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Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R05-91/166
August 1991

EPA

Superfund Record of Decision:

South Macomb Disposal #9, 9A, MI

50272-101

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 159-acre South Macomb Disposal #9, 9A site contains two inactive municipal landfills in Macomb Township, Macomb County, Michigan. Land use in the area is predominantly agricultural and rural, with several adjacent residences. A small stream, the McBride Drain, runs along the western and southern boundaries of the site, and there is a possible wetlands area located at the site. Until 1989, the estimated 34 residents in the immediate vicinity of the site used shallow and intermediate aquifers associated with contamination from landfills as their drinking water supply. From 1968 to 1975, South Macomb Disposal Authority (SMDA), a municipal corporation, used the site to facilitate the management and disposal of municipal refuse for five towns in Macomb County. SMDA acquired the 75-acre area #9 in 1968, accepted 680,000 cubic yards of municipal waste, and capped the area with soil in 1971. Subsequently, SMDA acquired the adjacent 84-acre area 9A in 1970, filled it with 1,200,000 cubic yards of municipal waste, and capped the area with a mixture of sand, clay and silt in 1975. As a result of reported fish kills and continued reports of leachate seepage into McBride Drain, a number of State investigations between 1976 and 1982 verified that the site was the source of the leachate problem and prompted SMDA to upgrade and

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - South Macomb Disposal #9, 9A, MI
First Remedial Action
Contaminated Medium: gw
Key Contaminants: VOCs (benzene, toluene), other organics (phenols), and metals (arsenic and chromium)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 75
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

Abstract (Continued)

expand leachate collection systems along various portions of area 9A. From 1983 to 1984, the State investigations detected VOC-contaminated ground water in several residential wells near the site. Consequently, from 1985 to 1988, SMDA constructed an additional leachate collection system on area #9, and a slurry wall across the northern portion of area #9. In 1989, Macomb Township connected residences near the site to the municipal water supply. This Record of Decision (ROD) addresses onsite contaminated ground water as Operable Unit 1 (OU1). A future ROD will address the landfill contents as OU2. The primary contaminants of concern affecting the ground water are VOCs including benzene and toluene; other organics including phenols; and metals including arsenic and chromium.

The selected remedial action for this site includes installing extraction wells in the intermediate aquifer, both within and outside the site boundary and subsurface drains in the shallow aquifer along the periphery of the waste deposits in both sites #9 and 9A; collecting ground water and leachate in a series of collection sumps, followed by pumping to the onsite ground water treatment system; treating the contaminated ground water onsite using air stripping, followed by granular activated carbon, oxidation/precipitation, and granular media filtration, with onsite discharge of the treated water to McBride Drain; disposing of any treatment residuals offsite; extending the existing slurry wall along the east side of area #9; providing a municipal water supply to any residences within a one-half mile radius of the site that are not currently attached; conducting long-term monitoring of ground water, surface water, sediment of McBride Drain, leachate, air, and residential wells; and implementing institutional controls including deed and ground water restrictions, and site access restrictions including fencing. The estimated present worth cost for this remedial action is $9,264,000, which includes an annual O&M cost of $224,000.

PERFORMANCE STANDARDS OR GOALS: Chemical-specific ground water clean-up goals are based on the more stringent of State standards or SDWA MCLs, and include benzene 2 ug/l (State), toluene 100 ug/l (State), phenols 1,100 ug/l (State), arsenic 1 ug/l (State), and chromium 100 ug/l (MCL).

DECLARATION
for the
RECORD OF DECISION

South Macomb Disposal Authority, Landfills 9 and 9a
Macomb County, Michigan

Statement of Basis and Purpose

This decision document presents the selected remedial action for the South Macomb Disposal Authority, Landfills 9 and 9a, (SMDA) Site, in Macomb County, Michigan, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this Site.

The State of Michigan concurs with the selected remedy. The letter of concurrence is attached.

Assessment of the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

The selected remedy is the first operable unit at the Site. Operable units are discrete actions that comprise incremental steps toward the final remedy. The nature of the second operable unit to address the landfill contents will be assessed during the performance of the first operable unit. The selected remedy treats the greatest risk posed by conditions at the Site, exposure by ingestion or direct contact with contaminants in the ground water. The treatment will achieve substantial risk reduction through extraction of the contaminated ground water at the Site, and treatment to health-based levels.

The major components of the selected remedy include the following:

- Installation of ground-water extraction wells and a slurry wall to control the plume of contamination;
- Construction of a collection and on-site treatment system for contaminated ground water;
- Long-term environmental monitoring;
- Connection of all residents in the immediate vicinity of the SMDA Site to a municipal water supply.

Declaration of Statutory Determinations

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

FOR Valdas V. Adamkus
Regional Administrator

9/13/91
Date

TABLE OF CONTENTS

FIGURES and TABLES

Figures

Tables

DECISION SUMMARY

A. Site Location and Description

The South Macomb Disposal Authority (SMDA) Landfill site is located at Foss Road and 24 Mile Road, in Macomb Township, Macomb County, Michigan (see Figure 1), about 25 miles north of Detroit, Michigan. The 159-acre site consists of two adjacent, rectangular-shaped municipal landfills, sites 9 and 9a, as shown in Figure 2. The landfills received municipal waste from 1968 until closure in 1975.

The surrounding area is generally rural/agricultural; residences and farm fields are located to the north, east, and west within several hundred feet of the landfill; a golf course and McBride Drain, a small stream, border the south. Macomb Township has a population of approximately 20,000 people. About 2,200 people live within a three-mile radius of the site, many of whom have private water wells as their drinking source. Thirty-four residences are located in the immediate vicinity of the site, along 24 Mile Road, Foss Road, and Card Road. Most of these residents, particularly those whose wells were historically affected by the off-site plume of contamination, are now attached to a municipal water supply.

The drainage system for the site and immediate vicinity is McBride Drain, a small stream heavily used for recreational and agricultural purposes. McBride Drain flows along the western and southern borders of the site, then south to the north branch of the Clinton River, a distance of approximately 1.5 miles. The Clinton River discharges directly into Lake Saint Clair, located northeast of Detroit. The average flow for McBride Drain is 1.81 cubic feet per second (cfs). The average flow for the Clinton River is 127 cfs.

No wetlands were identified by the State of Michigan or the Department of Interior upon initial review of the workplan for the Remedial Investigation (RI) or consequent reviews of the RI and the Feasibility Study (FS). A preliminary environmental assessment has been performed by the U.S. Environmental Protection Agency (EPA) that indicated wetlands may be present; a more in-depth assessment will be performed during the design phase of the remedial action.

B. Site History and Enforcement Activities

The site was operated as municipal landfills by the SMDA from 1968 to 1975. SMDA is a municipal corporation formed in the late 1960s by five towns in southern Macomb County, Roseville, East Detroit, Center Line, Warren, and St. Clair Shores, to facilitate the management and disposal of municipal refuse for its members. SMDA's board of directors consists of mayors from each of the member towns. The landfills consist entirely of municipal waste. While hazardous substances are present in the leachate produced in

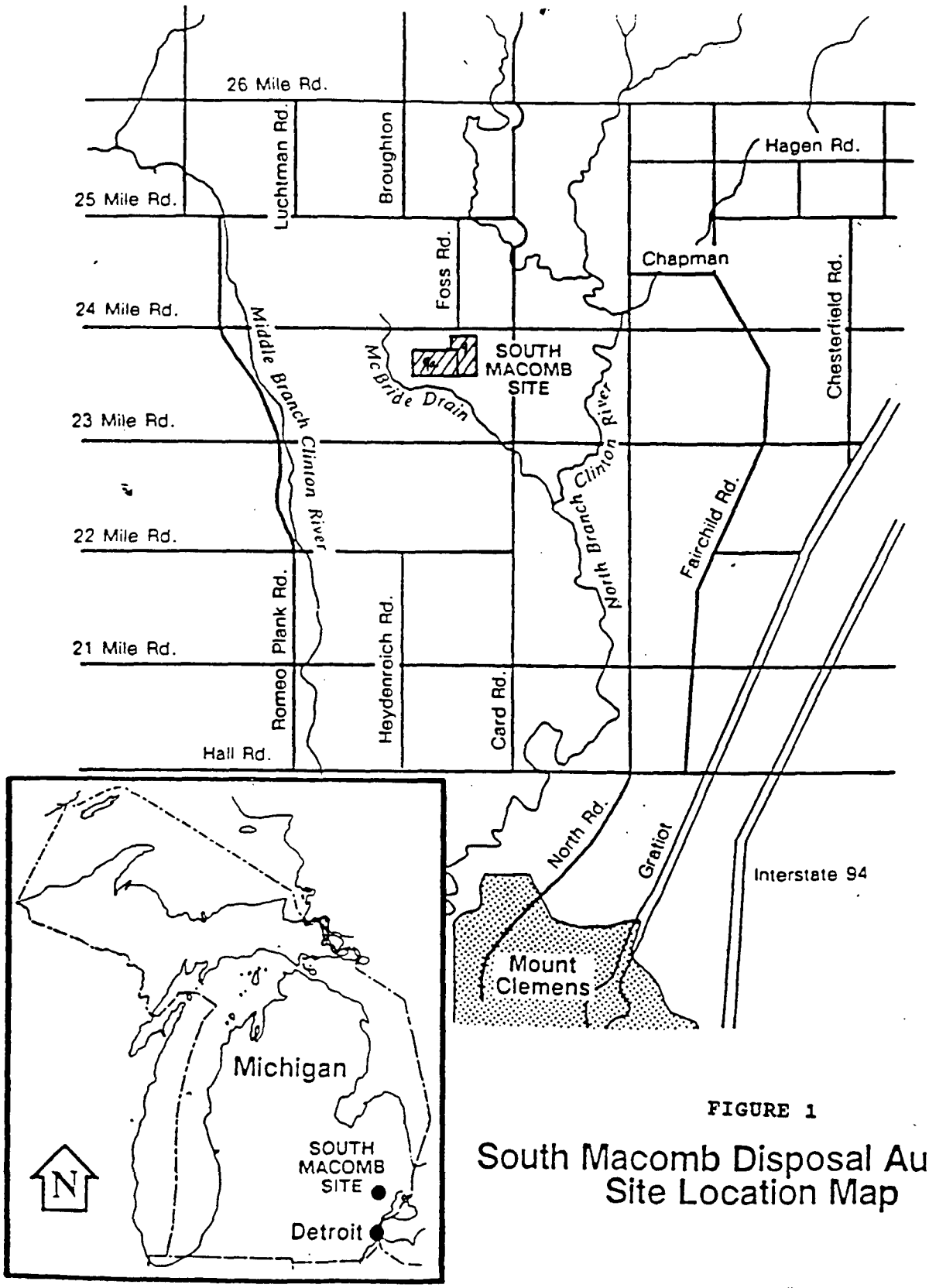
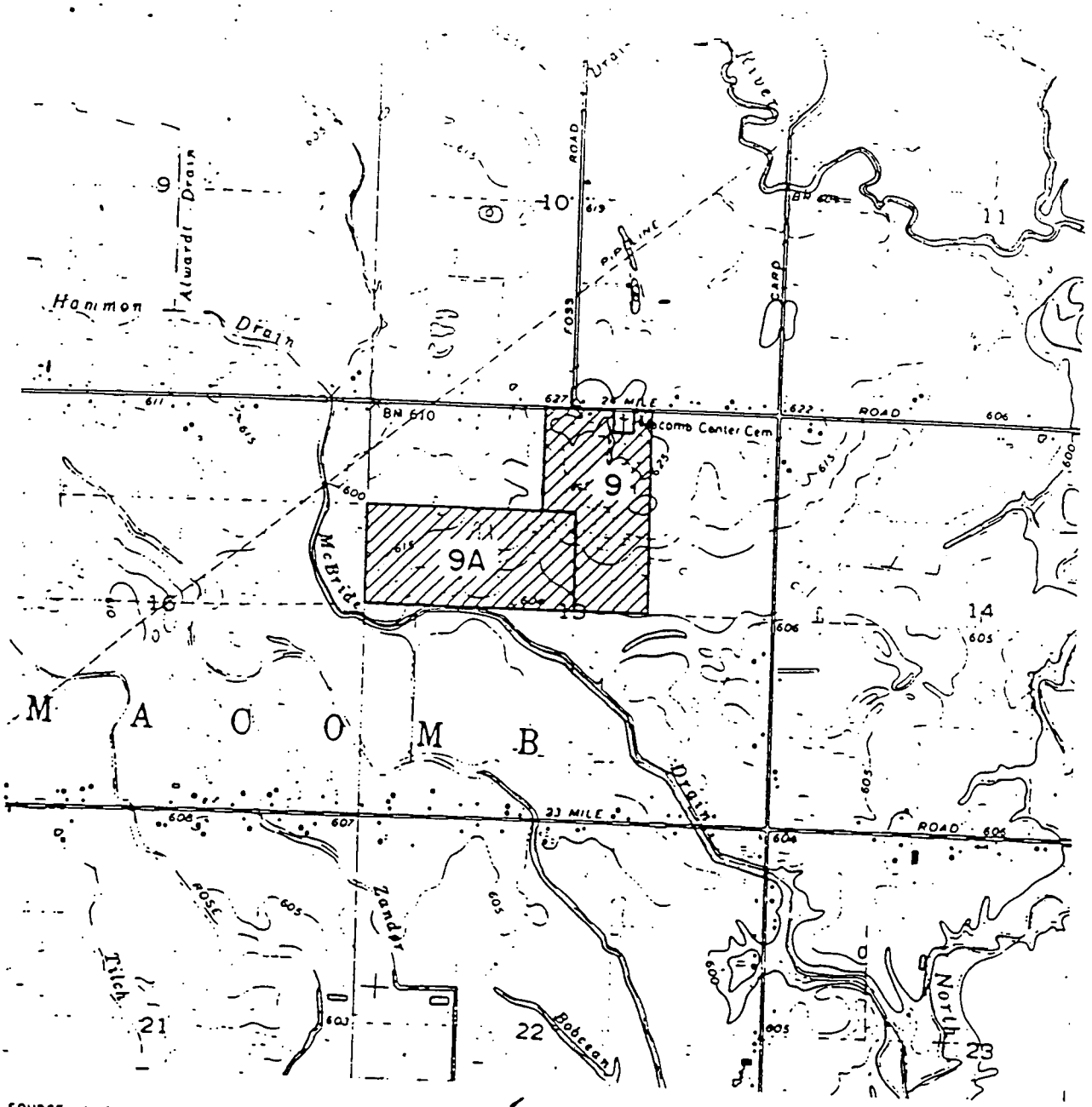
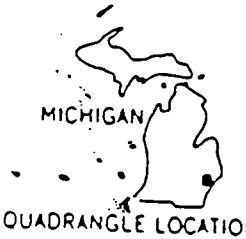


FIGURE 1

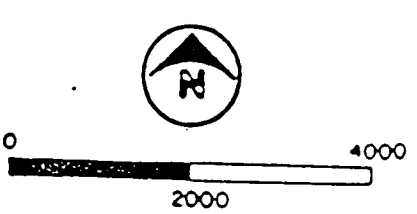
South Macomb Disposal Authority
Site Location Map



SOURCE: U.S.G.S. 7.5' topographic map, Waldenburg Quadrangle Michigan, Dated 1968 Photorevised 1973 and 1980 Scale: 1"=2000'.



QUADRANGLE LOCATION



SCALE IN FEET

POOR QUALITY ORIGINAL

LEGEND

DESIGNATES DISPOSAL SITES 9 AND 9A

FIGURE 2

SITE LOCATION

the landfill, there is no documentation indicating that non-household waste as defined by the Resource Conservation and Recovery Act (RCRA) and/or industrial waste was disposed of at the site.

SMDA acquired site 9, 75 acres, in 1968 and operated it until 1971. During this time, the site accepted about 680,000 cubic yards of municipal waste, some of which was placed directly into former mining pits containing water. In 1971, the site was closed and capped with soil. Subsequent reviews of site conditions by the Michigan Department of Natural Resources (MDNR) indicated that the soil cover thickness was less than the two feet required by Michigan law. Title to site 9 was transferred to Macomb Township in 1975.

As site 9 approached its operating capacity in 1970, SMDA purchased 84 acres of adjacent farm land to the west. This site, called 9a, began operations in 1971, accepting about 1,200,000 cubic yards of municipal waste. In 1975, at the completion of filling operations, site 9a was closed and covered with two feet of a mixture of sand, clay and silt.

During and after the operation of sites 9 and 9a, leachate from the landfills seeped into McBride Drain and flowed onto adjacent property, causing a ground-water contamination problem. Leachate discharges from the site were observed by the MDNR in 1971, 1975, 1976, and 1983. Complaints of fish kills and continued leachate seepage into McBride Drain prompted an MDNR investigation in 1976. The investigation verified the complaints and resulted in improved leachate management practices by SMDA. SMDA also improved erosion and sedimentation controls, tilling and regrading the landfill surface. However, leachate outbreaks occurred again north and south of the site in 1980 and 1982. In response to the 1980 leachate outbreak, SMDA installed a leachate collection system along the south-central and northern portions of site 9a.

In 1982, residents north of the site complained about a red slime that seeped into their basements. The substance was tested by the State and found not to be toxic. Residential wells were also tested. No contamination was found in the samples. In 1983, residents near the landfill filed suit against SMDA, Macomb County Health Department, Macomb Township, Michigan Department of Public Health, and the MDNR, for damages resulting from the site. Subsequently, the State of Michigan joined the residents as plaintiffs against SMDA and Macomb Township. The same year, the Michigan Department of Public Health detected volatile organic compounds (VOCs) in two residential wells near the site. These residents were advised not to drink their water and the State supplied bottled water. In 1984, two more residential wells were determined to be contaminated. In 1985, the State Attorney General obtained a circuit court order requiring SMDA to construct a leachate collection system on site 9 similar to the one on site 9a.

