	12400	10700			27.7B	
Manganese	15	319	339	240	235	2070	737	3060	2410	1950	1910	5150	5840	2970	2700	3010	2730				
Mercury	0.2					0.98		0.24													
Nickel	40	27.6B	52.1B	38.0B	36.2B	138	100	57.3B	81.4B	36.6B	26.2B	27.0B	21.1B	161	142	163	145			17.9B	
Potassium	5000	1480B	1530B	1300B	1370B	977D	2880P	3660P	1770B	2010B	1770B	1480B	1100B	3850P	3120P	4410P	2850P				421B
Sodium	5000	95800	101E3	69700	70600	96300	97500	121E3	119E3	172E3	174E3	25000	24600	54700	54400	53600	54500	98.6B	131B	254B	100B
Vandium	50					76.1		15.0P						7.4P		12.3P					
Zinc	20	115B	128B	139B	136B	496	120	24.8B	139B	82.2B	102B	101B	76.9B	515	481	509	490	11.2B	16.5B	54.4B	

(a) Sampling date: 2/21/91
(b) Only elements detected are summarized.
(c) All units ug/l
(d) T - Total metals (unfiltered)
(e) D - Dissolved metals (filtered)

B - Not detected above levels measured in blanks. J - Analyte present. Reported value may not be accurate or precise.
L - Analyte present. Value reported is biased low, actual value expected to be higher.
P - Analyte present. Quantitation may not be accurate.

trichloroethane was reported in MW-3 from the second sampling event. The MKT location is the most likely source of organic compounds in the mine pool, given that no organics were detected in upgradient monitoring wells. Chloroform and methylene chloride detections in both rounds appear to be derived from lab blank contamination.

Inorganics detected in monitoring wells at the MKT location are attributed to a combination of naturally elevated background conditions, the effects of mining and AMD, and former MKT location activities. The naturally elevated pH of the ground water results in the high concentrations of inorganics in the ground water by causing pH extensive dissolution of inorganics from soils at the MKT location and from the country rock in the subsurface. Of the inorganics detected in ground water, iron, manganese, beryllium, and nickel are associated with AMD. Inorganics that were detected at levels within background concentrations include barium, cadmium, lead, copper, and aluminum. Arsenic and chromium were detected in one sample from sampling event, but they were not detected in surface water downgradient from the site. Only cobalt, silver, and zinc were detected in concentrations that might be considered site-related.

OFF-SITE GROUND-WATER INVESTIGATION

The residential wells located on Silverbrook Road and Still Creek Road draw water from the water bearing zones within the Mauch Chunk Formation (see Figure 6), which is not present at the surface at the MKT location. Previous EPA studies completed in 1984 and 1985 both concluded that the residential wells were not likely to be hydrologically connected to the MKT location. However, the hydrogeologic relationship was re-evaluated during the 1991 focused RI, and nearby residential wells were resampled.

Ground-water elevations measured on December 19 and 20, 1990, in residential areas and general flow directions in the MKT location vicinity are shown schematically in Figure 10. A generally southerly hydrologic gradient is indicated by the water elevations, with the highest water elevations measured in the Silverbrook Road residences, lower water elevations in the MKT location wells (decreasing from north to south across the MKT location), and the lowest measured levels occurring in the residential wells along Still Creek Road.

Based on water level information, the Silverbrook Road residential wells are hydrologically upgradient from the wells at the MKT location. Residential well pumping is not considered to be of sufficient magnitude to change this general flow direction. In addition to occurring hydrologically upgradient from the MKT location, the residential wells along Silverbrook Road are situated "across geologic structure" from the MKT location. Ground water movement in sedimentary or meta-sedimentary rocks is likely to

