United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R05-87/055
September 1987

EPA

Superfund Record of Decision:

Marion/Bragg Landfill, IN

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA/ROD/R05-87/055		

4. TITLE AND SUBTITLE	5. REPORT DATE
SUPERFUND RECORD OF DECISION Marion/Bragg Landfill, IN First Remedial Action	September 30, 1987 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
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12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report 14. SPONSORING AGENCY CODE 800/00
15. SUPPLEMENTARY NOTES	

16. ABSTRACT

The Marion/Bragg Landfill is a 72-acre site located near the southeastern city limits of Marion, Indiana. The site is bordered on the north and east by the Mississinewa River. Main features of the site include a 45-acre landfill and a 15-acre pond. From 1935 to 1961 the site was used as a sand and gravel quarry, and from 1949 to 1970 portions of the site, leased by Radio Corporation of America and Bragg Construction Company, were used for industrial and municipal waste disposal, respectively. Throughout this period, the Indiana State Board of Health (ISBH) noted the disposal of acetone, plasticizers, lacquer thinner and enamels. Drummed wastes were also accepted and contents were allegedly emptied from the drums and worked into the landfill waste with a bulldozer, causing several fires on site. Drums were allegedly rinsed and resold. In 1975 Bragg Construction company ceased operation of the landfill. In 1975, Waste Reduction Systems constructed a transfer station to properly transfer solid wastes to an approved landfill. The transfer station was closed in 1977. The landfill contains approximately 1,100,000 yd^3 of waste. Primary contaminants of concern include: DCE, TCE, vinyl chloride, other VOCs including: Bis(2-ethylhexyl)phthalates and numerous heavy metals.

The selected interim remedial action for the Marion/Bragg landfill includes: capping with regrading; providing and maintaining flood control measures to protect the portion

(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Marion/Bragg Landfill, IN First Remedial Action Contaminated Media: gw, soil Key contaminants: TCE, DCE, VOCs, heavy metals		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
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	None	

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EPA/ROD/R05-87/055
Marion/Bragg Landfill, IN
First Remedial Action

16. ABSTRACT (continued)

of the site within the 100-year flood plain; fence construction; providing three private wells for drinking water; sealing shallow wells; and monitoring ground water to determine effectiveness of the interim remedy. Additional studies will be conducted to determine remedies for ground water and the onsite pond. The estimated capital cost of the selected interim remedy is $5,800,000, with present worth O&M of $1,000,000.

Declaration for the Record of Decision

Site Name and Location:

Marion/Bragg Landfill
Marion, Indiana

Statement of Basis and Purpose:

This decision document represents the selected interim remedial action for the Marion/Bragg Landfill developed in accordance with 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 Contingency Plan (NCP).

This decision is based upon the administrative record for the Marion/Bragg Landfill. The attached index identifies the items which comprise the administrative record and the public comments upon which the selection of an interim remedial action is based.

The State of Indiana, through the Department of Environmental Management, has concurred on the selected remedy.

Description of the Selected Remedy:

This landfill has three operable units: the surface soils and on-site wastes, the ground water and the on-site pond. This operable unit addresses the surface soils and the on-site wastes. The major components of the selected remedy include:

- Regrade and cap the site to promote rain runoff, reduce infiltration, eliminate leachate seeps and contaminated seep sediments, and prevent direct contact with contaminated surface soils and exposed waste.
- Provide and maintain flood control measures to protect that portion of the site which lies within the 100 year flood plain.
- Construct and maintain a fence around the site perimeter to protect the landfill cover and restrict access to the site and the on-site pond.
- Provide three private use drinking water wells within the deep aquifer for water users who drink from the affected aquifer within the site boundary. Seal the existing shallow wells (if possible, keep one as a monitoring well.)
- Monitor the ground water to determine the effectiveness of the interim remedy and conduct additional studies, as necessary, to complete the remaining ground water and on-site pond operable units.

Declaration:

The selected interim remedy is protective of human health and the environment, attains Federal and State requirements that are appropriate and is cost-effective for those elements addressed by this interim remedy. The statutory preference for treatment is not satisfied because treatment was found to be impractical and not cost-effective. Incineration was the only treatment technology considered beyond the initial screening stage. Based on the lack of off-site incineration capacity, anticipated duration of such remedial action (30 to 100 years), high inorganic content of the waste and ash disposal problems, incineration was not considered a feasible alternative for the landfill contents.

Concurrent with the implementation of the interim measures, the United States Environmental Protection Agency (U.S. EPA) will further study the nature of groundwater contamination on fish consumption and potential impacts to aquatic life and the environment. Implementation of these actions is appropriate now, pending a future determination of the need for any other remedial actions.

September 30th, 1987
Date

Valdas V. Adamkus
Regional Administrator
Region V

Record of Decision Summary
Marion/Bragg Landfill

I. Site Description

The Marion/Bragg Landfill site is located just outside the southeastern city limits of Marion, Indiana. (Figure 1) The landfill occupies approximately 45 acres of a 72-acre site along the west bank of the Mississinewa River. The northern end of the site is within the estimated 100 year flood plain.

The site is bordered on the north and east by the Mississinewa River. (Figure 2) A cemetery is located along the western border and the Eastside Cove recreational area is located along the site's southern border. A residence and two businesses are located on the southwest corner of the site. The two businesses are Marion Paving Company and Dobson Construction Company. Both companies are asphalt plants. A large (15 acre) pond formed from sand and gravel quarry operations is in the center of the site. The on-site pond is occasionally used for recreational purposes, such as boating and fishing. The on-site pond receives discharges associated with gravel washing operations from the Marion Paving Company asphalt plant. A large pond of similar size is located off-site on the Eastside Cove recreational area, adjacent to the southern site boundary. This large pond on the Eastside Cove recreational area is used for fishing.

I. Site History and Current Status

A. History and Waste Types

1. History

The Marion/Bragg site was used as a sand and gravel quarry from 1935 until approximately 1961. During the period from 1949 through 1970, Radio Corporation of America (RCA) leased and used portions of the site for industrial refuse disposal. Concurrently, during the period from 1957 to 1975, Bragg Construction leased and used the site for a municipal landfill. Periodic inspections by the Indiana State Board of Health indicated that operations at the landfill were continually conducted in an unacceptable manner. Indiana State Board of Health (ISBH) specifically noted the disposal of hazardous or prohibited wastes including acetone, plasticizers, lacquer thinners and enamels.

Drummed wastes were allegedly emptied from the drums and "worked" into the landfill waste with a bulldozer. Fires created from this co-disposal operation destroyed two bulldozers. Drums were allegedly rinsed and resold. Other typical violations included lack of daily cover, placing waste in standing water (pond encroachment) and the burning of refuse. In 1975 Bragg Construction ceased operation of the landfill. The landfill was covered with a sandy/silty material and seeded. The landfill was never formally closed through ISBH.

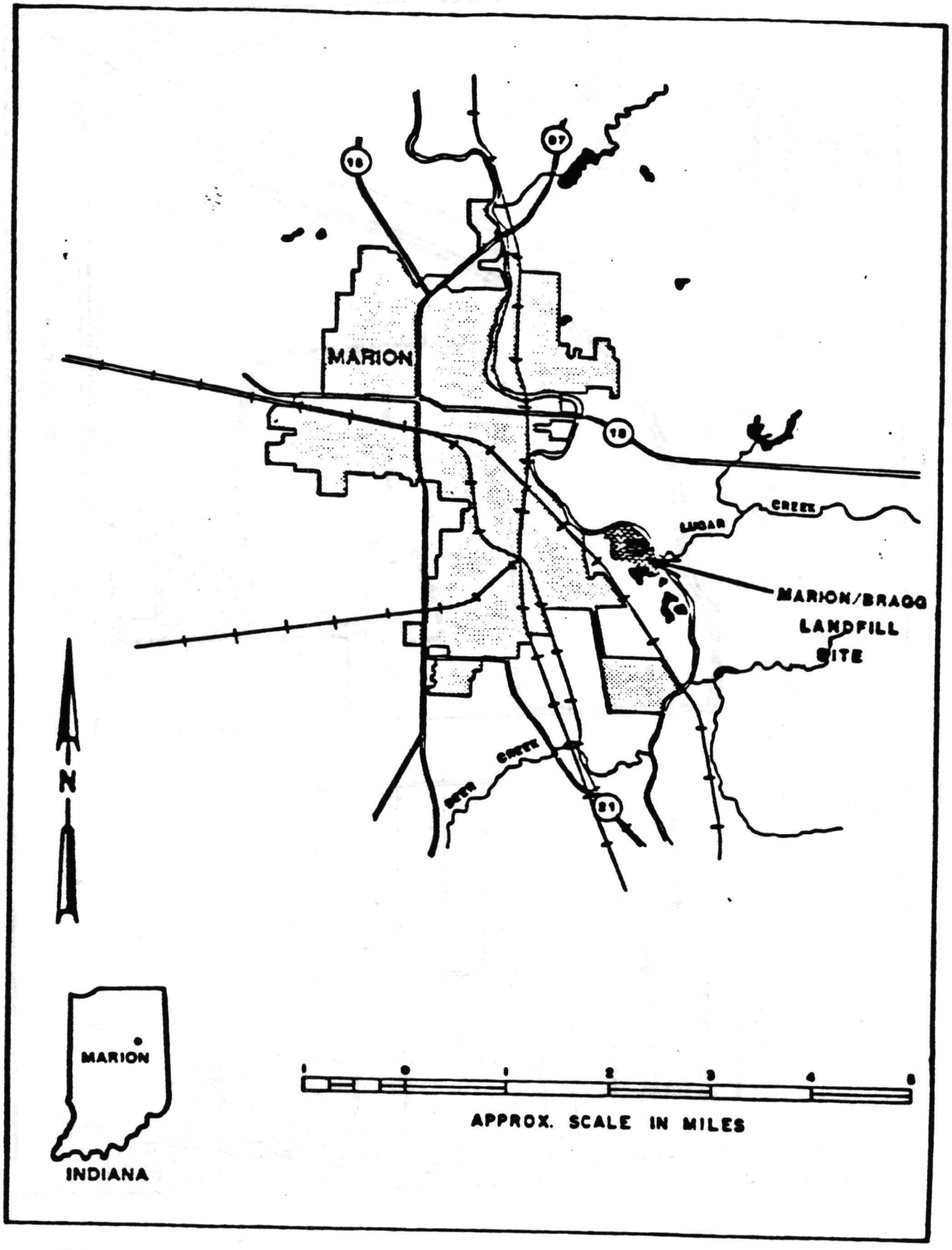


FIGURE 1 SITE LOCATION

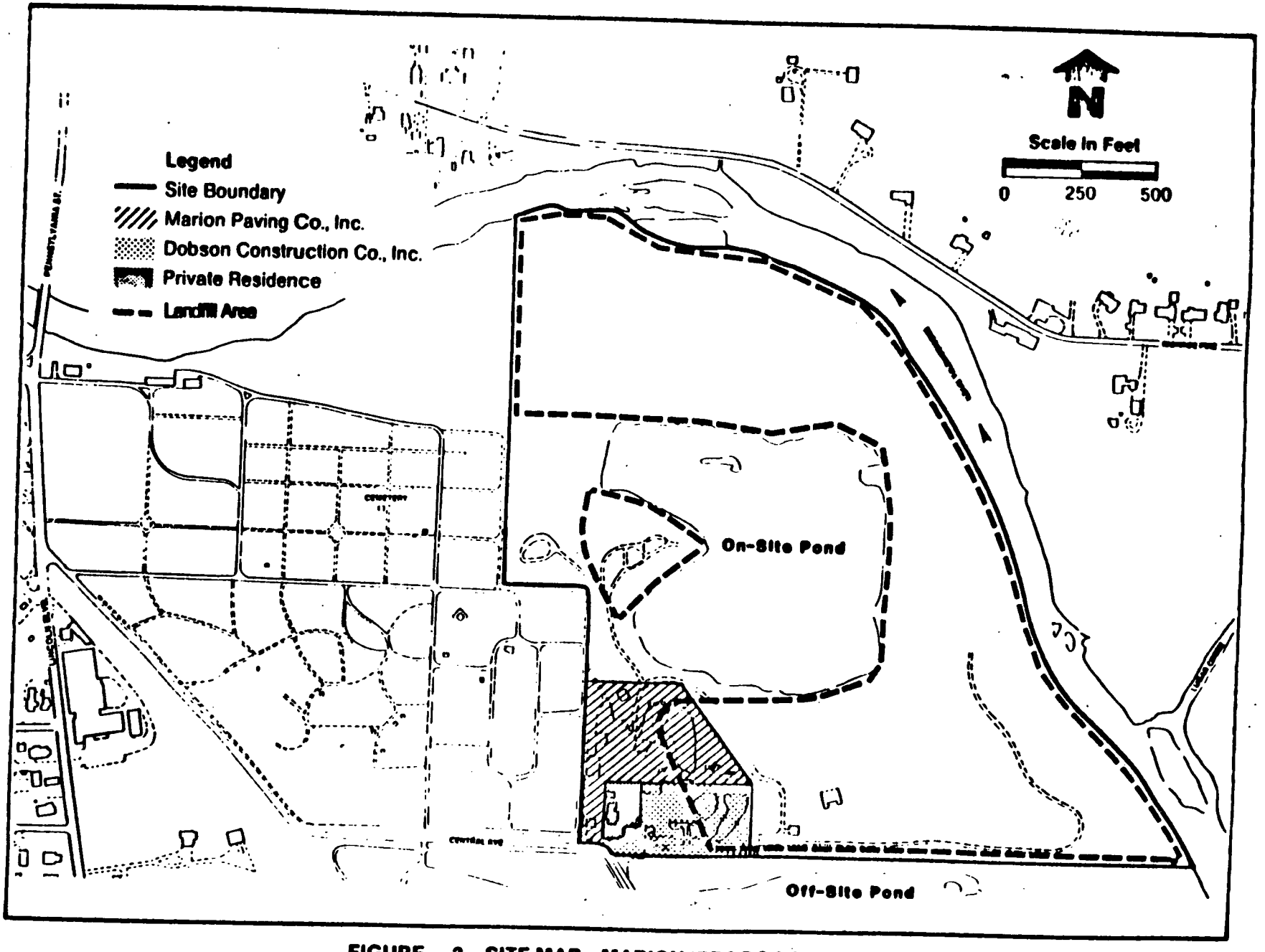


FIGURE 2 SITE MAP - MARION/BRAGG LANDFILL

In 1975, Waste Reduction Systems, a division of Decatur Salvage, Inc., constructed a transfer station on the premises in order to transfer solid wastes to an approved landfill. The transfer station was closed in 1977. In January 1980, ISBH issued a letter stating that the transfer station had been closed in an acceptable manner.

In December, 1982 the Marion/Bragg Landfill was proposed for the National Priorities List (NPL) with a score of 35.25.

2. Waste Types

During the remedial investigation, wastes from 3 boring locations were analyzed to confirm the presence and relative concentrations of hazardous contaminants. (Table 1) Leachate wells were constructed in these borings. These wells were screened within the waste material in order to provide information on the relative concentration of contaminants leaching from the landfill to the ground water at the present time.

B. Present Site Conditions

The final cover applied to the landfill is a very permeable silty sand material which varies in thickness from three to 24 inches. There are numerous areas where debris, including drum carcasses, protrude from the fill. The surface is vegetated in most areas and four to five inch diameter trees are also predominant surface features.

The on-site pond was at one time stocked for recreational fishing, but is no longer used as such. Teenage children have been seen fishing occasionally from the on-site pond, otherwise the site is not typically used. At the southwest edge of the pond is an intake pipe and effluent ditch from the Marion Paving Company. Marion Paving has an expired permit issued for "private use water." The permit allows water withdrawal and discharge to the on-site pond for the gravel washing operation.

Another asphalt company, Dobson Paving Company and a private residential home are also located within the property boundary. All three have shallow wells which are in the upgradient, uncontaminated portion of the aquifer.

C. Site Stratigraphy and Hydrogeology

The stratigraphy at the Marion/Bragg Landfill is very simple. It consists of landfill wastes (0-32 feet thick), outwash deposits (6-64 feet thick), glacial till (54 to 63 feet thick) and bedrock (thickness unknown, surface is 89 to 125 feet below ground surface).

