July 13, 2003

Douglas J. Ucci, Senior Associate
Quantum Management Group, Inc.
3550 Burch Avenue
Cincinnati, Ohio 45208

Graham Mine Annual Inspection
Galena, IL

Dear Doug:

Enclosed for your review are the following documents:

1. An original IEPA Facility Inspection Report for review and signature;
2. One completed ILR000184 inspection comments form;
3. One site plan drawing showing this year's photo locations;
4. Two pages of photos taken at the site during this year's inspection.

The site appears to be in generally good condition with established vegetative cover and no signs of erosion. There is no need for immediate remedial action however I recommend mowing the site soon to control weeds and promote grass propagation.

Based on the absence of surface mold, the agricultural lime we added last fall has raised the soil pH in the areas where it was applied. As you can see from the photos, we recently had a contractor apply cow manure to fertilize those bare areas.

The next step should be to reseed and mulch the fertilized locations in September. To seed now would require supplemental watering because the high nutrient level from the manure would cause the grass to bolt before it developed a root structure and then die from lack of water. If we delay seeding until September, the grass seed would germinate in more moderate temperature and the nutrients from the fertilizer would have had a chance to migrate into the soil. Erosion has not been a problem in the past so delaying the seeding should not be detrimental.

The drainage ditch photo is not illustrative of the bottom condition but the ditch is fully vegetated and requires no attention. Both the ditch and the site surface are stabilized and should continue to remain in that condition.

If you have questions or wish clarification, please contact me.

Thank you.

Sincerely,

Greg Stauder

encl:

cc: Paul Harper, Eagle Picher

IL000018

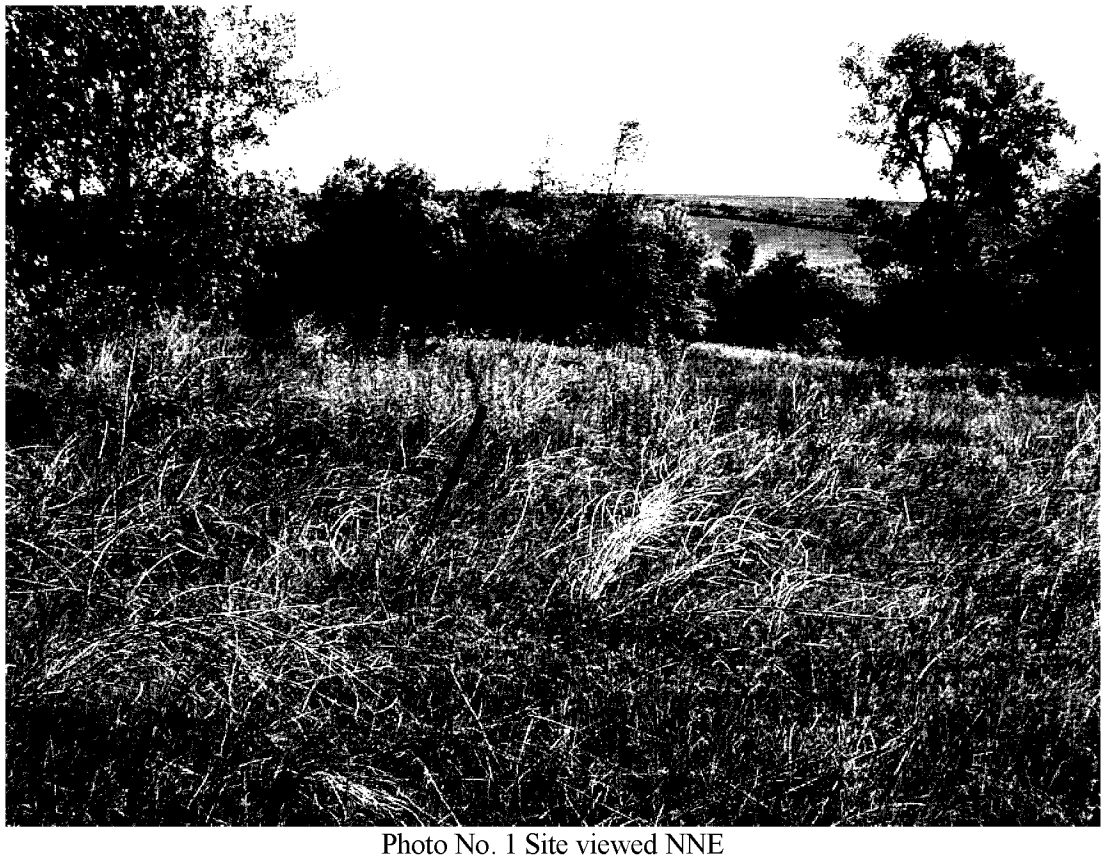


Photo No. 1 Site viewed NNE

Photo No. 2 Site viewed ENE

Photo No. 3 Manure application areas below former storage slab.

Photo No. 4 Drainage ditch area viewed WNW from Meridian Road.

June 28, 2004

Mr. Paul D. Harper
EaglePicher, Inc.
3402 E. University Drive
Phoenix, AZ 85034

Graham Mine Annual Inspection
Galena, IL

Dear Mr. Harper:

This letterform report consists of this one-page narrative followed by:

1. A site plan drawing showing this year's photo locations, page 2;
2. Three pages of photos taken at the site during this year's inspection, page 3-5;
3. One completed ILR000184 inspection comments form , page 6;
4. An original IEPA Facility Inspection Report for review and signature (separate from report).

Most of the site vegetative cover appears improved since last year and there are no signs of erosion. There is no need for immediate remedial action however I do recommend mowing the site to control weeds and promote grass propagation.

There is a considerable amount of surface mold growing on some of the bare areas indicative of a low soil pH. Increased mold development can be explained to some extent by abnormally high precipitation amounts and relatively cool temperatures. Traces of agricultural lime applied to the site in 2002 are still evident in some locations. The bare areas appearing on Photos 5 and 6 show considerable mold and sparse vegetation although no soil erosion is occurring.

Erosion has not been a problem in the past and the upslope vegetation seems to be growing more vigorously this year than in the past due to wet weather coupled with the 2003 fertilizer application. I recommend EaglePicher seriously consider mowing this year because several patches of weeds have developed in the area of the former storage slab. If left unchecked, these weeds will compete with the established grasses that are currently preventing erosion with their dense root structure.

It may also be worth considering another lime application on the bare areas downslope from the silt fence to raise soil pH. Tests have shown the soil in this area has high zinc content and in an acidic environment, the zinc tends to bond with any fertilizer nutrients making them unavailable to plants.

If you have questions or wish clarification, please contact me. Thank you.

Sincerely,

Greg Stauder

Slugged for photo orientation drawing

IL000022

Photo No. 1 Site viewed NE

Photo No. 2 Site viewed NNE vicinity of lower slab edge

Photo No. 3 Area immediately below former storage slab viewing NNE

Photo No. 4 Zinc plume area below silt fence (shown above) viewing NNE

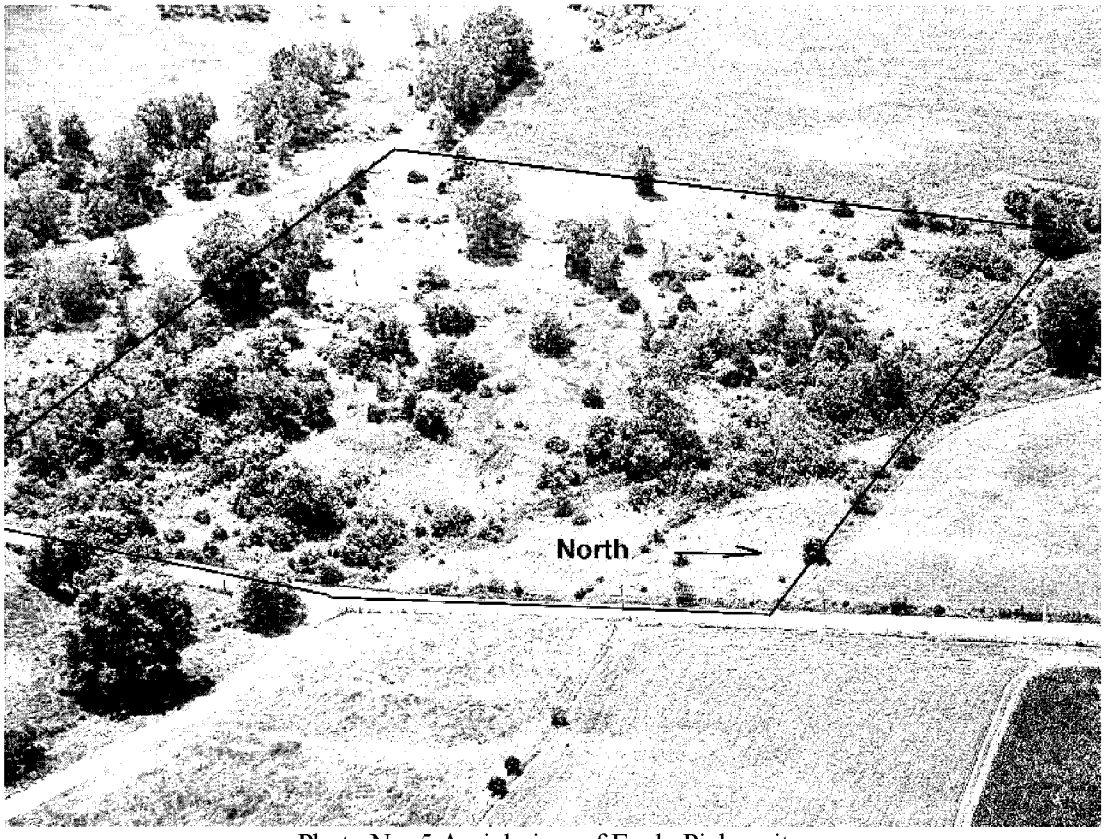
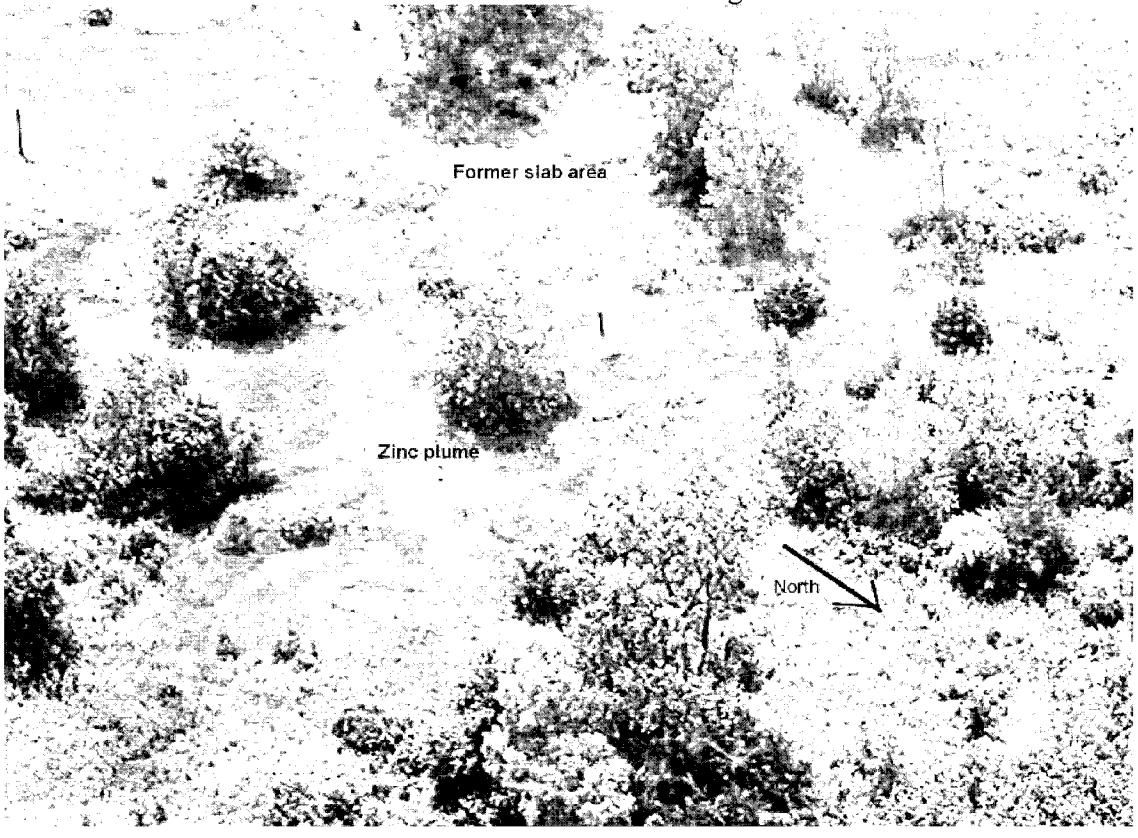


Photo No. 5 Aerial view of Eagle Picher site.

Photo No. 6. Aerial view of former storage slab area.



SEMI-ANNUAL INSPECTION REPORT
GRAHAM MINE SITE
ILR001084

Date 6/26/2004

Concrete Storage Slab Area

Condition of Cover	Generally good to excellent; few small bare areas; tall mixed grasses & weeds ranging from one to three feet in height. Coverage has improved since 2003 fertilizer application.

Corrective Measures	Recommend mowing to reduce weed growth and propagation.

Vegetative Cover

Condition of Vegetation	Generally fair to good; mixed grasses and weeds; few localized bare areas in chronic areas.

Evidence of Significant Erosion	None. Some small rivulets consistent with previous inspections. Silt fence deteriorating but still functioning.

Corrective Measures	Recommend mowing to reduce weed growth. Site below the former storage slab area received an application of agricultural lime to raise soil pH in 2002 and animal manure in July 2003 to provide plant nutrients. Additional ag lime application would be beneficial.

Receiving Stream

Condition	Heavily vegetated w/ various grasses, no evidence of erosion.

Corrective Measures	None req'd

Inspection Conducted by:	Greg Stauder, IL Reg. P.E. No. 062-037243
Company	Greg Stauder & Co., 201 Hill Street, Galena, IL 61036

IL0000027

KIEFFER EXCAVATING
20100 Route 20 West
EAST DUBUQUE, ILLINOIS 61025
(815) 747-3044
(815) 747-7776

CUSTOMER'S ORDER NO.	PHONE	DATE
		11-8-94

NAME Eagle Picher Industries
ADDRESS 580 Walnut Street
Cincinnati Ohio 45202

QTY.	DESCRIPTION	PRICE	AMOUNT
	Straw bales weighed approx 40 lbs apiece		
	needed 100 bales for coverage		
	total weight 4000 lbs - 2 tons		
	priced at $515.00 per ton		
	Amt for straw		$1030.00
		TAX	
RECEIVED BY		TOTAL	

9253 All claims and returned goods MUST be accompanied by this bill. **Thank You**

IL0000028

GREG STAUDER P.E.
Consulting Engineer

331 Franklin
Galena, IL 61036
815-777-1588

202 S. Main
Witt, IL 61036
1-800-254-5700

Date: November 8, 1994

To: Kieffer Excavating

From: Greg Stauder, P.E.

Subject: Return of Performance Guarantee

Attached to this memorandum is Bank Money Order #173289, dated September 14, 1994, given as performance guarantee during construction activities at the Graham Mine for Eagle Picher Industries. Receipt is acknowledged by the signature below.

Construction activities are complete in accordance with the contract documents. As of this date, the only remaining outstanding issue is final documentation substantiating the total amount of straw mulch used on the job. Once this is received, the balance of retainage held can be released. If you have questions regarding this, please contact me.

RECEIPT OF BANK MONEY ORDER # 173289 IN THE AMOUNT OF $6,500.00 IS HEREBY ACKNOWLEDGED:

Kieffer Excavating

By: Sharon Kieffer Date: 11-8-94

IL0000029

Kieffer Excavating

20100 Rt. 20 W.
East Dubuque, IL 61025
815-747-7776 or 815-747-3044

Eagle Picher Industries
580 Walnut Street
Cincinnati, Ohio 45202

Project:

Graham Mine, Galena Illinois

Date: October 5, 1994

Pay Request No. 1

Pay Item Units	Contract Quantities	Supplied Quantities	Unit Price	Amount
Borrow , cu.yd.	250	250	$ 7.50	$1875.00
Topsoil, cu.yd.	420	440	9.50	4180.00
Slab, Remove, L.S.	1	1	3345.00	3345.00
Silt Fence, lin.ft.	250	180	3.40	612.00
Fertilizer, acre	0.63	0.63	114.00	114.00
Seeding, acre	0.63	0.63	190.00	190.00
Straw Mulch, ton	1.20	2.00	515.00	1030.00
Bit. Sealer, gal.	1000	200	1.39	278.00

Total Completed to Date	$11624.00
Less Previous Payments	0.00
Less Retainage 5%	581.20
Payment this Estimate	11042.80
Balance to become Due	581.20
	$11624.00

==========

Approved for Materials & Quantities

Construction Inspector Date: 10/12/94

IL0000030

Kieffer Excavating

20100 Rt. 20 W.

East Dubuque, IL 61025

815-747-7776 or 815-747-3044

10-5-94

Work completed on the Graham mine storage slab removal in Galena,Illinois.

Pay Item		Quantity	Unit Price	Amount
Borrow	Delivered			
	9-19	160 cu.yd.		
	9-20	90 cu.yd.		
	Total	250 cu.yd.	$7.50-cu.yd.	$1,875.00
Topsoil				
	9-19	40 cu.yd.		
	9-20	80 Cu.yd.		
	9-21	30 cu.yd.		
	9-30	200 cu.yd.		
	10- 1	90 cu.yd.		
	Total	440 cu.yd.	$9.50-cu.yd.	$4,180.00
Slab Removal		Lump Sum		$3,345.00
Silt Fence		280 Lin.ft.	$3.40-1.ft.	$ 952.00
Fertilizer		0.63 ac.	$114.00-acre	$ 71.82
Seeding		0.63 ac.	$190.00-acre	$ 119.70
Straw Mulch		2.00 Tons	$515.00-ton	$1,030.00
Bituminous Sealer		1000 gal.	$1.39-gal.	$1,390.00
			TOTAL	$12,963.52

Thank You.

Jeffrey D. Kieffer

IL0000031

Kieffer Excavating
20100 Rt. 20 W.
East Dubuque, IL 61025
815-747-7776 or 815-747-3044

Inspiration Development
Illinois-Wisconsin Operations
P.O. Box 253
Galena, Illinois 61036

Date: October 5, 1994

Pay Request No. 1 & Final

Pay Item Units	Contract Quantities	Supplied Quantities	Unit Price	Amount
Silt Fence, lin.ft.	280	100	3.40	340.00
Bit. Sealer, gal.	1000	772	1.39	1073.08

Total Completed to Date	1413.08
Less Previous Payments	0.00
Payment Request this Estimate	$1413.08

==========

Approved for Materials & Quantity

_____ Date: 10/12/94
Construction Inspector

IL0000032

AGREEMENT

THIS AGREEMENT is made between EAGLE-PICHER INDUSTRIES, INC. ("EPI"), an Ohio corporation, having its principle place of business at 580 Walnut Street, Cincinnati, Ohio 45202 and KIEFFER EXCAVATING COMPANY ("Kieffer"), an Illinois company, having its principle place of business at 20100 Route 20 West, East Dubuque, Illinois 61025. This Agreement shall be effective when signed by both parties.

RECITALS

A. EPI owns a nine acre parcel of land in Galena, Illinois known as the "Graham Mine Site" (the "Site").

B. EPI has received approval from the Illinois Environmental Protection Agency to implement a Remediation Plan dated August 4, 1994 for the Site.

C. EPI opened the Remediation Plan to competitive biding and it was determined that Kieffer is the low bidder.

NOW, THEREFORE, in consideration of the mutual promises contained herein, the parties agree as follows:

1. Kieffer shall perform the remediation consistent with the August 4, 1994 Remediation Plan and with its bid which are both attached hereto as Exhibits A & B and which are hereby incorporated into this Agreement. The remediation shall be completed by Kieffer by September 30, 1994 for the sum of Twelve Thousand Two Hundred Ninety One Dollars and 52/100 ($12,291.52).

2. Prior to the start of the remediation, Kieffer will submit to Mr. Greg Stauder, P.E. ("Stauder"), EPI's consulting engineer, a cashier check in the amount of Six Thousand Five Hundred Dollars payable to EPI to secure Kieffer's performance under this Agreement. The cashier's check shall be held by Stauder until Stauder determines that the remediation has been successfully concluded. After Stauder's determination that the remediation has been successfully concluded, the cashier's check will be released to Kieffer. Stauder's determination of successful completion shall not be unreasonably withheld.

3. All payment requests by Kieffer are to be directed to Michael B. Dixon, EPI, for approval and copied to Stauder.

4. Kieffer is an independent contractor and is not an employee or agent of EPI.

5. Kieffer agrees to defend, indemnify, and hold EPI harmless from any cost, claim or liability, including, but not limited

IL000033

to, damage claim or award, attorney fee, lien, fine or penalty that may arise from Kieffer's performance under this Agreement.

6. This Agreement contains the entire understanding of the parties and cannot be modified except by written agreement signed by both parties. The interpretation and enforcement of this Agreement shall in accordance with the laws of the State of Ohio.

KIEFFER EXCAVATING COMPANY	EAGLE-PICHER INDUSTRIES, INC.
By Gary D Kiffer	By
Its Manager	Its
Date 4-15-94	Date

IL0000034

Eagle Picher Industries
Graham Mine Storage Slab Removal
Galena, Illinois

Pay Item	Quantity	Unit Price	Amount
Borrow	250 cu. yd.	$7.50 /cu.yd.	$1,875.00
Topsoil	420 cu. yd.	$9.50 /cu.yd.	$3,990.00
Slab, Remove	Lump Sum		$3,345.00
Silt Fence	250 lin.ft.	$3.40 /l.ft.	$ 850.00
Fertilizer	0.63 ac.	$114.00/acre	$ 71.82
Seeding	0.63 ac.	$190.00/acre	$ 119.70
Straw Mulch	1.26 tons	$515.00/ton	$ 650.00
Bituminous Sealer (Koch Matls. Dustbuster or equal)	1000 gal	$1.39 /gal.	$1,390.00

Signed Jeffrey D Kiff Total Bid $ 12,291.52

Note: Determination of the low bidder will be according to the Illinois Department of Transportation "Standard Specifications for Road & Bridge Construction", current edition.

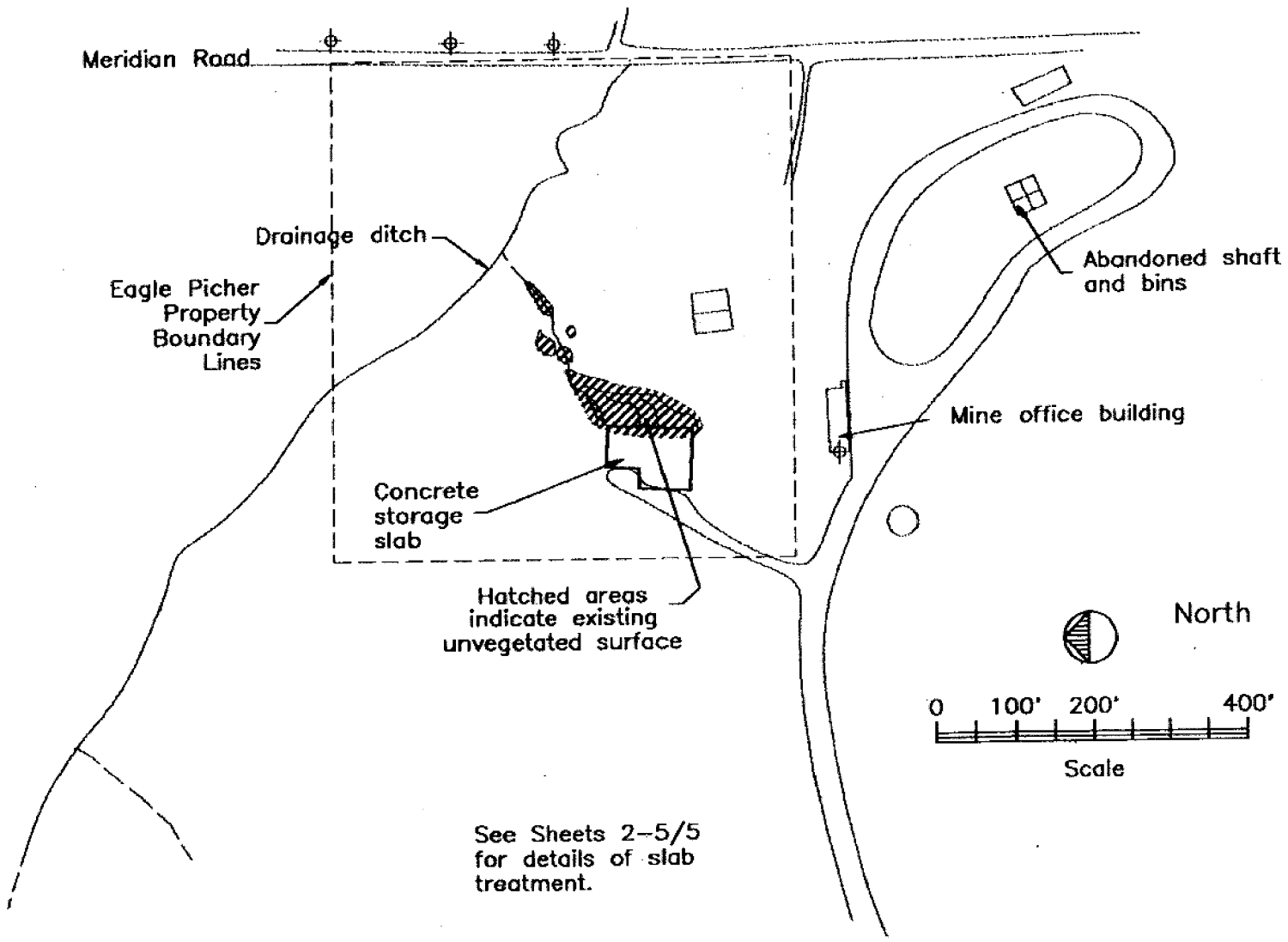
In general, the bid items above are to conform in material and construction methods to the equivalent pay items as described in the "Standard Specifications". The Contractor is specifically directed to the sections related to seeding and the performance requirements therein.

The borrow material must be clean fill approved by the owner's representative and free of large stones, vegetation, or other material that would prevent it from being graded properly.

The contractor is to provide documented evidence that the concrete removed from the site was delivered to an approved landfill. The material is to be carried from the site in covered trucks licensed in the State of Illinois to handle Special Waste.

Additional bituminous material and silt fence, as directed by the Engineer, will be required on the site at other locations to be specified. The bidder will be reimbursed for additional quantities at the unit prices bid above.

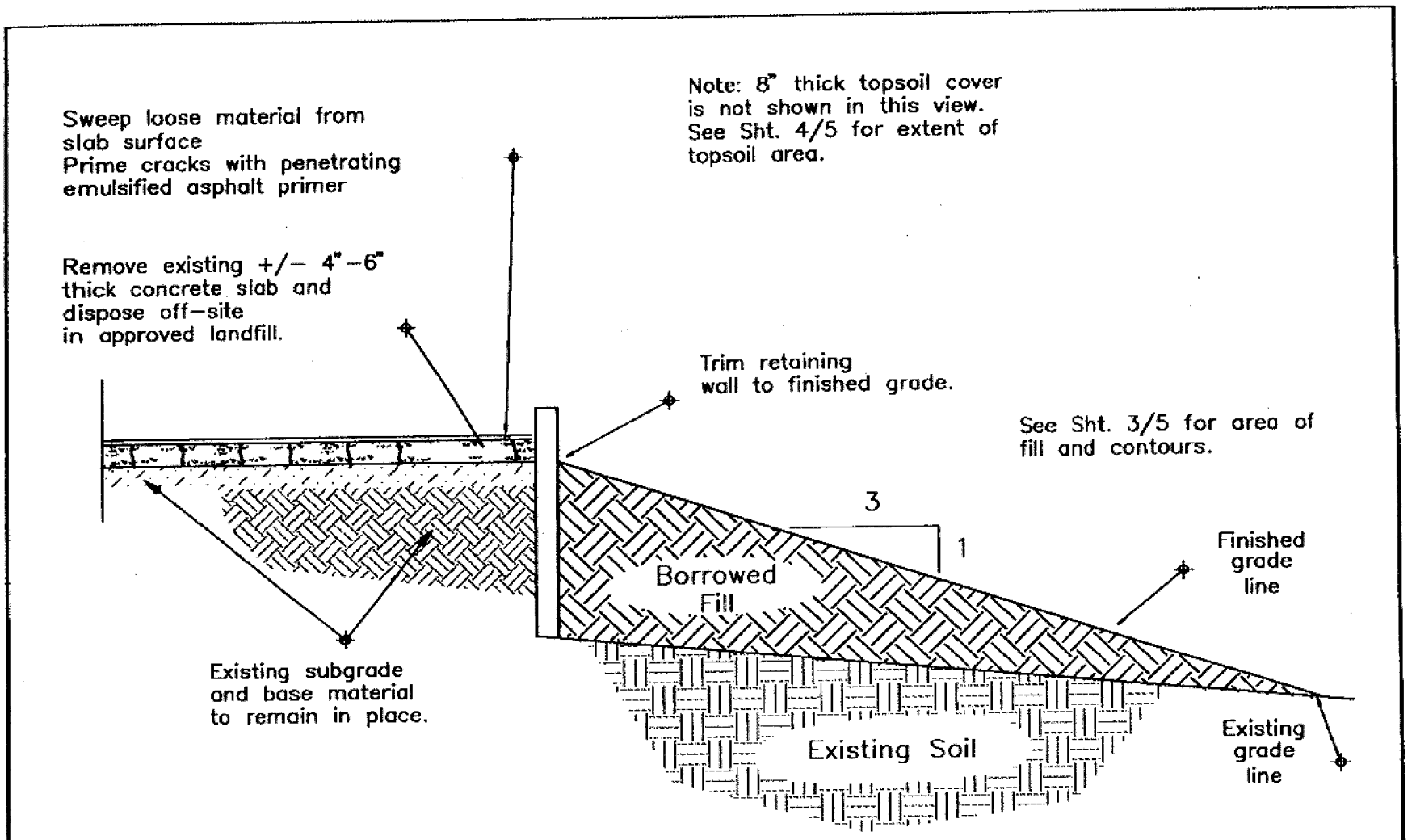
The successful bidder will be notified by the owner, Eagle Picher Industries, prior to September 6, 1994. This work must be completed no later than September 30, 1994. Payment requests are to be directed to Greg Stauder, Consulting Engineer, Galena, IL.



Rev. 5/23/94

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Mtt. IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/25/94	General Site Plan
		Sheet 1/5	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

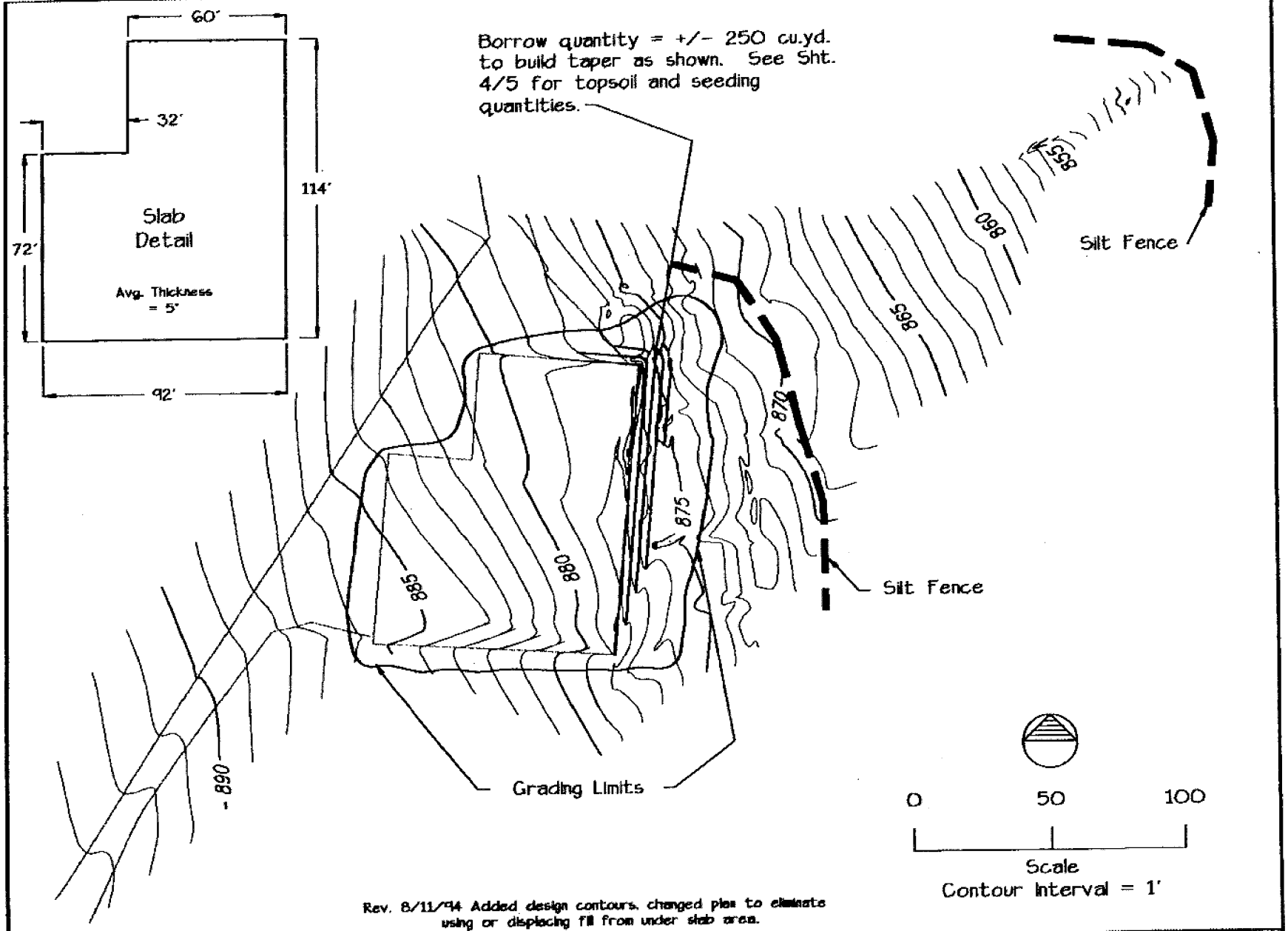
IL000035



Rev. 8/10/94 Add borrow fill. leave existing slab base in place.

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/25/94	Slab Detail. N.E. Corner
		Sheet 2/5	Eagle Picher Remedial Plan. Graham Mine. Galena. Illinois

IL000036



Rev. 8/11/94 Added design contours, changed plan to eliminate using or displacing fill from under slab area.

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/23/94	Grading Limits + Silt Fence Locations
		Sheet 3/5	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

IL000037

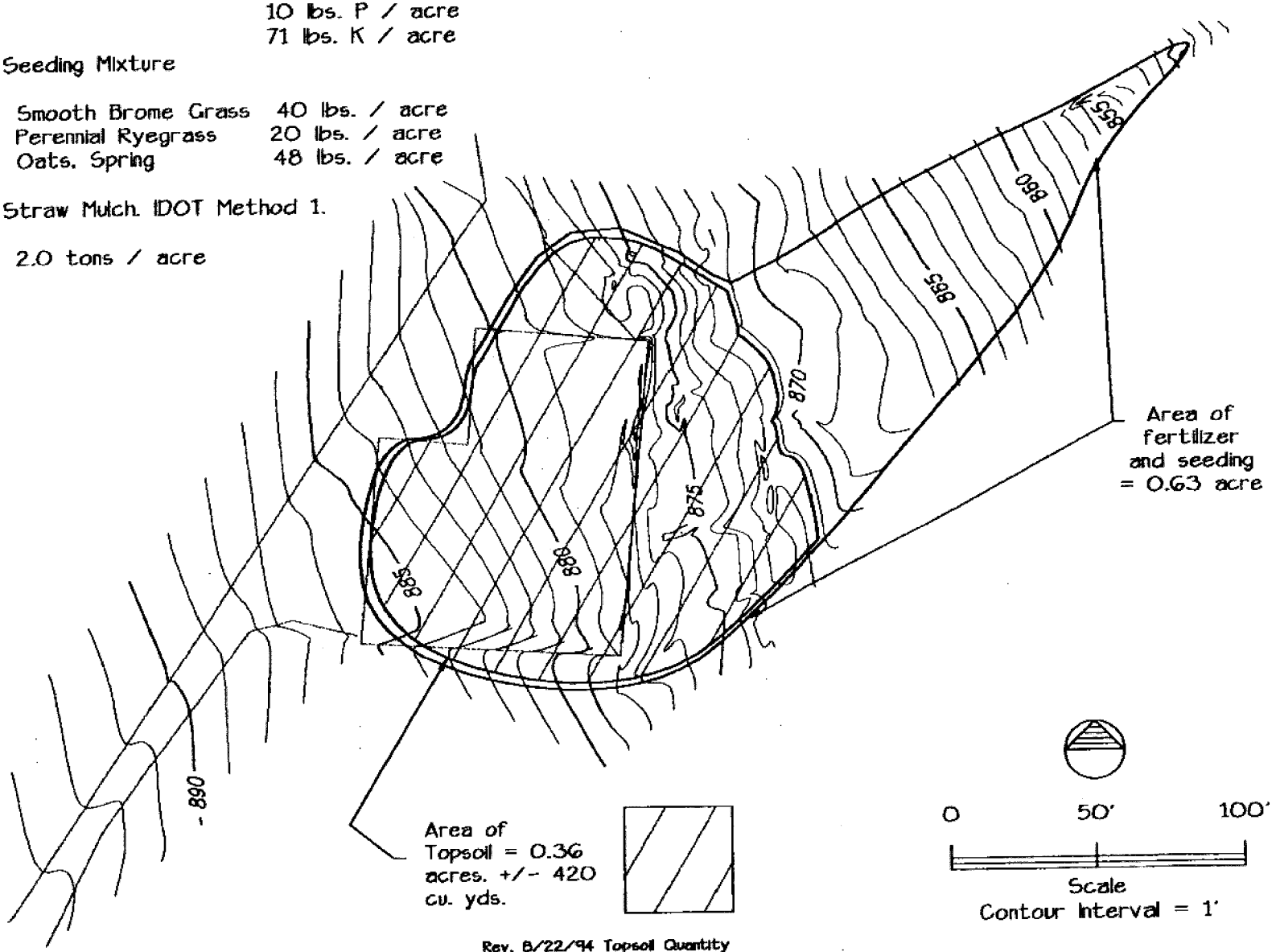
Fertilizer Nutrients = 113 lbs. N / acre
10 lbs. P / acre
71 lbs. K / acre

Seeding Mixture

Smooth Brome Grass	40 lbs. / acre
Perennial Ryegrass	20 lbs. / acre
Oats, Spring	48 lbs. / acre

Straw Mulch IDOT Method 1.

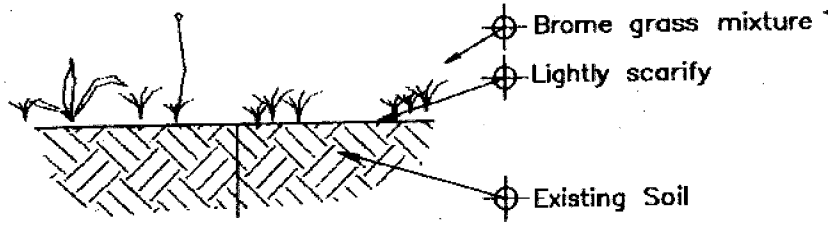
2.0 tons / acre



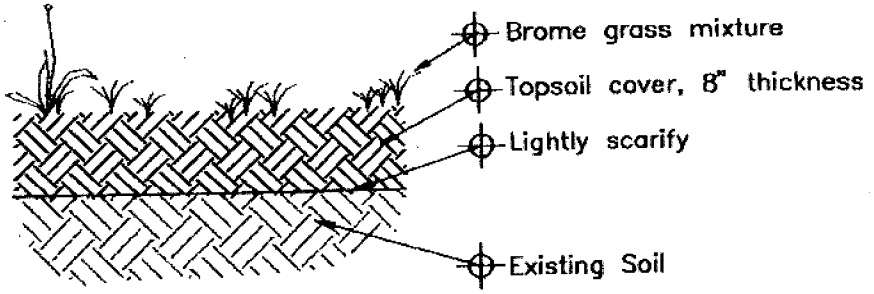
Rev. 8/22/94 Topsoil Quantity

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/23/94 Sheet 4/5	Landscaping Limits + Quantities Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

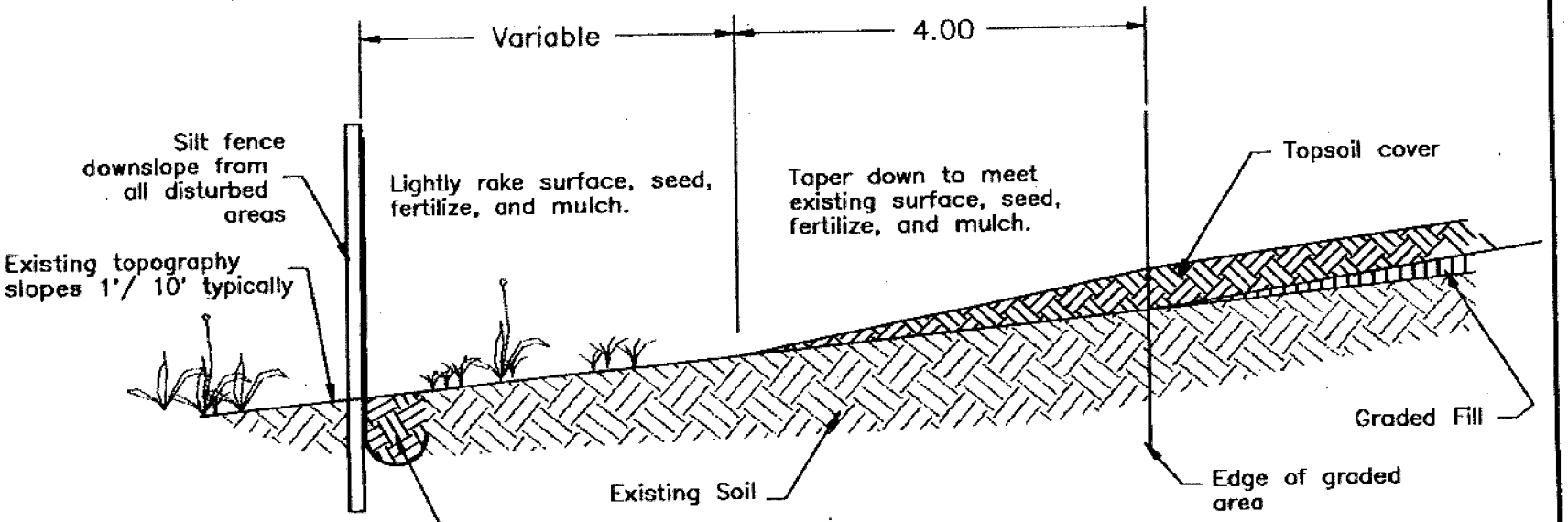
IL000038



Soil Treatment for Unvegetated Area



Soil Treatment for Graded Fill Area



Typical Edge Section

Rev. 8/10/94 Topsoil thickness to 8"

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/25/94	Silt Fence and Grading Details
		Sheet 5/5	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

IL000039

IL0000040

Eagle Picher Industries
Graham Mine Storage Slab Removal
Galena, Illinois

Pay Item	Quantity	Unit Price	Amount
Borrow	250 cu. yd.	12 /cu.yd.	5,040
Topsoil	420 cu. yd.	10 /cu.yd.	2,500
Slab, Remove	Lump Sum		22,000
Silt Fence	250 lin.ft.	4 /l.ft.	1,000
Fertilizer	0.63 ac.	400 /acre	252
Seeding	0.63 ac.	600 /acre	378
Straw Mulch	1.26 tons	450 /ton	567
Bituminous Sealer (Koch Matls. Dustbuster or equal)	1000 gal	2.30 /gal.	2,300

Ted Flack 9/2/94 /Total Bid $ 34,035.00

Note: Determination of the low bidder will be according to the Illinois Department of Transportation "Standard Specifications for Road & Bridge Construction", current edition.

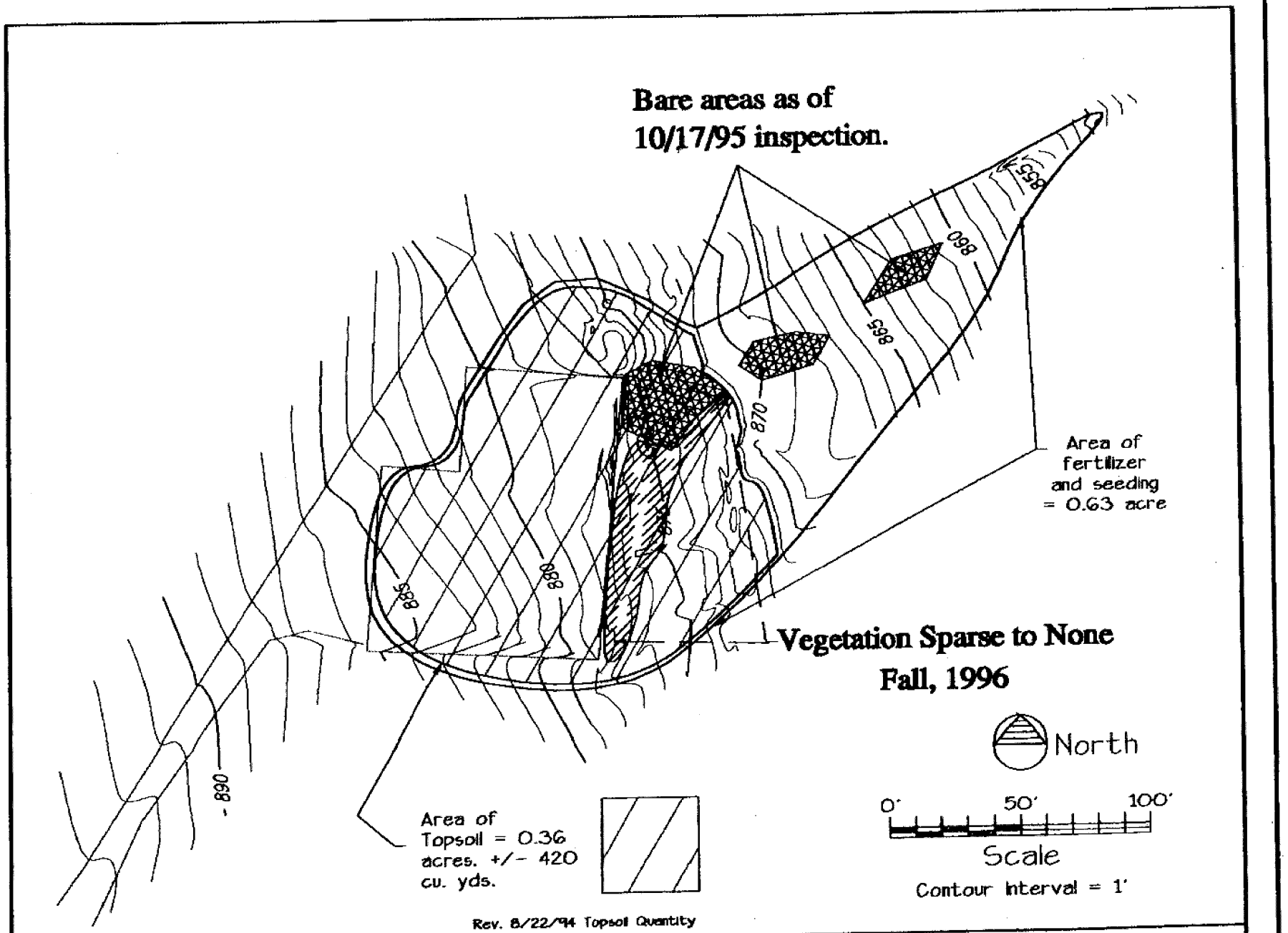
In general, the bid items above are to conform in material and construction methods to the equivalent pay items as described in the "Standard Specifications". The Contractor is specifically directed to the sections related to seeding and the performance requirements therein.

The borrow material must be clean fill approved by the owner's representative and free of large stones, vegetation, or other material that would prevent it from being graded properly.

The contractor is to provide documented evidence that the concrete removed from the site was delivered to an approved landfill. The material is to be carried from the site in covered trucks licensed in the State of Illinois to handle Special Waste.

Additional bituminous material and silt fence, as directed by the Engineer, will be required on the site at other locations to be specified. The bidder will be reimbursed for additional quantities at the unit prices bid above.

The successful bidder will be notified by the owner, Eagle Picher Industries, prior to September 6, 1994. This work must be completed no later than September 30, 1994. Payment requests are to be directed to Greg Stauder, Consulting Engineer, Galena, IL.



Rev. 8/22/94 Topsoil Quantity

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	12/30/96	Original Landscaping Limits + Current Conditions
		Sheet 1/1	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

IL000041

ILL00004 2

KIEFFER EXCAVATING
20100 Route 20 West
EAST DUBUQUE, ILLINOIS 61025
(815) 747-3044
(815) 747-7776

CUSTOMER'S ORDER NO.	PHONE	DATE
		11-8-94

NAME Cage Picker Industries
ADDRESS 580 Walnut Street
Cincinnati Ohio 45202

QTY.	DESCRIPTION	PRICE	AMOUNT
	Straw bales weighed approx 40 lbs apiece		
	needed 100 bales for coverage		
	total weight 4000 lbs - 2 tons		
	priced at $515.00 per ton		
	Amt for straw		$1030.00
		TAX	
RECEIVED BY		TOTAL	

9253 All claims and returned goods MUST be accompanied by this bill. **Thank You**

IL0000043

GREG STAUDER P.E.
Consulting Engineer

331 Franklin
Galena, IL 61036
815-777-1588

202 S. Main
Witt, IL 61036
1-800-254-5700

Date: November 8, 1994

To: Kieffer Excavating

From: Greg Stauder, P.E.

Subject: Return of Performance Guarantee

Attached to this memorandum is Bank Money Order #173289, dated September 14, 1994, given as performance guarantee during construction activities at the Graham Mine for Eagle Picher Industries. Receipt is acknowledged by the signature below.

Construction activities are complete in accordance with the contract documents. As of this date, the only remaining outstanding issue is final documentation substantiating the total amount of straw mulch used on the job. Once this is received, the balance of retainage held can be released. If you have questions regarding this, please contact me.

RECEIPT OF BANK MONEY ORDER # 173289 IN THE AMOUNT OF $6,500.00 IS HEREBY ACKNOWLEDGED:

Kieffer Excavating

By: Sharon Kieffer Date: 11-8-94

IL0000044

Eagle Picher Industries
Graham Mine Storage Slab Removal
Galena, Illinois

Pay Item	Quantity	Unit Price	Amount
Borrow	250 cu. yd.	12 /cu.yd.	5,040
Topsoil	420 cu. yd.	10 /cu.yd.	2,500
Slab, Remove	Lump Sum		22,000
Silt Fence	250 lin.ft.	4 /l.ft.	1,000
Fertilizer	0.63 ac.	400 /acre	252
Seeding	0.63 ac.	600 /acre	378
Straw Mulch	1.26 tons	450 /ton	567
Bituminous Sealer (Koch Matls. Dustbuster or equal)	1000 gal	2.30 /gal.	2,300

Ted Flack 9/2/94 /Total Bid $ 34,035.00

Note: Determination of the low bidder will be according to the Illinois Department of Transportation "Standard Specifications for Road & Bridge Construction", current edition.

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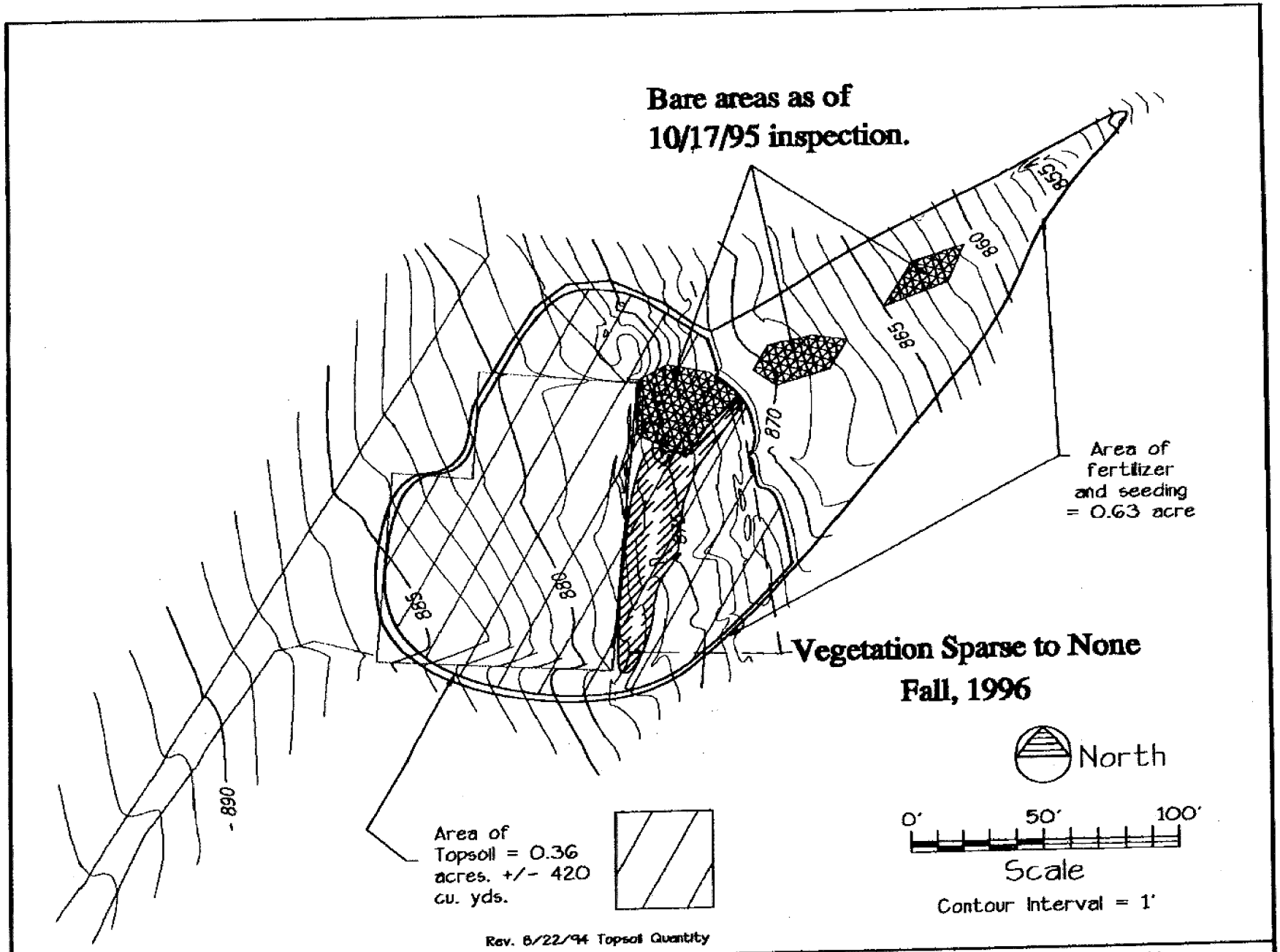
The successful bidder will be notified by the owner, Eagle Picher Industries, prior to September 6, 1994. This work must be completed no later than September 30, 1994. Payment requests are to be directed to Greg Stauder, Consulting Engineer, Galena, IL.



Rev. 8/22/94 Topsoil Quantity

Greg Stauder, P.E. Consulting Engineer	202 S. Main Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	12/30/96	Original Landscaping Limits + Current Conditions
		Sheet 1/1	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

IL000045

IL0000046

Kieffer Excavating

20100 Rt. 20 W.

East Dubuque, IL 61025

815-747-7776 or 815-747-3044

10-5-94

Work completed on the Graham mine storage slab removal in Galena,Illinois.

Pay Item		Quantity	Unit Price	Amount
Borrow	Delivered			
	9-19	160 cu.yd.		
	9-20	90 cu.yd.		
	Total	250 cu.yd.	$7.50-cu.yd.	$1,875.00
Topsoil				
	9-19	40 cu.yd.		
	9-20	80 Cu.yd.		
	9-21	30 cu.yd.		
	9-30	200 cu.yd.		
	10- 1	90 cu.yd.		
	Total	440 cu.yd.	$9.50-cu.yd.	$4,180.00
Slab Removal		Lump Sum		$3,345.00
Silt Fence		280 Lin.ft.	$3.40-1.ft.	$ 952.00
Fertilizer		0.63 ac.	$114.00-acre	$ 71.82
Seeding		0.63 ac.	$190.00-acre	$ 119.70
Straw Mulch		2.00 Tons	$515.00-ton	$1,030.00
Bituminous Sealer		1000 gal.	$1.39-gal.	$1,390.00
			TOTAL	$12,963.52

Thank You.

Jeffrey D. Kieffer

IL0000047

Kieffer Excavating

20100 Rt. 20 W.
East Dubuque, IL 61025
815-747-7776 or 815-747-3044

Eagle Picher Industries
580 Walnut Street
Cincinnati, Ohio 45202

Project:

Graham Mine, Galena Illinois

Date: October 5, 1994

Pay Request No. 1

Pay Item Units	Contract Quantities	Supplied Quantities	Unit Price	Amount
Borrow , cu.yd.	250	250	$ 7.50	$1875.00
Topsoil, cu.yd.	420	440	9.50	4180.00
Slab, Remove, L.S.	1	1	3345.00	3345.00
Silt Fence, lin.ft.	250	180	3.40	612.00
Fertilizer, acre	0.63	0.63	114.00	114.00
Seeding, acre	0.63	0.63	190.00	190.00
Straw Mulch, ton	1.20	2.00	515.00	1030.00
Bit. Sealer, gal.	1000	200	1.39	278.00

Total Completed to Date	$11624.00
Less Previous Payments	0.00
Less Retainage 5%	581.20
Payment this Estimate	11042.80
Balance to become Due	581.20
	$11624.00

==========

Approved for Materials & Quantities

Date: 10/12/94

Construction Inspector

IL0000048

Kieffer Excavating

20100 Rt. 20 W.
East Dubuque, IL 61025
815-747-7776 or 815-747-3044

Inspiration Development
Illinois-Wisconsin Operations
P.O. Box 253
Galena, Illinois 61036

Date: October 5, 1994

Pay Request No. 1 & Final

Pay Item Units	Contract Quantities	Supplied Quantities	Unit Price	Amount
Silt Fence, lin.ft.	280	100	3.40	340.00
Bit. Sealer, gal.	1000	772	1.39	1073.08

Total Completed to Date	1413.08
Less Previous Payments	0.00
Payment Request this Estimate	$1413.08

==========

Approved for Materials & Quantity

Construction Inspector Date: 10/12/94

IL0000049

Eagle Picher Industries
Graham Mine Storage Slab Removal
Galena, Illinois

Pay Item	Quantity	Unit Price	Amount
Borrow	250 cu. yd.	$7.50 /cu.yd.	$1,875.00
Topsoil	420 cu. yd.	$9.50 /cu.yd.	$3,990.00
Slab, Remove	Lump Sum		$3,345.00
Silt Fence	250 lin.ft.	$3.40 /l.ft.	$ 850.00
Fertilizer	0.63 ac.	$114.00/acre	$ 71.82
Seeding	0.63 ac.	$190.00/acre	$ 119.70
Straw Mulch	1.26 tons	$515.00/ton	$ 650.00
Bituminous Sealer (Koch Matls. Dustbuster or equal)	1000 gal	$1.39 /gal.	$1,390.00

Signed Jeffrey D Kiff Total Bid $ 12,291.52

Note: Determination of the low bidder will be according to the Illinois Department of Transportation "Standard Specifications for Road & Bridge Construction", current edition.

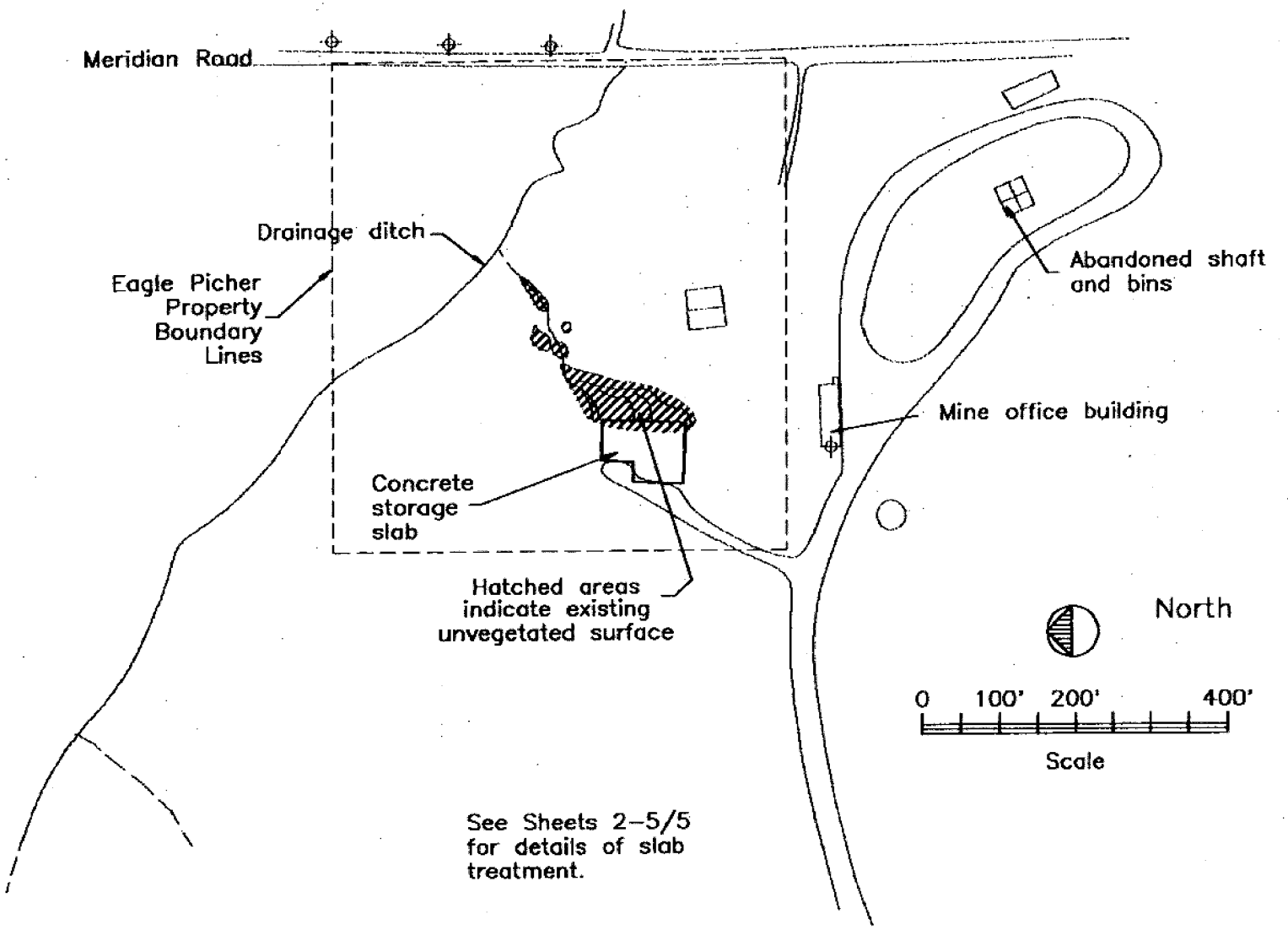
In general, the bid items above are to conform in material and construction methods to the equivalent pay items as described in the "Standard Specifications". The Contractor is specifically directed to the sections related to seeding and the performance requirements therein.

The borrow material must be clean fill approved by the owner's representative and free of large stones, vegetation, or other material that would prevent it from being graded properly.

The contractor is to provide documented evidence that the concrete removed from the site was delivered to an approved landfill. The material is to be carried from the site in covered trucks licensed in the State of Illinois to handle Special Waste.

Additional bituminous material and silt fence, as directed by the Engineer, will be required on the site at other locations to be specified. The bidder will be reimbursed for additional quantities at the unit prices bid above.

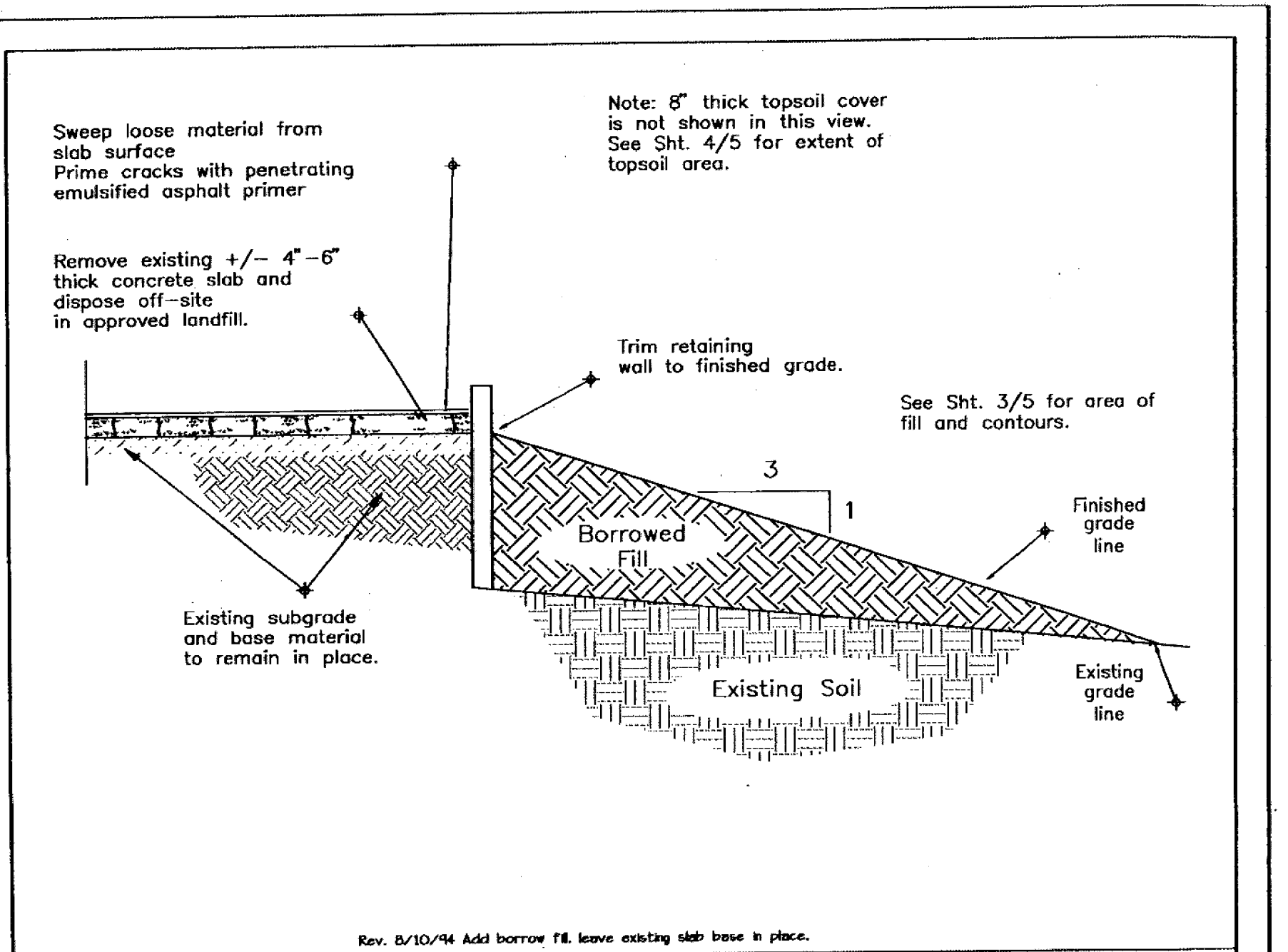
The successful bidder will be notified by the owner, Eagle Picher Industries, prior to September 6, 1994. This work must be completed no later than September 30, 1994. Payment requests are to be directed to Greg Stauder, Consulting Engineer, Galena, IL.