MDNR proposed to EPA that SMDA sites 9 and 9a be considered for cleanup under the Superfund program. On June 10, 1986, the site was placed on the National Priorities List (NPL) pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. Section 9605, with a Hazard Ranking System Score (HRS score) of 35.5, because of proximity to domestic water supplies and historic information on domestic well water quality. In May of 1987, notice letters were mailed to potentially responsible parties (PRPs) at the site, the South Macomb Disposal Authority (owner/operator) and Macomb Township (owner), inviting them to negotiate for the conduct of the Remedial Investigation/Feasibility Study (RI/FS). The PRPs declined the opportunity to perform the RI/FS.

Under an existing remedial contract, EPA assigned the consulting firm of CH2M Hill the RI/FS project. Field work began in October of 1988, about the time that SMDA, under a court order obtained by the State, began construction of a slurry wall across the northern edge of site 9. In 1989, Macomb Township, under a Consent Decree with the State, began the process of connecting residences around the site to municipal water. This process was completed by fall of 1990. This Consent Decree provides for residences to be hooked up to the municipal water supply if contamination originating from SMDA sites 9 and 9a is detected in their water supply in the future.

EPA completed the RI Report in August of 1990. The draft FS was released in September of 1990. In the intervening years since the May 1987 negotiations for performance of the RI/FS, EPA has determined that the five member townships of SMDA are PRPs individually liable for CERCLA cleanup costs at the site, as are the Macomb County Road Commission, and Van Dyke Disposal and Wiegand Disposal, both transporters. EPA issued notice letters to SMDA, its five member towns, Macomb Township, the Road Commission, and Van Dyke Disposal in March 1991, and Wiegand Disposal in July 1991. EPA continues to review the evidence concerning PRPs and may notify additional parties when it issues notice letters inviting PRPs to negotiate to perform the Remedial Design/Remedial Action (RD/RA) at the site.

In April 1991, a State of Michigan trial court judge ruled in the lawsuit instituted in 1983 that SMDA must undertake for both sites 9 and 9a, remedial measures to inhibit "leachate formation, breakouts and off-site migration" of contaminants. The court required grading and an impermeable cap consisting of at least "an increased slope and synthetic liner to ensure against percolation." Also the court ordered installation of slurry walls and a leachate collection system in addition to those already in place. Finally, the court ordered SMDA to perform "ground-water pumping of the contaminating plume by the purge well method."

C. Highlights of Community Participation

On October 6, 1988, EPA hosted a "kickoff" meeting at the Macomb Activities Hall in Mt. Clemens, Michigan. A community relations plan was finalized in May 1988. An RI update letter was distributed to the community in July of 1989. A public meeting was held on January 20, 1990 to provide the community with test results from residential well sampling and answer questions.

The RI/FS Report for the SMDA site was released to the public for review on October 1, 1990. The Proposed Plan was released to the public for comment on May 1, 1991. These two documents were made available to the public in both the administrative record and an information repository maintained at the EPA Docket Room in Region V and at the Macomb County Public Library located at 16480 Hall Road, Mt. Clemens, Michigan. The notice of availability for these two documents was published in the Macomb County Daily on May 1, 1991. A public comment period on the documents was held from May 1, 1991 to June 6, 1991. In addition, a public meeting was held on May 6, 1991 at the Senior Activities Center in Mt. Clemens, Michigan. At this meeting, representatives from EPA and MDNR answered questions about problems at the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this ROD.

The public participation requirements of CERCLA sections 113 (k) (2) (B) (i-v) and 117 have been met in the remedy selection process. This decision document presents the selected remedial action for the SMDA site, in Michigan, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan (NCP). The decision for this site is based on the administrative record.

D. Scope and Role of Operable Unit Within Site Strategy

The cleanup goals for this operable unit are to:

- Prevent direct contact with leachate and contaminated ground-water;
- Prevent off-site migration of the contaminants in the ground-water; and
- Remove and treat contaminants in ground-water.

These goals will be met through the proposed cleanup action, which includes an extension of the existing slurry wall on site 9; installation of ground-water extraction wells to control the plume of contamination; a collection/treatment system for contaminated ground-water; long-term environmental monitoring of ground-water;

and connection of all residents in the vicinity of the SMDA site to the municipal water supply. The proposed cleanup action is the first operable unit at the site. Operable units are discrete actions that comprise incremental steps toward the final remedy. The nature of a second operable unit to address the landfill contents will be assessed during performance of the first operable unit.

E. Summary of Site Characteristics

The remedial investigation involved extensive sampling and analysis of ground-water, air, surface water, sediment, leachate, subsurface soil, and surface soil. Water samples were collected from some residential wells around the site. Site geology, landfill characteristics, and ground-water flow patterns were also examined.

Based on the results of the RI, EPA determined that the greatest threat to human health and the environment by this site is through exposure, by direct contact or ingestion, to the VOCs, semi-volatile organic compounds (SVOCs), and inorganic compounds, such as metals, present in the leachate and ground-water. The following conditions were observed at the site:

1. Topography

The area surrounding the site is basically flat. The landfill operation has not resulted in any significant increase in topographic relief. The elevation of the ground surface surrounding the landfill ranges from approximately 605 feet (ft.) to 615 ft. above mean sea level (MSL). The site surface rises approximately 6 to 8 feet above the original land surface.

2. Hydrogeology

Three aquifers are located beneath the SMDA site: a shallow, an intermediate, and a deep aquifer. A ground-water divide defines an approximate ground-water basin containing about 95% of the SMDA site as shown in Figure 3. Ground water on either side of the divide may flow parallel to or away from the divide but never across the divide into another basin. The three aquifers are considered Class II aquifers by EPA because they are currently used or are potentially available for drinking water or other beneficial uses.

a. Shallow Aquifer. The shallow aquifer is discontinuous in nature. This unit generally includes saturated surficial sands, fill, and/or refuse where these materials reside above the shallow clay lacustrine unit. Where the lacustrine clay is absent, the shallow aquifer material is contiguous with the intermediate

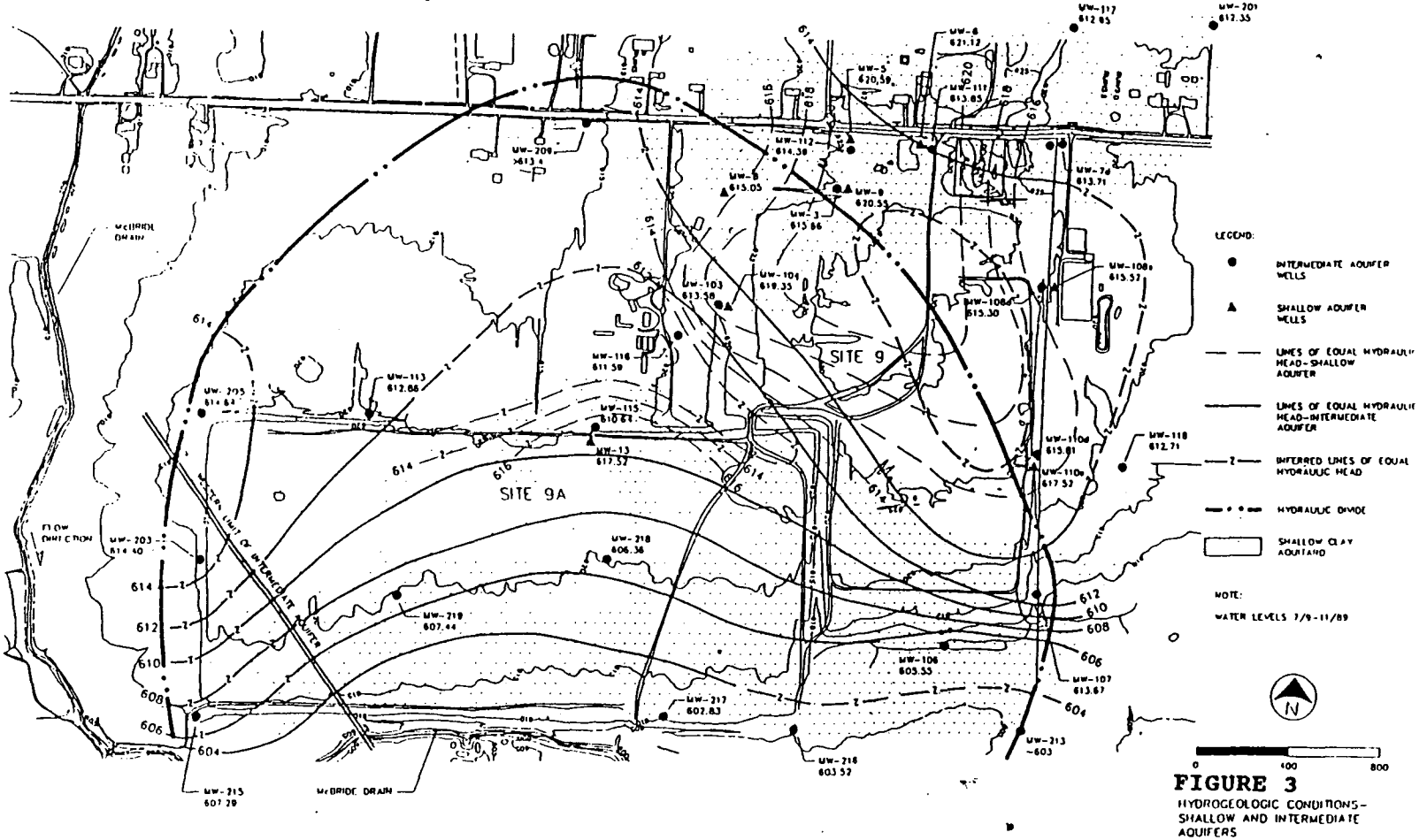


FIGURE 3

HYDROGEOLOGIC CONDITIONS-SHALLOW AND INTERMEDIATE AQUIFERS

SOUTH MACOMB DISPOSAL AUTHORITY SITE FS REPORT

aquifer and an unobstructed flow path exists between aquifers. This condition is most evident at site 9. The shallow aquifer extends down from approximately 615 ft. MSL to 600 ft. MSL.

Ground-water velocity in the shallow aquifer is approximately 0.61 feet per day. Most of this flow appears to be captured by the existing leachate collection system. In the absence of the system, the shallow aquifer would tend to discharge directly to McBride Drain through seepage, leachate seeps or springs. Ground-water flow tends to be radial on the north side of the hydraulic divide and south/west on the south side as shown in Figure 3.

b. Intermediate Aquifer. The intermediate aquifer consists of a lacustrine sand layer residing atop the fine grained glacial till and below the discontinuous lacustrine clay. The intermediate aquifer is generally confined where the overlying silty clay is present, and under water table conditions (unconfined) where it is absent. Where the clay unit is absent, the intermediate aquifer receives discharge from the shallow aquifer. The intermediate aquifer extends down from approximately 605 ft. MSL to 570 ft. MSL. Ground-water velocity in the intermediate aquifer is approximately 0.051 feet per day. Ground-water flow is generally southward toward McBride Drain.

c. Deep Aquifer. The deep aquifer includes a sandy glacial till layer sandwiched between upper and lower fine-grained till units. It is confined over the entire study area and buffered from the potential effects of the SMDA site by the intermediate aquifer and two aquitards. The deep aquifer extends from approximately 565 ft. MSL to 555 ft. MSL. Ground-water velocity in the deep aquifer is approximately 0.0041 feet per day. Ground-water flow is generally to the southeast at a uniform low gradient.

3. Landfills 9 and 9a

The partially fenced flat landfills are covered by trees and grasses. Surface water drains collect runoff, discharging it into a marshy area in the southwest corner of site 9, and directly into McBride Drain. Erosion is occurring along the perimeter of the landfill where steep, sandy slopes support sparse vegetation.

The site 9 landfill cover, thin and permeable, is considered a primary facilitator of leachate production and consequent contamination of the ground water. Refuse in site 9, up to 25

feet thick, is in direct contact with the shallow aquifer and intermediate aquifer.

The site 9a landfill cover is 2 to 3 feet thick and consists of a mixture of sand, clay and silt. Refuse in site 9a is up to 20 feet thick. As in site 9, most refuse is in direct contact with the shallow aquifer. Only a small portion, however, is in direct contact with the intermediate aquifer.

4. Leachate Collection Systems and Slurry Wall

Three leachate collection systems have been installed at the site. The most recent system was constructed in late 1988 along the northern edge of site 9, roughly in a line paralleling 24 Mile Road, 250 feet south of the property line. This system includes a slurry wall which extends about 40 feet through the shallow and intermediate aquifers and was keyed into the till in what appears to be a successful attempt to prevent the off-site migration of the plume of contamination to the north. A subsurface drain is located on the landfill side of the slurry wall at an elevation near the bottom of the shallow aquifer.

A second system was constructed along the south-central portion of site 9a following a leachate outbreak in 1980. This system, consisting of a six-inch underdrain which flows to a holding tank, was installed at an elevation above McBride Drain, entirely within the waste at site 9a, and extends for approximately 2,000 feet along the southern edge of the site. A small north-south lateral about 100 feet long exists in the southeastern part of site 9a. A third system was installed along the north side of site 9a.

Approximately 200,000 gallons of leachate per month are removed by tankers from the collection basins and treated at an off-site licensed wastewater treatment facility, City Environmental Inc. in Detroit, Michigan.

5. Contamination

a. Source

The source of contamination from this site is the landfilled waste. Much of the landfilled waste, up to 25 feet deep, is in direct contact with the shallow and intermediate aquifer ground water which means that the waste is in direct contact with laterally moving ground water. Leachate is produced in two ways: 1) by the horizontal movement of ground water through the waste and, 2) by the vertical movement of precipitation down through the cap and into the waste mass. Both means of leachate production are present at the site.

The presence of hazardous constituents in the waste mass is indicated by the chemical composition of the leachate. Volatile and semi-volatile organic compounds, inorganic compounds and metals were detected in the leachate including arsenic, methylene chloride, vinyl chloride, and cadmium. Table 1 lists the concentrations of contaminants of concern in the leachate.

The leachate produced and released by the site has contaminated ground water, and has historically impacted surface water, and has the potential to impact sediments at and near the site.

b. Ground Water

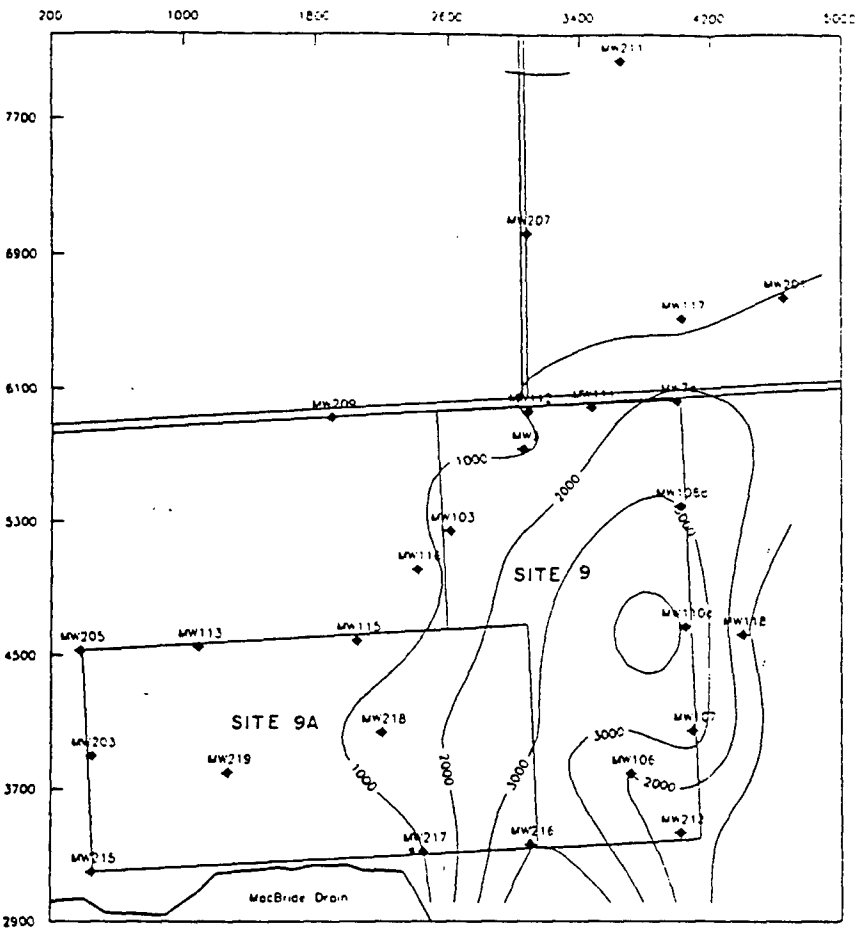
Three aquifers exist beneath the site: a shallow aquifer, an intermediate aquifer, and a deep aquifer.

i. Shallow Aquifer. Leachate from the landfill containing VOCs, SVOCs, and metals has seeped into and contaminated the shallow aquifer as shown in Figure 4. The contaminants include those found in the leachate samples taken from the leachate collection system. Table 2 summarizes the concentrations of contaminants found in the shallow aquifer.

ii. Intermediate Aquifer. Leachate from the landfills has contaminated the intermediate aquifer to a lesser extent. However, in most of site 9 and in portions of site 9a, the shallow aquifer connects with the intermediate aquifer, allowing a free flow of contaminants between the two aquifers. Figure 4 illustrates the plume of contamination. Table 3 summarizes the concentrations of contaminants found in the intermediate aquifer.

iii. Deep Aquifer. No evidence of contamination was found in the deep, confined aquifer.