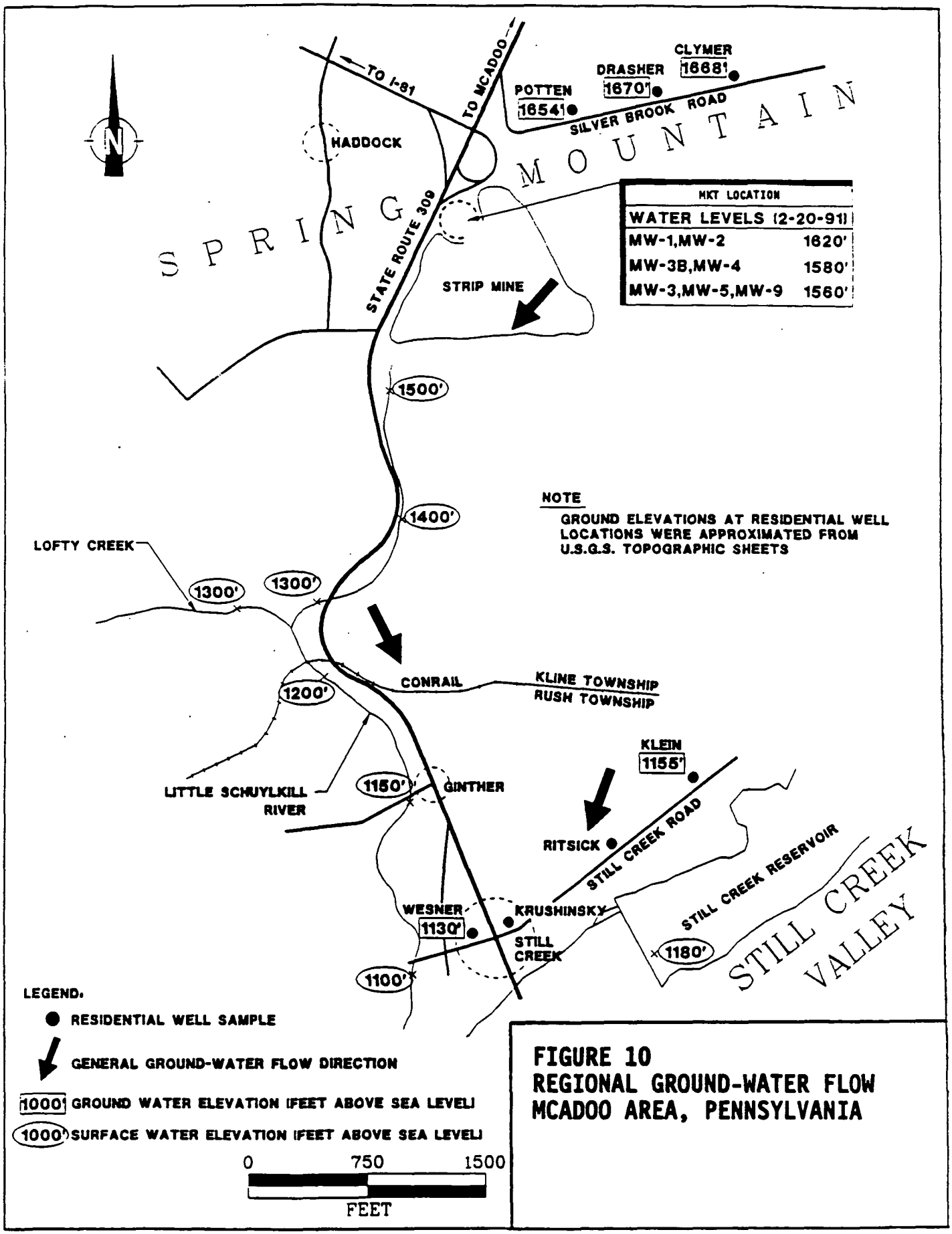


FIGURE 10
REGIONAL GROUND-WATER FLOW
MCADOO AREA, PENNSYLVANIA

preferentially occur along, rather than across, planer structural zones such as bedding planes and faults. Therefore, in order for ground water from the MKT location to reach the residential wells located along Silverbrook Road, it would have to flow both upgradient and across geologic structure, neither of which are probable. Finally, the well cemented lithology of the Pottsville Formation has been reported to act as a barrier to ground water movement in the area.

The residential wells along Still Creek Road are located south of the MKT location, which is nominally considered hydrologically "downgradient." However, the occurrence of the Little Schuylkill River and its proximity to the residential wells induces ground water flow towards the river, or to the southwest on the eastern side of the river. Additionally, the residential wells are located along the axis of the Delano Syncline in the Middle Member of the Mauch Chunk Formation. At the MKT location, this geologic unit is encountered only in the subsurface at a depth of greater than 2000 feet (Figure 6). In order for ground water from the MKT location to reach the residential wells located along Still Creek Road, it would have to flow across several intercepting zones, including bedding planes and four large fault zones, which is unlikely.

Given the MKT location and regional geology and hydrogeology, the residential wells and Honey Brook water supply wells are not hydrologically connected to the MKT location. Consequently, there is no complete ground-water migration pathway between the MKT location and nearby residential wells.

The off-site ground-water sampling that was conducted in conjunction with the 1991 focused RI included six residential wells (see Figure 10) and the Honey Brook Water Company well(s) (near the MBS location). Ground-water samples were collected in March 1990 and December 1990 from three residential wells located along Silver Brook Road (north of the MKT location) and three residential wells located along Still Creek Road (south of the MKT location). Ground-water samples obtained from residential tap sources were analyzed for TCL and TAL (total only). A summary of organic and inorganic sampling results for the two sampling events is given in Table 6.

Only a few compounds were detected in the samples collected from the residential wells. Methylene chloride was most frequently detected, especially in the first sampling event, but it was also detected in QA/QC blanks, thus is a suspected laboratory contaminant. The source of the other organics that were detected is unknown, but their levels are below relevant maximum contaminant concentrations. Several inorganics were also detected in the residential tap water samples, although concentrations were also below relevant maximum contaminant levels.

Table 6

Ground-Water Data Summary
Organic Compounds
Residential Wells

MKT LOCATION

1990

COMPOUNDS (a)	CRQL (b)	Clymer TAP		Drasher TAP		Potten TAP		Klein TAP		Wesner TAP		Ritsick TAP		Krushinsky TAP		Krushinsky TAP (DUP)		Honey Brook		FIELD BLANK		TRIP BLANK	
		3/21	12/20	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19
VOLATILES																							
chloroform												0.3						0.2J					
methylene chloride			0.8B		0.6B		0.7B		0.9B		1B				0.7B		1B				2B		1B
1,1,1 trichloroethane						1.0	0.8J																
tetrachloroethene												0.5											
SEMI-VOLATILES																							
methoxychlor																					.031J		
dieldrin													.0083J										
alpha-chlordane													.0042J										

(a) Only elements detected are summarized.
(b) All units ug/l

B - Not detected above levels measured in blanks
L - Analyte present. Value reported is biased low, actual value expected to be higher.
P - Analyte present. Quantitation may not be accurate.
J - Analyte present. Reported value may not be accurate or precise.

Table 6 (continued)

Ground-Water Data Summary
Inorganics
Residential Wells

MKT LOCATION
1990

ELEMENT (a)	CRDL (b)	Clymer TAP		Drasher TAP		Potten TAP		Klein TAP		Wesner TAP		Ritsick TAP		Krushinsky TAP		Krushinsky TAP (DUP)		Honeybrook		FIELD BLANK		RINSE BLANK	
		3/21	12/20	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19	3/21	12/19
Aluminum	200	297	119P			206				264	156P	182		186				166B		162B		183	
Antimony	60											30											
Arsenic	10																		4L				
Barium	200	92	67P							104	94P	13	12P	79	61P		51P						
Cadmium	5			3B				3B				6B								2B			
Calcium	5000	11E3J	9450	1090J	1360P	3260J	3450P	807J	1240L	9590J	9680	9520J	8560	20E3J	13000		12400	20E3J	19900				
Chromium	10		14L																				
Cobalt	50	9										6											
Copper	25	1990	209L	899	304	2300	130	101	44L	35B		9790L	525	1780	371		271	9B					
Iron	100	11	72B		163L	88B	26L	9B	58B	754	260L	15B	75B	28B	118L		120L	21B	27B	9B			
Lead	3	5	4K	22	12	7	4	7	3		2P	28	23	41	20		16		4	2K	1P		
Magnesium	5000	9680	7980	2210	2040P	2210	2080P	481	527B	3390	3340P	2340	2640P	4750	3050P		3030P	2040	2070B				
Manganese	15	934	386	7B	11P	4B	5P			394	363	6B	5L	150	114		106						
Nickel	40	15	34P				43		46		22P		49		58		47		49				
Potassium	5000	1910	1190L	530		290		191		1330	865L	804	430L	1910	395P		350L	249					
Selenium	5									3													
Silver	10																						
Sodium	5000	76605	190L	1680	1760P	971	1360P	1240	770L	23E3	25E3L	14E3	11E3L	56600	36300		36400	3980	3640L	135B	410B	81B	
Thallium	10																				26K		
Vandium	50				11B	5B											16B						
Zinc	20	75	40	40	26B	26	10B	11	13P	20	18P	127	25	175	57		41B				12B		