Rev. 5/23/94

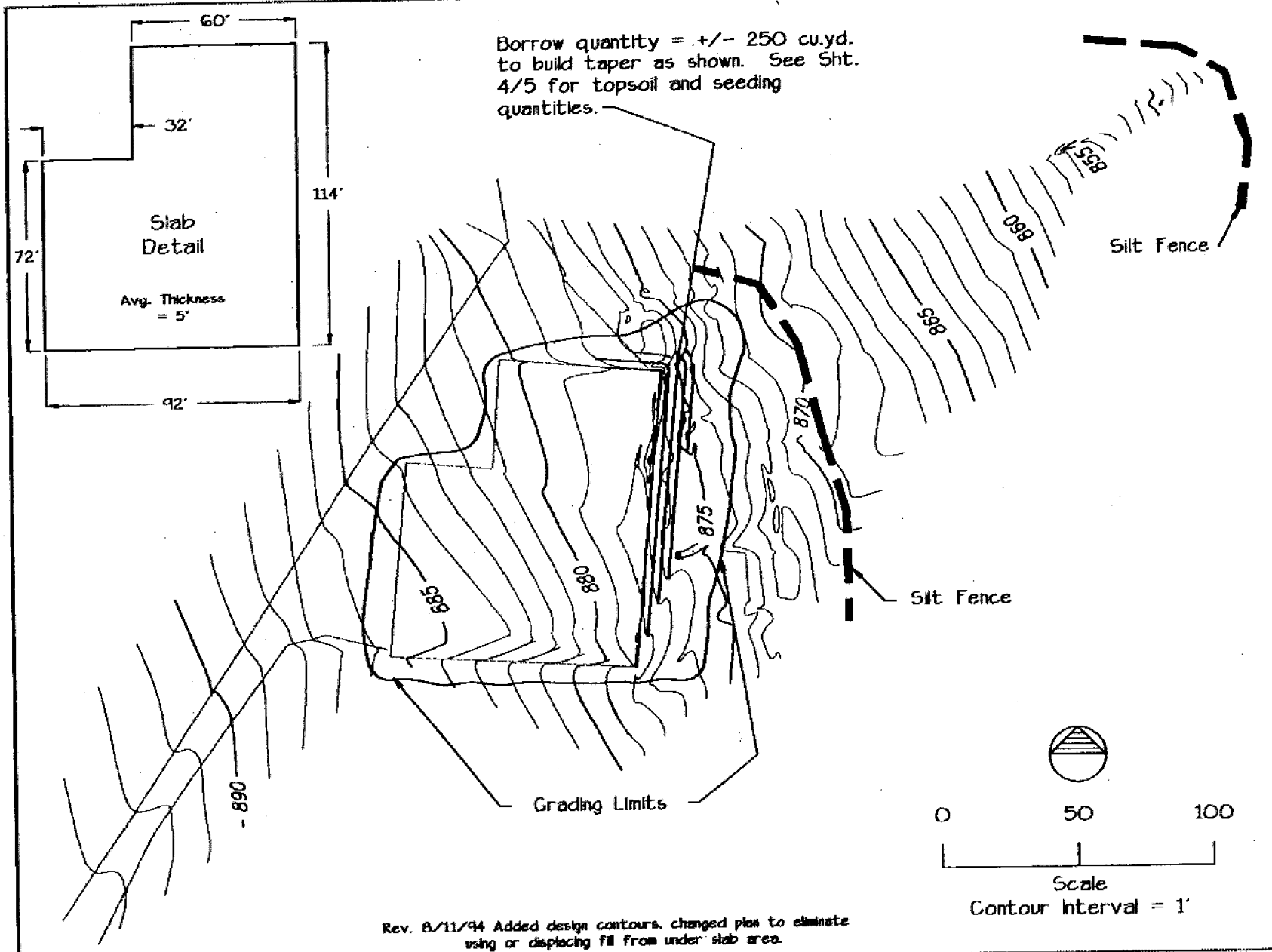
Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/25/94	General Site Plan
		Sheet 1/5	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

ILO00050



Rev. 8/10/94 Add borrow fill. leave existing slab base in place.

Greg Stauder. P.E. Consulting Engineer	202 S. Main. Witt. IL 62094 1-800-254-5700 331 Franklin. Galena. IL 61036 815-777-1568	4/25/94	Slab Detail. N.E. Corner
		Sheet 2/5	Eagle Picher Remedial Plan. Graham Mine. Galena. Illinois



Rev. 8/11/94 Added design contours, changed plan to eliminate using or displacing fill from under slab area.

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/23/94	Grading Limits + Silt Fence Locations
		Sheet 3/5	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

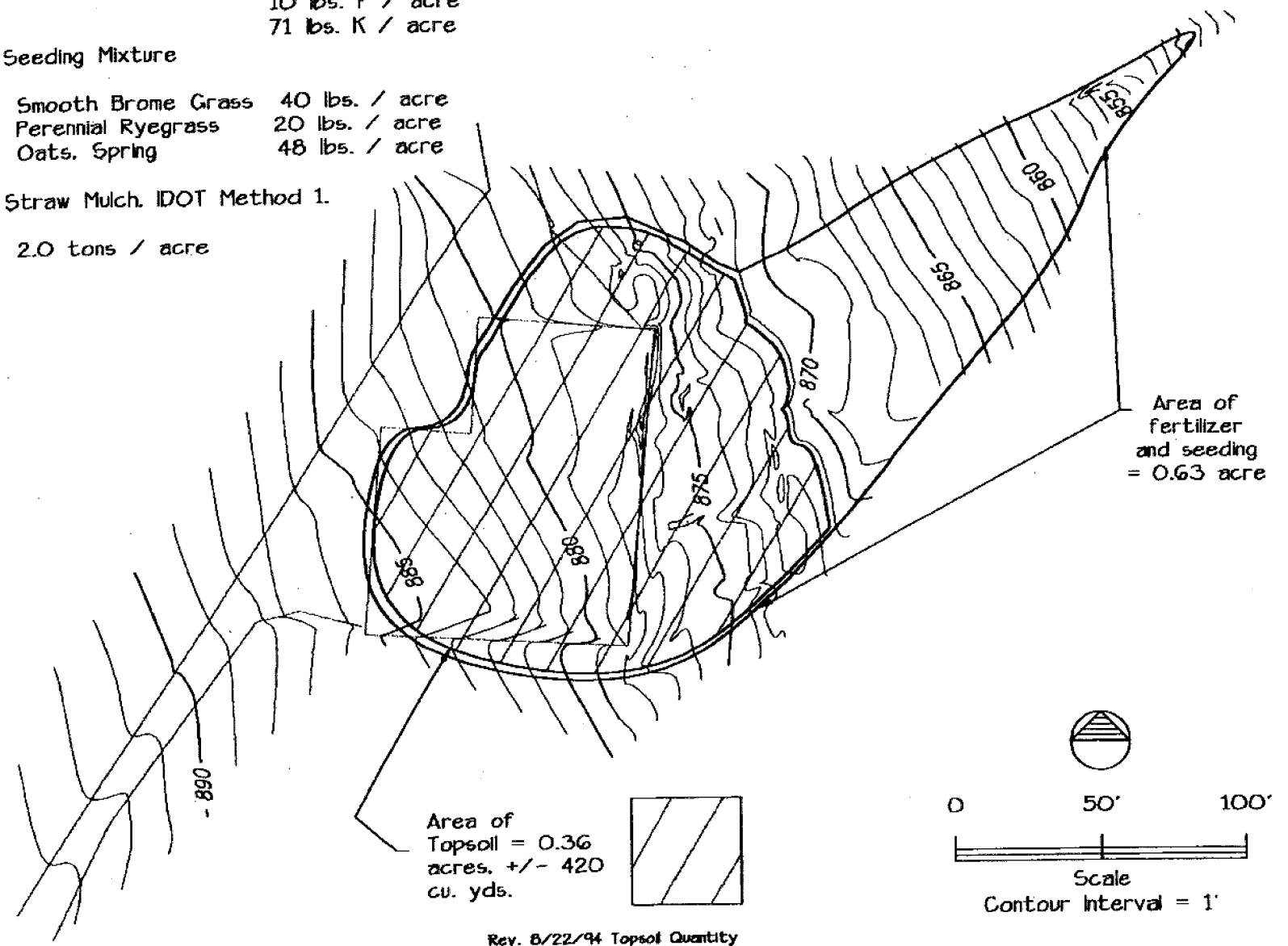
Fertilizer Nutrients = 113 lbs. N / acre
10 lbs. P / acre
71 lbs. K / acre

Seeding Mixture

Smooth Brome Grass	40 lbs. / acre
Perennial Ryegrass	20 lbs. / acre
Oats, Spring	48 lbs. / acre

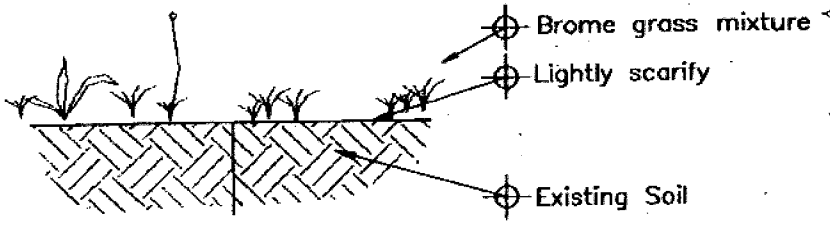
Straw Mulch IDOT Method 1.

2.0 tons / acre

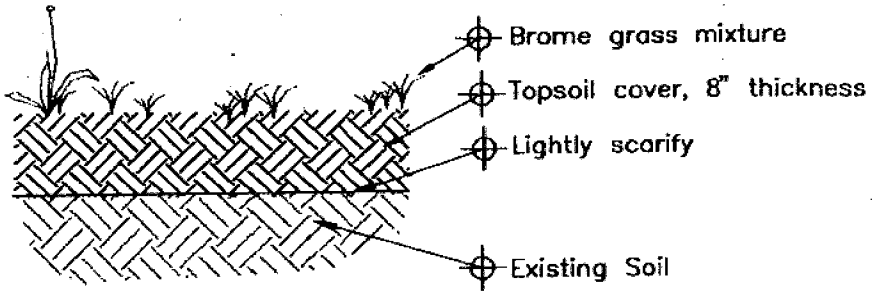


Rev. 8/22/94 Topsoil Quantity

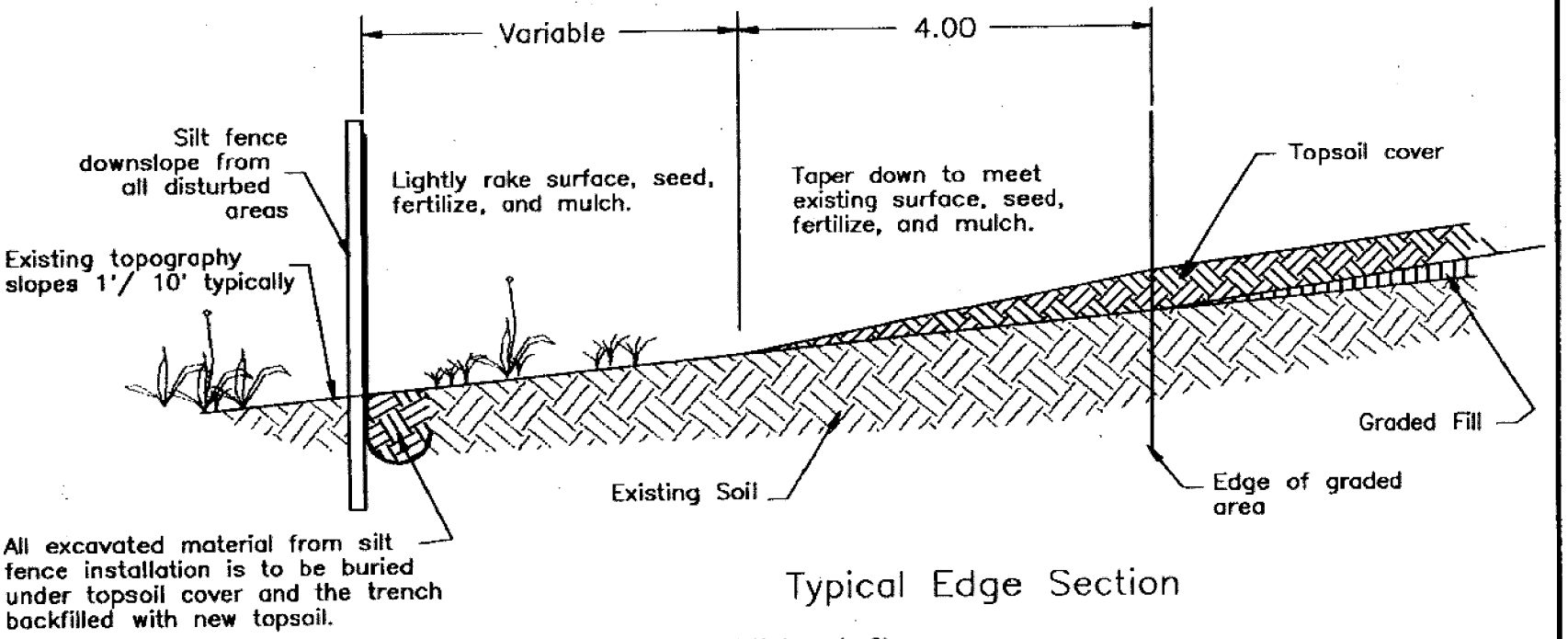
Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/23/94	Landscaping Limits + Quantities
		Sheet 4/5	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois



Soil Treatment for Unvegetated Area



Soil Treatment for Graded Fill Area



Typical Edge Section

Rev. 8/10/94 Topsoil thickness to 8"

Greg Stauder, P.E. Consulting Engineer	202 S. Main, Witt, IL 62094 1-800-254-5700 331 Franklin, Galena, IL 61036 815-777-1588	4/25/94	Silt Fence and Grading Details
		Sheet 5/5	Eagle Picher Remedial Plan, Graham Mine, Galena, Illinois

IL0000055

AGREEMENT

THIS AGREEMENT is made between EAGLE-PICHER INDUSTRIES, INC. ("EPI"), an Ohio corporation, having its principle place of business at 580 Walnut Street, Cincinnati, Ohio 45202 and KIEFFER EXCAVATING COMPANY ("Kieffer"), an Illinois company, having its principle place of business at 20100 Route 20 West, East Dubuque, Illinois 61025. This Agreement shall be effective when signed by both parties.

RECITALS

A. EPI owns a nine acre parcel of land in Galena, Illinois known as the "Graham Mine Site" (the "Site").

B. EPI has received approval from the Illinois Environmental Protection Agency to implement a Remediation Plan dated August 4, 1994 for the Site.

C. EPI opened the Remediation Plan to competitive biding and it was determined that Kieffer is the low bidder.

NOW, THEREFORE, in consideration of the mutual promises contained herein, the parties agree as follows:

1. Kieffer shall perform the remediation consistent with the August 4, 1994 Remediation Plan and with its bid which are both attached hereto as Exhibits A & B and which are hereby incorporated into this Agreement. The remediation shall be completed by Kieffer by September 30, 1994 for the sum of Twelve Thousand Two Hundred Ninety One Dollars and 52/100 ($12,291.52).

2. Prior to the start of the remediation, Kieffer will submit to Mr. Greg Stauder, P.E. ("Stauder"), EPI's consulting engineer, a cashier check in the amount of Six Thousand Five Hundred Dollars payable to EPI to secure Kieffer's performance under this Agreement. The cashier's check shall be held by Stauder until Stauder determines that the remediation has been successfully concluded. After Stauder's determination that the remediation has been successfully concluded, the cashier's check will be released to Kieffer. Stauder's determination of successful completion shall not be unreasonably withheld.

3. All payment requests by Kieffer are to be directed to Michael B. Dixon, EPI, for approval and copied to Stauder.

4. Kieffer is an independent contractor and is not an employee or agent of EPI.

5. Kieffer agrees to defend, indemnify, and hold EPI harmless from any cost, claim or liability, including, but not limited

IL0000056

to, damage claim or award, attorney fee, lien, fine or penalty that may arise from Kieffer's performance under this Agreement.

6. This Agreement contains the entire understanding of the parties and cannot be modified except by written agreement signed by both parties. The interpretation and enforcement of this Agreement shall in accordance with the laws of the State of Ohio.

KIEFFER EXCAVATING COMPANY	EAGLE-PICHER INDUSTRIES, INC.
By Jay D Kiffer	By
Its Manager	Its
Date 4-15-94	Date

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006-994-568-05	DAISY PARTS INC	****Personal Parcel**

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Wicker Pl
Development Dr
Hine Dr
Arch Ave
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1209 ft

MI0000976

Selected Features
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Lakes
Streams and Ditches
Roads
US Hwy
State Hwy
County Hwy
Roads
Private
Parcels

MI0000977

DAMES & MOORE

A DAMES & MOORE GROUP COMPANY

REVISED VOLUNTARY REMEDIAL ACTION PLAN HILLSDALE TOOL DIVISION RUBBER PRODUCTS AND DAISY II PLANTS HILLSDALE, MICHIGAN PREPARED FOR EAGLE-PICHER AUTOMOTIVE HILLSDALE TOOL DIVISION

DAMES & MOORE PROJECT NO. 14570-025-045
June 19, 1998

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MI0000982

EXECUTIVE SUMMARY

On behalf of Eagle-Picher Automotive Hillsdale Tool (HT), Dames & Moore is pleased to submit a work plan for additional Remedial Investigation (RI) activities and Remedial Action Plan (RAP) for the Rubber Products and Daisy II Plants in Hillsdale, Michigan.

The objective of the additional RI activities is to further define the extent of TCE impacted groundwater to the north and northeast of the plant and impacted soil to the east and west of the Rubber Products Plant. The additional investigation activities include the installation and sampling of two monitoring wells, advancement and sampling of two soil borings and preparation of a report summarizing the findings of the investigation.

In order to address the remaining soil impact beneath the Rubber Products building, the RAP includes a description of relevant exposure pathways, an evaluation of the indoor air inhalation pathway, an evaluation of the operation of the soil vapor extraction (SVE) system, and a description of the Restrictive Covenant proposed for the remaining impacted soil.

The RAP describes a method to extract the TCE impacted groundwater and bring HT to closure in approximately seven years. The plan consists of installing one horizontal well and three vertical wells to extract groundwater (Figure ES-1) and piping to discharge the extracted water to the sanitary sewer for treatment by the City of Hillsdale POTW. Remedial action and monitoring plans, as well as an Operations and Maintenance plan have also been included.

1.0 INTRODUCTION

On behalf of Eagle-Picher Automotive - Hillsdale Tool (HT), Dames & Moore is pleased to submit a workplan for additional Remedial Investigation (RI) activities and a Remedial Action Plan (RAP) for the Rubber Products and Daisy II Plants in Hillsdale, Michigan.

Included in this submission are the plans for completing the following:

- delineation of TCE groundwater plume;
- delineation of the TCE impact to soil in the vicinity of the Rubber Products Plant;
- evaluation of the indoor air inhalation pathway;
- preparation of a Restrictive Covenant to address remaining impacted soil beneath the Rubber Products building;
- implementation of an appropriate remedial action to extract TCE impacted groundwater;
- monitoring during remedial action to optimize operations;
- activities related to the routine operation and maintenance of the system; and monitoring to ensure the remedial effort has been effective.

MI0000984

2.0 SITE BACKGROUND

2.1 Site Location

The Site is located in the southeast quarter of the northeast quarter of Section 21, Township 6 South, Range 3 West in Hillsdale, Michigan. The Site is located in the Hillsdale Industrial Park in the northwest portion of the City of Hillsdale (Figure 1). The Site consists of the Rubber Products Plant at 215 Industrial Drive and the adjacent Daisy II Plant at 221 Industrial Drive which fronts on Uran Street (Figure 2).

2.2 Release History

In 1985, a release of trichloroethylene (TCE) occurred at the Rubber Products Plant. TCE, utilized in a degreasing bath at the Rubber Products Plant, was allowed to drain through an overflow pipe into an uncovered 55 gallon drum located in an unpaved parking lot on the north side of the Rubber Products Plant. The drum, which did not have a secondary form of containment, was allowed to overflow. As a result, the release impacted surrounding soil. The exact quantity of TCE loss is unknown.

Additional potential sources of the TCE observed at the Site may have been two former underground storage tanks (USTs) located at the south side of the Daisy II Plant. Initial information indicated that the Daisy II Plant did not utilize TCE; however, it was subsequently identified as having been in use and potentially discharged to the on-site waste oil USTs. These USTs were taken out of service and properly removed in 1995. One soil sample from borings installed as part of this removal action exceeded the TCE screening value of 100 parts per billion (ppb) which is a concentration defined as protective of groundwater. (This screening value is defined in MDEQ Operational Memorandum #14, Revision 2, as 20 times the drinking water maximum contaminant level (MCL) of 5 ppb.).

2.3 Summary of Previous Investigations and Remedial Actions

In response to the 1985 release, a number of investigations have been conducted and a soil vapor extraction (SVE) system installed to remediate soil near the release area. A brief summary of the investigative history of the site is presented in the following paragraphs.

- Keck Consulting Services, Inc. (Keck) conducted two investigations in 1985. These investigations included the advancement of several soil borings in the area of the former release and the installation of three monitoring wells. The three wells were open-hole completions from 50 feet below ground surface (bgs) to approximately 80 feet bgs.

- Midwest Water Resources Management designed the SVE system, which was subsequently installed by ETG Environmental, Inc. (ETG) in June 1986. ETG reported that by August 1993, 99% of the TCE had been recovered from the soil. Between 1986 and 1993, TCE concentrations in the groundwater also decreased by 75% in MW-3 to 99% in MW-1. These percent reductions are based on original TCE concentrations (1985-86) versus subsequent TCE concentrations from sampling conducted in 1993.

- Subsequent investigations conducted by ETG included packer testing of the original wells, the recompletion of the original wells as nested well sets (one shallow well completed above the shale and one deep well completed below the shale), and installation of new nested well sets (per MDNR, now MDEQ, request). According to ETG, the packer testing indicated that fracturing existed in the intervening shale layer between the upper (shallow) and lower (deep) sandstone units. This shale layer, ranging in thickness from approximately 10 to 20 feet, is encountered at a depth of approximately 60 feet in all of the wells. ETG interpreted the packer testing results as an indication that the shale was not acting as an aquitard and therefore, groundwater in the deep zone was not confined. Dames & Moore does not concur with ETGs interpretation of the packer tests. Although the original data is not available for review, the mounding effect which was present in several deep wells due to poor well construction methods indicate that the shale is, a confining unit.

Installation of the nested wells occurred as follows:

- Re-completion of original wells MW-1 through MW-3 was conducted in December, 1994 and January, 1995.

- Re-completion of MW-4 was conducted in May, 1995.

- Installation of MW-5 and MW-6 was conducted in December, 1994 when the three original wells were re-completed.

- Installation of MW-7 and MW-8 was conducted in May, 1995.

- Installation of MW-9, MW-10 and MW-11 was completed in October, 1995.

ETG re-completed the three original wells as deep wells and drilled off-set shallow wells. They over-drilled the existing hole and installed surface casing to a depth of 45 to 50 feet, which is above the shale. The remainder of the borehole beneath the surface casing to the bentonite seal was sealed with a neat cement/bentonite grout around the two-inch diameter stainless steel pipe.

In 1996, Dames & Moore performed an additional RI. The findings of this investigation were reported on March 14, 1997, and are summarized as follows:

- A total of 11 soil probes were installed inside and outside of the Rubber Products Plant to delineate the extent of soil impact. Review of the analytical results indicates that TCE is still present in the subsurface above the action level for soil of 100 ppb. The area of remaining impact is located beneath the Rubber Products Plant (Figure 3).

- One four-inch diameter extraction well was installed near the northeast property boundary and labeled EW-1. Two pumping tests and recharge tests were conducted in the extraction well. Data from these tests, as well as several slug tests, were inconclusive in accurately estimating hydraulic conductivities. The known physical data was used to ascertain a reasonable estimate of the hydraulic conductivity. Hydraulic conductivity of the unit is estimated to be 7.5 ft/day.

- An off-site monitoring well, MW-12, was installed in the shallow water bearing zone approximately 73 feet north of Uran Street. The well was developed and sampled in December 1996 and January 1997. The analytical results indicated TCE concentrations of 200 ppb and 180 ppb, respectively. Results indicate that MW-12 is located within the plume.

- An off-site monitoring well, MW-13, was installed in the shallow water bearing zone approximately 375 feet north of Uran Street. The well was developed and sampled in January 1997. The analytical results indicated TCE was detected at a concentration of 18 ppb. Results indicate that MW-13 is located near the leading edge of the plume (Figure 4).

- Groundwater sampling was conducted for monitoring wells MW-1D, MW-2D, MW-3D, MW-7D, and MW-8D completed in the deep zone. Analytical results for MW-2D, MW-7D, and MW-8D were below 5 ppb for the second consecutive sampling event. Analytical results for MW-1D and MW-3D were 18.3 and 8.2 ppb respectively, which is less than the previous sampling event results. This appears to confirm the diminishing impact in the deep zone.

- The soil vapor extraction (SVE) system was shut-off in October 1996. A Restrictive Covenant on the area of remaining impacted soil shall be developed and presented to MDEQ three months after MDEQ approval of this RAP.

2.4 Geologic and Hydrogeologic Setting

2.4.1 Regional Geologic and Hydrogeologic Setting

The lithologic unit underlying the Site is the Marshall Formation. This unit consists of alternating units of sandstone and shale and is utilized as a drinking water source for areas up gradient (west and southwest) of the site which are not served by municipal water supplies. Municipal well fields for the City of Hillsdale are completed in the Valley Fill Aquifer located along the St. Joseph River.

2.4.2 Site Specific Geologic and Hydrogeologic Setting

The Site is underlain by unconsolidated glacial till soil consisting of clays, silts, sands, and gravels. Bedrock (Marshal Formation) is encountered at depths ranging from 25 to 40 feet bgs. The first bedrock unit encountered is either a thin shale layer, typically less than 10 feet, and/or the near surface sandstone, which will be referred to as the shallow groundwater zone. Beneath this sandstone is a consistent shale layer ranging in thickness from 10 to 20 feet thick. The shale was encountered at a depth of approximately 60 to 70 feet bgs in every deep well. The shale overlies another sandstone to shaley sandstone unit encountered at approximately 70 to 90 feet bgs, and which will be referred to as the deep groundwater zone. This unit appears to average approximately 10 feet in thickness. Another shale was encountered beneath this unit in four of the deep wells installed.

Cross-sections of the geology previously developed for illustration and interpretation purposes are included in this report. Figure 5 is a site map showing the surface traces of the geologic cross-sections and monitoring well locations. Figures 6, 7, and 8 illustrate cross-sectional views of the geology across the site. Measured groundwater levels are also illustrated on the cross sections. Based upon the static water levels measured in the deep wells it appears the shale present between the two sandstone layers is confining the groundwater in the deep zone.

Groundwater flow direction in the shallow zone is to the northeast (Figure 9). Groundwater elevation measurements were only collected for the most recently constructed monitoring wells and the existing wells in which hydraulic testing was performed. Therefore, only the groundwater contours for the portion of the site where the water elevation measurements were collected are presented. Future reports shall contain potentiometric surface maps inclusive of all shallow wells. The range of hydraulic conductivities for the site based upon slug testing, pumping tests, and literature, is estimated between 7.5 feet/day to 16 feet/day.

MI0000989

3.0 ADDITIONAL REMEDIAL INVESTIGATION

The additional RI is being conducted to complete delineation of the TCE impact to soil at the Rubber Products Plant to delineate the northern and northeastern extent of the TCE plume in groundwater. Greater delineation of the TCE plume boundaries will ensure that the proposed remedial action will be effective. Delineation of the TCE impact to soil will allow for development of a Restrictive Covenant to manage the remaining impacted soil. The additional RI activities will be conducted prior to installation of any remedial system.

In effort to minimize mobilizations to the Site, the monitoring wells will be installed and sampled prior to advancement of the soil borings. This will allow the laboratory time to provide the groundwater sample results prior to demobilizing from the Site. If additional monitoring wells will be required to complete the delineation of the groundwater plume, it will completed during the same field event.

3.1 Installation of Additional Groundwater Monitoring Wells

Two groundwater monitoring wells shall be installed to complete the assessment of the extent of TCE impact in the shallow groundwater zone. The monitoring well locations will be dependent upon obtaining property access from the off-site landowners; however, generalized locations are depicted on Figure 10.

The proposed off-site wells shall be designated MW-14 and MW-15. Total depth of each proposed well is anticipated to be approximately 65 feet with the screen set at the base of the shallow sandstone unit. The wells shall be installed using two-inch diameter stainless steel riser pipe and five-foot long, 0.010-inch machine slotted well screen. The wells shall be logged in accordance with the Unified Soil Classification System (USCS).

All drilling tools, riser pipe, and screen will be decontaminated prior to drilling and installation. Decontamination will consist of a high-pressure hot water wash.

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3.2 . Groundwater Elevation Survey

After installation and development of the proposed monitoring wells, all shallow monitoring wells shall be gauged. A potentiometric surface map shall be prepared and included in the summary report.

3.3 Groundwater Sampling

After installation and development, using hand bailing techniques, the monitoring wells will be purged in accordance with RCRA Ground-Water Monitoring TEGD guidelines. These guidelines state that purging will be conducted by removing a minimum of three well volumes of fluid. Adequate purging will be assessed by monitoring consecutive temperature, specific conductance, and pH measurements. Purging is deemed complete when these parameters have stabilized within 10% over a minimum of two successive well volumes. These parameters will be measured with a portable field meter, which will be calibrated with commercial buffer solutions. Purge water shall be containerized in 55-gallon drums for proper future disposal. The wells will be purged with a weighted disposable dedicated bailer.

Groundwater samples will be collected in accordance with RCRA Ground-Water Monitoring TEGD guidelines using a dedicated, disposable, polyethylene bailer. The bailer will be attached to a new poly-rope and lowered slowly into the well to minimize agitation of the standing water. Samples will be transferred from the bailer to the sample containers in a manner as to minimize agitation and aeration. Personnel conducting the groundwater sampling will wear clean disposable protective gloves. Clean plastic sheeting will be placed around the well during sampling in case of spillage and to prevent the bailer and rope from touching the ground or other potentially impacted surfaces.

The groundwater samples will be analyzed for TCE by EPA Method 8260. The sample will be placed in clean laboratory supplied 40-milliliter glass volatile organic analyses (VOA) vials with teflon septa. The vials will be placed in sealed plastic bags and placed on ice in coolers. Samples will be re-iced and securely packed to protect against damage during shipping. These shipping coolers shall be sealed with custody seals and shipped via an overnight delivery service to the analytical laboratory under proper Chain-of-Custody (COC). A trip blank, prepared by the analytical laboratory, will accompany the samples in the shipment to assess cross contamination

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during transport. Expedited turn-around will be requested (48 hours) to ensure receipt of the results prior to completion of all phases of field work. If the results of these samples indicate that the plume has not been fully delineated to State target levels, additional monitoring wells may be installed.

3.4 Soil Boring Advancement and Subsurface Soil Sampling

Two additional borings will be advanced to laterally delineate the soil impact beneath the Rubber Products Plant. One boring each will be installed on the east and west sides of the Rubber Products Plant in accordance with MDEQs request (Figure 11). The soil borings will be advanced to a depth at which bedrock is encountered (estimated at 20 to 30 feet bgs).

Soil samples will be collected using a continuous core sampler advanced in front of the lead auger. Soil samples will be field screened using a photo-ionization detector (PID). The sample exhibiting the highest PID reading will be submitted to an off-site laboratory for analyses. If no samples indicate an impact, the sample from the bottom of the hole will be submitted for analysis. The methanol preservation method (USEPA SW-846 Method 5035/MDEQ Method 8260 Soil VOA) will be used for all soil sampling activities. Soil samples will be analyzed for volatile organic compounds by USEPA Method 8260. The samples will be shipped via an overnight delivery service to the analytical laboratory under proper Chain-of-Custody (COC).

All drilling tools and sampling equipment will be decontaminated prior to drilling each hole and collection of each sample. Decontamination will consist of a high pressure hot water wash for the drilling equipment and a detergent wash and tap water rinse for the sampling equipment.

3.5 Summary Report

A report summarizing the installation, sampling, and analytical results of the additional RI activities shall be prepared and submitted to MDEQ. The report will include a description of investigative activities, boring logs, potentiometric surface maps, analytical results, and a map depicting the extent of the TCE in groundwater.

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4.0 REMAINING IMPACTED SOIL

Impacted soil remains in the area of the Rubber Products building associated with the original release. As described in Section 2.0, a release of TCE occurred at the Rubber Products plant in 1985. A number of investigations were conducted, and a soil vapor extraction system was installed to remediate soil near the release area. The results of the previous and current investigations are discussed in detail in Section 2.3. Additional information regarding the SVE system is provided below.

4.1 Soil Vapor Extraction System

Midwest Water Resources Management designed the SVE system, which was subsequently installed by ETG Environmental, Inc. (ETG) in June 1986. ETG reported that by August 1993, 99% of the TCE had been recovered from the soil. Between 1986 and 1993, TCE concentrations in the groundwater also decreased by 75% in MW-3 to 99% in MW-1. These percent reductions are based on original TCE concentrations (1985-86) versus subsequent TCE concentrations from sampling conducted in 1993.

Figures provided by Midwest Water Resources show the cumulative yield of contaminants removed from the subsurface soils since January 22, 1992 (Figure 12) and the concentrations of contaminants in the system composite sample over time (Figure 13). Review of these figures indicate that continued operation of the system was not beneficial. As expected, the concentration of contaminants decreased over time and the time, labor and expense of operation/maintenance/monitoring of the system did not merit continued operation of the system. Therefore, operation of the SVE system was discontinued in 1993.

4.2 Subsurface Soil Sampling in Former Release Area

Subsurface soil sampling was performed during the Voluntary Investigative and Remedial Action (Dames & Moore, March 1997) in the area of the former release with two objectives: 1) to define the original extent of TCE impact, and 2) to confirm that the SVE system has sufficiently remediated the original extent of TCE impact.

A total of 11 soil borings were advanced during two sampling events for delineation purposes: six borings were located outside and five were located inside of the Rubber Products Building (Figure 3). Soil samples were collected using direct push sampling technology (Geoprobe®). Soil samples were continuously collected and filed screened using a PID. The sample or samples which exhibited the highest readings were analyzed by an on-site mobile laboratory. Two to five samples from each boring were submitted to the on-site mobile laboratory for analysis.

Review of the analytical results indicates that TCE is still present in the subsurface above the action level for soil of 100 ppb. Soil samples from four of the 11 probes detected TCE above the action level (SB-1, SB-6, SB-7, SB-8). The detected TCE concentrations in these four borings ranged from 15 to 1,800 ppb. Three of the four borings are located within the Rubber Products building. Results from the seven remaining borings indicate TCE concentrations below the soil action level. Based on the results it appears that the area of remaining impact is located beneath the Rubber Products building and that the soil beneath the area of the original release outside of the building has been sufficiently remediated. It should be noted that none of the soil sample results to date have exceeded the indoor air inhalation criteria value of 37,000 parts per billion as provided in the Part 201 Generic Cleanup Criteria and Screening Levels for industrial and commercial land use.

Based on the relative size and location of the area of remaining impacted soil, it was recommended that the SVE system be decommissioned and abandoned and a land use restriction be imposed at the site. The site is in an industrial setting and will remain an industrial facility. In addition, the remaining impacted soil is located beneath a building and paved area which act as a barrier to the remaining impact; therefore, the area of remaining impact is localized and inaccessible. Precipitation can not infiltrate into the ground and act as a driving force pushing constituents down to the shallow groundwater zone. Leachate sampling has not been recommended or performed as leachate generation is not considered a significant pathway of concern. A restrictive covenant could be imposed which would notify local government and subsequent purchasers of the property of the presence of the remaining impacted soil.

4.3 Soil Volatilization to Indoor Air

Part 201 administrative rule 299.5711(4) provides that contaminant concentrations in soil A shall not result in an air emission that causes an increased cancer risk of 1 in 1,000,000 or a

concentration that causes, alone or through reaction with other air contaminants, injurious effects to human health, safety, or welfare; animal life; plant life of significant value; or to property. At sites where vapor intrusion may occur, a site-specific evaluation must be performed to determine if this pathway poses a human health concern.

In accordance with the draft guidance *Generic Groundwater and Soil Volatilization to Indoor Air Inhalation Criteria: Technical Support Document* (DEQ, March 5, 1998), an evaluation of the indoor air inhalation pathway will be performed. This memorandum describes the technical development of generic groundwater and soil volatilization to indoor air inhalation criteria (GVIIC and SVIIC, respectively) for residential and commercial/industrial land use categories.

The volatilization of soil vapors will be evaluated using the Johnson and Ettinger model (JEM) as provided in the Technical Support Document. The JEM model is a mathematical model to estimate diffusive and convective transport of contaminant vapors emanating from soil into indoor spaces. A commercial/industrial land use scenario will be used in the analysis as the remaining soil impact is located beneath the Rubber Products Building and paved areas.

The residential/commercial and industrial soil volatilization to indoor air inhalation criteria are 7,000 ppb and 37,000 ppb, respectively. Should the results of the JEM model indicate that soil volatilization to indoor air, based on the existing concentrations detected in the soil beneath the building, exceed the industrial soil volatilization to indoor air inhalation criteria, a soil cleanup level will be determined.

4.4 Restrictive Covenant

Should the evaluation of the soil volatilization to indoor air inhalation indicate that volatilization of constituents to indoor air is not a concern and based on the isolated nature and location beneath a building and paved area with insignificant potential for leachate generation, a Restrictive Covenant will be drafted to address the soil. The Restrictive Covenant will be entered by and between Eagle-Picher Automotive - Hillsdale Tool Division and the MDEQ for the purpose of imposing restrictions on the Property. The Restrictive Covenant will include a list a restricted activities which are necessary to maintain the integrity of the exposure barrier and thus avoid exposure levels established in the RAP. These activities will include restricting excavation activities into the remaining impacted soil and installation of wells on the Property.

The restrictions shall run with the Property and shall be binding upon all future owners, successors, lessees or assigns and their authorized agents, employees, or persons acting under their direction and control, and shall continue until the MDEQ or its successor approves modifications or rescission of the Restrictive Covenant. A copy of this Restrictive Covenant shall be provided to all future owners, heirs, successors, lessees, assigns and transferees by the person transferring the interest.

A draft version of the Restrictive Covenant will be supplied as an addendum to this report.

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5.0 CLEANUP CRITERIA

5.1 Zoning of Facility

In accordance with Section 20120a(6), a remedial action plan will not be approved unless the current zoning of the property is documented to be consistent with the categorical criteria being proposed. The current zoning of the HTR property is considered Light Industrial. A copy of the zoning districts within the City of Hillsdale, Michigan as provided by City of Hillsdale is provided in Appendix A.

5.2 Cleanup Category

Section 20120a(1) of the Natural Resources and Environmental Protection Act states that the cleanup category proposed shall be the option of the person proposing the remedial action, subject to department approval, considering the appropriateness of the categorical criteria to the facility. The cleanup categories were selected based on the nature and operations of the Hillsdale Tool facility, the nature and extent of impact, and the zoning of the facility. As discussed with the MDEQ, the target cleanup categories for groundwater and soils may be different.

5.2.1 Soil Cleanup Category

The cleanup category proposed for soil will be the limited industrial category. The remaining impacted soil has been documented to be located beneath the asphalt covered roadways and Rubber Products building. The selection of the limited industrial target cleanup category for the soil is very appropriate due to the zoning of the area that the building is located and the industrial nature of the operations in the Rubber Products building. The Restrictive Covenant previously described will serve as the agreement for the limited industrial soil cleanup category.

5.2.2 Groundwater Cleanup Category

The cleanup category proposed for the groundwater will be the generic residential category.

5.3 Target Cleanup Levels

5.3.1 Soil Cleanup Level

As previously stated, the remaining impacted soil is located beneath a building and paved area which act as a barrier to infiltration from precipitation; therefore, the area of remaining impact is localized and inaccessible. Precipitation can not infiltrate into the ground and leach constituents from the soil and transport constituents down to the shallow groundwater zone. Leachate sampling has not been recommended or performed as leachate generation from infiltration of precipitation is not considered a significant pathway of concern. Since leaching to groundwater is not a viable pathway, comparison with the screening value of 100 ppb (20 times the drinking water MCL) does not apply. A leachate model will be run to assess the potential for the observed TCE concentration in soil to adversely effect groundwater under site-specific conditions. The maximum TCE concentration observed beneath the building was 1,800 ppb (Dames & Moore, 1997).

A Restrictive Covenant will be drafted to address the soil. The Restrictive Covenant will be entered by and between Eagle-Picher Automotive - Hillsdale Tool Division and the MDEQ for the purpose of imposing restrictions on the Property. Therefore, a soil cleanup level has not been proposed.

5.3.2 Groundwater Cleanup Level

The target cleanup level proposed for the remedial action is the generic residential criteria. The target cleanup level for groundwater will be the MCL of 5 ppb. This is the same value provided in the state drinking water standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976, being sections 325.1005 of the Michigan Compiled Laws.

6.0 REMEDIAL ACTION OF IMPACTED GROUNDWATER

A remedial action plan has been developed to describe the strategy to remediate the TCE impacted groundwater plume at HT. The remedial action consists of extracting groundwater and discharging it to the City of Hillsdale POTW, via the sanitary sewer, for treatment. If the findings of the additional RI warrant, the remedial action shall be modified to ensure any additional impacted groundwater is remediated.

Several remedial options were evaluated prior to development of the RAP including bioremediation, plume control, groundwater extraction and treatment through the use of multiple vertical wells, and groundwater extraction and treatment through the use of horizontal wells.

6.1 Extraction Wells

Groundwater conditions at the site were modeled using the USEPA computer modeling software MODFLOW with the Waterloo Hydrogeologic Visual Modflow, Version 1.5, Interface. The model was run to assess the optimal well placement and the corresponding estimated time to closure. Based upon the models and currently available drilling technology, the most efficient and cost-effective extraction well configuration utilizes one horizontally screened extraction well and three vertical screened extraction wells (Figure 14). The model shows that the site can be remediated to State Residential Standards within six years. During the first four years, each vertical well will be pumped at 0.2 gpm and the horizontal well will be pumped at 1.3 gpm. After four years of operation, the vertical well pumps will be turned-off and the horizontal well pump will remain operational. At this time the horizontal well will be pumped at a slightly increased rate of 1.5 gpm for an additional year and a half or until the analytical results indicate the TCE concentrations are below State Residential levels. Figures 15, 16, 17, and 18, present the plume reduction following two, four, five, and six years of operation, respectively. Estimated pumping rates and time to closure may be modified based on conditions observed during operation of the system.

6.1.1 Horizontal Extraction Well Installation and Construction Details

The horizontal well, HW-1, entry and exit curves were calculated to require a minimum of approximately 275 feet of horizontal distance to reach the required vertical depth of 70 feet.

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However, in order to work within the confines of the surface limitations, additional distance may be required for the entry and exit curves. The well shall have a 0.020- or 0.030-inch slot, screened section.

Wrong

The entry point for HW-1 is located at the northeast corner of HT Rubber Products Plant and the exit point is located 350 feet north of MW-13. HW-1 shall have a 500-foot screened interval and a surface trace of approximately 1,050 feet (Figure 14).

The horizontal extraction wells shall be installed in accordance with the USEPA Manual Alternate Methods for Fluid Delivery and Recovery Manual.

A midi-sized drill rig, 67 kN to 444 kN thrust/pullback, utilizing a downhole mud motor will be used to install the horizontal well. The rig shall be capable of installing the well as designed.

The well shall be installed using the pull-back method, a continuous well-bore method. An approach angle between 7- to 25-degrees shall be used with a medium to long radius of curvature (greater than 150 feet). To construct the continuous wellbore, a pilot hole shall be drilled from the surface, through the curved section to the target depth. Drilling then proceeds along the horizontal section, through another curved section, and back to the ground surface at the exit point.

An electromagnetic survey system, in conjunction with a magnetic wireline guidance tool, shall be used for drill string location and guidance. The system consists of a cable laid out on the ground in a rectangular configuration, with the well path running along the center of the long dimension of the rectangle. A direct current is applied to the cable, inducing an electromagnetic field of known intensity and size in the subsurface around the tool. The induced magnetic field generally is strong enough to overcome any indigenous magnetic interference, allowing the tool to display its location in the induced magnetic field.

The well materials, casing and screen, shall be assembled at the exit hole and attached to the drill string in the wellbore. A hole opener shall be placed at the end of the drill string, just before the well materials, to facilitate their installation. The drill string, with the hole opener and well material in tow, is pulled back through the wellbore. The purpose of the hole opener is to remove any excess cuttings or formation materials that may have sloughed into the wellbore, and to

enlarge the pilot hole to the desired diameter. Once all of the drill string has been removed from the wellbore, the well materials will be in place (Figure 19).

Air-inflatable packers or grout baskets, located at the junction between the screen and riser pipe, will be inflated or filled with sand prior to development or grouting the pipe to surface. Development of the well shall occur immediately after installation of the wells and inflation of the packers. After jetting the well with a thinning agent (metahexaphosphate), and water, the well shall be pumped to remove sediments and residual fluids. Upon successful completion of development, the riser pipe will be stage grouted.

Surface completions shall be constructed at both ends of the well, if site access is available. The completions shall provide for access to the well for typical O&M requirements (refer to Section 4.2.1 Surface Completions).

The well shall be constructed of 4- or 6-inch diameter high-density polyethylene (HDPE) pipe SDR-11 with 0.020- or 0.030-inch slot screen. The well diameter will be dependent upon best available drilling technology. The 20-foot sections of HDPE pipe shall be butt-welded to provide the best tensile strength possible for the joints.

6.1.2 Vertical Extraction Well Installation and Construction Details

The vertical extraction wells will be located on the southwest corner of the Daisy II Plant (Figure 14). The wellbores will be drilled utilizing hollow-stem augers to bedrock and air rotary through bedrock to total depth. Each wellbore will be advanced five feet into the shale confining unit, approximately 75 feet total depth.

The well will be constructed with 10 feet of 4-inch stainless steel screen and a five foot sump set into the confining unit. A sand filter pack will be placed using the positive displacement (tremie) method. The filter pack will extend from the bottom of the well-bore to five feet above the screen (20 feet of sand pack). A four foot hydrated bentonite seal will be placed above the filter pack. A cement/bentonite slurry will be used to grout the annulus from the bentonite seal to just below ground surface.

Surface completions shall be constructed as described in Section 4.2.1. The wells will be developed using a bailing or low-flow pumping technique. Development will continue until the water removed is free of suspended solids and temperature, specific conductance and pH measurements have stabilized. Development is deemed complete when these parameters have stabilized within 10% over a minimum of two successive well volumes.

6.1.3 Investigative Derived Wastes (IDW)

The spent drilling fluids generated shall be contained in standard, lined roll-off containers. After completion of the well installation, the container(s) shall be sampled and analyzed for characterization purposes. Based on the characteristics, the waste will be disposed of properly by an appropriately licensed contractor. Approximately 1,500 to 4,500 gallons of spent drilling fluid is expected.

Water extracted during well development shall be contained temporarily in storage tanks to allow settlement of solids. After solid settlement, the water shall be decanted and treated according to the treatment plan described within this RAP. The settled solids shall be disposed of in the same manner as the spent drilling fluids.

6.2 Site Construction

After installation and development of the extraction wells, the remaining site construction activities will commence. These activities include installation of pumps and surface completions, and the necessary discharge piping to the sewer.

6.2.1 Surface Completions

Vaults shall be placed at both ends of the horizontal extraction well depending on site access (Figure 20). The vault for each extraction well, shall contain an anchoring point for the pump, a flowmeter, a discharge sampling port, and the necessary equipment and wiring for the sensors and remote operation system. All surface completions shall extend below the frost line to a depth at least 5 feet bgs.

6.2.2 Pumps and System Control

A submersible centrifugal pump with universal bearings shall be installed within the riser, approximately one foot from the screen interval in the south end of the horizontal extraction well. Submersible centrifugal pumps will be installed in the vertical extraction wells approximately five feet from the bottom of the well. The pump shall be sized according to the installed diameter of the well and expected pumping rate (Figure 21). The horizontal extraction well pump will be sleeved with a pipe perforated every three inches with a 1/8-inch hole. The sleeve will be approximately the same length as the length of screen installed, 500 feet. The sleeve will increase the drawdown across the length of the screen rather than just affect drawdown around the pump intake as commonly occurs.

The pump shall be controlled using a software package, such as Paragon TNT, which allows control of the pumping rate from a remote location. The remote system will also monitor system operation and notify the responsible parties in the event of unscheduled O & M needs or pump failure. The remote system will allow for control of pumping rates to continuously optimize the system.

6.2.3 Piping

Discharge piping from the extraction wells shall be connected to the sanitary sewer within the HT Daisy II Plant (Figure 22).

6.2.4 Flow Rate Monitoring

Flowmeters shall be installed at each wellhead capable of measuring totalized and instantaneous flow within 0.1 gpm. The data obtained from these meters shall be used to evaluate system performance and calculate the volume of water discharged to the POTW. The remote access system will be capable of obtaining these data from the meters.

6.3 Treatment Plan

The water extracted for treatment shall be discharged to the sanitary sewer. The City of Hillsdale POTW shall treat the water for HT under an agreement between HT and the City of Hillsdale.

6.3.1 Volume Extracted for Treatment

A conservative estimate of the total expected flow rate for the system which includes all wells is 2 gpm or 2,880 gpd. This pumping rate will be optimized over the operational life of the system and the maximum sustainable pumping rate will be maintained. However, it is extremely unlikely that the system will ever exceed the 14,000 gpd limit which was previously agreed to by the POTW.

6.3.2 City of Hillsdale Discharge Agreement

A copy of the letter from the City of Hillsdale, which outlines the agreement between HT and the City, is included in Appendix B. This agreement requires the installation of a totalizing flowmeter to monitor quantities discharged to the sewer. The charges assessed for discharge will be based on the number of gallons discharged to the City.

MI0001004

7.0 REMEDIAL ACTION MONITORING

Monitoring of the effects of the remedial action in the shallow groundwater zone shall include periodic monitoring of groundwater elevations, sampling selected monitoring wells, and sampling the discharge stream to the sanitary sewer. The results of the monitoring shall be compiled into a chemical and hydraulic monitoring report and submitted to MDEQ on a semi-annual basis.

7.1 Groundwater Elevation Monitoring

Shallow monitoring wells on the site shall be gauged on a semi-annual basis prior to sampling. Conversely, if Paragon TNT® or similar control system is installed nearly continuous monitoring can be conducted for the selected shallow wells. Potentiometric surface maps of the shallow zone shall be compiled and included in the monitoring report.

7.2 Groundwater Sampling

Groundwater samples shall be collected from selected shallow zone monitoring wells (MW-1, -3, -12, -13, and -14) on a semi-annual basis and analyzed for TCE to monitor effectiveness of the system. These wells were selected because they represent the approximate center line of the groundwater plume. (See Section 3 for standard sampling and analysis details.) Isoconcentration maps shall be prepared and included in the monitoring report.

Monitoring of these selected shallow zone monitoring wells located along the approximate center line of the groundwater plume will document compliance with Rule 705(5). The horizontal and vertical extent of the TCE concentrations in the aquifer are not expected to increase after the initiation of remedial actions. Routine sampling of the monitoring wells and the extracted groundwater described in Section 7.3 will confirm the anticipated decrease in concentration of constituents. The purpose of the configuration of the horizontal well along the length of the plume is to, in effect, capture the entire plume and maintain control of the impacted groundwater. The remedial action is designed to be protective of the public health, safety, and welfare, and the environment.

7.3 Discharge Sampling and Monitoring

The extracted water shall be sampled on a semi-annual basis and the results reported in the monitoring report. In addition, total volume discharged to the sewer shall be measured monthly. This data shall be tabulated and included in the monitoring report.

7.4 Semi-Annual Monitoring Report

A report summarizing and interpreting the monitoring findings shall be submitted on a semi-annual basis. The monitoring reports shall be used to document the reduction in the nature and extent of the plume. While concentrations of TCE will be used to monitor effectiveness of the system, all lab data from the monitoring events will be reported that are normally reported in the laboratory method scan used.

The monitoring program will be amended once the extraction wells and the monitoring wells sampled as part of the remedial action monitoring program exhibit TCE concentrations below the target clean-up levels. The amended monitoring program will require sampling of the extraction wells monthly for a period of six months. In addition, all monitoring wells within the original plume shall be sampled quarterly for six months. If the concentration of TCE in all wells remain below target clean-up levels, the system will be shut down and closure monitoring shall commence.

MI0001006

8.0 OPERATION AND MAINTENANCE

8.1 Responsible Parties

Mr. Marlyn Moon of Hillsdale Tool will handle the on-site responsibilities. Mr. David Heinze of Dames & Moore shall handle off-site responsibilities.

On-site:
Marlyn Moon
Environmental Manager
Eagle-Picher Automotive
Hillsdale Tool Division
135 E. South Street
Hillsdale, Michigan 49242
Work: (517) 439-0547
Home: (517) 437-4530

Off-site:
David Heinze, P.E.
Project Manager
Dames & Moore
721 Emerson Road, Suite 220
St. Louis, Missouri 63141
Work: (314) 993-4599
Home: (314) 721-2032

8.2 Schedule

It is anticipated that the proposed remedial system can be installed and made operational in six weeks (see Appendix C). Optimization of the system will continue for an estimated duration of two weeks. Following system optimization, routine operation and maintenance will begin.

Inspection of the remedial system shall include checking all mechanical and electrical components. Specifically, pumps will be checked to ensure that they are operating within appropriate amperage ranges to maximize pump life. Accuracy of the automated system and related sensors, such as pump discharge rate, will be checked while on-site to ensure that the sensors are collecting accurate data. For example, pump discharge rate will be checked using a stopwatch and the instantaneous flowmeter mounted on the discharge line. Sensors will be cleaned and visually inspected for flaws. Calibration of sensors will be performed according to the manufacturers instructions.

In addition to inspection of the remedial equipment, the overall system performance and operation will be checked. Samples of discharge will be collected to monitor the suspended solids content. If suspended solids increase above 250 ppm, the system will be shut down and the extraction wells will be re-developed.

The system will be checked monthly for the first quarter. If the system is operating within acceptable operating parameters during that period, then the system will be checked on a quarterly basis henceforth.

8.3 Contingency Plan

In the instance of system failure, the remote system shall initiate a failure protocol in which the responsible parties will be contacted. The system shall automatically shut-down until the cause of system failure can be determined and repaired.

8.4 System Specifications

A System Specifications manual will be developed to aid in any potential repairs. The manual will include: electrical wiring diagrams, piping diagrams, O & M manuals for pumps and other vendor supplied equipment, a log of equipment, serial and part numbers, and trouble shooting instruments for some of the more commonly anticipated problems.

8.5 Available Parts

Parts, which are commonly replaced on similar systems, shall be kept on-site for repairs. These parts include, but are not limited to, the following:

- Replacement impellers for the submersible pumps.
- Wrenches and other hand tools for removing and cleaning of flowmeters.
- Multi-meter.

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9.0 CLOSURE ACTIVITIES

9.1 Monitoring

Once the target cleanup levels have been reached and maintained for six months according to State requirements, operation of the extraction system will be discontinued. Quarterly sampling of monitoring wells within the original plume will be performed for a period of one year. If the concentrations of TCE in all monitoring wells remain below the target clean-up levels for that period, the system, inclusive of all monitoring and extraction wells will be decommissioned. If the concentrations of TCE in the monitoring wells do not stay below the target clean-up level, the extraction system will be turned back on and monitoring shall continue as before until the system has reduced the concentrations below the target levels for a period of six months.

The Closure Monitoring Reports shall be compiled on a quarterly basis and will report the data obtained during groundwater elevation surveys and sampling of the required monitoring wells during each quarter. The same methods used for remedial action monitoring shall be employed.

9.2 System Decommissioning

Closure activities will include removal of all equipment, sensors, meters, and decommissioning and abandoning of monitoring and extraction wells. Monitoring and extraction wells will be abandoned by sealing the screened interval with a bentonite slurry. The bentonite slurry, 10 lbs/gallon or greater, will be placed by positive displacement. After sealing of the screened interval, the remaining portion of the well will be abandoned with neat Portland cement. The surface completion shall be removed and backfilled leaving no surface expression of the former wells.

10.0 PROJECT SCHEDULE FOR IMPLEMENTATION

10.1 Additional Remedial Investigation

The installation and development of the monitoring wells to define the north and northeastern extent of groundwater impact will be installed in the first four days of the RI. The monitoring wells will be sampled following installation and development. Sampling will require one day. Expedited turn-around of analyses will be requested (48 hours) to ensure receipt of results prior to completion of all phases of field work. If the results of these samples indicate the plume has not been fully delineated to State target levels, additional monitoring wells may be installed. Two days per well will be required for installation, development, and sampling of any additional wells.

Advancement of soil borings and collection of soil samples to delineate the TCE impact to the soil will be completed in one day.

The entire additional RI effort will take approximately six days to complete.

10.2 Implementation of Remedial Action

The installation and development of the horizontal extraction well is expected to take approximately two weeks. Installation of the three vertical extraction wells will take approximately six days. The remaining site construction, including vault installation and trenching, will take an additional two weeks. System optimization is planned to be completed two weeks after completion of system installation. Therefore, implementation of the complete remedial action shall take approximately seven weeks.

10.3 Remedial Action Monitoring

The remedial action and system monitoring is expected to last approximately six years. The monitoring schedule was previously discussed in Section 5.0. In summary, monitoring will be performed semi-annually throughout the operation of the remedial system.

10.4 Operation and Maintenance (O & M).

The O & M plan will be initiated upon completion of system optimization activities and continue throughout the operating life of the remedial action. Anticipated O & M frequency was previously discussed in Section 6.2. In summary, the system will be inspected monthly for the first quarter of operation, and quarterly thereafter.

10.5 Closure

Once samples collected from the extraction wells exhibit TCE concentrations below the target cleanup levels for six consecutive months, operation of the extraction system will be discontinued. Quarterly sampling of monitoring wells within the original plume will be performed for a period of one year past system shutdown. If the concentrations of TCE in the monitoring wells remain below the target cleanup level for one year, the system will be decommissioned and abandoned. The decommissioning and abandonment of the system and all wells is expected to take one week.