Although contaminants were detected in the ground-water beyond the landfill boundaries as indicated by the results of the residential well and off-site monitoring well sampling, no organic compounds were detected at levels exceeding Federal drinking-water quality standards. Some wells contained levels of inorganic compounds such as iron or barium that exceeded MCLs. These compounds occur naturally in local ground-water and may be related to natural conditions. However, since the landfill will continue to produce leachate, there is a



LEGEND

WATER SAMPLES TAKEN JULY AND NOV., 1989

Monitoring Well	Tot. Diss. Solids Conc. (mg/l)
MW3	817
MW7d	2220
MW103	1460
MW106	1960
MW107	3410
MW108d	2990
MW110d	4010
MW111	1580
MW112	1100
MW113	429
MW115	301
MW116	426
MW117	736
MW118	1150
MW201	1060
MW203	742
MW205	695
MW207	358
MW209	823
MW211	933
MW213	1510
MW215	584
MW216	3970
MW217	948
MW218	1500
MW219	445

Note: All nondetections assigned value = 1/2 detect. limit.

◆ MONITORING WELL LOCATION

—1000— CONTOUR LINE OF EQUAL TOTAL DISSOLVED SOLIDS CONCENTRATION CONTOUR INTERVAL = 1000

N

0 800 1600

SCALE IN FEET

FIGURE 4
TOTAL DISSOLVED SOLIDS
ISOCONCENTRATION CONTOUR MAP

TABLE 1
MAXIMUM CONCENTRATIONS DETECTED
IN LEACHATE
SOUTH MACOMB DISPOSAL AUTHORITY SITE

Parameter	Value
Acetone	2400
2-Butanone	11000
1,2-Dichloroethene	470
Methylene Chloride	3100
Toluene	530
Benzyl Alcohol	1600
Diethylphthalate	1100
4-Methylphenol	17000
Phenol	4600
Aluminum	233
Antimony	528
Arsenic	20
Barium	542
Cadmium	365
Calcium	3110000
Cobalt	258
Iron	2510000
Lead	68
Magnesium	500000
Manganese	33300
Mercury	70001
Nickel	238
Potassium	1450000
Silver	6
Sodium	1210000
Zinc	56500
*Total Suspended Solids	13.0
*Total Dissolved Solids	1130
*Total Alkalinity	7900
*Oil and Grease	1070
*Chloride	1470
*Sulfate	860
*Biological Oxygen Demand	2200
*Chemical Oxygen Demand	44400

All values except (*) are presented in micrograms per liter (ug/l).

* = mg/l

TABLE 2
CONTAMINANT CONCENTRATIONS DETECTED
IN THE SHALLOW AQUIFER
SOUTH MACOMB DISPOSAL AUTHORITY SITE

Parameter	Maximum Detected Value	Arithmetic Mean
Acetone	9300	4135.8
Benzene	8	4.3
2-Butanone	11000	4577.5
Chlorobenzene	25	10.0
1,2-Dichloroethene (total)	560	211.3
Ethylbenzene	40	15.0
Methylene Chloride	1700	767.9
4-Methyl-2-Pentanone	680	173.8
Toluene	1400	601.3
Total Xylenes	260	112.4
Bis(2-ethylhexyl)phthalate	32	NA
4-Chloro-3-Methylphenol	14	8.0
1,4-Dichlorobenzene	8	6.0
4-Methylphenol	15000	3753.8
Phenol	2100	528.8
Aluminum	4150	1750
Antimony	837	219
Arsenic	79	20
Barium	886	B
Cadmium	491	125
Calcium	629000	B
Chromium	136	B
Cobalt	187	52
Copper	86	30
Iron	459000	124130
Lead	1260	362
Magnesium	139000	B
Manganese	13000	3540
Mercury	1.4	B
Nickel	443	121
Potassium	277000	79807
Silver	43	12
Sodium	510000	144400
Vanadium	273	71
Zinc	6030	3140
*Total Suspended Solids	760	NA
*Total Dissolved Solids	14200	NA
*Total Alkalinity	2780	NA
*Oil and Grease	732	NA
*Chloride	710	NA
*Sulfate	60	NA
*Biological Oxygen Demand	19000	NA
*Chemical Oxygen Demand	28000	NA

All values except (*) are presented in micrograms per liter (ug/l).

* = mg/l
B = Concentrations are below background in this area.
NA = Not available

TABLE 3
CONTAMINANT CONCENTRATIONS DETECTED
IN THE INTERMEDIATE AQUIFER
SOUTH MACOMB DISPOSAL AUTHORITY SITE

Parameter	Maximum Detected Value	Arithmetic Mean
Acetone	1000	95.6
Benzene	22	4.1
2-Butanone	3200	537.5
Chloroethane	8	5.2
1,1-Dichloroethane	8	3.0
1,2-Dichloroethene (total)	4	2.7
1,2-Dichloropropane	23	3.7
Ethylbenzene	3	2.5
Methylene Chloride	19	3.5
4-Methyl-2-Pentanone	96	10.4
Toluene	3700	338.8
Total Xylenes	11	3.0
Vinyl Chloride	8	5.2
Benzoic Acid	53	26.8
Bis(2- ethylhexyl)phthalate	210	NA
Diethylphthalate	60	8.4
Isophorone	8	8.0
2-Methylphenol	20	5.9
4-Methylphenol	370	27.8
Pentachlorophenol	50	27.8
Phenol	19	5.9
1,2,4-Trichlorobenzene	12	5.4
Beta-BHC	0.069	0.03
Aluminum	956000	75440
Antimony	256	B
Arsenic	219	35
Barium	3660	1720
Beryllium	17.6	4.5
Cadmium	31	B
Calcium	4020000	794690
Chromium	692	162
Cobalt	367	91
Copper	950	263
Iron	717000	135760
Lead	481	74
Magnesium	909000	139690
Manganese	14300	4620
Mercury	13	2
Nickel	927	274
Potassium	659000	97850
Selenium	28.5	4.6
Silver	54	B
Sodium	526000	157340
Thallium	3.2	B
Vanadium	871	173
Zinc	308000	7746

TABLE 3 (Continued)
CONTAMINANT CONCENTRATIONS DETECTED
IN THE INTERMEDIATE AQUIFER
SOUTH MACOMB DISPOSAL AUTHORITY SITE

Parameter	Value
*Total Suspended Solids	116000
*Total Dissolved Solids	4010
*Total Alkalinity	2870
*Chloride	1070
*Sulfate	112
*Biological Oxygen Demand	1460
*Chemical Oxygen Demand	1520

All values except (*) are presented in micrograms per liter (ug/l).

* = mg/l

potential for the contaminant plume to move off-site in the future as it has in the past.

c. Soils

Surface soil samples were taken at background locations, as well as on and off-site. While no contaminants were detected above background in the on- and off-site surface soil, the subsurface soil samples on-site were contaminated with a wide variety of site-related organic and inorganic substances as shown in Table 4.

d. Surface Water and Sediments.

While leachate outbreaks have impacted McBride Drain in the past resulting in fish kills, leachate and contaminated ground water appeared to be having little measured effect on the surface water and sediment of McBride Drain, since the construction of the leachate collection systems and the slurry wall, as indicated by surface water and sediment samples taken during the investigation. The landfill will, however, continue to produce and potentially discharge hazardous leachate into the marshy areas and surface waters, if no action is taken. In this case, measurable adverse effects on McBride Drain, and consequently the Clinton River, may occur in the future.

F. Summary of Site Risks

The analytical data collected during the RI and the public health/environmental assessment indicated the presence of contaminants in various media at levels that may present a risk to human health. Pursuant to the NCP, a baseline risk assessment was performed based on present conditions at the site. The baseline risk assessment assumes no corrective action will take place and that no site-use restrictions or institutional controls such as fencing, ground-water use restrictions or construction restrictions will be imposed. The risk assessment then determines actual or potential risks or toxic effects the chemical contaminants at the site pose under current and future land use assumptions. The baseline risk assessment included the following assumptions:

- The aquifers contaminated by the site may be used as a drinking water source;
- Parts of the site may be used for residential development;
- Access restrictions such as fencing of the site will not be implemented; and
- No ground-water use restrictions will be enforced.

TABLE 4
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN BY MEDIUM
SOUTH MACOMB SITE

Chemical	Surface Water	Sediments	Surface Soil	Subsurface Soil	Air	Groundwater	Residential Wells
Volatiles							
Acetone							
Benzene				X			
2-Butanone		X		X (b)		X	
Carbon disulfide						X	
Carbon tetrachloride		X (b)		X		X	
Chloroethane (c)		X (b)					
Chloroform							
1,1-Dichloroethane		X (a)				X (b)	
1,2-Dichloroethylene							X
Ethylbenzene			X (b)	X (b)		X	
2-Hexanone (c)			X (b)	X		X	
Methylene chloride				X (b)		X	
4-Methyl-2-pentanone			X				
Styrene						X	
1,1,2,2-Tetrachloroethane						X	
Tetrachloroethylene							X
Toluene		X	X (b)	X			X
1,1,1-Trichloroethane		X	X	X			
Trichloroethylene						X	
Vinyl chloride		X (b)		X (b)	X (a)		X
Xylenes		X	X (b)	X	X (a)		
						X	
						X	
Semi-volatiles							X
Benzoic acid							
Bis(2-ethylhexyl)phthalate				X (b)			
Butyl benzyl phthalate				X		X (b)	X
Chlorobenzene		X (b)		X			X
4-Chloro-3-methylphenol (c)				X			
1,4-Dichlorobenzene						X (b)	X
Diethylphthalate			X (b)	X (b)		X	
Di-n-butyl phthalate						X	
Fluoranthene			X (b)			X (b)	
Isophorone			X (a)				X
2-Methylphenol							
4-Methylphenol						X (b)	
4-Nitrophenol (c)				X		X (b)	
Pentachlorophenol						X	
Phenanthrene							X
Phenol		X (d)				X (b)	
Pyrene		X (b)		X (b)			
1,2,4-Trichlorobenzene	X		X (a)	X		X	
2,4,5-Trichlorophenol							
						X (b)	
Pesticides/PCBs							X
Beta-BHC							
Heptachlor							
PCB-1232			X (b)			X (b)	
				X (b)			

POOR QUALITY
ORIGINAL

TABLE 4 (Continued)
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN BY MEDIUM
SOUTH MACOMB SITE

Chemical	Surface Water	Sediments	Surface Soil	Subsurface Soil	Air	Groundwater	Residential Wells
Inorganics							
Aluminum (c)	X			X		X	X
Antimony						X	
Arsenic	X			X		X	X
Barium				X		X	
Beryllium			X	X		X	
Cadmium				X		X	
Calcium (c)			X	X		X	X
Chromium				X		X	
Cobalt (c)				X		X	
Copper	X			X		X	
Iron (c)				X		X	
Lead (c)				X		X	
Magnesium (c)		X	X	X		X	X
Manganese	X	X		X		X	X
Mercury				X		X	
Nickel				X		X	
Potassium (c)				X		X	
Selenium	X			X		X	X
Silver				X		X	
Sodium (c)	X		X	X		X	
Thallium				X		X	X
Vanadium				X		X	
Zinc				X		X	
Cyanide	X (b)			X		X	

(a) Detected in upgradient or background samples at similar levels.
(b) Detected in only one sample.
(c) No human health toxicity criteria available for this chemical.
(d) Detected on-site only

POOR QUALITY
ORIGINAL

1. Contaminant Identification

The medium of concern for human exposures was identified primarily as ground water which has been contaminated by leachate from the landfills. The contaminants of concern selected for non-carcinogenic risk characterization in ground water were:

Acetone	2-Butanone	Methylene chloride
1,2-Dichloroethlene	4-Methyl-2-pentanone	
4-Methylphenol	Phenol	Toluene
Antimony	Arsenic	Barium
Cadmium	Chromium	Copper
Manganese	Mercury	Nickel
Selenium	Silver	Thallium
Vanadium	Zinc	

The contaminants of concern selected for carcinogenic risk characterization in ground water were:

Vinyl Chloride	Arsenic	Benzene
1,1-Dichloroethane	1,4-Dichlorobenzene	Methylene chloride
1,2-Dichloroethene		

Analytical data gathered from surface water and sediment samples from McBride Drain indicated no exceedances of constituents compared to background levels in the creek. The risk assessment concluded that the surface water and sediments in McBride Drain do not pose a current risk to human health and the environment.

Analytical data gathered from the residential wells sampled and monitoring wells located outside the site boundaries indicated no exceedances of Federal maximum contaminant levels (MCLs) for organic constituents. Metals that exceeded MCLs did not exceed background levels.

2. Exposure Assessment

Potential exposure to contaminants from this site can come about through the following potential pathways or routes of exposure:

- Incidental ingestion of ground water by trespassers, site workers and residents;

- Dermal contact with ground water by site workers and residents;

- Inhalation of volatile organic compounds by site workers and residents;

- Incidental ingestion of surface and subsurface soils by trespassers, site workers and residents; and

- Dermal contact with surface and subsurface soil by trespassers, site workers and residents.

3. Risk Characterization

The non-carcinogenic and carcinogenic health risks associated with each of the pathways and potential receptors listed above have been evaluated. Basic toxicity information used to calculate risk was derived from the Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Tables (HEAST).

a. Non-carcinogenic Health Risks

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. Rfds are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse non-carcinogenic effects to occur.

Potential concern for non-carcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. Any Hazard Index value greater than 1.0 suggests that a non-carcinogen potentially presents an unacceptable health risk.

The following table indicates the total Hazard Index for different scenarios involving ingestion or inhalation of, or direct contact with, site contaminants.

Receptor	HI
Worker/Resident On-site - surface soils, sub-surface soils, dust, and VOCs	<1.0
Worker/Resident Off-site - surface soils, sub-surface soils, dust, and VOCs	<1.0
Worker/Resident On-site Ground Water	
Shallow Aquifer	142.0
Intermediate Aquifer	15.7
Deep Aquifer	1.7
Resident Off-site Ground Water	1.5

The Hazard Index for ground water exceeds the value of 1.0 for all ground-water use. Table 5 provides an additional breakdown of Hazard Indices relating to exposure routes.

b. Carcinogenic Health Risks

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risk associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans).

Excess Lifetime Cancer Risks are determined by multiplying the intake level with the cancer potency factor for each contaminant of concern. These risks are probabilities that are generally expressed in scientific notation (e.g. 1×10^{-6} or 1E-6). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year

TABLE 5
QUANTITATIVE RISK ASSESSMENT SUMMARY
FUTURE LAND-USE EXPOSURE PATHWAYS
SOUTH MACOMB SITE

Exposure Pathway	Upper-bound Excess lifetime Cancer risk	Hazard Index
Direct contact with surface soils by construction workers		
On-site saturated soils	4E-08	7E-03
On-site unsaturated soils	1E-07	7E-03
Off-site saturated soils	3E-08	7E-03
Inhalation of volatiles by construction workers		
On-site saturated soils	5E-09	6E-01
On-site unsaturated soils	2E-07	9E-02
Off-site saturated soils	(a)	2E-03
Inhalation of dust by construction workers		
On-site saturated soils	3E-07	5E-02
On-site unsaturated soils	1E-07	1E-02
Off-site saturated soils	1E-07	1E-02
Direct contact with surface soils by future residents	4E-08	6E-05
Use of groundwater by future residents		
Shallow aquifer		
Ingestion (unfiltered inorganics)	2E-03	142
Ingestion (filtered inorganics)	3E-03	29.8
Inhalation while showering	6E-07	8E-03
Intermediate aquifer south		
Ingestion (unfiltered inorganics)	2E-03	15.7
Ingestion (filtered inorganics)	3E-03	7.7
Inhalation while showering	3E-09	1E-03
Intermediate aquifer north		
Ingestion (unfiltered inorganics)	2E-03	7.7
Ingestion (filtered inorganics)	2E-03	5.5
Inhalation while showering	6E-08	1E-04
Deep aquifer		
Ingestion (unfiltered inorganics)	9E-07	11.9
Ingestion (filtered inorganics)	9E-07	1.7
Inhalation while showering	3E-09	5E-07

TABLE 5 (Con't)
QUANTITATIVE RISK ASSESSMENT SUMMARY
FUTURE LAND-USE EXPOSURE PATHWAYS
SOUTH MACOMB SITE

Exposure Pathway	Upper-bound Excess lifetime Cancer risk	Hazard Index
Summation across exposure pathways		
Construction workers		
On-site saturated soils	3E-07	6E-01
On-site unsaturated soils	4E-07	1E-02
Off-site saturated soils	1E-07	2E-02
Future residents		
Shallow aquifer (unfiltered inorganics)	2E-03	142
Shallow aquifer (filtered inorganics)	3E-03	29.8
Intermediate aquifer south (unfiltered inorganics)	2E-03	15.7
Intermediate aquifer south (filtered inorganics)	2E-03	7.7
Intermediate aquifer north (unfiltered inorganics)	2E-03	7.7
Intermediate aquifer north (filtered inorganics)	2E-03	5.5
Deep aquifer (unfiltered inorganics)	9E-07	11.9
Deep aquifer (filtered inorganics)	9E-07	1.7

(a)No carcinogens detected.