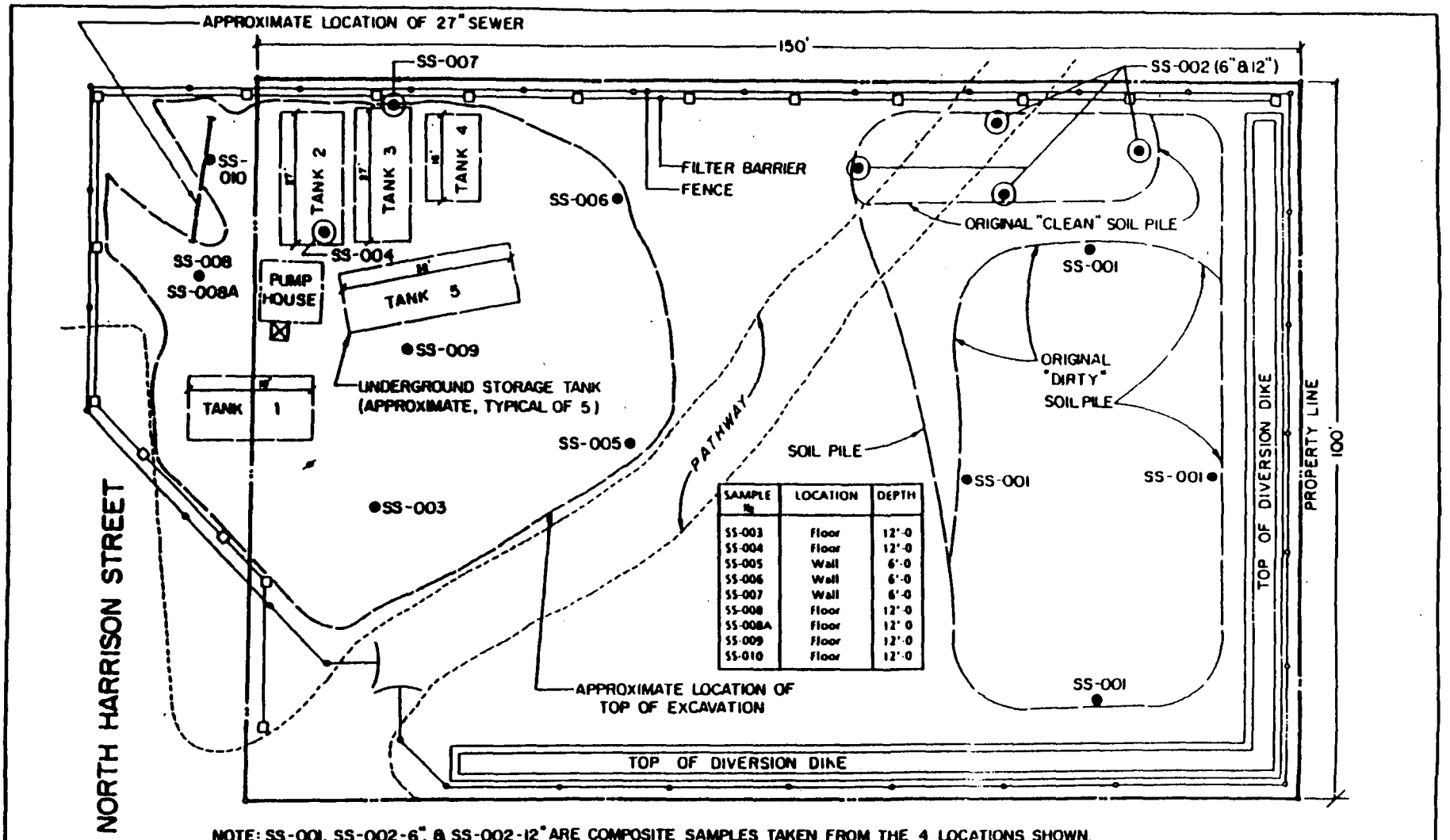
(a) Only elements detected are summarized.
(b) All units ug/l (total metals)
B - Not detected above levels measured in blanks
L - Analyte present. Value reported is biased low, actual value expected to be higher.
P - Analyte present. Quantitation may not be accurate.
J - Analyte present. Reported value may not be accurate or precise.
K - Analyte present. Reported value may be biased high, actual value expected to be lower.

MCADOO-BLAINE STREET (MBS) LOCATION

BACKGROUND INFORMATION REVIEW

The 1991 focused RI evaluated the results of confirmatory sampling performed by EPA as part of the removal of five underground tanks and approximately 3000 cubic yards of contaminated soil from the MBS location in 1985. Twelve soil samples were collected during 1985 removal activities at locations shown in Figure 11. In addition, 5 surface water samples were collected in 1985 from surface water features in the vicinity of the MBS location, at locations depicted in Figure 12. All samples were analyzed for a complete list of organic compounds and inorganics (Priority Pollutant List).

The results of confirmatory soil and surface water sampling are given in Tables 7 and 8. The results indicate that a few MBS location-related contaminants (organics and inorganics) remain in the subsurface soil. Regarding surface water, four organics and three inorganics were detected in the sample collected in the sewer outfall. In summary, the results of the historic soil and surface water sampling, and recent sampling of the Honeybrook wells indicate that MBS location related contaminants have not affected nearby surface water features or public water supply wells.