Table 1
Summary of Waste Boring Sampling Results
Marion/Bragg Landfill RI/FS

CONSTITUENTS	INVESTIGATIVE SAMPLES(a) NO. OF POSITIVE DETECTIONS/ NO. OF VALID OBSERVATIONS(c)	INVESTIGATIVE SAMPLES(a) RANGE OF DETECTION	BACKGROUND SAMPLES(b) NO. OF POSITIVE DETECTIONS/ NO. OF VALID OBSERVATIONS(c)	BACKGROUND SAMPLES(b) RANGE OF DETECTION	TYPICAL CONC. IN U.S. SOILS (EPA,1983)	EXCEEDS TYPICAL CO IN U.S. SO
VOLATILES, (ug/kg)						
1,1-Dichloroethene	1/11	12	0/7	ND	None Established	NA
1,1,1-Trichloroethane	4/11	15 - 46	0/7	ND	None Established	NA
Acetone	6/11	53 - 824	4/7	11 - 85	None Established	NA
Benzene	5/11	5 - 11	0/7	ND	None Established	NA
Carbon Disulfide	1/11	5	0/7	ND	None Established	NA
Ethylbenzene	5/11	13 - 340	0/7	ND	None Established	NA
Methylene Chloride	10/11	18 - 240	2/7	7.5 - 9.5	None Established	NA
Styrene	1/11	17	0/7	ND	None Established	NA
Tetrachloroethene	3/11	36 - 91	0/7	ND	None Established	NA
Toluene	5/11	5 - 27	0/7	ND	None Established	NA
Total Xylenes	3/11	40 - 100	0/7	ND	None Established	NA
Trans-1,2-dichloroethene	4/11	10 - 4745	0/7	ND	None Established	NA
Trichloroethene	9/11	5 - 414	0/7	ND	None Established	NA
myl Chloride	3/11	82 - 341	0/7	ND	None Established	NA
SEMI-VOLATILES,(ug/kg)						
bis(2-ethylhexyl)phthalate	11/11	537 - 9,040,000	1/7	970	None Established	NA
Di-n-butylphthalate	1/11	188,000	1/7	447	None Established	NA
Di-n-octylphthalate	1/11	450,000	0/7	ND	None Established	NA
PESTICIDES, (ug/kg)						
Chlordane	3/4	300 - 640	0/7	ND	None Established	NA
INORGANICS,(mg/kg)						
Antimony	3/11	28 - 46	0/7	ND	2 - 10	Y
Barium	11/11	10 - 402	7/7	11 - 85	100 - 3000	N
Cadmium	9/11	4.3 - 403	1/7	3	.01 - 0.7	Y
Chromium	11/11	6.3 - 25	7/7	7 - 17	1 - 1000	N
Copper	11/11	13 - 5850	7/7	11 - 42	2 - 100	Y
Lead	11/11	6.9 - 5870	7/7	5.5 - 18	2 - 200	Y
Mercury	8/11	.10 - .35	0/7	ND	0.01 - 0.3	N
Sodium	11/11	1410 - 3060	6/7	680 - 1960	None Established	NA
Tin	10/11	11 - 73	3/7	19 - 22	2 - 200	N
Zinc	11/11	32 - 2910	7/7	29 - 87	10 - 300	Y

a) Waste Boring Samples - WB01, WB02, and WB03
b) Background Samples - SS05, SS06, SS09, SS10, SB01, SB02, and SB03
c) Number of samples in which chemical was detected over total number of samples analyzed.
ND - Not Detected
NA - Not Applicable

The landfill contains approximately 1.1 million cubic yards of waste. At least 4 percent of the total volume is perennially saturated in the upper aquifer. The saturated areas are to the east, west, and north of the pond. South of the pond a water filled gravel pit was allegedly filled with demolition debris. The saturated volume of this pond has not been estimated. (Figures 3 & 4)

Outwash deposits (sands and gravel) constitute the surficial aquifer. The average hydraulic conductivity is 4.27×10^{-2} cm/sec. The aquifer gradient is toward the Mississinewa River. The Mississinewa River is a hydraulic barrier causing the contaminated groundwater beneath the site to discharge to the river, without allowing flow to pass beyond the river. The estimated flow velocity is 2.78 ft./day. At this rate, the aquifer beneath the site purges every 2.2 years, or 7 times in the last 15 years.

The on-site and off-site ponds are hydraulically connected to the groundwater. The presence of the large on-site and off-site ponds creates a hydraulic anomaly in that water flows from the off-site pond, discharging to the aquifer, recharging the on-site pond from the south. The on-site pond discharges radially from the west, north and east sides of the pond. The predominant discharge area is to the north, to the Mississinewa River.

The outwash deposits are underlain by a very low permeability glacial till. This till is approximately 54 to 63 feet thick. The hydraulic conductivity ranges from 1.0×10^{-7} cm/sec to 2.88×10^{-8} cm/sec. This till layer is considered an aquiclude.

The glacial till layer is underlain by limestone bedrock. The thickness of this layer is uncertain, but it was first encountered at 88 feet below ground surface. This bedrock layer constitutes a second aquifer. This confined aquifer has an upward vertical gradient, toward the glacial till.

D. Public Health Evaluation: Hazardous Compounds, Pathways and Risks

Numerous exposure pathways were considered in the Public Health Evaluation. These include direct contact with surface soils, leachate seeps, swimming and fish consumption from the on and off-site ponds and consumption of groundwater beneath the site. The field work was completed in two phases; spring (March) and summer (July). This offered some seasonal variability as well as providing two rounds of samples (in most matricies) for data evaluation.

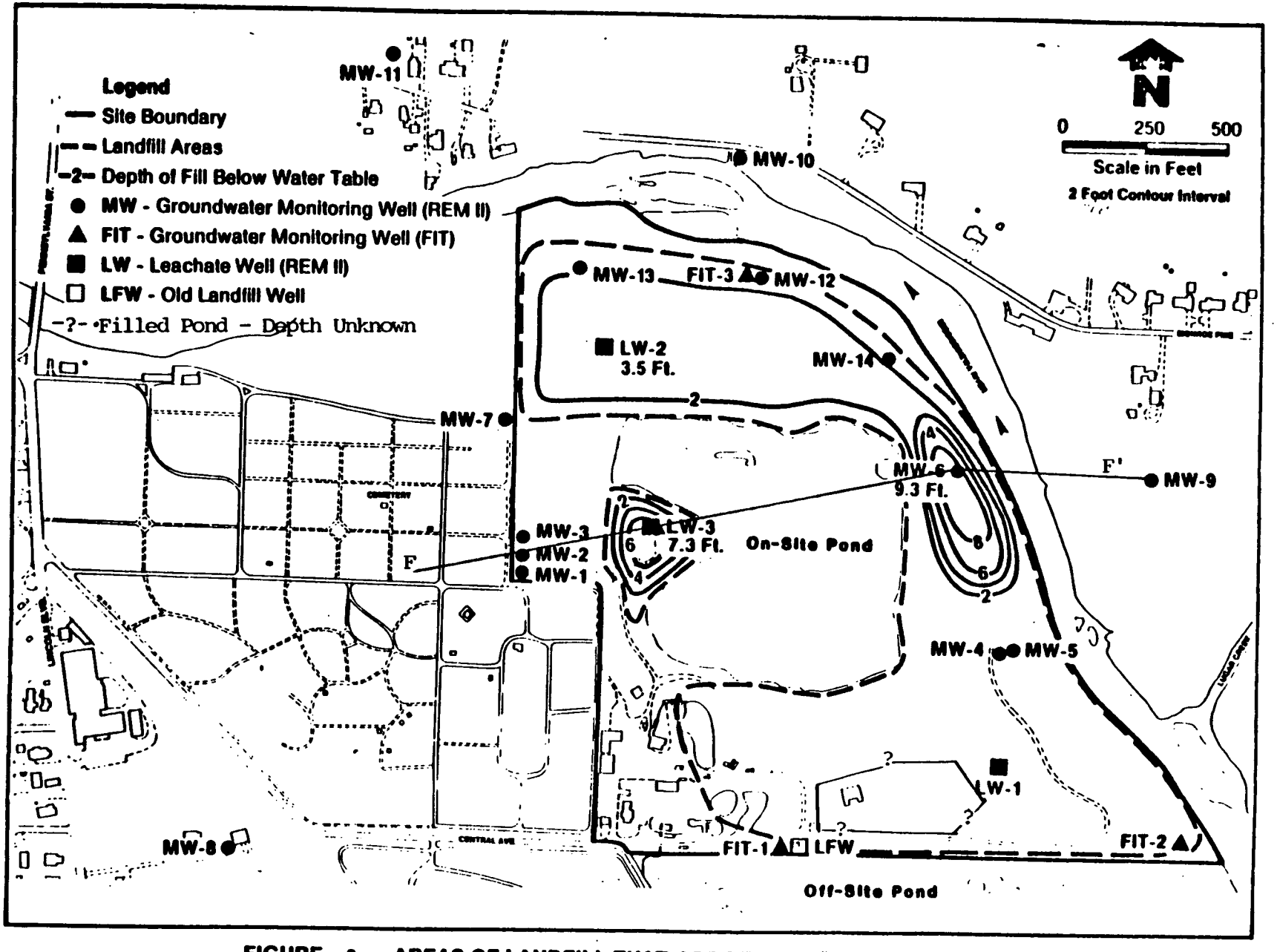


FIGURE 3 AREAS OF LANDFILL THAT ARE BELOW THE WATER TABLE MAY 27 AND JULY 23, 1986 - MARION/BRAGG LANDFILL

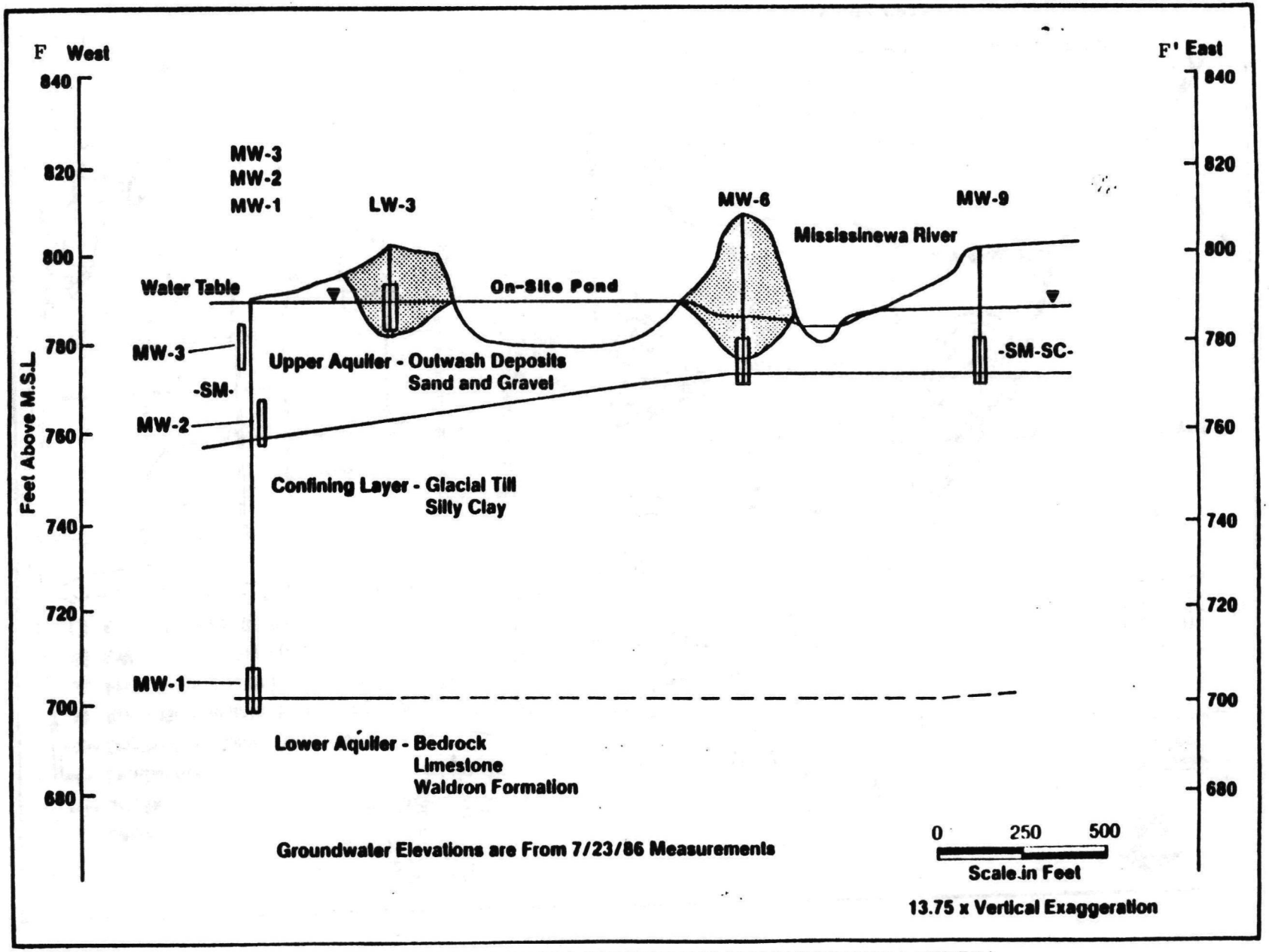


FIGURE 4 GEOLOGIC CROSS SECTION F-F' MARION/BRAGG LANDFILL

1) Surface Soils and Landfill Contents

a) Contaminants and Pathways of Exposure

Surface soil samples were collected to determine if hazards exist because of the contaminants present. Five samples were taken from the landfill surface, and one sample was taken adjacent to the asphalt plant, off of the landfill area. Each sample was a composite of five grab samples in a 50-foot radius. These data were evaluated relative to background soil concentrations.

The contaminants of concern were Bis (2-ethylhexyl) phthlate, cadmium, lead, mercury and several polycyclic aromatic hydrocarbons (PAHs). The presence of PAHs is likely due to both the landfill and the existing asphalt plants. PAH concentrations were highest in the sample near the asphalt plant. Only one other sample had a significant concentration. This was located on the northern part of the landfill, away from both asphalt plants. Cadmium and lead were also present at low levels in at least five of the six locations.

Two leachate seeps are present on the landfill surface. One leachate seep discharges directly into the on-site pond. The other leachate seep is on the south center section of the site. It is present most of the year. The seep follows the surface drainage direction off-site to the south and toward the large off-site pond on the East Side Cove property. The contaminants of concern are arsenic and most of the other inorganic metals.

Because the surface soil is contaminated, receptors (wildlife and human) may inhale, ingest and contact hazardous compounds directly. Contaminated soils may also be transported off-site during rain events. This action, over time, could result in greater exposure of landfill contents as well.

b) Risk to Receptors

Risks above 1×10^{-6} are associated with direct contact with soils due to PAHs in the surface soils (average: 2×10^{-7}, maximum: 5×10^{-5}) and arsenic in the leachate seep (average: 4×10^{-7}, maximum: 8×10^{-6}). The hazard indicies for these matrices for noncarcinogenic effects are less than one.

2) On-Site and Off-Site Pond Water and Sediments

a) Contaminants and Pathways of Exposure

Eleven samples were taken from on-site and off-site ponds. Seven sediment samples were collected. These data were compared to background samples. Chloroform (13 ppb) and bis(2-ethylhexyl) phthalate (11 ppb) were detected once in the on-site pond. Many inorganics were detected in the on-site pond above background levels. The only sample which exceeded water quality criteria

represented a leachate seep which discharges directly into the on-site pond. Chromium and mercury were each detected once in the off-site pond below acute water quality criteria. The mercury, however, was not reproducible in the sample duplicate, nor did subsequent sampling confirm its presence.

Pond sediments contained several inorganic constituents, phthalates and some PAH compounds. Two on-site pond sediment samples had low levels of some PAH compounds. Individual PAH were present at concentrations ranging from 65 to 170 parts per billion (ppb). One off-site pond sediment sample contained a trace amount of two PAH compounds. The off-site pond is hydraulically upgradient of the landfill. It may be somewhat under the influence of the landfill from the ground water pathway, however, it is likely that surface run-off from the landfill is the greater influence on water quality. Although the southern portion of the landfill is well vegetated, it does slope toward the south and the leachate seep flows off-site toward, and likely into, the off-site pond.

b) Risk to Receptors

Risks were considered for swimming in the on-site pond and fish ingestion for both ponds (the off-site pond is not used for swimming). The risks presented for these activities were not above the 1×10^{-6} point of departure, and the hazard index for noncarcinogenic effects was less than one. There are two possible weaknesses in this assessment. First, the risk assessment did not rely on actual fish data. Instead, bioaccumulation factors from available literature values were used. Such bioaccumulation pathways are not well studied and the modeling of fish contaminant uptake has a high degree of uncertainty. The risks (or lack of risk) estimated at this time may or may not reflect actual or potential risks due to the site.

PAHs and inorganics present in the pond sediments, in general, do not tend to bioaccumulate. The predominant method for the accumulation of chemicals by fish is presumed to be absorption through the gills from the water, not from the sediments or through the food chain. Sediments may be a critical source of chemicals for aquatic life that dwell or feed primarily on the bottom. There is very little information on the relative contribution of sediments to chemical residues in aquatic life. Literature values do not exist for sediment uptake by fish, therefore it can not be modeled.