TABLE 5 (Con't)

QUANTITATIVE RISK ASSESSMENT SUMMARY
CURRENT LAND-USE EXPOSURE PATHWAYS
SOUTH MACOMB SITE

Exposure Pathway	Upper-bound Excess lifetime Cancer risk	Hazard Index
Direct contact with surface soil by trespassers	2E-08	4E-05
Consumption of deer meat	3E-09	3E-10
Consumption of fish from McBride Drain	1E-05	5E-02
Dermal contact while wading in McBride Drain	9E-13	4E-03
Inhalation by trespassers	1E-06	1E-03
Inhalation by nearby residents	6E-06	7E-03
Summation across exposure pathways:		
Trespassers	1E-05	5E-02
Residents	2E-05 - 3E-05	6E-02 - 1.5

(a) No inhalation criteria available.
(b) No carcinogens detected.
(c) No volatile detected: therefore, no inhalation risk.

lifetime under the specific exposure conditions at a site. EPA generally attempts to reduce the excess lifetime cancer risk posed by a Superfund site to a range of 1E-04 to 1E-06 (1 in 10,000 to 1 in 1 million), with an emphasis on the most protective end (1E-06) of the scale.

The following table indicates the Excess Lifetime Cancer Risks for different scenarios involving ingestion or inhalation of, or direct contact with, site contaminants.

Receptor	Total Incremental Cancer Risk
Worker/Resident On-site - surface soils, sub-surface soils, dust, and VOCs	3E-07
Worker/Resident Off-site - surface soils, sub-surface soils, dust, and VOCs	1E-06
Worker/Resident On-site Ground Water	
Shallow Aquifer	2E-03
Intermediate Aquifer	2E-03
Deep Aquifer	9E-07
Resident Off-site Ground Water	2E-06

The excess lifetime cancer risk for all reasonable maximum exposure routes under the residential scenarios exceeds the acceptable risk range of 1E-04 to 1E-06. Table 5 provides an additional breakdown of excess lifetime cancer risk relating to exposure routes.

4. Environmental Risks

Environmental threats posed by the site appear to be minimal at the present time given the currently operated ground-water controls and the resulting low concentrations of chemicals detected during the investigation in surface soils and surface water. A preliminary ecological assessment has been performed at the site that indicates no critical habitats, endangered species or habitats of endangered species at or near the site are currently affected by site contamination. Contamination of the wetland area and McBride Drain has, however, occurred in the past resulting in fish kills, and could occur in the future if current response actions should be discontinued and further response actions not taken.

5. Risk Summary

The principal risks at the site are derived from the potential ingestion of contaminated ground-water from either the shallow or intermediate aquifers. Ingestion of contaminated water from either of these sources results in potential upperbound excess lifetime cancer risks of 2×10^{-3} and hazard indices ranging from 5.5 to 142. Exposure to contamination in surface and subsurface soils, either through direct contact or inhalation of volatile vapors or contaminated dust, results in health risks ranging from 1×10^{-6} to 2×10^{-8}.

The potential excess lifetime cancer risk posed by the site exceeds the acceptable risk range of 1×10^{-4} to 1×10^{-6} principally from the use of contaminated ground water in the shallow and intermediate aquifers. This represents unacceptable potential risks to human health.

The hazard indices for humans interacting with the site exceed the acceptable hazard index of 1.0, principally from the use of contaminated ground water in the shallow and intermediate aquifers. This represents unacceptable potential risks to human health.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementation of the response action selected by this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment. With the site in its present condition, the off-site release of contaminants from the landfills to ground-water, surface water (McBride Drain), and surrounding properties (through leachate breakouts) remains a distinct possibility.

G. Environmental Standards not met at the Site

In addition to posing unacceptable risks to receptors, SMDA sites 9 and 9a do not meet applicable or relevant and appropriate Federal or State environmental requirements (ARARs) at this time.

1. Ground Water

Table 6 lists the representative chemicals found in the contaminated ground water plume and the corresponding Federal and State preliminary ground-water clean-up criteria which EPA believes to be adequately protective. The ground water contaminant plume contains concentrations of hazardous substances which exceed most of these ground-water standards and clean-up criteria.

TABLE 6
Chemicals of Concern in Ground Water
Concentrations & Cleanup Standards

Ground Water Contaminant	Highest Observed Conc. (ppb)	Excess Upper Lifetime Cancer Risk	Hazard Index	Cancer Risk Target 1E-4	Cancer Risk Target 1E-6	SDWA MCL (ppb)	Mi Act 307 Type B (ppb)
** CATAGORY CARCINOGENS							
Arsenic	64.7	2.0E-03	NA	3.2	0.032	50.0	1.0 (a)*
1,1-Dichloroethane	3.6	5.8E-06	NA	62	0.62		700
1,2-Dichloropropane	5.8	7.0E-06	NA	83	0.83	5.0	1.0 (a)
1,4-Dichlorobenzene	8.0	3.4E-06	NA	235	2.35	75.0	5.0 (a)
Benzene	22.0	4.1E-06	NA	195	1.95	5.0	1.0
Methylene Chloride	1460	2.0E-04	NA	2.4	0.024	2.0	5.0
Vinyl Chloride	5.5	2.3E-04	NA	2.4	0.024	2.0	1.0 (a)
** CATAGORY NON CARCINOGENS							
Antimony	704	NA	7.3	NA	NA	10/5	3.0*
Arsenic	64.7	NA	2.7	NA	NA	50.0	1.0 (a)*
Barium	2410	NA	2.0	NA	NA	1000	2000*
Cadmium	412	NA	34	NA	NA	5.0	4.0*
Chromium, Total	282	NA	2.4	NA	NA	100	
Chromium III							7000*
Chromium VI							2.0 (b)*
Copper	442	NA	0.5	NA	NA	1300	1000*
Manganese	11000	NA	2.3	NA	NA		700*
Mercury	1.3	NA	0.18	NA	NA	2.0	2.0*
Nickel	454	NA	0.95	NA	NA	100	100*
Selenium	7.7	NA	0.11	NA	NA	50.0	20.0 (b)*
Silver	36.4	NA	0.51	NA	NA	50.0	0.1 (b)*
Thallium	3.2	NA	1.9	NA	NA	2/1	0.5*
Vanadium	230	NA	1.9	NA	NA		4.0*
Zinc	11000	NA	2.3	NA	NA		1000*
1,2-Dichloroethene	412	NA	0.86	NA	NA	70.0	70.0
2-Butanone	10800	NA	9.0	NA	NA		400
4-Methyl-2-pentanone	571	NA	0.48	NA	NA		400
4-Methylphenol	12600	NA	1.0	NA	NA		400
Acetone	7890	NA	3.3	NA	NA		500 (b)
Methylene Chloride	1460	NA	1.0	NA	NA	5	5.0
Phenol	1760	NA	.12	NA	NA		1100 (b)
Toluene	1150	NA	.16	NA	NA	1000	100 (b)

KEY: * If local background is greater, then use the average local background.
(a) Acceptable method detection limit.
(b) Act 307 - Type B criteria for surface water (R299.5713).

2. Ground Water Protection Goals and the National Contingency Plan

EPA's ground-water protection goal has been set forth in the NCP as follows:

The national goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste. Title 40 of the Code of Federal Regulations (40 CFR) Section 300.430(a)(1)(i)).

The NCP states that EPA expects to return usable ground waters to their beneficial uses, wherever practicable, within a time frame that is reasonable given the particular circumstances of the site. Whenever restoration of ground waters is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction. (40 CFR Section 300.430(a)(1)(iii)(F)).

Also, the NCP considers the use of institutional controls to limit exposures to hazardous substances in the ground water: EPA expects to use institutional controls such as water use and deed restrictions to supplement engineering controls as appropriate for short-and long-term management to prevent or limit exposure to hazardous substances, pollutants, or contaminants.... The use of institutional controls shall not substitute for active response measures as the sole remedy unless such response measures are determined not to be practicable.... (40 CFR Section 300.430(a)(1)(iii)(D)).

3. State of Michigan Ground Water Protection Goals

Michigan Act 307 provides for remedial action, at contaminated sites within the State, which "shall be protective of the public health, safety, and welfare and the environment and natural resources." Additionally, all "...remedial actions which address the remediation of an aquifer shall provide for removal of the hazardous substance or substances from the aquifer...." Michigan Act 307 also provides for the determination of acceptable criteria for ground-water remediation at the site.

4. Clean-up Standards

EPA's ground-water clean-up policy is to attain MCLs under the Federal Safe Drinking Water Act (SDWA); however, if clean-up to MCLs causes the residual risk levels to exceed the 1×10^{-4} to 1×10^{-6} risk range, then the Agency must apply risk-based clean-up levels to reach the goal of protectiveness (1×10^{-6} excess lifetime cancer risk).

Michigan Act 307 Rules contain clean-up criteria which include three different methods by which clean-up levels can be determined. The levels are Type A, Type B, and Type C. The methodology for Type A clean-up is based on background levels or method detection limits for chemicals of concern. The methodology for Type B clean-up uses standardized risk assumptions and exposure assumptions to determine clean-up levels which will be protective of human health, the environment, and the use of the involved resource. R. 299.5709, R. 299.5711, and R. 299.5713 provide a thorough explanation on how to apply the Type B clean-up to the chemicals of concern and calculate the figures to the site. The methodology for Type C clean-up reviews the actual conditions of the site; the uses, present and future, of the site; a site specific risk assessment; and cost effectiveness analysis. R. 299.5717 provides a thorough explanation of how to apply the Type C clean-up to the chemicals of concern.

Michigan Act 307, Type B clean-up criteria provide for the calculation of risk-based clean-up standards at the 1×10^{-6} excess lifetime cancer risk level for each carcinogenic compound. These standards are usually more stringent than the corresponding MCLs or non-zero Maximum Concentration Limit Goals (MCLGs). EPA has determined that Michigan Act 307, Type A and B criteria are protective and are applicable or relevant and appropriate to the site.

Table 6 lists the Ground-water Cleanup Standards for SMDA sites 9 and 9a.

H. Rationale for Further Action

Actual or threatened releases of hazardous substances from this site, if not addressed by implementation of the response action selected by this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment. Therefore, based on the findings in the RI report and the discussion above, a Feasibility Study (FS) was performed to develop alternatives to address the threats at the site. The FS report documents the risks at the site, site-specific applicable or relevant and appropriate requirements, and the requirements of CERCLA and the NCP, especially the ground-water protection policy, in the derivation of remedial alternatives for the SMDA sites 9 and 9a.

I. Description of Alternatives

The alternatives analyzed for the first operable unit at SMDA sites 9 and 9a are presented below:

Alternative 1: No Action

A No Action alternative was evaluated to serve as a baseline for comparison against the other cleanup alternatives. It assumes that no corrective action will be taken at the site and that no restrictions will be placed on access or future use of the site. There are no costs associated with this alternative.

Alternative 2: Limited Action

Capital Cost:	$ 427,000
Annual O&M Costs:	109,000
Present Worth:	2,192,000
Years to Implement:	1 to 2

Alternative 2, illustrated in Figures 5 and 6, includes long-term monitoring of the ground water, residential wells, surface water, sediment, leachate, and air at the site and surrounding area; construction of a chain link fence around the site; land use and deed restrictions; and, attachment of selected residences to the municipal water supply.

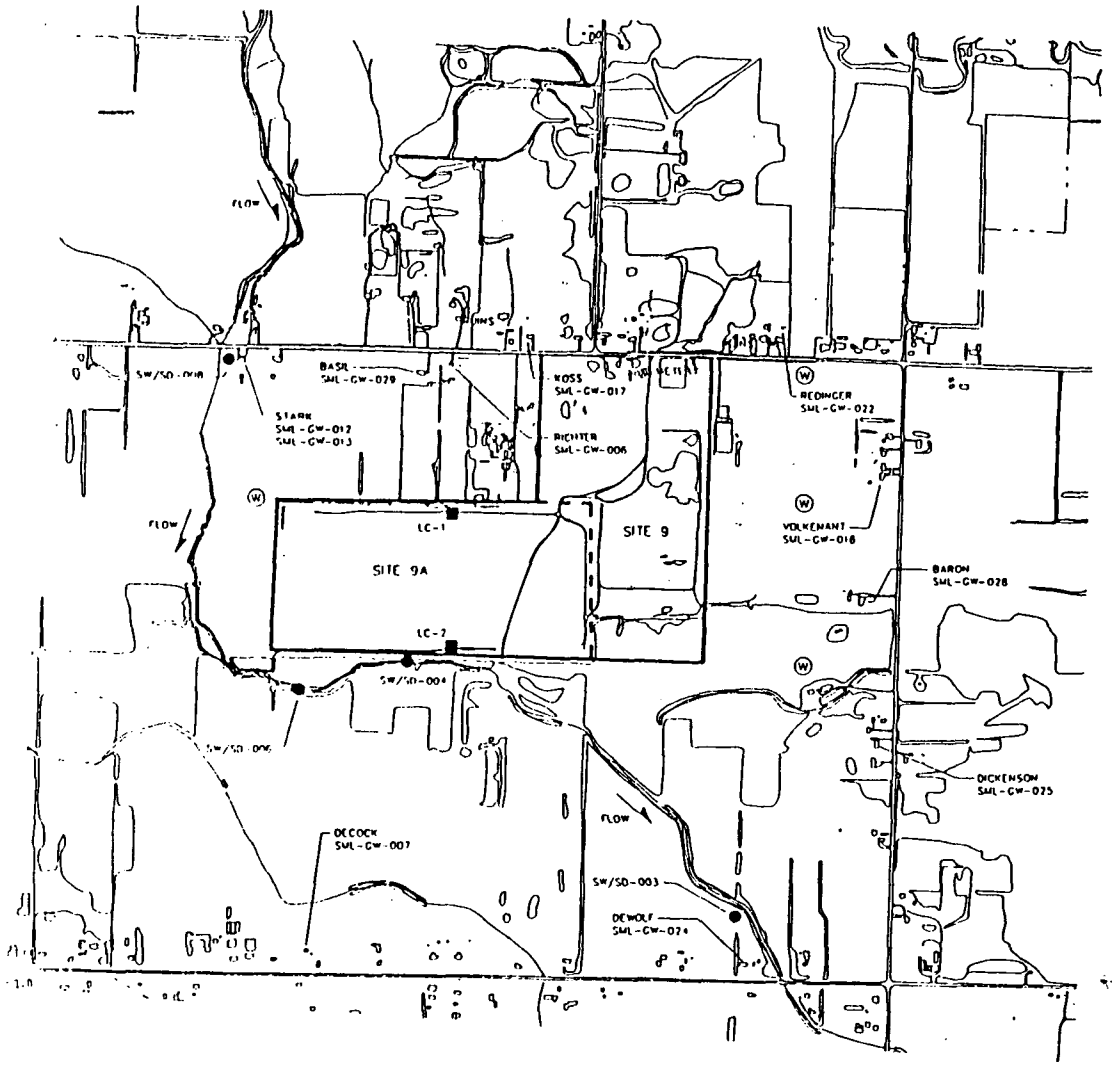
Long-term Monitoring: Long-term monitoring of ground water, residential wells, surface water and sediment of McBride Drain, leachate, and air will be performed twice a year for a minimum of 30 years at the approximate locations shown in Figures 5 and 6. All samples with the exception of air samples will be analyzed for the full Contract Laboratory Program (CLP) Target Compound List (TCL) and Target Analyte List (TAL) for both organic and inorganic contaminants with the exception of pesticides/PCBs. At the end of 30 years EPA will determine the need for additional monitoring.

Long-term monitoring locations will be determined during remedial design and will include at a minimum:

Upper Aquifer: 6 points (4 existing locations, 2 new)
Intermediate Aquifer: 16 points (10 existing locations, 6 new)
Deep Aquifer: 5 points (2 existing locations, 3 new)

Additional sampling will include any residential wells still in use around the site; surface water and sediment from 4 locations in McBride Drain; and leachate samples obtained from all holding tanks. Ambient air monitoring samples will be obtained from the vicinity of the site (1 upwind and 3 downwind from each site).