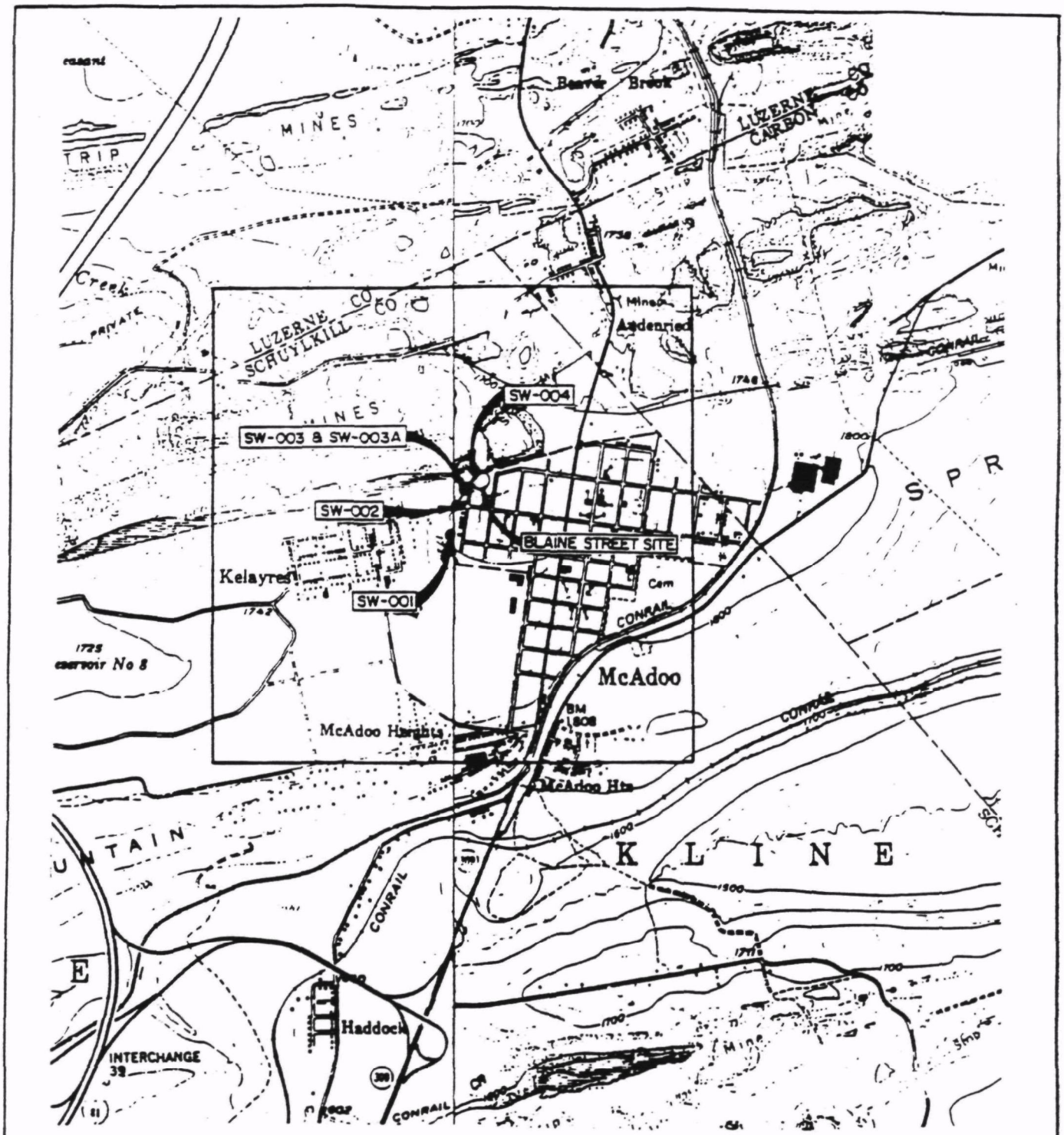
NOTE: SS-001, SS-002-6", & SS-002-12" ARE COMPOSITE SAMPLES TAKEN FROM THE 4 LOCATIONS SHOWN.

NOT TO SCALE

N

FIGURE 11
SOIL SAMPLING LOCATIONS
MCADOO-BLAINE STREET LOCATION
MCADOO, PENNSYLVANIA

SOURCE: NUS IRM FINAL REPORT, BLAINE STREET SITE, JULY 1986



SOURCE: NUS IRM FINAL REPORT, BLAINE STREET SITE, JULY 1986

FIGURE 12
SURFACE WATER SAMPLING LOCATIONS
MCADOO-BLAINE STREET LOCATION
MCADOO, PENNSYLVANIA

Table 7

Contaminants Detected in Soil - Phase 1
MBS LOCATION
(results reported in µg/kg)[1]

Contaminants	"Contaminated" Soil Pile - Composite	"Uncontaminated" Soil Pile - Composite		Pit Floor		Pit Wall			Trench			
	001	002-6	002-12	003	004	005	006	007	008	008A	009	010
Monocyclic Aromatics												
Total xylenes											2,400	
Halogenated Aliphatics												
Methylene chloride												470
Ketones												
Acetone												130
Phthalate Esters												
Bis(2-ethylhexyl)phthalate	180	15,000	1,100		6,500	150	24	35	30	82		540
Polynuclear Aromatic Hydrocarbons												
Naphthalene												210
2-Methylnaphthalene	260				1,800			35			3,700	310
Acenaphthylene								63	91	30		1,700
Pyrene		1,600			1,900		77	180	170	57		2,600
Fluoroanthene							120	380	340	86		3,100
Phenanthrene	140							180	140	30		1,800
Acenaphthene												120
Fluorene												460
Anthracene								93	60			870
Benzo(a)anthracene	24							110	89			1,400
Chrysene	49						80	180	200			2,500
Benzo(k)fluoranthene							56	130	120			2,200
Benzo(a)pyrene								100	96			1,900
Indeno(1,2,3-cd)pyrene												1,800
Dibenzo(a,h)anthracene												2,100
Benzo(g,h,i)perylene												2,400
Pesticides												
-BHC (Lindane)									44	14		
Heptachlor epoxide												4.9
4,4'-DDE								16				
4,4'-DDT								91				
Inorganics (mg/kg)												
Chromium	15	13	12	10	5	7	9	16	12	9	11	11
Copper	26	19	24	4	7	29	24	24	23	15	23	38
Lead	99	114	161	0.023	34	61	115	115	104	114	114	267
Mercury	0.2	0.3	0.2	0.3		0.3	0.2	0.3	0.1	0.3	0.2	0.3
Nickel		22	18									
Zinc	119	91	93	20	32	164	73	102	165	87	90	174
Percent Moisture	17	7	13	10	10	19	12	12	17	14	10	16

Notes:
[1] Lab results validated by NUS Corporation
Samples 001, 002-6, and 002-12 were composites from four areas within each pile.
Sample 002-12 was collected at a depth of 12 inches.
Samples 005-007 were collected at a depth of approximately 6-8 feet.
Sample 002-6 was collected at a depth of 6 inches.
Samples 003, 004, 008-010 were collected at a depth of 12 feet.
SOURCE: NUS Corporation IRM Final Report - July 1986

Table 8

Contaminants Detected in Surface Water
MBS LOCATION
(results reported in µg/l)[1]

Contaminant	SW-001 Reservoir	SW-002 Bridge	SW-003 West of Site	SW-003A West of Site	SW-004 Sewer Outfall (Downstream of Site)
Halogenated Aliphatics					
1,1,1-Trichloroethane					200
Methylene chloride					89
Ketones					
Acetone					21
Phthalate Esters					
Bis(2-ethylhexyl)phthalate					4
Inorganics					
Antimony			15		
Chromium		3			3
Copper	6	4	5	5	60
Zinc	29	40	36	49	90

(1) Note: Only compounds detected are presented

SOURCE: NUS Corporation IRM Final Report - July 1986

SUMMARY OF SITE RISKS

As part of the scope of work of the 1991 focused RI/FS completed for the site, a baseline risk assessment (RA) was performed. The RA typically evaluates the current and potential future risk(s) to human health and the environment as a result of site-related contaminants. It should be noted that most of the previous risks to human health and environment posed by the McAdoo Associates site were addressed as part of the 1984 IRM ROD removing tanks and contaminated soils at the MBS location, and the 1985 ROD removing contaminated soil and installing a cap on the entire area at the MKT location.