Second, the surface waters (with the exception of the leachate seep flowing into the on-site pond) met water quality criteria to the extent that this criteria was above detection limits. However, the difficulty with the water quality criteria is that many of the inorganic constituents have levels set for protectiveness of either the aquatic life or human consumption which are well below

analytical detection limits. Therefore, it is conceivable that bioaccumulation could be occurring either from the sediments or the water, which is not evident based on existing data. Bioassay work is needed to determine if a risk is present to human health from this surface water/sediment pathway.

Sediment data, in general, are difficult to evaluate because there are no criteria. Region V has developed a database for inorganics from the Great Lakes Harbor sediments. This provides a relative concentration range for comparing non-polluted, moderately polluted and heavily polluted sediments. In comparing the inorganics to the pollutional classification suggested in this database, only one sediment location was noted to be a potential concern by the U.S. Fish and Wildlife service. This was at the leachate seep in the on-site pond.

3) Ground Water

a) Contaminants and Pathway of Exposure

The ground water beneath the site discharges to the river. Ground water exposure is an incomplete pathway because no one is currently using the aquifer beneath the site as a water supply. The risk estimate was based on potential future use.

Thirteen wells were drilled around the site perimeter, eight of the wells were drilled through the landfill. Since this site borders the river, there is no plume or downgradient area to sample, except for the river. Therefore, the monitoring wells had to be drilled through the fill material and screened in the aquifer below.

Since any release from a facility is a potential problem, all chemicals present are of concern. Benzene, trichloroethylene and bis-(2-ethylhexyl) phthalate are present most frequently and above criteria. Most of the heavy metals were detected only once in the ground water beneath the site. These are generally below the MCL, where available, but above the fresh water aquatic life criteria. Arsenic is an exception. It is above the MCL in three of the samples, but detected at lower levels frequently. In general, the contaminants were detected at low levels. (Table 2)

b) Risk to Receptors

The public health evaluation presumed future land use as a recreational area, where drinking water wells would be required. Exposure would be infrequent, but would occur over at least a 10-year period. This resulted in a lifetime risk range of 7×10^{-6} to 5×10^{-4} due to arsenic. Without the arsenic, the maximum risk was estimated at 3×10^{-7}. The hazard index for noncarcinogenic effects was less than one.

Table 2

Summary of Groundwater Sampling Results
Marion/Bragg Landfill RI/FS

CONSTITUENTS	INVESTIGATIVE SAMPLES(a) NO. OF POSITIVE DETECTIONS/ NO. OF VALID OBSERVATIONS(c)	INVESTIGATIVE SAMPLES(a) RANGE OF DETECTION	BACKGROUND SAMPLES(b) NO. OF POSITIVE DETECTIONS/ NO. OF VALID OBSERVATIONS(c)	BACKGROUND SAMPLES(b) RANGE OF DETECTION	STANDARDS AND CRITERIA: SAFE DRINKING WATER ACT MCL	SDWA PROPOSED MCL	SDWA MCLG	SDWA PROPOSED MCLG	CLEAN WATER ACT: PROTECTION OF HUMAN HEALTH INGESTING WATER AND ORGANISMS	CWA HUMAN HEALTH INGESTING ORGANISMS ONLY	CWA PROTECTION OF FRESHWATER AQUATIC LIFE ACUTE	CWA CHRONIC	EXCEEDS STANDARDS AND CRITERIA: HUMAN HEALTH	EXCEEDS STANDARDS AND CRITERIA: FRESHWATER AQUATIC LIFE
UPPER AQUIFER														
VOLATILES,(ug/l)														
1,1-Dichloroethane	1/21	.92	0/7	ND	--	--	--	--	--	--	--	--	--	--
Benzene	9/21	1.5 - 12	1/7	5	5	--	0	--	.66 (e)	40 (e)	5300 (g)	--	Y	N
Chlorobenzene	4/21	4 - 16	0/7	ND	--	--	--	60	488 (d)	15,050 (d)	19,500 (g)	--	N	N
Ethylbenzene	4/21	1.5 - 9	0/7	ND	--	--	--	680	1400 (d)	3280 (d)	32,000 (g)	--	N	N
Styrene	1/21	3.3	0/7	ND	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	1/21	.78	0/7	ND	--	--	0	--	.8	78	5280 (g)	840 (g)	Y	N
trans-1,2-Dichloroethene	4/21	.26 - 28	0/7	ND	--	--	--	70	--	--	135,000 (g)	--	N	N
Trichloroethene	5/21	0.9 - 7.1	0/7	ND	5	--	0	--	2.7 (e)	81 (e)	45,000 (g)	--	Y	N
Xylenes(total)	3/21	2.3 -7.3	0/7	ND	--	--	--	440	--	--	--	--	N	--
SEMIVOLATILES,(ug/l)														
1,4-Dichlorobenzene	1/21	14	0/6	ND	75	--	75	--	400 (d)	2600 (d)	1120 (g)	763 (g)	N	N
Benzoic Acid	1/21	950	1/6	5	--	--	--	--	--	--	--	--	--	--
bis-(2-ethylhexyl)phthalate	9/21	9 - 1800	0/6	ND	--	--	--	--	15,000 (d)	50,000 (d)	11,100 (g)	3 (g)	N	Y
Di-n-Butylphthalate	1/21	99	0/6	ND	--	--	--	--	34,000 (d)	154,000 (d)	940 (g)	--	N	N
INORGANICS,(ug/l)														
Arsenic	18/21	11 - 78	0/6	ND	50	--	--	50	.0022 (e)	.0175 (e)	360 (f)	190 (f)	Y	N
Barium	21/21	39 - 1640	6/6	36 - 111	1000	--	--	1500	--	--	--	--	Y	--
Beryllium	1/21	6	1/6	.4	--	--	--	--	.0037 (e)	.0641 (e)	130 (g)	5.3 (g)	Y	Y
Cadmium	1/21	5	0/6	ND	10	--	--	5	10 (d)	--	17.1 (f,h)	3.2 (f,h)	N	Y
Iron	12/21	232 - 10700	0/6	ND	--	--	--	--	--	--	--	--	--	--
Lead	1/21	6	0/6	ND	50	--	--	20	50 (d)	--	429 (f,h)	16.8 (f,h)	N	N
Magnesium	21/21	26800-83000	6/6	21400 - 36700	--	--	--	--	--	--	--	--	--	--
Manganese	2/21	424 - 441	5/6	20 - 415	--	--	--	--	--	--	--	--	--	--
Silver	1/21	9.2	0/6	ND	50	--	--	--	50 (d)	--	38.2 (f,h)	.12 (f)	N	Y
Sodium	21/21	9180-253000	6/6	11100 - 27400	--	--	--	--	--	--	--	--	--	--
Zinc	1/21	118	6/6	16 - 97	--	--	--	--	--	--	947 (f,h)	47 (f,h)	N	Y

a) Groundwater samples - GW02,GW03,GW04,GW05,GW06,GW07,GW10,GW11,GW12,GW13,GW14, and GW15
b) Background Samples - GW08, GW09, GW16, and GW17
c) Number of samples in which chemical was detected over the total number of samples analyzed.
d) For Toxicity Protection
e) For 10E-6 Carcinogenicity Protection
f) EPA Ambient Water Quality Criteria
g) Lowest Reported Toxic Concentration
h) Values shown are based on an average groundwater hardness of 368 mg/l as CaCO3.
ND - Not Detected
NOTE: Results from unfiltered samples are not included in this table.

The risk present in the ground water beneath the source is likely to vary from one area to another due to varying waste types and resultant ground water concentrations. The maximum risk was estimated by using the highest concentrations of all contaminants found. (Table 3)

Parameters other than the priority pollutants are also a concern because they can indicate unacceptable water quality. Parameters of concern here are ammonia and chemical oxygen demand (COD). Ammonia is a product of degrading organic material. The ammonia ranged from 0 to 24 milligrams per liter (mg/l) and the average ground water COD was about 600 mg/l. There are no drinking water standards for these parameters.

Since the ground water discharges to the river, several parameters are of potential concern for protection of fresh water and aquatic life. These are discussed below.

4) The Mississinewa River

a) Contaminants and Pathway of Exposure

The Mississinewa River is the major ground water receptor. During the winter, river water levels were slightly higher than the summer. In both phases of field investigation, the river was at average flow (about 600 cfs). Ten water samples and six sediment samples were collected. The river did not show signs of being impacted by priority pollutants. Sodium was detected in the river water north of the site at levels above background. This is likely to be landfill related. Beryllium and silver were detected in one sediment sample downstream of the site. This may be a result of off-site migration of surface soils, due to the flood pathway between this sample location and the site. This is uncertain since these contaminants were found only once, at a low level.

Certain water quality indicator parameters were analyzed for in order to evaluate whether or not the landfill may be impacting water quality in a way which is not characterized by priority pollutants. Ammonia and chemical oxygen demand (COD) were again the key indicator parameters. The COD did not vary significantly between upstream, near-site or downstream. Ammonia was present above water quality criteria in two samples taken north of the site. One sample was taken from a backwater channel (5.6 ppm) and the other was taken at the river edge (3.2 ppm). Ammonia was also detected above background, but below water quality criteria east of the site (.6 ppm). The State of Indiana river standard for ammonia is .8 ppm in the summer and 1.13 ppm in the winter. This standard is pH and temperature dependent.

North of the site there is a backwater channel which flushes when the river is at a high level, but otherwise exists as a stagnant pool. The extent to which samples north of the site represented an impact from the landfill versus the backwater channel is uncertain. Ammonia is toxic to aquatic life, and the criteria represent the minimum conditions necessary to support aquatic life.

TABLE 3.

EXPOSURES AND RISKS ASSOCIATED WITH INGESTION OF UPPER AQUIFER GROUND WATER[a]

Carcinogens	Upper Aquifer Concentrations (ug/liter)		Chronic Daily Intake--70-kg Individual, Prorated over a 70-Year Lifetime (mg/kg/day)		Cancer Potency Factor $(mg/kg/day)^{-1}$	Risk (upperbound)	
	Average	Maximum	Average	Maximum		Average	Maximum
Arsenic	0.004	0.078	4.5×10^{-7}	3.5×10^{-5}	1.5×10^{1} (A)	7×10^{-6}	5×10^{-4}
Benzene	(b)	0.012	NQ	5.4×10^{-6}	2.6×10^{-2} (A)	NQ	1×10^{-7}
Bis(2-ethylhexyl) phthalate	0.0065	1.000	5.0×10^{-7}	4.5×10^{-4}	6.8×10^{-4} (B2)	3×10^{-10}	3×10^{-7}
Trichloroethene	(b)	0.007	NQ	3.1×10^{-6}	1.1×10^{-2} (B2)	NQ	3×10^{-8}
Tetrachloroethene	(b(	0.001	NQ	4.5×10^{-7}	5.1×10^{-2} (B2)	NQ	2×10^{-8}
Total						7×10^{-6}	5×10^{-4}

Noncarcinogens	Upper Aquifer Concentrations (ug/liter)		Chronic Daily Intake--70-kg Individual, 10 years (mg/kg/day)		Risk Reference Dose (mg/kg/day)	Hazard Index (CDI/RfD)	
	Average	Maximum	Average	Maximum		Average	Maximum
Barium	0.202	1.64	1.5×10^{-4}	5.1×10^{-3}	5×10^{-2}	3×10^{-3}	1×10^{-1}
Beryllium	(b)	0.006	NQ	1.9×10^{-5}	5×10^{-3}	NQ	4×10^{-3}
Bis(2-ethylhexyl) phthalate	0.0065	1.000	3.5×10^{-6}	3.1×10^{-3}	2×10^{-2}	2×10^{-4}	1×10^{-1}
Cadmium	(b)	0.005	NQ	1.6×10^{-5}	5×10^{-4}	NQ	5×10^{-2}
Chlorobenzene	(b)	0.016	NQ	5.0×10^{-5}	3×10^{-2}	NQ	2×10^{-3}
1,4-Dichlorobenzene	(b)	0.014	NQ	4.4×10^{-5}	2×10^{-2}	NQ	2×10^{-3}
trans-1,2-Dichloroethene	(b)	0.020	NQ	6.3×10^{-5}	1×10^{-2}	NQ	6×10^{-3}
Di-n-butylphthalate	(b)	0.099	NQ	3.1×10^{-4}	1×10^{-1}	NQ	3×10^{-3}
Ethylbenzene	(b)	0.009	NQ	2.8×10^{-5}	1×10^{-1}	NQ	3×10^{-4}
Silver	(b)	0.009	NQ	2.8×10^{-5}	3×10^{-3}	NQ	9×10^{-3}
Xylenes (Total)	.003	0.007	2.2×10^{-6}	2.2×10^{-5}	1×10^{-2}	2×10^{-4}	2×10^{-3}
1,1-Dichloroethene	(b)	0.001	NQ	3.1×10^{-6}	1.2×10^{-1}	NQ	3×10^{-5}
Tetrachloroethene	(b)	0.001	NQ	3.1×10^{-6}	2×10^{-2}	NQ	2×10^{-4}
Styrene	(b)	0.003	NQ	9.3×10^{-6}	2×10^{-1}	NQ	5×10^{-5}
Lead	(b)	0.006	NQ	1.9×10^{-5}	1.4×10^{-3}	NQ	1×10^{-2}
Manganese	.432	0.441	3.2×10^{-4}	1.3×10^{-3}	2.2×10^{-1}	2×10^{-3}	6×10^{-3}
Zinc	(b)	0.118	NQ	3.7×10^{-4}	2.1×10^{-1}	NQ	2×10^{-3}
Total						$<1(5\times10^{-3})$	$1<(3\times10^{-1})$

[a] Only chemicals of concern detected in the upper aquifer and for which quantitative health effects criteria are available were included in this assessment. Benzoic acid, iron, magnesium, and sodium were not evaluated. See text and Tables 5-5, 5-20, and 5-22 for details.

[b] Means were not calculated when only one sample was positive and were not reported when the calculated mean was less than the detection limit. These chemicals were evaluated in the plausible maximum scenario only.

b) Risk to Receptors

No current human health risk is estimated for recreational use of the river near the site. However, the FS did examine ground water discharge concentrations which would allow protection of the river, its uses and the biota. This is based on possible low river flow conditions. This approach is typically used under the National Pollutant Discharge Elimination System (NPDES) to establish discharge limits. The impact of a discharge on a river's water quality is based on minimum dilution which is represented by the lowest seven consecutive day flow occurring statistically once every 10 years (Q7/10) in a specific reach of the river. Limits developed using minimum dilution provide maximum protection of aquatic communities.

Given the groundwater contamination flow from the site, and the river flow, the resulting contaminant concentration in the river can be estimated. This is a simple dilution equation. Taking a slightly different approach, the on-site concentration allowed to protect the river at the low flow can be estimated. This NPDES approach is not required, but provides a logical means for estimating potential risk to the river. Under this scenario, two potential problems became apparent, the inorganics and ammonia. Aquatic species are very sensitive to low concentrations of some inorganics. Most inorganics of concern were not detected more than once on-site. Only longer term monitoring could determine their significance. Arsenic, however, is high on-site and has the potential to affect humans consuming fish. The aquatic life criteria for protection of fish ingestion is .0175 ppb. Since this level cannot be analytically detected in the surface water, arsenic released from the site could be bioaccumulating at a very low level. In addition, the on-site ground water ammonia levels have the potential to adversely impact aquatic life in the river. This is particularly a concern since elevated ammonia concentration have been detected in the river. In two samples, it was above the State of Indiana water quality criteria.

Based on this assessment, the Remedial Investigation (RI) and Feasibility Study (FS) conclude that there is no currently identfied risk to the river, but the potential for such risk does exist.

5. Asphalt Plant Effluent

The asphalt plant operates about half of the year. Effluent from the Marion Paving Company asphalt plant is discharged to the on-site pond via a surface drainage ditch. The effluent is a result of gravel washing. It was sampled to determine whether or not contaminants found in the on-site pond could logically be attributed to this source. The discharge contained a significant amount of inorganic contaminants, mostly associated with the high total solids content of the water. This source is not expected to contribute significantly to the inorganic contaminants within the on-site pond. The COD

in the effluent was high and likely contributes some oxygen demand within the pond, however, pond COD values were not significant.

Public Health Evaluation Summary

Table 4 summarizes the potential risks associated with the Marion/Bragg Landfill. These potential risks are above the 1 X 10^{-6} point of departure for carcinogenic risk for two pathways: surface soils and ground water consumption. As noted before, the PAHs causing the risk in the surface soils are a result of both the landfill and the asphalt plants. The hazard index for noncarcinogenic effects is less than one in all matrices.

III. Enforcement Summary (see appendix 1)

IV. Alternatives Evaluation

Remedial action goals were presented in the Marion/Bragg FS report to address each of the site hazards or exposure pathways identifed. They were identified for each of the following operable units: surface soils and on-site wastes, ground water, and on-site pond and sediments. The alternatives were also designed to comply with § 121 of SARA. The extent to which each alternative meets the remedial action goals and complies with SARA is discussed relative to the evaluation criteria provided by Section 121(b)(1).