MI0001011

11.0 REFERENCES

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MI0001012

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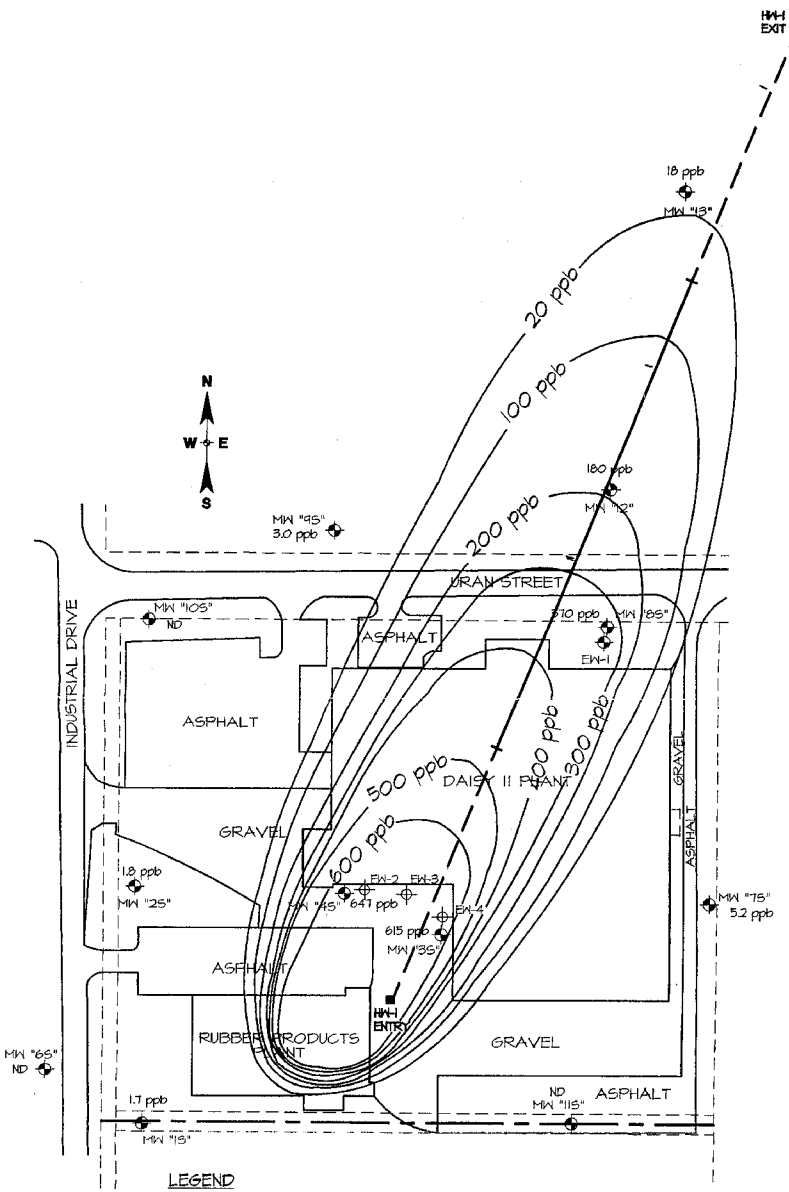

LEGEND

- MW "5S" — MONITORING WELL
- MW "15S" — PROPOSED MONITORING WELL
- MW "5S"
- EW-1 — VERTICAL EXTRACTION WELL
- EW-2 — PROPOSED VERTICAL EXTRACTION WELL
- 600 ppb — TRICHLOROETHYLENE ISOCONCENTRATION CONTOUR (ppb)
- HW-1 — PROPOSED HORIZONTAL EXTRACTION WELL ENTRY POINT
- HW-1 — PROPOSED HORIZONTAL EXTRACTION WELL EXIT POINT
- HORIZONTAL EXTRACTION WELL SCREEN
- SURFACE TRACE OF HORIZONTAL EXTRACTION WELL VERTICAL CURVE

100 0 50 100 200

FIGURE ES-1
EXECUTIVE SUMMARY FIGURE

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: DWD	CHK'D BY: NMP
SCALE: 1" = 100'	

DAMES & MOORE
GROUP — A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

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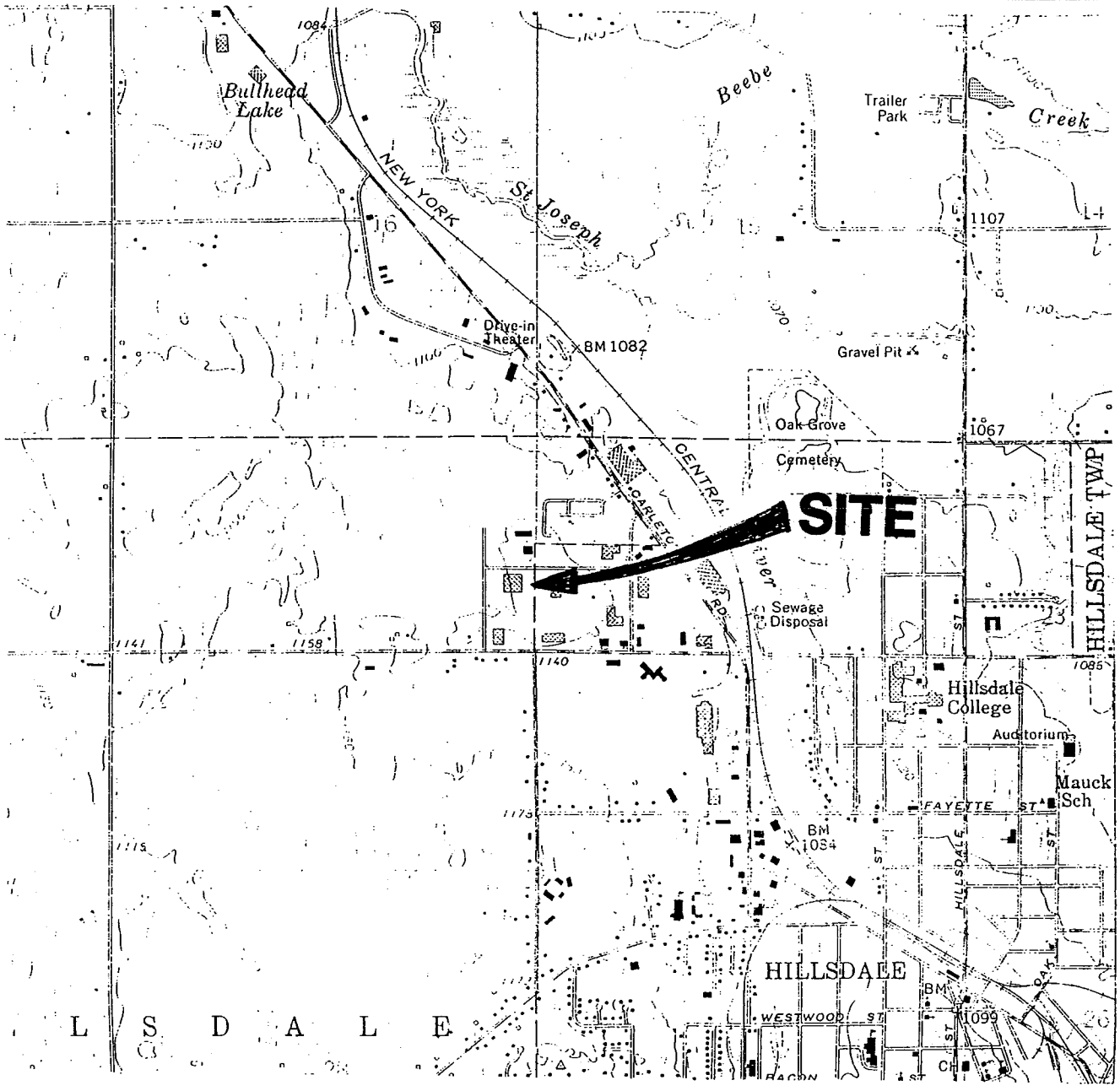
MI0001014



SCALE 1:24 000

1 1/2 1 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000

FIGURE 1
SITE LOCATION MAP

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

Quadrangle Map

Map Reference:
USGS Quadrangle Map, 7½ Minute Series
Hillsdale, Michigan, 1959, Photorevised 1979

R:\ENV\14570.025\025FIG1.DWG: 01/22/98

N
W E
S

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY JMS	CHK'D BY NMP
SCALE: NO SCALE	

DAMES & MOORE GROUP
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

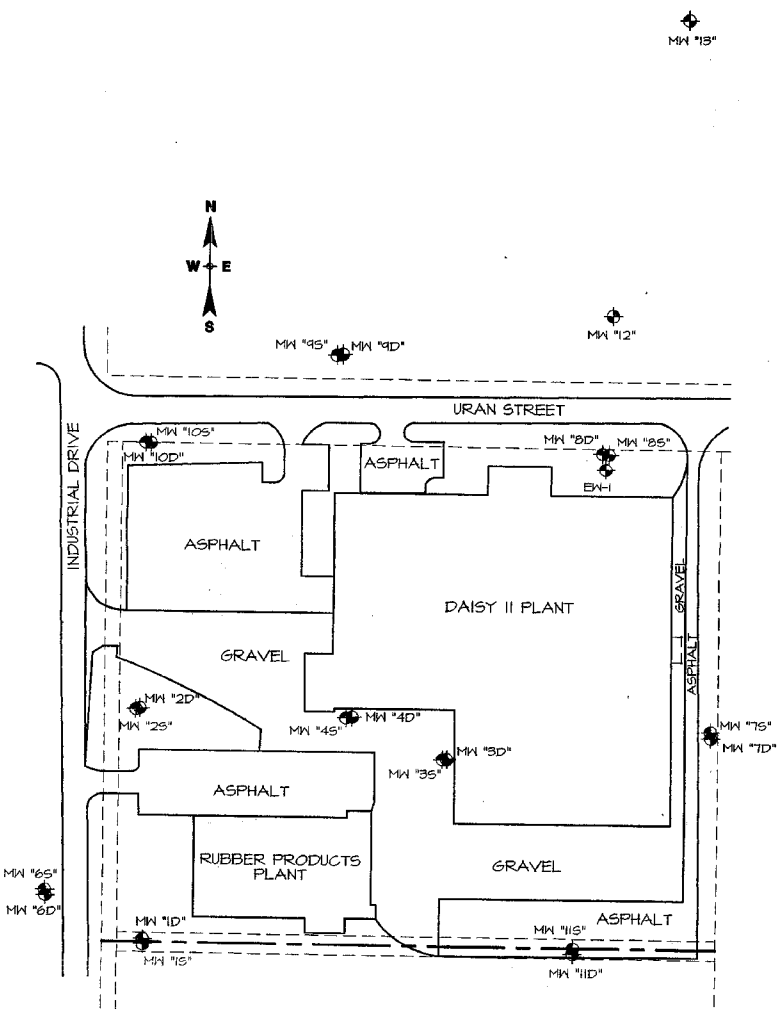


FIGURE 2
SITE PLAN AND MONITORING WELL LOCATIONS

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: JMS	CHK'D BY: NMP
SCALE: 1"= 100'	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4885

R:\ENV\14570.025\025FIG2.DWG, 01/22/98

MI0001016

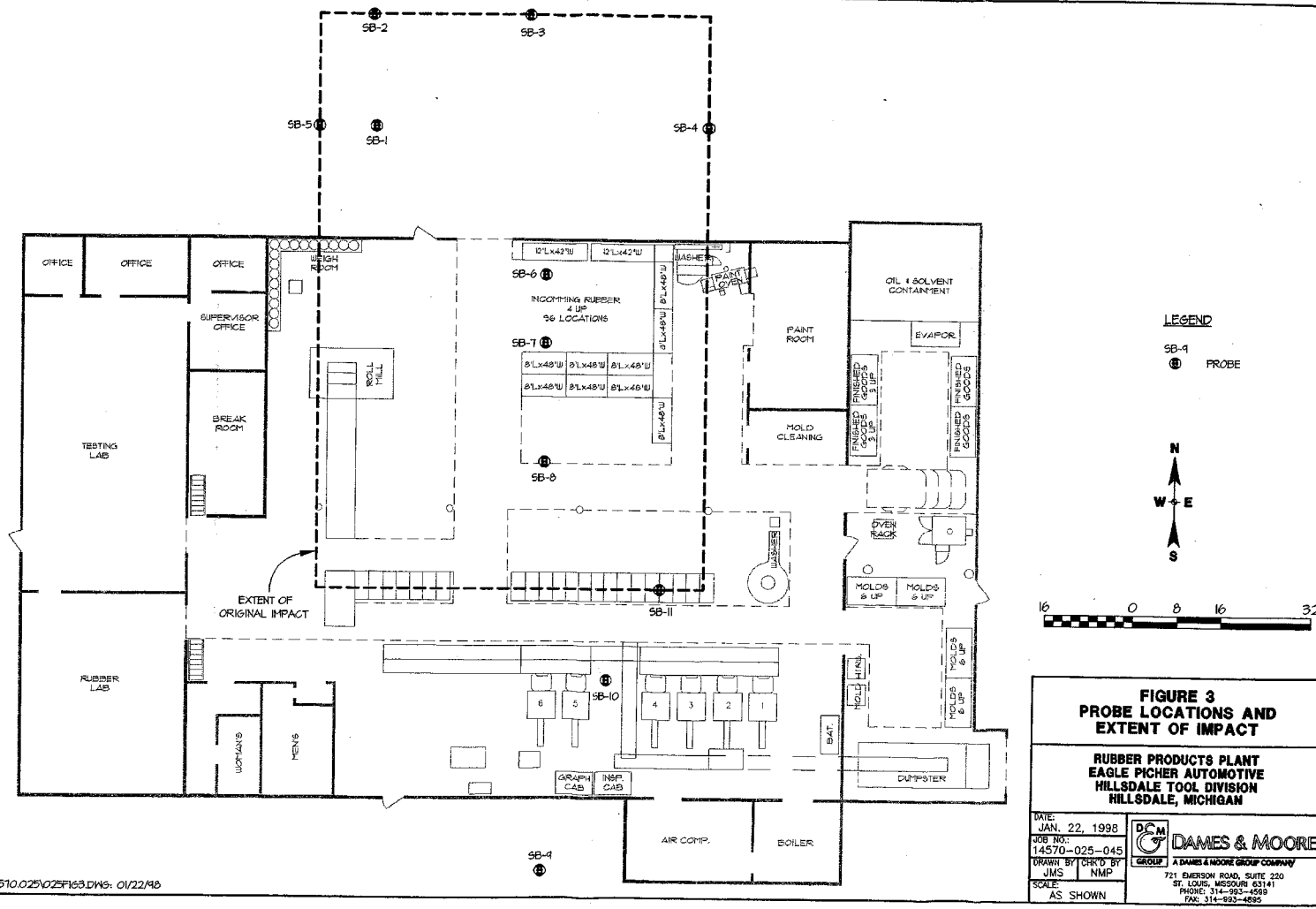


FIGURE 3
PROBE LOCATIONS AND EXTENT OF IMPACT

RUBBER PRODUCTS PLANT
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	DAMES & MOORE GROUP — A DAMES & MOORE GROUP COMPANY
JOB NO.: 14570-025-045	721 EMERSON ROAD, SUITE 220 ST. LOUIS, MISSOURI 63141 PHONE: 314-993-4599 FAX: 314-993-4695
DRAWN BY: JMS / CHK'D BY: NMP	
SCALE: AS SHOWN	

MI0001017

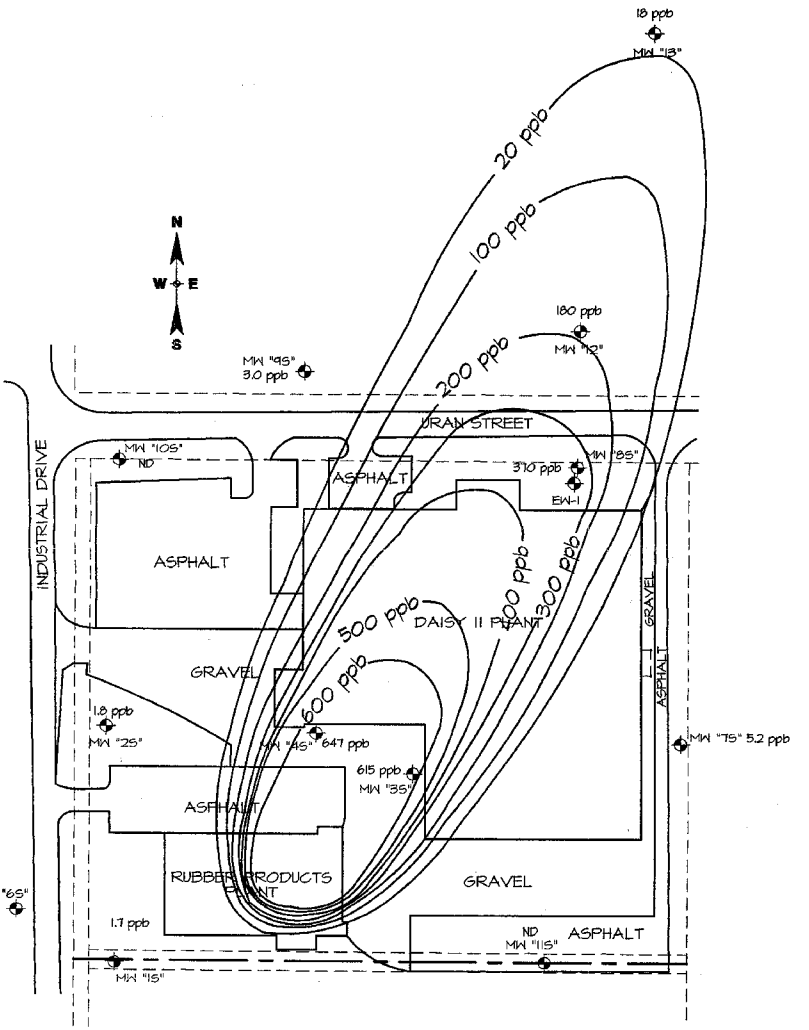


FIGURE 4
EXTENT OF TCE IMPACT TO SHALLOW GROUNDWATER

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: JMS	CHK'D BY: NMP
SCALE: 1" = 100'	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

R:\ENV\14570.025\025FIG4.DWG: 01/22/98

MI0001018

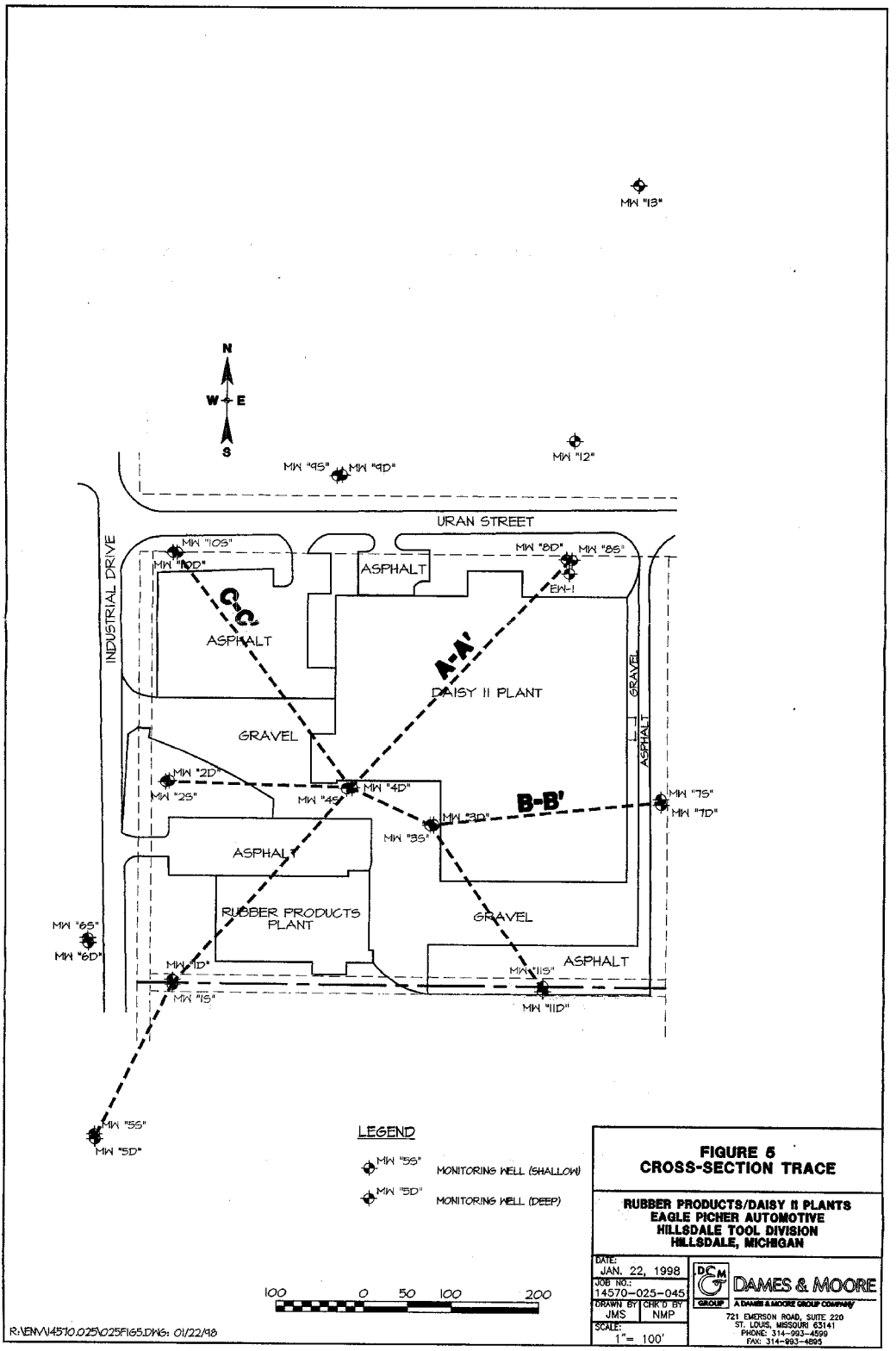


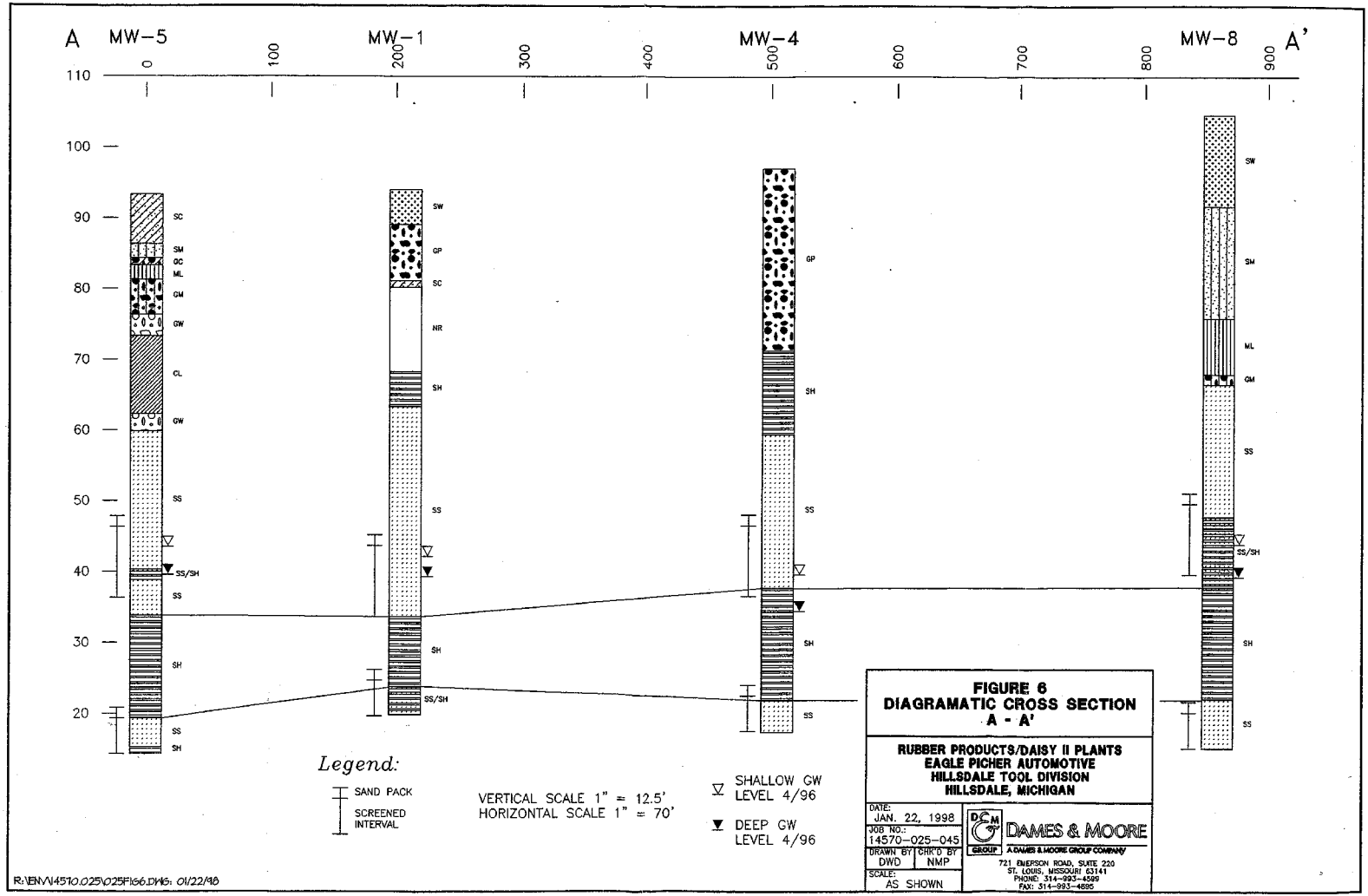
FIGURE 5
CROSS-SECTION TRACE

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: JMS	CHK'D BY: NMP
SCALE: 1" = 100'	

DCM GROUP
DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

MI0001019


A
MW-5
MW-1
MW-4
MW-8
A'
0
100
200
300
400
500
600
700
800
900
110
100
90
80
70
60
50
40
30
20
SC
SM
OC
ML
GM
GW
CL
GW
SS
SS/SH
SS
SH
SS
SH
SW
GP
SC
NR
SH
SS
SS/SH
SH
GP
SH
SS
SH
SS
SW
SM
ML
GM
SS
SS/SH
SH
SS
Legend:
SAND PACK
SCREENED INTERVAL
VERTICAL SCALE 1" = 12.5'
HORIZONTAL SCALE 1" = 70'
SHALLOW GW LEVEL 4/96
DEEP GW LEVEL 4/96
FIGURE 6
DIAGRAMATIC CROSS SECTION
A - A'
RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN
DATE: JAN. 22, 1998
JOB NO.: 14570-025-045
DRAWN BY: DWD
CHK'D BY: NMP
SCALE: AS SHOWN
DAMES & MOORE
GROUP
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4509
FAX: 314-993-4685
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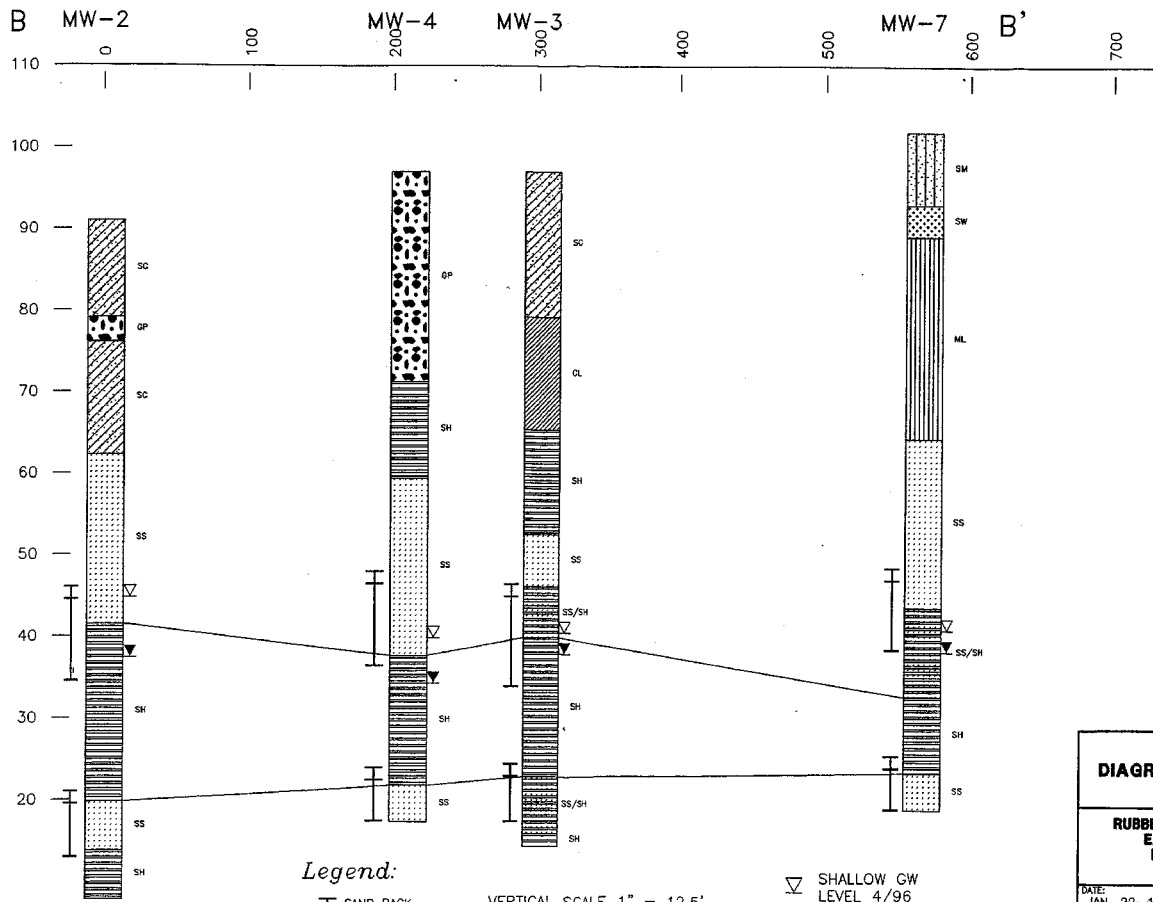
MI0001020



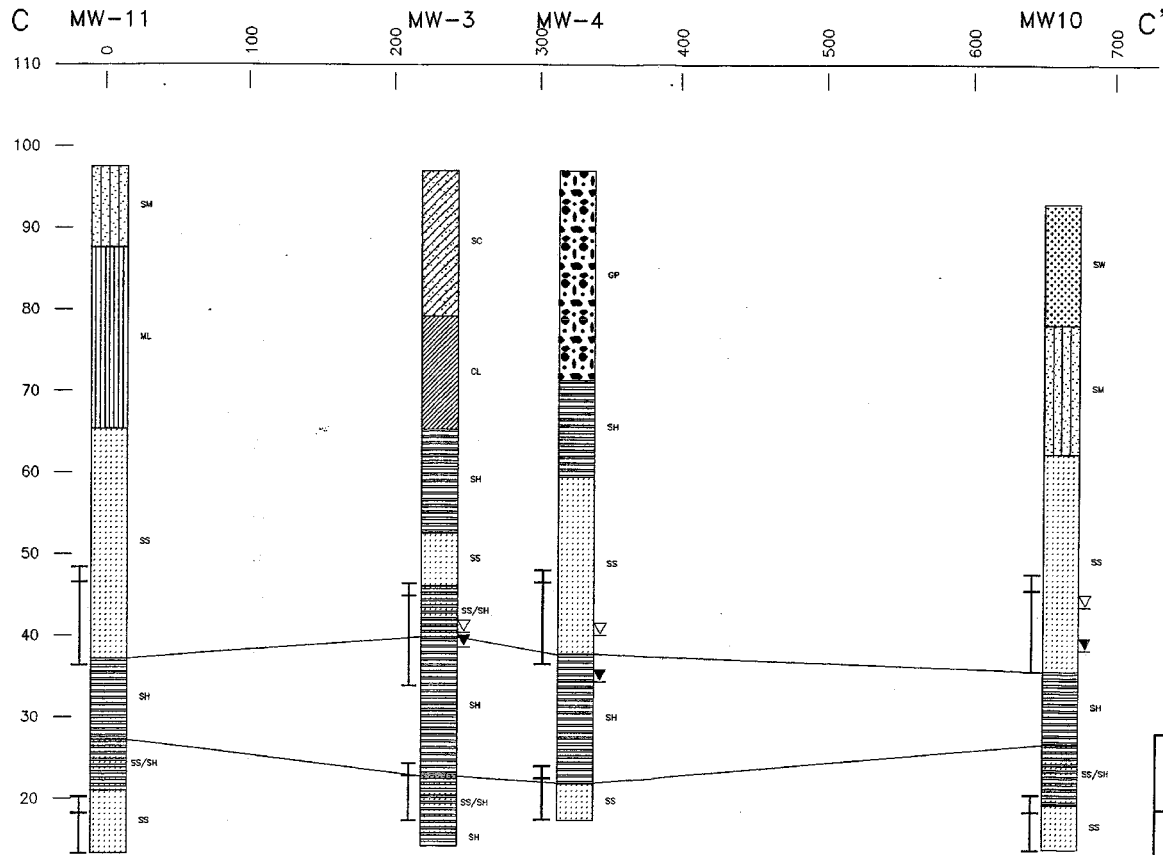
R:\ENV\14570.025\025FIG7.DWG: 01/22/98

FIGURE 7
DIAGRAMATIC CROSS SECTION
B - B'

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	DAMES & MOORE GROUP — A DAMES & MOORE GROUP COMPANY
JOB NO.: 14570-025-045	721 EMERSON ROAD, SUITE 220 ST. LOUIS, MISSOURI 63141 PHONE: 314-993-4599 FAX: 314-993-4895
DRAWN BY: DWD / CHK'D BY: NMP	
SCALE: AS SHOWN	

MI0001021



Legend:

SAND PACK

SCREENED INTERVAL

VERTICAL SCALE 1" = 12.5'
HORIZONTAL SCALE 1" = 70'

SHALLOW GW LEVEL 4/96

DEEP GW LEVEL 4/96

FIGURE 8
DIAGRAMATIC CROSS SECTION
C - C'

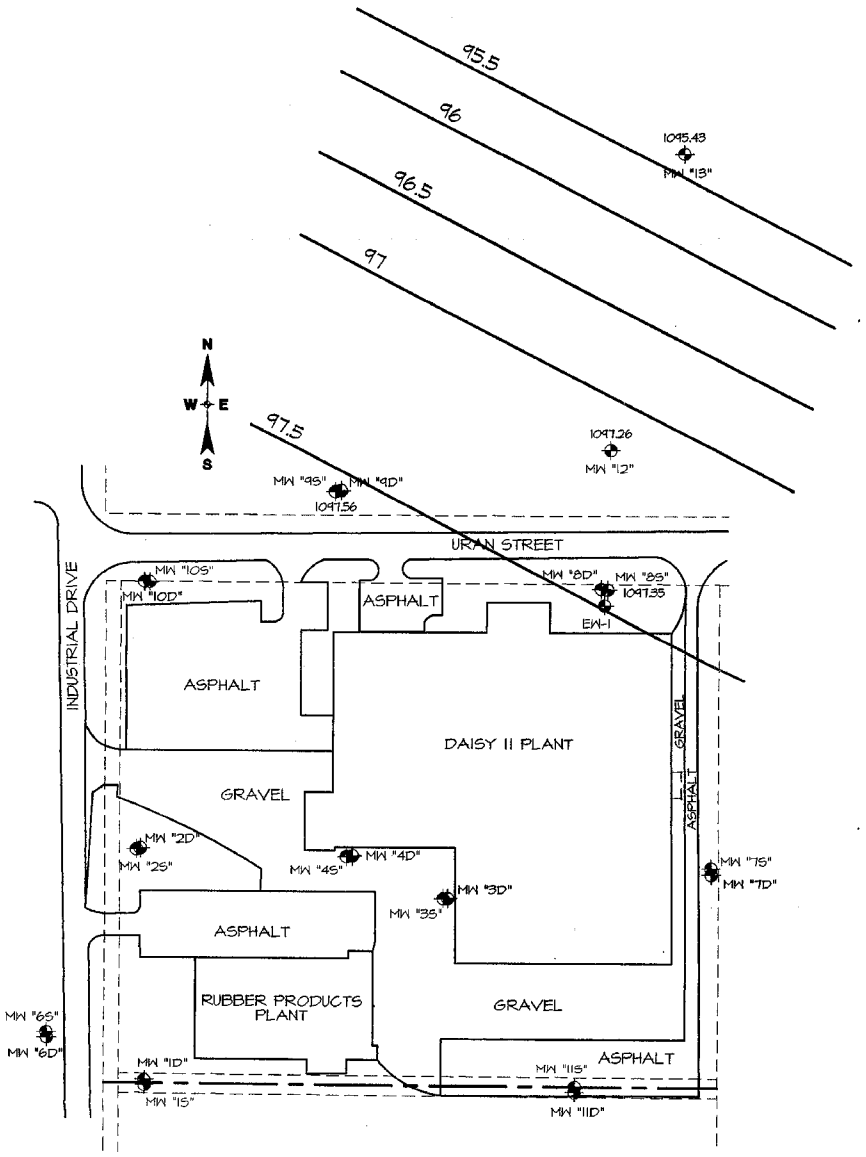
RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: DWD	CHK'D BY: NMP
SCALE: AS SHOWN	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

R:\ENV\14570.025\025FIG8.DWG: 01/22/98

MI0001022



MW "5S"
MW "5D"

LEGEND

MW "5S" MONITORING WELL (SHALLOW)

MW "5D" MONITORING WELL (DEEP)

97.5 GROUNDWATER ELEVATION CONTOUR (FT)

100 0 50 100 200

R:\ENV\14570.025\025FIG9.DWG: 01/22/98

FIGURE 9
POTENTIOMETRIC SURFACE MAP - SHALLOW ZONE

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: JMS	CHK'D BY: NMP
SCALE: 1" = 100'	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

MI0001023

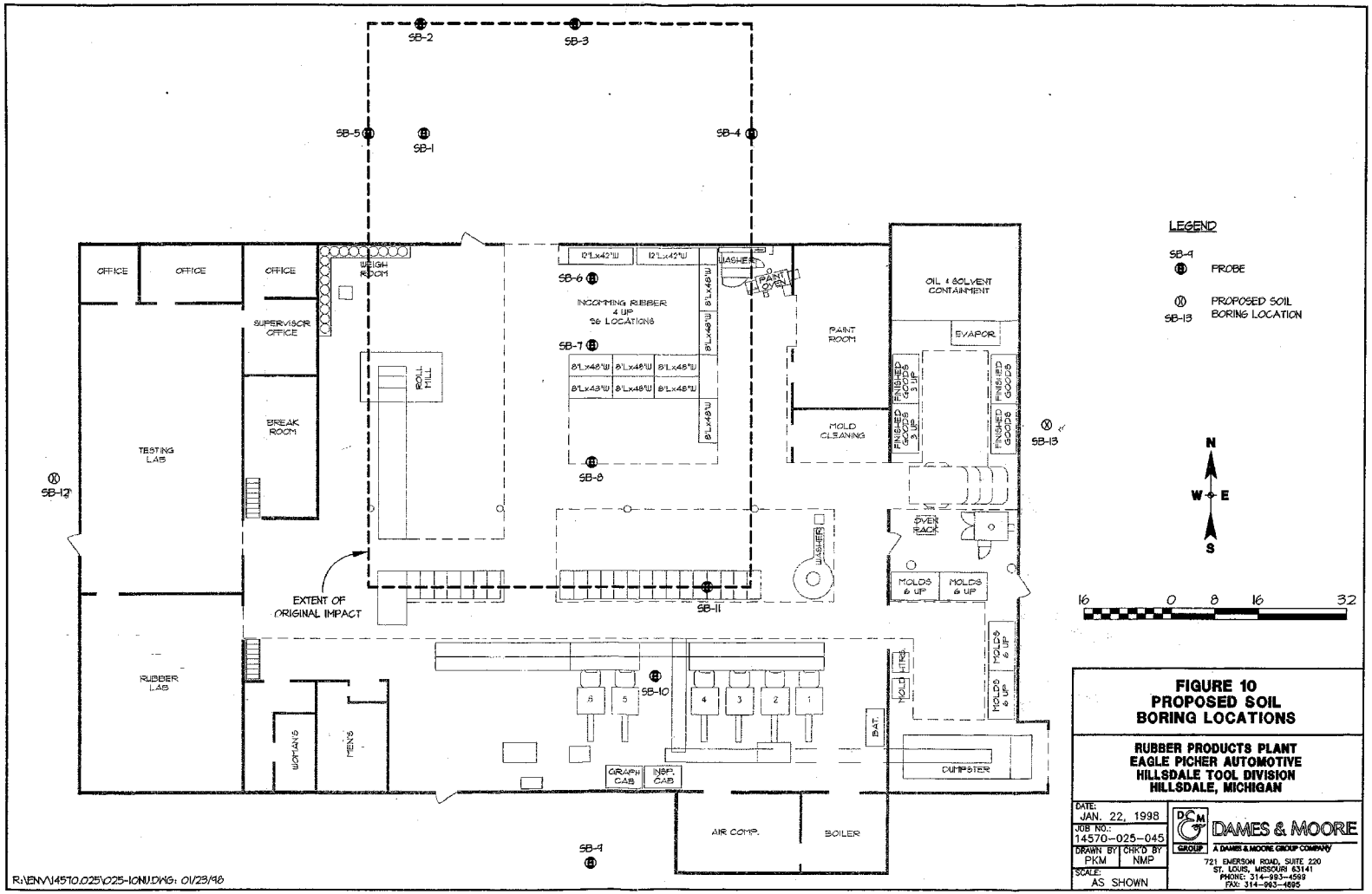
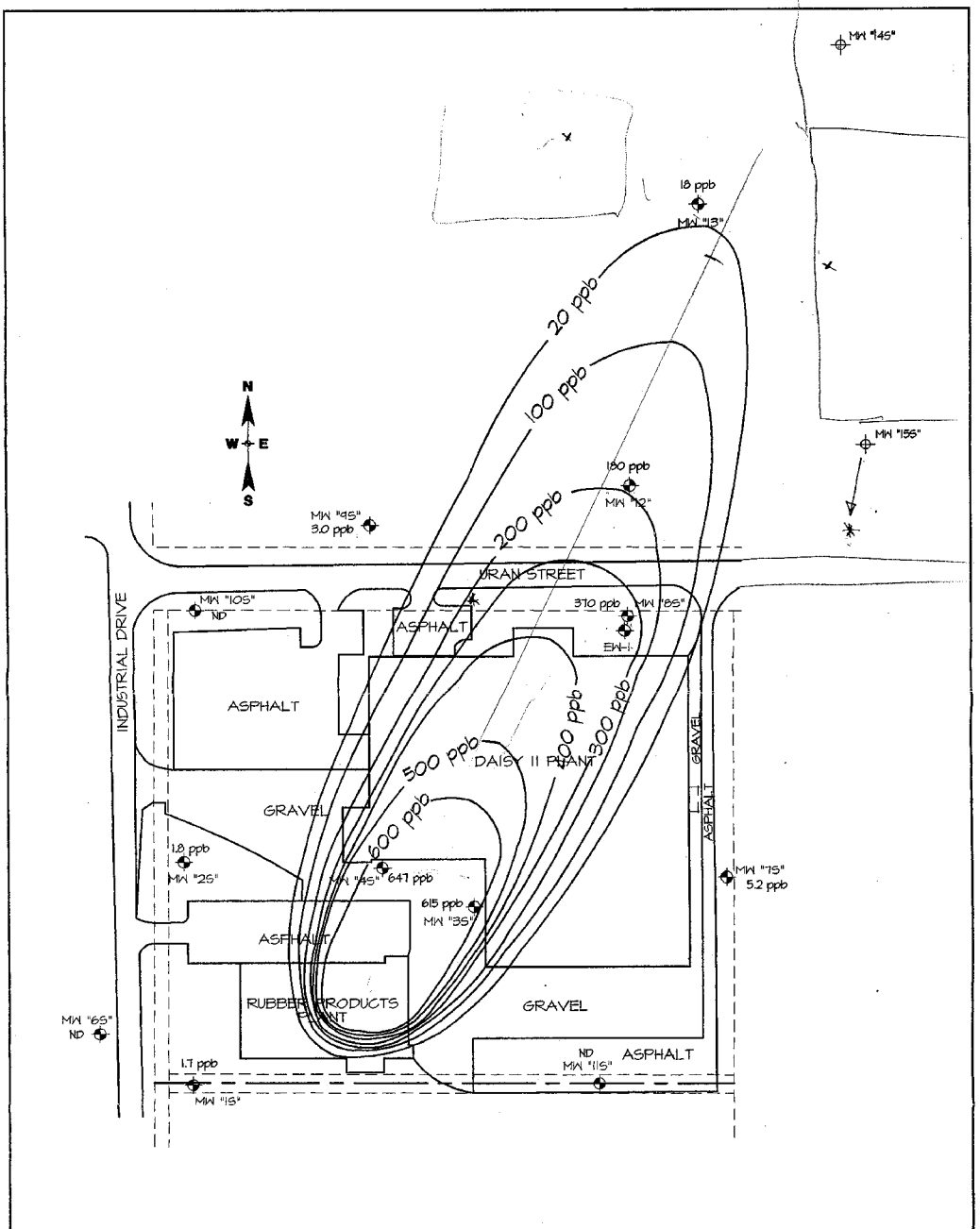


FIGURE 10
PROPOSED SOIL BORING LOCATIONS

RUBBER PRODUCTS PLANT
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	DAMES & MOORE GROUP — A DAMES & MOORE GROUP COMPANY
JOB NO.: 14570-025-045	721 EMERSON ROAD, SUITE 220 ST. LOUIS, MISSOURI 63141 PHONE: 314-993-4599 FAX: 314-993-4695
DRAWN BY: PKM / CHK'D BY: NMP	
SCALE: AS SHOWN	

MI0001024



LEGEND

MW "12S" MONITORING WELL

MW "15S" PROPOSED MONITORING WELL

100 0 50 100 200

FIGURE 11
PROPOSED MONITORING WELL LOCATIONS

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	DAMES & MOORE GROUP — A DAMES & MOORE GROUP COMPANY
JOB NO.: 14570-025-045	721 EMERSON ROAD, SUITE 220 ST. LOUIS, MISSOURI 63141 PHONE: 314-993-4599 FAX: 314-993-4895
DRAWN BY: JMS / CHK'D BY: NMP	
SCALE: 1"= 100'	

R:\ENV\14570.025\025FIG10.DWG: 01/22/98

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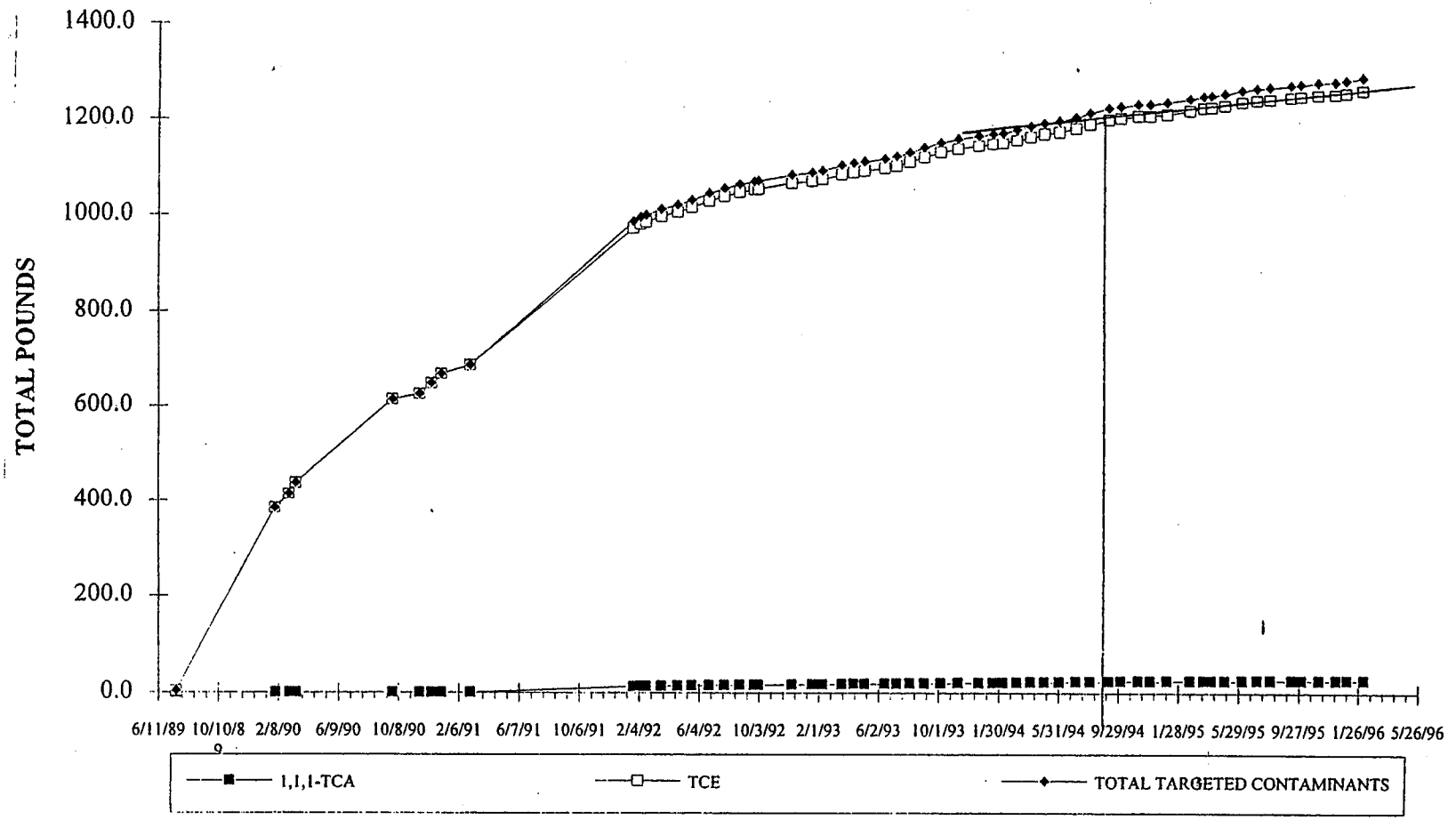


2/9/96

CUMULATIVE YIELD OF CONTAMINANTS
SOIL VAPOR EXTRACTION SYSTEM : TOTAL SYSTEM SAMPLE
HILLSDALE TOOL & RUBBER : HILLSDALE, MICHIGAN

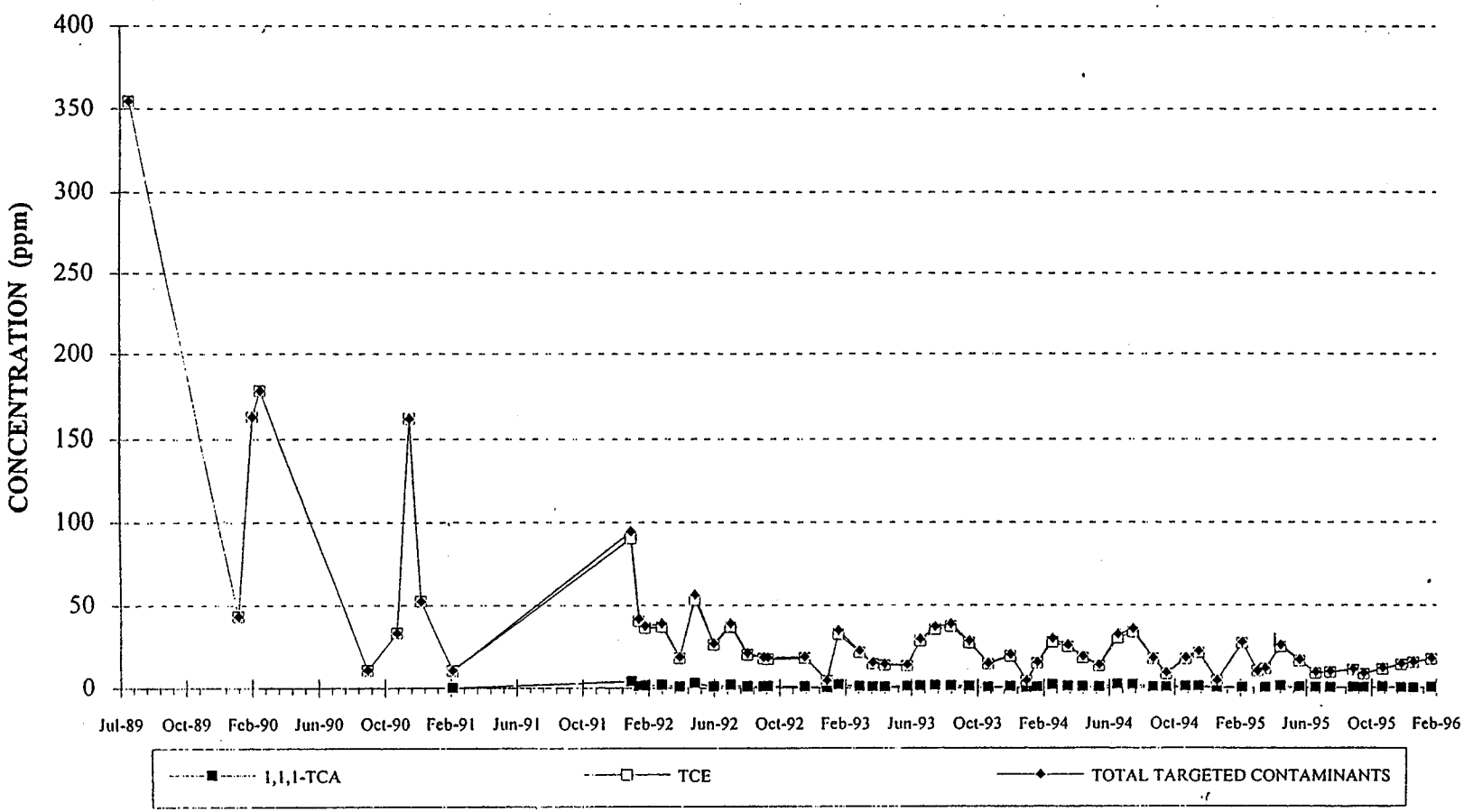
FIGURE 12
CUMULATIVE YIELD OF CONTAMINANTS REMOVED BY SVE SYSTEM

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY JMS	CHK'D BY NMP
SCALE: NO SCALE	

DAMES & MOORE
GROUP
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

FIGURE REFERNCE: MIDWEST WATER RESOURCES



1,1,1-TCA and TCE detection limit = .05 ppm

CONCENTRATION OF CONTAMINANTS
SOIL VAPOR EXTRACTION SYSTEM : TOTAL SYSTEM SAMPLE
HILLSDALE TOOL & RUBBER, HILLSDALE, MICHIGAN

FIGURE REFERNCE: MIDWEST WATER RESOURCES

FIGURE 13
CONCENTRATIONS OF CONTAMINANTS DETECTED IN SVE SYSTEM COMPOSITE SAMPLE OVER TIME

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY JMS	CHK'D BY NMP
SCALE: NO SCALE	

DCM GROUP
DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

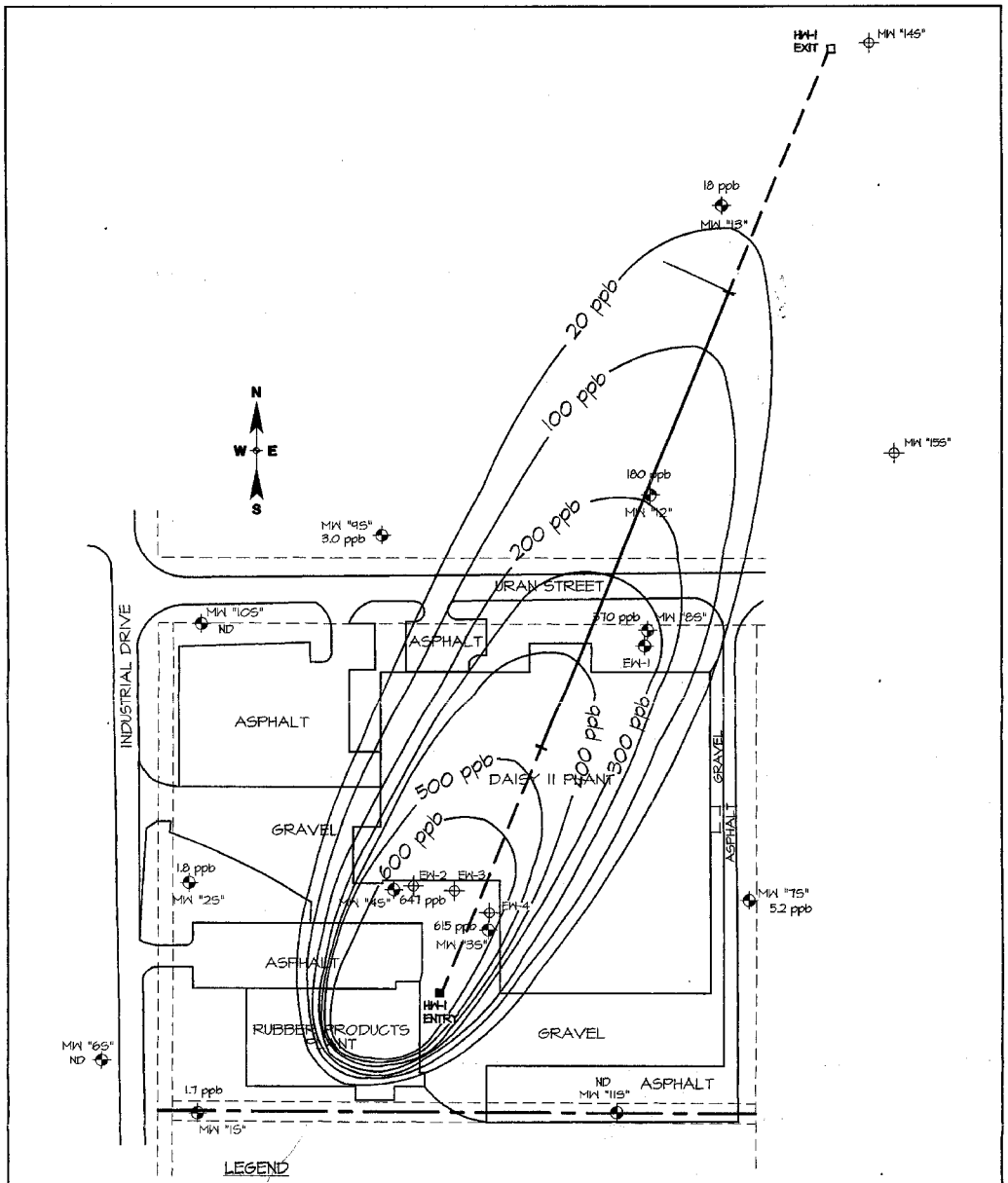


FIGURE 14
PROPOSED EXTRACTION WELL LOCATIONS

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	DAMES & MOORE GROUP — A DAMES & MOORE GROUP COMPANY
JOB NO.: 14570-025-045	721 EMERSON ROAD, SUITE 220 ST. LOUIS, MISSOURI 63141 PHONE: 314-993-4599 FAX: 314-993-4895
DRAWN BY: DWD / CHK'D BY: NMP	
SCALE: 1" = 100'	

R:\ENV\14570.025\025FIG11.DWG: 01/22/98

MI0001028

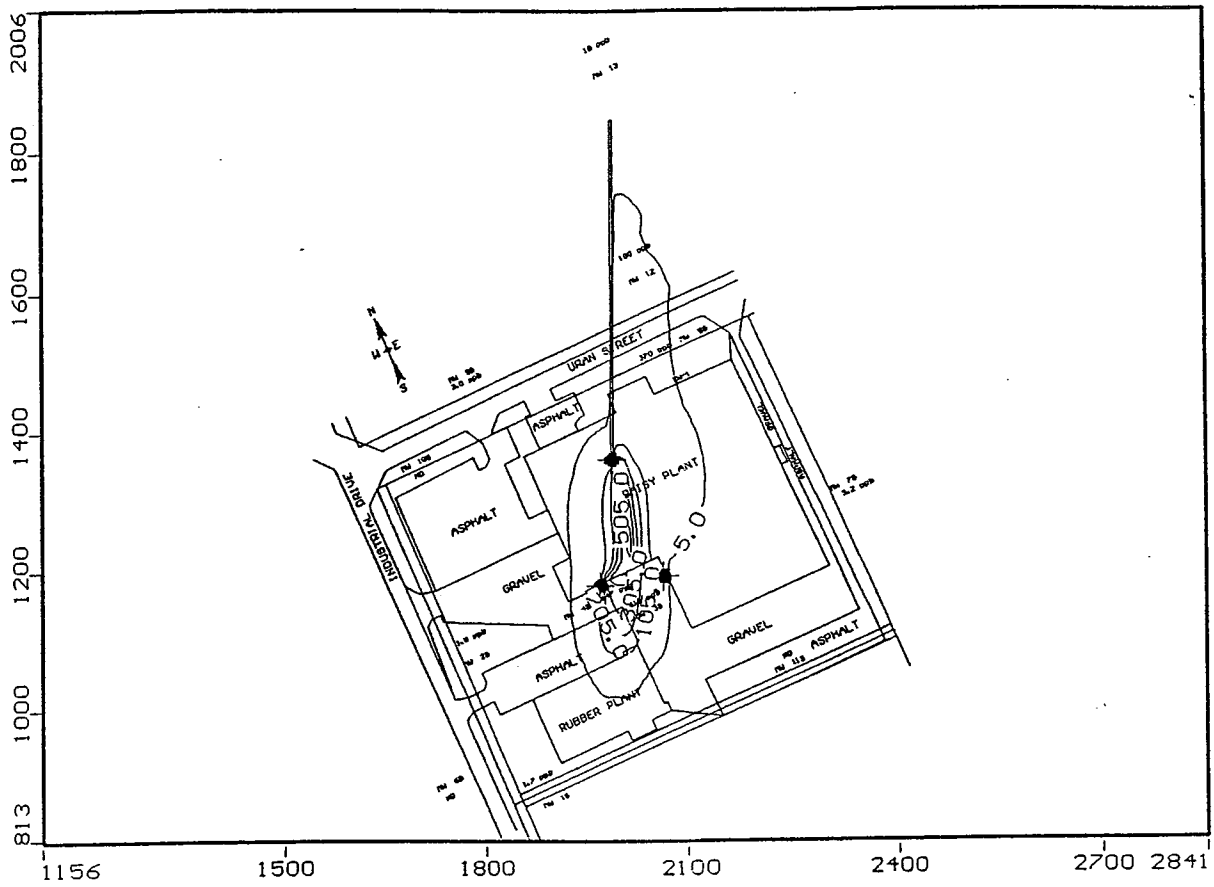


FIGURE 15
VISUAL MODFLOW
OPERATION YEAR 2

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: FEB. 05, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: DWD	CHK'D BY: NMP
SCALE: NO SCALE	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

R:\ENV\14570.025\025FIG12.DWG: 02/05/98

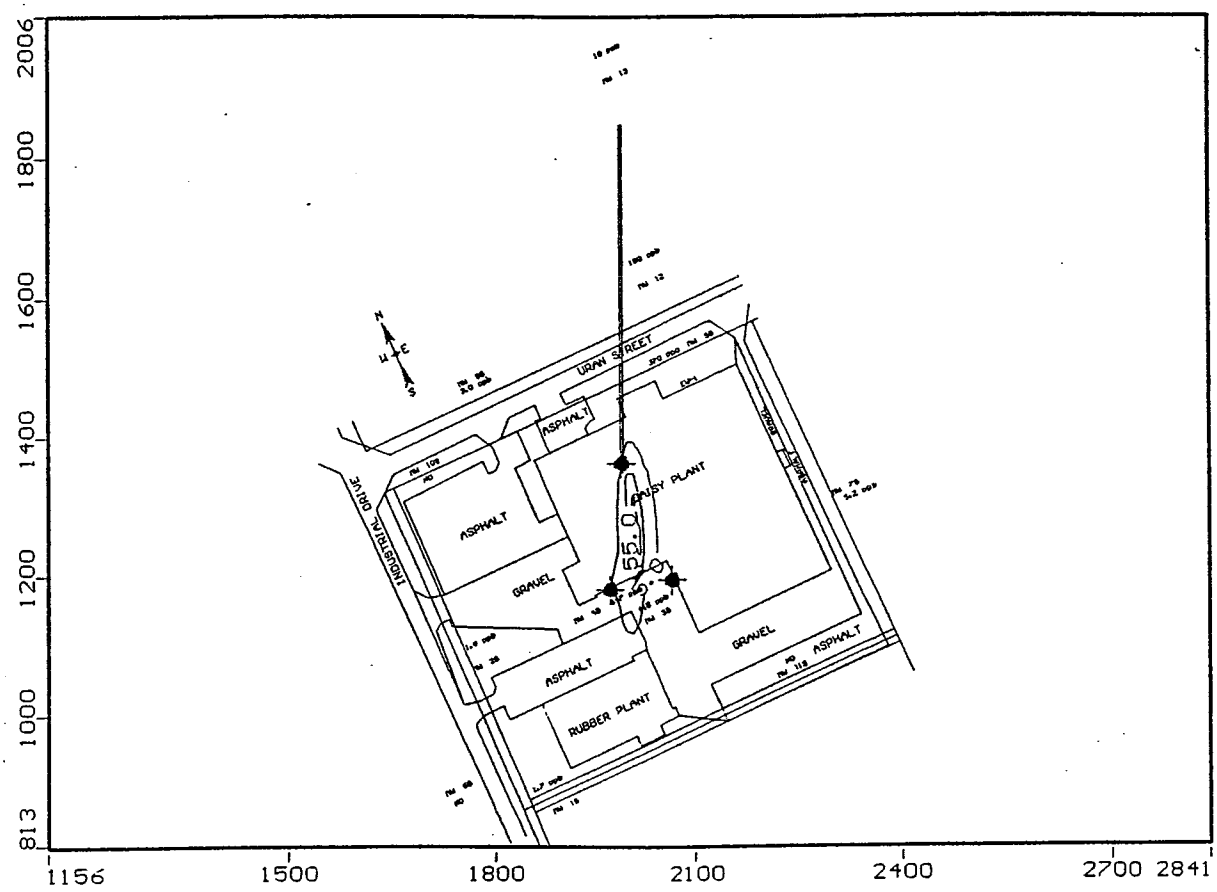


FIGURE 16
VISUAL MODFLOW
OPERATION YEAR 4

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: FEB. 05, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: DWD	CHK'D BY: NMP
SCALE: NO SCALE	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

R:\ENV\14570.025\025FIG13.DWG: 02/05/98

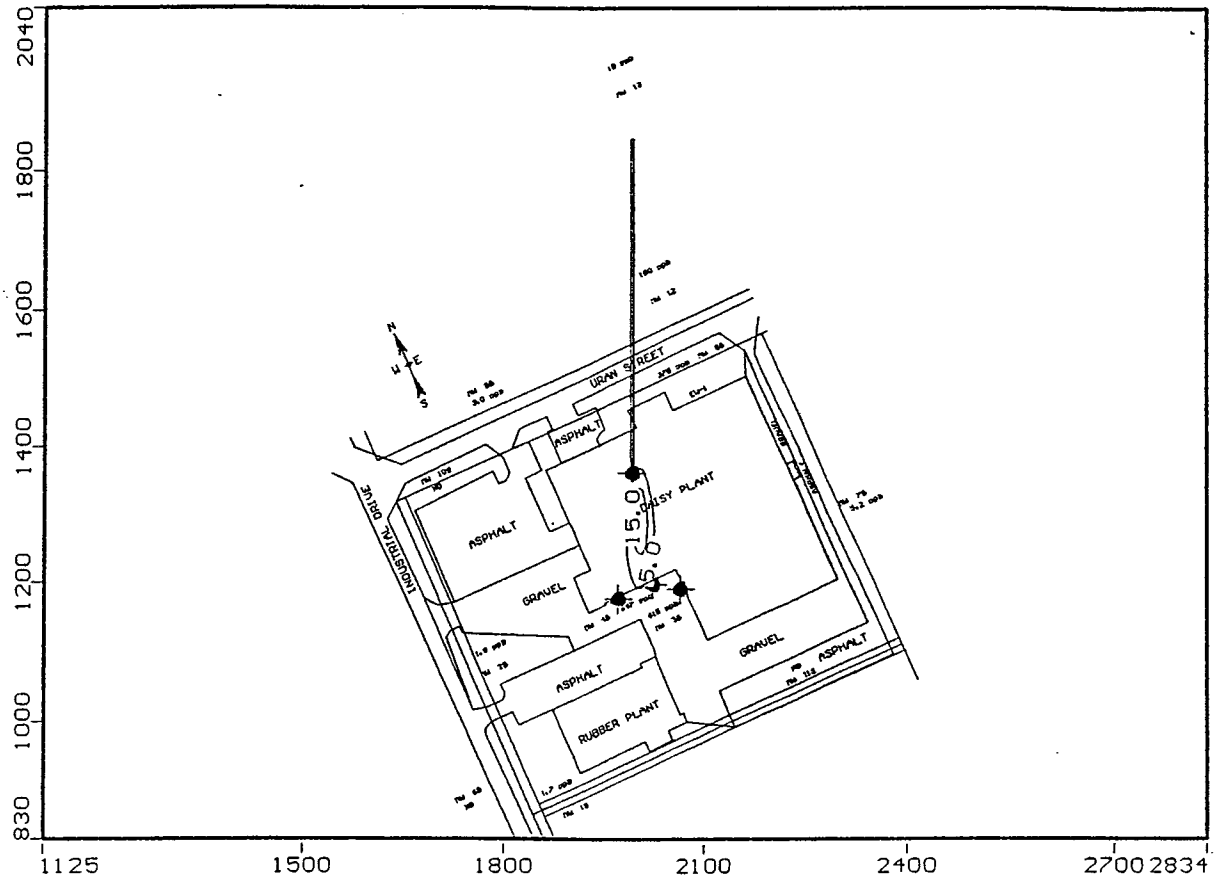


FIGURE 17
VISUAL MODFLOW
OPERATION YEAR 5

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: FEB. 05, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: DWD	CHK'D BY: NMP
SCALE: NO SCALE	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

R:\ENV\14570.025\025FIG14.DWG: 02/05/98

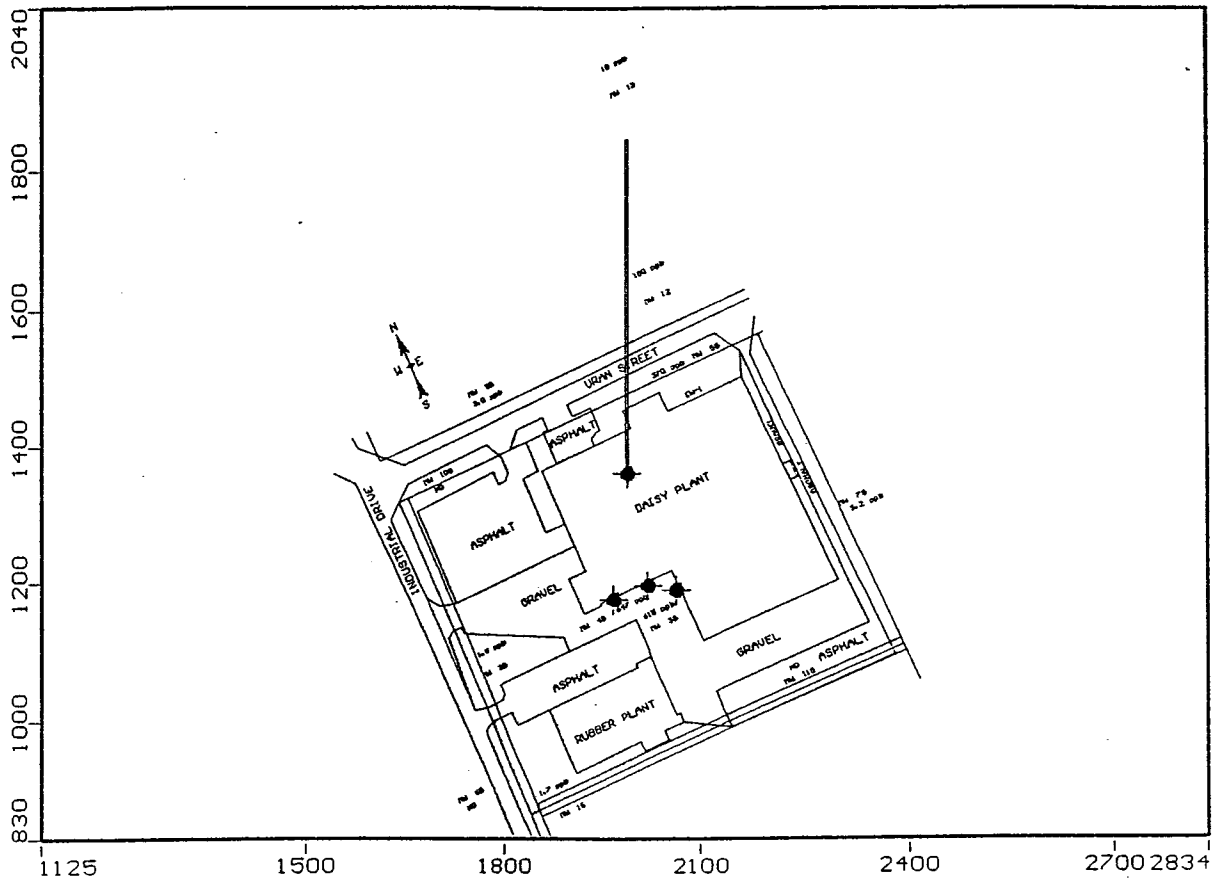


FIGURE 18
VISUAL MODFLOW
OPERATION YEAR 6

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: FEB. 05, 1998	
JOB NO.: 14570-025-045	
DRAWN BY DWD	CHK'D BY NMP
SCALE: NO SCALE	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

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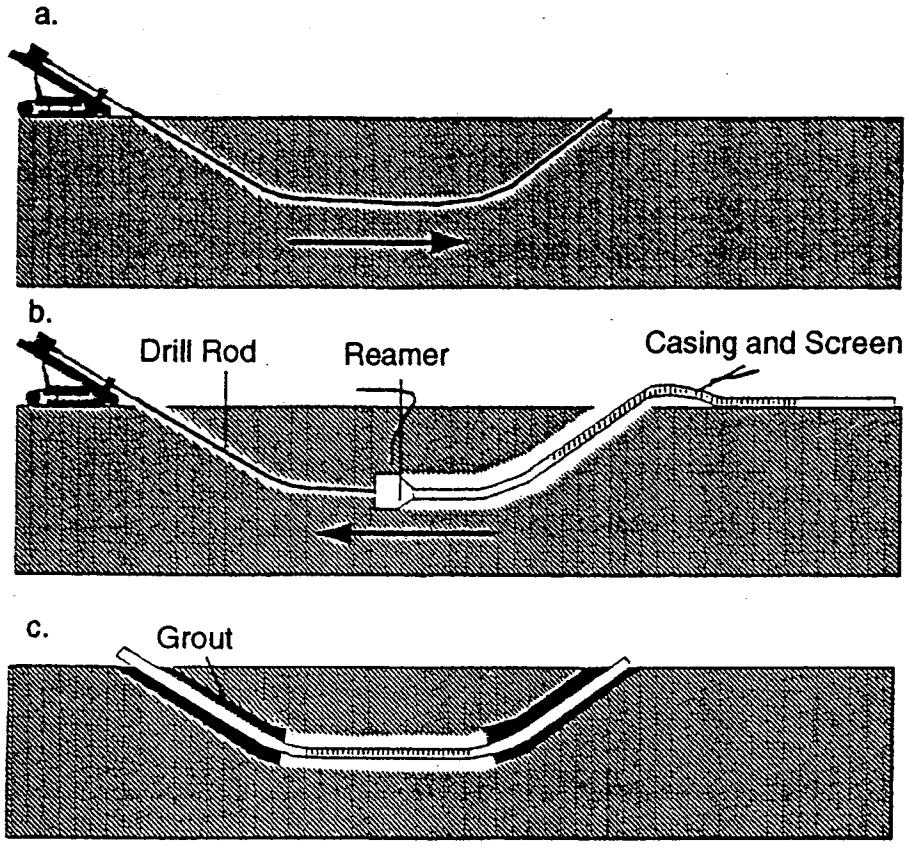


FIGURE 19
SCHEMATIC OF
CONTINUOUS WELL BORE

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: DWD	CHK'D BY: NMP
SCALE: NO SCALE	

DAMES & MOORE
GROUP
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

R:\ENV\14570.025\025FIG15.DWG: 01/22/98

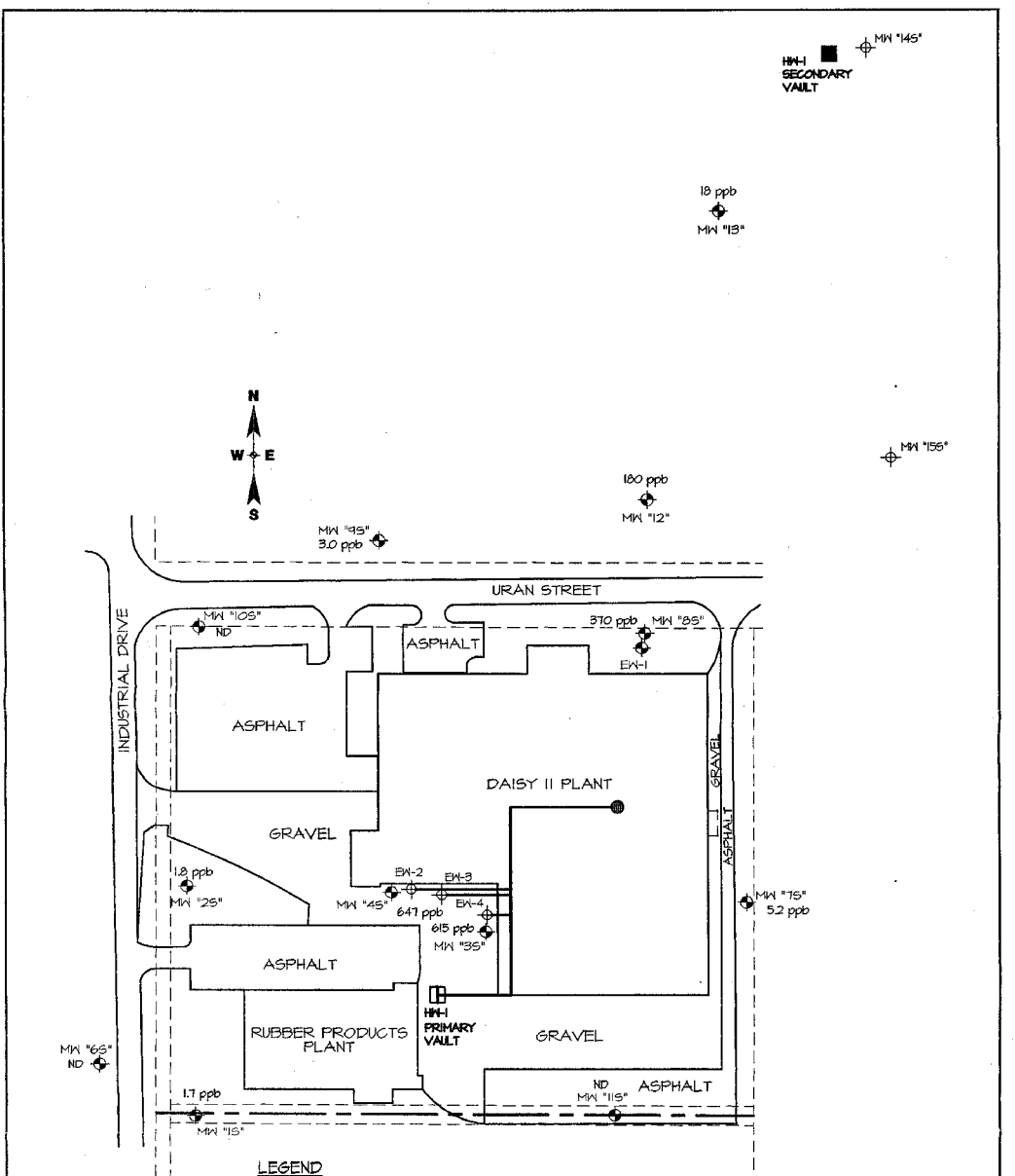


FIGURE 20
EXTRACTION SYSTEM
DISCHARGE PIPING

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	DCM GROUP — DAMES & MOORE, A DAMES & MOORE GROUP COMPANY
JOB NO.: 14570-025-045	721 EMERSON ROAD, SUITE 220 ST. LOUIS, MISSOURI 63141 PHONE: 314-993-4599 FAX: 314-993-4895
DRAWN BY: DWD / CHK'D BY: NMP	
SCALE: 1"= 100'	

R:\ENV\14570.025\025FIG16.DWG: 01/22/98

MI0001034

DIMENSIONS AND WEIGHTS

MODEL NO.	FIG.	HP	MOTOR SIZE	DISCH. SIZE	DIMENSIONS IN INCHES					APPROX. SHIP WT.
					A	B	C	D	E	
5S03-9	A	1/3	4"	1" NPT	22.3	8.8	13.5	3.8	3.9	27
5S05-13	A	1/2	4"	1" NPT	26.4	9.5	16.9	3.8	3.9	31
5S07-18	A	3/4	4"	1" NPT	31.7	10.7	21.0	3.8	3.9	34
5S10-22	A	1	4"	1" NPT	36.1	11.8	24.3	3.8	3.9	42
5S15-26	A	1 1/2	4"	1" NPT	41.2	13.6	27.6	3.8	3.9	46
5S15-31	A	1 1/2	4"	1" NPT	47.1	13.6	33.5	3.8	3.9	58
5S20-39DS	A	2	4"	1" NPT	55.2	15.1	40.1	3.8	3.9	65
5S30-48DS	A	3	4"	1" NPT	70.0	20.6	49.3	3.8	3.9	90

NOTES: All models suitable for use in 4" wells.
Weights include pump end with motor in lbs.