A summary of risks to human health and the environment as determined in the RA is set forth below. This section summarizes the findings of the human health risk and ecological risk assessment for the McAdoo Associates site. A summary of the risk assessment, including a description of the contaminants of potential concern, exposure pathways of concern, and potential carcinogenic risks and noncarcinogenic hazards estimated for the pathways quantitatively evaluated in the RI report is included in this section.

Contaminants of Potential Concern

Of the compounds detected at the McAdoo Associates site, contaminants of potential concern were selected based on several criteria, including evaluating the percent contribution of risk using derived risk factors, and the likely effect of former mining activities and acid mine drainage on the area. Contaminants of potential concern were selected for ground water at the MKT location as well as surface water and sediments in the Little Schuylkill River. Residential wells were not evaluated in the risk assessment since volatile organic compounds detected in these wells were not found to be site-related, although background levels of lead in the regional ground water may be of concern to public health.

Twenty-two chemicals were selected as contaminants of potential concern at the McAdoo Associates site including carcinogenic PAHs, volatile organic compounds, and a limited number of inorganics that differed between media. Most of the inorganics present in the ground water, surface water, and sediment can be predominantly attributed to the acid mine drainage in the area, and in most cases were not identified as site-related contaminants of concern.

Exposure Assessment

The following current land-use exposure pathways were quantitatively evaluated:

- direct contact with surface water and sediments by children playing in Little Schuylkill River; and
- ingestion of fish caught from Little Schuylkill River by recreational fisherman.

The following future land-use exposure pathways were quantitatively evaluated:

- ingestion of ground water and absorption and inhalation of chemicals while showering by hypothetical residents at the MKT location; and
- incidental ingestion and dermal absorption by hypothetical construction workers exposed to subsurface soils at the MBS location.

Exposure point concentrations were estimated for each contaminant of potential concern and exposure pathway. Exposure point concentrations and exposure parameters values were combined using a chemical intake equation to estimate exposure (i.e., chronic daily intake [CDI]) for the reasonable maximum exposure (RME) case for each contaminant of potential concern and pathway.

Human Health Risk

Toxicity criteria and CDIs identified in the Risk Assessment portion of the 1991 focused RI report were combined to quantify potential carcinogenic risks and noncarcinogenic hazards associated with the exposure pathways quantitatively evaluated in the McAdoo Associates site baseline risk assessment.

Potential carcinogenic risk was quantified by multiplying the CDI by the slope factor. Conservative exposure assumptions were used to estimate the CDIs in order that potential risk will not be underestimated. The assumptions used are discussed in detail in the 1991 focused RI report. Chemical-specific cancer risks were summed in order to quantify the total cancer risk associated with exposure to all contaminants of concern at the site. Potential carcinogenic risks were expressed as an increased probability of developing cancer over a lifetime (i.e., excess individual lifetime cancer risk). For example, a 10^{-6} increased cancer risk can be interpreted as an increased risk of 1 in 1,000,000 for developing cancer over a lifetime if an individual is exposed to site-related

contaminants. The NCP states that "for known or suspected carcinogens, acceptable levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}."

The noncarcinogenic hazard associated with exposure to a chemical was quantified by dividing the CDI by the chemical-specific reference dose (RfD) (note that the RfD values used in the 1991 focused RI risk assessment were obtained from current IRIS and HEAST data base updates.) This ratio is called the hazard quotient. If the hazard quotient exceeds unity (one), then an adverse health effect may occur. If the hazard quotient is less than unity, then adverse noncarcinogenic hazards are unlikely to occur. The potential hazard from all site-related contaminants was evaluated by calculating the hazard index, which is the sum of the chemical-specific hazard quotients.

A summary of the potential carcinogenic risks and noncarcinogenic hazards estimated for the exposure pathways quantitatively evaluated in the McAdoo Associates site baseline risk assessment are presented in Tables 9 through 15 and are summarized below:

- Current risks to human health related to direct exposure (i.e. children playing in the Little Schuylkill River) to surface water and sediments are within the National Contingency Plan (NCP) acceptable risk range (i.e. greater than 10^{-4}) for carcinogens (predominantly polynuclear aromatic hydrocarbons [PAHs]). Noncarcinogenic hazard was calculated to be below unity (Tables 9 and 10). Therefore, both carcinogenic or noncarcinogenic health effects associated with exposure to site-related contaminants present in surface water or sediment are unlikely to occur.

- There are no current site-related human health risks associated with the residual subsurface soil contamination at the MBS location. All residual contaminants are located at least 10 to 12 feet below the subsurface, and no current complete human health exposure pathway is identified.

- Current risks to human health related to ingestion of fish are within the NCP acceptable risk range for carcinogens (bis(2-ethylhexyl)phthalate), and noncarcinogenic hazard is calculated to be below unity (Table 11). Therefore, both carcinogenic or noncarcinogenic health effects associated with ingestion of fish exposed to MKT location-related contaminants present in surface water or sediment are unlikely to occur.

Table 9

Potential Carcinogenic Risk Associated with Direct Contact
of Surface Water by Children Playing in Little Schuylkill River for the RME Case

Chemical	RME Chronic Daily Intake (mg/kg/day)	Slope Factor $(mg/kg/day)^{-1}$	Weight-of-Evidence	Potential Cancer Risk
Organics:				
bis(2-Ethylhexyl)phthalate	6.8E-5	1.4E-2	B2	1.0E-6

Potential Noncarcinogenic Risks Associated with Direct
Contact of Surface Water by Children Playing in Little Schuylkill River
for the RME Case

Chemical (a)	RME Chronic Daily Intake (mg/kg/day)	RfD (mg/kg/day)	RfD Uncertainty Factor	Hazard Quotient
Organics:				
bis(2-Ethylhexyl)phthalate	4.8E-4	2.0E-2	1000	2.4E-2
Inorganics:				
Zinc	6.0E-3	2.0E-1	10	3.0E-2
		Total Hazard Index:		2.7E-2

(a) Toxicity criteria were not available for aluminum and cobalt; therefore, hazard quotients were not estimated for these elements.