A. Remedial Action Goals

1) Surface Soils (incl. Leachate Seeps) and On-Site Wastes (Landfill Contents)

Minimize Direct Contact - Minimize risk to public health and environment from direct contact or ingestion of landfill contents, contaminated surface soil, surface leachate seeps or seep sediments.

Control Migration Off-Site and to Surface Waters - Minimize and mitigate the overland migration of contaminants from leachate seeps and contaminated surface soils which may flow or be washed off-site or to the surface waters.

Minimize Migration to Ground Water - Minimize the leaching of contaminants from contaminated soils and landfill contents into the ground water to adequately protect the surface water receptors.

2) Groundwater

Minimize Direct Contaminant Consumption - Minimize possible future risk to public health from direct consumption of contaminated ground water.

TABLE 4

SUMMARY OF POTENTIAL RISKS ASSOCIATED WITH EXPOSURE TO MARION/ERAGG CHEMICALS OF CONCERN[a]

Pathway/Chemical	Frequency of Detection	Hazard Index for Noncarcinogenic Effects: Average	Hazard Index for Noncarcinogenic Effects: Maximum	Lifetime Excess Cancer Risk (Upperbound): Average	Lifetime Excess Cancer Risk (Upperbound): Maximum
Direct Contact with Soils					
Leachate Seep Area					
Arsenic	1/1	NQ	9×10^{-2}	4×10^{-7}	8×10^{-6}
Total	—	4×10^{-3}	9×10^{-2}	4×10^{-7}	8×10^{-6}
Surface Soils					
PAHs (Carcinogenic)	13/42[b]	NQ	NQ	2×10^{-7}	5×10^{-5}
Total	—	2×10^{-3}	6×10^{-1}	2×10^{-7}	5×10^{-5}
Swimming in On-site Pond					
Total	—	6.4×10^{-3}	2.3×10^{-3}	NQ	3×10^{-8}
Consumption of Fish from On-Site Pond					
Total	—	3.7×10^{-2}	2.2×10^{-1}	NQ	2.10^{-7}
Consumption of Fish from Off-Site Pond					
Total	—	NQ	7×10^{-4}	NQ	NQ
Consumption of Groundwater from Upper Aquifer					
Arsenic	7/19	NQ	3×10^{-1}	7×10^{-6}	5×10^{-4}
Total	—	5×10^{-3}	3×10^{-1}	7×10^{-6}	5×10^{-4}

[a] The individual chemicals of concern presented in this table are those that may pose a potential risk; they are defined as chemicals exhibiting noncarcinogenic effects for which the hazard index of exposure is greater than one, or the chemicals exhibiting carcinogenic effects for which the upperbound risk from exposure is greater than 10^{-6}.

[b] None of the individual carcinogenic PAHs were detected more frequently than 2/6 monitoring samples.

NQ = Not Quantified.

Control Migration to Surface Water - Manage migration of contaminated groundwater to the on-site pond and the Mississinewa River to provide adequate protection of surface water quality and aquatic life habitats, and the human ingestion of aquatic organisms.

3) On-Site Pond and Sediments

Minimize Direct Contact - Minimize the human exposure potential to the on-site pond from swimming and ingestion of aquatic organisms.

B. Alternatives Considered

Six alternatives (plus No Action) were developed to meet the above remedial action goals. These are described in detail in the FS. The alternatives were assembled in a building block manner so that any or all of the operable unit components could be addressed (i.e.: cap, cap and ground water). A wide range of subalternatives were provided because there are several ways of achieving the remedial action goals in a cost-effective way. Each alternative has four subalternatives based on two cost sensitive variables. The first variable concerns regrading of the existing landfill surface prior to capping. Both capping alternatives have minimum grade requirements to promote rain run-off and prevent erosion. This requires that either a significant amount of off-site borrow material be used on the existing surface to bring it up to grade, or that the existing surface be regraded to achieve the required grade before capping.

The second subalternative considers whether the on-site pond operable unit component is addressed. The pond water is a receptor for the contaminated groundwater. Since this pathway is a concern, options for minimizing potential exposure were evaluated. In leaving the pond open, long-term monitoring and site access restrictions are presumed. The other approach would be to eliminate the pathway by backfilling, and thereby eliminate the need for monitoring and access restrictions.

These two variables are assembled as subalternatives.

i) Cap installed over existing fill with pond remaining open
ii) Cap installed over existing fill with pond backfilled
iii) Cap installed after regrading existing fill with the pond remaining open
iv) Cap installed after regrading existing fill with the pond backfilled.

In total, there are 24 subalternatives to consider. All alternatives, except no action, include replacement of shallow wells, fencing and flood protection. Deed restrictions will also be sought from the land owner, regardless of the alternative selected. The components of the six alternatives are presented below.

Alternative 1 -- Indiana Sanitary Landfill Cap and Monitoring

Alternative 1 includes fencing, a two-foot clay-type cap and six inches of topsoil to reduce infiltration, promote runoff and eliminate off-site migration of contaminated soils and leachate seeps. This alternative addresses all of the operable unit goals except one. It does not aggressively manage the migration of groundwater to the surface water(s). The exposure pathway from groundwater to surface water is still present in this alternative. This alternative reduces infiltration through the landfill from 13.0 to 4.13 inches (70%). It meets the technical requirements for Subtitle D landfill capping under the State of Indiana regulation. This alternative minimizes, but does not eliminate, leaching of contaminants to the ground water. The alternative relies upon monitoring to ensure that levels protective of the surface water(s) and their uses is still achieved. If protective levels are exceeded then additional remedial actions would be indicated. Alternative 1 would cost between $6.8 million and $19.7 million in present worth (cost variations due to regrading and backfilling the on-site pond).

Alternative 2 -- Multi-layer (RCRA) Cap and Monitoring

Alternative 2 is the same as alternative 1 except that the cap is a RCRA multi-layer cap. This reduces infiltration to zero and meets the technical requirements for landfill capping for site closure under RCRA. This alternative does not address the groundwater and monitoring is still needed to ensure that levels protective of the surface water(s) and their uses is still achieved. Additional remedial action would be needed if protective levels are exceeded. Alternative 2 would cost between $11.2 and $25.6 million in present worth (cost variation due to regrading and backfilling the on-site pond).

Alternative 3A -- Indiana Sanitary Landfill Cap, Slurry and On-Site Ground Water Treatment

Alternative 3A includes the sanitary landfill cap, a slurry wall to minimize off-site migration and groundwater pumping, and on-site groundwater treatment. The on-site treatment facility would consist of activated carbon adsorption for low level organics and COD removal, and an air stripping system for ammonia removal. Pilot studies would be required before implementation of the remedy for slurry wall/waste compatibility and to ensure that the carbon adsorption ground water treatment system can remove the low level of inorganic contaminants. Since the landfill is not supported on the river's edge, the slurry wall would need to be installed 70 to 95 feet from the edge (i.e., through the landfill material). This would result in some portion of the landfill remaining outside the slurry wall (approximately 1.6% of the total waste volume).

Neither the slurry wall or the cap are impermeable. The ground water inside the wall would need to be pumped and treated. Sufficient water would be pumped to maintain an inward gradient, thus preventing any contaminants from seeping out.

This alternative would meet all of the remedial action goals. Monitoring would still be required to ensure effectiveness of remedy and to comply with the NPDES discharge permit from the on-site treatment facility. Alternative 3A is estimated to cost between $12.4 million and $25.1 million in present worth (cost variation due to regrading and pond backfilling).

Alternative 3B -- Indiana Sanitary Landfill Cap, Slurry Wall and Discharge of Ground Water to Marion POTW

This alternative contains all the same technical considerations as described for alternative 3A except that the Marion Publicly Owned Treatment Works (POTW) would provide the treatment and discharge under their NPDES permit. Alternative 3B is estimated to cost between $11.8 million and $24.5 million in present worth (variation in cost due to regrading and pond backfilling).

Alternative 4A -- Multi-layer (RCRA) Cap, Slurry Wall and On-Site Ground Water Treatment

Alternative 4A combines the RCRA cap discussed in alternative 2 with groundwater treatment. This alternative would meet the remedial action goals to the maximum extent practicable. The RCRA cap reduces the amount of ground water requiring treatment. The water which passes through the slurry wall or enters the pond from rainfall (if the pond is left open) would require treatment. The on-site treatment system would consist of carbon adsorbtion and air stripping. The cost for implementation of this alternative ranges from $16.7 million to $30.9 million in present worth (cost variations due to regrading and pond backfilling).

Alternative 4B -- Multi-layer (RCRA) Cap, Slurry Wall and Discharge of Groundwater to Marion POTW

Alternative 4B is similar to 4A except that the ground water would be treated at the Marion sewage treatment plant. This alternative meets the remedial action goals and costs between $16.1 million and $30.2 million in present worth (cost variation due to regrading and pond backfilling).

Alternative 5 -- No Action

The No Action Alternative is required by the National Contingency Plan. It provides a baseline for comparison of other alternatives.

C. Evaluation Criteria

Table 5 presents a brief qualitative summary of how the alternatives were evaluated against the human health and environmental goals expressed in Section 121 of the SARA amendments. The costs presented in this table presume the site will be regraded. This reduces the presentation of costs. Appendix 2 contains the cost summary for all 24 subalternatives.

Evaluation Summary

Capping alternatives 1 and 2 provide protection of public health and the environment from the risks associated with the surface soils and leachate seeps. Both alternatives reduce infiltration and therefore the leachate generated; both will prevent contaminated surface soil from discharging to surface waters or off-site, and both caps meet the technical specifications for landfill closure requirements which may be relevant and/or appropriate. Neither alternative, however, addresses the groundwater pathway in terms of direct human consumption or discharge to surface waters. Therefore, both alternatives rely on monitoring to ensure that the levels released are not above action levels. If action levels are exceeded, groundwater pump and treat or other active protective actions will be required.

Alternatives 3A, 3B, 4A and 4B address capping requirements and the groundwater pathway (with the option of pond open or backfilled). To the maximum extent practicable, all these alternatives address elimination of potential pathways of concern. The slurry wall eliminates off-site migration of ground water and reduces the amount of water requiring treatment. However, some waste must be left on the outside of the slurry wall in order to support the wall. The RCRA cap further reduces the amount of ground water to be treated, but maintenance requirements, especially repair work may be expensive. Both the on-site and off-site groundwater treatment system are technically feasible. The off-site treatment system would be more reliable since the operation and maintenance is already done by the city POTW. Further characterization may be required to determine if the ground water pumped from the Marion/Bragg site can be accepted at the Marion POTW.

TABLE 5 - Matrix Evaluation of Alternatives

Alternative	Cost (in Millions) Cap*	O&M*	PW*	Effectiveness: Public Health Protectiveness	Effectiveness: Environmental Protectiveness	Implementability: Technical Feasibility	Implementability: Administrative Feasibility
1) Sanitary Landfill Cap				Prevents direct contact threat from surface soils, but does not eliminate threat from ground water or from on-site pond (if open).	Would limit, but not prevent contact of ground water with landfill contents and subsequent discharge to the Mississinewa River.	Will significantly reduce infiltration, but long-term monitoring will be required. One construction season needed for implementation.	Long-term enforcement of site access and deed restrictions uncertain.
pond open	5.8	1.0	6.8				
pond closed	13.4	1.1	14.5				
2) RCRA Cap				Prevents direct contact threat from surface soils, but does not eliminate threat from ground water or from on-site pond (if open).	Would limit, but not prevent contact of ground water with landfill contents and subsequent discharge to the Mississinewa River.	Maintenance requirements of the cap, especially repair of the impermeable membrane, are substantial because of likely landfill differencial settling. Will significantly reduce infiltration, but long-term monitoring will be required. One construction season needed for implementation.	Long-term enforcement of site access and deed restrictions uncertain.
pond open	10.0	1.2	11.2				
pond closed	19.1	1.2	20.3				
3A) Sanitary Cap and Ground-water Treatment on-site				Extraction and treatment of ground water would significantly reduce potential risks	Minimal effects during construction.	Compatability testing of bentonite with waste prior to construction needed. One construction season needed for implementation.	NPDES permitting may significantly delay the construction.
pond open	10.9	1.4	12.4				
pond closed	18.6	1.2	19.8				
3B) Sanitary Cap and Ground-water Extraction, treatment at POTW				Extraction and off-site treatment of ground water would significantly reduce potential risks.	Minimal effects during construction.	Compatability testing on bentonite with waste prior to constuction needed. One construction season needed for implementation.	POTW acceptance of the discharge must be approved by Indiana Office of Water Management.
pond open	10.7	1.0	11.8				
pond closed	18.4	.8	19.2				
4A) RCRA Cap and Ground-water Treatment on-site				Extraction and treatment of ground water would significantly reduce potential risks.	Minimal effects during construction.	Maintenance requirements of the cap, especially repair of impermeable membrane, are substantial because of likely landfill differential settling. One construction season needed for implementation.	NPDES permitting may significantly delay construction.
pond open	15.2	1.5	16.7				
pond closed	24.3	1.3	25.6				
4B) RCRA Cap and Ground-water Extraction, treatment at POTW				Extraction and off-site treatment of ground water would significantly reduce potential risks.	Minimal effects during construction.	Maintenance requirements of the cap, especially repair of imperme-able membrane, and substantial because of likely landfill differential settling. Compatabilty testing of bentonite with waste prior to construction needed. One construction season needed for implementation.	POTW acceptance of the discharge must be approved by Indiana Office of Water Management.
pond open	15.0	1.0	16.1				
pond closed	24.1	.8	24.9				
5) No Action	No	Cost		Potential health risks associated with contact with contaminated soils, surface water and ground water will remain.	Contaminants spread to Mississinewa River.	None.	Not Applicable

*Capital costs/Operation & maintenance/Present worth

D. Rationale for Selection of an Interim Remedy

The ground water beneath this facility is contaminated with a low level of various organic and inorganic constituents. Given that hazardous wastes were mixed or co-disposed with other trash, and that some volume of this trash is perennially saturated, the contaminant levels found during the RI are likely to continue for a long time.

The general response objectives require that human health and the environment (in this case, surface waters) be protected from existing and potential future contamination. In protecting human health from exposure to ground water, two options are available; use institutional controls to prevent exposure, or pump and treat the aquifer. For surface water protection there are also two options available; establish as Alternate Concentration Limit (ACL), which essentially says that existing levels are protective, or pump and treat the aquifer in order to protect the river.

SARA specifically addresses Superfund sites which are adjacent to surface water bodies. § 121 (d)(2)(B) discusses the use of water quality criteria and releases to surface waters. In some circumstances, it is acceptable to establish an ACL or alternate contaminant level for releases to surface waters. There are two restrictions on use of this provision. There can be no statistically significant increase of constituents from the ground water in such surface water at the point of entry or any point where there is reason to believe accumulation of constituents may occur downstream; and the remedial action includes enforceable measures that will preclude human exposure to the contaminated ground water at any point between the facility boundary and all known or projected points of entry of such ground water into surface water.

The FS examined possible action levels based on protectiveness of the river at the Q7/10. This is a very protective approach since the Q7/10 does not occur frequently. Based on this approach, the inorganics and ammonia have the potential to impact the surface water at the low flow. The on-site ground water levels were above levels allowed by the NPDES model, yet these were not significant in the river samples (except for two ammonia data points).

A ground water remedy at the Marion/Bragg landfill should be carefully considered. If ground water treatment is required to protect human health or the environment, the resulting slurry wall and treatment scenario would last in perpetuity. On the other hand, the sensitive water quality criteria for inorganics, especially arsenic, and the presence of ammonia, suggest that a potential threat to aquatic resources does exist. In order to be conservative in selecting a ground water remedy to ensure protectiveness, additional ground water studies are recommended. These studies will focus on the general toxicity, if present, of this ground water on the surface waters or to humans through fish ingestion.

The ground water treatment alternatives 3A, 3B, 4A and 4B are being deferred at this time. When the final ground water remedy is selected, U. S. EPA will either select an appropriate ACL or action level and allow ground water discharge to continue, or select a ground water treatment alternative already investigated in the FS. This approach assumes a land use restriction is enforceable.

Enforceable institutional controls play an important role in selecting the final ground water action and determining the fate of the on-site pond, which is also a point of surface water exposure. CERCLA itself does not give that type of enforcement authority, yet requires enforceable land use restrictions to prevent human exposure as an element of the ground water option if releases continue. The State of Indiana lacks legal authority to bar uses of property for such activities as well drilling and excavation, that might interfere with the capping of the site. The Region will attempt to negotiate a voluntary restrictive covenant with the property owner, and expects that the PRPs will assist in these negotiations. The operable unit for the on-site pond will also be deferred until the ground water remedy is selected since the two operable units are related.