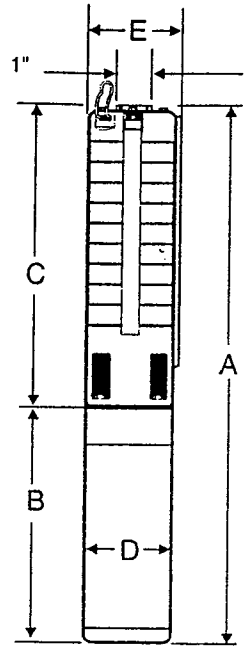


Fig. A

Performance Curves **5 GPM** **Model 5S**

FLOW RANGE: 1.2 - 7 GPM OUTLET SIZE: 1" NPT NOMINAL DIA. 4"

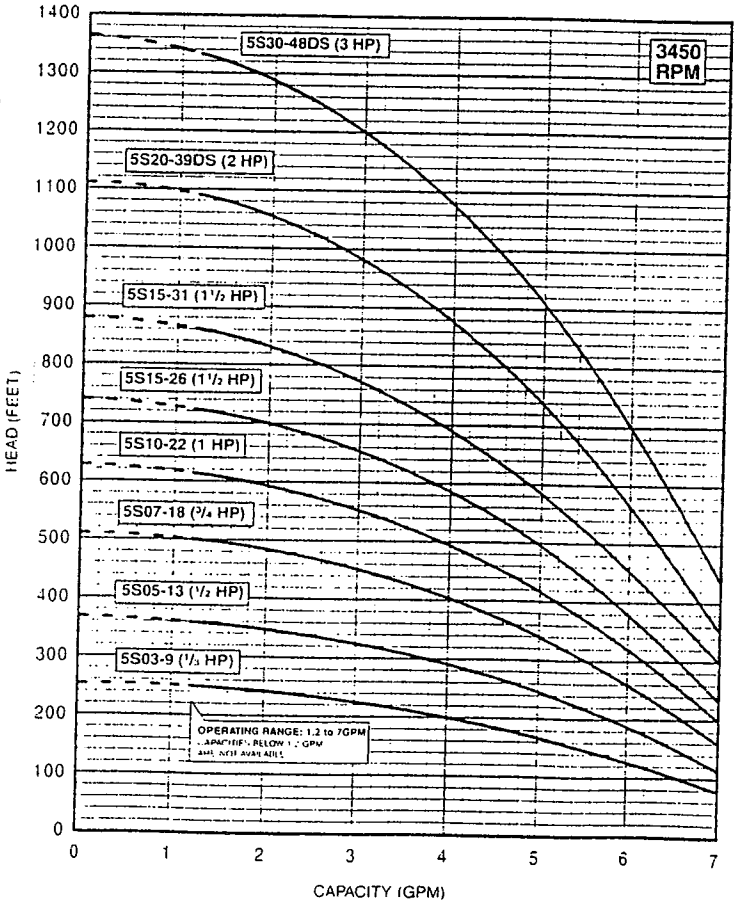
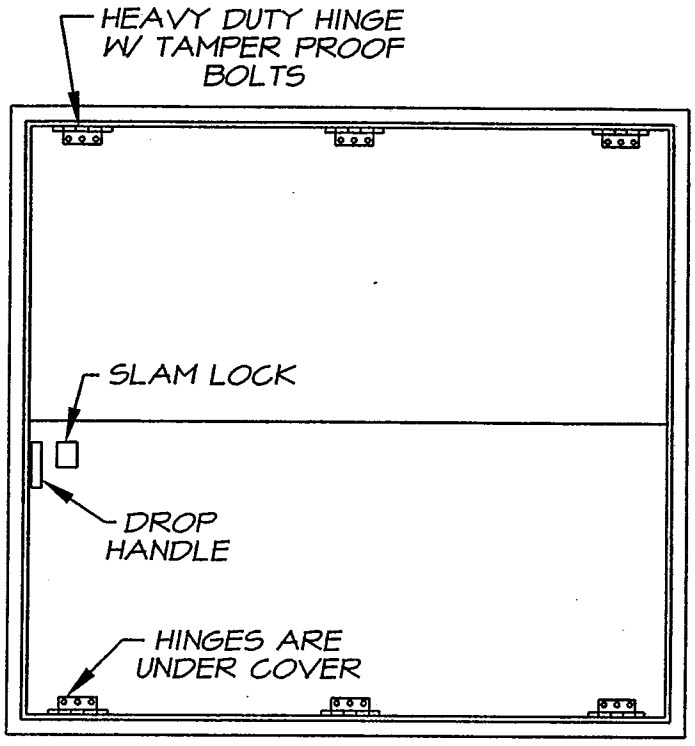


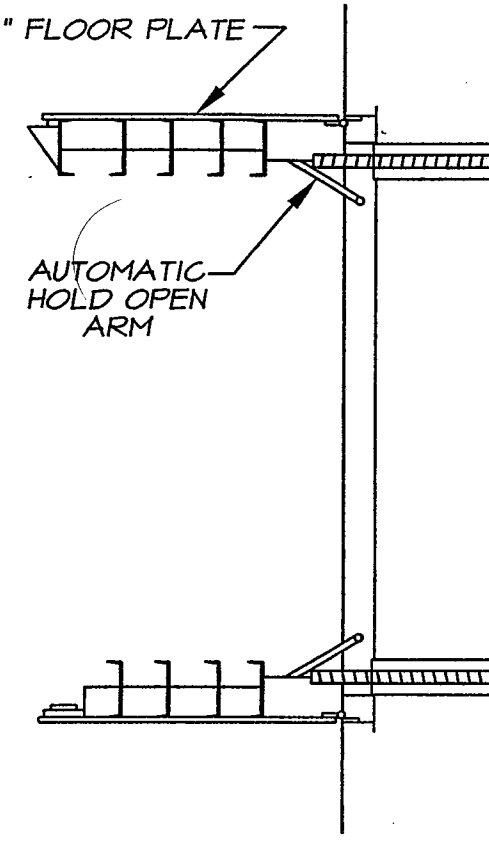
FIGURE 21
TYPICAL SUBMERSIBLE PUMP PERFORMANCE CURVE

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	DAMES & MOORE GROUP — A DAMES & MOORE GROUP COMPANY
JOB NO.: 14570-025-045	721 EMERSON ROAD, SUITE 220 ST. LOUIS, MISSOURI 63141 PHONE: 314-993-4599 FAX: 314-993-4895
DRAWN BY DWD / CHK'D BY NMP	
SCALE: NO SCALE	

R:\ENV\14570.025\025FIG17.DWG: 01/22/98





NOT TO SCALE

FIGURE 22
TYPICAL
VAULT DETAIL

RUBBER PRODUCTS/DAISY II PLANTS
EAGLE PICHER AUTOMOTIVE
HILLSDALE TOOL DIVISION
HILLSDALE, MICHIGAN

DATE: JAN. 22, 1998	
JOB NO.: 14570-025-045	
DRAWN BY: DWD	CHK'D BY: NMP
SCALE: NO SCALE	

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY
721 EMERSON ROAD, SUITE 220
ST. LOUIS, MISSOURI 63141
PHONE: 314-993-4599
FAX: 314-993-4895

R:\ENV\14570.025\025FIG18.DWG: 01/22/98

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

May 29, 1997

TO: John Spielberg, EQA
Jackson District Office
Environmental Response Division

FROM: Dan Yordanich, Geologist
Jackson District Office
Environmental Response Division

SUBJECT: Hillsdale Tool and Rubber, Hillsdale, Hillsdale County, Michigan

I have reviewed the report *"Findings of the Voluntary Investigative and Remedial Actions, Hillsdale Tool Division Rubber Products and Daisy II Facilities, Hillsdale, Michigan"* prepared for Eagle-Picher Automotive, Hillsdale Tool Division by Dames & Moore.

The following comments are provided respective of the report:

Section 2.3

- It is stated in part in the last paragraph that ETG over drilled the three original monitoring wells, installed a surface casing to a depth of 45 to 50 feet, installed two-inch diameter stainless steel pipe, and then completed the wells by grouting with a neat cement bentonite slurry. This contradicts the well construction procedure described by ETG in the *"Interim Results of the Hydrogeologic Investigation, Hillsdale Tool and Rubber Facility, Hillsdale Michigan"* (April, 1995). In general, the conversion of the existing wells, as described by ETG in the report, consisted of:

1. Grouting the bottom of the existing bore hole with a neat cement/bentonite slurry to the desired depth,
2. installation of a two-inch diameter galvanized riser with five foot stainless steel screen to the desired depth inside the existing four-inch diameter casing,
3. installation of a sand filter pack, two feet of bentonite chips, and grouting the remainder of the boring with a neat cement/bentonite slurry.

Dames & Moore is to clarify or correct this contradiction.

Section 2.4.2

- It is stated in part in paragraph 5 that "improper plugging and completion of MW-1D, MW-2D, and MW-3D as shallow wells of a nested well set". This contradicts an earlier statement in Section 2.3 that ETG re-completed the original wells as deep wells and drilled off-set shallow wells. This statement is to be corrected.
- In the sixth paragraph it is stated that a consistent anomalously low water level in MW-4D is in error. Has the consultant checked to survey data to assure that the error is not attributable to incorrect survey data?

EQ 0101
(10/95)

Section 3.4

- Of the compounds available for reporting from the USEPA Method 8010, only trichloroethylene (TCE) was requested. Since biodegradation has the potential to degrade TCE into more harmful compounds (i.e. vinyl chloride), the MDEQ requests the complete list of compounds be analyzed for and reported in the future.

Section 4.3

- Based on the data provided the horizontal extent of TCE contamination on the shallow groundwater zone has not been defined to concentrations below method detection limit or MCL. The MDEQ requests that additional monitoring well(s) be installed to define the leading edge and lateral extent of the plume.

Section 4.4

- Static water levels are requested to be collected from all the deep monitoring wells on a semi-annual basis. This data will assist to confirm groundwater flow direction and whether the mounding effect observed at MW-1D MW-2D and MW-3D is diminishing.
- Monitoring wells in the deep aquifer are requested to be sampled on a semi-annual basis for as long as there continues to be an impact to the groundwater at concentrations above applicable groundwater criteria.
- In addition, once TCE concentrations in the deep groundwater zone have demented to concentrations below the applicable groundwater criteria, one round of groundwater sampling is requested to be conducted from all monitoring wells in the deep groundwater zone.

Section 5.0

- Based on the conclusions reached from the pump testing, estimation of the hydraulic conductivity of the shallow groundwater zone, and the approximate extent of groundwater contamination, will one purge well be sufficient to capture the downgradient extent of contamination which has migrated off-site?
- Prior to decommissioning and abandonment of the SVE system other risks associated with the impacted soils beneath the Rubber Products building should be evaluated (i.e, volatilization to indoor air pathway, etc.)
- A remedial action plan (RAP) submitted should be consistent with the current zoning of the designated property. Is the property currently zoned industrial?
- A Restrictive Covenant for the impacted soils beneath the building should be prepared and submitted with a RAP submitted for this facility.

Other

- Review of the file indicates that the MDEQ has not yet received lithologic boring logs and monitoring well construction logs for the following monitoring wells: MW-4S/D, MW-5S/D, MW-6S/D, MW-7S/D and MW-8S/D. This information has been previously requested of Hillsdale Tool and Rubber, but has yet to be submitted. In addition to the boring logs and construction diagrams, elevational data is also requested to be submitted for the above referenced monitoring wells and MW-9S/D, MW-10S/D, and MW-11S/D. The elevational data should be referenced to USGS datum, and should include ground surface and top of casing elevations. A table compiling all the elevational data for all monitoring wells should be prepared and submitted to the MDEQ. If this information has already been submitted, please disregard this request.

DY:kl

URS **Facsimile**

Date: 10/20/03 Page 1 of: 16

To: Doug Rommeck From: URS CORPORATION

Firm: Eagle-Picher/Hillsdale Tool cc:

Facsimile: (313) 562-8248

Subject: **Requested Correspondence**

Message: Here are the letters that you asked for. The RAP is much too large to fax, however, we can get you a copy if you would like. I will talk to you at 2:00 (my time).

URS Corporation
1001 Highland Plaza Drive West, Suite 300
St. Louis, MO 63110
Tel: 314.429.0100
Fax: 314.429.0462
www.urscorp.com

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STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

RUSSELL J. HARDING, Director

REPLY TO:
JACKSON DISTRICT HEADQUARTERS
301 E LOUIS GLICK HWY
JACKSON MI 49201-1556

June 23, 1997

Mr. Marlyn Moon, Environmental Manager
Eagle Picher Automotive, Hillsdale Tool Division
135 E. South St., P. O. Box 286
Hillsdale, MI 49242

Dear Mr. Moon:

SUBJECT: *Findings of the Voluntary Investigative and Remedial Actions*
Hillsdale Tool and Rubber and Daisy II Facilities, Hillsdale County

Staff of the Environmental Response Division (ERD) of the Michigan Department of Environmental Quality (MDEQ) have reviewed the report noted above dated March 14, 1997, prepared by your consultant Dames & Moore for Eagle-Picher Automotive Hillsdale Tool Division (HT). The report summarizes their findings with respect to determining the environmental impacts from trichloroethylene (TCE) releases at the Hillsdale Tool and Rubber (HTR) and Daisy II facilities (Site). I will enumerate actions necessary for HT to implement in order to be considered for potential closure pursuant to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended. I will address the conclusions and recommendations noted on pages 20 and 21 of the report, but would emphasize at this time that implementation of a groundwater treatment system should take priority over any remaining soil impacts because of the continuing off-site migration of the groundwater plume. I have attached a copy of a review memo from our geologist, Mr. Dan Yordanich. Please incorporate Mr. Yordanich's comments as well as those noted below in planning your remedial actions:

1. The off-site monitoring well MW-13 appears to be located "near" the leading edge of the plume, not "at" the leading edge as noted on page 20 of the report. The plume is sufficiently defined to the west and south, but not as well to the east and north. As noted in Mr. Yordanich's memo (page 2, Section 4.3), more monitoring wells will be needed. This is especially true around the leading edge in order to monitor the effectiveness of any remedial system installed.

2. Pursuant to Section 20114(1)(h)(i), please prepare and submit a work plan that describes the groundwater remediation system for the shallow zone aquifer that you plan to install. The monitoring portion of this plan should include the installation of additional monitoring wells around the leading edge of the groundwater plume, as noted above. Since the extraction well EW-1 did not yield good pump and recharge test data, do you plan to use it as part of a remedial system to treat the groundwater plume?

3. With respect to monitoring the deeper aquifer, we agree with your conclusions. The three wells which have dropped below the 5 ppb cleanup criteria for TCE for two consecutive sampling events may be dropped from monitoring at this time. Once the other two wells being monitored drop to below the criterion, then one round of sampling from all the wells will be necessary before the MDEQ can make a no further action evaluation regarding the deep aquifer. One more year may be sufficient for continued

EQP 0100a
(10/95)

monitoring of wells MW-1D and MW-3D, but should be continued until TCE concentrations fall below the cleanup criterion of 5 ppb for two consecutive sampling events.

4. The complete delineation of the extent of soil contamination from the original release has not yet been determined to the east and west under the HTR building. This will need to be determined pursuant to Section 20114(1)(a) of the NREPA. At least two more borings will be necessary to complete this requirement; however, more may be needed.

5. With respect to your recommendation of abandoning the soil vapor extraction (SVE) system, have you evaluated the potential impacts to indoor air as a result of shutting off the system? If the system is turned off, residual TCE gases in the soil pores will not be drawn into the SVE system for treatment but may seek other routes, for example, into the HTR building. A comparison of Risk-Based Corrective Action (RBCA) screening levels for TCE volatilization to indoor air from soil indicates an action level of 1700 ppb. The highest level indicated in the report was 1,800 ppb at a depth of 16 feet. Because of the depth at which that sample was taken, unacceptable indoor air exposures seem unlikely. However, ERD toxicologists will need to review this potential risk to make a determination. Also, no determination has yet been made of the likely maximum concentration levels remaining in soils beneath the HTR building.

6. Pursuant to Section 20114(1)(h)(iv) of the NREPA, a Remedial Action Plan (RAP) will be necessary to address all remaining impacts at the Site. This is to be prepared in accordance with Sections 20107a, 20118, 20120b, and 20120d of the NREPA and also with Rule 515 of the Part 201 Administrative Rules. Any residual TCE soil contamination remaining beneath the HTR building above residential cleanup levels will need to be addressed in this RAP. If you wish to consider entering into a Restrictive Covenant to address this residual soil contamination, as noted in the report recommendation on page 21, this is one option available consistent with Part 201. It will need to be a part of the RAP and will need to be reviewed by district and management Quality Review Teams. This will then need to be approved by the MDEQ and implemented in accordance with an approved schedule. Once the remedial actions are completed according to the approved RAP, the Site will be delisted from the Michigan Sites of Environmental Contamination list.

Thank you for your efforts to-date on behalf of HT to address environmental impacts at the Site. Please contact me at 517-780-7912 should you have any questions or concerns regarding this matter.

Sincerely,

John Spielberg

John Spielberg
Jackson District Office
Environmental Response Division

JS:kl

Attachments

cc: Mr. Dan Price, Dames & Moore (w/attachments)
Mr. R. Dowe Parsons, MDEQ (w/o attachments)
Mr. Dan Yordanich, MDEQ (w/o attachments)

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

JACKSON DISTRICT OFFICE
STATE OFFICE BUILDING
301 E LOUIS GLICK HWY
JACKSON MI 49201-1556

April 20, 1998

Mr. Marlyn Moon
Eagle Picher Automotive
Hillsdale Tool Division
P. O. Box 286, 135 E. South St.
Hillsdale, Michigan 49242

Dear Mr. Moon:

SUBJECT: Incomplete Remedial Action Plan for the Hillsdale Tool and Rubber and Daisy II Facilities, Hillsdale County, Michigan

Staff of the Environmental Response Division (ERD) of the Department of Environmental Quality (DEQ) have reviewed your *Voluntary Remedial Action Plan* (RAP) dated March 2, 1998 for the Hillsdale Tool and Rubber and Daisy II facilities (Site). The RAP was prepared by Dames & Moore for Eagle-Picher Automotive Hillsdale Tool Division (HT), and received by the Jackson District Office on March 3, 1998. This letter will comment on three items: the submitted RAP, the planned remedial investigation (RI) and the proposed groundwater remediation, which will be treated as an interim response (IR). Any statutory references are from Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, and the Administrative Rules (Rules).

Section 20114(8) of Part 201 states that the DEQ shall either approve or deny the RAP within six months of the submittal of the information necessary or required for the department to makes its decision regarding RAP approval.

Remedial Action Plan (RAP)

The above mentioned RAP has been reviewed by staff of the Jackson District Office and has been found to be lacking some necessary or required information for the DEQ to make a decision. Regarding more specific and comprehensive RAP requirements, I recommend that our staff and your representatives discuss the matter after a plan for groundwater treatment is approved. This can be done either by phone or in a meeting, or both. At this time, we can ascertain the following items are required and will need to be submitted to the Jackson District Office before the DEQ can make a decision regarding RAP approval:

1. A RAP must be prepared in accordance with Part 201 and the Rules. To help enable this, please make sure you have the most current versions of Part 201 (September 1996), Part 201 Cleanup Criteria (Training Materials, January 1998) and both the proposed (January 1998) and current Rules. If you or Dames & Moore have not yet obtained any of these, I recommend you do so by calling

18

517-373-9893 and requesting copies. Please incorporate also the items noted in the June 23, 1997 and July 28, 1997 letters from Mr. John Spielberg of our staff regarding RAP requirements.

2. All site impacts, including soils, must be included. Subrule (2) of Rule 515 of the proposed Rules states that "response activity which does not comprehensively address all contamination on property owned or controlled by a person who is liable shall be considered an interim response and not a remedial action." The plan you submitted is a work plan focused on remediation of groundwater impacts, and includes also further RI work, but lacks any comprehensive treatment of soil impacts. As such, we can not treat it as a full closure RAP until such time that you will include all site impacts, including the remaining soil concerns and a discussion of all relevant exposure pathways. Our office will therefore treat your current submittal and any revisions as an IR plan, and comment accordingly. (See page 4 of this letter, Groundwater Remediation Interim Response Plan (Plan).

3. Your RAP will also need to include an evaluation of the indoor air inhalation pathway since soil samples from under the HTR building have shown remaining impacts which could affect indoor air quality. For more information on this subject, please refer to our draft guidance, *Generic Groundwater and Soil Volatilization to Indoor Air Inhalation Criteria: Technical Support Document* (DEQ, January 20, 1998).

4. A RAP requires a specific target cleanup category. Section 20120a(1) states that "the cleanup category proposed shall be the option of the person proposing the remedial action, subject to department approval...". See also Rule 705(4). We cannot evaluate your RAP without the specified target. You may specify any of the target cleanup categories noted in Section 20120a(1), or a combination of categories and the applicable cleanup criteria pursuant to Section 20120a(7). You mentioned "target cleanup levels" and "State Residential Standards" a number of times in the RAP, but without indicating which specific target or cleanup category you are proposing. If you propose the target to be the generic residential criteria, then we concur, and your Plan could be further evaluated by Jackson district staff without any need to consult Lansing staff. If you wish to propose some other target criteria, then more administrative elements will be necessary, including consultation with ERD management staff, and approval will take longer. Based on earlier evaluations and discussions, the target cleanup categories for groundwater and soils may be different. This is acceptable. Please provide a list of the actual applicable criteria proposed for all relevant pathways.

5. In accordance with Section 20114(1)(h)(v), include a RAP implementation schedule. The schedule you provided appears to focus on the groundwater treatment only. A schedule should include the series of events you plan to complete through closure of remedial actions, including soil remediation or control. In order to satisfy Section 20114(1)(g), a schedule is necessary.

6. Pursuant to Section 20118(8), you will need to include an analysis of source control measures. This should include an evaluation of the results of operating your soil vapor extraction system since 1986, and any remaining soil impacts. Please include also an evaluation of impacts to the unsaturated zone of bedrock below affected soils. Do you have any plans to reconsider using the methodology shown in the *Guidance Document, Verification of Soil Remediation* (Michigan Department of Natural Resources, April 1994, Revision 1)? In addition, have you completed any leachate tests on the more highly contaminated soil? If not, you might consider doing so. An acceptable test should be performed on a soil sample containing the highest level of contamination. Acceptable leachate tests include the toxicity characteristic leaching procedure (TCLP) or any listed in our MERA Operational Memorandum #12, Revision #2: Alternate Soil Leaching Procedure (MDNR, January 5, 1995).

7. Pursuant to Section 20120a(6), any proposed remedial action that will rely on a generic cleanup category other than residential requires documentation that demonstrates the current zoning of the HTR property is consistent with the cleanup category proposed. A document from the City of Hillsdale would be acceptable.

8. Pursuant to Section 20120b(3) and (4) for any of the limited category cleanups noted in Section 201201(a)(1)(f) to (j), including industrial, please include a draft version of a legally enforceable agreement with the department. This would include the restrictive covenant that you indicated in your July 7, 1997 "Interim Remedial Action Plan". I have attached two model documents that you can use to draft your own agreement and covenant.

9. An explanation of how you will comply with Rule 705(5). If compliance is not feasible, then you will need to provide an explanation in accordance with Section 20118(5) and (6).

Remedial Investigation (RI) Activities

Regarding your plans for further RI work, please address the following:

1. We concur with your plans for additional RI work. We prefer you complete this work prior to installing the groundwater treatment. This would mean completing the additional monitoring wells and soil borings, obtaining samples, analyzing them and submitting the results. This would assist us in evaluating the effectiveness of the proposed groundwater extraction system as well.

2. The extent of contamination must be defined to at least generic residential drinking water criteria for groundwater and to levels protective of drinking water in soils. For TCE, this would be 5 ug/L and 100 ug/kg, respectively. Non-detectable limits are also acceptable. Other VOC parameters may be applicable as well, for example, cis 1,2-dichloroethylene and vinyl chloride.

3. The proposed locations of the two additional monitoring wells is approved. If monitoring results exceed generic residential drinking water criteria however, more wells will be necessary further from the advancing plume to define the extent of contamination. This may involve seeking access to the trailer park or the Klein property further to the north/northeast.

4. All lab data is to be included in any report submitted and should include all the VOCs normally reported in the scan used, not just TCE. EPA Method 8260 is acceptable for both soils and groundwater, but see #8 below. Also, please submit complete lab data for past reports that included only TCE, if available. Your March 14, 1997 report, for example, included only TCE data for the samples taken, although the method blank reported results for other VOCs using the same method. One Chain-of-Custody sheet in that report indicated some soil samples to be analyzed using method "8010 (TCE & Breakdowns)," but only TCE was reported.

5. Have you completed any further monitoring of the deep aquifer since October 1996? We have not received any monitoring reports since then. You agreed at our meeting in Jackson on June 17, 1996 to monitor the deep aquifer on a semi-annual basis. If you have such results, please submit them to our office.

6. Your plans for two additional soil borings is accepted. However, the results of the soil samples from these might be open to interpretation with respect to possible remaining impacts below the HTR building. For example, if the results turn out to be non-detect, then that would likely mean that no soil contamination is present outside the HTR building to the east and west. However, such results

would not tell us what is the highest concentration under the building. We would need some demonstration to rule out the likelihood that TCE or breakdown products in soils beneath the building don't exceed levels protective of indoor air inhalation hazards. For TCE, this would be 37,000 ug/kg in an industrial setting.

7. The methanol preservation method for any further soil VOC investigation should be used. This EPA SW-846 Method 5035/MDEQ Method 8260 Soil VOA has been found to be more accurate than most other methods. For more information on methodology and training opportunities, please call 517-373-0249.

Groundwater Remediation Interim Response (IR) Plan (Plan)

If you wish to pursue groundwater cleanup as an approved IR, then please address the following comments, questions and recommendations in a revised Plan:

1. All lab data from any monitoring events should report all the VOCs normally reported in the scan used. Refer to item #4 above under the RI section.
2. Please answer the questions posed in the July 28, 1997 correspondence from Mr. John Spielberg of our staff regarding the proposed horizontal well installation and operation. This information is needed before we can evaluate your Plan.
3. The Plan requires a specific target cleanup category. See #4 under Remedial Action Plan (RAP) above. Please include a list of the actual applicable criteria.

If you have any questions or wish to further discuss the items described above, please contact Mr. John Spielberg of our staff at 517-780-7912. Thank you.

Sincerely,

Gary Klepper

Gary Klepper
District Supervisor
Environmental Response Division

GK:JS:kl

Enclosures

cc: Mr. Dan Schultz, DEQ
Ms. Patricia McKay, DEQ
Mr. John Spielberg, DEQ

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

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INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

JACKSON DISTRICT OFFICE
STATE OFFICE BUILDING
301 E LOUIS GLICK HWY
JACKSON MI 49201-1556

October 13, 1998

Mr. Marlyn Moon
Eagle-Picher Automotive, Hillsdale Tool Division
135 East South Street
P. O. Box 286
Hillsdale, Michigan 49242

Dear Mr. Moon:

SUBJECT: Incomplete Remedial Action Plan for the Hillsdale Tool and Rubber & Daisy II Facilities, Hillsdale County, Michigan

We have reviewed the *Revised Voluntary Remedial Action Plan* (RAP) dated June 19, 1998 for the Hillsdale Tool and Rubber and Daisy II facilities (Site). The RAP was prepared by consultant Dames & Moore for Eagle-Picher Automotive Hillsdale Tool Division (HT). The revised version was received by our office of the Department of Environmental Quality (DEQ) on July 6, 1998.

Section 20114(8) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, states that the DEQ shall either approve or deny the RAP within six months of the submittal of the information necessary or required for the department to makes its decision regarding RAP approval. Although your current RAP is much improved since the March version, it still lacks some necessary or required information for the DEQ to make a decision. The remaining deficiencies are mainly of the following two major categories:

- Information regarding facility characterization, in which defining the nature and extent of contamination is required pursuant to Section 20114(1)(a) of the NREPA. This information is required before a RAP can be approved. The DEQ wishes to emphasize the importance of completing this work as soon as is practicable.
- Information demonstrating that particular remedial actions will be sufficient.

Therefore, we are unable to conclude that your proposed response activities comprehensively address all contamination on the property in compliance with the obligations and criteria of Part 201. Please refer to the enclosed List of Required RAP Elements. The listed elements are "required" in that they appear to be necessary for RAP approval, given the remedial action

approach of your June 19 plan. Alternate approaches and/or new site data, could lead to different RAP actions being necessary or "required".

However, we are supportive of major elements of your RAP, and have the authority to acknowledge them as appropriate interim responses. And, in your particular case, dependent upon the nature of the yet to be developed site characterization information, the interim response for impacted shallow groundwater may in fact accomplish most, if not all, of the remedial actions necessary for impacts to the shallow zone groundwater. Note in particular the information regarding the horizontal extraction well in the accompanying staff memos. Although the memos do indicate a number of deficiencies in your RAP, they do also support the overall groundwater treatment you propose. Proceeding with the horizontal well recovery and treatment system at this time can both result in long-term benefits, and be evidence of your diligent pursuit of cleanup as required by Section 20114(1)(g) of the NREPA.

Thanks for your continued efforts on this case. While we appreciate your desire for securing a full RAP approval, we are precluded by law from issuing one at this time. Please contact us if we can be of further assistance. We would be most happy to provide further direction on compliance with Part 201.

A revised RAP may be submitted to our office after completing and revising the noted items above. It should include data from any new sampling and analysis of soils, bedrock and groundwater.

If you have any questions or wish to further discuss the items described above, please contact Mr. John Spielberg at 517-780-7912. Thank you.

Sincerely,

R. David Pearson, Acting for

Gary Klepper
District Supervisor
Environmental Response Division
517-780-7852

GK:JS:kl

Enclosures

cc: Mr. Dan Schultz, DEQ
Ms. Patricia McKay, DEQ
Mr. John Spielberg, DEQ
cc/enc: Mr. David Heinze, Dames & Moore

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

"Better Service for a Better Environment"

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

JACKSON DISTRICT OFFICE
STATE OFFICE BUILDING
301 E LOUIS GLICK HWY
JACKSON MI 49201-1556

May 20, 1999

DAMES & MOORE
MAY 22 1999

Mr. David J. Heinze
Dames & Moore
721 Emerson Road
Saint Louis, Missouri 63141-6748

Dear Mr. Heinze:

SUBJECT: Revised Additional Investigation Activities Work Plan, Hillsdale Tool Division: Rubber Products/Daisy II Facilities, Hillsdale County

This is written in response to your May 13, 1999 letter regarding the above referenced work plan. We have the following comments:

It is not clear from your response what your plans for verification sampling are. We do not think that an inversion of the grid adulterates the intention of the random numbers table. We approve of the current plan, but simply request the grid is inverted. Your response seems to argue against using the random numbers table at all, yet you did not propose any other method of sampling! What are your current plans?

Further, it is clear that continued confusion has clouded the issue of the deep aquifer contamination. We have repeatedly stated in meetings, telephone conversations and written correspondence that groundwater monitoring in and of itself is not sufficient as a "remedial action" to address the deep aquifer unless waivers for Administrative Rules 705(5) and 705(6) are granted. We have also explained that both extensive groundwater modeling and long term monitoring will be required. Despite our numerous attempts to explain why we require this, perhaps we have not done so well enough. Below you will find excerpts and paraphrasing of the pertinent Administrative Rules and sections of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

R 299.5705(5) of the Michigan administrative code states, "the horizontal and vertical extent of hazardous substance concentrations in an aquifer above the higher of either the concentration allowed by R 299.5707 or the concentration allowed by R 299.5709 shall not increase after the initiation of remedial actions to address an aquifer, except as approved by the director".

R 299.5705(6) of the Michigan administrative code states, "All remedial actions which address the remediation of an aquifer shall provide for removal of the hazardous substance or substances from the aquifer, either through active remediation or as a result of naturally occurring biological or chemical processes which can be documented to occur at the site".

Section 118(6)(d) of Part 201 provides for allowance of a remedial action plan pursuant to Rules 705(5) and 705(6) if the remedial action plan provides for the reduction of hazardous substance concentrations in the aquifer through a naturally occurring process that is

documented to occur at the facility. However, it has to be demonstrated that there will be no adverse impact on the environment as the result of migration of the hazardous substances during the remedial action, except for that part of the aquifer specified in and approved by the department in the remedial action plan. Also, the remedial action must include enforceable land use restrictions or other institutional controls necessary to prevent unacceptable risk from exposure to the hazardous substances, as defined by the cleanup criteria approved as part of the remedial action plan.

Section 118(5) states,"The department may select or approve of a remedial action plan meeting the criteria provide for in Section 20120a that does not attain a degree of control or cleanup of hazardous substances that complies with R 299.5705(5) or R 299.5705(6) of the Michigan administrative code, or both, if the department makes a finding that the remedial action is protective of the public health, safety, and welfare, and the environment. Notwithstanding any other provision of this subsection, the department shall not approve of a remedial action plan that does not attain a degree of control or cleanup of hazardous substances that complies with R 299.5705(5) or R 299.5705(6) of the Michigan administrative code if the remedial action plan is being implemented by a person who is liable under Section 20126 and the release was grossly negligent or intentional, unless attaining that degree of control is technically infeasible, or the adverse environmental impact of implementing a remedial action to satisfy the rule would exceed the environmental benefit of that remedial action."

It has not been determined whether the release that caused the contamination was grossly negligent. Both the Lansing and District Quality Review Teams would review this matter upon receipt of a waiver request. If an affirmative determination were made, the waiver request would be denied.

Regarding the above as it relates to the deep aquifer contamination, three things must be made clear. In the event the waiver for Rule 705(5) is not granted, it must be ensured that the impacted portion of the deep aquifer is not allowed to expand at all, even if there is a restrictive covenant on the use of the deep aquifer underneath your clients property. This is what Rule 705(5) means. The source of the confusion is obvious, for it usually seems to people that the compliance point is the property boundary. Actually, without a waiver for Rule 705(5), the compliance point is the current existing edges of the plume. It can not be allowed to expand. You have said you do not intend to install additional deep aquifer monitoring wells. Absent the waiver, how would you assure that the currently unimpacted aquifer remains as such? We see the only way is to install wells at the edge of the deep aquifer contamination. To monitor at the property boundary would be insufficient for the purpose of demonstrating compliance with Rule 705(5).

Secondly, the property boundary compliance points exist only to ensure that the concentrations of the contaminants do not exceed the residential drinking water criteria once (or if) the contaminants cross the property boundary. Even with a waiver for 705(5), it is necessary to ensure the continued protection of off-site groundwater resources. The reason I suggested additional wells is so that they can serve as sentry wells and perhaps to demonstrate compliance with 705(5). Sentry wells are placed far enough from the property boundary in order to allow sufficient time to implement an active groundwater recovery system if monitoring shows that the model was faulty. In other words, if you monitor right at the property boundary and you unexpectedly detect contamination, it is too late. Off-site groundwater resources are left vulnerable to migrating contamination. You must demonstrate this concern can be addressed through existing deep aquifer wells or you must install additional deep monitoring wells.

Lastly, but perhaps most importantly, the only way for the waiver for Rule 705(5) and 705(6) to be granted is if you can demonstrate compliance with section 118(6)(d). Again, this means you must demonstrate the reduction of hazardous substance concentrations is occurring in the aquifer through a naturally occurring process. It is quite possible that a part of being able to document this naturally occurring process will require additional wells being installed. **The reduction of the concentrations must be attributable to something other than continued migration and dilution.** An inadequate aquifer-monitoring plan could jeopardize the approval of the waiver. If the waiver is requested as a part of the Remedial Action Plan (RAP), the entire RAP could be denied.

If designed properly, additional monitoring wells can be placed such that if, in the event the waiver for 705(5) and 705(6) is not granted, the wells could serve to demonstrate compliance with Rule 705(5). At this point in time, we can "agree to disagree" as this issue should be addressed in the RAP. The purpose of our comments was to suggest installing these wells now, in order to avoid expensive re-mobilization costs that you may encounter if additional monitoring wells are required in order for the RAP to get approval. When the RAP comes in, both District and Lansing Quality Review Teams will review the RAP. An aquifer-monitoring plan shall be part of all remedial action plans that address aquifer contamination. The aquifer monitoring plan shall include all of the following: information addressed by R 299.5519(2)(a) to (*l*); identification of points of compliance for judging the effectiveness of the remedial action; and identification of points of compliance if standards based on section 20120a(1)(a) are required to be met as part of the remedial action. Section 20120a(1)(a) is the residential cleanup category which will be a part of the RAP at least at the property boundary. If any of the requirements of the aquifer-monitoring plan are deficient, we will not have the opportunity to ask you about it then. Our only option once we have a RAP is to grant approval or deny it within 6 months of submittal. If the department does not approve the plan, the reasons for the denial shall be provided by the department in writing with a complete and specific statement of the conditions or requirements necessary to obtain approval.

How you wish to address this issue as it relates to the current remedial investigation is up to you. Previous correspondence indicated your client's desire for the Michigan Department of Environmental Quality to tell you what you need to do in the remedial investigation so that you could move to a RAP stage. This correspondence is intended to offer you the benefit of our judgment and experience so that you may design an acceptable Remedial Investigation and RAP, which can gain quick approval.

I hope the issue of the deep aquifer is now clear, but if you have any questions or comments, please do not hesitate to contact me at 517-780-7914.

Sincerely

Vicki Katko

Vicki Katko
Environmental Quality Analyst
Environmental Response Division

VK:kl

cc: Mr. Marlyn Moon, Hillsdale Tool
Mr. R. Dowe Parsons, MDEQ

EAGLE PICHER
AUTOMOTIVE
HILLSDALE TOOL DIVISION
HT

DATE
JUN 10 1999

June 7, 1999

Environmental Response Division
Jackson District Office
Jackson State Office Building
301 East Louis Glick Hwy.
Jackson, Mi. 49201-1556

To Whom It May Concern:

Enclosed is the completed Notice of Migration of Contamination (form EQP4482) for the Hillsdale Tool site located at 215 and 221 Industrial Drive in Hillsdale Mi. 49242. Also enclosed is a modeling map showing the ground water contamination of the TCE that has migrated off site and concentrations for those area's (Figure 1). The soil contamination is outlined in figure 2.
This infromation is a duplicate to materials in reports that has been previously submitted to your department. This project has been on going for a number of years so I was surprised to find form EQP4482 on the internet and the reporting deadline. There has not been any notice received by our company or any other sites that I have spoken to or did our notice get lost in the mail.

If you have any further questions or comments please notify me at 517-439-0547.

Sincerely,
Marlyn Moon
Marlyn Moon
Hillsdale Tool Environmental Manager

Cc: Dames & Moore
Michael Dixon
File word\mydoc\letters\letter to deq erd for off site migration

135 SOUTH STREET • HILLSDALE, MICHIGAN 49242 • 517-439-9381 • FAX: 517-439-5953
MAILING ADDRESS: P.O. BOX 286 • HILLSDALE, MICHIGAN 49242

ENVIRONMENTAL RESPONSE DIVISION

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL RESPONSE DIVISION

For DEQ Use Only
ITS# _____
Site ID# _____

NOTICE OF MIGRATION OF CONTAMINATION (FORM EQP4482)

(Under the authority of Part 201, 1994 Act 451, as amended, and rules promulgated thereunder)

An owner or operator of property that is a facility who has knowledge that a hazardous substance is emanating from, has emanated from, or is likely to be emanating from the property and migrating beyond the boundaries of the property that he or she owns or operates is required under R 299.51017(1) to notify the Michigan Department of Environmental Quality ("DEQ"), unless he or she is exempt from MCL 324.20107a (see MCL 324.20107a(4) for exemptions). With regard to conditions known to the owner or operator prior to March 11, 1999 (the effective date of R 299.51017), this notice must be provided to the DEQ by June 9, 1999 (90 days after the effective date). With regard to conditions that were not known to the owner or operator prior to March 11, 1999, the report must be submitted to the DEQ within 45 days after the owner or operator has knowledge that hazardous substances have migrated, or are likely to have migrated, to or beyond the boundary of his or her property in reportable concentrations. Use of this form is mandatory for the notice required by R 299.51017(1). Completing this notice in no way relieves a person who is subject to MCL 324.20114 from the responsibility to undertake required response activities.

This notice must be sent to the DEQ office that serves the county in which the property is located.
A list of DEQ offices is attached. The DEQ will not prepare acknowledgement of receipt of these notices. The sender is responsible for sending the report using a method that provides proof of delivery if such proof is desired. Please label the outside of the envelope "Rule 1017 Notice."

Please answer the following questions as completely as possible.

1. Name and address of owner or operator making the report.
   Hillsdale Tool & Mfg. Co.
   135 East South Street
   Hillsdale, Mi. 49242

2. Status relative to the property.
   (Check one or both, as applicable.)
   Owner ☒
   Operator ☐

3. Name and telephone number of contact person for owner or operator.
   Marlyn Moon
   517-439-9381

4. Address/location of the property that is the subject of this notice (i.e., owned or operated by the person identified in item #1).
   215 & 221 Industrial Drive
   Hillsdale, Mi. 49242

Country USA

5. Complete the Table on Page 3 of this Form for each hazardous substance which has migrated, or is likely to have migrated, up to or beyond the property boundary at a concentration that exceeds a Generic Residential Cleanup Criterion developed by the DEQ pursuant to MCL 324.10120a(1). Complete additional copies of Page 3, if necessary, to list all hazardous substances that must be reported. Include a scaled map or drawing that shows the location of sampling points identified on the Table on Page 3.

6. If a map, report, or other additional information is available which depicts or describes the conditions reported on this form, and the basis for your conclusion that this report is required, that information may be (but is not required to be) submitted with this form. You may also identify by title and date any reports previously submitted to the DEQ that contain relevant information. Include the name of the site or facility that the report addresses. This additional information may assist the DEQ in determining whether response activity is required to address conditions described in this notice.

With my signature below, I certify that I am legally authorized to execute this notice on behalf of the owner or operator named on this form, and that to the best of my knowledge and belief the above representations are complete and accurate. I understand that intentionally submitting false information to the DEQ is a felony and may result in fines up to $25,000 for each violation.

Signature _____ Date June 7, 1999
(Person legally authorized to bind the person making this report)

Name (Typed or Printed) John Traylor

Title (Typed or Printed) Executive Vice President

NOTICE OF MIGRATION OF CONTAMINATION (FORM EQP4482)

(Under the authority of Part 201, 1994 Act 451, as amended, and the Rules promulgated thereunder)

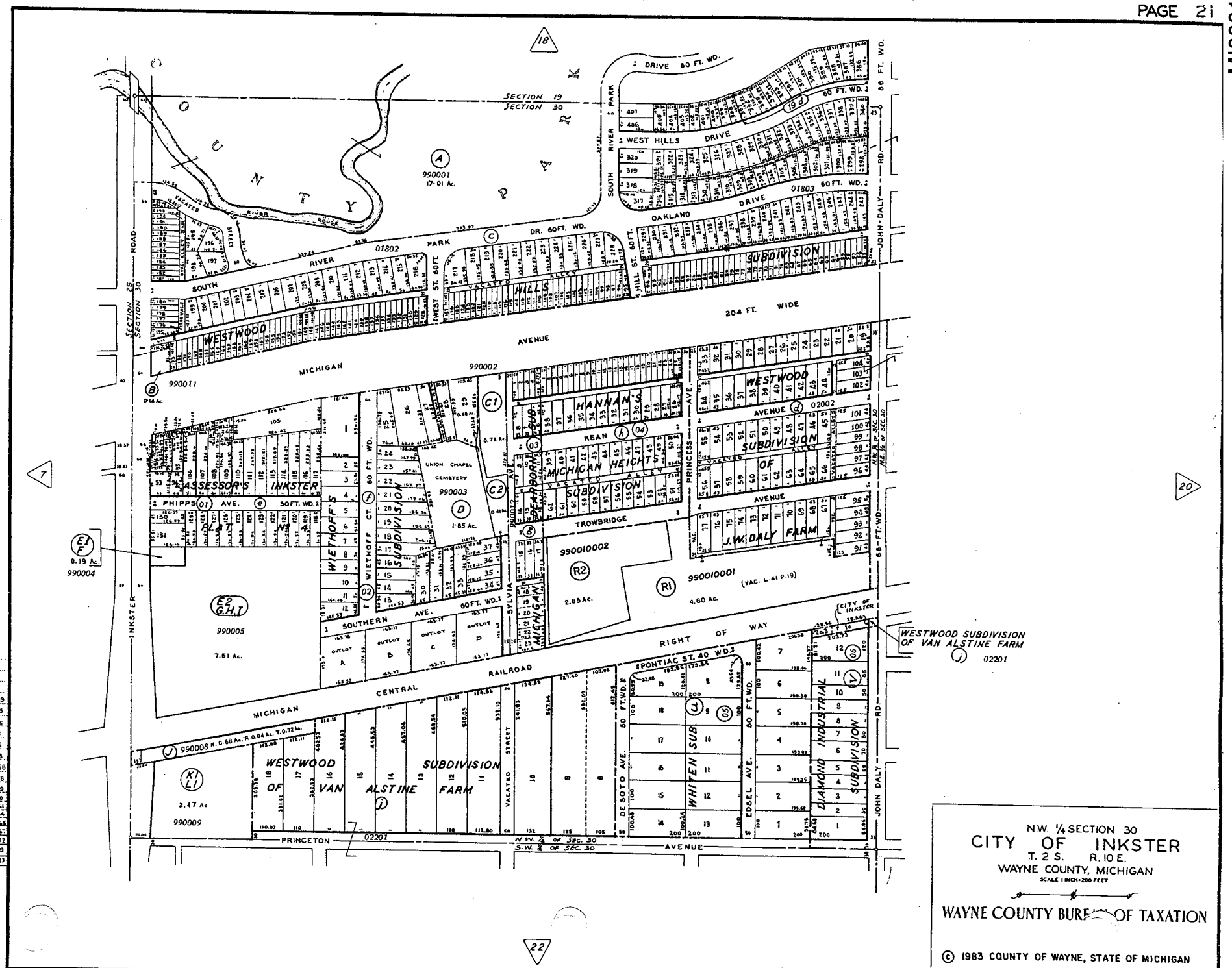
See Item 5 on Page 1 of this Form for instructions to be used in completing this Table. The information to be includ the Table is:

Column A Name of hazardous substance.
Column B Chemical Abstract Service (CAS) Number for the hazardous substance.
Column C Sample location for Column D (relate to label on map).
Column D Maximum hazardous substance concentration measured on the property, including units (e.g., 100 u Report maximum concentration separately for each environmental medium.
Column E Environmental medium in which concentration reported in Column D was measured (e.g., soil or gro
Column F Distance from point of maximum measured concentration (Column C) to property boundary, in direct migration, if direction is known or can reasonably be inferred. If direction is unknown, list distance to boundary.
Column G Direction of contaminant migration, if known.
Column H Sample location for Column I (relate to label on map).
Column I Concentration closest to property boundary, if known. If a concentration lower than the maximum co Column D has been measured at a point closer to the property boundary in the direction of contamin Column I to list the concentration that was measured closest to the property boundary in the directio migration.
Column J Environmental medium for measurement reported in Column I, if applicable.

A Hazardous Substance	B CAS Number	C Sample Location for "D"	D Maximum Concentration	E Environmental Medium for "D"	F Distance to Property Boundary	G Direction of Migration
Trichloroethylene	79-01-6	MW 4S	570 ppb	Groundwater	375'	N-NE
"	"	SB-7	1,800 ppb	Soil	525'	N-NE

EQP4482
Page 3 of 3

ADDRESSES FOR SUBMITTALS TO DEPARTMENT OF ENVIRONMENTAL QUALITY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SECTION 19
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SECTION 30
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990003
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WEST HILLS DRIVE
OAKLAND DRIVE
SOUTH RIVER PARK
DR. 60 FT. WD.
HILL ST. 60 FT.
WEST ST. 60 FT.
VACATED ALLEY
WESTWOOD SUBDIVISION
HILLS
MICHIGAN AVENUE
204 FT. WIDE
HANNAN'S SUB.
KEAN
MICHIGAN HEIGHTS SUBDIVISION
BEARBORN
TROWBRIDGE
PRINCESS AVE.
WESTWOOD SUBDIVISION OF J.W. DALY FARM
ASSESSOR'S INKSTER PLAT No. 4
PHIPPS AVE. 50 FT. WD.
WIETHOFF'S SUBDIVISION
WIETHOFF CT. 60 FT. WD.
UNION CHAPEL CEMETERY
SOUTHERN AVE. 60 FT. WD.
SYLVIA AVE.
MICHIGAN
INKSTER ROAD
RIGHT OF WAY
MICHIGAN CENTRAL RAILROAD
PONTIAC ST. 40 WD.
WESTWOOD SUBDIVISION OF VAN ALSTINE FARM
WHITEN SUB
DIAMOND INDUSTRIAL SUBDIVISION
DE SOTO AVE. 50 FT. WD.
EDSEL AVE. 50 FT. WD.
VACATED STREET
PRINCETON AVENUE
N.W. 1/4 OF SEC. 30
S.W. 1/4 OF SEC. 30
JOHN DALY RD.
66 FT. WD.
CITY OF INKSTER
WESTWOOD SUBDIVISION OF VAN ALSTINE FARM
N.W. 1/4 OF SEC. 30
N.E. 1/4 OF SEC. 30
18
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22
N.W. 1/4 SECTION 30
CITY OF INKSTER
T. 2 S. R. 10 E.
WAYNE COUNTY, MICHIGAN
SCALE 1 INCH=200 FEET
WAYNE COUNTY BUREAU OF TAXATION
© 1983 COUNTY OF WAYNE, STATE OF MICHIGAN

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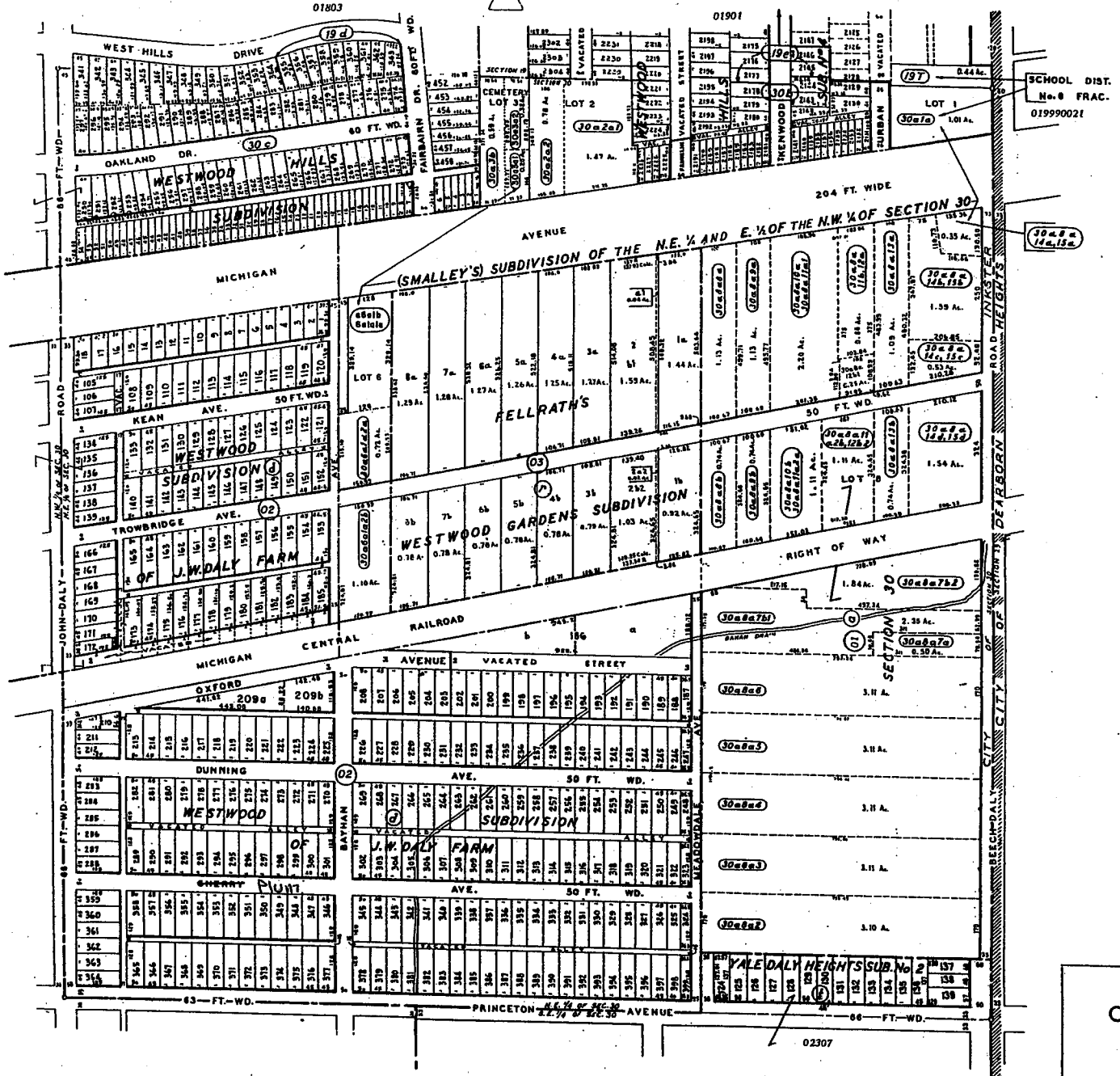

N.E. ¼ SECTION 30

CITY OF INKSTER

T. 2 S. R. 10 E.

WAYNE COUNTY, MICHIGAN

SCALE 1 INCH = 200 FEET

WAYNE COUNTY BUREAU OF TAXATION

© 1983 COUNTY OF WAYNE, STATE OF MICHIGAN

MI0001056

-Land and Buildings Prompt----------LB8005S1--

Jurisdiction: **I INKSTER**

Reset: _____ ____ + _____ ____ + _____

Type option, press Enter.
1=Select 10=Legal

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Opt	Property #	S	Address
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__	020-02-0095-000	A	**2638 PRINCESS**
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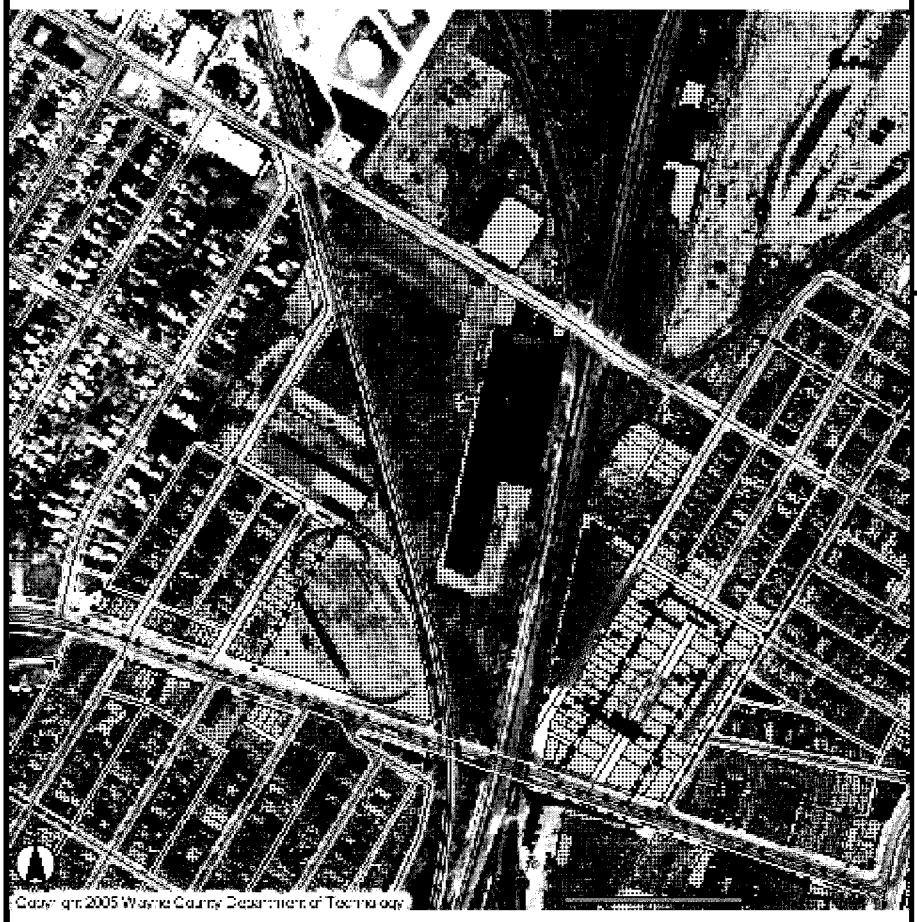
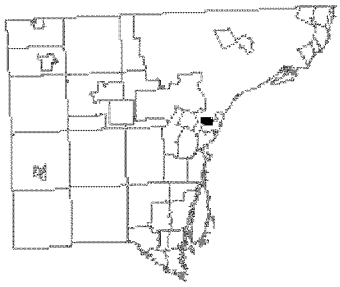
__	021-99-0010-707	A	**2638 PRINCESS**
__	~~999-00-1911-001~~	A	**2638 PRINCESS**
__	~~999-00-1976-003~~	A	**2638 PRINCESS**
__	999-00-1020-000	A	**2640 PRINCESS**
__	021-99-0010-001	A	**2642 PRINCESS**
__	021-99-0010-004	A	**2642 PRINCESS**
__	999-00-1944-002	A	**2642 PRINCESS**

More...

-F3=Exit F9=Reseq F12=Cancel F15=Juris F19=Left F20=Right----------

Wayne County Map Viewer





Legend

- Highway
- Major Road
- Local Road
- Road Edge
- Lot Line
- Plat
- Tax Parcel (Out County)
- Aerial Images (2000)

Tax Information Search Results

[Back to Non-Printer Friendly Version] [Send To Printer]

2 total record(s) were found in your search.

Parcel Number	Owner Name ↑	Property Address
50 008 99 0007 701	EAGLE PICHER INDUSTRIES INC	W PLEASANT
50 004 17 0070 000	EAGLE, PATRICIA	21 FOREST

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ARCADIS

ARCADIS G&M of Michigan, LLC
25200 Telegraph Road
Southfield
Michigan 48034
Tel 248 936 8000
Fax 248 936 8111

MEMO

To:
Paul Harper, EaglePicher
Douglas Rommeck, EaglePicher
Keith White, EaglePicher

Copies:
File

From:
Joe Quinnan and Greg Zellmer

Date:
March 2, 2005

ARCADIS Project No.:
SF003152.0005.00001

Subject:
DRAFT – *Privileged and Confidential Attorney Client Communication*
Summary of February 2005 Field Activities and Sampling at the EaglePicher Facility at 135 E. South Street in Hillsdale, Michigan

---

On February 3, 2005, ARCADIS collected depth-to-water measurements and groundwater samples from the four monitoring wells (MW-1 through MW-4) at the site (see Figure 1). The groundwater samples were analyzed for VOCs and PAHs to confirm the initial sampling results. ARCADIS attempted to obtain access to the storm sewer system to determine the depth of the laterals; however, due to snow and ice, the storm drain system was not accessible. The results are summarized below.

Analytical Results

The groundwater analytical results are presented in Table 1 and on Figure 1 and indicated the following:

- VOCs and PAHs were not detected in the groundwater samples collected from Monitoring Wells MW-1 or MW-4.
- Various VOCs and PAHs ranging from 1.1 ug/L (toluene) to 200 ug/L (1,2,4-trimethylbenzene [TMB]) were detected in the groundwater sample collected from Monitoring Well MW-3. The constituents detected were of similar magnitude as during previous sampling events.
- Vinyl chloride was detected in the groundwater sample collected from Monitoring Well MW-2 at a concentration (2.2 ug/L) that exceeded the generic MDEQ drinking water criteria of 2 ug/L, but was less

than the GSI criteria of 15 ug/L. No other VOCs or PAHs were detected in this sample. This result confirms the prior detection.

Groundwater Elevations and Flow Direction

Depth-to-water was measured at approximately 6 to 7 feet below the ground surface. The groundwater elevations indicate that the groundwater flow direction is to the east-northeast consistent with prior interpretations. Groundwater elevations and flow direction are presented in Figure 2.