Fence: A chainlink fence will be constructed around the entire site, including the southern border, to prevent access to the site. The fencing will consist of a minimum six foot high chain link perimeter fence topped with three strand barbed wire. The length of the fence will be approximately 13,400 feet, and include at a minimum one double, 12 foot wide, swing gate for controlled access. Warning signs advising that the area is hazardous will be posted



LEGEND

- SURFACE WATER/SEDIMENT SAMPLING LOCATION
- (W) AMBIENT AIR SAMPLING LOCATION
- LEACHATE SAMPLING LOCATION
- PROPERTY LINE
- DIVIDE BETWEEN SITES 9 AND 9A

N

0 800 1600

FIGURE 5

SURFACE WATER/SEDIMENT, LEACHATE, AMBIENT AIR AND RESIDENTIAL WELL SAMPLING LOCATIONS ALTERNATIVE 2
SOUTH MACOMB DISPOSAL AUTHORITY SITE
FS REPORT

POOR QUALITY
ORIGINAL

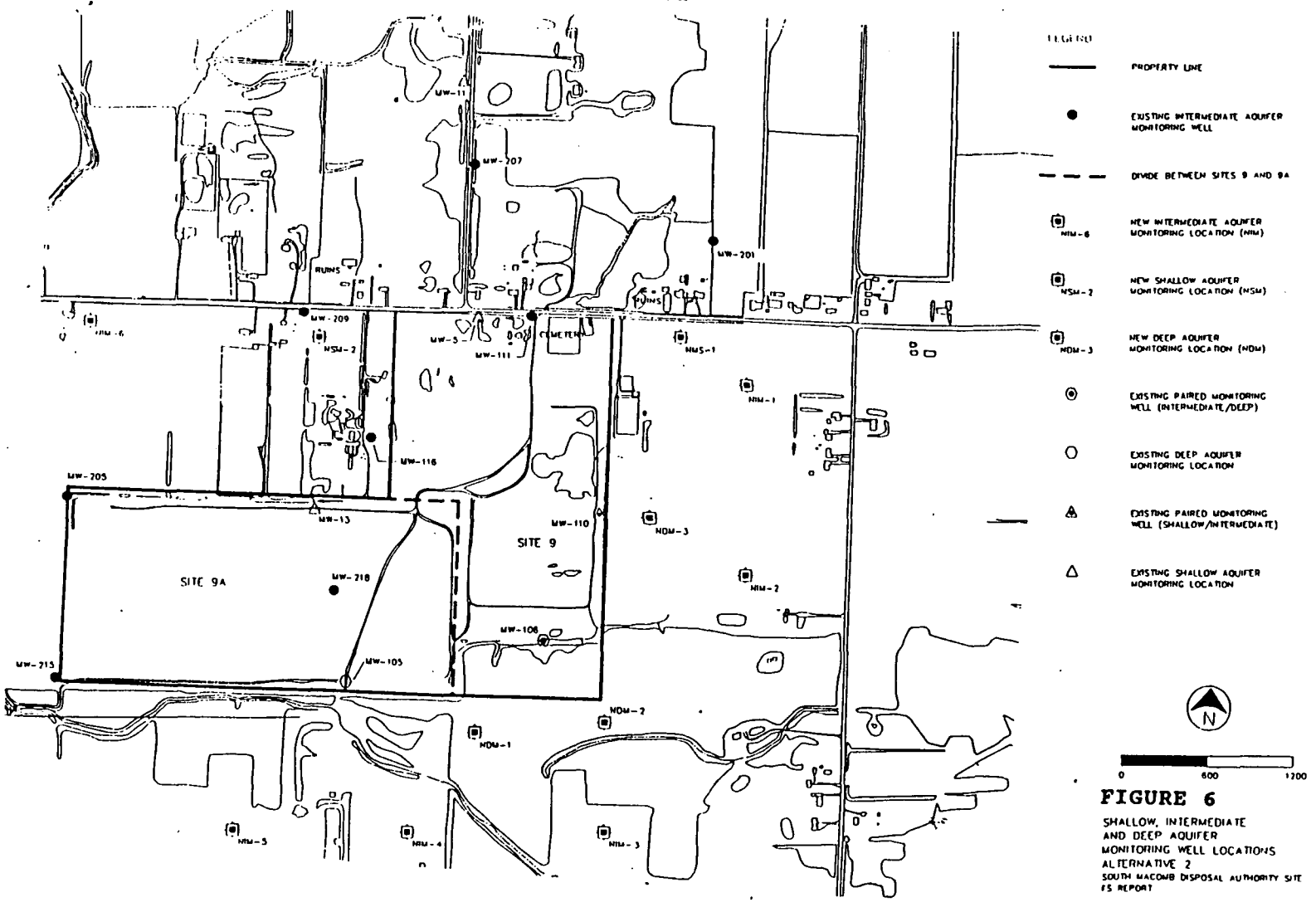


FIGURE 6

SHALLOW, INTERMEDIATE AND DEEP AQUIFER MONITORING WELL LOCATIONS ALTERNATIVE 2
SOUTH MACOMB DISPOSAL AUTHORITY SITE FS REPORT

POOR QUALITY ORIGINAL

at 100 foot intervals along the fence and at the gate.

Land Use and Deed Restrictions: Institutional controls, including deed restrictions, will be implemented to prohibit future development of the landfill (including but not limited to, on-site excavations, construction and drilling) and to prohibit the installation of drinking water supplies at the facility. The deed restrictions regarding future development of the landfill and installation of drinking water supplies will be considered permanent.

Municipal Water Supply: Individual residences where consumption of ground water from private wells exceeds a risk level of 1×10^{-6} due to contamination derived from the site, will be attached to the municipal water supply.

Review of Site Conditions: Site conditions will be re-evaluated every five years. The reviews will include a detailed analysis of the long-term monitoring data, a temporal and spatial evaluation of contaminant migration in various media, the progress of any natural attenuation, an assessment of current residual health risks, an evaluation of the effectiveness of the institutional controls, a discussion that addresses any public comments or complaints received during the five-year period, and an evaluation relative to what additional remedial measures, if any, should be implemented based on the reviewed site conditions.

Current Remedial Actions: Remedial actions currently in effect at the Site (leachate collection systems, leachate removal, and slurry wall) will be maintained and operated.

Alternative 3: Ground-water Collection and Treatment

Capital Cost:	$ 5,745,000
Annual O&M Costs:	224,000
Present Worth:	9,264,000
Years to Construct:	2 to 3

Alternative 3 includes a modified long-term monitoring program, ground-water collection and on-site treatment; an extension of the existing slurry wall, and residential attachment to municipal water supply. It also includes the land use/deed restrictions and construction of the chainlink fence described under Alternative 2. Figure 7 illustrates the components of Alternative 3.

Long-term Monitoring Program: Long-term monitoring of ground water, residential wells, surface water and sediment of McBride Drain, leachate, and air will be performed twice a year for a minimum of 30 years. All samples with the exception of air samples will be analyzed for organic and inorganic contaminants on the TCL and TAL, with the exception of pesticides/PCBs. At the end of 30 years EPA will determine the need for additional monitoring.

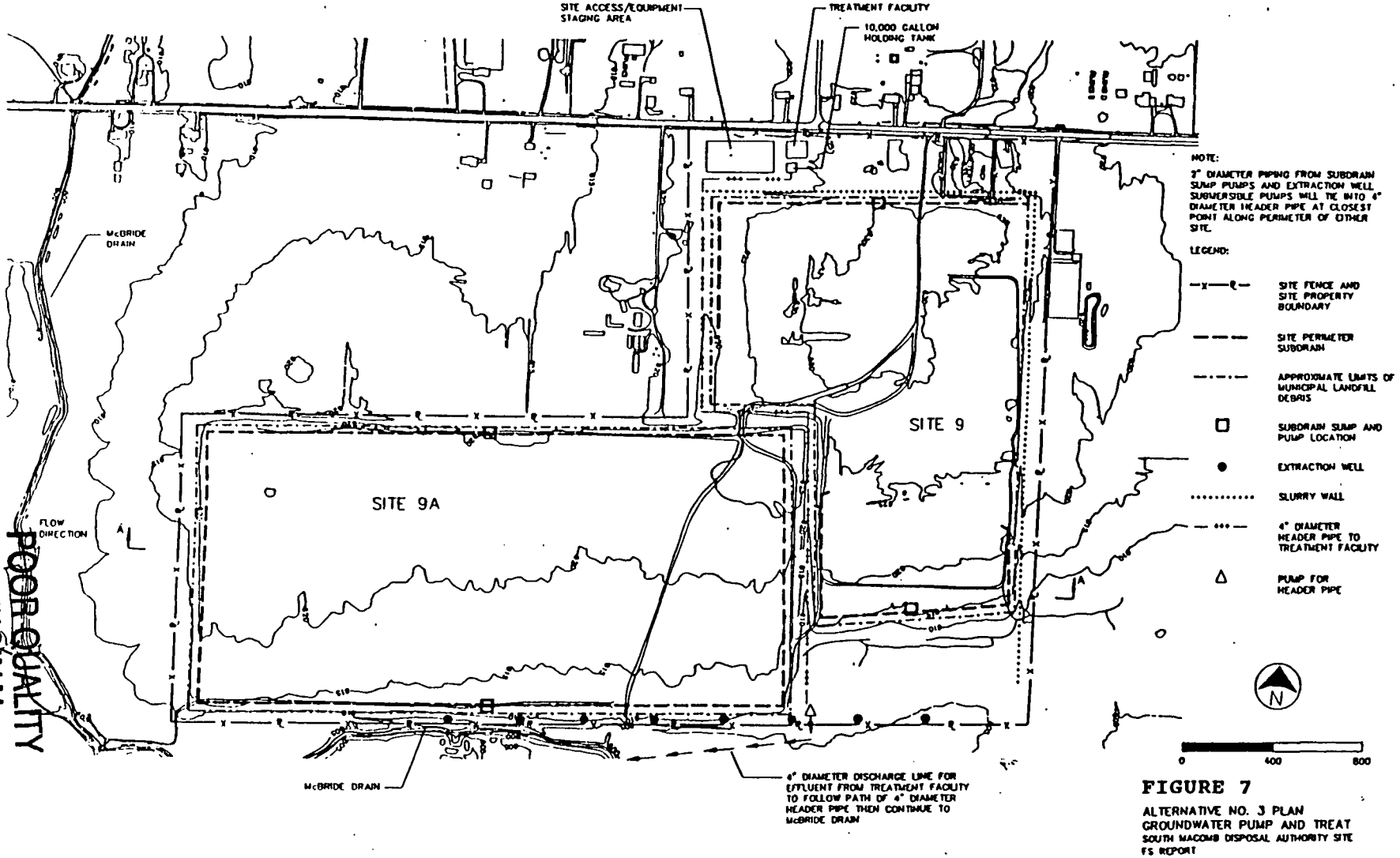


FIGURE 7

ALTERNATIVE NO. 3 PLAN
GROUNDWATER PUMP AND TREAT
SOUTH MACOMB DISPOSAL AUTHORITY SITE
FS REPORT

POOR QUALITY ORIGINAL

1. Ground water

The ground-water monitoring program for Alternative 3 is a modified version of the program discussed under Alternative 2. The ground-water monitoring program will be designed to detect increases or decreases in the chemical concentrations of the ground water at and adjacent to the site. Ground-water monitoring will include laboratory analysis of samples from existing monitoring wells, residential wells available for sampling or still in use, and new monitoring wells. The number and placement of additional monitoring wells will be determined during the pre-design phase and will include at a minimum: 3 monitoring wells to be installed off-site on the east side of the site, 2 north of MW 118 and one south of MW 118; 4 south of the site, adjacent to McBride Drain; and 4 background monitoring wells. The monitoring wells will be screened in the intermediate aquifer. An adequate number of monitoring wells will be placed to the north of the site to further delineate the extent of the contaminant plume.

2. Surface Water/Sediment Monitoring of McBride Drain

Samples will be collected upstream, adjacent to, and downstream of the site, and analyzed for the same parameters as ground-water samples.

3. Air Monitoring

Air samples will be obtained from the vicinity of the site, a minimum of 1 upwind and 3 downwind from each site, and analyzed for volatilized contaminants. The monitoring is intended to detect increases in the level of VOCs at the site. A gas collection system may be installed if air monitoring indicates air quality standards are being exceeded due to site related contamination.

Ground-water Extraction/Collection System

The ground-water extraction system will consist of, at a minimum 1) 8 extraction wells in the intermediate aquifer along the southern boundary of the site; and 2) shallow aquifer subsurface drains along the periphery of the waste deposits in both sites 9 and 9a. Additional extraction wells will be located as necessary to extract ground-water contaminants outside the site boundaries. The extraction wells and drains will collect leachate that will then drain by gravity to a series of strategically placed collection sumps from which it can be pumped to the treatment plant. The extraction wells will be designed to pump sufficient quantities of ground water to capture and extract the entire contaminant plume. The number of extraction wells required and the estimated total gallons per minute (gpm) necessary to capture the contamination plume(s) will be determined during the design phase and will

require a pilot test of the proposed system. Extracted ground water will be piped to the ground-water treatment system for removal of chemicals to their discharge clean up standards prior to the discharge to the McBride Drain. The extraction/collection system will operate until the ground-water cleanup standards are met. The system described in this paragraph may be modified in design and will reflect the results of a predesign investigation that will further delineate the extent of the contaminated plume.

Ground-water Treatment System

The on-site ground-water treatment system, shown in Figure 8, will consist of multiple process options capable of treating an aqueous waste stream containing VOCs, SVOCs, and inorganic compounds. The components of the system and target contaminants are as follows:

TREATMENT SYSTEMS	TARGET COMPOUNDS
Air stripping	- most VOCs and some SVOCs
Granular Activated Carbon	- remaining VOCs and SVOCs
Oxidation/Precipitation	- inorganic compounds
Granular Media Filtration	- remaining suspended solids.

The treatment system described above will be pilot tested during remedial design, at which point it may be modified; its subsequent performance will be monitored on a regular basis. The system will be adjusted, i.e. installation of additional ground-water extraction wells and/or increased pumping rates as warranted by the performance data collected during operation.

Cleanup Standards

Ground water will be treated until Federal Maximum Contaminant Levels (MCLs) or non-zero Maximum Contaminant Level Goals (MCLGs), promulgated under the Safe Drinking Water Act, and the ground-water cleanup standards derived under Michigan Act 307, Type A and B criteria are achieved at the point of compliance: the edge of the landfilled waste. While the cleanup standards can be met at that point soon after construction of the action is complete, the cleanup standards will not be met under the site, and it is anticipated that the system will operate perpetually. (See Table 6 for Ground-water Cleanup Standards.)

Effluent from the treatment plant will be discharged to McBride Drain, in compliance with the substantive requirements of a NPDES discharge permit under Part 21 of Michigan Act 245.

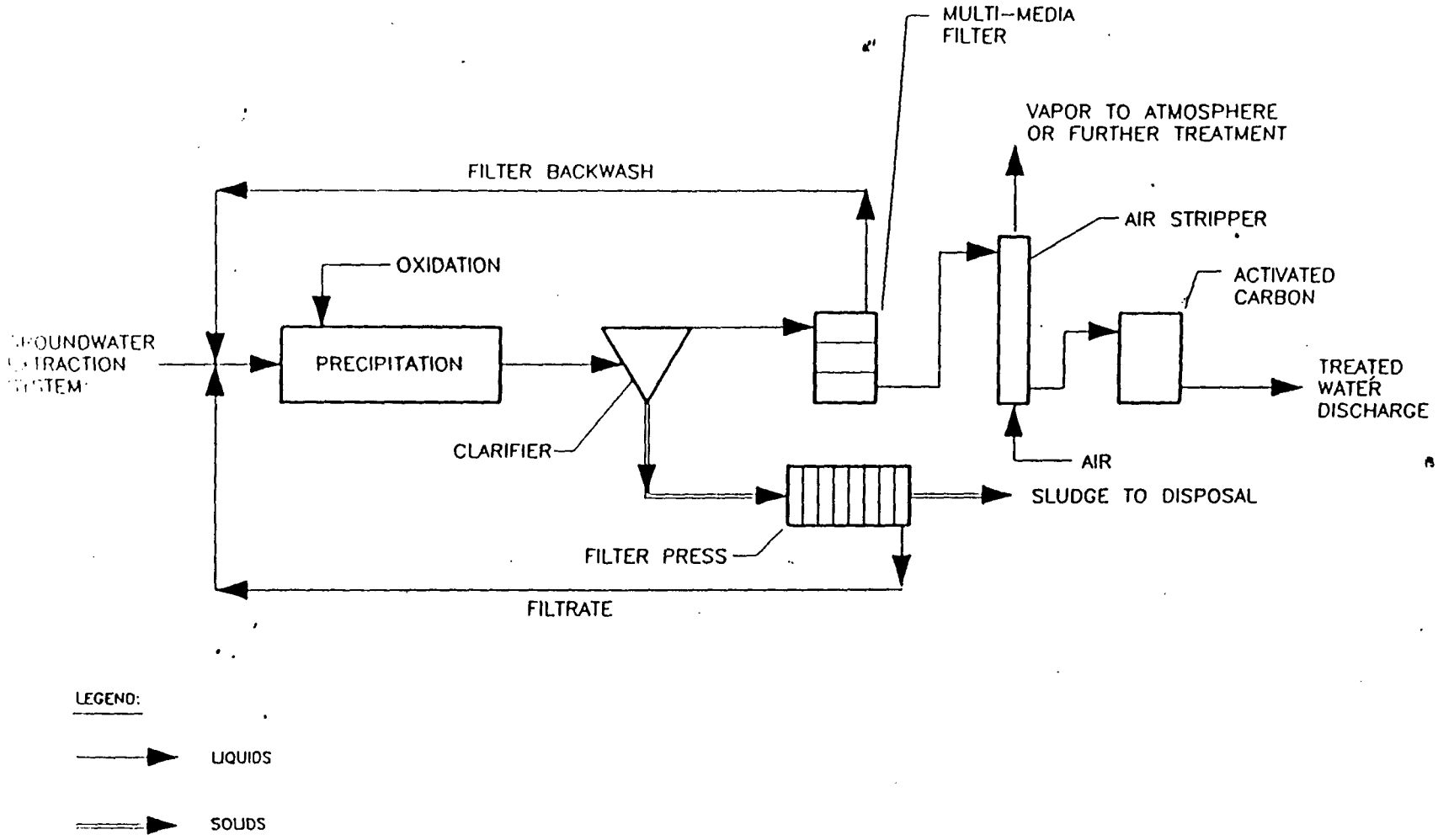


FIGURE 8
GROUNDWATER TREATMENT SCHEMATIC
SOUTH MACOMB DISPOSAL AUTHORITY SITE
FS REPORT

Reactivation of the Ground-water Extraction/Treatment System

If ground-water monitoring indicates that the concentration of one or more of the contaminants has increased above the cleanup standards after the ground-water extraction system has been completed or shut down, the ground-water extraction/treatment system will be reactivated.