Table 10

Potential Carcinogenic Risks Associated with Direct Contact with Sediment for Children Playing in Little Schuylkill River for the RME Case

Chemical	RME CDI for Incidental Ingestion (mg/kd/day)	RME CDI for Dermal Absorption (mg/kg/day)	Slope Factor $(mg/kg/day)^{-1}$	Weight-of-Evidence	Potential Cancer Risk for Ingestion	Potential Cancer Risk for Dermal Absorption
Organics:						
Benzo(a)pyrene (Equivalent)	1.4E-7	1.4E-7	1.2E+1	B2	1.7E-6	1.7E-6
Inorganics (a):						
Arsenic	2.4E-6	- - -	1.7E+0	A	4.1E-6	- - -
		Total Carcinogenic Risk by Route:			5.8E-6	1.7E-6
		Total Carcinogenic Risk for Sediment:				7.5E-6

Potential Noncarcinogenic Risks Associated with Direct Contact with Sediments for Children Playing in Little Schuylkill River for the RME Case

Chemical (b)	RME CDI for Incidental Ingestion (mg/kd/day)	RME CDI For Dermal Absorption (mg/kg/day)	RfD (mg/kd/day)	RfD Uncertainty Factor	Hazard Quotient for Ingestion	Hazard Quotient for Dermal Absorption
Inorganics: (a)						
Arsenic	1.7E-5	- -	1.0E-3	1	1.7E-2	- -
Chromium	5.0E-4	- -	5.0E-3	500	1.0E-1	- -
Zinc	7.1E-4	- -	2.0E-1	10	3.6E-3	- -
Total Hazard Index:				1.2E-1		

(a) The dermal absorption of inorganics in negligible; therefore, exposure and risk were not estimated for this route.
(b) Toxicity criteria were not available for benzo(a)pyrene (equivalent), cobalt, and lead; therefore, hazard quotients were not estimated for these chemicals.

Table 11

Potential Carcinogenic Risk Associated with Ingestion of Fish
from Little Schuylkill River Under Current Land-Use Conditions for the RME Case

Chemical	Chronic Daily Intake (mg/kg/day)	Slope Factor $(mg/kg/day)^{-1}$	Weight of Evidence	Potential Cancer Risk
Organics:				
bis(2-Ethylhexyl)phthalate	1.1E-3	1.4E-2	B2	1.5E-5

Potential Noncarcinogenic Risks Associated with Ingestion of Fish
from Little Schuylkill River Under Current Land-Use Conditions for the RME Case

Chemical (a)	RME Chronic Daily Intake (mg/kg/day)	RfD (mg/kg/day)	RfD Uncertainty Factor	Hazard Quotient
Organics:				
bis(2-Ethylhexyl)phthalate	2.5E-3	2.0E-2	1000	1.3E-1
		Total Hazard Index:		1.3E-1

(a) Toxicity criteria were not available for aluminum and cobalt; therefore, hazard quotients were not estimated for these elements.

- The potential risks from multiple exposure pathways under current land-use conditions are within the NCP acceptable risk range for carcinogens. the noncarcinogenic hazard was calculated to be below unity (Table 12).

- Future risks to human health related to ingestion of and exposure via dermal absorption and inhalation to ground water from the MKT location exist (Tables 13 and 14). Based on the scenario of ingestion of and exposure to mine pool ground water, the potential carcinogenic risk, primarily associated with 1, 2 dichloropropane, is 1×10^{-3}, and the hazard index (noncarcinogenic hazard) is 1. Therefore, there is potential for carcinogenic risk and noncarcinogenic hazard associated with future mine pool ground water ingestion and exposure. However, it is unlikely that the mine pool will ever be used for water supply given the low pH of the water as a result of acid mine drainage, low expected well yields, and overall poor natural background water quality.

- Future risks to human health related to exposure to subsurface soil at the MBS location via future construction activities (construction worker scenario of exposure via dermal absorption and incidental ingestion) are within the NCP acceptable risk range for carcinogens (PAHs), and noncarcinogenic hazard is calculated to be below unity (Table 15). Therefore, carcinogenic or noncarcinogenic health effects associated with exposure to residual contaminants during any future MBS location construction activities are unlikely to occur.

ECOLOGICAL RISK

- There are no federal or Commonwealth of Pennsylvania threatened, endangered species, or species of concern observed in the vicinity of the McAdoo Associates site.

- The aquatic community of the Little Schuylkill River is severely affected by AMD, indicating high ecological risk. However, given the limited amount of MKT location-related contamination in the surface water and sediment, the impact of the MKT location to the aquatic community is minimal.

- No ecological risk is identified with respect to the MBS location.

Table 12

Potential Risks from Multiple Exposure Pathways
under Current Land-Use Conditions

Pathway	Potential Carcinogenic Risk for the RME Case	Hazard Index for RME Case
Children Playing in Little Schuylkill River:		
Ingestion of sediments	6E-6	0.12
Dermal absorption from sediments	2E-6	0
Dermal absorption from surface water	1E-6	0.03
Subtotal for Pathway:	9E-6	0.15
Fishing in Little Schuylkill River	2E-5	0.13
Total for all Routes (a):	3E-5	0.28

(a) It should be noted that these risk estimates are conservative upper-bound estimates that assume that an individual is exposed according to the RME scenario outlined in this report for all exposure pathways evaluated; and thus represents the maximum possible risk under current land-use conditions.

Table 13

Potential Carcingenic Risks Associated with Ingestion and Dermal Absorption Exposure of from Use of Ground Water at the MKT Location by Hypothetical Residents for the RME Case

Chemical	RME Chronic Daily Intake (mg/kg/day)	Slope Factor $(mg/kg/day)^{-1}$	Weight-of-Evidence	Potential Cancer Risk
Organics:				
1,1-Dichloroethane	6.0E-4	9.1E-2	C	5.5E-5
1,1-Dichloroethene	1.2E-4	6.0E-1	C	7.2E-5
1,2-Dichloropropane	1.2E-2	6.8E-2	B2	8.2E-4
			Total Carcinogenic Risk:	1E-3

Potential Noncarcinogenic Risks Associated with Ingestion and Dermal Absorption Exposure from Use of Ground Water at the MKT Location by Hypothetical Residents for the RME Case

Chemical (a)	RME Chronic Daily Intake (mg/kg/day)	RfD (mg/kg/day)	RfD Uncertainty Factor	Hazard Quotient
Organics:				
1,1-Dichloroethane	1.4E-3	1.0E-1	1000	1.4E-2
1,1-Dichloroethene	2.9E-4	9.0E-3	1000	3.2E-2
1,1,1-Trichloroethane	1.0E-2	9.0E-2	1000	1.1E-1
Inorganics:				
Silver	2.0E-3	3.0E-3	2	6.7E-1
Zinc	3.5E-2	2.0E-1	10	1.8E-1
			Total Hazard Index:	2.7E+0

(a) Toxicity criteria were not available for aluminum, cobalt and 1,2-dichloropropane.