Alternatives 1 and 2, capping alternatives, remain for consideration for this operable unit. In comparing the two capping alternatives with respect to the evaluation criteria and the site-specific technical aspects, alternative 1, the sanitary landfill cap, was selected. This rationale is further documented in Section VI of this Record of Decision.

V. Recommended Alternative

U.S. EPA's recommended alternative is alternative 1. (Figure 5) The major components of the alternative are: access restrictions, residential well replacement, flood protection, clay-type cap, installation of ground water monitoring wells and additional study of the surface waters. The alternative includes regrading of the site, but defers action on the on-site pond. The capital cost is $5.7 million, the present worth of operation and maintenance is $1.0 million and total present worth is $6.8 million.

- Access Restriction

  The access restriction includes a fence to prevent site use. This preserves the integrity of the cap and prevents recreational use of the on-site pond. Access to the site would be controlled by completing the fencing around the site perimeter and posting signs. This component of the remedy will cost $54,000.

- Residential Well Replacement

  U.S. EPA seeks to secure a voluntary deed restriction to prohibit use of groundwater or installation of shallow wells on-site. As a protectiveness measure and in anticipation of an enforceable deed restriction, three existing shallow wells within the site boundary will be replaced with deep wells. The existing wells will be sealed. One well, however, maybe left open for monitoring purposes. This component of the remedy will cost $8,000.

° Flood Protection

To protect beneficial use of the floodplain, yet allow construction within the floodplain and prevent inundation of the site, flood protection will be required over the clay cap. For the purposes of cost estimation, it was anticipated that a levee would be required. This will protect the site from a 100 year flood event. The FS estimated that a levee would be approximately 2,800 feet long and be constructed of compacted soil. The cost for this component of the remedy is $385,000.

° Sanitary Landfill Cover (clay cap)

This cap includes two feet of clayey soil (10^{-6} cm/sec. permeability minimum) and six inches of topsoil.

Contaminated leachate seeps and sediments would be removed and/or covered under the clay cap in the course of regrading the surface. Waste, which is currently uncovered or protruding from the surface, would also be covered in the course of regrading. A minimum working face will be maintained during surface regrading in order to minimize the potential airborne release of contaminants. All work will be performed in a "good housekeeping" manner. Any drums or other hazardous wastes, if present, would be removed, analyzed and disposed according to RCRA requirements. If regrading fails to eliminate the seeps, then seep collection would be required. Disposal of seep leachate would be based upon its chemical characteristics.

Eight additional monitoring wells are recommended. These would be placed as close to the landfill edge as possible. These wells would best represent ground water quality as it enters the surface water.

The cap will be covered with six inches of topsoil and seeded to control erosion and promote evapotranspiration. This component of the remedy, including grading and site construction, will cost approximately $3,075,000.

° Monitoring

Contaminant migration would be assessed through a regular groundwater and surface water monitoring program. Priority pollutant analysis will be conducted on a semi-annual basis. Parameters at various locations requiring confirmation will be resampled on the alternate quarter. Selected indicator parameters will be included in the analyses every quarter. It is estimated that 10 groundwater wells, 3 on-site pond locations and 5 river locations will be included in the quarterly analyses. The existing leachate wells and the off-site pond will also be sampled occasionally. Should the ground water results remain relatively consistent over time, monitoring may not need to be as extensive.

° Determine the effectiveness of the clay cap

The key element of this interim remedy is to determine its effectiveness before implementing other remedial actions. The monitoring data gathered before and after installation of the clay cap will be evaluated to determine the effectiveness of this interim remedy. Design and construction of the cap may require 1 1/2 to 2 years. It will take approximately 2.2 years for the aquifer beneath the site to move from the south through the north to the Mississinewa River. Groundwater samples taken during and after that period should demonstrate the effectiveness of reduced infiltration on leachate generation and subsequent groundwater contamination.

° Additional Studies

The additional studies will include fish bioassay work for the on-site and off-site ponds and the river. Indicator parameters will be selected from the volatiles, PAHs and inorganic constituents. In addition, general toxicity tests will be performed on the river to determine if ammonia or other constituents in the ground water cause a toxic effect on the aquatic environment. These general tests may be modeled after the toxicity tests that NPDES dischargers are subject to, or employ other approaches as may deemed appropriate by U.S. EPA.

VI. Statutory Determinations

SARA §121 requires that the comparison of alternatives take into account the following factors:

(1) long-term uncertainties of land disposal;
(2) the goals and objectives of the Solid Waste Disposal Act (RCRA);
(3) the persistence, toxicity, mobility and propensity to bio-accumulate hazardous substances;
(4) short- and long-term potential for adverse human health effects;
(5) long-term maintenance costs;
(6) the potential for future remedial action costs if the chosen remedy were to fail; and
(7) the potential threat to human health and the environment associated with excavation, transportation, redisposal, or containment.

SARA further requires that the selected remedy be protective of human health and the environment, attain applicable or relevant and appropriate standards, use treatment technologies to the maximum extent practicable, and be cost-effective.

The Feasibility Study considered all these factors during screening of alternatives and recommendation of a final remedy. Appendix 3 contains the applicable or relevant and appropriate requirements for this site.

This section describes how the selected remedy will comply with the statutory requirements in SARA §121, generally referred to as the cleanup standards.

A. Consistency With Other Laws (Compliance with ARARs)

SARA requires that remedial actions meet legally applicable or relevant and appropriate requirements of other environmental laws. These laws may include: the Toxic Substances Control Act, the Safe Drinking Water Act, the Clean Air Act, the Clean Water Act, the Solid Waste Disposal Act (RCRA), and any state law which has stricter requirements than the corresponding federal law.

A "legally applicable" requirement is one which would legally apply to the response action if that action were not taken pursuant to §104 or §106 of CERCLA. A "relevant and appropriate" requirement is one that, while not "applicable" is designed to apply to problems sufficiently similar that their application is appropriate.

The following is a description of environmental laws which are legally applicable or relevant and appropriate to different components of the remedy, and an explanation of how this remedial action meets those requirements.

1. Landfill Closure Requirements

Neither the sanitary landfill requirements of Subtitle D or the RCRA Subtitle C requirements are directly applicable. This landfill accepted some hazardous waste before the passage and effective date of RCRA, but was not a hazardous waste landfill. Therefore, the jurisdictional prerequistes are not met for either subtitle. Both subtitles were designed to apply to landfills. The Marion/Bragg landfill is a sufficiently similar circumstance such that both laws are considered relevant.

The site was viewed in terms of the component parts for the total site remedy, or operable units. Each component was compared to the requirements of both Subtitle C and Subtitle D which were sufficiently similar. This interim remedy, and the final remedy, will comply with the requirements which are determined to be the most appropriate. For example, the flood protection requirement complies with RCRA, CWA (and other State of Indiana requirements which are not specifically stated in the Subtitle D regulation), and the cap complies with sanitary landfill requirements. The future ground water remedy must also consider the appropriateness of RCRA corrective actions, ground water protection requirements or other standards.

2. Soil/Capping Requirements

Alternatives 1 and 2 address capping requirements for the Marion/Bragg landfill. Alternative 1 complies with the State of Indiana Sanitary Landfill capping requirements. Alternative 2 complies with the RCRA capping requirements. Both caps are protective and meet respective statutory requirements.

The State of Indiana has jurisdiction for Subtitle D, sanitary landfill operation and closure laws. This is covered by the Solid Waste Management Board Regulation Title 329 IAC. This regulation is currently under revision. This regulation applies to those facilities which operated in accordance with the stated requirements and did not accept hazardous waste. The existing regulation is more general than the proposed regulation, and relies on guidance and final approval of the permit writer. The proposed regulation codifies previous requirements. The existing and the proposed standards are technically equivalent. The FS incorporated the greater level of technical detail offered by the proposed standard. Not unlike the general RCRA cap requirements, this cap seeks to minimize infiltration by specifying clay type, and promote drainage by specifying sloping and topsoil requirements. This also accommodates subsidence and minimizes maintenance.

RCRA Subtitle C requirements for caps as proposed in alternative 2 can also be considered. The RCRA regulation is applicable to those facilities which operated after promulgation of the regulation in 1980 and/or were granted interim status to operate in the manner provided by the regulation. This regulation requires that the cap minimize liquid migration, minimize maintenance, promote drainage, accommodate subsidence and be less permeable than the bottom liner. Since waste from regrading will be consolidated on-site, RCRA Land Ban Requirements will not be triggered.

Distinguishing which regulation is most applicable, when both are relevant, requires a review of site-specific technical considerations. The Marion/Bragg Landfill has a portion of the waste saturated within the upper aquifer. This water table aquifer will fluctuate up and down within the waste as dictated by seasonal hydrologic conditions. This fluctuation was noted in the RI. Although it is clear that reducing infiltration will reduce leachate generation, the low concentration of ground water contamination may be more influenced by seasonal fluctuations in the water table/waste saturation interface. Therefore, the zero infiltration provided by the RCRA cap will not likely result in a commensurate reduction in existing ground water concentrations. In addition, the nature of the codisposal operations at the landfill, the very permeable nature of the existing cap material and the fact that leaching has been occurring for a very long time now, suggests to U. S. EPA that the existing levels of ground water contamination are not likely to significantly increase. Therefore, between the two caps, the Subtitle D sanitary landfill capping requirements were considered to be the most appropriate.

3. Floodplain and Wetlands Protection

The State of Indiana regulation I.C. 13-2-22, Indiana Flood Control Act, regulates construction in a floodplain. The U.S. EPA also has a floodplains and wetlands policy which

serves similar objectives, as does RCRA 40 CFR 270.14(b)(11)(iv). Any construction which occurs in a floodplain must minimize the loss of floodplain and provide floodproofing for anything which must be constructed in that area. Appendix 4 shows the floodplain area and levee which must be constructed around the landfill. The flood control levee will border the west, north and one half of the eastern side of the landfill. This is a performance based goal. The FS evaluated a levee as the best means of complying with requirements. Other technical means of achieving the requirements may be available. The actual design is subject to appoval from the U. S. Army Corps of Engineers, U. S. Fish and Wildlife Service, Indiana Department of Natural Resources, in addition to U. S. EPA and IDEM.

B. Use of Permanent Solutions, Alternative Treatment and/or Resource Recovery Technologies (Reduction of Toxicity, Mobility or Volume)

Permanent solutions provided by treatment technologies were considered for this landfill, but were screened out before detailed analysis due to technical and cost considerations. This is detailed in the FS.

Incineration of the entire landfill was considered. On-site incineration was considered, even though it would require a waiver from existing State of Indiana regulations. These regulations prohibit the use of mobile or temporary incineration facilities within the state. On-site incineration would require at least 25 years, require waste pretreatment and is not very amenable to the high level of inorganics present in the landfill. The cost would be approximately $404 million.

Existing RCRA permited off-site incineration facilities were considered. Waste restrictions and/or pretreatment requirements were a significant limitation. In addition, existing capacity at these facilities limits their ability to dispose of the 1.1 million cubic yards of waste present at Marion/Bragg. Assuming this was not a limitation, it would still take 100 years to accomplish the objective, at a cost of approximately $3,439 million. (Costs were based on the use of SCA Incinerator.)

Given the numerous technical limitations, incineration as a means of permanently reducing toxicity and mobility was eliminated. Significant volume reduction would not occur with incineration because the resultant ash volume would be great. Capping in place does provide some reduction in contaminant mobility, but not toxicity or volume.

C. Short-Term Effectiveness

Short-term effectiveness considers such things as risks posed to the community during remedial action implementation, time required to complete remedial action and the subsequent reduction in existing risks. It is anticipated that remedial actions will require one construction season to complete. During that time some wastes

will be exposed due to regrading of the surface. U. S. EPA proposes to use "good housekeeping" procedures to minimize the airborne release of contaminants and minimize the working face of the regrading operations. The workers on-site will also have appropriate personal protection. Once remedial action is complete, the remedial action goals stated in section IV of this Record of Decision will be met.

D. Long-term Effectiveness and Permanence

It is clear from the screening of technologies in the FS, that this landfill will need to be contained in place. The contents will remain in-tact and therefore will require long term operation and maintenance and periodic review of the effectiveness. SARA §121(c) requires that EPA review remedial actions where any hazardous substances, pollutants, or contaminants remain at the site, no less often than every five years after initiating the remedial action. This review should assess whether the remedial action is truly protective of human health and the environment and determine whether any further action is necessary.

Since this is an interim remedy, the long-term effectiveness and permanence is best evaluated when the ground water component is resolved. However, one of the goals of this interim remedy is to determine its effectiveness in reducing leachate generation. The extensive monitoring data which will be provided over the next few years will aid in the evaluation of the effectiveness and permanence provided by any subsequently selected ground water action.

E. Implementability

Capping a landfill with clay is a very conventional technology, considered reliable in the long term and it does not require specialized expertise. Design approvals will be required from several Federal and State offices in order to ensure that technical requirements are met. Once design is complete, construction is expected to take only one construction season.

F. Cost and Cost-effectiveness

The capital, operation and maintenance and total present worth costs for alternatives 1 and 2 were considered. Should the ground water require treatment, the reduction in infiltration provided by the RCRA cap reduces the amount of ground water to be treated and correspondingly reduces the O&M costs. However, this savings is off-set by the possible higher costs involved in RCRA cap maintenance. Therefore, there are no long-term savings provided by the RCRA cap over the sanitary landfill cap. In fact, the total present worth costs of O & M are slightly less for the clay cap than for the RCRA cap.

G. Community Acceptance

This site has not seen a significant amount of community involvement. This is likely because few people are directly affected by the landfill. Comments on the FS provided by the Potentially Responsible Parties (PRPs) suggest that the actions proposed by the Agency in this Record of Decision are reasonable, but expensive. Instead of capping under Subtitle D requirements, they suggest maintenance of the existing cap material. In addition, they suggest that flood protection can be provided more cheaply and as effectively by means other than a levee. This Record of Decision specifies a performance based response to the flood protection goal. The PRPs can offer alternative means of achieving the goal in the design phase.

The municipal officials are concerned about the possible cost of the remedy and their potential liability. They do not feel the tax payers would be amenable to paying for the remedy. These comments are addressed in the responsiveness summary.

H. State Acceptance

The Indiana Department of Environmental Management has been a party to the RI/FS through their technical input, and concurs on the selected interim remedy. IDEM also recognizes their cost share and O & M responsibilities.

I. Overall Protection of Human Health and the Environment

This remedy has been evaluated according to the criteria listed in SARA §121. This remedial action will eliminate a direct contact threat associated with existing surface soils, leachate seeps and exposed debris. It will also prevent the off-site migration of contaminated surface soils to surface waters. Fencing the site to restrict access will prevent use of the on-site pond on an interim basis. Replacing the three existing shallow residential drinking water wells will provide long-term protection against the potential for any future contamination. Futhermore, this remedy will be consistent with any final ground water actions.

VII. Consistency with National Contingency Plan

The National Contingency Plan, 40 CFR Part 300.68(i)(1), states that the appropriate extent of remedy shall be a cost-effective remedial alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and the environment. The selected remedy will attain relevant and appropriate Federal and State public health and environmental requirements that have been identified for the Marion/Bragg site. Based upon the analysis of the options, State and Federal environmental requirements, and comments received from the public and the State, the recommended option has been determined to be consistent with Section 300.68.

VIII. Future Schedule

Good Faith proposal by PRPs to undertake Remedial Action	October, 1987
Conclude all negotiations	December, 1987
Begin Remedial Design	Fall, 1987/Spring, 1988
Complete Remedial Design	Fall, 1988
Complete Remedial Action	Summer/Fall, 1989
Determine effectiveness of interim remedy and select final ground water remedy	Fall, 1991

It is possible that a final ground water remedial action can be selected as soon as Spring, 1989. If the additional studies demonstrate that the existing ground water does not adversely impact the surface waters, action levels can be established which are protective of human health and the environment.

List of Appendicies

Appendix 1 -- Enforcement Summary (CONFIDENTIAL)

Appendix 2 -- Cost Summary for all alternatives

Appendix 3 -- Applicable or Relevant and Appropriate Requirements for the Marion/Bragg Landfill

Appendix 4 -- Floodplain and levee control area

Appendix 5 -- Community Relations History and Responsiveness Summary

Appendix 6 -- Administrative Record Index

Appendix 7 -- State of Indiana Concurrence

Appendix 1 -- Enforcement Summary

The Marion/Bragg Landfill site was proposed on the NPL on December 30, 1982. In March 1985 the REM II contractor was tasked to draft a work plan for a Remedial Investigation/Feasibility Study. The draft work plan was used as a basis for negotiating voluntary actions with an identified group of potentially responsible parties. Notice letters were issued and a meeting was held on November 7, 1985 at the Region IV office in order to provide them an opportunity to work cohesively and respond to the Agency's offer.