Point of Compliance

The point of compliance for the site will be the waste management boundaries.

Management of Treatment Residuals

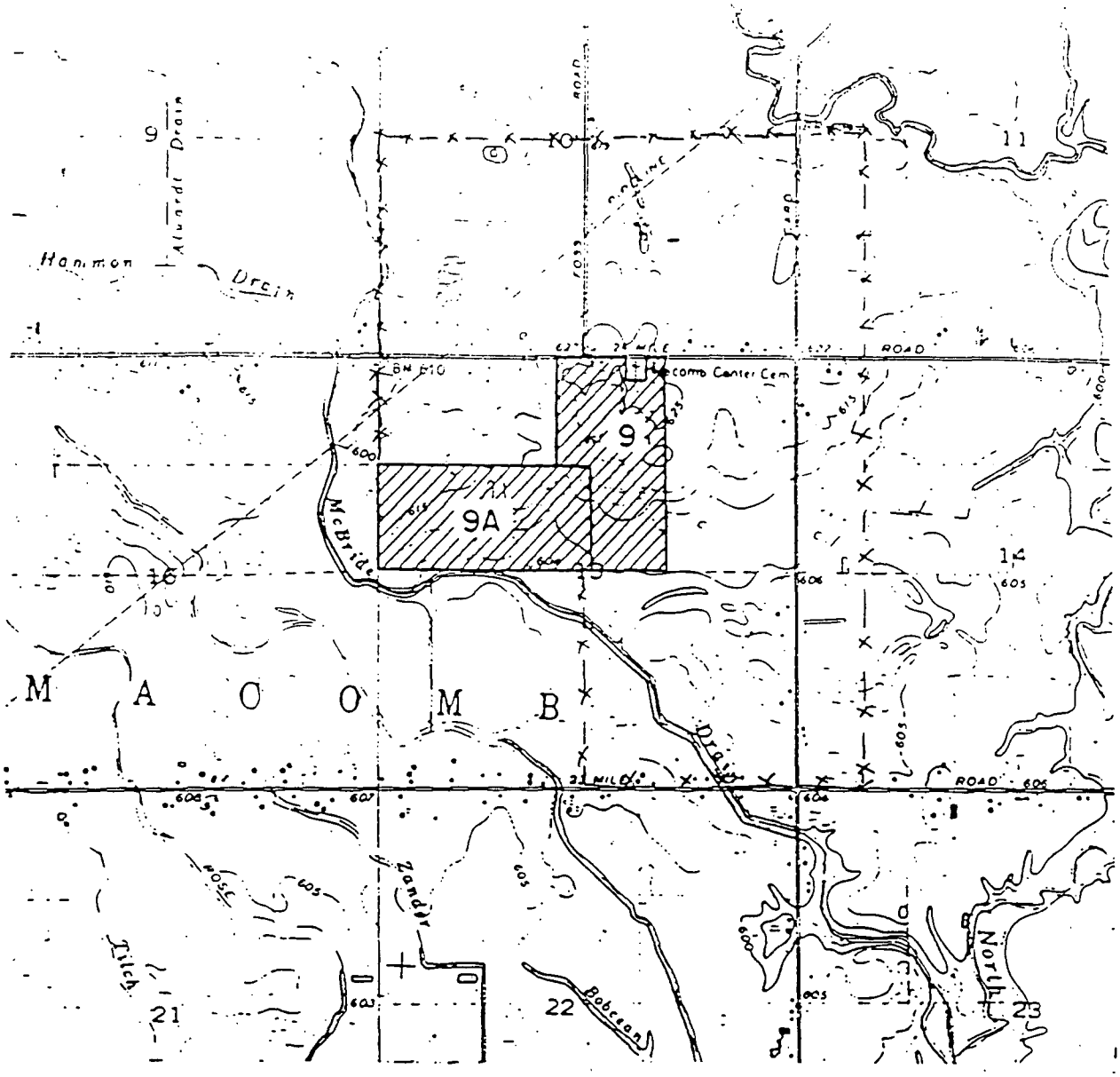
Treatment of the contaminated ground-water will result in the generation of residual sludge containing heavy metals and other contaminants, as well as spent carbon containing organic contaminants. The treatment residuals, which will be tested to determine if they are RCRA hazardous waste, will be disposed of at an off-site RCRA compliant facility. RCRA hazardous waste generated will comply with Land Disposal Restrictions.

Slurry Wall Extension

The purpose of the slurry wall extension is to intercept off-site migration of the contaminant flow and redirect the ground-water flow toward the collection system. The existing slurry wall along the north side of site 9 will be extended to include the east side of site 9 to its juncture with the south boundary, as shown in Figure 7. The slurry wall, extending from the ground surface through both the shallow and intermediate aquifers, will be anchored into the underlying low permeability glacial till; it will be compatible with the existing structure.

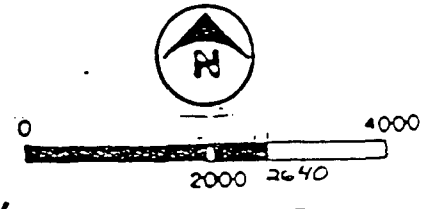
Municipal Water Supply Attachment

Including, but not limited to; all residences currently on 24 Mile Road adjacent to the site and within one half mile to the east and west, all residences on the first half mile of Foss Road, and all residences on Card Road between 23 Mile Road and 24 Mile Road, not currently attached to the municipal water supply, will be attached. All residences constructed in the future in the described area will also be attached. The area of attachment, as shown in Figure 9, includes the extent of historical and potential ground-water contamination.



SOURCE: U.S.G.S. 7.5' topographic map,
Waldenburg Quadrangle Michigan,
Dated 1968 Photorevised 1973 and 1980
Scale: 1"=2000'.

QUADRANGLE LOCATION



SCALE IN FEET

POOR QUALITY
ORIGINAL

FIGURE 9
SMDA SITE MAP

LEGEND

----X----X----X----X----X----
DESIGNATES BOUNDARIES OF MUNICIPAL WATER ATTACHMENT AREA

Current Remedial Actions

Remedial actions currently in effect at the site (leachate collection systems, leachate removal, and slurry wall) will continue to be maintained and operated, and will be incorporated into the remedial action as much as is practical from an engineering standpoint.

J. Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the relative performance of each alternative is evaluated using the nine criteria (40 CFR 300.430) (e) (9) (iii)), as a basis of comparison. This evaluation determines the most protective and cost-effective alternative that will meet the cleanup objectives for the site. The nine criteria are as follows:

Threshold Criteria

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed by each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

The primary risks at the site are due to contaminated ground water. Potential routes of exposure are ingestion, inhalation, and dermal absorption. Alternative 3 provides overall protection of human health and the environment by taking active measures to prevent exposure to the contaminants at the site. These active measures include collection and on-site treatment of leachate and contaminated ground water. The ground water collection/extraction system and slurry wall will prevent off-site migration of the contaminant plume and direct contaminated ground water to the treatment system. Cleanup standards for ground water, see Table 6, will be met at the waste boundary.

Alternative 1 (No Action) and Alternative 2 (fencing, institutional controls, and environmental monitoring) do not provide adequate protection to human health and the environment from exposure to the contaminants present in the ground water. Institutional controls are often difficult to enforce and do not reduce the risks to the environment. Monitoring would provide notice but not prevent the contaminant plume from migrating off-site, at which time additional measures would be taken.

2. Compliance with ARARs

This criterion evaluates whether an alternative meets applicable or relevant and appropriate requirements (ARARs) of other State and Federal environmental statutes and/or provide grounds for invoking a waiver.

The major ground water ARARs include the requirements of the Federal Safe Drinking Water Act, the State Safe Drinking Water Act (Act 399), Act 245 of 1929 (as amended), and the State Environmental Response Act (Act 307).

Alternative 3 will be designed and implemented to comply with ground-water cleanup standards at the point of compliance, the waste boundaries. The cleanup standards for contaminated ground water at the site are Michigan Act 307 Type A and B standards, which treat each contaminant to the 1 x 10-6 level (or background or limits of detection), and Federal standards, as shown in Table 6. All effluent discharges from the treatment system will comply with the substantive requirements of a National Pollution Discharge Elimination System (NPDES) permit under the Clean Water Act (CWA).

RCRA waste generation and temporary storage regulations under 40 CFR Part 262 and Land Disposal Restrictions (LDR or Land Ban) under 40 CFR Part 268, are applicable to residuals from the ground-water treatment system if they contain RCRA hazardous waste. Residuals will be tested for the presence of RCRA hazardous waste. If present, waste will be treated to meet LDRs before being disposed of at an off-site RCRA compliant treatment facility.

Wetland and flood plain requirements: construction activities at the site will be designed to limit impact on adjacent wetlands and the McBride Drain floodplain. Impacts include wetland hydrology changes due to excavation, drain fields and filling activities. A preliminary ecological assessment has been performed. Additional studies would be performed during preliminary design.

Alternatives 1 and 2 will not meet requirements for the remediation of contaminated ground water of Michigan Act 307 since no active measures for ground-water remediation would be initiated.

ARARs are discussed in greater detail in Section L.2. Statutory Determinations.

Primary Balancing Criteria

3. Long-Term Effectiveness and Permanence

This criterion refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

Alternative 3 would construct a ground-water collection and treatment system that would operative perpetually, or until ground-water cleanup standards are met. The ground-water collection system and slurry wall extension will prevent off-site migration of the contaminant plume.

Alternative 2 provides little long-term effectiveness and permanence as it relies on institutional controls and monitoring to reduce risks at the site. Alternatives 1 and 2 provide no response action and thus no long-term effectiveness.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

This criterion evaluates treatment technology performance in the reduction of chemical toxicity, mobility, or volume.

Alternative 3 treats the contaminants in the leachate and ground water in an on-site water treatment plant. Treatment of the contaminants would result in a significant reduction of contaminant toxicity through the treatment process and satisfy the statutory preference for treatment as the principal element of the remedy.

The on-site ground-water treatment system consists of multiple process options, including air stripping, granular activated carbon, oxidation/precipitation, and granular media filtration, capable of treating an aqueous waste stream containing VOCs, SVOCs, and inorganic compounds. The treatment process will result in the generation of residual sludge containing heavy metals and other contaminants, as well as spent carbon containing organic contaminants. The treatment residuals will be tested to determine if they are RCRA characteristic and, if so, will be treated to comply with LDRs before being disposed of at an off-site RCRA compliant facility.

Alternatives 1 and 2 do not use treatment.

5. Short-Term Effectiveness

Short-term effectiveness considers the time to reach cleanup objectives and the risks an alternative may pose to site workers, the community, and the environment during remedy implementation. This criterion also considers the reliability and effectiveness of any mitigative measures taken during remedy implementation to control those short-term risks.

All of the alternatives, except Alternative 1, are considered effective in the short term, as certain aspects of the alternatives, such as institutional controls and monitoring would be implemented within a year. The construction components of Alternative 3 would require 2 to 3 years to complete. The ground-water collection and treatment system, however, may operate

perpetually.

The potential for worker exposure to contaminated materials, dust, and vapors exists for all alternatives except Alternative 1. The potential for exposure increases as the amount of activity at the waste disposal area increases. Health risks to workers would be minimized with routine use of protective equipment.

Construction of the slurry wall in Alternative 3 involves excavation of waste and transportation of construction materials. These activities could pose a temporary health risk to the community because of the potential for inhaling wind-blown dust and increased truck traffic in the area of the site. This potential would be minimized as much as possible through good construction practices and engineering controls.

6. Implementability

This criterion considers the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement and/or construct the remedy.

No major implementability problems are anticipated for any of the alternatives. The technologies included in each alternative are readily available and easily implemented. Alternative 2 would appear to be the easiest to implement, since it would require only an environmental monitoring system and institutional controls. Institutional controls, which may include deed restrictions and access agreements are, however, often difficult to obtain and implement. Alternative 3 treats ground water and would require pilot studies to ensure the proper performance of the collection and treatment system.

7. Cost

Estimated cost includes estimated capital, operation and maintenance, and present net worth costs.

The estimated costs for remedial action alternatives, listed in the following table, are order-of-magnitude estimates with an intended accuracy range of +50 percent and -30 percent for the identified alternative. The estimated cost of the selected alternative will be further refined in the final design. Capital costs are the direct and indirect costs required to initiate and install a remedial action. Annual operation and maintenance cost (O&M) includes the annual operating cost for a remedial action incurred and paid on a yearly basis following implementation of the remedial action. Present worth analysis provides a method for evaluating and comparing costs that occur over different time periods by discounting future expenditures to the present year.

Table 7

Alternative	Capital Cost	O&M Cost	Present Worth
1	$ -0-	$ -0-	$ -0-
2	427,000	109,000	2,192,000
3	5,745,000	224,000	9,264,000

Modifying Criteria

8. State Acceptance

The State of Michigan concurs with the ROD.

9. Community Acceptance

Community acceptance of the preferred alternative is described in the Responsiveness Summary attached to this ROD.

K. Selected Remedy

As provided in CERCLA and the NCP, and based upon the evaluation of the RI/FS and the nine criteria, EPA has selected Alternative 3 as the method providing overall effectiveness proportional to its costs to adequately protect human health and the environment against exposures to hazardous substances at SMDA sites 9 and 9a.

The selected remedy, Alternative 3, includes long-term monitoring, ground-water collection and on-site treatment; an extension of the existing slurry wall; residential attachment to municipal water supply, and access restrictions. It requires 2 to 3 years to construct. Alternative 3 is discussed in more detail in Section I. The components of the selected remedy are as follows:

1. Long-term Monitoring

Long-term monitoring of ground water, residential wells, surface water and sediment of McBride Drain, leachate, and air will be performed twice a year for a minimum of 30 years. With the exception of air samples, samples will be analyzed for all compounds on the TCL and TAL as described in Section I. Air samples will be analyzed for VOCs only. At the end of 30 years EPA will determine the need for additional monitoring.

2. Ground-water Extraction/Collection System

Ground-water extraction wells will be installed in the intermediate aquifer as necessary to extract ground-water contaminants associated with the site. Shallow aquifer subsurface drains will be constructed along the periphery of

the waste deposits in both sites 9 and 9a. The purpose of the extraction wells is to capture and extract the entire contaminant plume. The extraction wells and drains will collect leachate in a series of collection sumps from which it will be transported to the on-site ground-water treatment system.

The extraction/collection system will operate until the aquifer ground-water cleanup standards are achieved at the point of compliance: the edge of the landfilled waste. While the cleanup standards can be met at that point soon after construction of the action is complete, the cleanup standards will not be met under the site and it is anticipated that the system will operate perpetually.

3. On-site Ground-water Treatment System

The on-site ground-water treatment system will consist of multiple process options capable of treating an aqueous waste stream containing VOCs, SVOCs, and inorganic compounds to their discharge cleanup standards prior to discharge to the McBride Drain. The treatment residuals, which will be tested to determine if they are Resource Conservation and Recovery Act (RCRA) hazardous waste, will be disposed of at an off-site RCRA compliant facility. Any RCRA hazardous waste generated will be treated to comply with Land Disposal Restrictions.

4. Slurry Wall Extension

The purpose of the slurry wall extension which will be constructed along the east side of site 9, is to intercept off-site migration of the contaminant flow and redirect the flow toward the collection system. The slurry wall extension will be attached to, and compatible with, the existing slurry wall along the north side of site 9.

5. Municipal Water Supply Attachment

All residences within a one half mile radius of the site that are not currently attached to the municipal water supply will be attached.

6. Access Restrictions

a. Institutional controls that will be instituted may include deed restrictions to limit access and prevent future development of the landfill, and ground-water use restrictions.

b. Permanent fences will be constructed and maintained around the entire site and treatment systems to prevent exposure to site contaminants and provide

security for the remedial action equipment.

7. Cost Summary

Capital Cost:	$ 5,745,000
Annual O&M Costs:	224,000
Present Worth:	9,264,000

8. Other Provisions

Mitigative measures will be taken during remedy construction activities to minimize the impacts of noise, dust, smell, and erosion run-off to the surrounding community and environs. Fugitive dust emissions will not violate the National Ambient Air Quality Standard for particulate matter smaller that 10 microns (PM-10). Potential runoff, silting and sedimentation problems from construction will be mitigated to comply with MI Acts including Acts 203 (1979), 346 (1972) and 347 (1972) for wetland protection, inland lakes and streams, and soil erosion and sedimentation control, respectively.

The selected remedy will achieve substantial risk reduction through extraction of the leachate and contaminated ground water and treatment to health-based levels. The ground-water treatment operable unit meets the remediation goals for cleanup of the ground water outlined in the FS.

L. Statutory Determinations

The selected remedy must satisfy the requirements of section 121(a-e) of CERCLA to:

1. Protect human health and the environment;
2. Comply with ARARs or justify a waiver;
3. Be cost effective;
4. Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
5. Satisfy a preference for treatment as a principal element of the remedy.

The implementation of Alternative 3 at the SMDA sites 9 and 9a satisfies the requirements of CERCLA as detailed below:

1. Protection of Human Health and the Environment

Implementation of the selected alternative will reduce and control potential risks to human health posed by exposure to contaminated ground water. Extraction and treatment of contaminated ground water to meet ground-water cleanup standards will reduce the potential excess lifetime cancer

risk due to ingestion of contaminated ground water from the unacceptable risks currently posed (e.g., 2.0×10^{-3}) by ground water contaminants to a maximum risk for individual carcinogenic chemicals of approximately 1×10^{-6}. As above, assuming that all carcinogens were only treated to the 1×10^{-6} level, the maximum cumulative risk would be approximately 1×10^{-5}, which is an acceptable level. The Hazard Index would be reduced to 1.0, which is also an acceptable level. Extracting ground water in the vicinity of the landfills will lower the water table of the shallow and intermediate aquifers to below the level of the landfilled waste to the maximum extent practicable, thus minimizing the production of leachate by ground water flowing laterally through the waste.