Table 14

Potential Carcinogenic Risks Associated with the Inhalation of VOCs
While Showering for Hypothetical Residents
at the MKT Location for the RME Case

Chemical	RME Chronic Daily Intake (mg/kg/day)	Slope Factor $(mg/kg/day)^{-1}$	Weight-of-Evidence	Potential Cancer Risk
1,1-Dichloroethane	2.3E-4	9.1E-2	C	2.1E-5
1,1-Dichloroethene	4.8E-5	1.2E+0	C	5.8E-5
1,2-Dichloropropane	4.8E-3	6.8E-2(a)	B2	3.2E-4
			Total Carcinogenic Risk:	4.0E-4

Potential Noncarcinogenic Risks Associated with
Inhalation of VOCs While Showering for Hypothetical Residents
at the MKT Location for the RME Case

Chemical (b)	RME Chronic Daily Intake (mg/kg/day)	RfD mg/kg/day)	RfD Uncertainty Factor	Hazard Quotient
1,1-Dichloroethane	5.7E-4	1.0E-1	1000	5.7E-3
1,1-Dichloroethene	1.2E-4	9.0E-3(c)	1000	1.3E-2
1,1,1-Trichloroethane	4.8E-3	3.0E-1	1000	1.6E-2
			Total Hazard Index:	3.5E-2

(a) No inhalation slope factor (SF) was available for 1,2-dichloropropane for this pathway. In order to calculate risk, the oral SF was used.

(b) No oral or inhalation RfDs were available for 1,2-dichloropropane; therefore, the estimated risk does not include this chemical.

(c) No inhalation RfD was available for 1,1-dichloroethene for this pathway. In order to calculate risk, the oral RfD was used.

Table 15

Potential Carcinogenic Risks
Associated with Direct Contact with
Subsurface Soils by Hypothetical
Construction Workers
MBS Location

	Exposure Point Concentration (ug/kg)	RME CDI (mg/kg/day)	SF $(mg/kg/day)^{-1}$	Potential Carcinogenic Risk
Organics:				
Benzo(a)pyrene (Equivalent)	5,271	3.1E-8	11.5	3.6E-7
gamma-BHC	44	2.6E-10	1.3	3.4E-10
DDT (total)	107	6.3E-10	0.34	2.1E-10
bis(2-Ethylhexyl)phthalate	6,500	3.8E-8	0.014	5.3E-10
Heptachlor Epoxide	4.9	2.9E-11	9.1	2.6E-10
Methylene Chloride	470	5.6E-9	7.5E-3	4.2E-11
			Total Carcinogenic Risk:	4E-7

Potential Noncarcinogenic Hazards

Chemical	Exposure Point Concentration	RME CDI (mg/kg/day)	RFD (mg/kg/day)	Hazard Quotient
Organics (ug/kg):				
Acetone	130	6.0E-7	1E-1	6.0E-6
gamma-BHC	44	1.0E-7	3E-4	3.3E-4
DDT (total)	107	2.5E-7	5E-4	5.0E-4
bis(2-Ethylhexyl)phthalate	6,500	1.5E-5	2E-2	7.5E-4
Heptachlor Epoxide	4.9	1.1E-8	1.3E-5	8.5E-4
Methylene Chloride	470	2.2E-6	6E-2	3.7E-5
Polycyclic Aromatic Hydrocarbons				
Anthracene	870	2.0E-6	3E-1	6.7E-6
Flouranthene	3,100	7.1E-6	4E-3	1.8E-3
Flourene	460	1.1E-6	4E-2	2.8E-5
Napthalene	210	4.8E-7	4E-3	1.2E-4
Pyrene	2,600	6.0E-6	3E-2	2.0E-4
Xylenes (total)	2,400	5.5E-6	2E+0	2.8E-6
Inorganics (mg/kg):				
Chromium	16	2.2E-5	5E-3	4.4E-3
Copper	38	5.3E-5	1.3E+0	4.1E-5
Mercury	0.3	4.2E-7	3E-4	1.4E-3
Zinc	174	2.4E-4	2E-1	1.2E-3
			Hazard Index	1E-2

SELECTED REMEDY

After consideration of the existing and future risks posed to human health and environment, EPA's selected remedy for the McAdoo Associates site is No Further Action, with monitoring. Based on information collected to date, the EPA has determined that no additional remedial actions other than those already implemented are required to ensure protection of human health and the environment beyond ground-water monitoring. Monitoring at the MKT location (which is already proposed as part of the 1985 ROD) will be expanded to include all of the existing monitoring wells. Samples from these wells shall be analyzed for volatile organic compounds and nine inorganics. Three inorganics (cobalt, silver, and zinc) are included because they were selected as contaminants of concern for ground water during the RI for this ROD, and the other six inorganics (beryllium, cadmium, chromium, nickel, lead, and cyanide) were selected in view of their concentrations detected in soil samples collected as part of the RI for the 1985 ROD for this site. At the MBS location, four monitoring wells will be installed and long-term ground-water monitoring will be performed. Samples from these wells shall be analyzed for volatile and semi-volatile organic compounds and TAL inorganics. The duration of ground-water monitoring at both locations will be 30 years.

Although the ground water in the mine pool is contaminated with 1, 2 dichloropropane, it does not result in any additional level of risk since there is no complete pathway to affect human health. If the mine pool were considered for use as a source of potable water, the technical difficulties associated with treating this ground water would prevent any such project from occurring. These difficulties are primarily associated with the treatment that would be required to make the water potable, namely the large amount of lime that would be required to adjust the pH of the highly acidic water, and the treatment that would be required to reduce the high concentrations of metals present. The pH adjustment and metals treatment alone would result in the generation of large amounts of lime sludge that would need to be disposed of either in a municipal or possibly a hazardous waste disposal facility. Furthermore, once the pre-treatment is complete, it is likely that additional treatment for the 1, 2 dichloropropane would be required, as this compound would probably volatilize during the exothermic reaction and vigorous mixing associated with the pre-treatment process. Therefore, as discussed above, it would be unreasonable to assume that this water resource, which has been severely affected by natural conditions, would ever provide a complete pathway for human exposure to necessitate any remedial action beyond the No Further Action alternative.

The present worth cost of this No Further Action, with Monitoring remedy is $503,540. The breakdown of this cost is $69,540 for the

capital costs (primarily monitoring well installation) and $434,000 for monitoring costs.

Because this remedy will result in hazardous substances remaining on-site, a review will be conducted within five years after the commencement of this remedial action in accordance with Section 121(c) of CERCLA, 42 U.S.C. Section 9621(c), to ensure that human health and the environment continue to be adequately protected by the remedy. It should be noted that previous remedial actions shall also be reviewed in the future.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the McAdoo Associates site was released for public comment on July 22, 1991. The Proposed Plan identified the no further action, with monitoring alternative as the EPA preferred alternative. EPA reviewed all written and verbal comments submitted during the public comment period. Based on the review of these comments, it was determined that no significant changes to the preferred alternative, as it was originally identified in the Proposed Plan (and presented in this ROD), were necessary.