On December 9, 1985 Enforcement and Regional Counsel determined that the RI/FS should proceed as a program lead. Little or no interaction has occurred with the PRPs since.

Special notice letters were issued at the completion of the RI/FS on August 7, 1987. The negotiation moratorium commenced on August 12 and will be completed by October 11th, at which time the program will proceed with RD if a good faith offer is not received.

Appendix 2 -- Cost Summary for all alternatives

SUMMARY OF DETAILED ANALYSIS OF ALTERNATIVES
HORTON/GRAND LANDFILL SITE

EVALUATION CRITERIA	ALTERNATIVE 1 INDIANA SANITARY LANDFILL CAP AND MONITORING		ALTERNATIVE 2 MULTI-LAYER (RCRA) CAP AND MONITORING		ALTERNATIVE 3A INDIANA SANITARY LANDFILL CAP SLURRY WALL AND ON-SITE GROUNDWATER TREATMENT		ALTERNATIVE 3B INDIANA SANITARY LANDFILL CAP SLURRY WALL AND DISCHARGE OF GROUNDWATER TO HORTON PIPE		ALTERNATIVE 4A MULTI-LAYER (RCRA) CAP SLURRY WALL AND ON-SITE GROUNDWATER TREATMENT		ALTERNATIVE 4B MULTI-LAYER (RCRA) CAP SLURRY WALL AND DISCHARGE OF GROUNDWATER TO HORTON PIPE		ALTERNATIVE 5 NO ACTION
COST EVALUATION	Sub Alt		Sub Alt		Sub Alt		Sub Alt		Sub Alt		Sub Alt		
1.) Cap installed over existing fill with pond remaining open													
CAPITAL	1A	7,489,000	2A	11,446,000	3A-1	12,382,000	3B-1	12,177,000	4A-1	10,666,000	4B-1	10,630,000	
O & M present Worth	1A	1,681,000	2A	1,220,000	3A-1	1,414,000	3B-1	1,046,000	4A-1	1,497,000	4B-1	1,681,000	
Total Present Worth	1A	9,266,000	2A	12,666,000	3A-1	13,796,000	3B-1	13,223,000	4A-1	10,163,000	4B-1	17,519,000	
2.) Cap installed over existing fill with pond backfilled.													
CAPITAL	1B	10,792,000	2B	26,601,000	3A-2	23,981,000	3B-2	23,696,000	4A-2	29,681,000	4B-2	29,396,000	
O & M present Worth	1B	1,680,000	2B	1,265,000	3A-2	1,262,000	3B-2	847,000	4A-2	1,343,000	4B-2	813,000	
Total Present Worth	1B	19,792,000	2B	25,666,000	3A-2	25,163,000	3B-2	24,543,000	4A-2	30,944,000	4B-2	30,237,000	
3.) Cap installed after regrading existing fill with the pond remaining open													
CAPITAL	1C	9,991,000	2C	10,893,000	3A-3	10,991,000	3B-3	10,787,000	4A-3	19,231,000	4B-3	19,046,000	
O & M present Worth	1C	1,681,000	2C	1,220,000	3A-3	1,414,000	3B-3	1,046,000	4A-3	1,497,000	4B-3	1,681,000	
Total Present Worth	1C	8,672,000	2C	11,273,000	3A-3	12,405,000	3B-3	11,833,000	4A-3	10,748,000	4B-3	10,727,000	
4.) Cap installed after regrading existing fill with pond backfilled													
CAPITAL	1D	13,423,000	2D	19,121,000	3A-4	18,621,000	3B-4	18,418,000	4A-4	28,321,000	4B-4	28,116,000	
O & M present Worth	1D	1,680,000	2D	1,265,000	3A-4	1,262,000	3B-4	847,000	4A-4	1,343,000	4B-4	813,000	
Total Present Worth	1D	14,913,000	2D	20,386,000	3A-4	19,883,000	3B-4	19,265,000	4A-4	29,664,000	4B-4	28,917,000	

Appendix 3 -- Applicable or Relevant and Appropriate Requirements for the Marion/Bragg Landfill

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
MARION/BRAGG LANDFILL SITE

REGULATION, POLICY OR LAW	APPLICABILITY	RESPONSE	ALTERNATIVES 1	2	3A	3B	4A	4B	5
FEDERAL									
Resource Conservation and Recovery (RCRA) Subtitle C	Closure of Hazardous Waste Facilities	This alternative meets RCRA capping requirements.		X			X	X	
		This alternative meets RCRA closure requirements.					X	X	
40 CFR 264.116	Deed Restriction	State of Indiana has jurisdiction.	X	X	X	X	X	X	
40 CFR 264.14 264.117(b)	Access Restriction	Meets RCRA requirements if implemented.	X	X	X	X	X	X	
40 CFR 264.310(b)(5)	Monitoring Surface Run-Off (Final Cover)	Surface water management system would comply with RCRA requirements.	X	X	X	X	X	X	
40 CFR 264.90 3008(h) 3004(u)	Contamination Levels, Monitoring, Treatment	Action levels in on-site pond, groundwater and Mississinewa river will be set by U.S. EPA.	X	X					

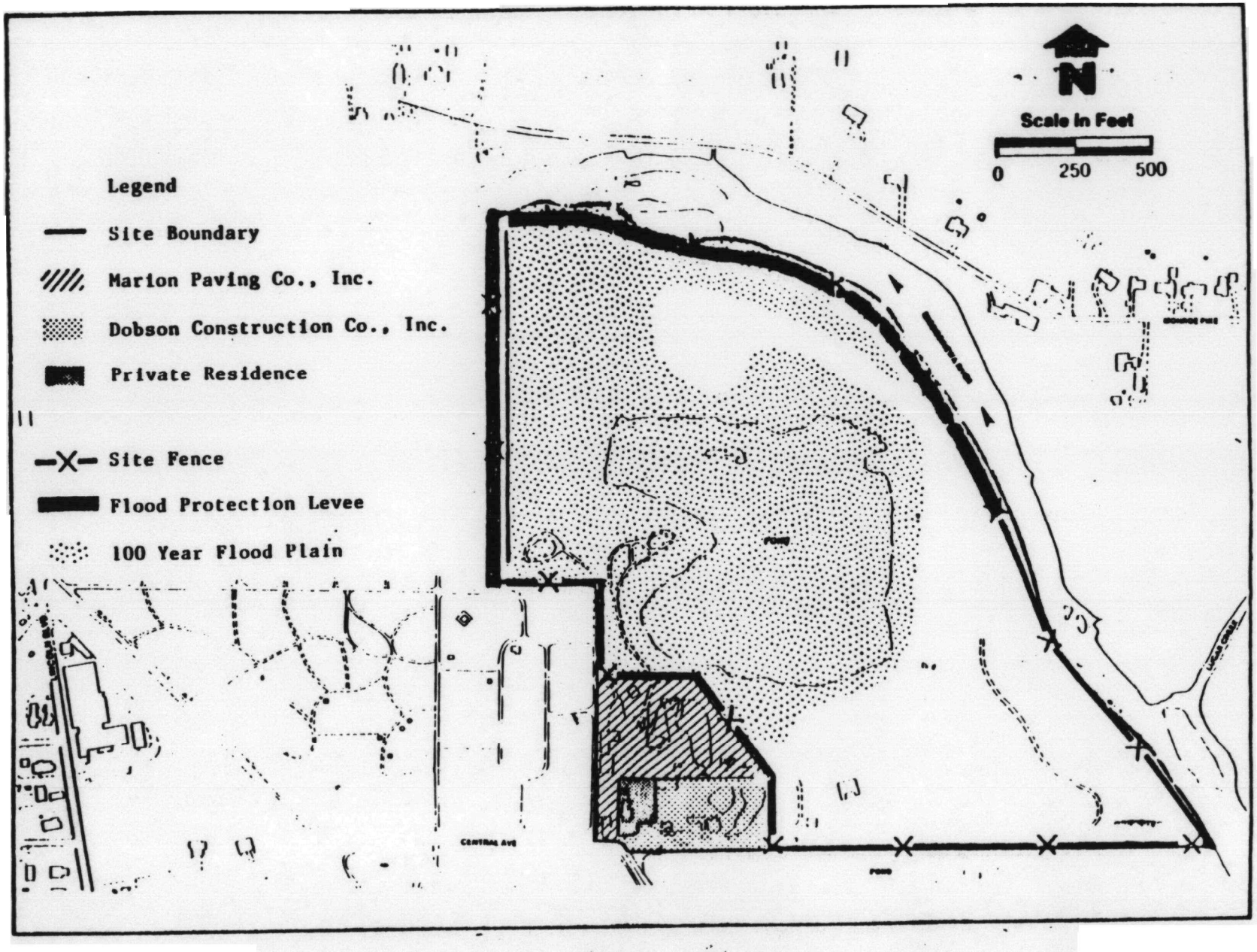
COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
MARION/BRAGG LANDFILL SITE

REGULATION, POLICY OR LAW	APPLICABILITY	RESPONSE	ALTERNATIVES 1	2	3A	3B	4A	4B	5
40 CFR 264.310	RCRA Landfill Cover Systems	This alternative meets RCRA capping requirements.		X			X	X	
		This alternative meets RCRA Closure requirements.					X	X	
40 CFR 270.14	Slurry Wall	Slurry wall will be located behind the flood control levee.			X	X	X	X	
40 CFR 264.340(c)	Treatment/Incineration	None of the alternatives involve treatment or incineration of landfill contents.							
40 CFR 262 & 263	Groundwater Storage	None of the alternatives involve the storage and surface transportation of contaminated groundwater.							
40 CFR 261.4(a)(2)	Groundwater Discharge	Discharge of groundwater to Mississinewa River would comply with CWA, Section 402.			X		X		
40 CFR 264.114	Decontamination of Equipment	Equipment decontamination procedures will be followed during construction.	X	X	X	X	X	X	
Clean Air Act (CAA)	Incineration/Treatment	None of the alternatives involve incineration or treatment of hazardous soil.							
Clean Water Act (CWA)	Regulates Discharge of Water into Rivers	State of Indiana has jurisdiction over issuance of NPDES permits (See state ARARs).			X		X		

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
MARION/BRAGG LANDFILL SITE

REGULATION, POLICY OR LAW	APPLICABILITY	RESPONSE	ALTERNATIVES						
			1	2	3A	3B	4A	4B	5
STATE OF INDIANA									
Indiana Dept. of Environmental Management (IDEM)									
Indiana Hazardous Waste Management Program (IHWMP) - 320 IAC-4	Regulates Closure of Existing Hazardous Waste Facilities	This alternative is in compliance with IHWMP.		X			X	X	
Indiana Waste Treatment Facilities Regulation (IWTFR) 330 IAC-3.1	Authorizes and Regulates Waste Treatment Facilities	This alternantive provides for an on-site treatment facility and complies with IWTFR.			X		X		
Industrial Waste Water Pretreatment and NPDES Program 330 IAC-5(1-10)	Regulates Discharges to State Waters NPDES	This alternative will require an NPDES permit.			X		X		
Pretreatment Standards 330 IAC-5(11-15)	Regulates Discharge to POTW	This alternative includes discharge of contaminated groundwater to Marion POTW.				X		X	
Indiana Water Quality Standards Stream Pollution Control Board 330 IAC 1&2(b)	Establishes Water Quality Standards for the State	This alternative is subject to compliance with Indiana Water Quality Standards.	X	X	X		X		
Title 329 (Proposed) Solid Waste Management Board 329 IAC 2-8-(4,7) 2-9-(2,3)	Regulates Solid Waste Landfill Closure	This alternative will comply with proposed solid waste regulations.	X		X	X			
Dept. of Natural Resources Division of Water									
Indiana Flood Control Act I.C.13-2-22	Regulates construction in a flood plain	This alternative is subject to compliance with DNR Division of Water requirements.	X	X	X	X	X	X	
LOCAL									
City of Marion Municipal Code Ord. 8-1981	Regulates discharge to municipal sewer system.	This alternative is subject to the requirements of the Marion sewer use code.				X		X	

Appendix 4 -- Floodplain and Levee Control Area



Access Restrictions, 100 Year Flood Plain, Flood Protection Levee
All Alternatives Except No Action

Appendix -- 5 Community Relations History and Responsiveness Summary

Marion/Bragg Landfill
Responsiveness Summary

Section I. Overview

Section II. Background on Community Involvement and Concerns

Section III. Summary of Major Comments Received during the Public Comment Period and EPA Responses to the Comments

Section IV. Remaining Concerns

I. Overview

The United States Environmental Protection Agency (U.S. EPA) presented a preferred alternative in the feasibility study. This was available at the beginning of the five and one half week public comment period. Only the Potentially Responsible Parties submitted comments. Judging from the comments received, the PRPs support the remedial action goals, but suggest that the risks posed by the site do not warrent the cost of response presented in the FS. These comments are addressed in Section III.

II. Background on Community Involvement and Concerns

Very little interaction has occured with the community of Marion. Most of the people who attended the RI/FS kick-off meeting were those homeowners living adjacent to the existing landfill. These people wanted U. S. EPA to close this facility. They were also concerned about acceptable levels of arsenic (detected in their wells). The citizens were advised of the MCL and advised to submit any analytical data to the State. They were also advised that the State has authority for sanitary landfills, not U. S. EPA. This landfill is now closed and this group of citizens did not attend the FS public meeting.

The municipal officials are concerned about the possible cost of the remedy and their potential liability. They don't feel the taxpayers would be amenable to paying for the remedy. These comments are addressed in the responsiveness summary.

III. Summary of Major Comments Received during the Public Comment Period

Comments were received from the following parties:

1) Mr. J.B. Smith of Beckman, Kelly and Smith on behalf of Mr. Delmar Bragg;

2) Mr. Spitzer of Browne, Spiter, Herriman, Browne, Stephenson & Holderead on behalf of General Plastics Corporation;

3) Mr. Browne of Browne, Spiter, Herriman, Browne, Stephenson & Holderead on behalf of the City of Marion and the Marion Utility Services Board;

4) Mr. Cromer of Mishkin, Cromer, Eaglesfield & Maher P.A. on behalf of RCA Corporation; and,

5) Mr. Hanson of Beveridge & Diamond, P.C. on behalf of the Steering Committee. This Steering Committee is comprised of the following firms:

1. Dana Corporation
2. General Electric Corporation
3. General Motors Corporation
4. Central Waste Systems, Waste Management Corporation of North America, Inc.
5. RCA Corporation
6. Owens-Illinois, Inc.
7. American National Can Company

There were three types of comments submitted; technical, legal and party specific. Comments from parties 2, 3 and 4 listed above incorporate by reference, comments submitted by Mr. Hanson. These comments will be categorized by relevant topic. The comments had to be paraphrased in order to fit them into the summary. The reader is referred to the actual reports and comments available at the public repository (Marion Public Library).

A. Technical

ERM, acting as technical consultant to Mr. Hanson and the Steering Committee, submitted a report divided into 6 Sections; each addressing a specific portion of the RI/FS. U.S. EPA will respond by section as well.

Section 1 - Introduction

This is an executive summary of all comments contained in Sections 2 through 5.

U.S. EPA Response: These comments will be addressed by general topic in the subsequent sections.

Section 2 - Remedial Investigation - Hydrogeology

Comment 1. The geophysical information was referenced in the RI, but data and results are not contained within the report.

EPA Response: The EPA contractor, Roy F. Weston, through the REM II contract, was not tasked to complete the geophysical work. The geophysical work was completed by the Agency (in-house). The contractor was present to aid in data interpretation and to ensure project continuity. The geophysical data and interpretation report was available at the public repository at the time of public comment.

Comment 2. Minor errors were made in developing contour maps showing the groundwater surface, particularly at MW-12 and FIT-3.

EPA Response: The contour lines were not in error. The head differences in MW-12 and FIT-3 are due to an upward vertical gradient from the ground water discharge to the river (similarly at MW-4 and MW-5).

This is common near major rivers and supports the assessment that the river is a hydraulic barrier. See RI p.2-27, 2nd paragraph.

Section 3 - Remedial Investigation - Quality Assurance/Quality Control

Comment 1. The organization charts presented in the QAPP (pages 3-2 and 3-3) give names of individuals responsible for QA reviews, yet no reviews were present in the RI/FS.

EPA Response: The flow charts presented are not site-specific, but refer to the entire National Superfund program under REM II, beginning with the Hazardous Site Control Division in Headquarters (Fig. 3-1 REM II Organizational Charts) to the Camp, Dresser & McKee (CDM) Regional representive of Quality Assurance (Fig. 3-2 REM QA Organization). Under the REM II contract, there are rigorous QA requirements. The procedures and actual requirements are documented in the contract itself and the established Standard Operating Procedures (SOPs). The QAPP documents how this site fits into the QA/QC responsibilities under the REM II contract.