Conclusions

Based on the results of the groundwater monitoring results, ARCADIS presents the following conclusions:

- TMB isomers, vinyl chloride, xylenes, and naphthalene exceeded generic MDEQ drinking water and GSI criteria in samples collected from Well MW-3.
- Petroleum hydrocarbon constituents detected in samples collected from Well MW-3 have not been detected in perimeter monitoring wells (i.e., MW-1, MW-2, and MW-4). Thus, the extent of petroleum hydrocarbons has been adequately defined to the west, north and east-northeast and petroleum hydrocarbon constituents do not appear to be adversely impacting potential off site receptors.
- Based on the analytical results of groundwater samples collected from Well MW-3 and the soil samples collected from soil borings completed inside the facility, the extent of petroleum hydrocarbons has not been adequately defined to the south-southeast.
- Chlorinated compounds were not detected in the samples collected from Wells MW-1 and MW-4. Thus, the extent of chlorinated compounds has been adequately defined to the west and north. Chlorinated compounds do not appear to be adversely impacting potential off-site receptors to the west and north.
- Several chlorinated compounds were detected in the sample collected from downgradient monitoring well MW-2 during the November 2004 event. Vinyl chloride was the only constituent detected in the sample collected from Well MW-2 during the February 2005 event. Vinyl chloride concentrations exceeded drinking water criteria but did not exceed GSI criteria. Thus, chlorinated compounds do not appear to be adversely impacting the St. Joseph River downgradient of Well MW-2.
- Based on the analytical results of groundwater samples collected from Well MW-3 and the soil samples collected from soil borings completed inside the facility, the extent of chlorinated compounds has not been adequately defined to the south-southeast.

ARCADIS

DRAFT
EaglePicher
South Street
March 2, 2005

Recommendations

Additional Characterization

The analytical results of previous investigative activities indicate soil exceedances of MDEQ drinking water and GSI protection criteria. These criteria are important from a characterization perspective, as delineation is required to all relevant generic criteria. As discussed above, the groundwater analytical results indicate that the extent of chlorinated and petroleum hydrocarbon compounds detected in the soil samples has been adequately addressed to the west, north and northeast, but not to the east-southeast.

1. To verify the extent of COCs to the east and south, ARCADIS recommends additional borings/monitoring wells be completed and collect soil and groundwater samples. The cost to conduct this activity is estimated to be $5,000 to $7,000.

2. The soil samples collected from AGM-11 (inside the building) indicate increasing chlorinated compound concentrations with depth. ARCADIS recommends completing a soil boring and collecting groundwater samples at 5 to 10 foot depth intervals to determine the vertical extent of impacts. The cost to conduct this activity is estimated to be $4,000 to $6,000.

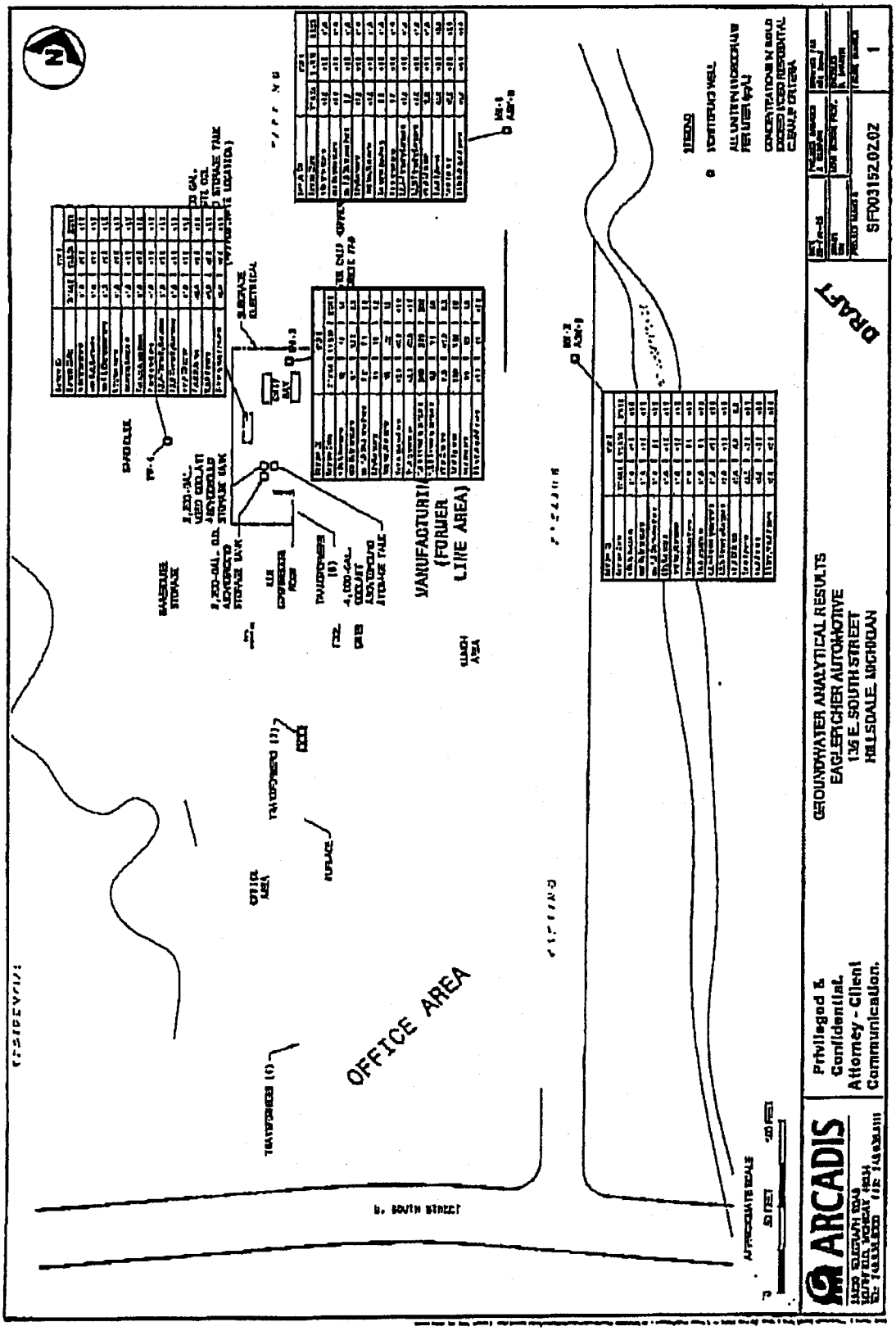
3. Continue to collect groundwater samples from existing monitoring wells on a quarterly basis. The cost to conduct this activity (4 sample events using low flow sample collection) is estimated to be $8,000 to $9,000.

As discussed in our December 2004 meeting, vinyl chloride exceeding generic criteria was detected in a perimeter well and is potentially migrating off site. By rule, a notice of off-site migration should be reported to the MDEQ. However, ARCADIS agrees that the storm drain could influence groundwater flow along the property line down gradient of the impact and restrict migration of the impact. In addition, concentrations of chlorinated compounds have decreased during each sample event. Therefore, ARCADIS recommends obtaining the depth and position of the storm drain system and evaluating additional sampling results to determine if a notice is necessary.

Remediation

It is ARCADIS' understanding that EaglePicher would like to pursue a passive, monitoring strategy at the South Street Site. Based on the results of the investigative activities, it is ARCADIS' opinion is that this approach is reasonable. Following delineation of soil and groundwater impacts, ARCADIS recommends that EaglePicher pursue a groundwater use restriction and passive remediation by monitoring. Four consecutive quarters of groundwater monitoring with perimeter results below generic criteria would be required. Assuming delineation is complete with 2 additional wells, the estimated cost to conduct this closure activity would be approximately $12,000 to $15,000.

[P:\EPNCommon\EaglePicher\EPO167\Hillsdale\130 E. South St\Site Info\February 2005 Results\South 2-23-05 Invest Memo.doc]


OFFICE AREA
MANUFACTURING (FORMER LINE AREA)
GROUNDWATER ANALYTICAL RESULTS
EAGLEPICHER AUTOMOTIVE
135 E. SOUTH STREET
HILLSDALE, MICHIGAN
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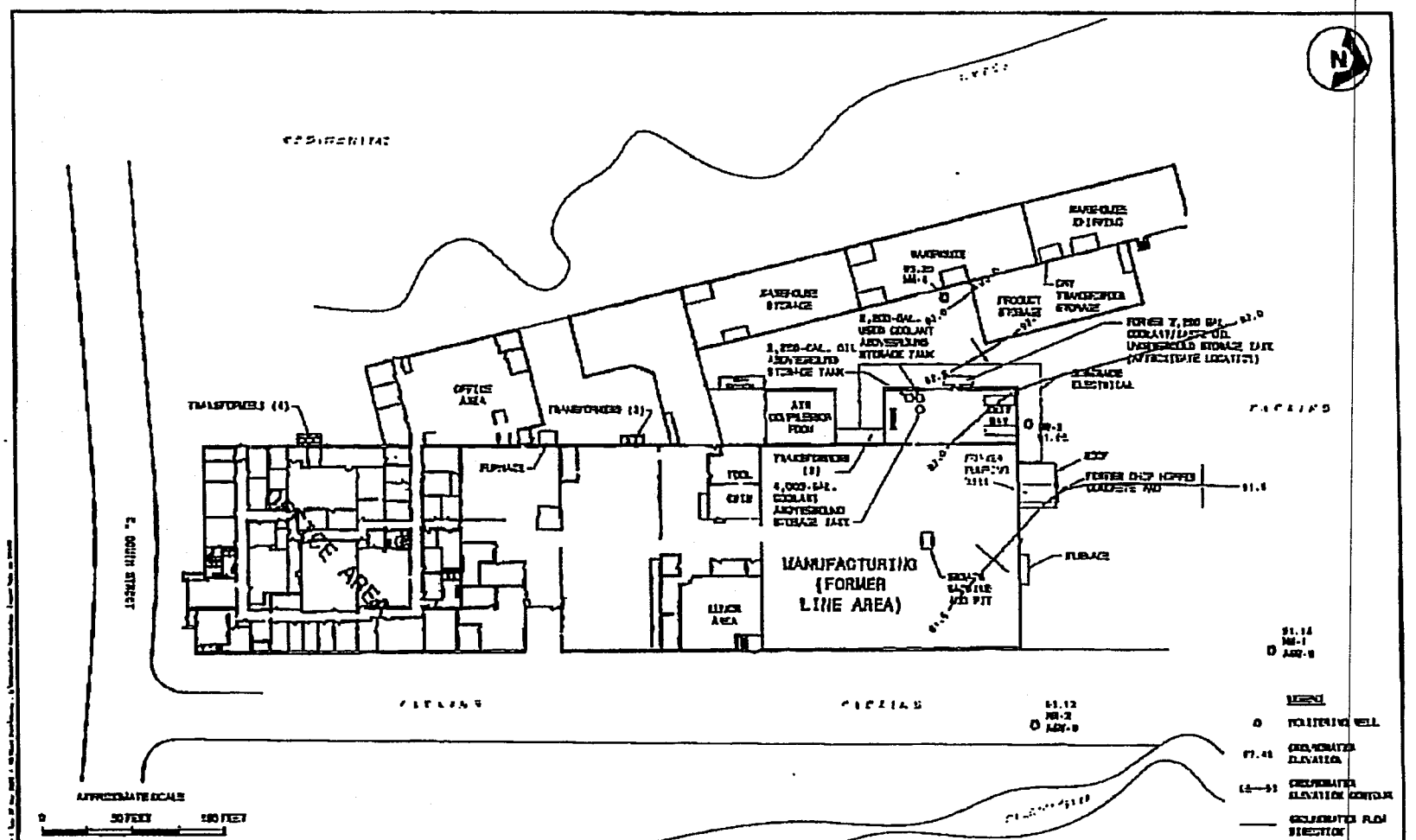
ARCADIS
DRAFT
SF003152.02.02
1



ARCADIS

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GROUNDWATER ELEVATION - FEBRUARY 3, 2005
EAGLEPICHER AUTOMOTIVE
135 E. SOUTH STREET
HILLSDALE, MICHIGAN

SF003152.02.02

2

Table 1. Constituents Detected in Groundwater Samples, EaglePicher Automotive, 135 E. South Street, Hillsdale, Michigan.

Sample ID:	MW-1				MW-2			MW-3	
Sample Date:	7/14/04	8/17/04	11/8/04	2/3/05	7/14/04	11/8/04	2/3/05	7/14/04	11/8/04
Volatile Organic Compounds									
Benzene (I)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0*	1.1
n-Butylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12	14
sec-Butylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	9.1	12.0
tert-Butylbenzene (I)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0*	<2.0*
cis-1,2-Dichloroethene	6.7	<1.0	<1.0	<1.0	<1.0	5.2	<1.0	7.0	7.0
Ethylbenzene (I)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11	16
Isopropylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	16	22
n-Propylbenzene (I)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0*	<2.0*
Tetrachloroethene	2.8	<1.0	<1.0	<1.0	<1.0	2.0	<1.0	<2.0*	<2.0*
Toluene (I)	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	1.4	<2.0*	<2.0*
Trichloroethene	1.7	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<2.0*	<2.0*
1,2,4-Trimethylbenzene (I)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	340	250
1,3,5-Trimethylbenzene (I)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	63	71
Vinyl Chloride	7.2	<1.0	<1.0	<1.0	<1.0	4.7	2.2	7.2	<1.0
Total Xylenes (I)	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	130	130
Semivolatile Organic Compounds									
2-Methylnaphthalene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	15
Naphthalene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	39	63

See notes on page 2.

MI0001066

JAN-30-2006(MON) 10:40 Wolverine Gasket (FAX)1 313 562 8248 P. 009/012

	Residential & Commercial I Criteria			
2/3/05	Drinking Water	Groundwater/Surface-Water Interface	Groundwater Volatilization to Indoor Air Inhalation	Groundwater Contact
<1.0	100	4,000 (X)	1,600	180,000
14	80	ID	ID	5,900
2.8	80	ID	ID	4,400
1.6	80	ID	ID	8,900
2.6	70	620	93,000	200,000
8.2	74	18	110,000	170,000
13	800	ID	56,000	56,000
20	1,600	NA	ID	2,500,000
<1.0	5 (A)	45 (X)	25,000	12,000
1.1	790 (E)	140	530,000 (S)	530,000 (S)
<1.0	5 (A)	200 (X)	15,000	22,000
200	63	17	56,000	56,000
46	72	45	61,000	61,000
2.3	2 (A)	15 (A)	1,100	1,000
59	280 (E)	35 (E)	190,000 (S)	190,000 (S)
<5.0	57,000	ID	ID	8,100,000
33	520	13	31,000	31,000

MI0001067

MI0001068

Table 2. Constituents Detected in Groundwater Samples, EaglePicher Automotive, 135 E. South Street, Hillsdale, Michigan.

Sample ID:	MW-4			Residential & Commercial I Criteria			
Sample Date:	7/14/04	11/8/04	2/3/05	Drinking Water	Groundwater/Surface-Water Interface	Groundwater Volatilization to Indoor Air Inhalation	Groundwater Contact
Volatile Organic Compounds							
Benzene (I)	<1.0	<1.0	<1.0	100	4,000 (X)	1,600	180,000
n-Butylbenzene	<1.0	<1.0	<1.0	80	ID	ID	5,900
sec-Butylbenzene	<1.0	<1.0	<1.0	80	ID	ID	4,400
tert-Butylbenzene (I)	<1.0	<1.0	<1.0	80	ID	ID	8,900
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0	70	620	93,000	200,000
Ethylbenzene (I)	<1.0	<1.0	<1.0	74	18	110,000	170,000
Isopropylbenzene	<1.0	<1.0	<1.0	800	ID	56,000	56,000
n-Propylbenzene (I)	<1.0	<1.0	<1.0	1,600	NA	ID	2,500,000
Tetrachloroethene	<1.0	<1.0	<1.0	5 (A)	45 (X)	25,000	12,000
Toluene (I)	<1.0	<1.0	<1.0	790 (E)	140	530,000 (S)	530,000 (S)
Trichloroethene	<1.0	<1.0	<1.0	5 (A)	200 (X)	15,000	22,000
1,2,4-Trimethylbenzene (I)	<1.0	<1.0	<1.0	63	17	56,000	56,000
1,3,5-Trimethylbenzene (I)	<1.0	<1.0	<1.0	72	45	61,000	61,000
Vinyl Chloride	<1.0	<1.0	<1.0	2 (A)	15 (A)	1,100	1,000
Total Xylenes (I)	<3.0	<3.0	<3.0	280 (E)	35 (E)	190,000 (S)	190,000 (S)
Semivolatile Organic Compounds							
2-Methylnaphthalene	<5.0	<5.0	<5.0	57,000	ID	ID	8,100,000
Naphthalene	<5.0	<5.0	<5.0	520	13	31,000	31,000

Notes:

All units in micrograms per liter (µg/L).
Only compounds that were detected at concentrations greater than the laboratory detection limit are shown. Samples were analyzed for volatile organic compounds (VOCs), polynuclear hydrocarbons (PAHs), and hexavalent chromium.

Bold Exceeds criterion.

Cleanup criteria published in Part 201 of the Natural Resources and Environmental Protection Act (NREPA) 1994, Public Act (PA) 451, as amended, Section R 299.5744, dated December 21, 2002.

(E) Criterion is the aesthetic drinking water value.

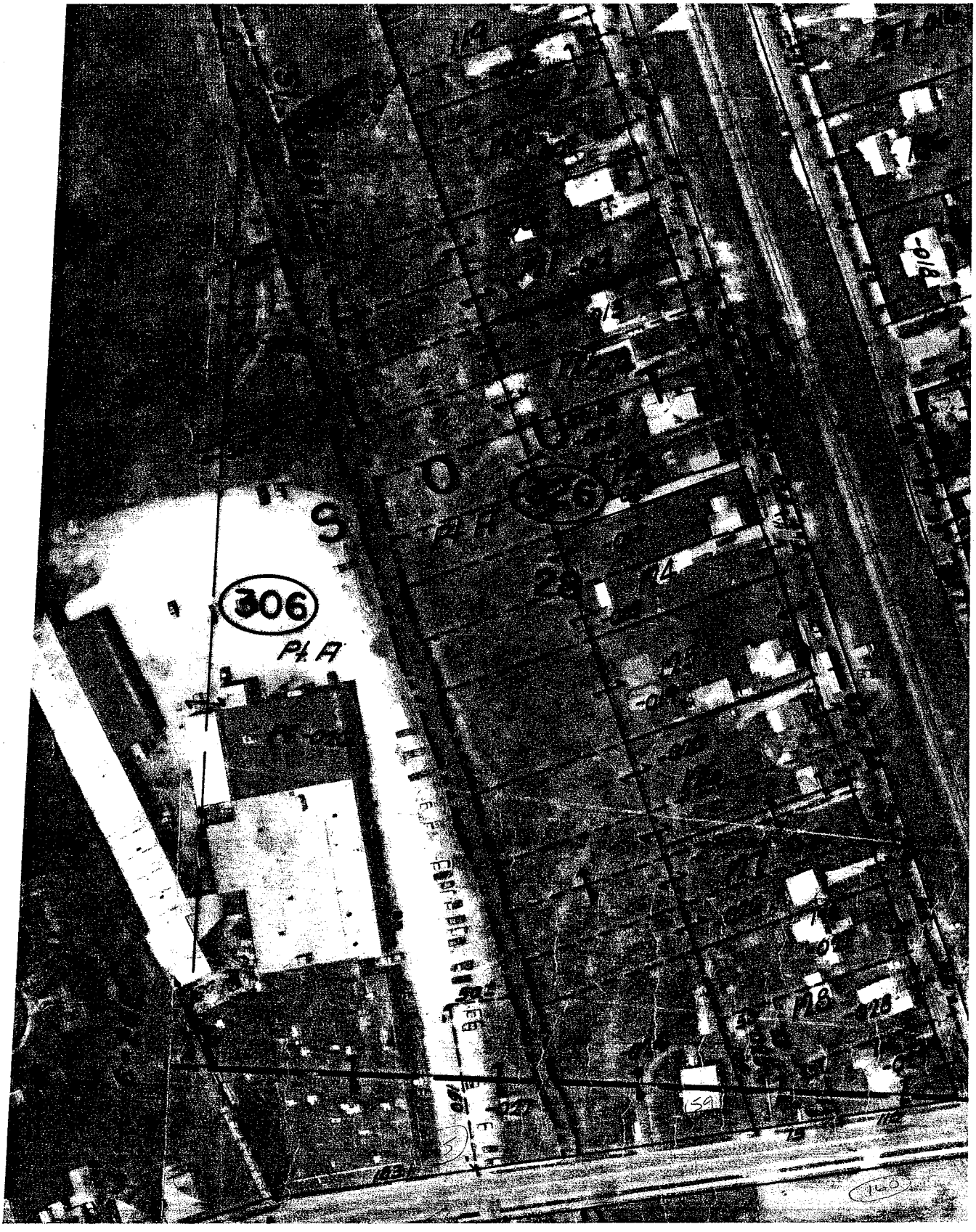
(S) Criterion defaults to the hazardous substance-specific water solubility limit.

(X) Groundwater/surface-water interface (GSI) criterion is not protective for surface water that is used as a drinking water source.

ft bgs Feet below ground surface.

ID Insufficient data to develop criterion.

MI0001070


306
Pt. A
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59

A D D.
River
306
Pl-026
CT

Selected Features
Sections
Lakes
Streams and Ditches
Roads
US Hwy
State Hwy
County Hwy
Roads
Private
Parcels

MI0001073

ARCADIS

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Southfield
Michigan 48034
Tel 248 936 8000
Fax 248 936 8111

MEMO

To:
Paul Harper, EaglePicher
Douglas Rommeck, EaglePicher
Keith White, EaglePicher

Copies:
File

From:
Joe Quinnan and Greg Zellmer

Date:
March 2, 2005

ARCADIS Project No.:
SF003152.0005.00001

Subject:
DRAFT – *Privileged and Confidential Attorney Client Communication*
Summary of February 2005 Field Activities and Sampling at the EaglePicher Facility at 135 E. South Street in Hillsdale, Michigan

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On February 3, 2005, ARCADIS collected depth-to-water measurements and groundwater samples from the four monitoring wells (MW-1 through MW-4) at the site (see Figure 1). The groundwater samples were analyzed for VOCs and PAHs to confirm the initial sampling results. ARCADIS attempted to obtain access to the storm sewer system to determine the depth of the laterals; however, due to snow and ice, the storm drain system was not accessible. The results are summarized below.

Analytical Results

The groundwater analytical results are presented in Table 1 and on Figure 1 and indicated the following:

- VOCs and PAHs were not detected in the groundwater samples collected from Monitoring Wells MW-1 or MW-4.
- Various VOCs and PAHs ranging from 1.1 ug/L (toluene) to 200 ug/L (1,2,4-trimethylbenzene [TMB]) were detected in the groundwater sample collected from Monitoring Well MW-3. The constituents detected were of similar magnitude as during previous sampling events.
- Vinyl chloride was detected in the groundwater sample collected from Monitoring Well MW-2 at a concentration (2.2 ug/L) that exceeded the generic MDEQ drinking water criteria of 2 ug/L, but was less

than the GSI criteria of 15 ug/L. No other VOCs or PAHs were detected in this sample. This result confirms the prior detection.

Groundwater Elevations and Flow Direction

Depth-to-water was measured at approximately 6 to 7 feet below the ground surface. The groundwater elevations indicate that the groundwater flow direction is to the east-northeast consistent with prior interpretations. Groundwater elevations and flow direction are presented in Figure 2.

Conclusions

Based on the results of the groundwater monitoring results, ARCADIS presents the following conclusions:

- TMB isomers, vinyl chloride, xylenes, and naphthalene exceeded generic MDEQ drinking water and GSI criteria in samples collected from Well MW-3.

- Petroleum hydrocarbon constituents detected in samples collected from Well MW-3 have not been detected in perimeter monitoring wells (i.e., MW-1, MW-2, and MW-4). Thus, the extent of petroleum hydrocarbons has been adequately defined to the west, north and east-northeast and petroleum hydrocarbon constituents do not appear to be adversely impacting potential off site receptors.

- Based on the analytical results of groundwater samples collected from Well MW-3 and the soil samples collected from soil borings completed inside the facility, the extent of petroleum hydrocarbons has not been adequately defined to the south-southeast.

- Chlorinated compounds were not detected in the samples collected from Wells MW-1 and MW-4. Thus, the extent of chlorinated compounds has been adequately defined to the west and north. Chlorinated compounds do not appear to be adversely impacting potential off-site receptors to the west and north.

- Several chlorinated compounds were detected in the sample collected from downgradient monitoring well MW-2 during the November 2004 event. Vinyl chloride was the only constituent detected in the sample collected from Well MW-2 during the February 2005 event. Vinyl chloride concentrations exceeded drinking water criteria but did not exceed GSI criteria. Thus, chlorinated compounds do not appear to be adversely impacting the St. Joseph River downgradient of Well MW-2.

- Based on the analytical results of groundwater samples collected from Well MW-3 and the soil samples collected from soil borings completed inside the facility, the extent of chlorinated compounds has not been adequately defined to the south-southeast.

Recommendations

Additional Characterization

The analytical results of previous investigative activities indicate soil exceedances of MDEQ drinking water and GSI protection criteria. These criteria are important from a characterization perspective, as delineation is required to all relevant generic criteria. As discussed above, the groundwater analytical results indicate that the extent of chlorinated and petroleum hydrocarbon compounds detected in the soil samples has been adequately addressed to the west, north and northeast, but not to the east-southeast.

1. To verify the extent of COCs to the east and south, ARCADIS recommends additional borings/monitoring wells be completed and collect soil and groundwater samples. The cost to conduct this activity is estimated to be $5,000 to $7,000.

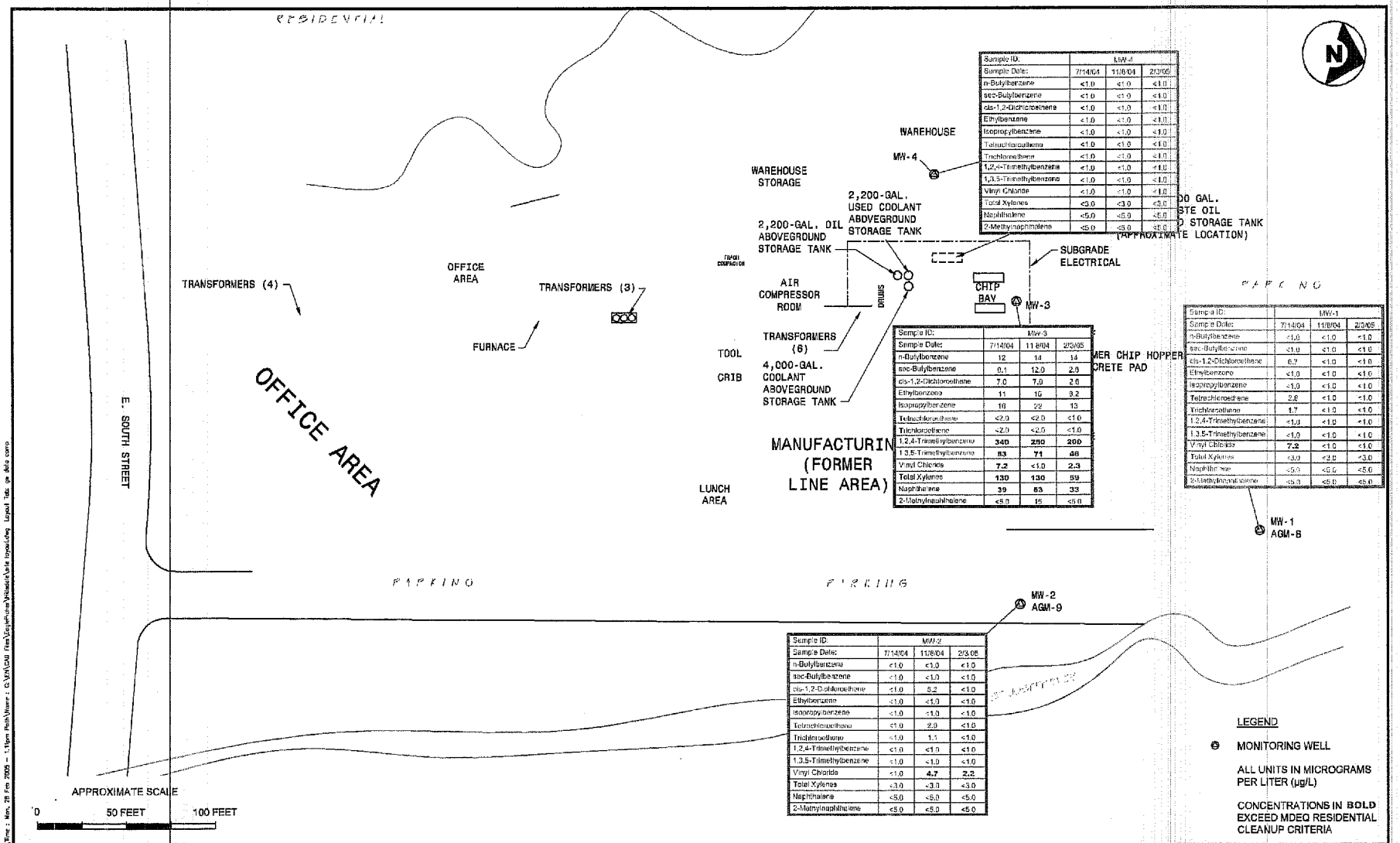
2. The soil samples collected from AGM-11 (inside the building) indicate increasing chlorinated compound concentrations with depth. ARCADIS recommends completing a soil boring and collecting groundwater samples at 5 to 10 foot depth intervals to determine the vertical extent of impacts. The cost to conduct this activity is estimated to be $4,000 to $6,000.

3. Continue to collect groundwater samples from existing monitoring wells on a quarterly basis. The cost to conduct this activity (4 sample events using low flow sample collection) is estimated to be $8,000 to $9,000.

As discussed in our December 2004 meeting, vinyl chloride exceeding generic criteria was detected in a perimeter well and is potentially migrating off site. By rule, a notice of off-site migration should be reported to the MDEQ. However, ARCADIS agrees that the storm drain could influence groundwater flow along the property line down gradient of the impact and restrict migration of the impact. In addition, concentrations of chlorinated compounds have decreased during each sample event. Therefore, ARCADIS recommends obtaining the depth and position of the storm drain system and evaluating additional sampling results to determine if a notice is necessary.

Remediation

It is ARCADIS' understanding that EaglePicher would like to pursue a passive, monitoring strategy at the South Street Site. Based on the results of the investigative activities, it is ARCADIS' opinion is that this approach is reasonable. Following delineation of soil and groundwater impacts, ARCADIS recommends that EaglePicher pursue a groundwater use restriction and passive remediation by monitoring. Four consecutive quarters of groundwater monitoring with perimeter results below generic criteria would be required. Assuming delineation is complete with 2 additional wells, the estimated cost to conduct this closure activity would be approximately $12,000 to $15,000.



Sample ID:	MW-4		
Sample Date:	7/14/04	11/8/04	2/3/05
n-Butylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Ethylbenzene	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
Tetrachloroethene	<1.0	<1.0	<1.0
Trichloroethene	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
Vinyl Chloride	<1.0	<1.0	<1.0
Total Xylenes	<3.0	<3.0	<3.0
Naphthalene	<5.0	<5.0	<5.0
2-Methylnaphthalene	<5.0	<5.0	<5.0

Sample ID:	MW-3		
Sample Date:	7/14/04	11/8/04	2/3/05
n-Butylbenzene	12	14	14
sec-Butylbenzene	9.1	12.0	2.0
cis-1,2-Dichloroethene	7.0	7.0	2.0
Ethylbenzene	11	16	9.2
Isopropylbenzene	16	22	13
Tetrachloroethene	<2.0	<2.0	<1.0
Trichloroethene	<2.0	<2.0	<1.0
1,2,4-Trimethylbenzene	**340**	**250**	**200**
1,3,5-Trimethylbenzene	**83**	**71**	**46**
Vinyl Chloride	**7.2**	<1.0	**2.3**
Total Xylenes	**130**	**130**	**59**
Naphthalene	**39**	**83**	**33**
2-Methylnaphthalene	<5.0	15	<5.0

Sample ID:	MW-1		
Sample Date:	7/14/04	11/8/04	2/3/05
n-Butylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	6.7	<1.0	<1.0
Ethylbenzene	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
Tetrachloroethene	2.6	<1.0	<1.0
Trichloroethene	1.7	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
Vinyl Chloride	**7.2**	<1.0	<1.0
Total Xylenes	<3.0	<2.0	<3.0
Naphthalene	<5.0	<5.0	<5.0
2-Methylnaphthalene	<5.0	<5.0	<5.0

Sample ID:	MW-2		
Sample Date:	7/14/04	11/8/04	2/3/05
n-Butylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	5.2	<1.0
Ethylbenzene	<1.0	<1.0	<1.0
Isopropylbenzene	<1.0	<1.0	<1.0
Tetrachloroethene	<1.0	2.0	<1.0
Trichloroethene	<1.0	1.1	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
Vinyl Chloride	<1.0	**4.7**	**2.2**
Total Xylenes	<3.0	<3.0	<3.0
Naphthalene	<5.0	<5.0	<5.0
2-Methylnaphthalene	<5.0	<5.0	<5.0

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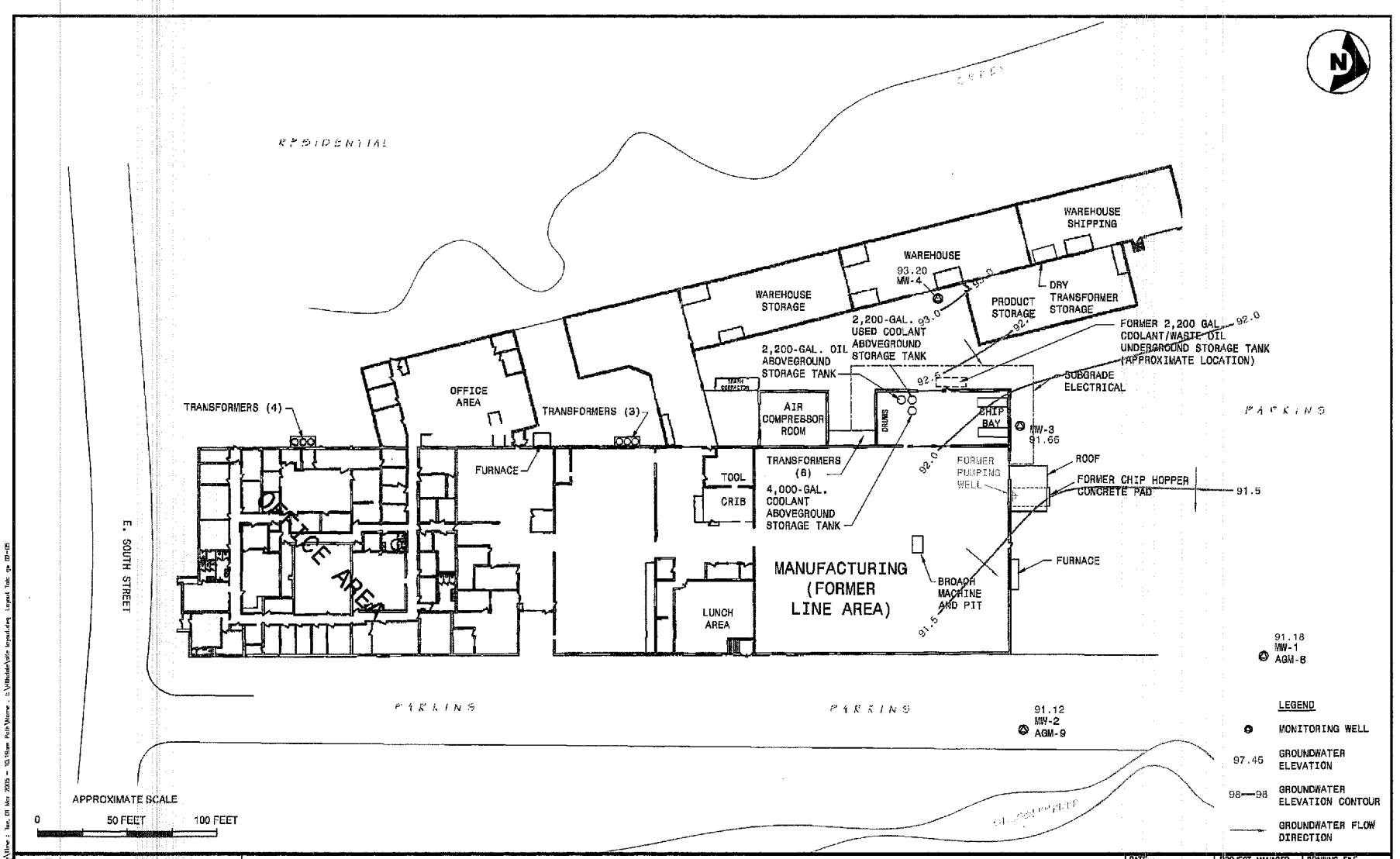
Privileged & Confidential. Attorney - Client Communication.

GROUNDWATER ANALYTICAL RESULTS
EAGLEPICHER AUTOMOTIVE
135 E. SOUTH STREET
HILLSDALE, MICHIGAN

DRAFT

DATE 25-Feb-05	PROJECT MANAGER J. QUINNAN	DRAWING FILE site layout
DRAWN TRY	LEAD DESIGN PROF.	CHECKED D. SHARVIN
PROJECT NUMBER SF003152.02.02		FIGURE NUMBER 1

MI0001077



ARCADIS

25200 TELEGRAPH ROAD
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GROUNDWATER ELEVATION - FEBRUARY 3, 2005
EAGLEPICHER AUTOMOTIVE
135 E. SOUTH STREET
HILLSDALE, MICHIGAN

DATE 01-Mar-05	PROJECT MANAGER J. QUINNAN	DRAWING FILE site layout
DRAWN TRY	LEAD DESIGN PROF.	CHECKED D. SHARVIN
PROJECT NUMBER SF003152.02.02		FIGURE NUMBER 2

MI0001078

MI0001079

Table 1. Constituents Detected in Groundwater Samples, EaglePicher Automotive, 135 E. South Street, Hillsdale, Michigan.

Sample ID:	MW-1				MW-2			MW-3	
Sample Date:	7/14/04	8/17/04	11/8/04	2/3/05	7/14/04	11/8/04	2/3/05	7/14/04	11/8/04
Volatile Organic Compounds									
Benzene {I}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0*	1.1
n-Butylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12	14
sec-Butylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	9.1	12.0
tert-Butylbenzene {I}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0*	<2.0*
cis-1,2-Dichloroethene	6.7	<1.0	<1.0	<1.0	<1.0	5.2	<1.0	7.0	7.0
Ethylbenzene {I}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11	16
Isopropylbenzene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	16	22
n-Propylbenzene {I}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0*	<2.0*
Tetrachloroethene	2.8	<1.0	<1.0	<1.0	<1.0	2.0	<1.0	<2.0*	<2.0*
Toluene {I}	<1.0	<1.0	<1.0	<1.0	<1.0	2.0	1.4	<2.0*	<2.0*
Trichloroethene	1.7	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<2.0*	<2.0*
1,2,4-Trimethylbenzene {I}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**340**	**250**
1,3,5-Trimethylbenzene {I}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**63**	**71**
Vinyl Chloride	**7.2**	<1.0	<1.0	<1.0	<1.0	**4.7**	**2.2**	**7.2**	<1.0
Total Xylenes {I}	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	**130**	**130**
Semivolatile Organic Compounds									
2-Methylnaphthalene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	15
Naphthalene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**39**	**63**

See notes on page 2.

MI0001080

MI0001081

	Residential & Commercial I Criteria			
2/3/05	Drinking Water	Groundwater/Surface-Water Interface	Groundwater Volatilization to Indoor Air Inhalation	Groundwater Contact
<1.0	100	4,000 {X}	1,600	180,000
14	80	ID	ID	5,900
2.8	80	ID	ID	4,400
1.6	80	ID	ID	8,900
2.6	70	620	93,000	200,000
8.2	74	18	110,000	170,000
13	800	ID	56,000	56,000
20	1,600	NA	ID	2,500,000
<1.0	5 {A}	45 {X}	25,000	12,000
1.1	790 {E}	140	530,000 {S}	530,000 {S}
<1.0	5 {A}	200 {X}	15,000	22,000
200	63	17	56,000	56,000
46	72	45	61,000	61,000
2.3	2 {A}	15 {A}	1,100	1,000
59	280 {E}	35 {E}	190,000 (S)	190,000 (S)
<5.0	57,000	ID	ID	8,100,000
33	520	13	31,000	31,000

MI0001082

MI0001083

Table 2. Constituents Detected in Groundwater Samples, EaglePicher Automotive, 135 E. South Street, Hillsdale, Michigan.

				Residential & Commercial I Criteria			
Sample ID:	MW-4						
Sample Date:	7/14/04	11/8/04	2/3/05	Drinking Water	Groundwater/Surface-Water Interface	Groundwater Volatilization to Indoor Air Inhalation	Groundwater Contact
Volatile Organic Compounds							
Benzene {I}	<1.0	<1.0	<1.0	100	4,000 {X}	1,600	180,000
n-Butylbenzene	<1.0	<1.0	<1.0	80	ID	ID	5,900
sec-Butylbenzene	<1.0	<1.0	<1.0	80	ID	ID	4,400
tert-Butylbenzene {I}	<1.0	<1.0	<1.0	80	ID	ID	8,900
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0	70	620	93,000	200,000
Ethylbenzene {I}	<1.0	<1.0	<1.0	74	18	110,000	170,000
Isopropylbenzene	<1.0	<1.0	<1.0	800	ID	56,000	56,000
n-Propylbenzene {I}	<1.0	<1.0	<1.0	1,600	NA	ID	2,500,000
Tetrachloroethene	<1.0	<1.0	<1.0	5 {A}	45 {X}	25,000	12,000
Toluene {I}	<1.0	<1.0	<1.0	790 {E}	140	530,000 {S}	530,000 {S}
Trichloroethene	<1.0	<1.0	<1.0	5 {A}	200 {X}	15,000	22,000
1,2,4-Trimethylbenzene {I}	<1.0	<1.0	<1.0	63	17	56,000	56,000
1,3,5-Trimethylbenzene {I}	<1.0	<1.0	<1.0	72	45	61,000	61,000
Vinyl Chloride	<1.0	<1.0	<1.0	2 {A}	15 {A}	1,100	1,000
Total Xylenes {I}	<3.0	<3.0	<3.0	280 {E}	35 {E}	190,000 (S)	190,000 (S)
Semivolatile Organic Compounds							
2-Methylnaphthalene	<5.0	<5.0	<5.0	57,000	ID	ID	8,100,000
Naphthalene	<5.0	<5.0	<5.0	520	13	31,000	31,000

Notes:

All units in micrograms per liter (µg/L).

Only compounds that were detected at concentrations greater than the laboratory detection limit are shown. Samples were analyzed for volatile organic compounds (VOCs), polynuclear hydrocarbons (PAHs), and hexavalent chromium.

MI0001084

Bold Exceeds criterion.

Cleanup criteria published in Part 201 of the Natural Resources and Environmental Protection Act (NREPA) 1994, Public Act (PA) 451, as amended, Section R 299.5744, dated December 21, 2002.

{E} Criterion is the aesthetic drinking water value.

{S} Criterion defaults to the hazardous substance-specific water solubility limit.

{X} Groundwater/surface-water interface (GSI) criterion is not protective for surface water that is used as a drinking water source.

ft bgs Feet below ground surface.

ID Insufficient data to develop criterion.

Fibertec
environmental
services

August 19, 2004

Fibertec Project #	79115
Project Identification:	Eagle Picher, Hillsdale, MI/ SF003152.00004
Sample Receipt Date:	August 17, 2004

Mr. Christian Seidel
Arcadis
25200 Telegraph Road
Southfield, MI 48034

Dear Mr. Seidel:

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed as requested and the results compiled in the enclosed report. Please note sample will be disposed of 30 days after reporting date.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

Daryl P. Strandbergh
Laboratory Director

DPS/kc

Enclosures

1914 Holloway Drive Holt, Michigan 48842 Telephone: (517) 699-0345 Facsimile: (517) 699-0388
7794 Boardwalk Road Brighton, Michigan 48116 Telephone: (248) 446-5700 Facsimile: (248) 466-5701

ANALYTICAL LABORATORY RESULTS

CLIENT IDENTIFICATION:	**ARCADIS**	SAMPLE MATRIX:	**WATER**
FIBERTEC PROJECT NO:	**79115**	FIBERTEC SAMPLE NUMBER:	**001**

CLIENT SAMPLE INFORMATION

PROJECT IDENTIFICATION:	**EAGLE PICHER, HILLSDALE, MI**	CLIENT SAMPLE DESCRIPTION:	**MW-1**
PROJECT NUMBER:	**SF003152.00004**	CLIENT SAMPLE NUMBER:	**1**
SAMPLE DATE:	**8/17/2004**	CHAIN OF CUSTODY NUMBER:	**134899**

COMMENTS:

DEFINITIONS: **ND** = NOT DETECTED AT OR ABOVE REPORTING LIMIT; **RL** = REPORTING LIMIT
N/A = NOT AVAILABLE OR NOT APPLICABLE

ANALYTE	RESULT	UNITS	RL	METHOD	BATCH	PREPARATION DATE	ANALYSIS DATE	TECH. INIT.
ACETONE	ND	ug/L	25	5030B/8260B	30151	8/19/2004	8/19/2004	CW
ACRYLONITRILE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
BENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
BROMOBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
BROMOCHLOROMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
BROMODICHLOROMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
BROMOFORM	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
BROMOMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
2-BUTANONE	ND	ug/L	25	5030B/8260B	30151	8/19/2004	8/19/2004	CW
N-BUTYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
SEC-BUTYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TERT-BUTYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CARBON DISULFIDE	ND	ug/L	5.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CARBON TETRACHLORIDE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CHLOROBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CHLOROETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CHLOROFORM	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CHLOROMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
2-CHLOROTOLUENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
DIBROMOCHLOROMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,2-DIBROMO-3-CHLOROPROPANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
DIBROMOMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,2-DICHLOROBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,3-DICHLOROBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,4-DICHLOROBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW

ANALYTICAL LABORATORY RESULTS

CLIENT IDENTIFICATION:	**ARCADIS**	SAMPLE MATRIX:	**WATER**
FIBERTEC PROJECT NO:	**79115**	FIBERTEC SAMPLE NUMBER:	**001**

CLIENT SAMPLE INFORMATION

PROJECT IDENTIFICATION:	**EAGLE PICHER, HILLSDALE, MI**	CLIENT SAMPLE DESCRIPTION:	**MW-1**
PROJECT NUMBER:	**SF003152.00004**	CLIENT SAMPLE NUMBER:	**1**
SAMPLE DATE:	**8/17/2004**	CHAIN OF CUSTODY NUMBER:	**134899**

COMMENTS:

DEFINITIONS: **ND** = NOT DETECTED AT OR ABOVE REPORTING LIMIT; **RL** = REPORTING LIMIT
N/A = NOT AVAILABLE OR NOT APPLICABLE

ANALYTE	RESULT	UNITS	RL	METHOD	BATCH	PREPARATION DATE	ANALYSIS DATE	TECH. INIT.
DICHLORODIFLUOROMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,1-DICHLOROETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,2-DICHLOROETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,1-DICHLOROETHENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CIS-1,2-DICHLOROETHENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TRANS-1,2-DICHLOROETHENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,2-DICHLOROPROPANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
CIS-1,3-DICHLOROPROPENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TRANS-1,3-DICHLOROPROPENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
ETHYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
ETHYLENE DIBROMIDE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
2-HEXANONE	ND	ug/L	50	5030B/8260B	30151	8/19/2004	8/19/2004	CW
IODOMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
ISOPROPYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
4-METHYL-2-PENTANONE	ND	ug/L	50	5030B/8260B	30151	8/19/2004	8/19/2004	CW
METHYLENE CHLORIDE	ND	ug/L	5.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
2-METHYLNAPHTHALENE	ND	ug/L	5.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
MTBE	ND	ug/L	5.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
NAPHTHALENE	ND	ug/L	5.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
N-PROPYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
STYRENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,1,1,2-TETRACHLOROETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,1,2,2-TETRACHLOROETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TETRACHLOROETHENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TOLUENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW

ANALYTICAL LABORATORY RESULTS

CLIENT IDENTIFICATION:	**ARCADIS**	SAMPLE MATRIX:	**WATER**
FIBERTEC PROJECT NO:	**79115**	FIBERTEC SAMPLE NUMBER:	**001**

CLIENT SAMPLE INFORMATION

PROJECT IDENTIFICATION:	**EAGLE PICHER, HILLSDALE, MI**	CLIENT SAMPLE DESCRIPTION:	**MW-1**
PROJECT NUMBER:	**SF003152.00004**	CLIENT SAMPLE NUMBER:	**1**
SAMPLE DATE:	**8/17/2004**	CHAIN OF CUSTODY NUMBER:	**134899**

COMMENTS:

DEFINITIONS: **ND** = NOT DETECTED AT OR ABOVE REPORTING LIMIT; **RL** = REPORTING LIMIT
N/A = NOT AVAILABLE OR NOT APPLICABLE

ANALYTE	RESULT	UNITS	RL	METHOD	BATCH	PREPARATION DATE	ANALYSIS DATE	TECH. INIT.
1,2,3-TRICHLOROBENZENE	ND	ug/L	5.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,2,4-TRICHLOROBENZENE	ND	ug/L	5.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,1,1-TRICHLOROETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,1,2-TRICHLOROETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TRICHLOROETHENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TRICHLOROFLUOROMETHANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,2,3-TRICHLOROPROPANE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,2,4-TRIMETHYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
1,3,5-TRIMETHYLBENZENE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
VINYL CHLORIDE	ND	ug/L	1.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW
TOTAL XYLENES	ND	ug/L	3.0	5030B/8260B	30151	8/19/2004	8/19/2004	CW

ARCADIS

Infrastructure, buildings, environment, communications

ARCADIS G&M of Michigan, LLC
25200 Telegraph Road
Southfield
Michigan 48034
Tel 248 936 8000
Fax 248 936 8111
www.arcadis-us.com

Mr. Paul Harper
Director, Risk Management, Environmental, Health & Safety
EaglePicher Incorporated
3402 East University Drive
Phoenix, Arizona 85034

ENVIRONMENTAL

Subject:
Privileged & Confidential – Attorney Client Communication
Significant Findings of Phase I Environmental Site Assessment and Phase II Investigation at the EaglePicher South Street Plant located at 135 E. South Street, Hillsdale, Michigan.

Date:
April 13, 2004

Contact:
Dawn Sharvin

Phone:
(248) 936-8638

Email:
dsharvin@arcadis-us.com

Our ref:
SF003152.0002.00002

Dear Mr. Harper:

ARCADIS G&M of Michigan, LLC (ARCADIS) is pleased to provide EaglePicher Automotive (EaglePicher) with a summary of the significant findings of the Phase I Environmental Site Assessment (ESA) and Phase II site investigation that were conducted at the EaglePicher South Street Plant located at 135 E. South Street, in Hillsdale, Michigan.

Significant Findings

Phase I ESA

- A re-enforced concrete containment area (of unknown capacity) and below grade sump are located in the chip bay area to collect coolant draining from the metal chip roll-off containers. The integrity of these below grade structures could not be verified during the site reconnaissance.

- Six materials at the subject property were found to be asbestos containing and 1 material was assumed to contain asbestos. Braided pipe wrap insulation in the Bay 3 manufacturing area was determined to be asbestos-containing. This insulation is severely damaged and needs to be removed and replaced with a non-asbestos replacement product. Also, the slightly damaged straight pipe insulation in the men's restroom in the south hallway should be repaired because of its damaged condition. Labels indicating 'Materials contain asbestos fibers. Avoid creating dust. Cancer and lung disease hazard.' should be applied on or near these areas to inform plant employees of the asbestos-containing materials.

- Two paints were found to be lead-based.

Phase II Investigation

Five soil borings were installed at the subject property on March 9 and 10, 2004. A comparison of the analytical results was made to the residential criteria established in Part 201 of the Natural Resources and Environmental Protection Act (NREPA) 1994, Public Act (PA) 451, as amended, Section R 299.5744, dated December 21, 2002 Part 201). Analytical soil and groundwater data are included on Tables 1 through 2, are shown on Figures 1 through 2, and are summarized below.

- Various volatile organic compounds (VOCs) (1,1,2,2-tetrachloroethane [TCA], 1,2,4-trimethylbenzene [TMB], 1,3,5-TMB, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, ethylbenzene, isopropylbenzene, n-propylbenzene, and xylenes) and polyaromatic hydrocarbons (PAHs) (naphthalene, 2-methylnaphthalene, fluorene and phenanthrene) were detected in two soil borings (SSG-3 and SSG-4) installed in the vicinity of the chip bays and former waste oil/coolant underground storage tank (UST). Concentrations of 1,2,4-TMB, 1,3,5-TMB, n-butylbenzene, sec-butylbenzene, ethylbenzene, n-propylbenzene, naphthalene, and xylenes exceeded the Michigan Department of Environmental Quality (MDEQ) Part 201 residential cleanup criteria (Drinking Water [DW] Protection and Groundwater/Surface-Water Interface [GSI] Protection). However none of these constituent concentrations exceeded MDEQ industrial criteria (i.e., direct contact, indoor air, etc.). The extent of impacts is not vertically or horizontally delineated but appears to be limited to the area immediately surrounding the chip bays and the location of a former waste oil/coolant UST.

- Selenium in the soil sample collected from Soil Boring SSG-3 (510 micrograms per kilogram [µg/kg]) exceeded MDEQ Part 201 GSI Protection criteria and chromium in the soil sample collected from Soil Boring SSG-4 (130,000 µg/kg) exceeded MDEQ Part 201 DW Protection and GSI Protection criteria.

- Naphthalene, 1,2,4-TMB, 1,3,5-TMB, and xylenes in groundwater samples collected in the vicinity of the chip bays and former waste oil/coolant UST exceed the MDEQ Part 201 generic residential criteria (DW and GSI).

The results of this investigation indicate that residuals from the 1993 LUST incident at the site are currently present in excess of the residential closure criteria that was

granted by the MDEQ in 1996. Accordingly, a notice to the MDEQ, re-opening of the 1993 LUST incident, and additional investigation are warranted.

ARCADIS appreciates the opportunity to be of service to EaglePicher on this project. If you have any questions, please contact Ms. Dawn Sharvin at (248) 936-8638 or Mr. Joe Quinnan at (248) 936-8732.

Sincerely,

ARCADIS G&M of Michigan, LLC

Dawn L. Sharvin
Staff Scientist

Robert A. Ferree, C.P.G.
Vice President

Copies:
Mr. David Krall, Esq.
Mr. Joe Quinnan, ARCADIS

Table 1. Constituents Detected in Soil Samples, EaglePicher Automotive, 135 E. South Street, Hillsdale, Michigan

Sample ID: Sample Depth (ft. bgs): Sampe Date:	SSG-3 9-10 3/9/04	SSG-4 7.5-8 3/9/04	SSG-4 Rerun 7.5-8 3/9/04	Statewide Default Background Levels	Residential & Commercial I Criteria			
					Drinking Water Protection	Groundwater/ Surface-Water Interface Protection	Groundwater Volatilization to Indoor Air Inhalation	Direct Contact
Volatile Organic Compounds								
1,1,2,2-Tetrachloroethane	140	130	NA	NA	170	1,600	4,300	53,000
1,2,4-Trimethylbenzene	44,000	56,000	NA	NA	2,100	570	110,000	110,000
1,3,5-Trimethylbenzene	9,400	13,000	NA	NA	1,800	1,100	94,000	94,000
n-Butylbenzene	5,200	5,300	NA	NA	1,600	ID	ID	2,500,000
sec-Butylbenzene	4,100	5,500	NA	NA	1,600	ID	ID	2,500,000
tert-Butylbenzene	380	730	NA	NA	1,600	NA	ID	2,500,000
Ethylbenzene	1,200	540	NA	NA	1,500	360	87,000	140,000
Isopropylbenzene	2,300	2,200	NA	NA	91,000	ID	390,000	390,000
n-Propylbenzene	7,300	5,800	NA	NA	1,600	NA	ID	2,500,000
Xylenes	18,000	< 7,500	NA	NA	5,600	700	150,000	150,000
Semivolatile Organic Compounds								
2-Methynaphthalene	3,300	590	NA	NA	57,000	ID	ID	8,100,000
Fluorene	1,500	460	NA	NA	390,000	5,300	580,000,000	27,000,000
Naphthalene	6,700	1,000	NA	NA	35,000	870	250,000	16,000,000
Phenanthrene	2,200	< 1,700	NA	NA	56,000	5,300	2,800,000	1,600,000
Metals								
Arsenic	1,300	6,000	NA	5,800	23,000	70,000	NLV	7,600
Barium {B}	39,000	22,000	NA	75,000	1,300,000	{G,X}	NLV	37,000,000
Cadmium {B}	90	280	NA	1,200	6,000	{G,X}	NLV	550,000
Chromium {B,H}	6,500	130,000	35,000	18,000	30,000	3,300	NLV	2,500,000
Copper {B}	2,800	36,000	NA	32,000	5,800,000	{G}	NLV	20,000,000
Lead {B}	3,600	7,000	NA	21,000	700,000	{G,M,X}	NLV	400,000
Selenium {B}	510	< 200	NA	410	4,000	400	NLV	2,600,000
Zinc {B}	8,800	13,000	NA	47,000	2,400,000	{G}	NLV	170,000,000

See notes on page 2.

Privileged & Confidential. Attorney - Client Communication.

MI0001092

Table 1. Constituents Detected in Soil Samples, EaglePicher Automotive, 135 E. South Street, Hillsdale, Michigan

Notes:
All units in micrograms per kilogram (µg/kg).
Only compounds that were detected at concentrations greater than the laboratory detection limit are shown. Samples were analyzed for volatile organic compounds (VOCs), polynuclear hydrocarbons (PAHs), and the Michigan 10 metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc).

Bold	Concentration exceeds comparision criteria.

Cleanup criteria published in Part 201 of the Natural Resources and Environmental Protection Act (NREPA) 1994, Public Act (PA) 451, as amended, Section R 299.5744, dated December 21, 2002.

{A}	Criterion is the state of Michigan drinking water standard.
{B}	Background, as defined in Rule 299.5701(b), may be substituted if higher than the calculated cleanup criterion.
{G}	Groundwater/Surface-Water Interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving waters.
{H}	If analytical data are provided for total chromium (Cr) only, they shall be compared to the cleanup criteria for Cr VI.
{M}	Calculated criterion is below the Target Detection Limit (TDL); therefore, the criterion defaults to the TDL.
{X}	GSI criterion is not protective for surface water that is used as a drinking water source.
ft bgs	Feet below ground surface.
ID	Insufficient data to develop criterion.
NA	Not available.
NLV	Not likely to volatilize.

Privileged & Confidential. Attorney - Client Communication.

MI0001093

Table 2. Constituents Detected in Groundwater Samples, EaglePicher Automotive, 135 E. South Street, Hillsdale, Michigan

Sample ID:	SSG-1	SSG-2	SSG-2 DUPLICATE	SSG-3	SSG-4	SSG-5	Residential & Commercial I Criteria			
Sample Interval (ft bgs):	7-12	8-13	8-13	9-14	5-10	8-13	Drinking Water	Groundwater/ Surface-Water Interface	Groundwater Volatilization to Indoor Air Inhalation	Groundwater Contact
Sample Date:	3/9/04	3/9/04	3/9/04	3/9/04	3/9/04	3/9/04				
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	< 1	< 1	< 1	51	320	< 1	63	17	56,000	56,000
1,3,5-Trimethylbenzene	< 1	< 1	< 1	8.8	50	< 1	72	45	61,000	61,000
Chlorobenzene	< 1	< 1	< 1	1.5	< 5	< 1	100	47	210,000	86,000
Ethylbenzene	< 1	< 1	< 1	2	6.5	< 1	74	18	110,000	170,000
Isopropylbenzene	< 1	< 1	< 1	33	16	< 1	800	ID	56,000	56,000
Naphthalene	NA	NA	NA	NA	50	NA	520	13	31,000	31,000
n-Butylbenzene	< 1	< 1	< 1	8.8	16	< 1	80	ID	ID	5,900
sec-Butylbenzene	< 1	< 1	< 1	11	14	< 1	80	ID	ID	4,400
tert-Butylbenzene	< 1	< 1	< 1	1.2	< 5	< 1	80	ID	ID	8,900
Xylenes	< 3	< 3	< 3	22	80	< 3	280	35	190,000	190,000
Semivolatile Organic Compounds										
Naphthalene	< 5	< 5	< 5	24	NA	< 5	520	13	31,000	31,000
Metals (Dissolved)										
Arsenic	< 10	< 10	< 10	19	NA	< 10	50	150	NLV	4,300
Barium	140	< 100	< 100	130	NA	< 100	2,000	(G,X)	NLV	14,000,000
Chromium	9	10	6.9	< 5	NA	5.9	100	11	NLV	290,000,000
Zinc	< 10	< 10	< 10	11	NA	17	2,400	(G)	NLV	110,000,000

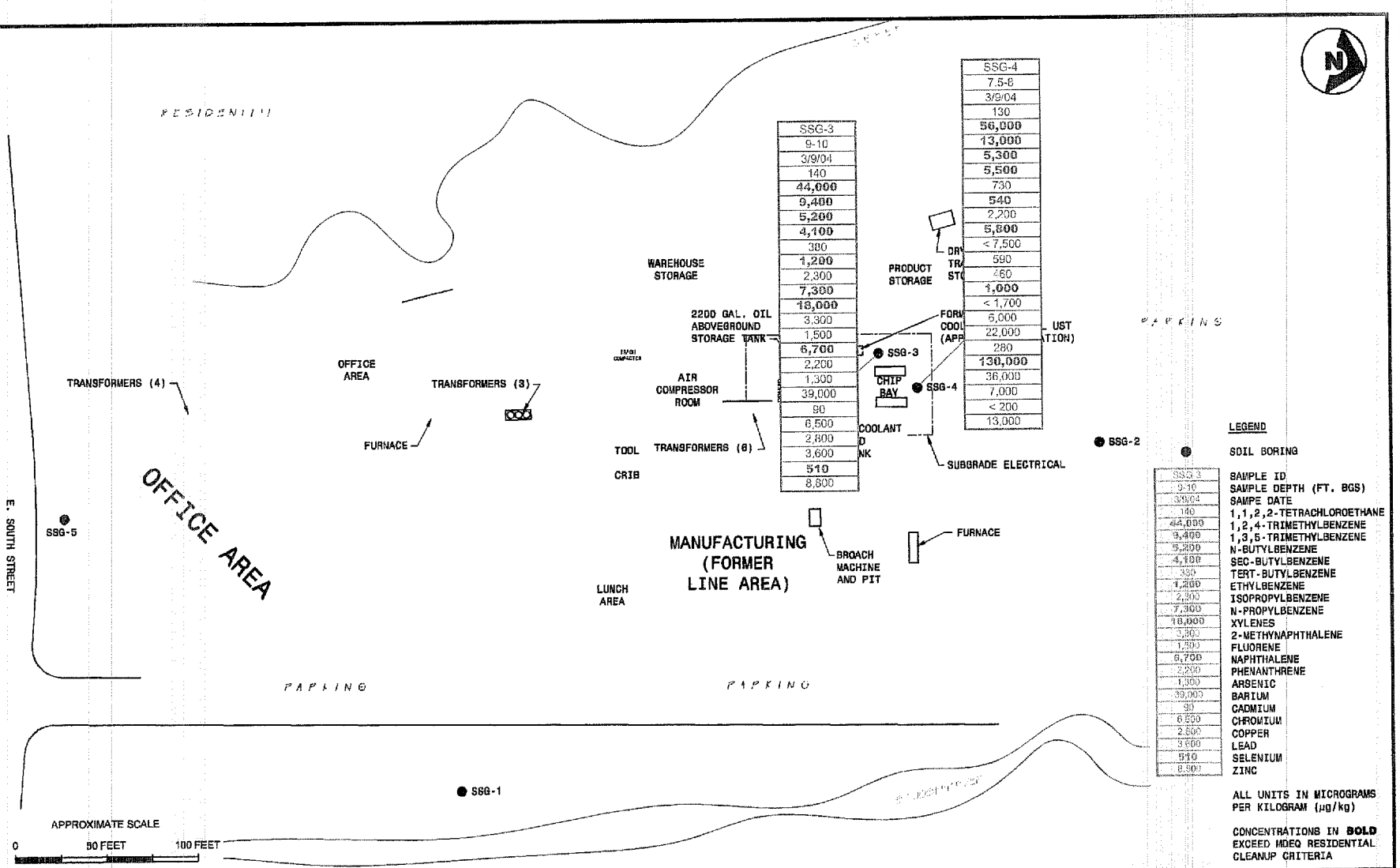
Notes:

All units in micrograms per liter (µg/L).
Only compounds that were detected at concentrations greater than the laboratory detection limit are shown. Samples were analyzed for volatile organic compounds (VOCs), polynuclear hydrocarbons (PAHs), and the Michigan 10 metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc).

Bold Concentration exceeds comparision criteria.
Cleanup criteria published in Part 201 of the Natural Resources and Environmental Protection Act (NREPA) 1994, Public Act (PA) 451, as amended, Section R 299.5744, dated December 21, 2002.
(G) Groundwater/Surface-Water Interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving waters.
(X) GSI criterion is not protective for surface water that is used as a drinking water source.
ft bgs Feet below ground surface.
ID Insufficient data to develop criterion.
NLV Not likely to volatilize.
NA Not analyzed.

Privileged & Confidential. Attorney - Client Communication.

MI0001094



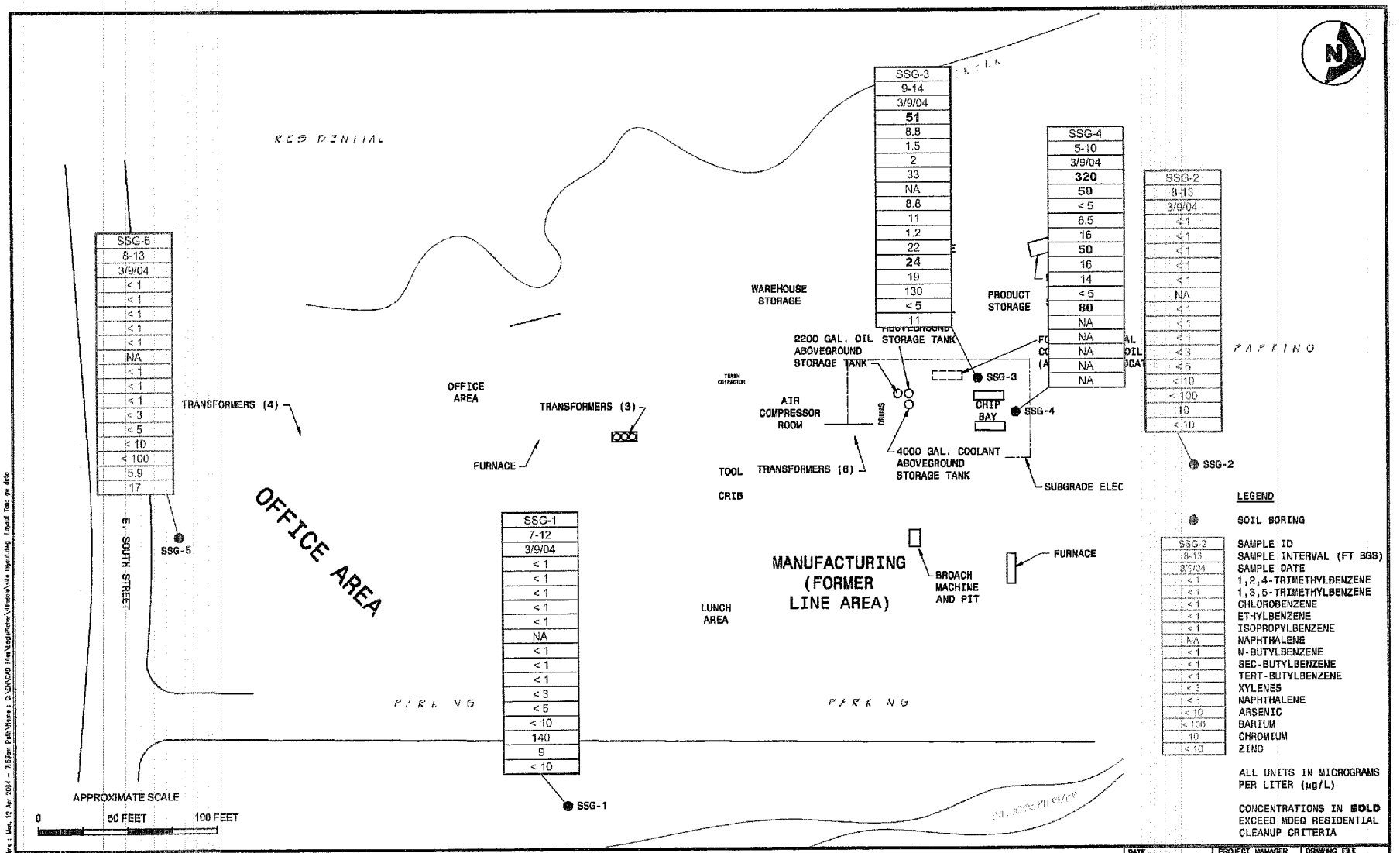
ARCADIS
25200 TELEGRAPH ROAD
SOUTHFIELD, MICHIGAN 48034
TEL: 248.936.8000 FAX: 248.936.8111

Privileged & Confidential. Attorney - Client Communication.