Access restrictions will prevent direct contact with contaminated ground water until the ground-water cleanup standards are met. The selected remedy also protects the environment by reducing the potential risks posed by site chemicals discharging to the surface water (McBride Drain).

No unacceptable short-term risks will be caused by implementation of the remedy. The community and site workers may be exposed to noise and dust nuisances during installation of extraction/monitoring wells and construction of the slurry wall. Mitigative measures will be taken during remedy construction activities to minimize impacts of construction upon the surrounding community. The chances of vehicular accidents may rise due to the projected increase in the volume of truck traffic in hauling construction materials to the landfill. Standard safety programs should manage any short-term risk of accidents. The air stripping treatment component will be designed and monitored so as to not result in short-term risks due to VOC air emissions. Treatment residuals will be managed in accordance with LDRs.

2. Compliance with ARARs

The selected remedy will comply with the Federal and/or State, where more stringent, applicable or relevant and appropriate requirements (ARARs) listed below:

a. Chemical-specific ARARs

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the extent of clean-up at a site.

i. Ground Water

Federal ARARs

Maximum contaminant levels (MCLs) and, to a certain extent, non-zero maximum contaminant level goals (MCLGs), the Federal drinking-water standards promulgated under the Safe Drinking Water Act (SDWA), are applicable to municipal water supplies servicing 25 or more people. At SMDA sites 9 and 9a, MCLs and MCLGs are not applicable but are relevant and appropriate since the upper and intermediate aquifers are Class II sources which could potentially be used as a source of drinking water in the area of concern, and contaminants from the two aquifers could potentially contaminate the deep aquifer that is being used as a source of drinking water. MCLGs are relevant and appropriate when the standard is set at a level greater than zero (for non-carcinogens), otherwise, MCLs are relevant and appropriate. The point of compliance for Federal drinking-water standards is at the boundary of the landfilled wastes.

State ARARs

The substantive provisions of Parts 6 and 7 of Michigan Act 307 and Rule 57 of Act 245 are applicable or relevant and appropriate to the SMDA sites 9 and 9a. EPA has determined that acceptable standards for ground water clean-up, that have been derived under Type A and B criteria, would be protective in all the areas of the plume outside of the landfilled waste. Clean-up levels derived under Type A and B criteria would allow the aquifer to be restored to its beneficial uses by achieving the risk-based clean-up standards. EPA has determined that these clean-up standards are protective of human health and the environment. The point of compliance for these standards is at the boundary of the landfilled waste.

EPA has determined that Type A and B criteria would yield ground-water clean-up standards which would also provide for the protection of surface water quality, in turn protecting human health and the environment.

ii. Surface Water

Federal ARARs

Surface water quality standards for the protection of human health and aquatic life were developed under Section 304 of the Clean Water Act (CWA). The Federal Ambient Water Quality Criteria (AWQC)

are nonenforceable guidelines that set pollutant concentration limits to protect surface waters that are applicable to point source discharges, such as from industrial or municipal wastewater streams. At a Superfund site, the Federal AWQC would not be applicable except for pretreatment requirements for discharge of treated water to a Publicly Owned Treatment Works (POTW). CERCLA (section 121(d)(1)) requires EPA to consider whether AWQC would be relevant and appropriate under the circumstances of a release or threatened release, depending on the designated or potential use of ground water or surface water, the environmental media affected by the releases or potential releases, and the latest information available. Since the contaminated aquifer is a potential source of drinking water and since treated water may be discharged to McBride Drain, AWQC adopted for drinking water and AWQC for protection of freshwater aquatic organisms are relevant and appropriate to the point source discharge of the treated water into McBride Drain.

State ARARs

Portions of the Water Resources Commission Act 245 (Michigan Act 245) of 1929, as amended, establish surface water-quality standards to protect human health and the environment. The State administers the NPDES program under Part 21 of Michigan Act 245; therefore, Part 21 of Act 245 would be applicable to the direct discharge of treated water to McBride Drain, to the indirect discharge through ground water movement to a surface water body, or to a discharge to a POTW.

b. Location-specific ARARs

Location-specific ARARs are those requirements that relate to the geographical position of a site. These include:

Federal ARARs

Executive Order 11988 - Protection of Flood Plains - are relevant and appropriate for this site. This order would require that the leachate and ground-water treatment system be located above 100-year flood plain elevation and be protected from erosional damage. The landfills are not currently in a 100-year floodplain. However, any portion of the remedy that is constructed within the 100-year flood plain must be adequately protected against a 100-year flood event.

Section 404 of the CWA regulates the discharge of dredged or fill material to waters of the United States. Activities during the remedy may be regulated under section 404 of the CWA; therefore, the substantive requirements of section 404 would be relevant and appropriate to the remedial action at the site.

Executive Order 11990 - Protection of Wetlands - is an applicable requirement to protect against the loss or degradation of wetlands. Remedial activities may pose a threat to wetland areas on the south side of site 9. These threats include drawdown from the ground-water extraction system as well as siltation and sedimentation from construction. While a preliminary ecological assessment has been performed, the scope of the impact will be determined during design. Mitigative efforts will be applied to the clean-up if an impact is seen on wetlands.

State ARARs

The Goemaere-Anderson Wetland Protection Act 203 of 1979 (Act 203) regulates any activity which may take place within wetlands in the State of Michigan. Act 203 is relevant and appropriate to the remedial action at SMDA sites 9 and 9a; it may also require the replacement of adversely impacted wetlands with comparable resources.

The Inland Lakes and Streams Act 346 of 1972, as amended, regulates inland lakes and streams in the State. Act 346 would be applicable to any dredging or filling activity on McBride Drain bottomlands.

The Soil Erosion and Sedimentation Control Act 347 of 1972 regulates earth changes, including cut and fill activities, which may contribute to soil erosion and sedimentation of surface waters of the State. Act 347 would apply to any such activity where more than 1 acre of land is affected or the regulated action occurs within 500 feet of a lake or stream. Act 347 would be applicable to the ground-water extraction system and slurry wall construction activities since these actions could impact McBride Drain, which is less than 500 feet from the landfill area.

c. Action-specific ARARs

Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

Federal ARARs

Since the SMDA landfills closed prior to November 1980, RCRA Subtitle C requirements are not applicable unless RCRA-listed or characteristic hazardous wastes are excavated and managed (treated, disposed, or stored), as defined by RCRA, during cleanup. RCRA Land Disposal Restrictions (LDR or Land Ban) would not be applicable since no "placement" of RCRA hazardous waste would be occurring at this site.

The selected remedy will store and dispose of hazardous waste when the ground-water treatment system is in operation. The contaminated ground water collected will be stored at the treatment facility while awaiting treatment. The treatment processes will result in the generation of residual sludge containing heavy metals and other contaminants, as well as spent carbon containing organic contaminants. The RCRA waste generation and temporary storage regulations under 40 CFR Part 262 would then be applicable to that action. Treatment residuals will be disposed of at an off-site RCRA compliant facility.

State ARARs

The State of Michigan administers RCRA within the State. Under Hazardous Waste Management Act 64 of 1979, as amended, the State regulates the generation, transport, treatment, storage, and disposal of hazardous waste. Act 64 would be applicable to the storage/treatment/transport of hazardous residuals from the on-site treatment facility.

Parts 4, 9, and 21 of the Water Resources Commission Act 245 of 1929, as amended, establish rules for water quality by prohibiting injurious discharges to surface water. These rules would be applicable to the discharge of treated ground water to McBride Drain.

As described earlier in this document, the Michigan Environmental Response Act 307 of 1982, as amended (Act 307), provides for the identification, risk assessment, and evaluation of contaminated sites within the State. EPA has determined that the substantive provisions of Parts 6 and 7 of Act 307 are applicable or relevant and appropriate to SMDA sites 9 and 9a. The Act 307 rules require that remedial actions shall be protective of human health, safety, the environment, and the natural resources of the State. To achieve this standard of protectiveness, the Act 307 rules require that a remedial action achieves a degree of clean-up under either Type A (clean-up to background levels), Type B (clean-up to risk-based levels), or Type C (clean-up to risk-based

levels under site-specific considerations) criteria. EPA has determined that the Type A and B criteria are appropriate for the ground-water operable unit. The point of compliance for clean-up standards is at the boundary of the landfilled waste.

3. Cost-effectiveness

Cost-effectiveness compares the effectiveness of an alternative in proportion to its cost of providing its environmental benefits. Table 7 under Section J. 7. lists the costs associated with the implementation of the remedies.

Alternative 1 (No Action) has no cost and no benefit. Alternative 2, (environmental monitoring), is the least expensive of the two alternatives that involve action. However, it does not provide adequate protection of human health and the environment, meet ARARs, or provide effectiveness over the long term.

The selected alternative (Alternative 3) is considered the most cost-effective way to achieve remediation standards quickly, thereby protecting human health and the environment, provide long-term effectiveness, and meet ARARs.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for this site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of tradeoffs in terms of long-term effectiveness and permanence, reduction in toxicity , mobility, or volume achieved through treatment, short-term effectiveness, implementability, cost, and considering State and community acceptance.

The NCP gives priority to long-term effectiveness and reduction of toxicity, mobility or volume at a site, stating that these two criteria are generally the key decisional factors to be considered at Superfund sites once the threshold criteria of protectiveness and compliance with ARARs is satisfied. The key criterion used in remedy selection for SMDA sites 9 and 9a was immediate reduction of toxicity through treatment. Short-term and long-term effectiveness were also emphasized in that the selected remedy will prevent off-site migration of the contaminant plume.

The selected remedy will significantly reduce the inherent hazards posed by the contaminated ground water and leachate by collecting and treating these contaminants. The slurry wall extension and extraction wells will prevent off-site migration of the plume of contamination. These benefits are achieved quickly and at a reasonable cost. Contaminants from the ground water are extracted and permanently addressed through treatment.

The State of Michigan has (concurred) with the remedy. Community acceptance is addressed in the responsiveness summary attached to the ROD.

5. Preference for Treatment as a Principal Element

The selected remedy for the first operable unit satisfies the statutory preference for treatment as a principal element through treatment of the contaminants in the leachate and ground water in an on-site ground-water treatment plant. Treatment of the contaminants would result in a significant reduction of contaminant toxicity through the treatment process. Residuals generated by the multiple process treatment system, which could include residual sludge containing heavy metals and spent carbon containing organic contaminants, will be treated if necessary to comply with LDRs, before being disposed of at an off-site RCRA compliant facility.

RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared to meet the requirements of Sections 113(k)(2)(B)(iv) and 117(b) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), which requires the United States Environmental Protection Agency (EPA) to respond "...to each of the **significant** comments, criticisms, and new data submitted in written or oral presentations" on a proposed plan for remedial action. This Responsiveness Summary addresses concerns expressed by the public and the potentially responsible parties (PRPs) in the written and oral comments received by EPA regarding the proposed remedy for the South Macomb Disposal Authority (SMDA) Landfill site.

A. OVERVIEW

I. BACKGROUND/PROPOSED PLAN

The 159-acre SMDA site, located 30 miles northeast of Detroit in Macomb County, Michigan, consists of two adjacent former municipal landfills, sites 9 and 9a. The 159-acre landfill is located in a generally rural/agricultural area. The Remedial Investigation identified two areas of concern at the site: the contaminated ground water under the site, and the source of the contamination, the landfill contents.

The remedial alternative selected for the SMDA site, Alternative 3, is an operable unit that addresses the contaminated ground water. An operable unit is a discrete action that comprises an incremental step toward the final remedy; it is an integral part of a more comprehensive action that will be taken at the site. This operable unit addresses the contaminated ground water at the site. The nature of a second operable unit to address the landfill contents will be assessed during the performance of the first operable unit. The Proposed Plan for remedial action included the following:

- Extraction and treatment of the groundwater contaminant plume, with discharge of the treated water to adjacent McBride Drain;
- Construction of a slurry wall;
- Environmental monitoring; and
- Connection of nearby residents to the local municipal water supply.

II. PUBLIC COMMENT PERIOD

A public comment period was held from May 1, 1991 to June 6, 1991, to allow interested parties to comment on the proposed plan, in accordance with Section 117 of CERCLA. On May 6, 1991, a public meeting was held at the Senior Activities Center in Mt. Clemens, Michigan at which EPA presented the proposed plan, answered questions, and accepted comments from the public. During the comment period, EPA received approximately 3 written comments and 1 verbal comment concerning the Proposed Plan.

B. COMMUNITY INVOLVEMENT

The level of public interest regarding the site has been high since the controversial siting of site 9 in 1968. Community concern heightened when leachate outbreaks were observed in 1971 and continued on into the 1980s. The leachate outbreaks resulted in contamination of McBride Drain and a number of residential drinking water wells, whereupon local residents brought suit against SMDA and the State of Michigan in 1983. The State of Michigan joined the residents in their suit in 1984. This case was decided in favor of the plaintiffs in April 1991. The judge's decision requires SMDA to undertake a comprehensive remedial action plan at the site that includes a cap, slurry wall, and ground-water treatment.

Several key areas of community concern in regard to the preferred remedy in the Proposed Plan are as follows:

- The remedy proposed is not as comprehensive as it should be; i.e., it should include the slurry wall and cap required in the judge's decision;
- The remedy should be implemented as soon as possible, as the community has already waited so long for something to be done; and
- The proposed construction activity may have an adverse impact on the community due to increased traffic, noise, and dust levels in the residential areas in the vicinity of the site. In addition, excavation of the waste, and operation of the ground-water treatment plant may produce unpleasant odors.

The above concerns have been addressed in the following section.

C. SUMMARY OF SIGNIFICANT COMMENTS

The public comments regarding the SMDA site are organized into the following categories:

- Summary of comments from the local community regarding the proposed plan;
- Summary of comments from PRPs concerning the Remedial Investigation (RI), Feasibility Study (FS) and the proposed plan.

Many of the comments below have been paraphrased in order to effectively summarize them in this document. The reader is referred to the public meeting transcript and the written comments submitted during the public comment, which are available in the Information Repository located at the Macomb County Public Library.

I. SUMMARY OF SIGNIFICANT COMMUNITY COMMENTS

Most comments received from the community were taken at the public meeting. These ranged from support for the preferred alternative (Alternative 3), as long as it is not the final remedy and requests that the EPA stay involved, to outrage that EPA is not proposing a more comprehensive remedy or subordinating its process to the judge's ruling in State court. Several commenters reiterated concerns expressed at previous meetings rather than supporting or opposing any particular remedy. Comments received from the community are listed below:

Comment 1

Several commenters requested that cleanup begin as soon as possible, asserting that negotiations would delay the start of the project.

Response 1

EPA is working to ensure that the project proceeds as quickly as possible. However, whenever practicable and in the public interest, the EPA is required under Section 122 of CERCLA to negotiate with the PRPs to have them conduct and fund the cleanup before expending public funds from the Superfund. At this time, no condition at the site has been identified which would demonstrate that the additional time required for negotiations would be detrimental to the public interest, and thus warrant use of the Superfund. PRPs have indicated interest in conducting the remedial design/remedial action (RD/RA) and should then be afforded the opportunity to negotiate. However, should negotiations fail to achieve an agreement, the PRPs could be ordered to conduct the RD/RA under Section 106 of CERCLA or the EPA could conduct the

action using the Superfund trust fund.

Comment 2

Residents in the immediate vicinity of the site expressed concerns about noise, dust, traffic and odors emanating from the excavated waste during the construction phase of the remedial action. One resident was also concerned about smells from the treatment plant.

Response 2

EPA agrees that noise, dust, traffic, and odor control considerations are a high priority during construction of the remedy and afterwards during operation. During the design phase of the project, EPA will determine the most effective ways to control traffic, dust, and construction noise around the site to ensure the health and safety of area residents. This determination will include discussions and meetings with the community prior to any actions occurring at the site as well as during the activities. It will require on-going communication and cooperation between the community and EPA.

Possible solutions may include scheduling truck traffic for specific hours and limiting the number of trucks; spraying work areas and roads with water to keep down dust; use of barriers and suppressants to limit dust and odors; as well as scheduling certain types of work such as excavation of waste for the colder months of the year. The treatment plant itself would not emit odors as it will be enclosed.

Comment 3

While some commenters said EPA was "our only hope," others wanted to know why they couldn't say "thanks for coming but we don't need you anymore" (since the judge's decision was so comprehensive). Several commenters wanted to know why "EPA doesn't just subordinate to the judge" or write a proposed plan that "incorporates the judge's remedy." Two commenters expressed concerns that the cleanup plan selected by EPA and the action ordered by Judge Balkwill will interfere with each other.

Response 3

Once a site is placed on the National Priorities List (NPL) and becomes a Superfund site, the legal processes required by CERCLA must be completed. This includes a determination of the nature and extent of contamination, evaluation and selection of cleanup alternatives according to the evaluation criteria discussed in the National Contingency Plan (NCP), followed by cleanup of the site and eventual delisting (removal of the site from the NPL). Any cleanup alternative proposed or endorsed by EPA must be selected after being subjected to specific evaluation criteria. These

criteria are discussed in Section J of the ROD.