On a site specific basis, the project tasks must include a line item for project QA (See the Work Plan). Each deliverable, including the QAPP has an organizational sign-off sheet which shows the individuals who have reviewed the deliverable to ensure it meets all requirements, thus demonstrating the QA system meets its intended purpose.

Comment 2. No report on the data quality was presented in the RI report (reference to Figure 9-1 of the QAPP).

EPA Response: This figure refers to the data flow at CRL. The REM II contractor is not responsible for analysis of samples or data validation. Analysis is handled through the CRL and CLP systems under a different contract, and the data review is done by EPA. The labs are responsible for data QA in accordance with the CLP contact, SOPs and other guidance. The QC review is done in-house on every data package. A summary page of comments is prepared by the EPA data reviewer concerning the use, and qualifications for use, of the data. These qualifiers are present on the data in the RI. No data quality report is prepared or required because it is specific to the data package itself. These reviews are available with the raw data package. Since the raw data is massive, it is made available by request only.

Comment 3. CRL Lab audit reports do not appear in the RI.

EPA Response: They do not belong in a site-specific RI. These are not performed by the contractors, but by U.S. EPA. They serve to ensure that each lab meets the performance standards established by U.S. EPA under the CLP system. In doing so, quality data is ensured for each site. The QAPP describes where audit freqency, responsibilities and SOP references are located. Audit results of a specific lab can be made available upon request.

Comment 4. Data review procedures are not documented (QAPP Section 13).

EPA Response: Data review procedures follow specific EPA guidance. Site-specific documentation is not required. A list of all relevant EPA guidance was provided at the repository.

Comment 5. Corrective action requirements are not documented in the RI (QAPP Section 14).

EPA Response: Laboratories which have sample specific problems are required to call the specified Region V EPA data reviewer. This chemist will advise on corrective action procedures. The corrective action resolution is documented by the lab on the the individual data package.

Comment 6. No QA/QC section is provided in the RI (QAPP Section 15).

EPA Response: Subsequent to QAPP approval, it was determined that this task was unnecessary for the following reasons: 1) Data review is an Agency function; the contractor is merely the recepient of the qualified data and has no direct review authorities; 2) To be interpreted correctly, the data packages must be viewed individually. A summary may generalize the data and cause confusion in interpretation or use; 3) Such a summary would be a duplication of the Agency's work.

Comment 7. Appendix A, page 2 is unacceptable
Comment 8. One half hour is insufficient data review time
Comment 9. The cyanide data presented in Appendix A may have QA/QC problems associated with it which may invalidate the basis for scoring the site.

EPA Response: In reviewing the QAPP from the commentor's perspective, it is now clear why Appendix A of the QAPP would lead to the above questions. Appendix A should have been more clearly labeled. It is the raw data package summary for the HRS scoring of the site. The Region V QA office always requests a summary of existing data available at the site in order to evaluate whether the analytical range presented in the QAPP will meet the site's Data Quality Objectives. No RI data had been gathered before the QAPP, therefore, the site scoring data was submitted. (Site scoring data is under the purview of a different QAPP.) With respect to the cyanide, the holding times can be tracked if needed. If the holding times were exceeded, the contract requirements would have been violated and the data rejected. The time to have submitted comments on the site scoring was in 1983 when the site was proposed for NPL listing.

Comment 10. The RI fails to document holding times, especially for SAS parameters.

EPA Response: This does not need to be in the RI. Holding times for RAS are specified in the CLP contract (and the QAPP). Holding times for SAS are specified in the SAS's attached to the QAPP. Laboratories call the EPA for corrective action procedures

if holding times are a problem. The EPA data reviewers check holding times when the data package is reviewed. Holding time was exceeded for one set of pesticides samples during this RI. EPA subsequently rejected the data. This rejected data is noted on RI p.3-13, however, the reason for rejection was not listed.

Additional EPA Response: All the above questions concerned the site specific implementation of the system established by U.S. EPA to ensure defensible data. All contractor SOPs are available for review at the Region V office. All EPA SOPs are established through guidance from Headquarters. A list of all available program guidance was provided for review in the project file at the Marion Public Library. The sections of the QAPP referred to should be almost identical between REM II projects, since the same "system" is used. In the case where a project is not conducted by REM, under the CLP system, the burden is on the project director to explain how equivalent QA/QC procedures will meet EPA requirements.

Comment 11. The definition and use of "non-detects" is arbitrary and means that every sample is considered a positive result.

EPA Response: For the purposes of this project, the selection of "chemicals of concern" and the data reduction procedures are one in the same. The procedures are described before the data is dicussed (RI p.3-3, 3-4) and again in the PHE (RI p.5-4). A geomentic mean was applied to the data set. It is a particularly good method for this site because the ground water investigation was conducted beneath the source material and there was significant variability in the concentrations detected. Geometric rather than arithmetic means were used since most collections of measurements of environmental contaminants are log-normally distributed. An arithmetic mean is "additive", where as a geometric mean is "proportional". One cannot calculate the log of zero, therefore, one half of the CRDL was arbitrarily used. Most statistics books say that X + 1 is frequently used for a zero value. Since the CRDL is used as a baseline, it is reasonable to use half of that value for zero. As noted above, this approach best suits this site and works to the commentor's favor since a geometric mean is generally lower than an arithmetic mean.

To further clarify the application to the PHE, refer to RI p. 5-4. A mean wasn't used unless at least two samples were above the CRDL. If, however, only one sample was detected above the CRDL, it was used in the maximum exposure scenario. Contaminants detected below the CRDL were not used in the PHE at all. This approach is reasonable and defensible.

Comment 12. Use of Federal water Quality criteria for leachate comparison is erroneous.

EPA Response: EPA assumes the commentor is referring to Table 3-17 (See RI page 3-51, 3rd paragraph). The Agency agrees that

fish don't live in leachate. The RI presents the criteria merely as a reference. This is discussed in the RI p.3-51, middle paragraph.

Comment 13. Screening of data qualified as a "B" was not done according to the specified rules.

EPA Response: In general, the rules were followed. Had the commentor provided an example, EPA could provide better explanation. The EPA project manager noted that one EPA data reviewer had inadvertently misapplied the evaluation criteria with respect to the "B" qualifier. The data were rechecked and corrected. It is possible that some corrections were overlooked. This applies to typical lab contaminants such as methylene choride and the pthalates. In order to be cautious about the data, all QA/QC was checked for parameters which were sensitive to the interpretation of the PHE.

Comment 14. Typical concentrations of metals in soils are not provided.

EPA Response: Data summary tables for soils compares the investigative sample results to both the site-specific background valves and typical concentrations found in U.S. soils. See Table 3-1, 3-7 and 3-12.

Comment 15. Cyanide was not detected in the waste borings yet was the basis for site scoring.

EPA Response: The comment is noted. Three borings are not representative of the entire landfill contents. Other contaminants detected bring the site clearly within the scope of SARA.

Comment 16. Data below CRDL is reported as being detected when concentrations below CRDL can not be detected and quantified with accuracy.

EPA Response: The data referred to in Table 5-4 is a geometric mean. The phthalate and arsenic were in error; the values should be 13.4 and 12.3 respectively. This changes the average risk due arsenic from 7×10^{-6} to 2×10^{-5}. An errata sheet will be issued. The following clarification of the definition of the CRDL is provided. The CRDL represents a minimum detection limit that all laboratories participating in the CLP program must meet. The CRDL value is actually set artificially high in order to be certain that a sufficient number of laboratories qualify for the program to meet the program capacity needs. In reality, most labs can achieve a more sensitive instrument detection limit. Any value detected is a "hard" number. It is quantified with accuracy because it is above the instrument's detection limit, and therefore within the instrument's analytical range. The results would be reproducible on any instrument which could achieve the same detection limit. The "J" value means that the result may not be reproducible (it may not be detected) if another lab were used. Another lab may not have an instrument which can achieve the same sensitivity. Defining "J" as "estimated" is a misnomer, since the value presented is not an estimate. Technically, every data value could have been used in the PHE. The CRDL provided a convenient break point for selecting chemicals of concern.

Comment 17. There is no documentation in the RI to indicate whether the inorganics were filtered or unfiltered. The application of MCLs to unfiltered samples is not justified.

EPA Response: See the last footnote on Table 3-22, page 3-56 of the RI.

Comment 18. The PAH concentrations detected on-site are typical of urban soils and are attributed to sources other than the landfill.

EPA Response: The history of the site suggests that a lot of burning occured on-site. Burning creates PAHs. The RI clearly states (page 3-22) where each sample was taken. The conclusion that EPA draws from this data is that multiple sources (i.e., the landfill and the asphalt plants) contribute to the PAH problem. PAHs were detected above site-specific background values.

Comment 19. The RI describes DDT and cadmium in background as "anomalies" and therefore may not be considering alternate sources of contamination.

EPA Response: EPA assumes the commentor is referring to page 3-34, 5th paragraph, in which case the pesticide in question is BHC, not DDT. The soil boring samples were used as site-specific background values for comparison to the waste boring (Table 3-1). Since BHC was not found in the waste boring, listing the background soil concentration is moot. The cadmium value was listed in the table. Therefore, from Table 3-1, one can conclude that the background cadmium (detected once in seven samples) is above typical soil concentrations, but the waste boring sample for cadmium is statistically significant above the background values. The commentor's remark is not clear.

Section 4 - Risk Assessment

Comment 1. Unrealistic Interpretation of the Plausible Maximum Scenario for PAH Exposure in Surface Soils.

EPA Response: EPA interprets the commentor to suggest that subchronic exosures should have been calculated, and that the site average concentration should have been used in the maximum exposure case. Both exposures scenarios are considered chronic. Exposure duration is what determines chronic or subchronic (occuring over a period of time). The difference in the exposure scenarios was frequency, not duration. Subchronic values were not needed. It is generally the Agency's procedure to look at the maximum value in the maximum exposure case. This is supported in the Superfund Exposure Assessment Manual (Aug. 17, 1984). A review of the maximum, or worst case exposure scenario is necessary to compensate for uncertainties in sampling and analysis, unknown health effects due to multiple contaminants and possible exposure to sensitive subgroups within the population. It is true that the maximum concentration for PAHs represent a specific source. This particular area leaches radially in the direction of the surface slope. The point at which it enters the pond serves as a convenient access point. Teenage kids seen fishing from the pond, have been noted at the most accessible points, on the western side of the pond. This assessment doesn't even address

the exposure to workers who are present in this area during the asphalt plant's operating periods.

Comment 2. Representation of Various PAHs with limited evidence of Carcinogenicity as Benzo (a) Pyrene.

EPA Response: The discussion presented on p. 5-56 and 5-59 very clearly states that numerous assumptions are made for PAHs in the risk assessment. Each assumption is discussed, the impacts of that assumption on the risk value presented and the appropriate EPA references which endorse the assumption are given. The nature of risk assessments is such that many assumptions must be made. Use of this group of carcinogenic PAHs is suggested in the criteria documents (attached) used to develop the SPHEM guidance. Refer to:

EPA (1984) Health Effects Assessment for Polycyclic Aromatic Hydrocarbons. Environmental Critteria and Assessment Office. September 1984. EPA 540/1-86-013. and,

EPA (1980) Ambient Water Quality Criteria for PAHs. Office of Water Regulations and Standards, Criteria and Standards Division. October 1980. EPA 440/5-80-069.

There is a discrepancy between these criteria documents and the SPHEM with respect to the two compounds mentioned by the commentor. The Agency will request clarification of this, but would rely on the criteria development documents for the time being.

3. 4.3 Inappropriate Specification of Applicable or Relevant and Appropriate Requirements (ARARs).

EPA Response: Possible ARARs were identified throughout the entire RI, in all discussion of data. It is important to distinguish applicable from relevant and appropriate. A standard which is applicable in a given situation, meets the statutory requirements (circumstances) of the law it reflects. A relevant and appropriate requirement is not directly applicable but the circumstances are sufficiently similiar that its use is appropriate. For example, MCLs are not directly applicable to the aquifer beneath the site. However, since the aquifer is a Class II B, potential use aquifer, MCLs may be considered relevant and appropriate.

The commentor states: "These ARARs are applicable at the point of use; if concentrations of contaminants are not available at these points, the concentrations should be predicted." The Agency agrees, and did just that when predicting possible risks from consumption of the aquifer beneath the site, if it were used. The RI clearly states the ground water risk is based on potential future use. In addition, in the absence of criteria, health effects criteria such as risk reference doses or potency factors are to be considered in risk development. Therefore, ARARs presented in Chapter 5 are correctly used and the points of exposure (beneath the site) correctly referenced.

IARC (1983) has evaluated selected PAHs based on the overall weight of evidence of carcinogenicity to humans. These classifications range from Group 2A (BaP) and 2B meaning that the compound is probably carcinogenic in humans to Group 3 which indicates that there is only limited animal evidence or a paucity of evidence such that the data base is inadequate to assess the human carcinogenic potential. Some of these classifications are based on routes of exposure other than oral and inhalation. As a class, PAH-containing soots, tars and oils are most appropriately classified as Group 1 (IARC, 1983). Applying the criteria proposed by the Carcinogen Assessment Group of the U.S. EPA (Federal Register, 1984) for evaluating the overall weight of evidence for human carcinogenicity, these chemicals are most appropriately classified in Group A.

IARC has judged the following specific PAHs to be probably carcinogenic in humans, there being sufficient animal evidence and or limited human evidence. The corresponding U.S. EPA grouping (Federal Register, 1984) would be Group B1 or B2, depending on the quality of the evidence.

1. benz[a]anthracene
2. benzo[b]fluoranthene
3. benzo[j]fluoranthene
4. benzo[k]fluoranthene
5. benzo[a]pyrene
6. dibenz[a,h]acridine
7. dibenz[a,j]acridine
8. dibenz[a,h]anthracene
9. 7H-dibenzo[c,g]carbazole
10. dibenzo[a,e]pyrene
11. dibenzo[a,h]pyrene
12. dibenzo[a,i]pyrene
13. dibenzo[a,l]pyrene
14. indeno[1,2,3-cd]pyrene

Reference: EPA (1984) Health Effects Assessment for Polycyclic Aromatic Hydrocarbons. Environmental Criteria and Assessment Office. September 1984. EPA 540/1-86-013.

Further, the following compounds have limited animal evidence for carcinogenicity, however, the evidence according to IARC is inadequate for making a definitive statement about the human carcinogenic potential. The appropriate U.S. EPA classification (Federal Register, 1984) for these chemicals is Group C-Possible Human Carcinogen.

1. anthanthrene
2. benz[c]acridine
3. carbazole
4. chrysene
5. cyclopenta[c,d]pyrene
6. dibenz[a,c]anthracene
7. dibenz[a,j]anthracene
8. dibenzo[a,e]fluoranthene
9. 2 and 3-methylfluoranthenes

Comment 3. The Future Use Scenario is unrealistic.

EPA Response: The commentor's opinion is noted. The Agency did not check with the County to determine land use. However, it would not be unreasonable to assume future land use similar to existing land use (i.e. additional commercial facilities on the property, perhaps with a need for recirculating cooling water, as Marion Paving has now). Since municipal water does not extend to this area, use of the surficial aquifer is not an unreasonable assumption. Restrictions currently do not exist. Note that the home existing within the site boundry has a woman of child bearing age, with an infant (sensitive population). Many more conservative assumptions could have been made, just based on extrapolation of existing conditions. The recreational use projected for only a five or ten year period (depending on matrix) presents a rock bottom set of assumptions (which favor the commentor's view) when future conditions cannot be known.

Comment 4. Application of Data Reduction Procedures is Inconsistent.

The commentor felt that data reduction errors led to erroneous identification of chemicals of concern at the site and that use of the highest contaminant value in the maximum exposure scenario presents a misleading interpretation of the risks present at the site. The commentor also presents his interpretation of the best indicator chemicals.

EPA Response: Examples of data reduction errors were not presented, therefore, EPA has no comment on this point. Use of the highest contaminate value and the plausible maximum exposure scenario is conservative, but not unreasonable given it is at least based on existing values where future values are uncertain. See response to Comment 1, section 4. The maximum exposure scenario compensates for many data uncertainties.

The selection of indicator chemicals is not a requirement, merely a convenience when working with a large data base. This process was not necessary at Marion/Bragg. The Agency doesn't need to assess the commentor's recommended PHE procedures. The RI has already completed this task in a manner which complies with the guidelines.

Section 5 - Feasibility Study

Comment 1. Listing of Media Inconsistent

The commentor suggests that inconsistent listing of media has lead to inconsistent response objectives, which may not correspond to the PHE.

EPA Response: The FS correctly identifies the media in which the PHE identified risks, as well as the media in which the pathway for potential future risk exists. The on-site pond and/or river

were identified as presenting a current risk, however, they are exposure pathways of concern. In addition, the FS (Chapter 7) clearly states that (based on existing data) these pathways are more likely to be impacted if existing contaminant level actually increase over time. Since the Agency is required to select remedial actions which are permanent and protective, then the potential for future risk must be addressed.