SOIL ANALYTICAL RESULTS
EAGLEPICHER AUTOMOTIVE
135 E. SOUTH STREET
HILLSDALE, MICHIGAN

DATE	PROJECT MANAGER	DRAWING FILE
12-Apr-04	R. FERREE	site layout
DRAWN	LEAD DESIGN PROF.	CHECKED
TRY		D. SHARVIN
PROJECT NUMBER		FIGURE NUMBER
SF003152.0001		1

MI0001095



ARCADIS
25200 TELEGRAPH ROAD
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TEL: 248.936.8000 FAX: 248.936.8111

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GROUNDWATER ANALYTICAL RESULTS
EAGLEPICHER AUTOMOTIVE
135 E. SOUTH STREET
HILLSDALE, MICHIGAN

DATE 12-Apr-04	PROJECT MANAGER R. FERREE	DRAWING FILE site layout
DRAWN TRY	LEAD DESIGN PROF.	CHECKED D. SHARVIN
PROJECT NUMBER SF003152.0001		FIGURE NUMBER 2

MI0001096

APR 8 2005

CEC

April 7, 2005

Mr. Paul D. Harper
Director, Risk Management, Environmental
EaglePicher Incorporated
3402 East University Drive
Phoenix, AZ 85034

Regarding: Field Visit and Inspection Report
Brooklyn Avenue Sand Fill
Sidney, Shelby County, Ohio
CEC Project No. 200815.0030

Dear Mr. Harper:

This report summarizes the findings of a site visit and inspection performed by Civil & Environmental Consultants, Inc. (CEC) of a spent foundry sand fill (Brooklyn Avenue Sand Fill) associated with Ross Aluminum Foundries' former operations located in Sidney, Ohio (Figure 1). The property is currently owned by EaglePicher Incorporated (EPI) and was used by Ross Aluminum Foundries (a former subsidiary of EPI) for the disposal of spent foundry sand and sand cores between the early 1980s and 2000. CEC performed a site reconnaissance and wetlands delineation at the property in October 2000 and prepared a site topographic map and property line survey in November 2000.

SUMMARY OF FINDINGS

CEC visited the site on March 18, 2005 to inspect and assess current site conditions, particularly as it relates to surface exposure and conditions of sand fill slopes and vegetation. The objective of the site visit was to assess the need for a minimum cover material to stabilize the foundry sand material at the surface as well as the need for reconfiguration of the slopes along the western

Civil & Environmental Consultants, Inc.

Cincinnati 3600 Park 42 Drive
Suite 130B
Cincinnati, Ohio 45241-2072
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Toll Free 800/759-5614
E-mail cincinnati@cecinc.com

Pittsburgh 800/365-2324
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Export 800/899-3610
Indianapolis 877/746-0749
Nashville 800/763-2326
St. Louis 866/250-3679

Corporate Web Site http://www.cecinc.com

portion of the sand fill. Digital photos were collected and are attached. Findings of the site visit are summarized as follows:

- Slopes along the northern and western portion of the sand fill appear to be stable, with no signs of slumping or significant erosion observed (Photo Nos. 3, 7, 10, and 12). Any disturbance noted on side slopes appear to be associated with burrowing animals or game trails (Photo Nos. 2 and 13);

- Slopes are generally vegetated, and heavily vegetated (trees and brush) in some areas (Photo Nos. 3, 10, and 12);

- The flat surface of the fill area is sparsely vegetated with foundry sand and sand cores exposed (Photo Nos. 4 and 5). The northeast corner of the sand fill is grass-covered (Photo No. 1); otherwise the majority of the top of the sand fill is exposed;

- Various types of debris (metal, crushed drums, tires, bricks, etc) were observed in some areas to the west of the sand fill slopes (Photo Nos. 8, 9, and 14).

- The depression area to the southeast of the fill area was visited (Photo Nos. 6 and 7). There does not appear to be surface water outflow from this area; it is assumed that surface water stands and infiltrates in this area.

RECOMMENDATIONS

Based upon the results of the site visit, the following recommendations are provided:

- The side slopes appear stable and there is no need for re-configuration of the west or north slopes of the sand fill.

- The poorly-vegetated upper flat area of the fill could be vegetated using methods designed for relatively sterile sand/gravel conditions. These methods could include the

tilling in of organic matter and nutrients followed by seeding/mulching, or hydro-seeding/hydro-mulching (or, depending on site conditions, some combination of the two).

- Samples of the foundry sand (0 to 12 inches) should be collected for agronomic analysis. It is likely that, with the proper amendments, the foundry sand would function as an effective growing medium. Samples would be collected primarily from the flat area on top of the fill. Samples from the vegetated side slopes would also be collected.

- The objective of the vegetation program would be to stabilize the upper flat area by accelerating plant growth and soil formation. It is likely that this could be accomplished without additional soil cover.

- The planting may be performed using non-invasive methods such as hydro-seeding/hydro-mulching. As a result, stormwater controls and permitting would not likely be needed. If tilling is required, then silt fencing would be needed, and a stormwater Notice of Intent (NOI) would need to be filed. However, an individual NPDES permit would not likely be required.

CLOSING

CEC appreciates the opportunity to be of service to EaglePicher Incorporated. If you have any questions or need additional information, please give us a call.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

John Holm, PE
Project Manager

Richard L. Boone, CPG, CHMM
Vice President

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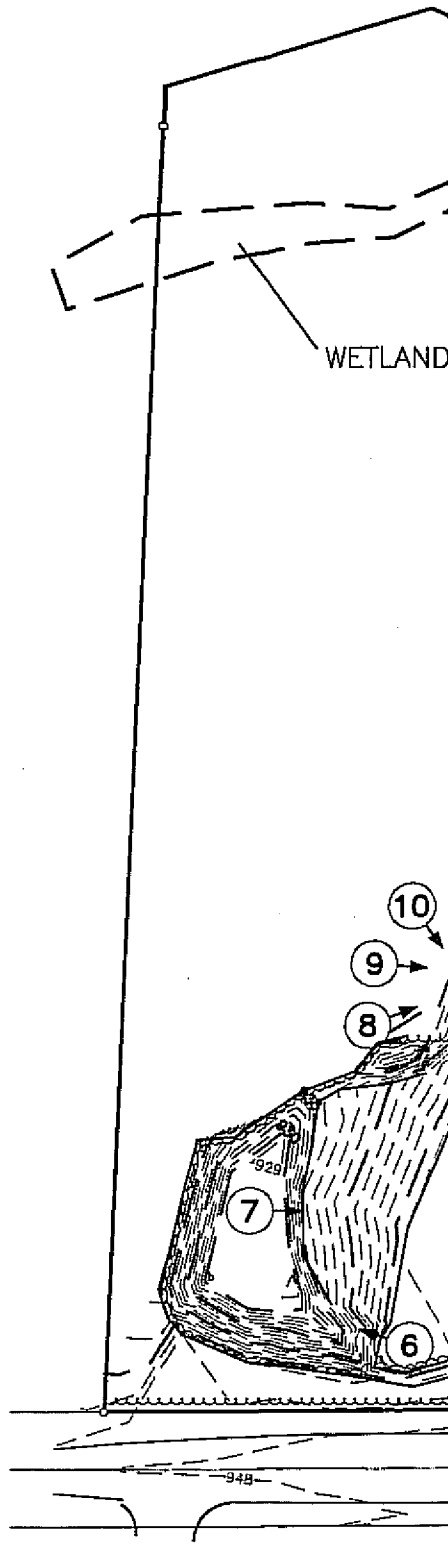


LEGEND

PHOTO NUMBER AND DIRECTION

PROPERTY BOUNDARY

THE BASE FOR THIS DRAWING WAS DONE BY HALEY-DUSA ENGINEERING & SURVEYING GROUP, LLC., *BOUNDARY & TOPOGRAPHIC SURVEY, NOVEMBER 3, 2000*

100' 0

Photo Location Map

EAGLEPICHER INCORPORATED
Brooklyn Avenue Sandfill

Sidney, Ohio

PROJECT NO:	FIGURE NO:
200815.0030	1

G:\Projects\2000\200815\0030\dwg\S0422.dwg, 11X17, 4/7/2005 1:42:51 PM, mkummer, sv-1036-rpcs-merge.pc3, 11" x 17", 1:1

G:\PROJECTS\2000\200815\0030\DWG\S0422.dwg MKUMMER - APRIL 07, 2005 - 09:13:25 XREFS:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PHOTOGRAPHIC RECORD
PHOTO NOS. 1 & 2

CLIENT: EaglePicher Incorporated | **CEC PROJECT NO:** 200815

SITE NAME: Brooklyn Avenue Sand Fill | **SITE LOCATION:** Sidney, Shelby County, Ohio

PHOTOGRAPHER: John Holm

DIRECTION: Facing southwest

COMMENTS:

View of grass-covered northeast corner of sand fill area.

PHOTOGRAPHER: John Holm

DIRECTION: Facing north

COMMENTS: View of animal burrow in north side slope.

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PHOTOGRAPHIC RECORD
PHOTO NOS. 3 & 4

CLIENT: EaglePicher Incorporated | **CEC PROJECT NO:** 200815

SITE NAME: Brooklyn Avenue Sand Fill | **SITE LOCATION:** Sidney, Shelby County, Ohio

PHOTOGRAPHER: John Holm

DIRECTION: Facing south

COMMENTS: View of vegetation on northwest slope.

PHOTOGRAPHER: John Holm

DIRECTION: Facing southeast

COMMENTS: View of sparsely vegetated surface of south end of sand fill area.

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PHOTOGRAPHIC RECORD
PHOTO NOS. 5 & 6

CLIENT: EaglePicher Incorporated | **CEC PROJECT NO:** 200815

SITE NAME: Brooklyn Avenue Sand Fill | **SITE LOCATION:** Sidney, Shelby County, Ohio

PHOTOGRAPHER: John Holm

DIRECTION: Facing north

COMMENTS:

View of sparsely vegetated surface of south end of sand fill area.

PHOTOGRAPHER: John Holm

DIRECTION: Facing south

COMMENTS:

View of depression area located to the south of sand fill.

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PHOTOGRAPHIC RECORD
PHOTO NOS. 7 & 8

CLIENT: EaglePicher Incorporated | **CEC PROJECT NO:** 200815

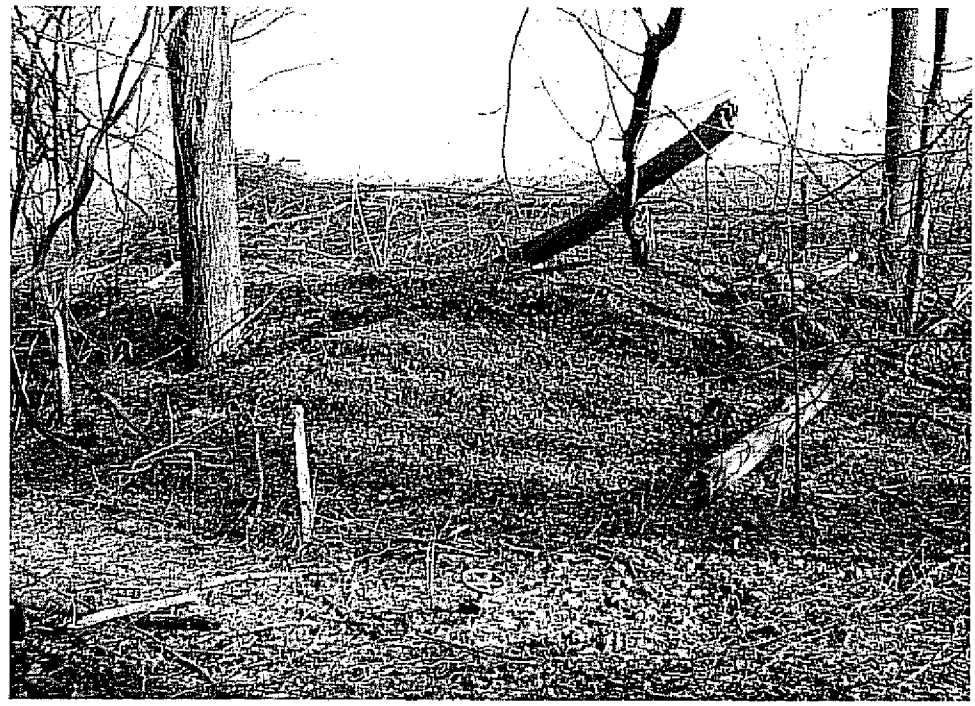
SITE NAME: Brooklyn Avenue Sand Fill | **SITE LOCATION:** Sidney, Shelby County, Ohio

PHOTOGRAPHER: John Holm

DIRECTION: Facing north

COMMENTS:

View from depression of south slope of sand fill.



PHOTOGRAPHER: John Holm

DIRECTION: Facing northwest

COMMENTS:

View of debris, including discarded drums and other metal containers, beyond the southwest slope of the fill area.

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PHOTOGRAPHIC RECORD
PHOTO NOS. 9 & 10

CLIENT: EaglePicher Incorporated | **CEC PROJECT NO:** 200815

SITE NAME: Brooklyn Avenue Sand Fill | **SITE LOCATION:** Sidney, Shelby County, Ohio

PHOTOGRAPHER: John Holm

DIRECTION:

COMMENTS:

View of metal debris and discarded drums beyond the southwest slope of the fill area.

PHOTOGRAPHER: John Holm

DIRECTION: Facing northeast

COMMENTS: View of southwest slope of sand fill.

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PHOTOGRAPHIC RECORD
PHOTO NOS. 11 & 12

CLIENT: EaglePicher Incorporated | **CEC PROJECT NO:** 200815

SITE NAME: Brooklyn Avenue Sand Fill | **SITE LOCATION:** Sidney, Shelby County, Ohio

PHOTOGRAPHER: John Holm

DIRECTION: Facing northeast

COMMENTS: View of drainage culvert that apparently exists below the sand fill. The culvert daylights at a point beyond the southwest slope of the fill area.

PHOTOGRAPHER: John Holm

DIRECTION: Facing northeast

COMMENTS: View of western slope of sand fill. No visible signs of active erosion.

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PHOTOGRAPHIC RECORD
PHOTO NOS. 13 & 14

CLIENT: EaglePicher Incorporated | **CEC PROJECT NO:** 200815

SITE NAME: Brooklyn Avenue Sand Fill | **SITE LOCATION:** Sidney, Shelby County, Ohio

PHOTOGRAPHER: John Holm

DIRECTION: Facing west

COMMENTS:

View of western slope of sand fill showing game trail through central portion of the photograph.

PHOTOGRAPHER: John Holm

DIRECTION: Facing southeast

COMMENTS:

View of debris including tires, metal fencing, and bricks, in northwest area to the west of slope of sand fill.

The Best In Equipment For Your Transportation Needs

498-1151

January 24, 1986

Mr. Tom Kramer, President
Ross Aluminum Foundry
815 Oak Street
Sidney, OH 45365

Dear Mr. Kramer:

The Board of Health has notified us that we are not permitted to dump core sand or other toxic materials into our lake on Vandemark Road.

As a result of their action, we must ask that Ross Aluminum immediately discontinue dumping of any material into the lake.

Mr. Don Fair at the Board of Health has informed me that you may request a clearance, and if granted, you may resume dumping your material into the lake.

We apologize for any inconvenience this may cause. If we can assist you in any way, please let us know.

Sincerely,

Lloyd W. Schroer
President

kw

Enclosure

cc: Don Fair

Vandemark Rd. Sidney, Ohio 45365 Phone (513) 498-1151

Ross Aluminum Foundries
P.O. Box 609 Sidney, Ohio 45365-0609 937/492-4134 Fax 937/498-1883

February 22, 2000

Robert Mai, RS
Sidney-Shelby Cnty B of H
202 West Poplar St.
Sidney, Ohio 45365

RE: Sand Monofill at Brooklyn Avenue

Dear Mr. Mai:

The following analysis summary for spent foundry sand is being submitted for your review.

Samples were collected by Swank Consulting, Inc., and represent the foundry sand deposited on the Ross Aluminum Foundries, Division of Eagle Picher Ind. property located west of Brooklyn Avenue.

1-28-99		TOTAL PHENOLICS		0.12 mg/l
7-26-99		TOTAL PHENOLICS		N/D
11-11-99	Acidity - Total	8.79 S.U.	8.16 S.U.	8.10 S.U.
	Alkalinity	40.5	29.1	22.8
	Conductivity	196 mmhos	236	7.40
	pH	7.57 S.U.	7.50 S.U.	7.4 S.U.
	Sulfate	1269 mg/kg	1510	1186
	TDS	221 mg/kg	85	144
	Aluminum	9865 mg/kg	4305	2435
	Iron	11647 mg/kg	20721	15055
	Manganese	90.5 mg/kg	165	124
	Vanadium	4.92 mg/kg	4.70	3.66
	Zinc	91.5 mg/kg	52.6	22.0
1-22-00		Cyanide		N/D
		Fluoride		0.80 mg/l

Phenolics	0.1 mg/l
Arsenic	N/D
Barium	0.29 mg/l
Cadmium	N/D
Chromium	N/D
Lead	N/D
Mercury	N/D
Selenium	N/D
Silver	N/D

On January 28, 2000 Ross Aluminum was sold by Eagle Picher Ind., Inc. The Brooklyn property was not sold and remains an asset of Eagle Picher Ind., Inc. As of 1-28-2000 Ross Aluminum stopped sending spent foundry sand to this property. It is my understanding that Eagle Picher Ind. will be re-grading and capping the area with top soil to close its use as a monofill.

If you have any questions on any of this information please let me know.

Sincerely,

Ted Settlage

Coord. Env. & Safety

FILE NO: **60243**

CLIENT NAME : **Ross Aluminum Foundries**

PROJECT NAME :

REPORT NUMBER: **IS0207005**

REVIEWER INITIALS:

TEST NAME: ** GENERAL ANALYSIS **

SAMPLE MATRIX : **SOLID**

SAMPLE ID :

SAMPLE DESCRIPTION : **BROOKLYN LANDFILL**

LAB NUMBER : **IS0207005**

DATE SAMPLED: **01/22/00**

DATE RECEIVED: **02/07/00**

CODE	ANALYTE	PREPARATION METHOD	ANALYTICAL METHOD	DATE ANALYZED	ANALYST	RESULT	LIMIT OF DETECTION
IA240	CYANIDE - TOTAL		ASTM D3987	02/16/00	LG	N/D**	0.01 mg/l
IA360	FLUORIDE		ASTM D3987	02/17/00	ML	0.80** mg/l	0.20 mg/l
IA850	TOTAL PHENOLICS		ASTM D3987	02/15/00	EP	0.27** mg/l	0.01 mg/l

* N/D - None Detected
** - Water Extraction used.

FILE NO: **60243**
CLIENT NAME : **Ross Aluminum Foundries**
PROJECT NAME :

PAGE NO : **3 of 3**
REPORT NUMBER: **IS0207005**
REVIEWER INITIALS:

TEST NAME : **** TCLP Metals ****

SAMPLE MATRIX : **TCLP EXTRACT**
SAMPLE ID :
SAMPLE DESCRIPTION : **BROOKLYN LANDFILL**
LAB NUMBER : **IS0207005**
EXTRACTION METHOD : **EPA 1311**

DATE SAMPLED: **01/22/00**
DATE RECEIVED: **02/07/00**
DATE EXTRACTED : **02/14/00**
DATE ANALYZED: **02/14/00**
ANALYST: **RJE**

EPA HW NO*	ANALYTE	METHOD	RESULT (mg/l)	REGULATORY LIMIT (mg/l)	LIMIT OF DETECTION (mg/l)
D004	ARSENIC	EPA 6010	N/D	5.0	0.10
D005	BARIUM	EPA 6010	0.29	100.0	0.01
D006	CADMIUM	EPA 6010	N/D	1.0	0.01
D007	CHROMIUM	EPA 6010	N/D	5.0	0.01
D008	LEAD	EPA 6010	N/D	5.0	0.05
D009	MERCURY	EPA 7470	N/D	0.2	0.002
D010	SELENIUM	EPA 6010	N/D	1.0	0.10
D011	SILVER	EPA 6010	N/D	5.0	0.01

* EPA's Hazardous Waste Number
* N/D - None Detected

FILE NO: **60243**

CLIENT NAME : **Ross Aluminum Foundries**

PROJECT NAME :

REPORT NUMBER: **IS1111033**

REVIEWER INITIALS:

TEST NAME: ** GENERAL ANALYSIS **

SAMPLE MATRIX : **SOLID**

SAMPLE ID :

SAMPLE DESCRIPTION : **SAND - PLANT**

LAB NUMBER : **IS1111033**

DATE SAMPLED: **11/11/99**

DATE RECEIVED: **11/11/99**

CODE	ANALYTE	PREPARATION METHOD	ANALYTICAL METHOD	DATE ANALYZED	ANALYST	RESULT	LIMIT OF DETECTION
IA010	ACIDITY - TOTAL		SM 2310 B	12/03/99	JAE	8.79 S.U.	2.0 S.U.
IA030	ALKALINITY - TOTAL		SM 2320 B	11/12/99	FS	40.5* mg/kg	2.0 mg/kg
IA270	CONDUCTIVITY		EPA 9050	11/12/99	FS	196 mmhos/cm	2.0 mmhos/cm
IA590	pH		EPA 150.1	11/12/99	FS	7.57 S.U.	0.01 S.U.
IA720	SULFATE (as SO4)	EPA 3050	EPA 6010 A	11/22/99	BJK	1269 mg/kg	108 mg/kg
IA800	TOTAL DISSOLVED SOLIDS (TDS)		EPA 160.1	11/19/99	JAE	221 mg/kg	1.0 mg/kg
IB010	ALUMINUM	EPA 3050	EPA 6010 A	11/22/99	BJK	9865 mg/kg	5.90 mg/kg
IB130	IRON	EPA 3050	EPA 6010 A	11/22/99	BJK	11647 mg/kg	1.97 mg/kg
IB160	MANGANESE	EPA 3050	EPA 6010 A	11/22/99	BJK	90.5 mg/kg	0.98 mg/kg
IB290	VANADIUM	EPA 3050	EPA 6010 A	11/22/99	BJK	4.92 mg/kg	0.98 mg/kg
IB300	ZINC	EPA 3050	EPA 6010 A	11/22/99	BJK	91.5 mg/kg	2.95 mg/kg

* As $CaCO_3$

FILE NO: **60243**

CLIENT NAME : **Ross Aluminum Foundries**

PROJECT NAME :

REPORT NUMBER: **IS1111033**

REVIEWER INITIALS: JM

TEST NAME: ** GENERAL ANALYSIS **

SAMPLE MATRIX : **SOLID**

SAMPLE ID :

SAMPLE DESCRIPTION : **SAND - LANDFILL 2**

LAB NUMBER : **IS1111035**

DATE SAMPLED: **11/11/99**

DATE RECEIVED: **11/11/99**

CODE	ANALYTE	PREPARATION METHOD	ANALYTICAL METHOD	DATE ANALYZED	ANALYST	RESULT	LIMIT OF DETECTION
IA010	ACIDITY - TOTAL		SM 2310 B	12/03/99	JAE	8.10 S.U.	2.0 S.U.
IA030	ALKALINITY - TOTAL		SM 2320 B	11/12/99	FS	22.8* mg/kg	2.0 mg/kg
IA270	CONDUCTIVITY		EPA 9050	11/12/99	FS	235 mmhos/cm	2.0 mmhos/cm
IA590	pH		EPA 150.1	11/12/99	FS	7.40 S.U.	0.01 S.U.
IA720	SULFATE (as SO4)	EPA 3050	EPA 6010 A	11/22/99	BJK	1186 mg/kg	101 mg/kg
IA800	TOTAL DISSOLVED SOLIDS (TDS)		EPA 160.1	11/19/99	JAE	144 mg/kg	1.0 mg/kg
IB010	ALUMINUM	EPA 3050	EPA 6010 A	11/22/99	BJK	2435 mg/kg	5.49 mg/kg
IB130	IRON	EPA 3050	EPA 6010 A	11/22/99	BJK	15055 mg/kg	1.83 mg/kg
IB160	MANGANESE	EPA 3050	EPA 6010 A	11/22/99	BJK	124 mg/kg	0.92 mg/kg
IB290	VANADIUM	EPA 3050	EPA 6010 A	11/22/99	BJK	3.66 mg/kg	0.92 mg/kg
IB300	ZINC	EPA 3050	EPA 6010 A	11/22/99	BJK	22.0 mg/kg	2.75 mg/kg

* As $CaCO_3$

FILE NO: **60243**

CLIENT NAME : **Ross Aluminum Foundries**

PROJECT NAME :

REPORT NUMBER: **IS1111033**

REVIEWER INITIALS:

TEST NAME: ** GENERAL ANALYSIS **

SAMPLE MATRIX : **SOLID**

SAMPLE ID :

SAMPLE DESCRIPTION : **SAND - LANDFILL 1**

LAB NUMBER : **IS1111034**

DATE SAMPLED: **11/11/99**

DATE RECEIVED: **11/11/99**

CODE	ANALYTE	PREPARATION METHOD	ANALYTICAL METHOD	DATE ANALYZED	ANALYST	RESULT	LIMIT OF DETECTION
IA010	ACIDITY - TOTAL		SM 2310 B	12/03/99	JAE	8.16 S.U.	2.0 S.U.
IA030	ALKALINITY - TOTAL		SM 2320 B	11/12/99	FS	29.1* mg/kg	2.0 mg/kg
IA270	CONDUCTIVITY		EPA 9050	11/12/99	FS	236 mmhos/cm	2.0 mmhos/cm
IA590	pH		EPA 150.1	11/12/99	FS	7.50 S.U.	0.01 S.U.
IA720	SULFATE (as SO4)	EPA 3050	EPA 6010 A	11/22/99	BJK	1510 mg/kg	103 mg/kg
IA800	TOTAL DISSOLVED SOLIDS (TDS)		EPA 160.1	11/19/99	JAE	85.0 mg/kg	1.0 mg/kg
IB010	ALUMINUM	EPA 3050	EPA 6010 A	11/22/99	BJK	4305 mg/kg	5.63 mg/kg
IB130	IRON	EPA 3050	EPA 6010 A	11/22/99	BJK	20721 mg/kg	1.88 mg/kg
IB160	MANGANESE	EPA 3050	EPA 6010 A	11/22/99	BJK	165 mg/kg	0.94 mg/kg
IB290	VANADIUM	EPA 3050	EPA 6010 A	11/22/99	BJK	4.70 mg/kg	0.94 mg/kg
IB300	ZINC	EPA 3050	EPA 6010 A	11/22/99	BJK	52.6 mg/kg	2.82 mg/kg

* As CaCO3

Ross Aluminum Foundries
P.O. Box 609 Sidney, Ohio 45365-0609 513/492-4134 Fax 513/498-1883

February, 3 1999

Joe E. Sargeant, R.S.
Director Of Environmental Health
Sidney-Shelby County board Of Health
202 West Poplar Street
Sidney, OH 45365

Dear Mr. Sargeant:

The following analysis summary for spent foundry sand is being submitted for your review.

Samples were collected by Swank Consulting, Inc., and analyzed by Brookside Laboratories, Inc., and represent the foundry sand deposited on the Ross Aluminum Foundries property located west of Brooklyn Avenue.

3-12-98	TCLP For Phenolics		2.03 mg/l
12-28-98	TCLP For Metals		
		Arsenic	N/D
		Barium	0.05 mg/l
		Cadmium	N/D
		Chromium	0.04 mg/l
		Cyanide (total)	N/D
		Fluoride	2.0 mg/l
		Lead	N/D
		Mercury	N/D
		Phenolics	0.05 mg/l
		Selenium	N/D
		Silver	N/D

If you have any questions or require additional information please let me know.

Sincerely,

Ted Settlage
Coordinator Environ. & Safety

F:\TED\SHARED\110398.TAS

DIVISION OF EAGLE PICHER

FILE NO: **60243**
CLIENT NAME : **Ross Aluminum Foundries**
PROJECT NAME : **Brooklyn Landfill**

PAGE NO : **3 of 4**
REPORT NUMBER: **IS0107020**
REVIEWER INITIALS: fnl

TEST NAME : **** TCLP Metals ****

SAMPLE MATRIX : **TCLP EXTRACT**
SAMPLE ID :
SAMPLE DESCRIPTION : **LANDFILL COMPOSITE**
LAB NUMBER : **IS0107020**
EXTRACTION METHOD : **EPA 1311**

DATE SAMPLED: **12/28/98**
DATE RECEIVED: **01/07/99**
DATE EXTRACTED : **01/28/99**
DATE ANALYZED: **01/27/99**
ANALYST: **ZLX/SRE**

EPA HW NO*	ANALYTE	METHOD	RESULT (mg/l)	REGULATORY LIMIT (mg/l)	LIMIT OF DETECTION (mg/l)
D004	ARSENIC	EPA 200.9	N/D	5.0	0.04
D005	BARIUM	EPA 6010	0.05	100.0	0.02
D006	CADMIUM	EPA 6010	N/D	1.0	0.03
D007	CHROMIUM	EPA 6010	0.04	5.0	0.03
D008	LEAD	EPA 6010	N/D	5.0	0.10
D009	MERCURY	EPA 7471	N/D	0.0002	0.0002
D010	SELENIUM	EPA 200.9	N/D	1.0	0.05
D011	SILVER	EPA 7760	N/D	5.0	0.04

* EPA's Hazardous Waste Number
* N/D - None Detected

FILE NO: **60243**

CLIENT NAME : **Ross Aluminum Foundries**

PROJECT NAME : **Brooklyn Landfill**

REPORT NUMBER : **IS0107020**

REVIEWER INITIALS: pnl

QA/QC REPORT

Duplicate Analysis

ANALYTE	LAB NO.	ANALYST	RESULT	RESULT(DUP)	RPD
IA240 CYANIDE - TOTAL	DI1230015	CJH	<0.02 mg/l	<0.02 mg/l	0.0

Spike Recovery I

ANALYTE	LAB NO.	ANALYST	% RECOVERY
IA240 CYANIDE - TOTAL	LCS	CJH	90.6
IA360 FLUORIDE	IS0107020	MCW	105
IA850 TOTAL PHENOLICS	LCS	MCW	97.5
IB030 ARSENIC	IS0107020	SRE	81.4
IB040 BARIUM	LCS	JAM	87.8
IB210 SELENIUM	IS0107020	SRE	94.5

Spike Recovery II

ANALYTE	LAB NO.	ANALYST	MS REC.	MSD REC.	RPD
IB040 BARIUM	IS0107020	JAM	82.9 %	84.3 %	1.6
IB060 CADMIUM	IS0107020	ZLX	78.2 %	78.7 %	0.6
IB090 CHROMIUM-TOTAL	IS0107020	ZLX	79.4 %	79.3 %	0.1
IB140 LEAD	IS0107020	ZLX	79.7 %	77.8 %	2.4
IB170 MERCURY	IS0107020	ZLX	98.7 %	108 %	9.0

Kirk NationaLease Co.

Covers The Miles With Quality

August 17, 1988

Mr. Jim Renker
Quality Coordinator
Ross Aluminum Foundries
815 Oak Avenue
Sidney, OH 45365

Dear Jim:

Kirk NationaLease Co. is in agreement to sell Lot 51, located on Brooklyn Avenue in Sidney, to Ross Aluminum Foundries. The price for this property will be $27,500. We have received $1,000 earnest money from Ross Aluminum which leaves the remaining balance at $26,500.

Per our conversation, we would like to have the purchase of this property completed by September 16, 1988. However, if there are any problems in meeting this date, please contact us and we will review the situation at that time. If we can assist you in any way, please don't hesitate to give us a call.

Sincerely,

James R. Harvey
Executive Vice President

kw

cc: Lloyd Schroer
Phil Lahrmer

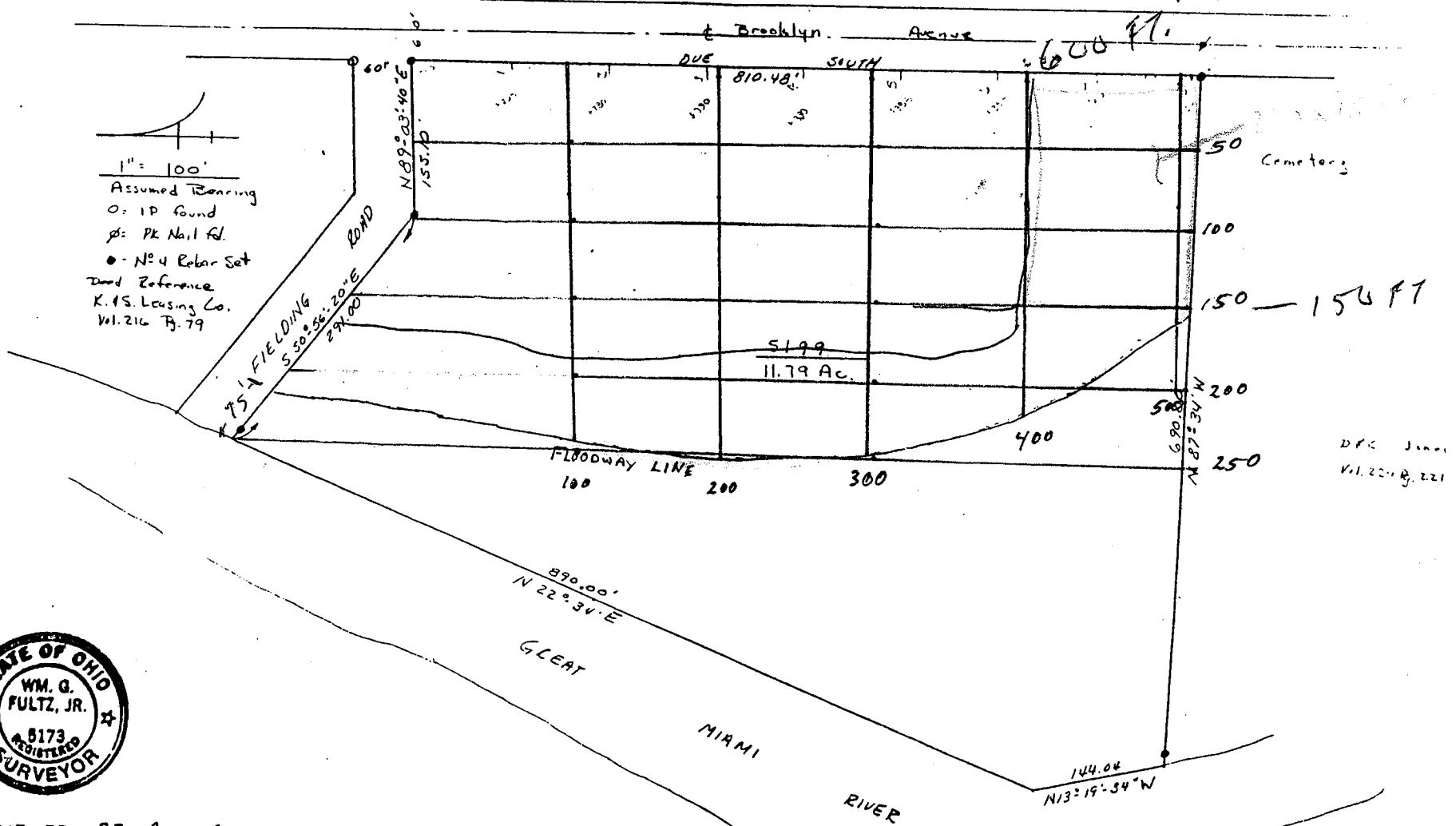
#29/67

800 Vandemark Rd. • P.O. Box 4369 • Sidney, Ohio 45365 • Phone (513) 498-1151

Affiliated with: National Truck Leasing System

K. & S. LEASING COMPANY PLAT

Part of Fra. Sec. 10, T1, R13, M.R.S.,
City of Sidney, Clinton Twp., Shelby Co., Ohio



OH000024

Ross Aluminum Foundries P.O. Box 609 Sidney, Ohio 45365-0609 513/492-4134

September 9, 1986

Lloyd W. Schroer, President
KIRK NATIONALEASE
P.O. Box 784
Sidney, OH 45365

Dear Mr. Schroer:

Ross Aluminum Foundries has been dumping clean spent Foundry sand on your South Brooklyn Avenue property in accordance with the Ross/Kirk Nationalease Agreement dated May 28, 1986.

Since that date, we have employed a Certified Laboratory to conduct periodic sampling and analysis of the Foundry sand going to the site.

In addition to sampling the materials at this location, we are also in the process of conducting site sampling to certify Ross compliance to the contract.

The writer accompanied a Laboratory Representative to the dump site on September 5, 1986 to observe conditions and sampling technique. We noticed some things I will pass on to you for your information:

1. Some person(s) have used this site to dump automobile tires, both on the south side and the southeast corner of the fill area.

2. There is evidence of several truckloads of a gray lightweight material that resembles airfloated clay in chunk and powder forms. There were several aerosol cans mixed in with this material that had contained laquer and at least one can for "thinsit" paint thinner.

We appreciate the opportunity of working with Kirk and felt you would like to know what we had seen.

Sincerely,

ROSS ALUMINUM FOUNDRIES

James F. Rinker

James F. Rinker

JFR;djm

XC: File

LAW OFFICES

ELSASS, SCHMITT, WALLACE & CO., L.P.A.

101 SOUTH OHIO AVENUE
FIRST BORDER SAVINGS BUILDING
POST OFFICE BOX 499
SIDNEY, OHIO 45365

(513) 492-6191
(OHIO) 800-821-6362

EUGENE P. ELSASS
JOHN D. SCHMITT
RICHARD H. WALLACE
STANLEY R. EVANS
KEITH M. SCHNELLE

E. J. GARMHAUSEN
(1913-1972)

June 2, 1986

Mr. James Rinker
Quality Coordinator
Ross Aluminum Foundries
P. O. Box 609
Sidney, Ohio 45365

Re: Ross Aluminum Foundries - Kirk Nationalease Co.

Dear Jim:

I am pleased to enclose an original copy of the agreement entered into between the above-captioned parties.

Thanks for your cooperation.

Very truly yours,

Richard H. Wallace

RHW/jm
Encl.

JMG/nas
5-22-86

AGREEMENT

This Agreement made and concluded this 28th day of May, 1986 by and between Ross Aluminum Foundries, a division of Eagle Picher Industries (hereinafter "Ross"), and Kirk NationaLease Co., an Ohio corporation (hereinafter "Kirk").

W I T N E S S E T H :

WHEREAS, Kirk owns certain property located on Brooklyn Avenue in the City of Sidney, Shelby County, Ohio that is suitable for the disposal of certain industrial waste materials; and

WHEREAS, Ross conducts a foundry operation in Shelby County, Ohio and is desirous of obtaining a site to dispose of certain industrial substances (to wit: foundry sand) on the premises owned by Kirk; and

WHEREAS, Kirk is willing to permit Ross to dispose of certain materials on the site subject to certain terms and conditions.

NOW, THEREFORE, the parties agree as follows:

1. Kirk hereby agrees to permit Ross to dispose of foundry sand that does not contain toxic substances on its Brooklyn Avenue property. The consent given by Kirk is conditioned on and subject to the initial approval of the Board of Health of Shelby County, Ohio and the absence of any further action by the Board of Health to withdraw its approval.

2. Ross agrees to comply with the terms and conditions of the Board of Health authorization dated February 26, 1986, a copy of which is attached hereto and marked as Exhibit "A," and any further authorization. Ross further agrees to obtain any and all permits and/or approvals required

from the Board of Health, the State of Ohio, the U.S. or Ohio Environmental Protection Agencies or any other administrative agency having jurisdiction or authority over either the disposal site or the disposed materials.

3. Ross agrees to assume any and all liability and damages which may arise as a result of the disposal of any substance or material from Ross at the Brooklyn Avenue property. In the event a governmental agency requires any treatment to or clean up of the disposed substances on the Brooklyn Avenue property, Ross will agree to assume such responsibilities and pay such expenses and costs that are associated with that portion of the material deposited at the site by Ross.

4. This Agreement may be terminated by either party upon notifying the other party in writing no less than sixty (60) days prior to the date of termination. Termination of this Agreement shall not affect or in any manner discharge the continuing obligations of Ross under Sections 2 and 3 of this Agreement.

IN WITNESS WHEREOF, the parties have hereunto set their hands this 28th day of May, 1986.

In the presence of:

Rod W H Wallace

James F. Riker

John M. Gaulausen

Judy Wixford

ROSS ALUMINUM FOUNDRIES, A DIVISION OF EAGLE PICHER INDUSTRIES

By: T E Kramer

Its: President

KIRK NATIONALEASE CO.

By: Lloyd W Schroer

Lloyd W. Schroer, President

A/N1

Board of Health
SHELBY COUNTY AND SIDNEY, OHIO
COURT HOUSE
PHONE: 498-7249
SIDNEY, OHIO 45365

February 26, 1986

Kirk Nationalease
Mr. Lloyd Schroer
Vice President Operations
P.O. Box 784
Sidney, Ohio 45365

Re: Foundry Sand Disposal

Dear Mr. Schroer:

The disposal of fly ash and foundry sand devoid of toxic substances can be use as fill material in areas not subjected to flooding, or in ponded water, streams or the water table. The area owned by Kirk Nationalease on Brooklyn Avenue has been used for that purpose and at this time appears to be satisfactory with this office.

Sincerely,

Richard H. Breece, M.D.

Richard H. Breece, M.D.
Health Commissioner

Donald L. Fair R.S.

Donald L. Fair, R.S.
Administrative Sanitarian

DLF:lsn
cc: OEPA,
Mr. Joe Moore
Ross Aluminum Foundries,
Mr. Jim Ricker

EXHIBIT "A"

LAW OFFICES

ELSASS, SCHMITT, WALLACE & CO., L.P.A.

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FIRST BORDER SAVINGS BUILDING
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STANLEY R. EVANS
KEITH M. SCHNELLE
LOUIS M. BEST

E. J. GARMHAUSEN
(1913-1972)
TELECOPIER (513) 492-0876

September 23, 1988

Mr. Jim Rinker
Ross Aluminum Foundries
815 Oak Avenue
Sidney, OH 45365

Re: Title Insurance Policy on Lot 5199

Dear Jim:

Enclosed please find a Title Insurance Policy as issued by Lawyers Title Insurance Corporation for the above-referenced property. Also enclosed please find invoice for the insurance.

If you should have any questions, please feel free to contact me.

Very truly yours,

ELSASS, SCHMITT, WALLACE & CO., L.P.A.

Keith M. Schnelle

KMS:lb
Enclosures (2)

Lawyers Title Insurance Corporation

National Headquarters — Richmond, Virginia

Policy Number

85 - 00 - 694584

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS CONTAINED IN SCHEDULE B AND THE PROVISIONS OF THE CONDITIONS AND STIPULATIONS HEREOF, LAWYERS TITLE INSURANCE CORPORATION, a Virginia corporation, herein called the Company, insures, as of Date of Policy shown in Schedule A, against loss or damage, not exceeding the amount of insurance stated in Schedule A, and costs, attorneys' fees and expenses which the Company may become obligated to pay hereunder, sustained or incurred by the insured by reason of:

1. Title to the estate or interest described in Schedule A being vested otherwise than as stated therein;
2. Any defect in or lien or encumbrance on such title;
3. Lack of a right of access to and from the land; or
4. Unmarketability of such title.

IN WITNESS WHEREOF the Company has caused this policy to be signed and sealed, to be valid when Schedule A is countersigned by an authorized officer or agent of the Company, all in accordance with its By-Laws.

Lawyers Title Insurance Corporation

Robert C. Dawson

President

Attest:

Samuel A. Ian

Secretary.

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy:

1. (a) Governmental police power.

   (b) Any law, ordinance or governmental regulation relating to environmental protection.

   (c) Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part.

   (d) The effect of any violation of the matters excluded under (a), (b), or (c) above, unless notice of a defect, lien or encumbrance resulting from a violation has been recorded at Date of Policy in those records in which under state statutes deeds, mortgages, lis pendens, liens or other title encumbrances must be recorded in order to impart constructive notice to purchasers of the land for value and without knowledge; provided, however, that without limitation, such records shall not be construed to include records in any of the offices of federal, state or local environmental protection, zoning, building, health or public safety authorities.

2. Rights of eminent domain unless notice of the exercise of such rights appears in the public records at Date of Policy.

3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder; (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy; or (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.

CONDITIONS AND STIPULATIONS

1. Definition of Terms

The following terms when used in this policy mean:

(a) "insured": the insured named in Schedule A, and, subject to any rights or defenses the Company may have had against the named insured, those who succeed to the interest of such insured by operation of law as distinguished from purchase including, but not limited to, heirs, distributees, devisees, survivors, personal representatives, next of kin, or corporate or fiduciary successors.

(b) "insured claimant": an insured claiming loss or damage hereunder.

(c) "knowledge": actual knowledge, not constructive knowledge or notice which may be imputed to an insured by reason of any public records.

(d) "land": the land described, specifically or by reference in Schedule A, and improvements affixed thereto which by law constitute real property; provided, however, the term "land" does not include any property beyond the lines of the area specifically described or referred to in Schedule A, nor any right, title, interest, estate or easement in abutting streets, roads, avenues, alleys, lanes, ways or waterways, but nothing herein shall modify or limit the extent to which a right of access to and from the land is insured by this policy.

(e) "mortgage": mortgage, deed or trust, trust deed, or other security instrument.

(f) "public records": those records which by law impart constructive notice of matters relating to said land.

2. Continuation of Insurance after Conveyance of Title

The Coverage of this policy shall continue in force as of Date of Policy in favor of an insured so long as such insured retains an estate or interest in the land, or holds an indebtedness secured by a purchase money mortgage given by a purchaser from such insured, or so long as such insured shall have liability by reason of covenants of warranty made by such insured in any transfer or conveyance of such estate or interest; provided, however, this policy shall not continue in force in favor of any purchaser from such insured of either said estate or interest or the indebtedness secured by a purchase money mortgage given to such insured.

3. Defense and Prosecution of Actions—Notice of Claim to be given by an Insured Claimant

(a) The Company, at its own cost and without undue delay, shall provide for the defense of an insured in all litigation consisting of actions or proceedings commenced against such insured or a defense interposed against an insured in an action to enforce a contract for a sale of the estate or interest in said land, to the extent that such litigation is founded upon an alleged defect, lien, encumbrance, or other matter insured against by this policy.

(b) The insured shall notify the Company promptly in writing (i) in case any action or proceeding is begun or defense is interposed as set forth in (a) above, (ii) in case knowledge shall come to an insured hereunder of any claim of title or interest which is adverse to the title to the estate or interest, as insured, and which might cause loss or damage for which the Company may be liable by virtue of this policy, or (iii) if title to the estate or interest, as insured, is rejected as unmarketable. If such prompt notice shall not be given to the Company, then as to such insured all liability of the Company shall cease and terminate in regard to the matter or matters for which such prompt notice is required; provided, however, that failure to notify shall in no case prejudice the rights of any such insured under this policy unless the Company shall be prejudiced by such failure and then only to the

(c) The Company shall have the right at its own cost to institute and without undue delay prosecute any action or proceeding or to do any other act which in its opinion may be necessary or desirable to establish the title to the estate or interest as insured, and the Company may take any appropriate action under the terms of this policy, whether or not it shall be liable thereunder, and shall not thereby concede liability or waive any provision of this policy.

(d) Whenever the Company, shall have brought any action or interposed a defense as required or permitted by the provision of this policy, the Company may pursue any such litigation to final determination by a court of competent jurisdiction and expressly reserves the right, in its sole discretion, to appeal from any adverse judgment or order.

(e) In all cases where this policy permits or requires the Company to prosecute or provide for the defense of any action or proceeding, the insured hereunder shall secure to the Company the right to so prosecute or provide defense in such action or proceeding, and all appeals therein, and permit the Company to use, at its option, the name of such insured for such purpose. Whenever requested by the Company, such insured shall give the Company all reasonable aid in any such action or proceeding, in effecting settlement, securing evidence, obtaining witnesses, or prosecuting or defending such action or proceeding, and the Company shall reimburse such insured for any expense so incurred.

4. Notice of Loss—Limitation of Action

In addition to the notices required under paragraph 3(b) of these Conditions and Stipulations, a statement in writing of any loss or damage for which it is claimed the Company is liable under this policy shall be furnished to the Company within 90 days after such loss or damage shall have been determined and no right of action shall accrue to an insured claimant until 30 days after such statement shall have been furnished. Failure to furnish such statement of loss or damage shall terminate any liability of the Company under this policy as to such loss or damage.

5. Options to Pay or Otherwise Settle Claims

The Company shall have the option to pay or otherwise settle for or in the name of an insured claimant any claim insured against or to terminate all liability and obligations of the Company hereunder by paying or tendering payment of the amount of insurance under this policy together with any costs, attorneys' fees and expenses incurred up to the time of such payment or tender of payment, by the insured claimant and authorized by the Company.

6. Determination and Payment of Loss

(a) The liability of the Company under this policy shall in no case exceed the least of:

(i) the actual loss of the insured claimant; or

(ii) the amount of insurance stated in Schedule A.

(b) The Company will pay, in addition to any loss insured against by this policy, all costs imposed upon an insured in litigation carried on by the Company for such insured, and all costs, attorneys' fees and expenses in litigation carried on by such insured with the written authorization of the Company.

(c) When liability has been definitely fixed in accordance with the conditions of this policy, the loss or damage shall be payable within 30 days thereafter.

THIS SHADED AREA FOR STATISTICAL PURPOSES ONLY AND IS NOT A PART OF THE POLICY			1 Policy Number 2 Property Type 3 County	4 Policy Amount 5 Premium 6 Rate Rule	7 Effective Date 8 Survey Amendment 9 Additional Chains			
85 1	2	3	$ 4	$ 5	6	7	8	9

Lawyers Title Insurance Corporation

OWNER'S POLICY

Schedule A

CASE NUMBER	DATE OF POLICY	AMOUNT OF INSURANCE	POLICY NUMBER
LTS-259	9-9-88 at 4:27 pm	$27,500.00	85-00-694584

THE POLICY NUMBER SHOWN ON THIS SCHEDULE MUST AGREE WITH THE PREPRINTED NUMBER ON THE COVER SHEET

1. Name of Insured:

Eagle-Picher Industries, Inc.

2. The estate or interest in the land described herein and which is covered by this policy is:

fee simple

3. The estate or interest referred to herein is at Date of Policy vested in:

Eagle-Picher Industries, Inc., by a warranty deed dated September 9, 1988, presented for record September 9, 1988, and recorded in Deed Volume 167, Page 664, Shelby County, Ohio.

4. The land referred to in this policy is described as follows:

Situated in the City of Sidney, County of Shelby, and State of Ohio:

Being all of Inlot 5199 of the K & S Leasing Company Plat as recorded at Plat Volume 19, Page 807, Shelby County, Ohio.

A copy of the plat is attached hereto.

Lawyers Title Agency of Sidney, Inc.

By _____
Countersignature Authorized Officer or Agent

Sidney, Ohio
Issued at (Location)

Lawyers Title Insurance Corporation

OWNER'S POLICY

CASE NUMBER	DATE OF POLICY
LTS-259	9-9-88

THE POLICY NUMBER SHOWN ON THIS SCHEDULE MUST AGREE WITH THE PREPRINTED NUMBER ON THE COVER SHEET

POLICY NUMBER
85-00-694584

Schedule B

This policy does not insure against loss or damage by reason of the following:

a. The dower, curtesy, homestead, community property, or other statutory marital rights, if any, of the spouse of any individual insured.

b. Real estate taxes for the calendar year 1988 and subsequent years, none of which are delinquent.

c. Unmatured installments of special assessment for Sidney lighting purposes.

d. Assessments, if any, which have not been certified to the County Auditor.

e. Any lien, or right to a lien, for services, labor, or materials, heretofore or hereafter furnished, imposed by law, and not shown on the public records.

f. Rights or claims of parties in possession and easements, or claims of easements not shown by the public records, boundary line disputes, overlaps, encroachments, and any matters of record which would be disclosed by an accurate survey of and inspection of the premises.

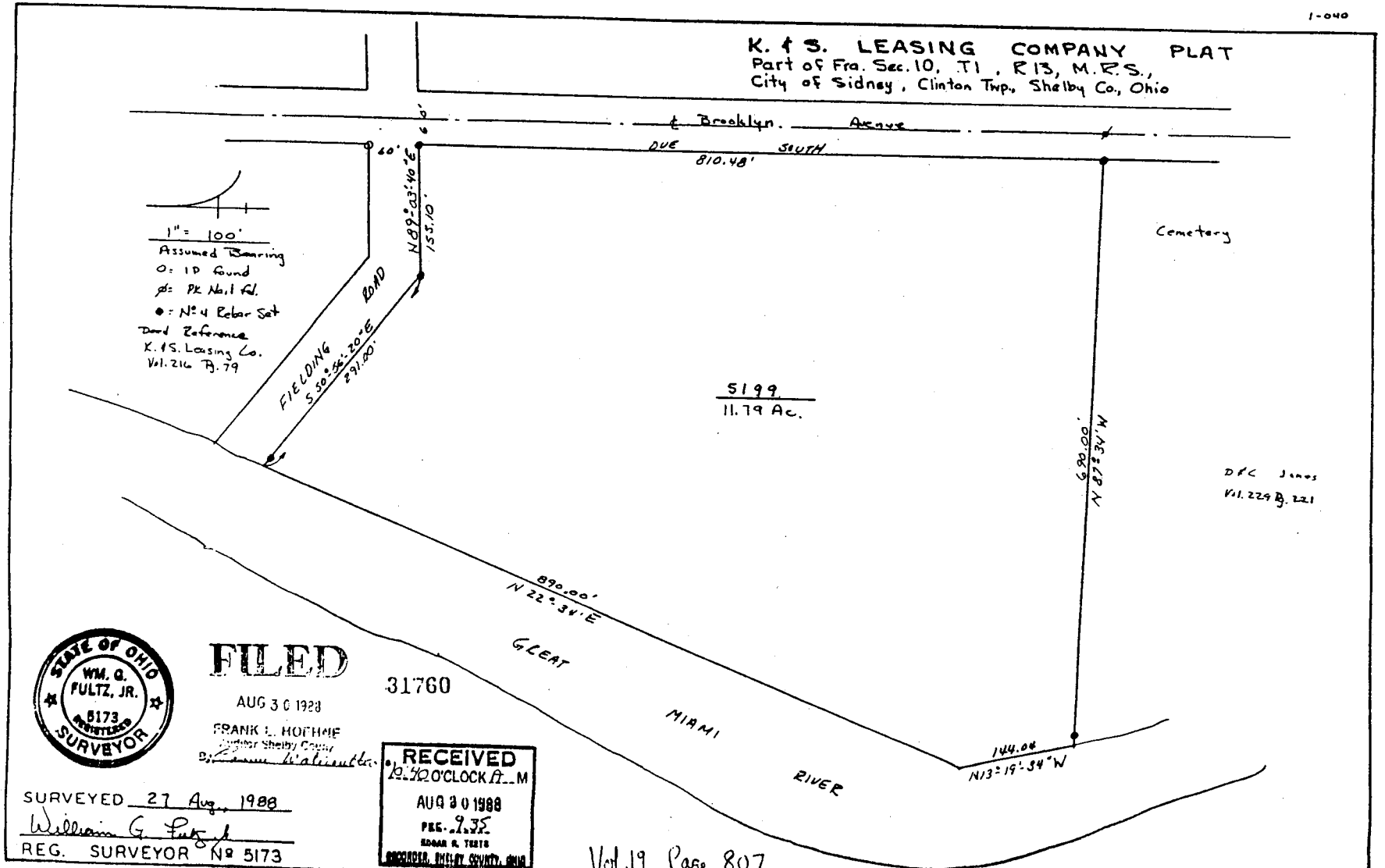
g. Attention is directed to the fact that the insured premises is located within the flood hazard area of the Great Miami River and subject to the flood zone requirements and provisions of all applicable governmental authorities.

OH000035

1-040

K. & S. LEASING COMPANY PLAT

Part of Fra. Sec. 10, T1, R13, M.R.S.,
City of Sidney, Clinton Twp., Shelby Co., Ohio



Vol. 19 Page. 807

CONDITIONS AND STIPULATIONS—CONTINUED

7. Limitation of Liability

No claim shall arise or be maintainable under this policy (a) if the Company, after having received notice of an alleged defect, lien or encumbrance insured against hereunder, by litigation or otherwise, removes such defect, lien or encumbrance or establishes the title, as insured, within a reasonable time after receipt of such notice; (b) in the event of litigation until there has been a final determination by a court of competent jurisdiction, and disposition of all appeals therefrom, adverse to the title, as insured, as provided in paragraph 3 hereof; or (c) for liability voluntarily assumed by an insured in settling any claim or suit without prior written consent of the Company.

8. Reduction of Liability

All payments under this policy, except payments made for costs, attorneys' fees and expenses, shall reduce the amount of the insurance pro tanto. No payment shall be made without producing this policy for endorsement of such payment unless the policy be lost or destroyed, in which case proof of such loss or destruction shall be furnished to the satisfaction of the Company.

9. Liability Noncumulative

It is expressly understood that the amount of insurance under this policy shall be reduced by any amount the Company may pay under any policy insuring either (a) a mortgage shown or referred to in Schedule B hereof which is a lien on the estate or interest covered by this policy, or (b) a mortgage hereafter executed by an insured which is a charge or lien on the estate or interest described or referred to in Schedule A, and the amount so paid shall be deemed a payment under this policy. The Company shall have the option to apply to the payment of any such mortgages any amount that otherwise would be payable hereunder to the insured owner of the estate or interest covered by this policy and the amount so paid shall be deemed a payment under this policy to said insured owner.

10. Apportionment

If the land described in Schedule A consists of two or more parcels which are not used as a single site, and a loss is established affecting one or more of said parcels but not all, the loss shall be computed and settled on a pro rata basis as if the amount of insurance under this policy was divided pro rata as to the value on Date of Policy of each separate parcel to the whole, exclusive of any improvements made subsequent to Date of Policy, unless a liability or value has otherwise been agreed upon as to each such parcel by the Company and the insured at the time of the issuance of this policy and shown by an express statement herein or by an endorsement attached hereto.

11. Subrogation Upon Payment or Settlement

Whenever the Company shall have settled a claim under this policy, all right of subrogation shall vest in the Company unaffected by any act of the insured claimant. The Company shall be subrogated to and be entitled to all rights and remedies which such insured claimant would have had against any person or property in respect to such claim had this policy not been issued, and if requested by the Company, such insured claimant shall transfer to the Company all rights and remedies against any person or property necessary in order to perfect such right of subrogation and shall permit the Company to use the name of such insured claimant in any transaction or litigation involving such rights or remedies. If the payment does not cover the loss of such insured claimant, the Company shall be subrogated to such rights and remedies in the proportion which said payment bears to the amount of said loss. If loss should result from any act of such insured claimant, such act shall not void this policy, but the Company, in that event, shall be required to pay only that part of any losses insured against hereunder which shall exceed the amount, if any, lost to the Company be reason of the impairment of the right of subrogation.

12. Liability Limited to this Policy

This instrument together with all endorsements and other instruments, if any, attached hereto by the Company is the entire policy and contract between the insured and the Company.

Any claim of loss or damage, whether or not based on negligence, and which arises out of the status of the title to the estate or interest covered hereby or any action asserting such claim, shall be restricted to the provisions and conditions and stipulations of this policy.

No amendment of or endorsement to this policy can be made except by writing endorsed hereon or attached hereto signed by either the President, a Vice President, the Secretary, an Assistant Secretary, or validating officer or authorized signatory of the Company.

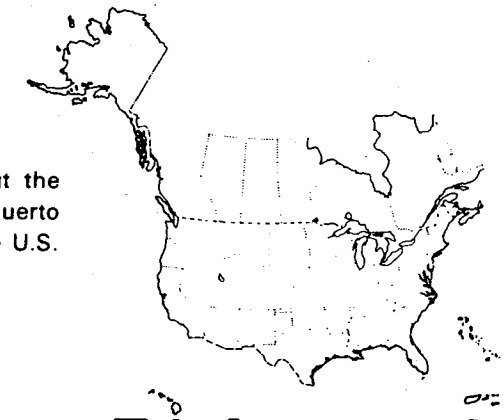
13. Notices, Where Sent

All notices required to be given the Company and any statement in writing required to be furnished the Company shall include the number of this policy and shall be addressed to its Corporate Headquarters, 6630 West Broad Street, mailing address: P.O. Box 27567, Richmond, Virginia 23261.

Lawyers Title Insurance Corporation

National Headquarters — Richmond, Virginia

Service available throughout the United States, Canada, Puerto Rico, the Bahamas, and the U.S. Virgin Islands.



National Division, Branch and Agency offices and Approved Attorneys are located throughout the operating territory.

Lawyers Title Insurance Corporation

National Headquarters — Richmond, Virginia

Lawyers Title
Insurance Corporation
National Headquarters
Richmond, Virginia

Policy of Title Insurance

A word of thanks to our insured . . . . .

As we make your policy a part of our permanent records, we want to express our appreciation of this evidence of your faith in Lawyers Title Insurance Corporation.

There is no recurring premium.

This policy provides valuable title protection and we suggest you keep it in a safe place where it will be readily available for future reference.

If you have any questions about the protection provided by this policy or wish to contact us for any other reason, contact the office that issued your policy or you may write to:

Consumer Affairs Department
Lawyers Title Insurance Corporation
P.O. Box 27567
Richmond, Virginia 23261

BROOKSIDE FARMS LABORATORY ASS'N., INC.
ENVIRONMENTAL & INDUSTRIAL DIVISION
NEW KNOXVILLE, OH 45871
(419) 753-2448

August 30, 1988

LAM VAN HO, Ph.D.
DIVISION DIRECTOR

Mr. Jim Rinker, Quality Coordinator
Ross Aluminum Foundries
707-815 N. Oak Ave.
P.O. Box 609
Sidney, OH 45365

Dear Jim,

Re: Recheck of Iron and Barium analysis from composite samples.

As we expected, all high readings of Fe and Ba from analytical reports submitted to you on August 5, 1988 were lower than the actual concentrations because they exceeded the preset linear concentration range of our analytical instrumentation. The rechecked results are summarized as follows:

Lab No.	Sample ID	Test Parameter	Reported Result (mg/kg)	Corrected Result (mg/kg)
IE83017	001 Composite	Fe	133,290	170,800
IE83019	003 Composite	Fe	36,579	42,983
IE83021	005 Composite	Ba	1,562	3,288
IE83026	009 Composite	Fe	133,320	442,400
IE83029	011 (Bottom 2")	Fe	133,300	295,288

For your file, I am forwarding to you the revised reports. Please discard the previous submittal. Thank you for giving us the opportunity to serve you.

Respectfully submitted,

Lam

Lam V. Ho, Ph.D.
Director, EID

LVH/js

cc/Monte Swank

Enclosure

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

** ANALYSIS REPORT **

Ross Aluminum Foundries
707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83017	IE83018
Sample Description		001 COMPOSITE	002 COMPOSITE
ARSENIC	mg/kg	12.9 *	6.55 *
BARIUM	mg/kg	306 *	652 *
CADMIUM	mg/kg	7.90 *	2.90 *
CHROMIUM - TOTAL	mg/kg	48.0 *	28.0 *
IRON	mg/kg	170,800 *	31843 *
LEAD	mg/kg	1774 *	847 *
MERCURY (Cold Vapor)	mg/kg	2.63	0.76
SELENIUM	mg/kg	0.30 *	.015 *
SILVER	mg/kg	2.0 *	1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	4.29	3.94

* Results are on dry-weight basis.

Peter A. Conidaris / LH
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

** ANALYSIS REPORT **

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707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83019	IE83020
Sample Description		003 COMPOSITE	004 COMPOSITE
ARSENIC	mg/kg	4.68 *	3.34 *
BARIUM	mg/kg	193 *	107 *
CADMIUM	mg/kg	10.1 *	0.7 *
CHROMIUM - TOTAL	mg/kg	51.0 *	16.0 *
IRON	mg/kg	42,983 *	17050 *
LEAD	mg/kg	501 *	34.0 *
MERCURY (Cold Vapor)	mg/kg	0.56	0.34
SELENIUM	mg/kg	.020 *	.048 *
SILVER	mg/kg	< 1.0 *	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	2.84	1.68

* Results are on dry-weight basis.

Peter A. Conidaris /LH
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
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P.O.Box 609
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File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83021	IE83022
Sample Description		005 COMPOSITE	006 (0-6")
ARSENIC	mg/kg	2.53 *	0.63 *
BARIUM	mg/kg	3288 *	168 *
CADMIUM	mg/kg	30.3 *	1.70 *
CHROMIUM - TOTAL	mg/kg	36.0 *	20.0 *
CYANIDES - TOTAL	mg/kg	1.15	.675
IRON	mg/kg	16862 *	29669 *
LEAD	mg/kg	28050 *	97.0 *
MERCURY (Cold Vapor)	mg/kg	3.73	0.19
PHENOLS - TOTAL	mg/kg	0.47	0.30
SELENIUM	mg/kg	.024 *	.022 *
SILVER	mg/kg	1.0 *	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	5.51	0.93

* Results are on dry-weight basis.

Peter A Conidaris /lit
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

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Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83026	IE83027
Sample Description		009 COMPOSITE	010 COMPOSITE
ARSENIC	mg/kg	51.6 *	6.15 *
BARIUM	mg/kg	8.50 *	73.0 *
CADMIUM	mg/kg	< 0.5 *	0.6 *
CHROMIUM - TOTAL	mg/kg	3930 *	10.0 *
IRON	mg/kg	442,400 *	12021 *
LEAD	mg/kg	177 *	269 *
MERCURY (Cold Vapor)	mg/kg	< 0.03	< 0.025
SELENIUM	mg/kg	< 0.01 *	.029 *
SILVER	mg/kg	3.0 *	< 1.0 *

* Results are on dry-weight basis.