MCADOO ASSOCIATES SITE OU2
ADMINISTRATIVE RECORD FILE *
INDEX OF DOCUMENTS

II. REMEDIAL ENFORCEMENT PLANNING

1. Report: McAdoo Associates Site, Final Cover System 100 Percent Design Package, prepared by Roy F. Weston, Inc., 12/7/90. P. 200001-200160. A transmittal letter is attached.

* Administrative Record File available 7/23/91, updated 7/30/91, updated 9/27/91.

Note: Information pertaining to McAdoo OU2 can also be found in the McAdoo OU1 Administrative Record File, located at the same site repository and file as this record.

III. REMEDIAL RESPONSE PLANNING

1. Report: Work Plan, Volume I, (Technical), Remedial Investigation/Feasibility Study, prepared by Tetra Tech, Inc., 9/90. P. 300001-300107.

2. Memorandum to Mr. John S. Mellow, Pennsylvania Department of Environmental Resources (PADER), from Ms. Kate Crowley, PADER, re: Comments on the work plan, 11/8/90. P. 300108-300108.

3. Letter to Mr. Tad Yancheski, Tetra Tech, Inc., from Mr. Eugene Dennis, U.S. EPA, re: Comments on the work plan, 11/14/90. P. 300109-300112.

4. Memorandum to Mr. Eugene Dennis, U.S. EPA, from Mr. Mike Ellickson, U.S. EPA, re: Comments on the project plan, 12/4/90. P. 300113-300129.

5. Letter to Mr. Eugene Dennis, U.S. EPA, from Mr. Joseph D'Onofrio, PADER, re: Comments on the work plan, 12/7/90. P. 300130-300130.

6. Letter to Mr. Ted [sic] Yancheski, Tetra Tech, Inc., from Mr. Eugene Dennis, U.S. EPA, re: Comments on the work plan and Field Sampling Plan, 12/12/90. P. 300131-300133.

7. Letter to Mr. Eugene Dennis, U.S. EPA, from Mr. Tad B. Yancheski, Tetra Tech, Inc., re: Revisions to McAdoo Project Plans, 12/17/90. P. 300134-300174. The amended pages are attached.

8. Letter to Mr. Tad Yancheski, Tetra Tech, Inc., from Mr. Eugene Dennis, U.S. EPA, re: Approval of work plan, 1/14/91. P. 300175-300175.

9. Report: Feasibility Study Report for Surface Water, Sediment, Ground-Water, and Blaine Street Elements, prepared by Tetra Tech, Inc., 7/91. P. 300176-300290.

10. Report: Remedial Investigation Report for Surface Water, Sediment, Ground-Water, and Blaine Street Elements, prepared by Tetra Tech, Inc., 7/91. P. 300291-300630.

11. Report: Remedial Investigation Report for Surface Water, Sediment, Ground-Water, and Blaine Street Elements Appendices, prepared by Tetra Tech, Inc., 7/91. P. 300631-300899.

12. Letter to Mr. Tad Yancheski, Tetra Tech, Inc., from Mr. Eugene Dennis, U.S. EPA, re: Comments on the Draft Remedial Investigation Report. 7/18/91. P. 300900-300909.

13. Letter to Mr. Tad Yancheski, Tetra Tech, Inc., From Mr. Eugene Dennis, U.S. EPA, re: Comments on the Feasibility Study for McAdoo, 7/18/91. P. 300910-300913.

14. Letter to Mr. Eugene Dennis, U.S. EPA, from Mr. Tad B. Yancheski, Tetra Tech, Inc., re: Transmittal of revisions to the RI/FS, 7/22/91. P. 300914-301086.

15. U.S. EPA Proposed Plan, McAdoo Associates Superfund Site, 7/22/91. P. 301087-301097.

16. Letter to Mr. Eugene Dennis, U.S. EPA, from Mr. Joseph D'Onofrio, PADER, re: Comments on draft proposed plan, 7/17/91. P. 301098-301099.

17. Letter to Mr. Eugene Dennis, U.S. EPA, from Mr. Tad B. Yancheski, Tetra Tech, Inc., re: Transmittal of Revised Remedial Investigation Study Report, Appendix B, 7/23/91. P. 301112-301254. The report is attached.

V. COMMUNITY INVOLVEMENT/ CONGRESSIONAL CORRESPONDENCE/IMAGERY

1. U.S. EPA Public Meeting, McAdoo Superfund Site, 8/8/91. P. 500001-500089.

2. Letter to Ms. Francesca DiCosmo, U.S. EPA, from Mr. Michael W. Ziegler, re: Comments to the proposed clean up alternative, 8/9/91. P. 500090-500090.

BIBLIOGRAPHY OF SITE SPECIFIC DOCUMENTS

1. Settlement and Cover Subsidence of Hazardous Waste Landfills: Project Summary, prepared by M. W.L. Murphy and M. P.A. Gilbert, 5/1/85.
EPA-600/S2-85-035

2. Review of In-place Treatment Techniques for Contaminated Surface Soils - Vol. 1: Technical Evaluation, prepared by OSWER/OERR/ORD/MERL, 9/19/84.
EPA/540/2-84-003a

3. Final RCRA Comprehensive Ground-Water Monitoring Evaluation (CME) Guidance Document, prepared by M. G.A. Lucero and OWPE, 12/19/86.
OSWER #9950.2

4. Ground-Water Protection Strategy, prepared by the Office of Ground-Water Protection, 8/1/84.
EPA/440/6-84-002

5. RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, TEGD: Executive Summary, prepared by M. G.A. Lucero and OWPE, 7/1/87.
OSWER #9950.1-a

6. CERCLA Compliance with Other Laws Manual - CERCLA Compliance with State Requirements [Quick Reference Fact Sheet], prepared by OSWER, 12/1/89.
OSWER #9234.2-05FS

7. CERCLA Compliance with Other Laws Manual - CERCLA Compliance with the CWA and SDWA [Quick Reference Fact Sheet], prepared by OSWER, 2/1/90.
OSWER #9234.2-06FS

8. CERCLA Compliance with Other Laws Manual - Overview of ARARs - Focus on ARAR Waivers [Quick Reference Fact Sheet], prepared by OSWER, 12/1/89.
OSWER #9234.2-03FS

9. RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD), prepared by EPA, 9/1/86.
OSWER #9950.1