Comment 2. Interim Remedy

The commentor presents an alternate view of the selected remedy elements.

5.3.1 Access and Deed Restrictions

The commentor concurs on the need.

EPA Response: The comment is noted. A point of clarification is needed with respect to the deed restriction. The land owner must provide the restriction voluntarily. The Agency does not have the authority to impose it.

5.3.2 Flood Protection Measures

The commentor feels the levee is an expensive means of achieving the goal and suggests other technical approaches which are felt to be comparable.

EPA Response: The language in the ROD has been clarified as a result of this comment. The goal stated is performance based. If the PRPs can find another means of achieving it which gains the approval of appropriate State and Federal Agencies, then U.S. EPA may accept it as well.

Comment 3. Indiana Sanitary Landfill Cap

The commentor feels the clay cap is an excessive means of preventing the direct contact threat. Further, the commentor suggests that repair work on the existing cap is all that is necessary.

EPA Response: Section 121 of SARA specifically states that the selected remedy will comply with the ARARs which are determined to be appropriate. The Subtitle D requirements are the minimum ARAR at this site. Two feet of clay would be excessive if the direct contact threat was the only concern. Congress wanted to ensure that selected remedies did not undermine the minimum protectiveness requirements considered by the regulations established under other State and Federal environmental laws. This mandate is very clear in Section 121. The sloping and capping requirements under Subtitle D serve to minimize future problems at any landfill. This minimum ARAR follows common sense and good engineering practice. This cap will be consistent with any ground water remedy, ACL or slurry wall.

Comment 4. Monitoring and Additional Investigations

The commentor suggests that additional study is not needed, only monitoring. Further, a frequency for monitoring is suggested, interpretion of the point of compliance, and action levels selected based on table 6-2 in the FS.

EPA Response: The FS clearly states that ammonia is a "potential" problem (page 7-4, 4th paragraph), and that additional data will answer whether it is an actual problem. This is a conservative and reasonable approach to make sure that the final remedy is indeed permanent and protective.

The monitoring program suggested is not sufficient. The river bank is one half mile long on the site border. Ground water quality will change because waste type and characteristics will change. In order to be protective, EPA recommended monitoring appropriate "discharge zones" (page 6-7). The action levels suggested in Table 6-2 are only "to-be-considered". The NPDES approach is logical, but there are several differences in the fundamental assumptions between an end-of-pipe discharger and a chronic discharge occurring over a one half mile stretch. The FS did not specify which of the "to-be-considered" values would be applicable since the ground water remedy was not being selected at this time. Other approaches can also be considered in the future. Refer to the RCRA ACL Determinations guidance for examples.

Comment 5. Future Remedial Actions

The commentor felt that a slurry wall was not justified by the existing risks and that the FS failed to adequately address the technical limiations associated with installation of a slurry wall through trash.

EPA Response: EPA is not recommending a slurry wall at this time. If it were needed, the FS strongly suggests that compatibility tests be performed first (Table 6-3). Table 6.8 shows the potential cost consequences if the slurry wall failed. The EPA contractor recognized the difficulties and risks associated with application of a slurry wall in a landfill environment and made adjustments for those concerns in the estimated capital cost. However, if it was necessary to prevent the ground water from reaching the river, not many technical choices are available. The FS evaluates use of a hydraulic barrier (FS Appendix A), but still suggests that the slurry wall presents the best cost and feasibility.

Comment 6. General Comments - FS

The commentor felt that the cost documentation should have been more detailed so that they could determine the reasonableness of the figures.

EPA Response: This level of cost documentation is typical of FSs. EPA has offered to make detailed cost documentation available to the PRP steering committee.

Section 6 - Conclusions

The commentor summarized all previous comments and suggests that the proposed remedy is not responsive to the risk.

EPA Response: All comments have been adequately addressed. It appears that the commentor actually concurs with EPA's response actions, but feels that the clay cap is excessive. The comments have not changed the Agency's view of the need for the selected remedy. The EPA again reminds the commentor of the requirements of SARA, particularly Section 121.

No other technical comments were submitted. The next section will summarize legal comments. This will begin with Mr. Hanson's letter.

1. Mr. Hanson of Beveridge & Diamond, P.C. on behalf of the Steering Committee.

Comment: Due Process Requires a Reasonable Comment Period and Fair Agency Procedures: They Have Not Been Provided.

The PRPs are entitled to procedural due process, and are entitled to a substantially extended public comment period to include 60 days beyond the date they receive a response to a Freedom of Information Act request concerning the Marion/Bragg site.

EPA Response: EPA agrees that the PRPs are entitled to the benefits of that procedural due process, which is due and appropriate under the circumstances, regarding notice of and an opportunity to comment on the remedy selection set forth in the Feasibility Study (FS) released August 4, 1987. However, EPA disagrees with the PRP position that the demanded extension of the public comment period beyond that provided for in the enabling legislation and the National Contingency Plan is mandated by considerations of due process.

First, the public comment period began with the release, with public notice, of the FS on August 4. Special notice letters were sent to the PRPs on August 10, 1987, notifying them of their opportunity to negotiate a voluntary performance of remedial action at the facility, and notifying them of the availability of the FS. EPA rejects as completely ungrounded the PRP assertion that public comment period began on August 22, 1987.

Most of the PRPs who have received special notice under Section 122(f) of SARA were previously given, in December 1985, an opportunity to perform the RI and FS themselves. They declined to do so. They have also been aware of the existence of the Region's ongoing RI and FS activities since that date, which are part of a continuum from identification and listing of an NPL site through of final remedy and removal from that list. The PRPs have evidently chosen not to remain involved in that process or to seek to obtain the data and other developing site information

available from the EPA. Notice consistent with the requirements of Section 113(k) of SARA was given, along with "special notice" of the moratorium period under Section 122(e)(2) of SARA. The administrative record developed to date has been available since August 4, 1987, in the locations prescribed in Section 113(k)(1) of SARA (at the Marion public library and in Region V's offices), and it contains the "background data and procedures" used in developing the RI and FS. The FOIA request submitted by one of the PRPs largely tracks and includes information already available to the PRPs in the public record established by the Region.

Comment: A summary of the technical comments is provided in points II, III, IV and V. The Agency will not repeat the response to comments which have been provided to the ERM Report in Appendix 2 to Mr. Hanson's letter.

Comment: Mr. Hanson also requests the opportunity to comment on a draft work plan for remedial action.

EPA Response: The Agency generally does not submit a work plan for RD/RA to public comment since it represents implementation of a remedy already the public has already commented on. The plan, however, will be put in the repository for review. If the steering committee elected not to undertake RD/RA, their next opportunity for project involvement will be at cost recovery. There is, of course, the moratorium period which began with the special notice (plus delivery time) on August 10, 1987. The negotiations during this period, and the PRP's opportunity to submit a good faith proposal for RD/RA work consistent with this ROD, allows the PRPs access to discussions on the work plan with EPA.

2. Mr. J. B. Smith of Beckman, Kelly and Smith on behalf of Mr. Delmar Bragg.

Comment: Mr. Smith refutes the Agency's record of hazardous waste at the site and provided additional information on the likely quantities. He also felt the risk posed by the site was de minimus and that a clay cap over only the transfer station area is needed to restrict percolation. He suggests that EPA consider this in lieu of the FS proposed remedy.

EPA Response: The Agency appreciates the augmentation of site history provided. A clay cap over a small portion of the landfill achieves very little and does not comply with the law.

3. Mr. Spitzer of Brown, Spitzer, Herriman, Browne, Stephenson and Holderead on be half of General Plastics Corporation.

Comment: Mr. Spitzer requests that General Plastics Corporation be removed from the list of PRPs since their waste is of an industrial, but not hazardous nature.

EPA Response: EPA will accept information General Plastics cares to submit on the scope of their involvement.

4. Mr. Browne of Browne, Spitzer, Herriman, Browne, Stephenson & Holderead on behalf of the City of Marion and the Marion Utility Services Board.

   Comment: Mr. Browne requests that the City of Marion be withdrawn from the EPA list of PRPs because the City does not handle hazardous waste (or hazardous sludge). Mr. Browne also suggests that this landfill does not pose a risk and the EPA remedy is inappropriate.

   EPA Response: Ultimately, the court determines liability. EPA has adequately addressed the technical concerns raised by the steering committee and continues to assert that the recommended remedy is the minimum necessary to protect human health and the environment. Therefore, it is appropriate.

5. Mr. Cromer of Mishkin, Cromer, Eaglesfield & Maher P.A. on behalf of RCA Corporation.

   Comment: The procedure followed in identifying and selection the Marion/Bragg remedy is inconsistent with CERCLA and SARA and arbitrary and capricious.

   This general statement and comment includes a number of sub-points that will be addressed individually.

   Comment: The allegedly short review and comment period is being imposed solely to meet internal Regional desires to conclude the ROD by the end of EPA's fiscal year.

   EPA Response: As demonstrated above, EPA does not believe the comment period is unreasonable short, but does not dispute that it desires to conclude the ROD process as quickly as possible. EPA maintains, however, that the procedures and timing followed here are fully consistent with the law.

   Comment: The PRPs are entitled to a full trial-type hearing before a "neutral and detached decision maker," including pre-hearing discovery, examination of witnesses and associated procedures, before being compelled to expend large sums of money at the facility.

   EPA Response: The PRPs have not been required to expend large sums of money to finance the remedy. The PRPs have received the statutory notice of two opportunities to voluntarily assume the responsibility for certain response actions: To perform the RI/FS, and to undertake the remedy. No compulsion attaches to EPA's offer to allow such voluntary action.

Beyond that threshold point, however, it is patent that neither CERCLA nor SARA apprehend any adjudication-type procedures before a "neutral and detached decision maker," presumably and equivalent of an administrative law judge or hearing officer. Section 113 requires notice and opportunity to comment, which has been provided. Section 107 provides defenses and sets the standards for recovery, in a judicial adjudication that must be brought by EPA, of costs the EPA must expend if the PRPs decline to assume the remedial tasks. Particular notice and opportunity to comment have been given to the PRPs and the community in the manner provided by the site, and the PRPs have been on notice of ongoing RI/FS process since December 1985. The data generated by EPA during the RI/FS process are made available routinely on request from PRPs and the public and are included in the public record.

The final decision on a ROD is committed by delegated authority to the Regional Administrator, who is not involved in the details of the remedial development process. EPA believes that the statutory process is fully protective of the PRPs' due process rights, and the process as administered here was neither arbitrary nor capricious given the manifold opportunities the PRPs have had continuously available to gain information about the remedy selection process and prepare comments for submission during the public comment period.

Comment: EPA has disregarded a requirement of Section 122(e) of CERCLA, as amended, by closing the public comment period during the moratorium on r esponse action established in Section 122(e).

EPA Response: Closure of the public comment period on the FS is not "commencement of response action" under Section 104(a). Rather, it is only one step in the process, already under way, leading to actual commencement of on-site cleanup activity. The moratorium period is clearly inteneded to halt, where environmental and human health threats are not pressing, the actual conduct of response actions at the facility. The moratorium period, moreover, is an additional opportunity for the PRPs to negotiate with EPA concerning response work to be performed, if the PRPs prbduce a good-faith proposal after 60 days and oblige themselves by the end of 120 days through a consent agreement to perform the remedial work. EPA does not agree that the Section 122 moratorium requires holding the public comment period and the administrative record open. Indeed, this PRP comment, were it to be acceded to by EPA, poses a conundrum: A remedy, following the PRPs' view of the moratorium, could not be selected through a ROD and made the subject of negotiations until the moratorium period was over, but negotiations over the remedy cannot begin until the EPA has established the remedy.

Comment: In a cost recovery action, the EPA will not be able to support its recommended remedy, and the ultimate decision maker on issues such as cost recovery will be a Federal District Court.

EPA Response: EPA agrees that cost recovery actions will be decided, if they are not settled, by a federal court. This comment illustrates a degree of confusion between the process of selecting a remedy through notice-and-comment procedures, and litigation of cost recovery claims should the PRPs decline to undertake the remedy. In any cost recovery action, the PRP defendants will have the opportunity to demonstrate to the court that the remedy is inconsistent with the National Contingency Plan and the enabling legislation, and to seek to raise challenges to that legislation as well. The PRPs' rights to due process of remedy selection and to negotiate their own agreement on performing a remedy; and they have access to judicial review, in action brought to recover EPA costs, of the EPA's remedy.

IV. Remaining Concerns

None identified.

Appendix 6 -- Administrative Record Index

Administrative Record Index -- Marion/Bragg Landfill

Administrative Record for Marion/Bragg Landfill, Grant County, Indiana as of September 30, 1987.

File # 1. PA/SI, HRS

- Raw data for scoring package

2. Site Inventory

- memos from observation during site visits
- file search information obtained during RAMP period including: land ownership, water well records, city township location documentation

3. RAMP (Remedial Action Master Plan) 9/9/83

4. RI/FS initiation

- letter from IDEM requesting project initiation and making Assurances
- RI/FS Statement of Work

5. Work Plan memorandum 6/19/85

6. Community Relation Plan 2/10/86

7. Initial Site Evaluation 8/20/85

8. Groundwater Utilization Survey 7/18/85

9. Draft Geophysical Investigation Fall '85

10. Work Plan - PRP negotiating draft 10/11/85

11. Final Work Plan 4/24/86

12. Final Quality Assurances Project Plan 7/10/86

13. Final Health and Safety Plan 4/24/86

14. Phase II Sampling and Analysis Memorandum 6/2/86

15. Request for applicable, relevant and appropriate requirements for Remedial Alternatives 3/6/87

    USEPA Comments:

    - Water Division 4/28/87
    - Air Division 6/17/87
    - Great Lakes National Program Office 4/27/87
    - Solid Waste Branch 4/15/87

    IDEM Comments: 5/4/87 and 7/27/87

16. Quality Assurance Project Plan - Addendum One for supplemental sampling (May, 1987)

17. General Correspondence File - Contains various comments and correspondence with other Agencies such as; ATSDR, ISBH, IDEM and U.S. Fish and Wildlife Service.

    - ISBH letter identifing water quality standards 7/3/85
    - Fact sheet, Public "Kick-off" meeting 1/30/86
    - ISBH comments to Draft QAPP and Health and Safety Plan 9/25/85
    - ISBH comments to Draft Work Plan 10/9/85
    - ATSDR comments to Draft Work Plan and Draft QAPP 10/23/85
    - Memo from Potentially Responsible Party meeting of 11/7/85
    - ATSDR memo for review of residential drinking water samples 11/9/85
    - ISBH additional comments on Work Plan and QAPP 2/6/86
    - U.S Fish and Wildlife comments on surface water and sediment data 6/10/87

18. Applicable Guidance

19. Comments to Agency Proposed Plan

Uncopied references which are available at the Regional Office in Chicago, Illinois:

1. Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments - April, 1977

2. Raw Data from all RI field investigations

The reader should note that in 1986 the Indiana State Board of Health (ISBH) was reorganized and the Indiana Department of Environmental Management (IDEM) was created.

Appendix 7 - State of Indiana Concurrence

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
NANCY A. MALOLEY, Commissioner

105 South Meridian Street
P.O. Box 6015
Indianapolis 46206-6015
Telephone 317-232-8603

September 29, 1987

Mr. Valdas V. Adamkus
Regional Administrator, Region V
U.S. Environmental Protection Agency
230 S. Dearborn Street
Chicago, IL 60604

Re: Letter of Concurrence
Marion/Bragg Landfill
Grant County, Indiana

Dear Mr. Adamkus:

The draft Record of Decision (ROD) for the Marion/Bragg Landfill has been reviewed by the staff of the Indiana Department of Environmental Management (IDEM). The IDEM is in concurrence with the selected interim remedy presented in the draft ROD.

The selected interim remedy has the following components: a) a sanitary landfill cap which meets IDEM's proposed landfill closure requirements, b) construction of a flood control dike, c) access restrictions, d) replacement of 3 private use wells on-site by constructing new wells into the deeper aquifer, and e) monitoring of ground water, surface water and aquatic life on an around the site. In our view, this selected remedy best addresses the public health, welfare and the environment surrounding the Marion/Bragg Landfill and it meets the State's Applicable or Relevant and Appropriate Requirements (ARARs).

The State of Indiana recognizes its obligation to provide the assurances listed in Section 104(c)(3) of the CERCLA as amended by SARA. The State will provide the required ten percent State match of approximately $600,000 for the remedial action, and operation and maintenance costs of $1,080,000, present worth, for thirty years. Please be assured that the State of Indiana is committed to accomplish cleanup of all Indiana sites on the NPL and intends to fulfill all obligations required by law to achieve that goal. In addition to these assurances, Indiana will provide assistance to the U.S. EPA regarding site access to the degree that the State has legal authority.

Sincerely,

Nancy A. Maloley

Nancy A. Maloley
Commissioner