Peter A. Conidaris /lh
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
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** ANALYSIS REPORT **

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P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83029	IE83030
Sample Description		011 (BOTTOM 2")	012 (TOP 3")
ARSENIC	mg/kg	3.91 *	1.37 *
BARIUM	mg/kg	200 *	24.0 *
CADMIUM	mg/kg	3.50 *	< 0.5 *
CHROMIUM - TOTAL	mg/kg	3290 *	16.0 *
IRON	mg/kg	295,288 *	11770 *
LEAD	mg/kg	900 *	55.0 *
MERCURY (Cold Vapor)	mg/kg	< 0.025	0.27
SELENIUM	mg/kg	.019 *	< 0.012 *
SILVER	mg/kg	6.0 *	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	0.81	2.44

* Results are on dry-weight basis.

Peter A. Conidaris /lw
Peter A. Conidaris
Laboratory Manager

City of Sidney

August 25, 1988

Mr. James F. Rinker
Quality Coordinator
Ross Aluminum Foundries
707 North Oak Avenue
Sidney, Ohio 45365

Dear Mr. Rinker:

The City staff has reviewed your request to fill area between Brooklyn Avenue and the Great Miami River. This area is zoned R-3, Multiple Family Residence District. Since you are not building any type of structure, the R-3 regulations do not prevent the filling of this area with foundry sand. Since a portion of this area, however, is within the flood plain, Chapter 1108 of the City Codified Ordinances does apply. Section 1108.07, specifies that a zoning certificate be obtained from the City Building Inspector prior to a development. There is no reason why a zoning certificate cannot be issued for the property in question provided that all sand placement is outside the floodway and that appropriate slopes are provided so as to prevent the sand from sliding into the floodway.

If you have any questions on this matter, please do not hesitate to contact me.

Sincerely,

Steven C. Husemann
City Manager

SCH/skc

Municipal Building, 201 West Poplar St., Sidney, Ohio 45365-2781, 513-498-2335

Kirk NationaLease

The Best In Equipment For Your Transportation Needs

May 31, 1988

Mr. James F. Rinker
Ross Aluminum Foundries
P.O. Box 609
Sidney, OH 45365

Dear Mr. Rinker:

Ross Aluminum Foundries currently dumps foundry sand on our South Brooklyn Avenue property. At the present time, Kirk sees that the sand is leveled with a bulldozer.

Kirk has made arrangements to sell its bulldozer, and as of July 1, 1988, we will no longer be able to level the sand. If Ross agrees to take the responsibility of having the sand leveled, the sand can continue to be dumped on the property. Unfortunately, if Ross does not wish to do this, we must terminate our present agreement.

Our plans are to sell this property in the near future. If Ross would be interested in purchasing the property, please get in touch with me, as we will not be placing it with a real estate agent for several weeks.

I hope that we can work something out so that the sand can continue to be dumped on the property. Please contact me once you have had time to consider this matter.

Sincerely,

Lloyd W. Schroer

Lloyd W. Schroer
President

cm

cc: Jim Harvey

#15/95

800 Vandemark Rd. • P.O. Box 4369 • Sidney, Ohio 45365 • Phone (513) 498-1151

Affiliated with: National Truck Leasing System

Ross Aluminum Foundries
P.O. Box 609 Sidney, Ohio 45365-0609 513/492-4134 Fax 513/498-1883

Tuesday
June 14th, 1988

Lloyd Schroer, President
KIRK NATIONALEASE
800 Vandemark Road
Sidney, OH 45365

Dear Mr. Schroer:

Ross Aluminum Foundries is very appreciative of the opportunity to deposit spent foundry sand on your South Brooklyn Avenue property and for leveling of that sand with your bulldozer.

We will continue to dump sand on the South Brooklyn property and we have made arrangements for bulldozer service as directed in your letter of May 31, 1988.

Ross Aluminum Foundries will purchase the property at the mutually agreed price of thirty thousand dollars, payable as follows: One thousand dollars cash as earnest money and the balance of twenty nine thousand dollars at closing. The sales closing is contingent on the satisfactory environmental evaluation of the site. Should Ross determine that the site is not suitable for continued dumping of foundry sand the thousand dollar earnest money will be returned.

We request exclusive use of the property while we collect the necessary information to complete the transaction.

If you agree to these conditions, please sign a copy of this letter and return to me.

Sincerely,

James F. Rinker

James F. Rinker
Quality Coordinator

JFR/baj
xc: File (2)

Lloyd W Schroer June 15 - 1988
Signature Kirk Nationalease

Date

DIVISION OF EAGLE PICHER

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

** ANALYSIS REPORT **

Ross Aluminum Foundries
707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83017	IE83018
Sample Description		001 COMPOSITE	002 COMPOSITE
ARSENIC	mg/kg	12.9 *	6.55 *
BARIUM	mg/kg	306 *	652 *
CADMIUM	mg/kg	7.90 *	2.90 *
CHROMIUM - TOTAL	mg/kg	48.0 *	28.0 *
IRON	mg/kg	133290 *	31843 *
LEAD	mg/kg	1774 *	847 *
MERCURY (Cold Vapor)	mg/kg	2.63	0.76
SELENIUM	mg/kg	0.30 *	.015 *
SILVER	mg/kg	2.0 *	1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	4.29	3.94

* Results are on dry-weight basis.

Peter A. Conidaris /LH
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

** ANALYSIS REPORT **

Rose Aluminum Foundries
707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

FID Rept. Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83019	IE83020
Sample Description		003 COMPOSITE	004 COMPOSITE
ARSENIC	mg/kg	4.68 *	3.34 *
BARIUM	mg/kg	193 *	107 *
CADMIUM	mg/kg	10.1 *	0.7 *
CHROMIUM - TOTAL	mg/kg	51.0 *	16.0 *
IRON	mg/kg	36579 *	17050 *
LEAD	mg/kg	501 *	34.0 *
MERCURY (Cold Vapor)	mg/kg	0.56	0.34
SELENIUM	mg/kg	.020 *	.048 *
SILVER	mg/kg	< 1.0 *	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	2.84	1.68

* Results are on dry-weight basis.

Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
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** ANALYSIS REPORT **

Ross Aluminum Foundries
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File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83021	IE83022
Sample Description		005 COMPOSITE	006 (0-6")
ARSENIC	mg/kg	2.53 *	0.63 *
BARIUM	mg/kg	1562 *	168 *
CADMIUM	mg/kg	30.3 *	1.70 *
CHROMIUM - TOTAL	mg/kg	36.0 *	20.0 *
CYANIDES - TOTAL	mg/kg	1.15	.675
IRON	mg/kg	16862 *	29669 *
LEAD	mg/kg	28050 *	97.0 *
MERCURY (Cold Vapor)	mg/kg	3.73	0.19
PHENOLS - TOTAL	mg/kg	0.47	0.30
SELENIUM	mg/kg	.024 *	.022 *
SILVER	mg/kg	1.0 *	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	5.51	0.93

* Results are on dry-weight basis.

Peter A. Conidaris /cf

Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

** ANALYSIS REPORT **

Ross Aluminum Foundries
707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83023	IE83024
Sample Description		006 (17-20")	007 (27-30" BOTTOM 3")
ARSENIC	mg/kg	0.68 *	8.38 *
BARIUM	mg/kg	167 *	138 *
CADMIUM	mg/kg	0.9 *	1.20 *
CHROMIUM - TOTAL	mg/kg	17.0 *	12.0 *
CYANIDES - TOTAL	mg/kg	.175	0.400
IRON	mg/kg	28778 *	22480 *
LEAD	mg/kg	32.0 *	175 *
MERCURY (Cold Vapor)	mg/kg	.065	0.27
PHENOLS - TOTAL	mg/kg	< 0.03	< 0.03
SELENIUM	mg/kg	.021 *	0.021 *
SILVER	mg/kg	< 1.0 *	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	1.74	0.58

* Results are on dry-weight basis.

Peter A. Conidaris /LB
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

** ANALYSIS REPORT **

Ross Aluminum Foundries
707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EJD Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83025
Sample Description		008 COMPOSITE
ARSENIC	mg/kg	0.80 *
BARIUM	mg/kg	88.0 *
CADMIUM	mg/kg	0.7 *
CHROMIUM - TOTAL	mg/kg	10.0 *
CYANIDES - TOTAL	mg/kg	0.425
IRON	mg/kg	17729 *
LEAD	mg/kg	74.0 *
MERCURY (Cold Vapor)	mg/kg	0.19
PHENOLS - TOTAL	mg/kg	0.35
SELENIUM	mg/kg	0.023 *
SILVER	mg/kg	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	3.42

* Results are on dry-weight basis.

Peter A. Conidaris

Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
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** ANALYSIS REPORT **

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707-815 N. Oak Avenue
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Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83026	IE83027
Sample Description		009 COMPOSITE	010 COMPOSITE
ARSENIC	mg/kg	51.6 *	6.15 *
BARIUM	mg/kg	8.50 *	73.0 *
CADMIUM	mg/kg	< 0.5 *	0.6 *
CHROMIUM - TOTAL	mg/kg	3930 *	10.0 *
IRON	mg/kg	133320 *	12021 *
LEAD	mg/kg	177 *	269 *
MERCURY (Cold Vapor)	mg/kg	< 0.03	< 0.025
SELENIUM	mg/kg	< 0.01 *	.029 *
SILVER	mg/kg	3.0 *	< 1.0 *

* Results are on dry-weight basis.

Peter A. Conidaris / LH
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
(419) 753-2448

** ANALYSIS REPORT **

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Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IF83028
Sample Description		011 (TOP 2", To Bottom of Tars)
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	54.5

Peter A. Conidaris /cm
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
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** ANALYSIS REPORT **

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File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83029	IE83030
Sample Description		011 (BOTTOM 2")	012 (TOP 3")
ARSENIC	mg/kg	3.91 *	1.37 *
BARIUM	mg/kg	200 *	24.0 *
CADMIUM	mg/kg	3.50 *	< 0.5 *
CHROMIUM - TOTAL	mg/kg	3290 *	16.0 *
IRON	mg/kg	133300 *	11770 *
LEAD	mg/kg	900 *	55.0 *
MERCURY (Cold Vapor)	mg/kg	< 0.025	0.27
SELENIUM	mg/kg	.019 *	< 0.012 *
SILVER	mg/kg	6.0 *	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	0.81	2.44

* Results are on dry-weight basis.

Peter A. Conidaris

Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
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** ANALYSIS REPORT **

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707-815 N. Oak Avenue
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File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83031
Sample Description		012 (BOTTOM 3")
ARSENIC	mg/kg	1.66 *
BARIUM	mg/kg	35.0 *
CADMIUM	mg/kg	0.9 *
CHROMIUM - TOTAL	mg/kg	22.0 *
IRON	mg/kg	13264 *
LEAD	mg/kg	257 *
MERCURY (Cold Vapor)	mg/kg	0.09
SELENIUM	mg/kg	0.037 *
SILVER	mg/kg	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	1.33

* Results are on dry-weight basis.

Peter A. Conidaris /LW
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABOPATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
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** ANALYSIS REPORT **

Ross Aluminum Foundries
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File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		TE83032
Sample Description		013 COMPOSITE
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	57.7

Peter A. Conidaris

Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
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** ANALYSIS REPORT **

Ross Aluminum Foundries
707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

FID.Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83033
Sample Description		014 (ID METAL TYPE)
CHROMIUM - TOTAL	%	12.5

Peter A. Conidaris

Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
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File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83034
Sample Description		015 COMPOSITE
ARSENIC	mg/kg	1.11 *
BARIUM	mg/kg	21.0 *
CADMIUM	mg/kg	0.6 *
CHROMIUM - TOTAL	mg/kg	15.0 *
IRON	mg/kg	6690 *
LEAD	mg/kg	21.0 *
MERCURY (Cold Vapor)	mg/kg	< 0.025
SELENIUM	mg/kg	.012 *
SILVER	mg/kg	< 1.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	0.93

* Results are on dry-weight basis.

Peter A. Conidaris /LH
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
Environmental & Industrial Division
New Knoxville, Ohio 45871
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** ANALYSIS REPORT **

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P.O.Box 609
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File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		IE83035
Sample Description		016
ASBESTOS (Chrysotile)	%	25.0

Peter A. Conidaris /LW
Peter A. Conidaris
Laboratory Manager

BROOKSIDE FARMS LABORATORY ASSN. INC.
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** ANALYSIS REPORT **

Ross Aluminum Foundries
707-815 N. Oak Avenue
P.O.Box 609
Sidney, OH 45365

File Number: 60243
Date recv'd: 07/19/88
Date rept'd: 08/05/88

EID Rep: Monte W. Swank
Attention: Mr. Jim Rinker

Lab Number		TE83061
Sample Description		CORE SAND SAMPLE
ARSENIC	mg/kg	.161 *
BARIUM	mg/kg	< 0.10 *
CADMIUM	mg/kg	0.5 *
CHROMIUM - TOTAL	mg/kg	28.0 *
CYANIDES - TOTAL	mg/kg	1.23
IRON	mg/kg	249 *
LEAD	mg/kg	14.0 *
MERCURY (Cold Vapor)	mg/kg	0.10
PHENOLS - TOTAL	mg/kg	2.84
SELENIUM	mg/kg	0.01 *
SILVER	mg/kg	2.0 *
EXTRACTABLE ORGANIC HALIDES (EOX)	mg/kg	< 3.0
ORGANIC CARBON, TOTAL (TOC)	%	2.49

* Results are on dry-weight basis.

Peter A. Conidaris /LH
Peter A. Conidaris
Laboratory Manager

EAGLE PICHER

TELECOPIER TRANSMITTAL LETTER

Date of Transmittal: July 27, 1988

Please deliver these telecopied pages as soon as possible to:

Mr. Jim Rinker
Ross Aluminum Foundries
Sidney, Ohio

Telecopier: (513) 498-1883

From: Paul D. Harper
Legal Department
Eagle-Picher Industries, Inc.
(513) 721-7010 ext. 2418

Total number of pages
including this transmittal letter: 2

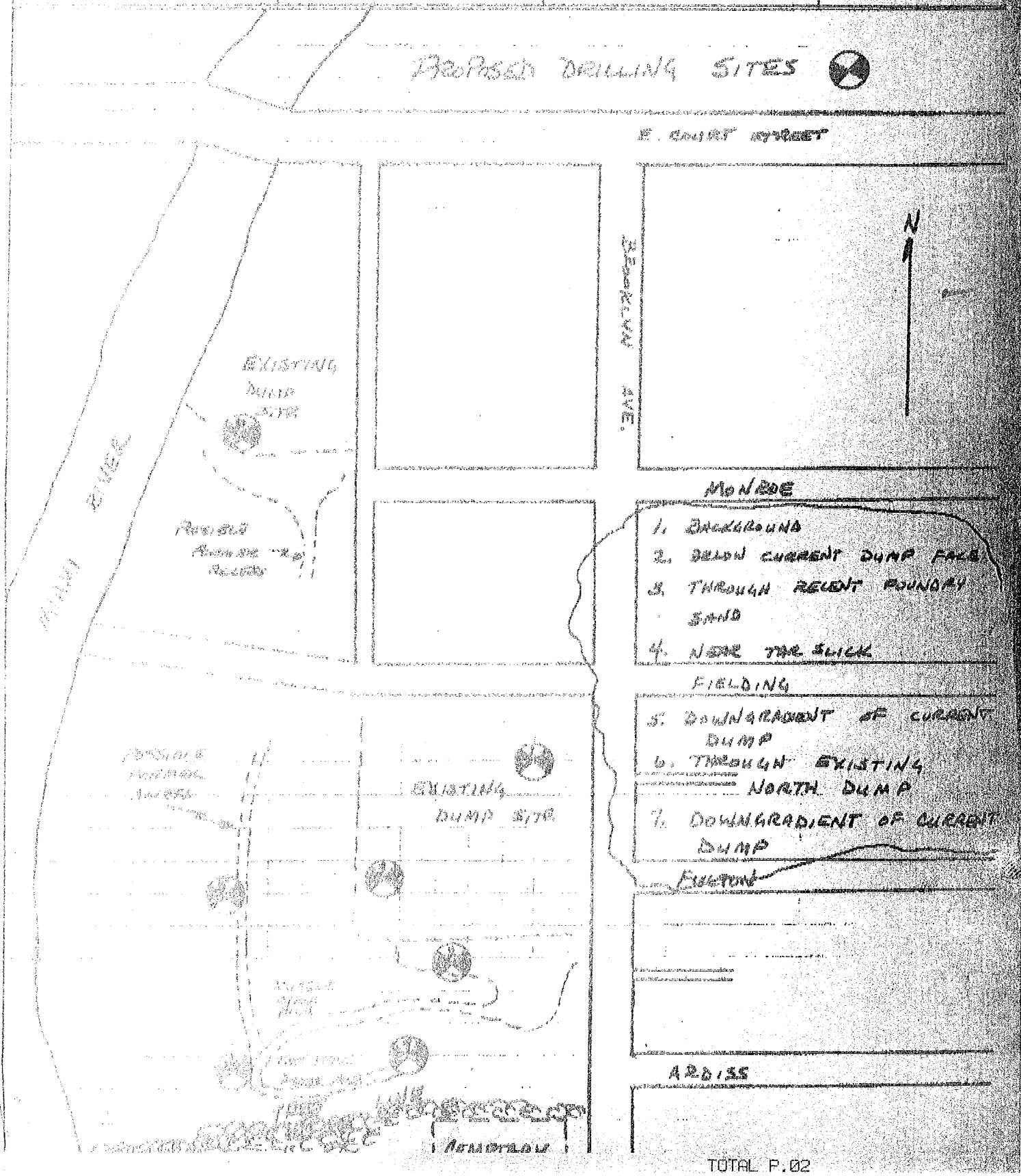
Transmitted on a Panafax UF-6005F
(513) 721-2341

IF ANY OF THESE PAGES ARE NOT CLEARLY RECEIVED, PLEASE CALL (513) 721-7010 ext. 2515 IMMEDIATELY.

PAGE ____ OF ____

CALCULATION WORKSHEET

CLIENT: Ross Aluminum	JOB NUMBER:
SUBJECT: Foundry Sand Disposal Site	
	DRAWING NUMBER:
SCALE: NTS	CHECKED BY: / APPROVED BY: / DATE:



OH000062

SYDNEY OH PROPOSED DUMP SITE	7.18.88 SITE SURFACE SAMPLING

001 SOLID MATERIAL, IE DROSS, FROM DUMP PILE, TROWEL

002 SOILS 15 FT. FROM 001, WEST

003 6" PLUG SOILS, NR. DRUM DUMP, 20+ YR OLD

004 6" PLUG, 10' WEST OF SLAG PILE, 20+ YR OLD

005 6" PLUG WEST OF RUBBER PILE, c. 1958 (FROM 5 GAL CAN) 20' WEST

006 0-20" SHELBY TUBE @ BOTTOM OF SOUTH DUMP

007 20"-30" SHELBY TUBE " " " " "

008 6" PLUG, BOTTOM OF OF NORTH DUMP, IN RUNOFF CHANNEL

009 METAL SHAVING PILE, TROWEL, 20+ YR OLD

010 6" SOIL PLUG, 30 FT WEST OF 009

011 4" SHELBY TUBE THRU TARRY RUNOFF TO SOILS, UNDERLAIN BY OXIDS. METAL PARTICLES

012 SHELBY TUBE, 0-20" APPROX, FROM SAND IN NORTH DUMP

013 TARRY SUBSTANCE, SURFACE, OSI.

014 METAL TRIMMINGS FROM METAL PILE

015 SOILS, 6" & TROWEL, SANDY, 150 FT WEST OF METAL PILES, 20+ YR OLD

016 TILE, FROM NORTH ACTIVE DUMP

NATIONAL 42-381 50 SHEETS 5 SQUARE 42-382 100 SHEETS 5 SQUARE 42-389 200 SHEETS 5 SQUARE Made in U.S.A.

TOTAL METALS SCAN (TMS)
As, Cd, Cr, Ba, Fe, Pb, Hg, Ag, Se (BY ICP IF REQ'D)
CN
phenols
TOC
TOX

001 COMPOSITE, TMS, TOC, TOX

002 COMPOSITE, TMS, TOC, TOX

003 COMPOSITE, TMS, TOC, TOX

004 COMPOSITE, TMS TOC, TOX

005 COMPOSITE, TMS, TOC, TOX, CN, phenols

006 0-6" SEGMENT : TMS, TOC, TOX, CN, phenols
17-20" " : " " " " "

007 27-30" SEGMENT (BOTTOM 3") : TMS, TOC, TOX, CN, phenols

008 COMPOSITE, TMS, TOC, TOX, CN, phenols

009 COMPOSITE, TMS,

010 COMPOSITE TMS

011 TOP 2" (TO BOTTOM OF TARS) : TOC, TOX
BOTTOM 2" : TMS, TOC, TOX

012 TOP 3" : TMS, TOC, TOX,
BOTTOM 3" : " " "

013 COMPOSITE, TOC, TOX

014 ID METAL TYPE

015 COMPOSITE, TMS, TOC, TOX

016 ASBESTOS

CORE SAND SAMPLE ; TMS, phenols, CN, TOC, TOX

NATIONAL 42-381 50 SHEETS 5 SQUARE 42-382 100 SHEETS 5 SQUARE 42-389 200 SHEETS 5 SQUARE

jim rinker

9-19-88

THIS DOCUMENT IS A ZONING VARIANCE THAT ALLOWS ROSS TO DEPOSIT SPENT FOUNDRY SAND IN THE FLOOD PLAIN. THE ZONING FOR THE PROPERTY REMAINS "R-3."

SHOULD ROSS WANT TO BUILD ON THIS PROPERTY AT A LATER DATE THE NORMAL PROCEDURE FOR PERMITS, ETC SHOULD BE FOLLOWED, IE: CONTACT BUILDING INSPECTOR, ETC.

James F. Rinker

jim rinker

8-9-88

ENVIRONMENTAL EVALUATION

SOIL SAMPLE ANALYSIS	3269
HNU (ORGANIC VOLATILE)	750
DRILLING (DIG & FILL) 4 OR 5 SITES	750
ANALYSIS OF H_2O FROM DIG, ETC.	1000
OTHER WATER SAMPLES (BACKGROUND)	300
PERSONNEL COSTS	500
	$ 6569.00

TOM THIS IS THE BEST GUESS TO DATE. I HAVE INCLUDED SOME CUSHION.

J.

BROOKSIDE FARMS LABORATORY ASS'N., INC.
ENVIRONMENTAL & INDUSTRIAL DIVISION
NEW KNOXVILLE, OH 45871
(419) 753-2448

LAM VAN HO, Ph.D.
DIVISION DIRECTOR

August 30, 1988

Mr. Jim Rinker, Quality Coordinator
Ross Aluminum Foundries
707-815 N. Oak Avenue
P.O. Box 609
Sidney, OH 45365

Dear Jim,

Re: Field Inspection Report

In confirming our verbal report to you, this letter summarizes our field work on August 8 (Hydrocarbon Vapor Scan) and August 11 (soil profile inspection/sampling and subsurface water sampling) at the Brooklyn Landfill.

The analytical reports of your soil and water samples were already submitted to you on August 15. (As you requested, the invoice for all of these services are also enclosed).

I. Hydrocarbon Vapor Scan

The hydrocarbon vapor scan was performed throughout the site, using a HNU Portable Photoionization Analyzer (Model PI 101) with a 11.7 eV lamp. (Please see the attached Field Investigation Map)

The instrumentation uses a ultraviolet light detector to measure organic vapor and is specifically sensitive to the following chemicals:

Carbon disulfide	1,1,1-trichloroethane
Heptane	Carbon tetrachloride
Hexane	Ethylene dichloride
Pentane	Butane
1,2 Dichloroethane	THF
Benzene	Acrylonitrite
MIBK	MEK
Isobutylene	Chloroform
Toluene	1,1,2,2-tetrachloroethane
Methyl Chloride	Acetone
Methylene Chloride	Propane

The analyzer's probe was placed close to the soil surface to detect vapor coming directly from the soil. No hydrocarbon vapor was found.

II. Soil Profile Inspection/Sampling and Subsurface Water Sampling

Five trenches were dug at the landfill using a backhoe machine. Table 1 presents the trenching location, and other relevant information. Immediately after excavation, hydrocarbon vapor scan was also performed throughout the newly dug soil profiles. Again, no evidence of hydrocarbon vapor was found.

III. Conclusion

Up to the depth of excavation (about 15 feet below soil surface), there was no evidence of volatile organics at the landfill.

Jim, please accept my apology for late submittal of this report. As I presented to you, the Brookside Annual Conference and the emergency service need from one of our clients have forced me to delay the preparation of this report. However, I trust that my verbal communication with you has taken care of everything you need.

Thank you for your patience, and for giving us the opportunity to participate in this important project. If you have any questions pertaining to this report, please feel free to call.

Respectfully submitted,

Lam

Lam V. Ho, Ph.D.
Director, EID

LVH/js

cc/Monte Swank

Table 1 - Soil Profile Investigation at the Brooklyn Landfill

Trench Location*	Depth (ft)	Sampling/Remark	Monitoring Parameters
(1)Background	15	1. Soil sample at 0-3" depth	pH, Heavy Metals#
		2. Soil sample at 14' depth	EP Toxicity
		3. No water was found	
(2)Below current dump site	9	1. Soil sample at 0-3" depth	pH, Heavy Metals
		2. Soil sample at 6' depth	pH, Heavy Metals
		3. Water was found at 6'6"depth	
		4. Subsurface water sample	Heavy Metals
(4)Near Tar Slick	11	1. Soil sample at 0-3" depth	pH, Heavy Metals
		2. Soil sample at 8'6" depth	pH, Heavy Metals
		3. Water was found at 9' depth	
		4. Subsurface water sample	Heavy Metals
(5)Downgradient of current dump	14	1. Soil sample at 0-3" depth	pH, Heavy Metals
		2. Soil sample at 10'6" depth	EP Toxicity
		3. Water was found at 11' depth	
		4. Subsurface water sample	Heavy Metals
(6)Downgradient of current dump	10	1. Soil sample at 0-3" depth	pH, Heavy Metals
		2. Soil sample at 8'3" depth	pH, Heavy Metals
		3. Water was found at 9' depth	
		4. Subsurface water sample	Heavy Metals

* Please refer to the attached map.
\# Heavy Metals tested: As, Ba, Cd, Cr, Pb, Se, Ag and Hg.

FIELD INVESTIGATION MAP

CLIENT: ROSS ALUMINUM

SUBJECT: FOUNDRY SAND DISPOSAL SITE

BASED ON:

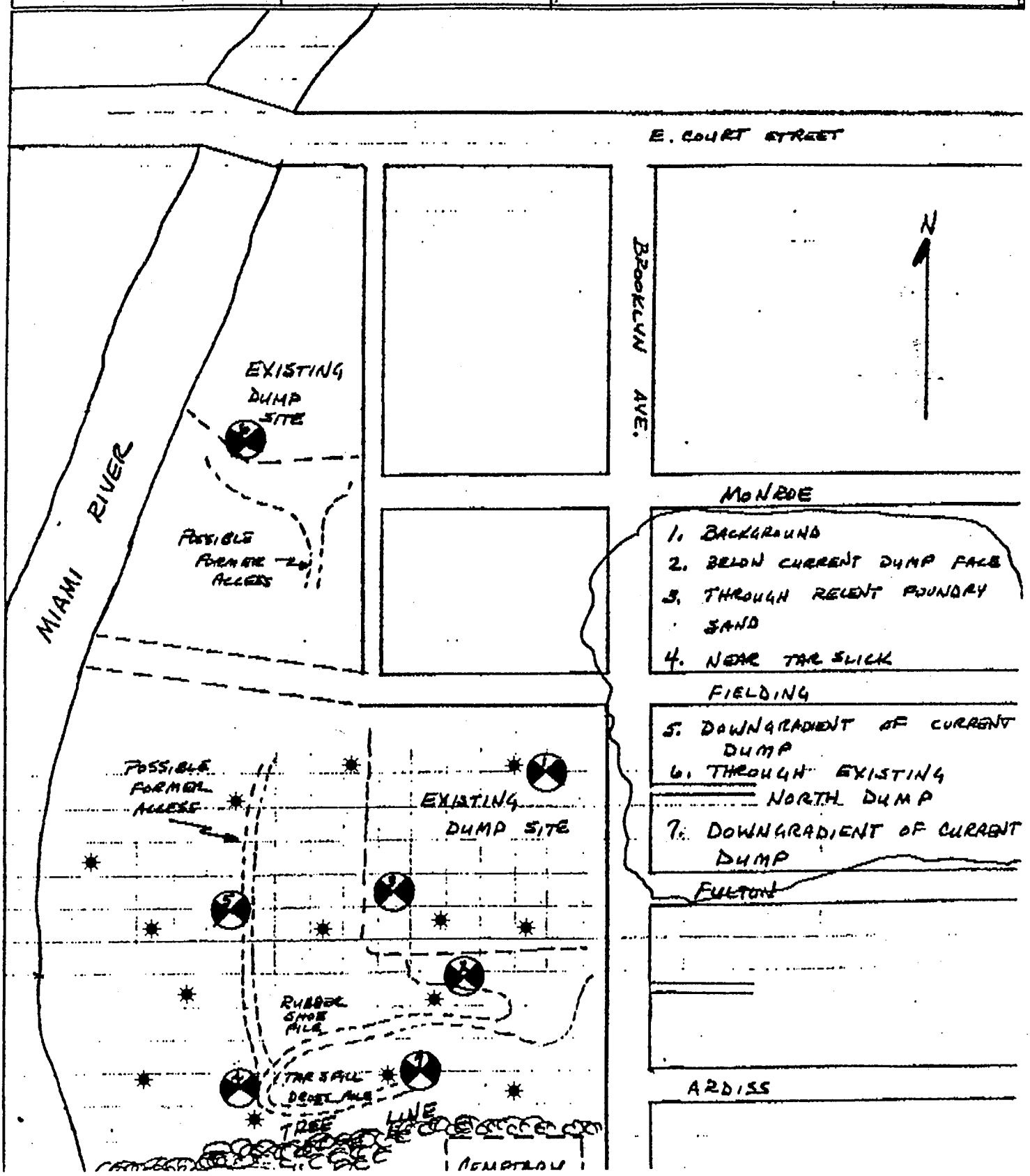
BY:

CHECKED BY:

LEGEND:

HYDROCARBON VAPOR SCAN ✸

PROPOSED DRILLING SITES



LAW OFFICES

ELSASS, SCHMITT, WALLACE & CO., L.P.A.

101 SOUTH OHIO AVENUE
FIRST BORDER SAVINGS BUILDING
POST OFFICE BOX 499
SIDNEY, OHIO 45365

(513) 492-6191
(OHIO) 800-821-6362

EUGENE P. ELSASS
JOHN D. SCHMITT
RICHARD H. WALLACE
STANLEY R. EVANS
KEITH M. SCHNELLE
LOUIS M. BEST

E. J. GARMHAUSEN
(1913-1972)
TELECOPIER (513) 492-0876

August 22, 1988

John M. Garmhausen, Esq.
BLAKE, FULKNER, GARMHAUSEN
KEISTER & SHENK
126 N. Main Avenue
Sidney, OH 45365

RE: ROSS ALUMINUM FOUNDRIES and KIRK NATIONALEASE

Dear John:

I understand that Ross and Kirk Nationalease are in the midst of consummating a transaction concerning the purchase of a certain parcel of real estate located on Brooklyn Avenue owned by your client. You will shortly be asked to prepare a warranty deed for the transaction. Should you need a copy of the relevant description, please let me know.

As you may be aware, the site was used as a dump for some period of time prior to this transaction by other parties. We would like to have the following language placed in the warranty deed:

> "Grantor expressly agrees to indemnify and save harmless Grantee from any and all losses, damages, claims or demands resulting from or to result in the future from the use or operation of the premises prior to the date of the execution of this warranty deed."

We would like to review a copy of the deed prior to the closing. I understand that this will be a cash transaction.

Should you need further information, let me know.

Very truly yours,

Richard H. Wallace

RHW:dlg

bcc: Jim Rinker

Kirk NationaLease

The Best In Equipment For Your Transportation Needs

March 31, 1986

Mr. Tom Kramer, President
Ross Aluminum Foundry
815 Oak Street
Sidney, OH 45365

Dear Mr. Kramer:

This will confirm our agreement to permit Ross Aluminum Foundry to dispose of fly ash and foundry sand devoid of toxic substances on the property owned by Kirk NationaLease on Brooklyn Avenue, Sidney, Ohio. This authorization is given subject to the approval of the Board of Health as contained in their correspondence of February 26, 1986, a copy of which is enclosed.

This will further confirm our understanding that Ross Aluminum Foundry agrees to comply with the terms and conditions of the Board of Health authorization of February 26, 1986 and further that Ross Aluminum Foundry, so long as it continues to use the Brooklyn Avenue property for disposal purposes, shall obtain any and all permits and/or approvals required from the Board of Health, State of Ohio, Environmental Protection Agency and any other administrative agency.

It is our further understanding that Ross Aluminum Foundry will assume any and all liability which may arise as a result of the disposal of any substances from Ross Aluminum Foundry on the Brooklyn Avenue property. We further assume that in the event a governmental agency or body at some time in the future requires any treatment to or clean up of the disposed substances on the Brooklyn Avenue property, that Ross Aluminum Foundry will assume such responsibilities, expenses and costs with that disposed of by Ross Aluminum Foundry.

While Kirk NationaLease is most willing to permit the disposal of these substances on our property, I trust that you understand that we believe any further responsiblities or obligations in connection with the disposal of these substances should be the responsibility of your Company.

800 Vandemark Rd. • P.O. Box 784 • Sidney, Ohio 45365 • Phone (513) 498-1151

Affiliated with: National Truck Leasing System

I would appreciate your acknowledging your agreement to this understanding by signing the enclosed copy of this letter and return it to me.

In the event you have any questions, please feel free to contact me.

Sincerely,

Lloyd W. Schroer
President

kw

Ross Aluminum Foundry agrees to the terms and conditions of the foregoing letter.

ROSS ALUMINUM FOUNDRY

By:_____

Date:_____

Ross Aluminum Foundries P.O. Box 609 Sidney, Ohio 45365-0609 513/492-4134

Thursday
March 27th, 1986

Lloyd Schroer, President
KIRK NATIONALEASE
800 Vandemark Road
Sidney, OH 45365

Dear Mr. Schroer:

Thank you for your letter of March 19, we appreciate your prompt response.

While we agree in principle with your letter there is one area we would like to see more explicit, ie.: Starting with the last sentence in the third paragraph (highlighted). We would suggest that you change the text to say, in effect, that Ross Aluminum Foundries is responsible only for materials on the Brooklyn Avenue property that we have put there. We feel that this is the intent but we would like to see it spelled out.

We are very confident that the foundry sand we are disposing of on your property at the south Brooklyn site is devoid of toxic substances. We base this on individual and composite core sand samples and water samples representative of areas adjacent to an accumulation of the same materials.

We at Ross appreciate this opportunity of working together with you.

Should you have additional comment, feel free to contact me.

Sincerely,

ROSS ALUMINUM FOUNDRIES

James F. Rinker

James F. Rinker
Quality Coordinator

JFR/baj

xc: T. E. Kramer, President, ROSS

G. L. Freisthler, VP-Operations, ROSS

File (2)

DIVISION OF EAGLE PICHER

OH000074

Ross Aluminum Foundries P.O. Box 609 Sidney, Ohio 45365-0609 513/492-4134

Thursday
March 27th, 1986

Lloyd Schroer, President
KIRK NATIONALEASE
800 Vandemark Road
Sidney, OH 45365

Dear Mr. Schroer:

Thank you for your letter of March 19, we appreciate your prompt response.

While we agree in principle with your letter there is one area we would like to see more explicit, ie.: Starting with the last sentence in the third paragraph (highlighted). We would suggest that you change the text to say, in effect, that Ross Aluminum Foundries is responsible only for materials on the Brooklyn Avenue property that we have put there. We feel that this is the intent but we would like to see it spelled out.

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Should you have additional comment, feel free to contact me.

Sincerely,

ROSS ALUMINUM FOUNDRIES

James F. Rinker

James F. Rinker
Quality Coordinator

JFR/baj

xc: T. E. Kramer, President, ROSS

G. L. Freisthler, VP-Operations, ROSS

File (2)

Jim Rinker
Gene
Discuss

The Best In Equipment For Your Transportation Needs

March 19, 1986

Mr. Tom Kramer, President
Ross Aluminum Foundry
815 Oak Street
Sidney, OH 45365

Dear Mr. Kramer:

This will confirm our agreement to permit Ross Aluminum Foundry to dispose of fly ash and foundry sand devoid of toxic substances on the property owned by Kirk NationaLease on Brooklyn Avenue, Sidney, Ohio. This authorization is given subject to the approval of the Board of Health as contained in their correspondence of February 26, 1986, a copy of which is enclosed.

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While Kirk NationaLease is most willing to permit the disposal of these substances on our property, I trust that you understand that we believe any further responsibilities or obligations in connection with the disposal of these substances should be the responsibility of your Company.

...ndemark Rd. • P.O. Box 734 • Sidney, Ohio 45365 • Phone (513) 498-1151

I would appreciate your acknowledging your agreement to this understanding by signing the enclosed copy of this letter and return it to me.

In the event you have any questions, please feel free to contact me.

Sincerely,

Lloyd W. Schroer

Lloyd W. Schroer, President

LWS:jlg
Enclosures

Ross Aluminum Foundry agrees to the terms and conditions of the foregoing letter.

ROSS ALUMINUM FOUNDRY

By: _____

Date: _____

Ross Aluminum Foundries P.O. Box 609 Sidney, Ohio 45365-0609 513/492-4134

Monday
April 7th, 1986

Richard H. Wallace, Attorney
101 South Ohio Street
Sidney, OH 45365

Dear Mr. Wallace:

I have attached several pieces of correspondence regarding the disposal of foundry sand from Ross Aluminum Foundries.

We would very much appreciate your comments, especially on Kirk's letter of March 31, 1986. We don't intend to sign the agreement until we hear from you.

Thank you for your cooperation in this matter.

Sincerely,

ROSS ALUMINUM FOUNDRIES

James F. Rinker

James F. Rinker
Quality Coordinator

JFR/baj

Enclosures

xc: File (2)

Board of Health

SHELBY COUNTY AND SIDNEY, OHIO
COURT HOUSE
PHONE: 498-7249
SIDNEY, OHIO 45365

January 22, 1986

Kirk Nationalease
Mr. Lloyd Schroer
Vice-President Operations
P. O. Box 784
Sidney, Ohio 45365

Re: Ash Disposal

Dear Mr. Schroer:

Our office has observed that your company is engaged in the filling of the pond adjacant to your truck parking lot with various materials including earth and fly ash. The use of inert materials such as clean concrete, brick or earth does not usually cause a problem to the water table, however, the depositing of cinders, fly ash and foundry sand cannot be used for the purpose of backfilling where it is placed in direct contact with ponded water, the water table or a flowing stream. This restriction stems from the fact that trace elements of chemicals are present in the material which can contaminate the water table or stream. Some types of foundry sand, for example, contain certain chemical elements which are classified as toxic, including phenolics, cyanides and fluorides.

It has been our past experience with EPA and those industries in Shelby County which must dispose of fly ash, cinders or foundry sand that the waste products can be used as fill where it is not in direct contact with ponded water or placed in or adjacent to streams or drainage swales. We must therefore ask that your company terminate its current practice of placing fly ash, cinders or foundry sand in the pond.

We wish to thank you for your cooperation and extend an invitation to you to contact our office if there are any questions.

Re: Ash Disposal

You may also contact the OEPA, Mr. Joe Moore at 1-449-6357 Dayton, Ohio, should you desire a more thorough technical explanation.

Sincerely,

Richard H. Breece, M.D.

Richard H. Breece, M.D.
Health Commissioner

Donald L. Fair, R.S.

Donald L. Fair, R.S.
Administrative Sanitarian

DLF:jsb

cc: Mr. Joe Moore
7 East 4th Street
Dayton, Ohio 45402-2086

Board of Health

SHELBY COUNTY AND SIDNEY, OHIO
COURT HOUSE
PHONE: 498-7249
SIDNEY, OHIO 45365

February 26, 1986

Kirk Nationalease
Mr. Lloyd Schroer
Vice President Operations
P.O. Box 784
Sidney, Ohio 45365

Re: Foundry Sand Disposal

Dear Mr. Schroer:

The disposal of fly ash and foundry sand devoid of toxic substances can be use as fill material in areas not subjected to flooding, or in ponded water, streams or the water table. The area owned by Kirk Nationalease on Brooklyn Avenue has been used for that purpose and at this time appears to be satisfactory with this office.

Sincerely,

Richard H. Breece, M.D.
Health Commissioner

Donald L. Fair, R.S.
Administrative Sanitarian

DLF:lsn
cc: OEPA,
Mr. Joe Moore
Ross Aluminum Foundries,
Mr. Jim Ricker

The Best In Equipment For Your Transportation Needs

March 19, 1986

Mr. Tom Kramer, President
Ross Aluminum Foundry
815 Oak Street
Sidney, OH 45365

Dear Mr. Kramer:

This will confirm our agreement to permit Ross Aluminum Foundry to dispose of fly ash and foundry sand devoid of toxic substances on the property owned by Kirk NationaLease on Brooklyn Avenue, Sidney, Ohio. This authorization is given subject to the approval of the Board of Health as contained in their correspondence of February 26, 1986, a copy of which is enclosed.

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It is our further understanding that Ross Aluminum Foundry will assume any and all liability which may arise as a result of the disposal of any substances from Ross Aluminum Foundry on the Brooklyn Avenue property. We further assume that in the event a governmental agency or body at some time in the future requires any treatment to or clean up of the disposed substances on the Brooklyn Avenue property, that Ross Aluminum Foundry will assume such responsibilities, expenses and costs.

While Kirk NationaLease is most willing to permit the disposal of these substances on our property, I trust that you understand that we believe any further responsibilities or obligations in connection with the disposal of these substances should be the responsibility of your Company.

I would appreciate your acknowledging your agreement to this understanding by signing the enclosed copy of this letter and return it to me.

In the event you have any questions, please feel free to contact me.

Sincerely,

Lloyd W. Schroer

Lloyd W. Schroer, President

LWS:jlg
Enclosures

Ross Aluminum Foundry agrees to the terms and conditions of the foregoing letter.

ROSS ALUMINUM FOUNDRY

By: _____

Date: _____

Ross Aluminum Foundries P.O. Box 609 Sidney, Ohio 45365-0609 513/492-4134

Thursday
March 27th, 1986

Lloyd Schroer, President
KIRK NATIONALEASE
800 Vandemark Road
Sidney, OH 45365

Dear Mr. Schroer:

Thank you for your letter of March 19, we appreciate your prompt response.

While we agree in principle with your letter there is one area we would like to see more explicit, ie.: Starting with the last sentence in the third paragraph (highlighted). We would suggest that you change the text to say, in effect, that Ross Aluminum Foundries is responsible only for materials on the Brooklyn Avenue property that we have put there. We feel that this is the intent but we would like to see it spelled out.

We are very confident that the foundry sand we are disposing of on your property at the south Brooklyn site is devoid of toxic substances. We base this on individual and composite core sand samples and water samples representative of areas adjacent to an accumulation of the same materials.

We at Ross appreciate this opportunity of working together with you.

Should you have additional comment, feel free to contact me.

Sincerely,

ROSS ALUMINUM FOUNDRIES

James F. Rinker

James F. Rinker
Quality Coordinator

JFR/baj

xc: T. E. Kramer, President, ROSS

G. L. Freisthler, VP-Operations, ROSS

File (2)

The Best In Equipment For Your Transportation Needs

March 31, 1986

Mr. Tom Kramer, President
Ross Aluminum Foundry
815 Oak Street
Sidney, OH 45365

Dear Mr. Kramer:

This will confirm our agreement to permit Ross Aluminum Foundry to dispose of fly ash and foundry sand devoid of toxic substances on the property owned by Kirk NationaLease on Brooklyn Avenue, Sidney, Ohio. This authorization is given subject to the approval of the Board of Health as contained in their correspondence of February 26, 1986, a copy of which is enclosed.

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It is our further understanding that Ross Aluminum Foundry will assume any and all liability which may arise as a result of the disposal of any substances from Ross Aluminum Foundry on the Brooklyn Avenue property. We further assume that in the event a governmental agency or body at some time in the future requires any treatment to or clean up of the disposed substances on the Brooklyn Avenue property, that Ross Aluminum Foundry will assume such responsibilities, expenses and costs with that disposed of by Ross Aluminum Foundry.

While Kirk NationaLease is most willing to permit the disposal of these substances on our property, I trust that you understand that we believe any further responsiblities or obligations in connection with the disposal of these substances should be the responsibility of your Company.

I would appreciate your acknowledging your agreement to this understanding by signing the enclosed copy of this letter and return it to me.

In the event you have any questions, please feel free to contact me.

Sincerely,

Lloyd W. Schroer
President

kw

Ross Aluminum Foundry agrees to the terms and conditions of the foregoing letter.

ROSS ALUMINUM FOUNDRY

By:_____

Date:_____

JMG/nas
5-22-86

AGREEMENT

This Agreement made and concluded this _____ day of May, 1986 by and between Ross Aluminum Foundries, a division of Eagle Picher Industries (hereinafter "Ross"), and Kirk NationaLease Co., an Ohio corporation (hereinafter "Kirk").

W I T N E S S E T H :

WHEREAS, Kirk owns certain property located on Brooklyn Avenue in the City of Sidney, Shelby County, Ohio that is suitable for the disposal of certain industrial waste materials; and

WHEREAS, Ross conducts a foundry operation in Shelby County, Ohio and is desirous of obtaining a site to dispose of certain industrial substances (to wit: foundry sand) on the premises owned by Kirk; and

WHEREAS, Kirk is willing to permit Ross to dispose of certain materials on the site subject to certain terms and conditions.

NOW, THEREFORE, the parties agree as follows:

1. Kirk hereby agrees to permit Ross to dispose of foundry sand that does not contain toxic substances on its Brooklyn Avenue property. The consent given by Kirk is conditioned on and subject to the initial approval of the Board of Health of Shelby County, Ohio and the absence of any further action by the Board of Health to withdraw its approval.

2. Ross agrees to comply with the terms and conditions of the Board of Health authorization dated February 26, 1986, a copy of which is attached hereto and marked as Exhibit "A," and any further authorization. Ross further agrees to obtain any and all permits and/or approvals required

from the Board of Health, the State of Ohio, the U.S. or Ohio Environmental Protection Agencies or any other administrative agency having jurisdiction or authority over either the disposal site or the disposed materials.

3. Ross agrees to assume any and all liability and damages which may arise as a result of the disposal of any substance or material from Ross at the Brooklyn Avenue property. In the event a governmental agency requires any treatment to or clean up of the disposed substances on the Brooklyn Avenue property, Ross will agree to assume such responsibilities and pay such expenses and costs that are associated with that portion of the material deposited at the site by Ross.

4. This Agreement may be terminated by either party upon notifying the other party in writing no less than sixty (60) days prior to the date of termination. Termination of this Agreement shall not affect or in any manner discharge the continuing obligations of Ross under Sections 2 and 3 of this Agreement.

IN WITNESS WHEREOF, the parties have hereunto set their hands this _____ day of May, 1986.

In the presence of:

ROSS ALUMINUM FOUNDRIES, A DIVISION OF EAGLE PICHER INDUSTRIES

By: T E Kramer

Its: President

KIRK NATIONALEASE CO.

By: Lloyd W. Schroer

Lloyd W. Schroer, President

A/N1

OH000088

Board of Health

SHELBY COUNTY AND SIDNEY, OHIO
COURT HOUSE
PHONE: 498-7249
SIDNEY, OHIO 45365

February 26, 1986

Kirk Nationalease
Mr. Lloyd Schroer
Vice President Operations
P.O. Box 784
Sidney, Ohio 45365

Re: Foundry Sand Disposal

Dear Mr. Schroer:

The disposal of fly ash and foundry sand devoid of toxic substances can be use as fill material in areas not subjected to flooding, or in ponded water, streams or the water table. The area owned by Kirk Nationalease on Brooklyn Avenue has been used for that purpose and at this time appears to be satisfactory with this office.

Sincerely,

Richard H. Breece, M.D.

Richard H. Breece, M.D.
Health Commissioner

Donald L. Fair R.S.

Donald L. Fair, R.S.
Administrative Sanitarian

DLF:lsn
cc: OEPA,
Mr. Joe Moore
Ross Aluminum Foundries,
Mr. Jim Ricker

EXHIBIT "A"

Memorandum

To: Ralph Hirshberg
Rick Boone

From: Mike Waligura

Date: 10/23/00

RE: Wetland Assessment
EPI – Brooklyn Avenue Sand Fill
Sidney, OH

This memorandum summarizes the findings of CEC's wetland assessment performed at the above-referenced site. The field work was completed by Mike Waligura and Greg Gerke of Civil & Environmental Consultants, Inc. (CEC) in general accordance with the *Corps of Engineers Wetland Delineation Manual (1987)* on Thursday, October 19, 2000.

Site Background

The subject property (referred to as the Brooklyn Avenue Sand Fill) is located on Brooklyn Avenue in Sidney, Ohio, just east of the Great Miami River. Between the early 1980s and 2000, a portion of the site was used as a disposal area for spent foundry sand and sand cores by Ross Aluminum Foundries. The sand fill area occupies approximately 3.5 acres of the site and is located along the eastern portion of the property (adjacent to Brooklyn Avenue). The western extent of the sand fill is placed along the 100-year flood boundary of the Great Miami River. The depth of the foundry sand is estimated to be approximately 15 feet.

Off-Site Routine Data

The following sources were reviewed by CEC prior to performing the field work to indicate potential wetland areas on the property.

Topographic Map

A review of the Sidney, Ohio USGS 7.5 Minute Topographic Map was conducted to identify physiographic features that may indicate wetland areas. Topographic relief of the site slopes downward from east to west towards the Great Miami River. Surface elevations range from approximately 950 to 930 feet mean sea level (MSL). No ponds, stream valleys, or other surface water features are shown on the subject property.

National Wetland Inventory Map (U.S. Department of the Interior, Fish and Wildlife Service-1995)

A review of the Sidney, Ohio National Wetland Inventory (NWI) Map was conducted to determine if previously identified wetland areas are located on-site. The Great Miami River is indicated as a riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH) wetland area. The Great Miami River is considered the western property boundary of the subject site. No other wetland areas are shown.

Shelby County Soil Survey

A review of the Shelby County soil survey map was conducted to determine the soil mapping unit found on-site. The soil survey map was generated by the Soil Conservation Service, issued in April 1980. A total of four soil mapping units are identified at the site and include Genesee silt loam (GE), Eldean loam, 0 to 2 percent slope (EIA), Eldean loam, 2 to 6 percent slope (EIB), and limited areas of Pits, gravel (Pg).

Genesee silt loam soils are located along the western portion of the property, adjacent to the Great Miami River, and consist of level and nearly level, well drained soil within flood plain area along major streams and larger tributaries. Permeability is moderate and flooding during the growing season in these areas is uncommon. Eldean loam (0 to 2 percent slope) soils consist of level to nearly level, well drained soil in broad areas on outwash terraces near major streams. Permeability is moderate to moderately slow in the subsoil and very rapid in the underlying material. This mapping unit is located in the central potion of the site. Eldean loam, 2 to 6 percent slope, occupy the northeast portion of the subject site. In general, Eldean loam soils occupy the majority of the site. The southeastern portion of the site consists of an area containing open excavations from which gravel and sand have been removed (Pg-Pits, gravel). Gravel pits typically occupy outwash terraces along major streams. The larger pits are typically 20 to 30 feet deep or more and contain water. Of the four soil mapping units, no hydric soils were identified.

Flood Insurance Rate Map (FIRM)

A review of the FIRM maps for the City of Sidney (Community-Panel Number 390507 0004 B; effective November 17, 1982) was conducted to identify areas of the site which are historically subject to flooding or contain floodprone soils. It appears that the majority of the site, excluding the east portion adjacent to Brooklyn Avenue, is located within the areas of the 100-year flood (Zone A8). Near the southeast corner of the site is a small area that is identified within the limits of the 100-year and 500-year flood.

Results from the Off-Site Routine Data Search

Results from the off-site routine data search revealed some evidence that potential wetland areas may exist. Based on the information contained in the FIRM map, the majority of the subject site

is located within the limits of the 100-year flood. No hydric soils were identified within the mapping units listed in the soil survey for Shelby County and no wetland areas were shown to exist within the property boundaries of the site according to the NWI map for Sidney, Ohio. The USGS topographic map did not identify the presence of any ponds, stream valleys, or other surface water features, excluding the Great Miami River which is considered the western property boundary of the subject site. Surface drainage is towards the west.

On-Site Reconnaissance

Plant Communities

The subject property was inspected by CEC to identify plant communities present. As indicated above, the eastern portion of the site was historically used to dispose of spent foundry sand and sand cores since the early 1980s. The depth of sand fill in this area was approximately 15 feet. This portion of the site was absent or contained limited vegetative cover. In particular, the northern portion of the sand fill contained some grass cover which was short and may have been recently mowed. The remaining areas of the site were occupied by mostly medium-sized trees and shrubs. Dominant plant species included Silver Maple, Sycamore, Glossy Buckthorne, Box Elder, Green Ash, American Elm, Honeysuckle, and Poison Ivy. Some Viburnum and Lowland Loosestrife were also identified in limited areas. Within a small drainage channel located at the southwest corner of the site included other plant species such as Black Willow, White Aster, Cottonwood, Reed Canary Grass, Whitegrass, and Smartweed.

The majority of the plant species found consisted of a facultative wet (FACW) indicator status, with limited upland and obligate plant species.

Soil Type

Three test site areas were chosen to document soils present. No test pits were completed within the eastern portion of the site occupied by the spent foundry sand fill. The first test site (TS-1) was completed within a depressional area located at the southeast portion of the site. According to the soil survey, this area consisted of mapping area (Pg). Soils in this area consist of a silt loam A horizon (10 YR 2/2) which extends to a depth of approximately 4 inches. Below this depth is a thin sandy silt B horizon (10YR 3/2) to approximately 5 to 6 inches below grade. Below 6 inches consists of a sand and gravel C horizon (10 YR 4/6) which extends to at least 16 inches below grade. No evidence of soil mottling was encountered.

The second test site area was completed within the south-central (wooded) portion of the site. The test pit was completed to a total depth of approximately 16 inches. The upper 8 inches of the soil profile in this area consisted of a silty sand slag fill with some rocks. Evidence of discarded debris, mounds of suspected slag, and former containers was found throughout most of the wooded portions of the site. Due to the fill debris present at this test site, no A horizon was found. The B horizon consists of a loamy sand (10 YR 3/2) from a depth of 8 to 12 inches below

grade. From 12 to 16 inches, the soil consists of a sandy loam C horizon (10 YR 3/6). No soil mottling was observed at this test site as well.

The final test site was performed within a dry drainage channel located at the southwest corner of the site, near the Great Miami River. The soil pit was excavated to a total depth of approximately 15 inches. From 0 to 3 inches consisted of a sandy clay O horizon (10 YR 3/2). Underlying this surface consisted of a sandy clay A horizon (10 YR 3/2) from 3 to 7 inches below grade. A fine sandy clay loam B horizon (10 Y/R 2/2) was observed from approximately 7 to 9 inches below grade and contained few mottles (2.5 YR 4/4). From 9 to 15 inches consisted of a sandy clay loam C horizon (10 YR 3/2) with few mottles (2.5 YR 4/4). Although no water was present within the upper 15 inches, the soils were very moist and contained hydric soil indicators such as reducing conditions and low-chroma colors.

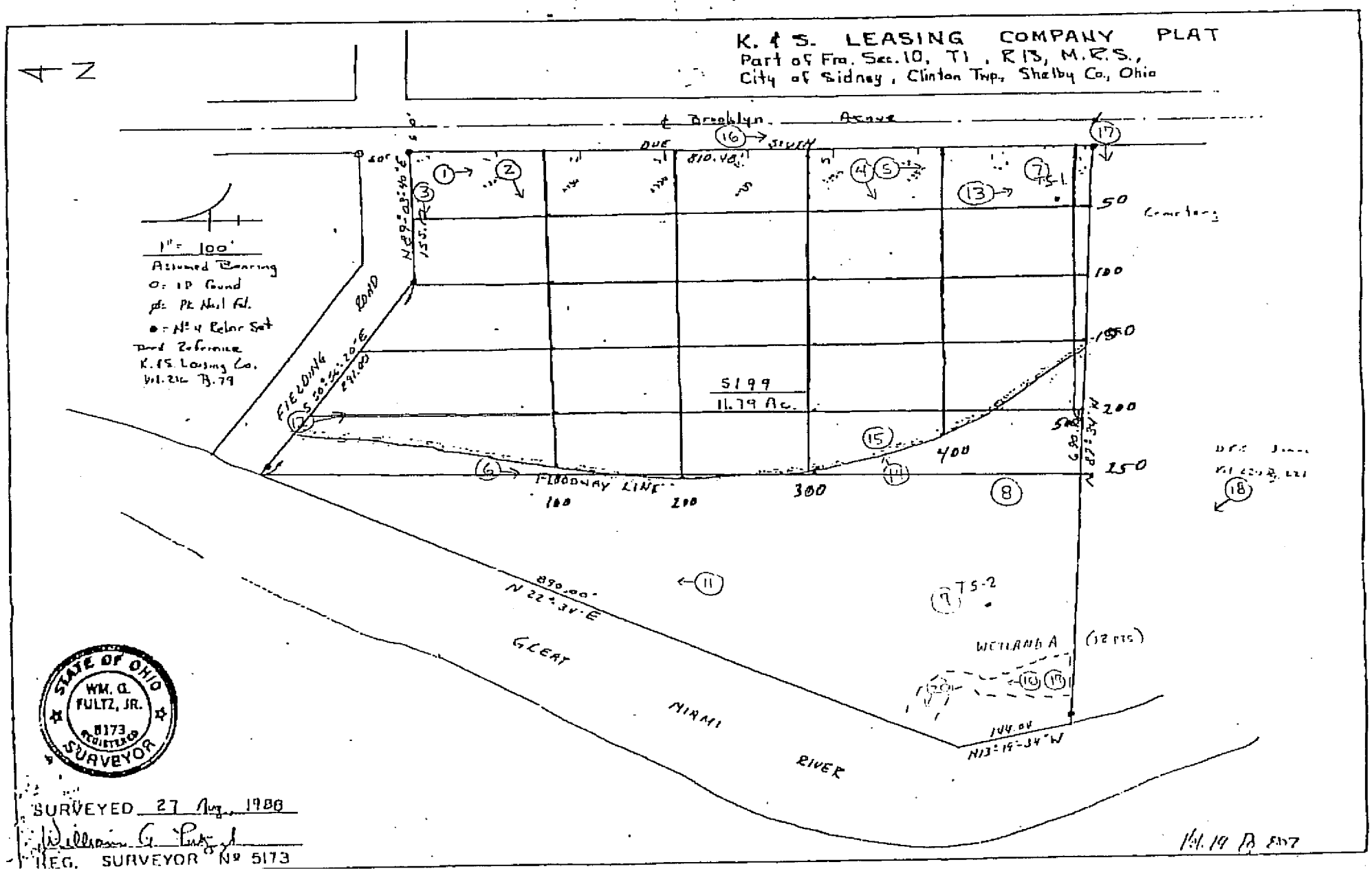
Hydrology

The presence or absence of wetland hydrology was determined at each of the test sites. At TS-1 and TS-2, no surface water, saturated soil, or hydrology indicators (primary and secondary) were observed. At TS-3, CEC observed evidence of water marks, drift lines, sediment deposits, drainage pattern, and water stained leaves. As a result, the criteria for wetland hydrology was satisfied at this location. The extent of wetland hydrology was limited to the banks of the intermittent drainage channel, located at the southwest corner of the subject site.

Conclusion

Based upon CEC's findings, the subject site does appear to contain a small area which satisfies the three conditions necessary for wetland identification. This area consists of a small drainage channel which was dry during the site reconnaissance, but appears to direct surface runoff from the adjacent property to the south (grass lot and trailer home community) to the Great Miami River during certain periods of the year. A total of 12 survey points were placed along the boundary of wetland area using high-visibility survey ribbon. This area is designated as Wetland Area-1 on the attached figure. The remaining portions of the site do not appear to contain wetland areas.

Attachments
- Site Map
- Site Photographs


K. & S. LEASING COMPANY PLAT
Part of Fra. Sec. 10, T1, R13, M.R.S.,
City of Sidney, Clinton Twp., Shelby Co., Ohio
N
1" = 100'
Assumed Bearing
O: IP Found
Pk Nail Fd.
• = No 4 Rebar Set
Deed Reference
K. & S. Leasing Co.
Vol. 216 Pg. 79
Brooklyn Avenue
DUE SOUTH
810.48'
FIELDING ROAD
S 50°56'20"E
291.00'
N 89°03'40"E
155.18'
S199
11.79 Ac.
FLOODWAY LINE
100
200
300
400
500
50
100
150
200
250
Cemetery
TS-1
TS-2
890.00'
N 22°34'E
GREAT MIAMI RIVER
WETLAND A
(12 pts)
144.04'
N13°19'34"W
STATE OF OHIO
WM. G. FULTZ, JR.
5173
REGISTERED
SURVEYOR
SURVEYED 27 Aug. 1988
William G. Fultz Jr.
REG. SURVEYOR No 5173

OH000094

Photo 1. View of the foundry sand fill area while standing near the northeast corner of the property facing south.

Photo 2. Central and northern portion of the foundry sand fill area while standing near the northeast corner facing southwest.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 3. Facing west adjacent to the north property boundary while standing at the northeast corner of the site.

Photo 4. The southern end of the foundry sand fill area was absent of any surface vegetative cover. Photo taken facing west/southwest.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 5. Facing south along the southeast property boundary of the foundry sand fill area.

Photo 6. Standing along the base of the sand fill within the wooded area of the site facing south.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 7. View of the soil pit performed at TS-1.

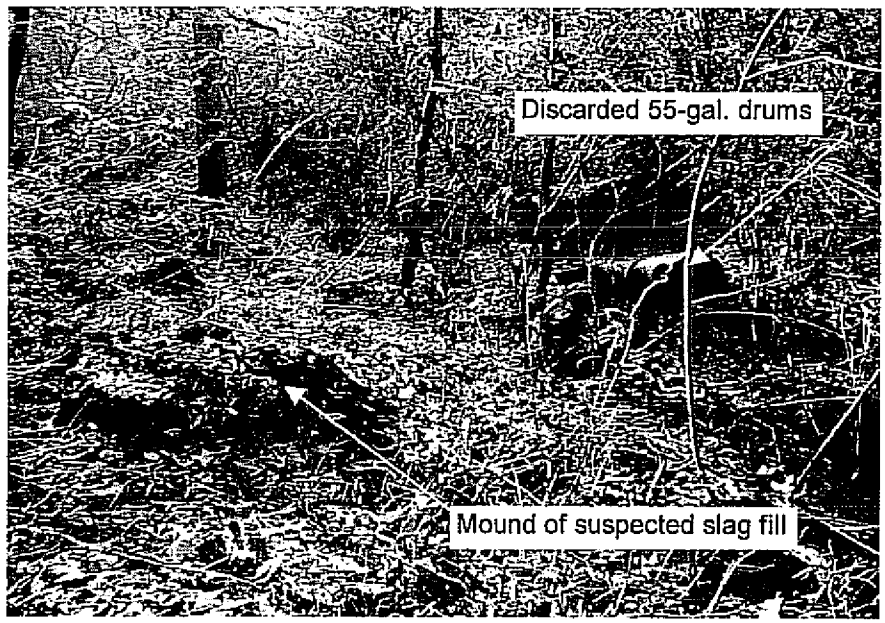


Photo 8. Typical view of the types of waste debris encountered within the wooded areas of the site. Specifically, several discarded drums, and other metal containers were found as well as mounds of suspected slag fill.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 9. Soil pit for test site #2 (TS-2), located near the southwest portion of the site.

Photo 10. View of the wetland area located at the southwest corner of the site. The wetland area consists of a narrow intermittent drainage channel. Photo taken while facing northwest.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 11. Typical view of the vegative cover found in the wooded portion (north-central) of the site. Photo taken while facing north.

Photo 12. View of the wooded area located near the northwest portion of the site. Photo taken while facing south.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 13. View of the depressional area located to the south of the foundry sand fill area facing south (TS #1).

Photo 14. View of the drainage culvert which appears to exist below the sand fill. The culvert daylights at a point near the southwest portion of the fill. Photo taken facing northeast.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 15. View of the draiange culvert while standing on the sand fill and facing west.

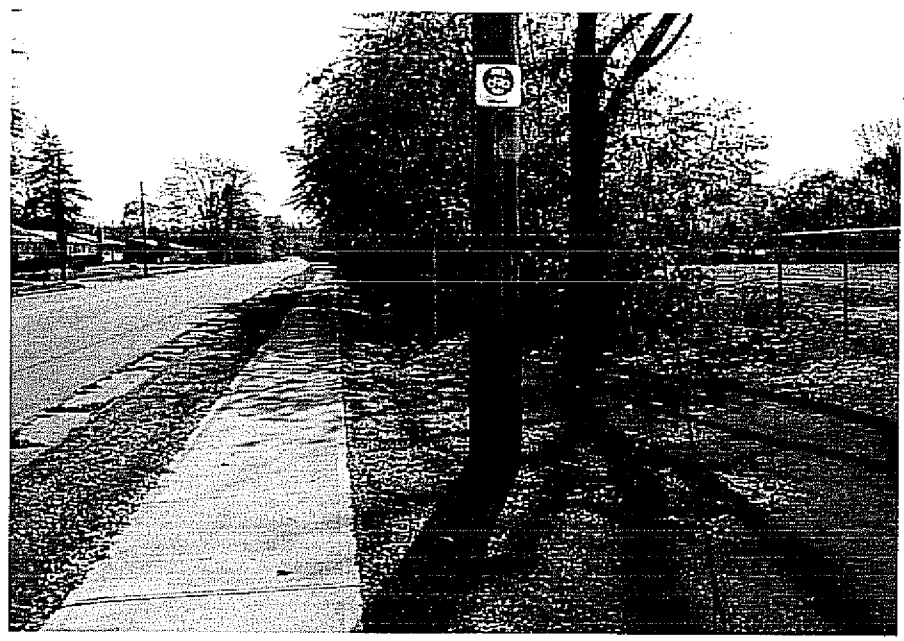


Photo 16. Standing along the west side of Brooklyn Avenue facing south. A chain-linked fence exists only along the east side of the property.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

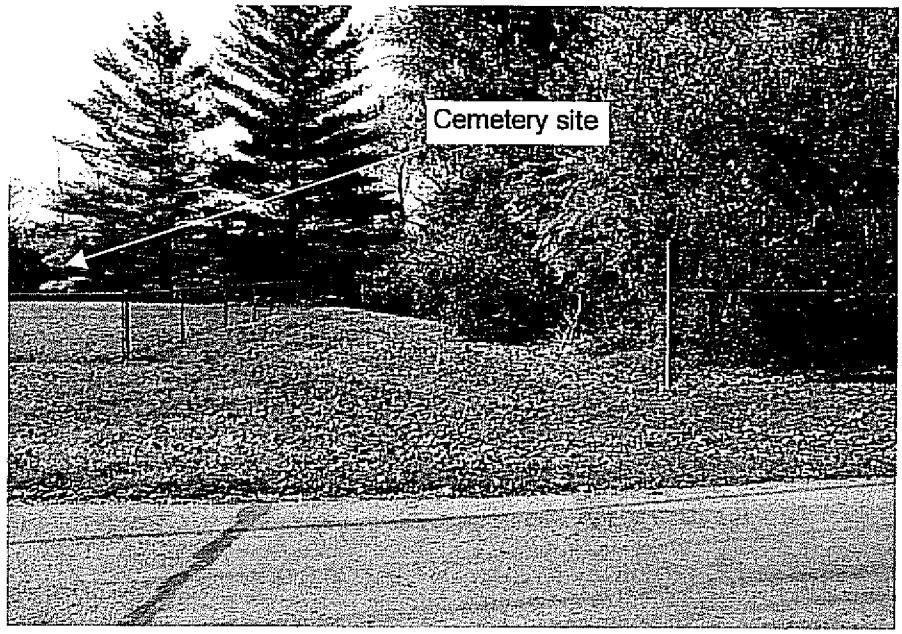


Photo 17. Standing at the southeast corner of the property facing west.