While the remedy ordered by Judge Balkwill does not appear to conflict with the ground-water operable unit selected by EPA, EPA recognizes the potential problem and will strive to coordinate with the appropriate parties to preclude this conflict from occurring.

Comment 4

One commenter suggested that EPA was "going for the cheapest remedy" and that EPA was being politically pressured and basing its decision solely on cost.

Response 4

Cost is only one of nine criteria used during the FS to evaluate remedies to clean up an NPL site. EPA selects the least costly remedy only when all other evaluation criteria are met. In this case, EPA's proposed alternative for cleaning up the site is the most expensive evaluated for this operable unit. EPA has not been "politically pressured" into proposing its cleanup plan. The proposed plan is the result of the evaluation criteria discussed in the FS.

Comment 5

The same commenter wanted to know how EPA "ever got past step 1" (protection of human health and the environment) with a remedy that does not "get the garbage out of the ground water."

Response 5

EPA's proposed plan for cleaning up the SMDA site addresses the greatest threat associated with the site - the contaminants in the ground water. Section F. of the ROD discusses the results of the risk assessment. The ground-water operable unit will reduce site-related risks to health-based levels quickly, and is therefore protective of human health and the environment. A second operable unit will address the landfilled waste.

Comment 6

The same commenter stated that "midnight dumping" had taken place in 1968 and 1969. She wanted to know what method had been used to look for "barrels" at the site and had a scan been done for nuclear waste.

Response 6

EPA currently has no information concerning illegal dumping at the site, but encourages individuals who have such information to contact Dan O'Riordan, EPA's Community Relations Coordinator, at 1-

800-621-8431. EPA has no evidence indicating that drums or nuclear waste were disposed of at the site.

Comment 7

The same commenter expressed the opinion that, since the RI contained the phrases "lack sufficient data, poorly defined, uncertain, assumed,.....may and difficult," EPA did not have enough information to "come up with any kind of conclusion or any kind of a remedy."

Response 7

EPA disagrees with the comment. The purpose of the RI as stated in the National Contingency Plan (NCP) is to assess site conditions to the extent necessary to select and implement a remedy in as timely a manner as possible in order to protect human health and the environment. The NCP reflects a bias for action. EPA believes that, while the remedial investigation does not provide answers to all questions regarding the nature and extent of contamination, it was performed to a sufficient level of detail and was sufficiently comprehensive to determine the need for remedial action and to evaluate remedial action alternatives. It is part of the scientific method to both identify that which is not known and to make assumptions based upon what is known.

Comment 8

One commenter stated that $9.3 million is not acceptable as "a fine of judgment."

Response 8

A Superfund cleanup is not a punitive action. The cost of the remedial action is not a fine or penalty. It is the cost to construct and maintain the cleanup at the SMDA site. The cost is the same whether the PRPs or Superfund pays for the cleanup.

Comment 10

Several residents present at the public meeting asked how they could get their wells tested.

Response 10

Residents can call John Hesse, Chief of the Environmental Health Assessment Division, Michigan Department of Public Health at 517/335-8353.

Comment 11

Residents wanted to know who, under the proposed plan, would be

connected to municipal water.

Response 11

Figure 9 in the ROD shows a map of the area that will be included in the remedial action.

Comment 12

Two commenters wanted to know "how large the aquifers are under the landfill ... and who is at risk," how far the aquifers extend beyond the landfill, and which way the ground water flows in the aquifers.

Response 12

The physical characteristics of the aquifers are discussed in Sections E.2. and E.5. of the ROD. The risks associated with the ground water are discussed in Section F.5. of the ROD. The purpose of the Remedial Investigation was to determine the nature and extent of **contamination** at the site. The horizontal extent of the three aquifers was delineated only as far as was necessary to ascertain the extent of contamination. However, boring and monitoring well information indicate that the three aquifers extend to the north of the site at least 2,000 feet and that the intermediate and deep aquifers appear to merge just to the south of McBride drain.

In addition, the preferred plan in the Proposed Plan requires continual monitoring of the ground water in all three aquifers. Since ground-water flow is very slow, if any site contaminants should migrate off-site in the future, they can be detected early and action taken to prevent risks to residents in the area still using wells for drinking water.

Comment 13

Several residents expressed appreciation and support for the remedial action.

Response 13

Acknowledged.

II. SUMMARY OF SIGNIFICANT PRP COMMENTS

The South Macomb Disposal Authority (SMDA) submitted written comments on the Proposed Plan through the Detroit law firm of Dykema Gossett. SMDA determined that the proposed plan is "unwarranted given the insufficient data upon which this remedy is

based and the minimal risk associated with the groundwater." The commenter also determined that EPA has "improperly de-emphasized cost as a factor to be considered in its selection of a remedy," and that Alternative 2 would be a more appropriate choice. The comments are addressed below:

Comment 1

SMDA states that the data upon which the remedy selection is based is not only inadequate, but is "seriously flawed," particularly the residential well sampling.

Response 1

EPA disagrees. EPA does not believe more data is required at this time or that the data is "seriously flawed." The subject of additional data needs was addressed under Comment/Response 7, above, which defined the purpose of the RI.

As to the subject of "flawed data," data gathered and analyzed during a remedial investigation under the Superfund program must comply with a Quality Assurance Project Plan (QAPP) which establishes a high standard of data quality. The data used to evaluate alternatives at the SMDA site was subjected to QAPP requirements which also demand that data be validated by EPA's Central Regional Laboratory. Data that did not meet established standards were not used in the evaluation.

As discussed under response 7 above, the purpose of the investigation was to acquire sufficient information of high quality to make an expeditious decision concerning the most appropriate way to clean up the site. Data necessary for design purposes of the remedy, as opposed to remedy selection, can be obtained during the pre-design or remedial design (RD) phases. This enables EPA to clean up sites as quickly as possible and avoid the delays associated with lengthy and costly investigations that are not specifically necessary for remedy selection.

Comment 2

SMDA states that there is no evidence that ground water from sites 9 and 9a poses a risk to human health or to the environment, and further, that there is no significant risk to human health because one of the exposure pathways - residential use of ground water as a drinking water source - has been or will be eliminated at the appropriate time as additional residences are or will be connected to the municipal water supply in the event of future well contamination.

Response 2

EPA disagrees with the commenters' determination and believes there

is significant risk from contaminated ground water at the site. The commenter is referred to the risk assessment section of the ROD (Section F).

The SMDA risk assessment seems to be based on the fact that a municipal water supply has been or will be made available to local residents. However, the fact that residents are being or will be connected to a municipal water supply does not thereby eliminate the human exposure pathway from consideration and permit contamination of the ground water to continue unchecked. If no action is taken at the site and, in the future, contamination is detected in residential wells, it can be assumed that the residents will have consumed water from the wells before the contamination was detected. This has occurred in the past and it is unacceptable that it should happen in the future.

In addition, the NCP states that EPA expects to return usable ground waters to their beneficial uses, wherever practicable, within a time frame that is reasonable given the particular circumstances of the site. Whenever restoration of ground water is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction. The goals of this remedial action are to prevent direct contact with the ground-water contaminants and off-site migration of the contaminant plume. (40 CFR Section 300.430(a)(1)(iii)(F)).

The NCP also states that the use of institutional controls shall not substitute for active response measures as the sole remedy unless such response measures are determined not to be practicable. (40 CFR Section 300.430(a)(1)(iii)(D)). Active response measures are practicable in this case.

SMDA also states that its preferred alternative, Alternative 2 (monitoring only), would comply with ARARs. EPA has determined that Alternative 2 would not meet comply with ARARs and refers the commenter to the discussion of ARARs in Section J. of the ROD. Contaminants in the ground water at the site exceed the acceptable risk range for human health established by EPA, maximum contaminant levels (MCLs) and Michigan Act 307 standards.

Comment 3

SMDA states that "EPA has improperly de-emphasized cost as a factor to be considered" in selection of a remedy and questions the cost effectiveness of the preferred cleanup alternative in that it "may be only an interim component of a more comprehensive remedy."

Response 3

EPA disagrees. The remedial alternative selected for the SMDA site, Alternative 3, is an operable unit. The NCP defines operable

units as "discrete actions that comprise incremental steps toward the final remedy." It is an integral part of a more comprehensive action that will be taken at the site at a later date and, as such, will not become obsolete or unnecessary until total site cleanup is achieved and the ground water beneath the site returned to beneficial use. Most landfill cleanups include some type of ground-water remediation and a cap. EPA considers the ground-water operable unit to be a complete and final remedy for this phase of the cleanup. A second phase will address the landfill contents.

EPA has determined that the greatest risk to human health and the environment at the site is ingestion of or contact with the contaminated ground water. The cleanup goals for this operable unit are to prevent direct contact with the contaminated ground water, prevent off-site migration of the contaminants in the ground water, and remove and treat the contaminants to health-based levels. EPA considers the selected alternative (Alternative 3) to be the most cost-effective way to achieve the cleanup goals quickly, thereby protecting human health and the environment.

ADMINISTRATIVE RECORD INDEX
REMEDIAL ACTION - UPDATE NO. 1
SOUTH MACOMB DISPOSAL SUPERFUND SITE
MACOMB COUNTY, MICHIGAN

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
	1	00/00/00	Comments regarding residents near the South Macomb Disposal Authority Landfill	Glen Osanock - Citizen of Macomb Township, MI	Dan O'Riordan, USEPA	Correspondence	
	2	90/04/21	Summary of Existing Technical Information	Brenda Tollett, Dykema Gossett - (Attorneys for SMDA)	Betty Lavis - USEPA	Correspondence	
	2	91/06/03	Letter re: The degree of Liability on South Macomb Disposal Authority (SMDA)	Gary Robertson - Citizen of Warren, MI	Dan O'Riordan, USEPA	Correspondence	
	25	91/06/05	Letter re: Enclosure of three copies of comments to the EPA's Proposal Plan for Remedial Action for the SMDA Landfill Superfund Site	Marguerite Gritenas, Dykema Gossett - (Attorneys for SMDA)	Dan O'Riordan, USEPA	Correspondence	
	21	90/04/19	Appendix D, Volume II, Summary of Existing Technical Information Available for South Macomb Disposal Authority Site 9 & 9A	Contractors for SMDA	USEPA	Maps	
	30	91/05/24	Meeting Note re: Original transcript of the EPA Public Hearing in regards to the South Macomb Disposal Authority Landfill Superfund Site on 5/6/91 with cover letter	Candace Noblett, Professional Court Reporting	Dan O'Riordan, USEPA	Meeting Notes	
	352	87/07/17	Report on Preliminary Hydrogeologic Investigation Landfills 9 and 9A	Meyer, Tiseo & Hindo, Ltd. (Prepared for SMDA)	USEPA	Report/Studies	

ADMINISTRATIVE RECORD INDEX
REMEDIAL ACTION - UPDATE NO. 1
SOUTH MACOMB DISPOSAL SUPERFUND SITE
MACOMB COUNTY, MICHIGAN

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
	107	90/04/19	Appendix D, Volume 1 to Summary of Existing Technical Information Available for South Macomb Disposal Authority Sites 9 and 9A	Contractors for SMDA	USEPA	Report/Studies	
	288	90/04/19	Appendices A,B,&C to Summary of Existing Technical Information Available for South Macomb Disposal Authority Sites 9 and 9A	Contractors for SMDA	USEPA	Report/Studies	
	57	90/04/19	Summary of Existing Technical Information Available for South Macomb Disposal Authority Sites 9 and 9A	Contractors for SMDA	USEPA	Report/Studies	
	372	90/08/23	Remedial Investigation Report - South Macomb Disposal Authority Volume I of II	CH2MHILL	USEPA	Report/Studies	
	878	90/08/23	Remedial Investigation Report - South Macomb Disposal Authority Volume II of II	CH2MHILL	USEPA	Report/Studies	
	687	90/09/28	Public Comment Feasibility Study Report - South Macomb Disposal Authority	CH2MHILL	USEPA	Report/Studies	
	9	91/05/00	Proposed Plan for Remedial Action		USEPA	Reports/Studies	
	24	91/05/06	South Macomb Disposal Authority comments to EPA's proposed plan for Remedial Action	Ted B. Wahby - SMDA	USEPA	Reports/Studies	

ADMINISTRATIVE RECORD INDEX
REMEDIAL ACTION - UPDATE NO. 1
SOUTH MACOMB DISPOSAL SUPERFUND SITE
MACOMB COUNTY, MICHIGAN

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			for the South Macomb Authority Superfund Site				

ADMINISTRATIVE RECORD INDEX
SOUTH MACOMB DISPOSAL LANDFILL SUPERFUND SITE
MACOMB COUNTY, MICHIGAN

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
	23	89/07/18	Documentation Records For Hazard Ranking Systen South Macomb Landfill 89	USEPA		Other	1
	111	83/09/08	Report on Subsurface Investigation for the South Macomb Disposal Authority [Note: this report was produced by engineers for the PRPs]	Meyer, Tiseo & Hindo, Ltd.	S.Macomb Disposal Auth.	Reports/Studies	2
	158	83/09/13	Report on Preliminary Hydrogeologic Investigation [Note: This report was produced by engineers working for the PRPs]	Meyer, Tiseo & Hindo, LTD.	S.Macomb Disposal Auth.	Reports/Studies	3
	22	84/03/07	Potential Hazardous Waste Site Preliminary Assessment	USEPA		Reports/Studies	4
	135	88/05/17	Final Work Plan Remedial Investigation/ Feasibility Study EPA WA NO. 193-5LS4	CH2M Hill	USEPA	Reports/Studies	5
	48	90/01/12	Alternative Array Memorandum South Macomb Disposal Authority	CH2M Hill	USEPA	Reports/Studies	6

ADMINISTRATIVE RECORD INDEX
SOUTH MACOMB DISPOSAL LANDFILL SUPERFUND SITE
MACOMB COUNTY, MICHIGAN

FICHE/FRAME	PAGES	DATE	TITLE	AUTHOR	RECIPIENT	DOCUMENT TYPE	DOCNUMBER
			Macomb County, Michigan				

ACRONYM GUIDE for the Administrative Record
SOUTH DISPOSAL LANDFILL SUPERFUND SITE
MACOMB COUNTY, MICHIGAN

ACRONYM	DEFINITION
Auth.	Authority
Ltd.	Limited
USEPA	United States Environmental Protection Agency

NATURAL RESOURCES COMMISSION
MARLENE J. FLUHARTY
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RAYMOND POUPORE

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DEPARTMENT OF NATURAL RESOURCES

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DELBERT RECTOR, Director

REMEDIAL & ENFORCEMENT
RESPONSE BRANCH

September 5, 1991

Mr. Valdas Adamkus, Regional Administrator
U.S. Environmental Protection Agency
Region 5, 5RA-14
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Adamkus:

The Michigan Department of Natural Resources (MDNR), on behalf of the State of Michigan, has reviewed the Record of Decision (ROD) signed by you on August 13, 1991, for the groundwater operable unit at the South Macomb Disposal Authority (SMDA) Sites 9 and 9A, in Macomb County, Michigan. Although the declaration in the ROD states the contrary, there was no concurrence letter attached to the signed ROD because we were awaiting confirmation that our comments on the last draft of the ROD had been addressed. The State of Michigan does, however, concur with the remedy proposed in the ROD for the first operable unit for this site since the remedial action will halt further off-site migration of contaminated groundwater.

The remedy selected in that ROD consists of:

- leachate collection,
- groundwater extraction on-site and off-site as necessary,
- on-site treatment of groundwater and leachate with discharge to McBride Drain,
- extension of the existing slurry wall,
- replacement of water supply wells in the surrounding area with municipal water supply,
- deed restrictions and fencing to provide for the integrity of the remedy,
- and long term monitoring of groundwater, including selected residential wells in the area.

It is the MDNR's judgement that although the selected remedial action for this site will meet all legally Applicable or Relevant and Appropriate Requirements (ARARs) pertinent to the action to be taken; it will not satisfy ARARs for the site as a whole. This remedy will meet the Type A or B groundwater cleanup criteria in Michigan's Act 307 rules at and beyond the landfill boundaries;

however, the remaining contamination inside the landfill boundaries will require a Type C final remedy for the site. The State of Michigan reiterates the need for further action to address the landfill contents which EPA has chosen to defer to a second operable unit. The landfill is, and will continue to be, a source of contamination to the groundwater beneath the site. Until a remedy is implemented which controls this ongoing source of groundwater contamination, ARARs cannot be met.

Please be aware that there are two very significant court orders currently in place regarding this site which may impact aspects of implementation. The first is a 1989 Consent Decree between Macomb Township and the State of Michigan which provides for residences in the vicinity of SMDA Sites 9 and 9A to be attached to municipal water supply in the event that they become contaminated. The second is the April 4, 1991 Circuit Court Order requiring SMDA to remedy the sites. In addition to groundwater control actions outlined in this ROD, the court order requires SMDA to construct a multi-media cap on the site and a slurry wall and leachate collection system entirely around both of the sites. We believe that implementation of the court ordered remedy will meet federal and state ARARs. Although there is no direct conflict between these orders and this ROD, it will be imperative for our agencies to work closely on these actions to avoid duplication of effort and conflict.

It is my hope that in the near future our agencies can successfully select and implement a final remedy for this site which meets federal and state requirements and considers the existing judicial decisions achieved through state enforcement actions.

Sincerely,

Frank Ruswick
Acting Deputy Director
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cc: Mr. Jon Dikinis, US EPA
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Mr. Thomas Emery, Dept. of Attorney General
Mr. William Bradford, MDNR
Ms. Claudia Kerbawy, MDNR
Ms. Kate Parling, MDNR