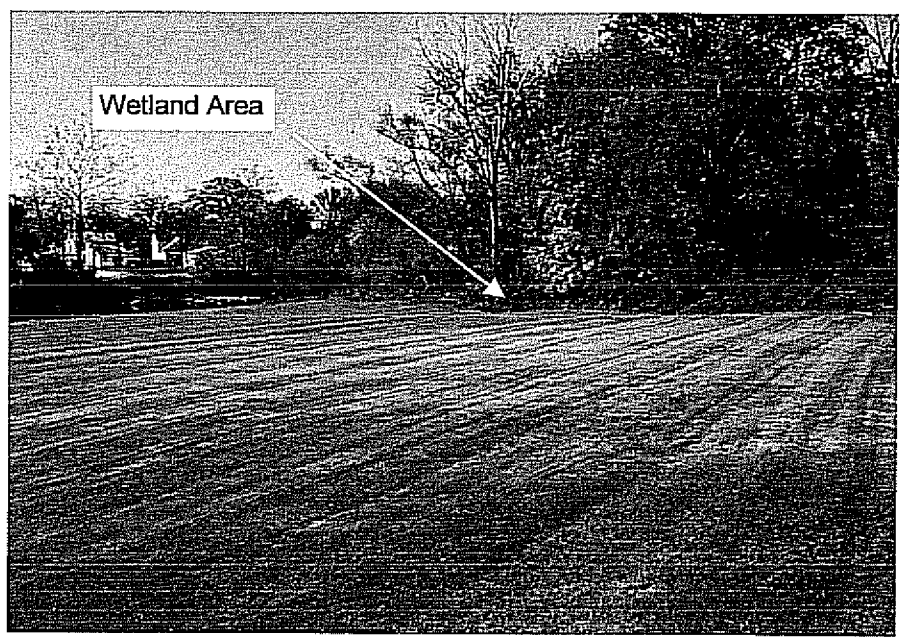


Photo 18. View of the grassed lot located at the southwest corner of the subject site. Photo taken facing northwest.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

Photo 19. Facing northwest along the wetland drainage channel.

Photo 20. Portion of the wetland drainage channel which discharges into the Great Miami River. Photo taken facing west.

SITE PHOTOGRAPHS

Eagle-Picher Industries, Inc.
Wetland Assessment
Brooklyn Avenue Sand Fill
Sidney, Ohio
CEC Project No. 200815.0010

ENVIRONMENTAL SITE ASSESSMENT
OF
CHI-VIT CORPORATION
(URBANA, OHIO)

PREPARED FOR:

CHI-VIT CORPORATION
THE BANK OF NOVA SCOTIA
BANCBOSTON VENTURES, INC.

c/o
CHI-VIT CORPORATION
SOUTH EDGEWOOD AVENUE
URBANA, OHIO 43708

PREPARED BY:

QSOURCE ENGINEERING, INC.
228 Byers Road, Suite 300
Miamisburg, OH 45342

December 9, 1988

INTRODUCTION

At the request of Mr. Robert Maynard of Vorys, Sater, Seymour & Pease, Qsource Engineering Inc. has performed an environmental site review of three Chi-Vit Corporation manufacturing facilities. These facilities are located in Urbana, Ohio; Leesburg, Alabama; and Ingersoll, Ontario. This report pertains to one of those sites: Urbana, Ohio.

On November 22 and 23, Gregory Hemker and Edward Everding of Qsource Engineering visited the Urbana plant. An examination was made of the building and process equipment, the plant property, available records pertaining to regulatory compliance, and the surrounding properties.

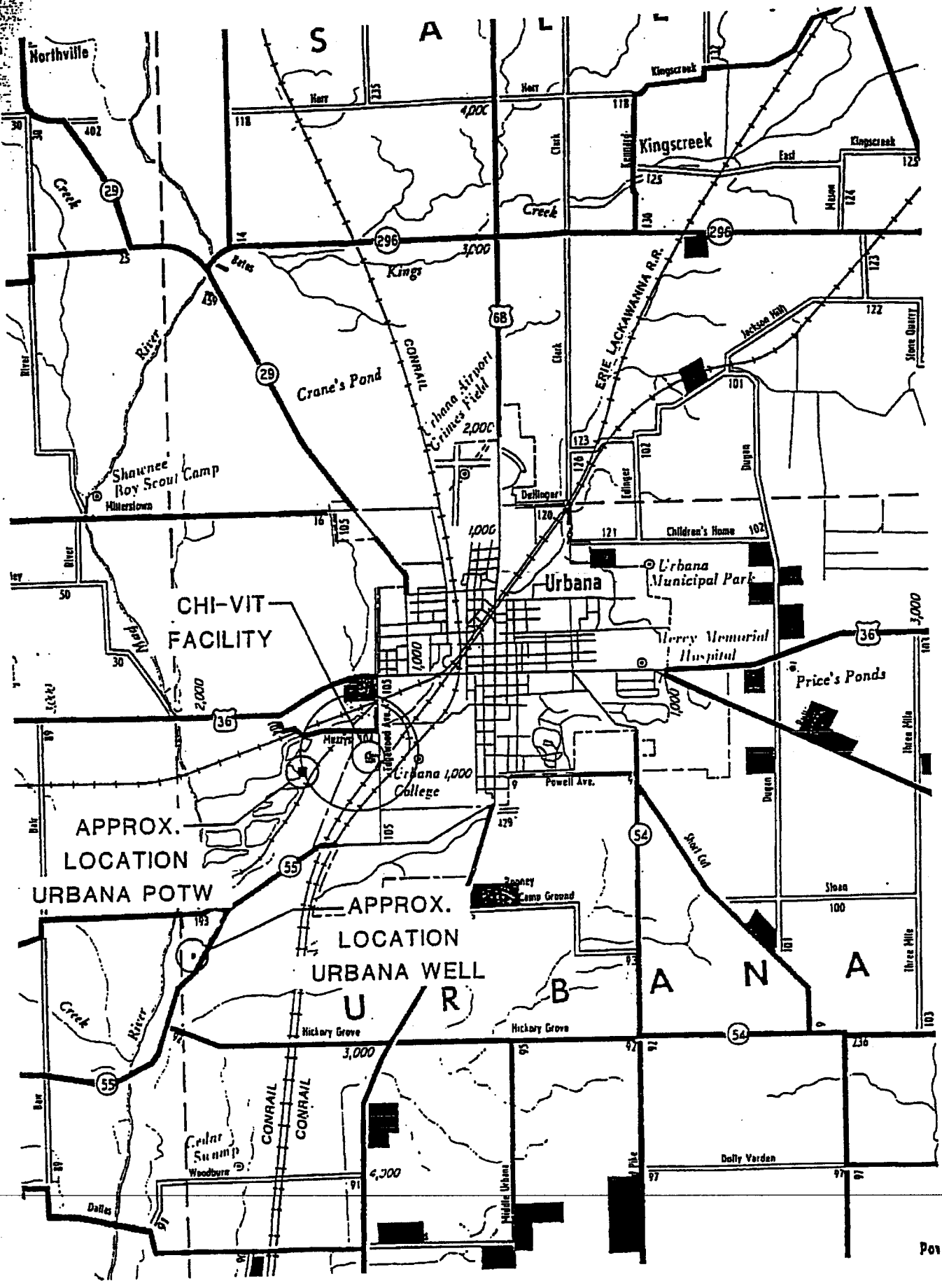
Related information was obtained from officials of the City of Urbana Engineers Office, the Champaign County Engineers Office, The Miami Conservancy District and the Ohio Department of Natural Resources.

Details of the investigation are presented below.

DESCRIPTION OF SITE AND HISTORY

Figure 1 shows the general location of the site within the city of Urbana. Photo 1 is a general aerial view of the plant. The property consists of approximately 26 acres of land. A manufacturing facility of about 85,000 square feet, an office and R/D building, and a parking lot are located on the east-central section of the property. A one-acre cooling water overflow pond is located in the south-east corner of the site. Figures 2 is a copy of an aerial photograph of the site taken in 1988. Figure 3 is a site plan of the property with prominent features shown.

The plant was constructed on undeveloped ground in 1966. In 1977, a research laboratory was added, and a small office building was constructed in 1983. The plant originally operated using water from an on-site well and discharged sanitary waste water to a septic system. It was tied into the City Water System shortly after initial start-up of the plant. The plant connected to the City Sewer System in 1977 thereby eliminating the use of the septic tank and leach field. The septic tank was filled and covered.



Northville
Kingscreek
Kings
Creek
Crane's Pond
CONRAIL
Urbana Airport Grimes Field
ERIE LACKAWANNA R.R.
Jackson Hill
Stone Quarry
Shawnee Boy Scout Camp
Mitterstown
Dellinger
Children's Home
Urbana
Urbana Municipal Park
CHI-VIT FACILITY
Mercy Memorial Hospital
Price's Ponds
Urbana College
Powell Ave.
APPROX. LOCATION URBANA POTW
APPROX. LOCATION URBANA WELL
Rooney Camp Ground
Short Cut
Hickory Grove
Cedar Swamp
Woodburn
Dolly Varden
Middle Urbana
Three Mile
Dugan
Edinger
Mad
Creek
River
Bates
Clark
Kennard
Mason
Herr
Kingscreek
East
Dallas
Baw
Bair
Pike
Stoan
Pow

FIGURE 1

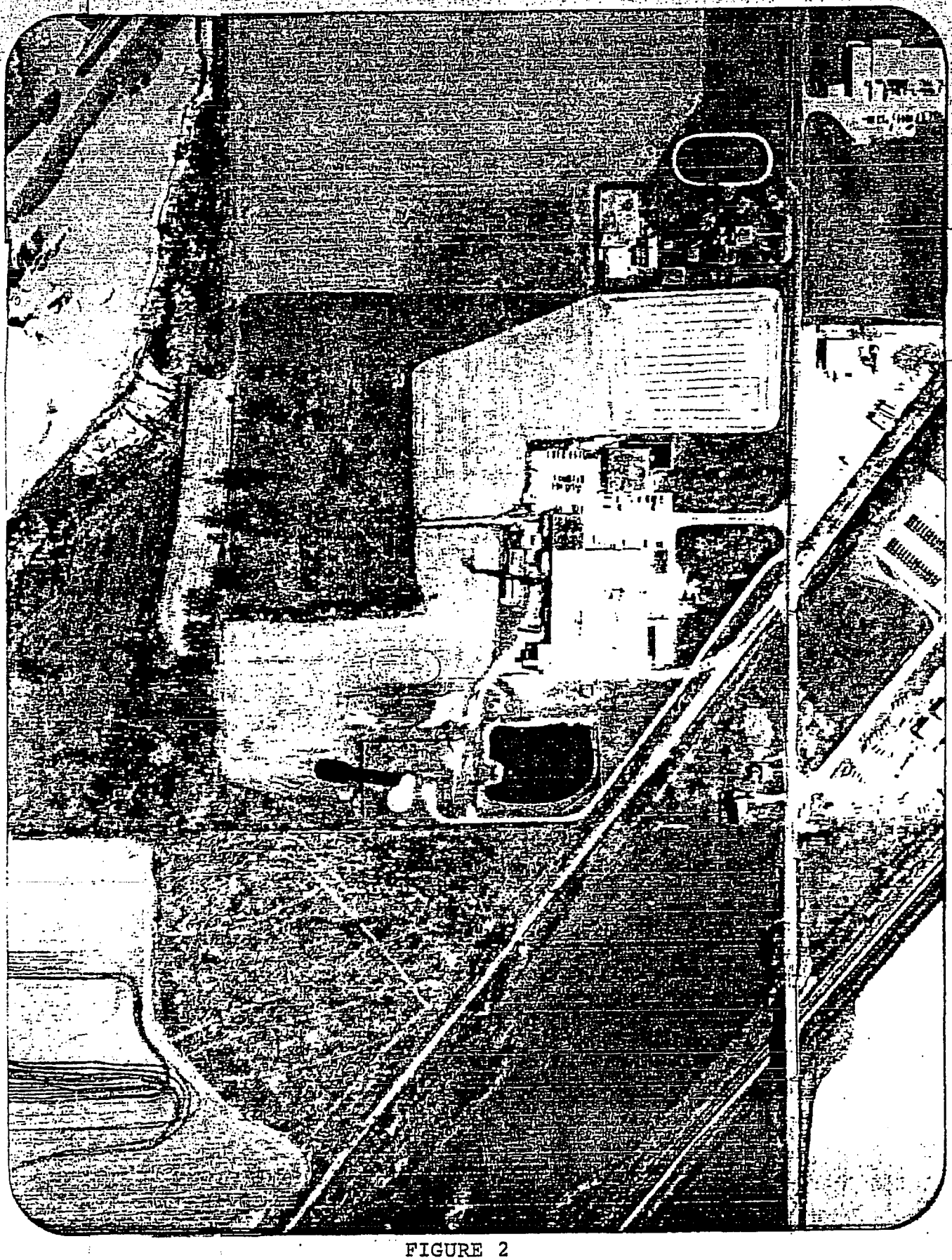
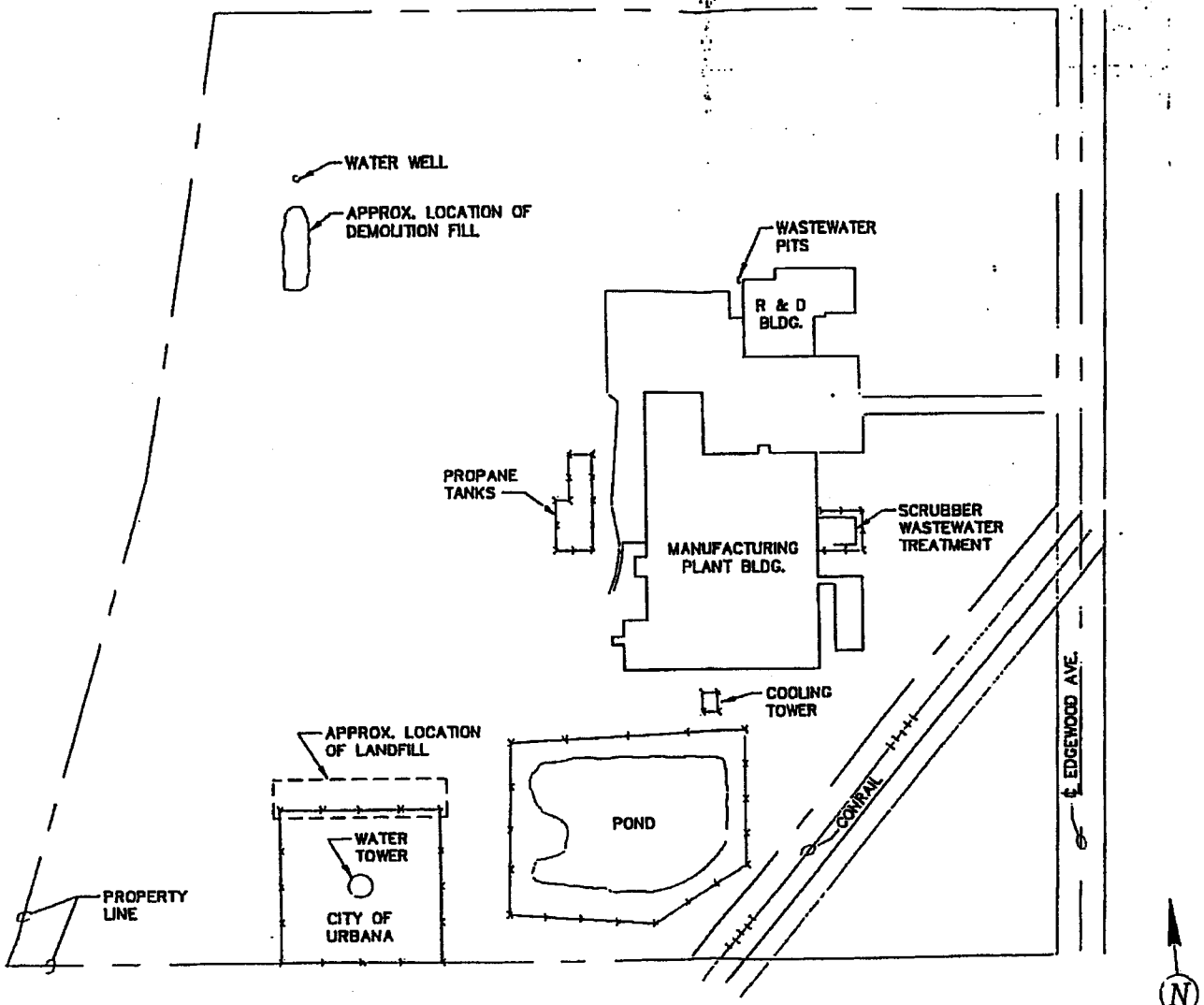


FIGURE 2
AERIAL VIEW
1988



SITE PLAN

NOT TO SCALE

QSOURCE ENGINEERING, INC.

FIGURE 3
CHI-VIT CORP.
URBANA, OHIO

OH000109

SITE INVESTIGATION

Process Description - The Chi-Vit Corporation manufactures two basic products: porcelain frit and continuous cast steel process mold powder. At Urbana Plant only frit is manufactured. Frit is a combination of silica, potassium, sodium, and lesser amounts of metal oxides. Raw materials are received in a dry condition, in either bags or in bulk. They are weighed, mixed and introduced into a high-temperature smelter where they are melted to form the basic frit. Upon cooling, the frit is broken into small pieces (less than one inch). The frit may then be either bagged as product, or further ground in ball mills to a powder consistency. Mold release compounds although not produced are tested at the R & D building.

Air Pollution Emissions - Air emissions from the manufacturing plant are created from the handling of dry raw materials, and from the exhaust gases of the smelters. At the various points within the plant where raw materials are added to weighing and mixing hoppers, local exhaust hoods remove the dust to fabric filter control devices. Raw material storage silos are equipped with filter control devices on their vents. The hot gas emissions from the three smelters are ducted to a high energy venturi scrubbing air pollution control system (Photo 2). This scrubber removes both particulate emissions and gaseous fluorides which are formed as a by-product of the smelting process.

The major emitting sources at the facility have received permits from the OEPA. However, a number of minor sources primarily associated with the R & D facility have not been included in the permit process. The table below shows the permit status of the facility sources. Appendix B contains copies of the air permits.

Manufacturing Plant (Premise #0511010000)

	Source Description	Permit Status
1.	smelter #2	P001 PTO
2.	smelter #3	P002 PTO
3.	smelter #4	P003 PTO
4.	smelter #2 raw material feed	P005 registration
5.	smelter #3 raw material feed	P010 registration
6.	smelter #4 raw material feed	P011 registration
7.	7 raw material weight stations	P004 registration
8.	7 metal oxide weight stations	PTI-05-707
9.	scrubber sludge dryer	no permit
10.	borax bulk system	no permit
11.	vibratory screens	P009 registration
12.	small sand blaster	no permit

13.	maintenance degreaser	no permit
14.	metal oxide blending/packaging	no permit
15.	QC continuous firing furnace	no permit
16.	QC large spray booth	no permit
17.	QC small spray booth	no permit

R & D Plant (Premise #0511010000)

	Source Description	Permit Status
18.	Lab hood - gold dispensing	no permit
19.	R&D spray booth #1	no permit
20.	R&D spray booth #2	no permit
21.	R&D spray booth #3	no permit
22.	R&D smelter #1	no permit
23.	R&D smelter #2	no permit
24.	R&D smelter #3	no permit
25.	R&D smelter #4	no permit
26.	R&D raw material weigh station	no permit
27.	R&D sand blaster	P008 registration

Ohio EPA has conducted an extensive investigation into the health effects of fluoride emissions from the plant on area residents. Based on emissions tests, vegetative surveys and physical examinations of individual citizens, OEPA dismissed the complaints against Chi-Vit. A local referendum which would have mandated further reductions in fluoride emissions was defeated by voters of Urbana. Appendix C contains documents pertaining to the OEPA investigation.

Waste Water Discharge - Aside from the normal sanitary wastes (lavatory and sinks) there are three (3) waste water streams from the manufacturing processes and one (1) from the Research and Development activity.

The two largest waste water streams from the manufacturing process are independently handled and recirculated in the process, creating virtually a zero discharge situation. Minor amounts of process water are discharged to the sanitary sewer.

One of the larger waste water streams is cooling water used in the manufacturing of frit. This water is collected and recirculated through a cooling tower (Photo 3) for reuse in the process.

The other larger waste water streams is from the air pollution control device, which is a scrubber. This water is treated for solids removal (Photo 4), and recirculated to the scrubber.

A small intermittent waste water stream is directly discharged to the ground surface from the manufacturing plant and compression systems. This is a minor problem due to a small quantity of oil content.

Prior to the availability of the sanitary sewer in 1977, the minor amounts of waste water were discharged to the on-site septic system.

A settling pond on the south side of the property (Photos 5 & 6) was originally used as part of the cooling water recirculation system, and possibly for the scrubber water recirculation system. The use of the pond for these purposes has been discontinued due to operating difficulties. A layer of precipitate remains on the bottom of this pond.

Water discharges from the research and development building are directed to a series of settling pits (Photo 7) to remove the solids (frit), then to the sanitary sewer. A discharge permit from the City of Urbana requires that certain general quality parameters be met. The discharge has been tested by an independent laboratory, and found to be within acceptable limits. Appendix D is a copy of documents pertinent to plant water discharges to the Urbana waste treatment system.

Waste Management and Disposal - The Urbana personnel indicated the plant has an OEPA hazardous waste generator identification number, but this was not documented. However, this facility does not generate any hazardous process waste. Certain raw materials would be considered hazardous if they were discarded, but all these materials are used directly, or reintroduced to the processes.

A small amount of solvent waste from the maintenance facility (about 30 gallons per year) is mixed with the regular plant waste and sent to a sanitary landfill. This material is technically considered to be hazardous by the characteristic of ignitability. Because of the volume generated, the facility is classified as a "conditionally exempt small quality generator", therefore the current disposal method is lawful. We recommend that it be reconsidered as a matter of sound management practice.

A small amount of off-specification product and the sludge from the air pollution scrubber is disposed of at the Bellefontaine landfill (formerly know as Logan Waste Control). The material has been analyzed by an independent laboratory, and approved for disposal by Ohio EPA. Appendix E is a copy of documents pertinent to off-site solid waste disposal and the most recent waste analysis result.

Used refractory brick from the smelters, along with small amounts of vitrified material have been disposed of on the site. Disposal is near the recreational area which provided fill for a depression. See Figure 3 for general location. This brick does not contain chromium, and should not present a problem as a result of disposal. Under federal and state solid waste disposal, it would be considered as demolition waste, and would not be regulated.

From the beginning of operations in 1966 until about 1975, the facility did dispose of materials on-site which could potentially be considered hazardous under current regulations. Certain raw materials, containers for these materials and general plant debris was deposited in an on-site general landfill located at the extreme south side of the property, see Figure 3. The pit for this disposal was created as a result of plant construction. Its estimated dimensions are 12' X 50' X 200'. The nature of the materials in this pit, and the geology of the area combine to present a potential hazard of contamination to the local groundwater supply. Appendix F contains documentation of the general geology and hydrology of the area.

Employee Health and Safety

The Occupational Safety and Health Administration Standards (OSHA) are basically divided into two broad categories. These being employee safety and employee health. The division of these two categories is based on equipment standards (safety) and chemical exposure standards (health). The Health & Safety Officer of the Urbana facility indicated OSHA has inspected the facility twice in recent years and has found no violations. However, no documentation could be found to support this.

During Qsource's inspection in November, available employee health information was reviewed and employee working conditions were observed. The information reviewed included the results of air monitoring projects and the company's Hazard Communication Program.

AIR MONITORING PROGRAM - Seven (7) air monitoring projects conducted in the period from 1978 to 1985 were reviewed (Appendix G). Violations of several specific chemical standards, respirable dust, and total dust limitations were noted. There is no notation or record of any positive action on the part of Chi-Vit to investigate or to remediate the problems which resulted in the violations of the OSHA Standards. Additionally, because of the lack of required records when conducting air monitoring, all results are suspect.

Throughout the facility, employees were observed wearing disposable respirators. Although this practice is desirable in an industrial setting like Chi-Vit's, the use of personnel protective equipment must be instituted after employee training and after the preparation of a written personnel protection program. In addition, when using respirators, it is extremely important to evaluate the potential for employee stress and illness as a result of respirator use. No documentation of these requirements was noted.

HAZARD COMMUNICATION - OSHA requires that all manufacturing companies prepare and maintain a Hazard Communication Program for its employees. The Standard (1910.1200) requires that the program:

- Be Written
- List all hazardous materials in the work place
- Include all material safety data sheets
- Specify a method to insure adequate labeling of all containers
- Contain a discussion of material safety data sheets and how to read and understand them
- Contain a list of special safety and health issues for non-routine operations
- Contain an employee education and training program
- Contain an outside contractor policy

Chi-Vits Hazard Communication Program was reviewed (written program and MSDS's). Although the company has complied with the requirement for a written plan and has a list of MSDS's and a Master Chemical List, The program demands improvement in other areas. Specifically:

- The written program does not contain a labeling policy nor a quality assurance program for labeling transfer and bulk storage containers.
- Does not have a discussion of MSDS's in general nor how to interpret the sheets in the facility.
- Does not contain a listing of health and safety issues for non-routine operations including emergencies.

- Does not have any portion of the employee training program, the content of the training presentation, the requirement for additional training when a new hazard is introduced into the work place nor a discussion of when new employees are to be trained.

- The contractors policy is deficient in not specifying what information a contractor is to give to Chi-Vit when bringing in new chemical hazards, nor who is responsible for training Chi-Vit and contractor personnel.

Community Right-to Know Regulations - The facility has filed the appropriate forms required under sections 312 and 313 of the SARA III amendments.

The 312 filing was not complete, as it did not include all the required TIER II reporting requirements for the State and Local Emergency Response Planning Commissions.

The 313 Form R's appeared correct, however no supporting documentation was prepared to describe the method of data collection and analysis. In addition, fluoride compounds were not included. Their generation in the manufacturing process may require reporting.

Miscellaneous Items - (PCB's) Three large liquid-cooled transformers were located on the site near the main building. These transformers are located in a locked, fenced area maintained by the Dayton Power and Light Company, and apparently belong to DP&L. They were not marked with regard to PCB content. There is no evidence of leakage of fluid from any of the units.

There is no evidence of asbestos-containing material at the plant. A sample of the ceiling material was taken from the men's locker room. A preliminary laboratory report showed no asbestos content in the same. A final written record is forthcoming.

There are no underground chemical storage tanks located on the site.

There is no noise problem at the Urbana facility.

Verbal communications were made with Jim Sumner, Jim Simpson, and Jim Seccundi of the OEPA to discuss air pollution, water pollution, and solid waste issues, respectively. Generally, OEPA has no problems with Chi-Vit in these three areas. They (OEPA) indicated that Chi-Vit is not contributing to any environmental problems and is not subject to any enforcement actions.

Appendix H is a copy of the Qsource checklist used to perform this assessment.

RECOMMENDATIONS

1. Obtain air permits for unpermitted sources listed in this report and install control equipment, as necessary.

2. Redirect the intermittent wastewater discharge from the air compressor system to the sanitary sewer after removal of oil and grease.

3. Sample and analyze pond sludge and water for metals and volatile organics.

4. Discontinue the current disposal of waste solvents and arrange for recycling.

5. Information on the contents of the general landfill near the water tower is inconclusive. Soil boring and groundwater sampling & analysis is recommend to characterize landfill contents and groundwater quality.

6. Upgrade the employee industrial hygiene air monitoring program to a minimum of an annual evaluation that confirms to NIOSH and OSHA standards.

7. Prepare and implement a written respirator protection program.

8. Update and improve the Hazard Communication Program.

APPENDIX A

PHOTOGRAPHS

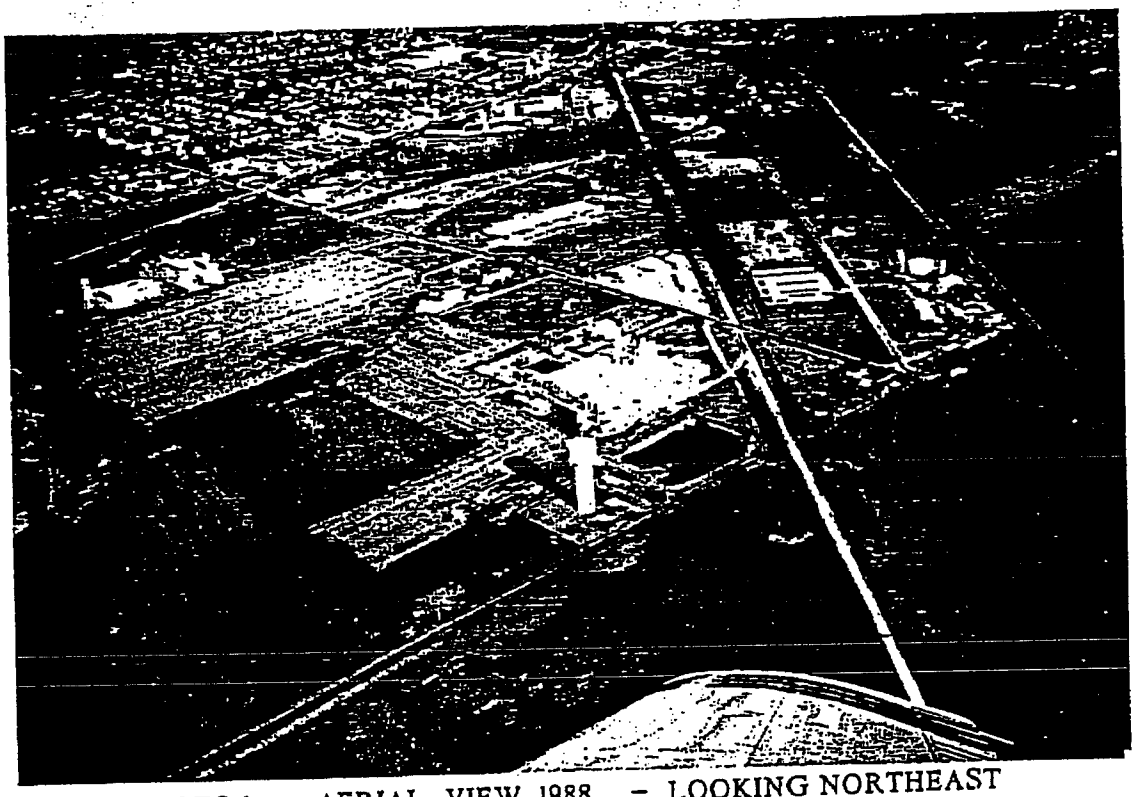


PHOTO I: AERIAL VIEW 1988 - LOOKING NORTHEAST

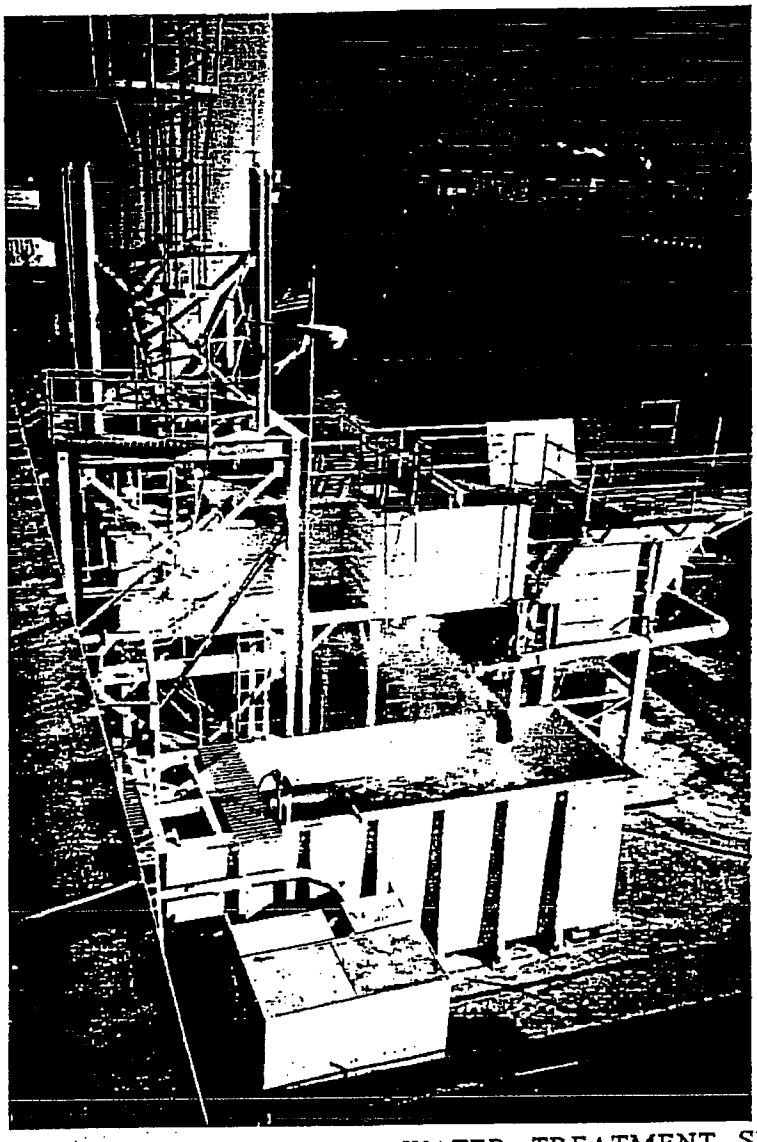


PHOTO 4: SCRUBBER WASTE WATER TREATMENT SYSTEM

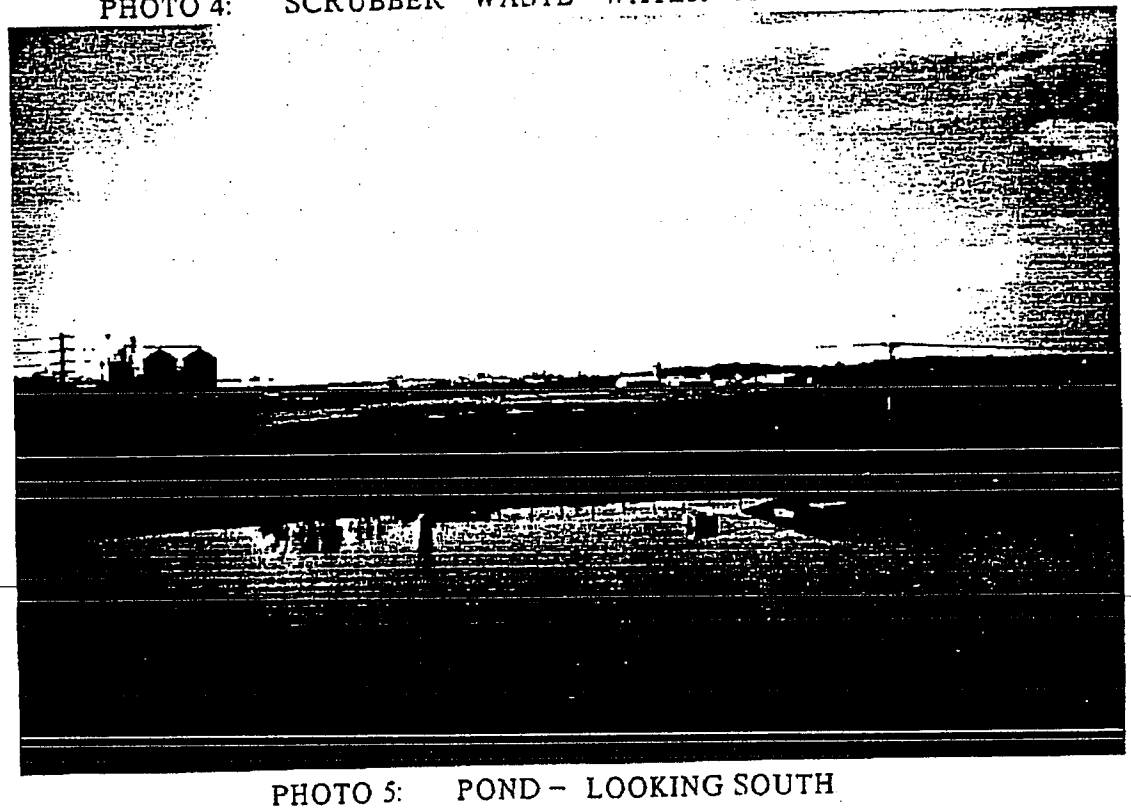


PHOTO 5: POND – LOOKING SOUTH

APPENDIX B

AIR PERMIT DOCUMENTS

APPLICATION NUMBER: 05110100000 P001

FACILITY NAME: Chi-Vit Corporation

EQUIPMENT DESCRIPTION: Frit Smelter

COMPANY ID: E-3

SPECIAL TERMS AND CONDITIONS

1. The permit holder shall operate the above described equipment, along with the control equipment, in accordance with manufacturer's recommendations and instructions, including start-up, maintenance procedure, inspections and repair. The permit holder shall keep records of such inspections and repair and make such records available to the Ohio EPA upon request.

2. Any malfunction of this source or its associated air pollution control system shall be reported immediately to the Ohio EPA Southwest District Office in accordance with Ohio Administrative Code(OAC) 3745-15-06.

3. In the event of a control system malfunction Chi-Vit Corporation shall immediately shut off the fuel supply to the smelters and thus shutdown the operation of the smelters. At no time shall any smelter be operated while the control system is being bypassed.

4. Chi-Vit Corporation shall install and maintain an interlock system which shall automatically shut off the fuel supply to the smelters in the event of a control system malfunction. This interlock system shall be installed and operational no later than June 1, 1988.

5. The company shall keep records documenting the operation of the scrubber and associated equipment. The records shall consist of operating start/stop times. Additionally the company shall keep records of all control system malfunctions and what actions were necessary to correct the malfunctions. While operating, the pressure drop associated with the scrubber shall be recorded continuously. These records shall be available for inspection by an authorized representative of the Ohio EPA.

6. Quarterly written reports shall be submitted to the Southwest District Office of the Ohio EPA fifteen days after the end of each calendar quarter summarizing the information obtained above.

7. If frequent failures and/or breakdowns of the control equipment occur in a given quarter then, along with the report required above, the permit holder shall submit a detailed report which outlines the methods the company plans to use to either prevent detect and/or correct similar future failures and/or breakdowns of the control equipment.

(continued)

8. The pressure drop across the venturi of the control equipment shall be maintained a a level that will guarantee the compliance of the smelter operation with the applicable rules of the Ohio Administrative Code(OAC).

9. As identified in Ohio Administrative Code(OAC) 3745-17-11 the combined emission limitation for the three smelters (P001 - P003) is 9.1 pounds of particulate per hour.

10. Within 6 months prior to the expiration of this permit, this facility shall conduct, or have conducted, an emission test(s) for this source in order to demonstrate compliance with the allowable mass emission rate for particulates. The emission test(s) shall be conducted in accordance with the test methods and procedures specified in OAC rule 3745-17-03.

    Not later than 30 days prior to the proposed test date(s), this facility shall submit an "Intent to Test" notification to the Ohio EPA field office. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the source operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the field office's refusal to accept the results of the emission test(s).

    Personnel from the Ohio EPA field office shall be permitted to witness the test(s), examine the testing equipment and acquire data and information regarding the source operating parameters.

    A comprehensive written report on the results of the emission test(s) shall be submitted to the Ohio EPA field office within 30 days following completion of the test(s).

PREPARED BY: James W. Sumner
DATE PREPARED: February 17, 1988

ioEPA
of Ohio Environmental Protection Agency

RMIT TO OPERATE AN AIR CONTAMINANT SOURCE

of Issuance 03/25/88

Application No. 0511010000P002

ive Date 03/25/88

Permit Fee $210

document constitutes issuance to:

CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

permit to operate for:

MELTER
-7

following terms and conditions are hereby expressly incorporated into this permit to operate:

This permit to operate shall be effective until 03/24/91
You will be contacted approximately six months prior to this date regarding the renewal of this permit. If you are not contacted, please write to the appropriate Ohio EPA field office.

The above-described source is and shall remain in full compliance with all applicable State and federal laws and regulations and the terms and conditions of this permit.

Prior to any modification of this source, as defined in rule 3745-31-01 of the Ohio Administrative Code (OAC), a permit to install must be granted by the Ohio EPA pursuant to OAC Chapter 3745-31.

The Director of the Ohio EPA or an authorized representative may, subject to the safety requirements of the permit holder, enter upon the premises of this source at any reasonable time for purposes of making inspections, conducting tests, examining records or reports pertaining to any emission of air contaminants, and determining compliance with any applicable State and federal air pollution laws and regulations and the terms and conditions of this permit.

A permit fee in the amount specified above must be remitted within 15 days from the issuance date of this permit.

Any transferee of this permit shall assume the responsibilities of the prior permit holder. The appropriate Ohio EPA field office must be notified in writing of any transfer of this permit.

This source and any associated air pollution control system(s) shall be maintained regularly in accordance with good engineering practices in order to minimize air contaminant emissions. Any malfunction of this source or any associated air pollution control system(s) shall be reported immediately to the appropriate Ohio EPA field office in accordance with OAC rule 3745-15-06. Except as provided in that rule, any scheduled maintenance or malfunction necessitating the shutdown or bypassing of any air pollution control system(s) shall be accompanied by the shutdown of this source.

Any unauthorized or emergency release of an air contaminant from this source which, due to the toxic or hazardous nature of the material, may pose a threat to public health, or otherwise endanger the safety or welfare of the public, shall be reported immediately to the appropriate Ohio EPA field office (during normal business hours) or to the Ohio EPA's Emergency Response Group (1-800-282-9378). (Additional reporting may be required pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act.)

The appropriate Ohio EPA field office is:
OHIO EPA, SOUTHWEST DISTRICT OFFICE
AIR POLLUTION GROUP 7 E. FOURTH ST.
DAYTON, OH 45402 (513) 449-6357

☒ If this term and condition is checked, the permit holder is subject to the attached special terms and conditions.

IO ENVIRONMENTAL PROTECTION AGENCY

Richard L. Shank

ector

3834
SED 1-87

APPLICATION NUMBER: 051101000 P002

FACILITY NAME: Chi-Vit Corporation

EQUIPMENT DESCRIPTION: Frit Smelter

COMPANY ID: E-7

SPECIAL TERMS AND CONDITIONS

1. The permit holder shall operate the above described equipment, along with the control equipment, in accordance with manufacturer's recommendations and instructions, including start-up, maintenance procedure, inspections and repair. The permit holder shall keep records of such inspections and repair and make such records available to the Ohio EPA upon request.

2. Any malfunction of this source or its associated air pollution control system shall be reported immediately to the Ohio EPA Southwest District Office in accordance with Ohio Administrative Code(OAC) 3745-15-06.

3. In the event of a control system malfunction Chi-Vit Corporation shall immediately shut off the fuel supply to the smelters and thus shutdown the operation of the smelters. At no time shall any smelter be operated while the control system is being bypassed.

4. Chi-Vit Corporation shall install and maintain an interlock system which shall automatically shut off the fuel supply to the smelters in the event of a control system malfunction. This interlock system shall be installed and operational no later than June 1, 1988.

5. The company shall keep records documenting the operation of the scrubber and associated equipment. The records shall consist of operating start/stop times. Additionally the company shall keep records of all control system malfunctions and what actions were necessary to correct the malfunctions. While operating, the pressure drop associated with the scrubber shall be recorded continuously. These records shall be available for inspection by an authorized representative of the Ohio EPA.

6. Quarterly written reports shall be submitted to the Southwest District Office of the Ohio EPA fifteen days after the end of each calendar quarter summarizing the information obtained above.

7. If frequent failures and/or breakdowns of the control equipment occur in a given quarter then, along with the report required above, the permit holder shall submit a detailed report which outlines the methods the company plans to use to either prevent detect and/or correct similar future failures and/or breakdowns of the control equipment.

(continued)

8. The pressure drop across the venturi of the control equipment shall be maintained a a level that will guarantee the compliance of the smelter operation with the applicable rules of the Ohio Administrative Code(OAC).

9. As identified in Ohio Administrative Code(OAC) 3745-17-11 the combined emission limitation for the three smelters (P001 - P003) is 9.1 pounds of particulate per hour.

10. Within 6 months prior to the expiration of this permit, this facility shall conduct, or have conducted, an emission test(s) for this source in order to demonstrate compliance with the allowable mass emission rate for particulates. The emission test(s) shall be conducted in accordance with the test methods and procedures specified in OAC rule 3745-17-03.

    Not later than 30 days prior to the proposed test date(s), this facility shall submit an "Intent to Test" notification to the Ohio EPA field office. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the source operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the field office's refusal to accept the results of the emission test(s).

    Personnel from the Ohio EPA field office shall be permitted to witness the test(s), examine the testing equipment and acquire data and information regarding the source operating parameters.

    A comprehensive written report on the results of the emission test(s) shall be submitted to the Ohio EPA field office within 30 days following completion of the test(s).

PREPARED BY: James W. Sumner
DATE PREPARED: February 17, 1988

hioEPA
of Ohio Environmental Protection Agency

RMIT TO OPERATE AN AIR CONTAMINANT SOURCE

of Issuance 03/25/88 Application No. 0511010000P003

tive Date 03/25/88 Permit Fee $210

document constitutes issuance to:

CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

permit to operate for:

MELTER
-11

following terms and conditions are hereby expressly incorporated into this permit to operate:

This permit to operate shall be effective until 03/24/91
You will be contacted approximately six months prior to this date regarding the renewal of this permit. If you are not contacted, please write to the appropriate Ohio EPA field office.

The above-described source is and shall remain in full compliance with all applicable State and federal laws and regulations and the terms and conditions of this permit.

Prior to any modification of this source, as defined in rule 3745-31-01 of the Ohio Administrative Code (OAC), a permit to install must be granted by the Ohio EPA pursuant to OAC Chapter 3745-31.

The Director of the Ohio EPA or an authorized representative may, subject to the safety requirements of the permit holder, enter upon the premises of this source at any reasonable time for purposes of making inspections, conducting tests, examining records or reports pertaining to any emission of air contaminants, and determining compliance with any applicable State and federal air pollution laws and regulations and the terms and conditions of this permit.

A permit fee in the amount specified above must be remitted within 15 days from the issuance date of this permit.

Any transferee of this permit shall assume the responsibilities of the prior permit holder. The appropriate Ohio EPA field office must be notified in writing of any transfer of this permit.

This source and any associated air pollution control system(s) shall be maintained regularly in accordance with good engineering practices in order to minimize air contaminant emissions. Any malfunction of this source or any associated air pollution control system(s) shall be reported immediately to the appropriate Ohio EPA field office in accordance with OAC rule 3745-15-06. Except as provided in that rule, any scheduled maintenance or malfunction necessitating the shutdown or bypassing of any air pollution control system(s) shall be accompanied by the shutdown of this source.

Any unauthorized or emergency release of an air contaminant from this source which, due to the toxic or hazardous nature of the material, may pose a threat to public health, or otherwise endanger the safety or welfare of the public, shall be reported immediately to the appropriate Ohio EPA field office (during normal business hours) or to the Ohio EPA's Emergency Response Group (1-800-282-9378). (Additional reporting may be required pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act.)

The appropriate Ohio EPA field office is:

OHIO EPA, SOUTHWEST DISTRICT OFFICE
AIR POLLUTION GROUP 7 E. FOURTH ST.
DAYTON, OH 45402 (513) 449-6357

☒ If this term and condition is checked, the permit holder is subject to the attached special terms and conditions.

O ENVIRONMENTAL PROTECTION AGENCY

Richard L. Shank

ector

3834
SED 1-87

APPLICATION NUMBER: 051101000 P003

FACILITY NAME: Chi-Vit Corporation

EQUIPMENT DESCRIPTION: Frit Smelter

COMPANY ID: E-11

SPECIAL TERMS AND CONDITIONS

1. The permit holder shall operate the above described equipment, along with the control equipment, in accordance with manufacturer's recommendations and instructions, including start-up, maintenance procedure, inspections and repair. The permit holder shall keep records of such inspections and repair and make such records available to the Ohio EPA upon request.

2. Any malfunction of this source or its associated air pollution control system shall be reported immediately to the Ohio EPA Southwest District Office in accordance with Ohio Administrative Code(OAC) 3745-15-06.

3. In the event of a control system malfunction Chi-Vit Corporation shall immediately shut off the fuel supply to the smelters and thus shutdown the operation of the smelters. At no time shall any smelter be operated while the control system is being bypassed.

4. Chi-Vit Corporation shall install and maintain an interlock system which shall automatically shut off the fuel supply to the smelters in the event of a control system malfunction. This interlock system shall be installed and operational no later than June 1, 1988.

5. The company shall keep records documenting the operation of the scrubber and associated equipment. The records shall consist of operating start/stop times. Additionally the company shall keep records of all control system malfunctions and what actions were necessary to correct the malfunctions. While operating, the pressure drop associated with the scrubber shall be recorded continuously. These records shall be available for inspection by an authorized representative of the Ohio EPA.

6. Quarterly written reports shall be submitted to the Southwest District Office of the Ohio EPA fifteen days after the end of each calendar quarter summarizing the information obtained above.

7. If frequent failures and/or breakdowns of the control equipment occur in a given quarter then, along with the report required above, the permit holder shall submit a detailed report which outlines the methods the company plans to use to either prevent detect and/or correct similar future failures and/or breakdowns of the control equipment.

(continued)

8. The pressure drop across the venturi of the control equipment shall be maintained a a level that will guarantee the compliance of the smelter operation with the applicable rules of the Ohio Administrative Code(OAC).

9. As identified in Ohio Administrative Code(OAC) 3745-17-11 the combined emission limitation for the three smelters (P001 - P003) is 9.1 pounds of particulate per hour.

10. Within 6 months prior to the expiration of this permit, this facility shall conduct, or have conducted, an emission test(s) for this source in order to demonstrate compliance with the allowable mass emission rate for particulates. The emission test(s) shall be conducted in accordance with the test methods and procedures specified in OAC rule 3745-17-03.

    Not later than 30 days prior to the proposed test date(s), this facility shall submit an "Intent to Test" notification to the Ohio EPA field office. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the source operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the field office's refusal to accept the results of the emission test(s).

    Personnel from the Ohio EPA field office shall be permitted to witness the test(s), examine the testing equipment and acquire data and information regarding the source operating parameters.

    A comprehensive written report on the results of the emission test(s) shall be submitted to the Ohio EPA field office within 30 days following completion of the test(s).

PREPARED BY: James W. Sumner
DATE PREPARED: February 17, 1988

NOTICE OF REGISTRATION

TO:
CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

FOR:

APPLICATION NO	0511010000 P004
EQUIPMENT DESCRIPTION	: RAW BATCHING - 7 WEIGH & BATCH STATIONS
COMPANY ID.	E-1
ISSUE DATE	04/23/82
EFFECTIVE DATE	04/23/82

(SEE ENCLOSED LETTER FOR EXPLANATION)

Wayne S. Nichols

DIRECTOR

JAN 29 1982

0511010000 P005

CHI VIT CORPORATION
JAMES RINKER
PO BOX 270
URBANA OHIO 43078

Dear Sir or Madam:

This letter is to notify you that the application(s) you had made for permit(s) to operate the air contaminant source(s) as described on the attached notice(s) have been reviewed by the Ohio EPA and placed on registration status by the Director.

Under current Ohio Environmental Protection Agency policies and regulations, operation of these sources does not require a permit to operate. Consequently, the Ohio EPA will be taking no further action on the permit applications for these source(s) at this time.

This action does not affect your legal obligation to comply with all applicable Ohio EPA regulations, including emission regulations. Additionally, this action in no way precludes the Director's option of requiring a permit for these source(s) at some future date.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency and the Environmental Law Division of the Office of the Attorney General within three (3) days of filing with the Board. An appeal may be filed with the Environmental Board of Review at the following address:

Environmental Board of Review
250 East Town Street
Room 101
Columbus, Ohio 43215

Very truly yours,

Patricia P. Walling

Patricia P. Walling, Chief
Div. of Authorization & Compliance
Office of Air Pollution Control

EPA-3168

NOTICE OF REGISTRATION 40

TO:
CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

FOR:

APPLICATION NO	0511010000 P008
EQUIPMENT DESCRIPTION	SANDBLASTER-INTERMITTANT RESEARCH ONLY
COMPANY ID	MOTT SANDBLASTER
ISSUE DATE	12/31/81
EFFECTIVE DATE	12/31/81

(SEE ENCLOSED LETTER FOR EXPLANATION)

Wayne S Nichols

DIRECTOR

NOTICE OF REGISTRATION

TO:
CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

FOR:

APPLICATION NO	0511010000.P009
EQUIPMENT DESCRIPTION	VIBRO MILL; SCREEN PACKER
COMPANY ID	E-14, E-14A
ISSUE DATE	12/31/81
EFFECTIVE DATE	12/31/81

(SEE ENCLOSED LETTER FOR EXPLANATION)

Wayne S Nichols

DIRECTOR

NOTICE OF REGISTRATION

TO:
CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

FOR:

APPLICATION NO	0511010000 P010
EQUIPMENT DESCRIPTION	MIXER & FEEDER
COMPANY ID	E-6
ISSUE DATE	01/06/82
EFFECTIVE DATE	01/06/82

(SEE ENCLOSED LETTER FOR EXPLANATION)

DIRECTOR

NOTICE OF REGISTRATION

TO:
CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

FOR:

APPLICATION NO	05I1010000 P011
EQUIPMENT DESCRIPTION	MIXER & FEEDER
COMPANY ID	E-10
ISSUE DATE	01/06/82
EFFECTIVE DATE	01/06/82

(SEE ENCLOSED LETTER FOR EXPLANATION)

DIRECTOR

OhioEPA

Permit to Install
Terms and Conditions

Application No. 05-707

APS Premise No. 0511010000

Permit Fee: $200.00

Name of Facility: Chi Vit Corporation

Person to Contact: David S. Cameron

Address: P. O. Box 270
Urbana, Ohio 43078

Location of proposed source(s): 720 South Edgewood Avenue
Urbana, Ohio

Description of proposed source(s): specialty chemical weigh station with fabric filter control

Date of Issuance: June 29, 1983

Effective Date: June 29, 1983

The above named entity is hereby granted a permit to install for the above described source(s) pursuant to Chapter 3745-31 of the Ohio Administrative Code. Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the above described source(s) of environmental pollutants will operate in compliance with applicable State and Federal laws and regulations, and does not constitute expressed or implied assurance that if constructed or modified in accordance with those plans and specifications, the above described source(s) of pollutants will be granted the necessary permits to operate (air) or NPDES permits as applicable.

This permit is granted subject to the conditions attached hereto.

Ohio Environmental Protection Agency

Director

EPA 3156

Substantial construction for installation must take place within eighteen months of the effective date of this permit. This deadline may be extended by up to twelve months, if application is made to the Director no less than sixty days before the expiration of this permit and the party shows good cause for any such extension.

The Director of the Ohio Environmental Protection Agency, or his authorized representatives, may enter upon the premises of the above named applicant during construction and operation at any reasonable time for the purpose of making inspections, conducting tests, examining records or reports pertaining to the construction, modification or installation of the above described source of environmental pollutants.

The proposed source shall be constructed in strict accordance with the plans and application submitted for this permit to the Director of the Ohio Environmental Protection Agency. There may be no deviation from the approved plans without the express, written approval of the Agency. Any deviations from the approved plans or the above conditions may lead to such sanctions and penalties as provided under Ohio law. Approval of these plans does not constitute an assurance that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed sources are inadequate or cannot meet applicable standards.

The specified permit fee must be remitted within 15 days of the effective date of this permit to install.

This permit shall apply only to the source(s) shown on the application approved by the Ohio Environmental Protection Agency.

The limited use of this source (less than 2 hours per day) and the operation of the baghouse, at all times, while weighing is occurring constitutes Best Available Technology.

APPENDIX C

RESERVED FOR
FLUORIDE EMISSIONS DOCUMENT

APPENDIX D

WASTEWATER DISCHARGE DOCUMENTATIONS

IWD Permit # 7 - 86

CITY OF URBANA

DEPARTMENT OF PUBLIC WORKS

INDUSTRIAL WASTEWATER DISCHARGE PERMIT

COMPANY NAME : CHI - VIT

MAILING ADDRESS : 720 SOUTH EDGEWOOD

URBANA , OHIO 43078

FACILITY ADDRESS : SAME

In accordance with the provisions of the City of Urbana Sewer Use Ordinance, Chapter 52 and the Pretreatment Ordinance, Chapter 56, the City of Urbana hereby issues permits to the industrial user named above.

These Orders are issued in accordance with the Wastewater Discharge Permit Application form filed on October 15, 1985 with the City of Urbana, and other data submitted in support of the Application Form.

Issue Date - May 30, 1986

Effective Date - May 30, 1986

Expiration Date - May 30, 1991

ORDERS

Chi - Vit Corporation shall discharge industrial process wasewater to the Edgewood Avenue sanitary sewer system only in accordance with the following discharge limitations and monitoring requirements. These limitations are based on an average daily flow of 4,000 gallons per day.

1. pH should be in a range from 5.5 to 9.5 standard units at any time.

   Additional local limitations : To be established

2. The standard strengths for biochemical oxygen demand and suspended solids as defined in the Urbana Code of Ordinance , Section 52.32 shall be subtracted from average strengths, as determined in Section 52.58 to determine the extra billing strengths of each industrial class user for each strength surcharge billing period.

3. Compliance for these standards shall be assessed by analyses of samples taken from manhole A, as shown on page 5 of this permit.

4. Chi - Vit Corp. shall take wastewater samples from manhole A at least once every three calendar months. All samples shall be 24 hour composited and shall be taken on days and at times representative of normal or above average production rates. Each sample will be anaylzed for cadmium, chromium, copper, nickel, zinc, selenium, arsenic, antimony and pH . In addition flow rates must be reported.

5. The permittee shall report the analyses for those parameters described by June 30 and December 31 of each year. Results will be reviewed for compliance and reported by the City of Urbana.

6. The permittee is required to notify the City of Urbana wastewater treatment plant officials verbally within one hour of the discovery of a slug load of pollutants to the sanitary sewer system. Written notification of slug loads must be submitted within five (5) days of the discovery of the incident.

7. The permittee is required to notify the City of Urbana wastewater treatment plant officials of any changes in operations that materially effect the volume of the wastewater discharged to the sewer and, or concentrations of pollutants contained in the wastewater.

8. The permittee shall submit a new wastewater discharge permit application to the Director of Public Works, no less than 90 days before the expiration date on these orders.

Issued this 30th day of May 1986

Arthur D. Baer II
Director of Public Works

City of Urbana, Ohio

PART II

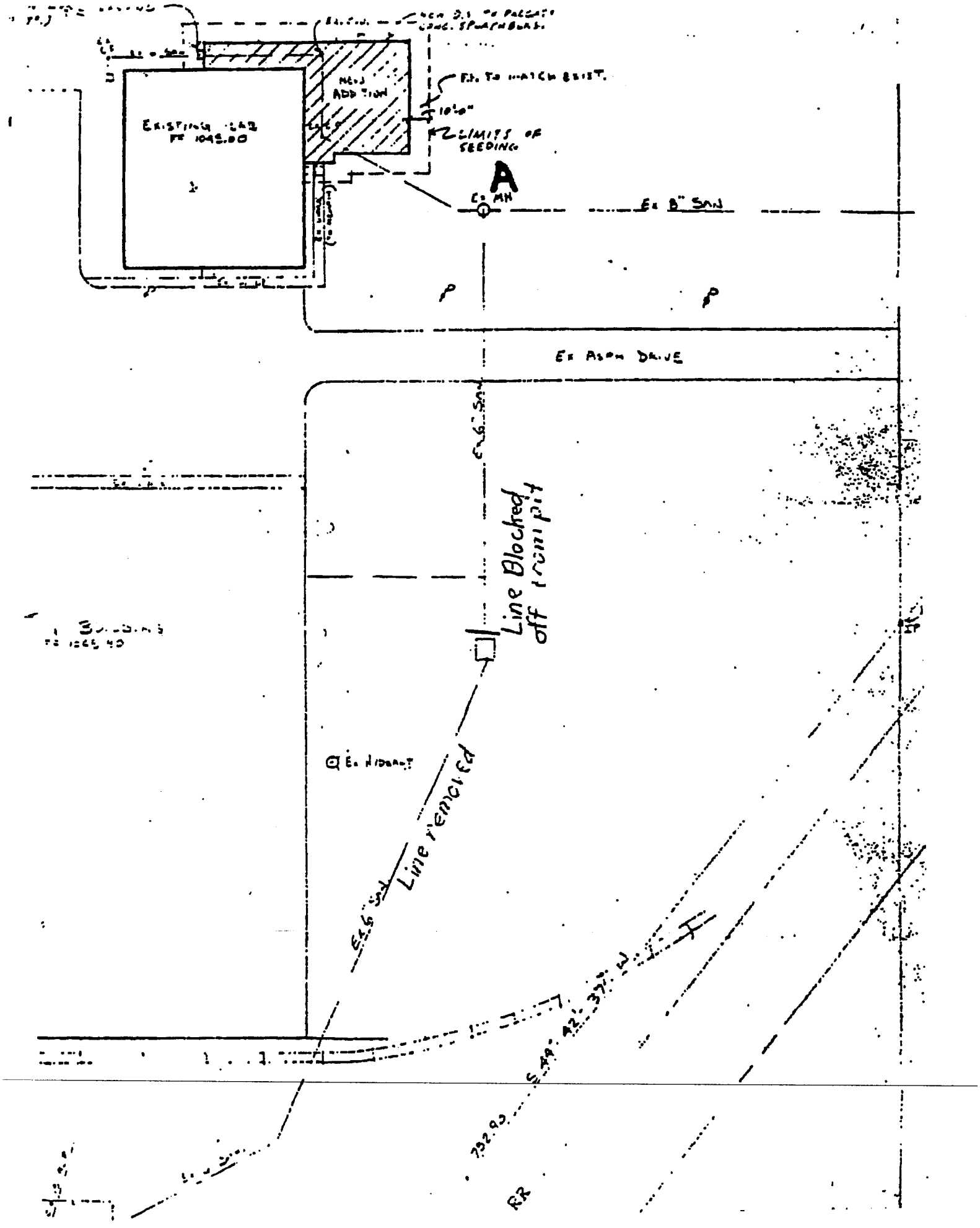
OTHER REQUIREMENTS

A. Review of the final POTW NPDES permit may change presently issued limitations and, or incorporate additional limits.

B. This permit may be modified, revoked and/or reissued to incorporate any approved and updated codes of the ordinance of the City of Urbana.

C. Right of Entry ; The permittee shall allow authorized representatives of the City of Urbana upon the presentation of credentials; to enter upon the permittees premises to sample the effluent source, and at a reasonable time have access to and copy any records required to be kept under this permit.

D. A plant inspection will take place once per year during the scheduled sampling. The inspection shall be conducted in the same manner as used in the program development. City personnel will schedule the inspections.



NEW ADDITION
F.F. TO MATCH EXIST.
10'-0"
LIMITS OF SEEDING
A
EX MH
EX 8" SAN
EX ASPH DRIVE
EX 6" SAN
Line Blocked off from pit
Line removed
EX HIDRANT
RR

PART III

DEFINITIONS

1. IWD - Industrial Waste Discharge
2. mg/l - Milligrams per liter
3. NPDES - National Pollutant Discharge Elimination System
4. (T) - refers to total
5. TSS - Total suspended solids
6. TTO - Total toxic organics
7. POTW - Publically Owned Treatment Works
8. Slug load - any substance released in a discharge at a rate and/ or concentration which causes interference to the POTW

Refer to the Urbana Code of Ordinances Chapters 52 and 56 for additional information.

Questions can be directed to the Director of Public Works at 653 - 3812 or the POTW at 653 - 7245.

Please send all correspondences to :

Director of Public Works
City of Urbana
205 South Main Street
Urbana, Ohio 43078

1 HOWARD LABS INC REPORT LAB # 85-08-591

VED: 08/15/85 09/09/85 17:44:43

T CHI VIT SAMPLES 2 PREPARED HOWARD LABORATORIES, INC.
Chi-Vit Corporation BY 3601 South Dixie Drive
P.O. Box 349
Dayton, OH 45449
PHONE 513-294-6856

CERTIFIED BY

CONTACT J ANDREJCIO

PORT Chi-Vit Corporation
TO 720 South Edgewood Avenue
Urbana, Ohio 43078

Enclosed are the results of specified samples submitted for analyses. If you have any questions, please advise. Use the "LAB #" for faster identification.
OHIO EPA CERTIFICATION: CHEMICAL 4074 BACTERIOLOGICAL 857

TTEN Bruce Larson

K ID Main Discharge & Collection
AKEN 8/13/85
RANS Collected by HLI Personnel
TYPE Aqueous
O. #
OICE under separate cover

AMPLE IDENTIFICATION
rab - 8/13/85 10:40
4 Hr. Comp. - 8/13/85

HOWARD LABS INC TEST CODES and NAMES used on this report

AG	Silver
CD	Cadmium
CN	Cyanide
CR	Chromium
CU	Copper
F	Fluoride
NI	Nickel
PB	Lead
PHNLI	Phenols
ZN	Zinc

GE 2 HOWARD LABS INC REPORT LAB # 85-08-591

CEIVED: 08/15/85 Results by Sample

SAMPLE ID Grab - 8/13/85 10:40 SAMPLE # 01 FRACTIONS: A,B
Date & Time Collected 08/13/85 10:40:00 Category

CN 0.007 mg/L PHNLI 0.044 mg/L

SAMPLE ID 24 Hr. Comp. - 8/13/85 SAMPLE # 02 FRACTIONS: A,B,C
Date & Time Collected 08/13/85 Category

AG <0.030 mg/L CD 0.051 mg/L CR 0.043 mg/L CU 0.846 mg/L F 19.00 mg/L NI 1.080 mg/L

PB 0.010 mg/L ZN 11.500 mg/L

APPENDIX E

OFF-SITE WASTE DISPOSAL DOCUMENTS

Eagle-Picher Industries, Inc.

SPECIALTY MATERIALS DIVISION

MIAMI RESEARCH LABORATORY

P. O. Box 1090 Miami, Oklahoma 74354 918-542-1801

May 11, 1979

Mr. David S. Cameron
Director of Environmental Affairs & Safety
Chi-Vit Corporation
720 South Edgewood Avenue
Urbana, Ohio 43078

Dear Mr. Cameron:

The material received from you May 3, 1979 labeled 1212 Scrubber Sludge has been analyzed by this laboratory to demonstrate possible non-inclusion in Subtitle C.

An X-Ray Diffraction analysis using a Rigaku 3064 Dataflex was made which indicated that this material was essentially all Calcium Fluoride(CaF_2).

The following determinations were made according to paragraph 250.13 of the Federal Register, Vol. 43, No. 243, Monday, December 18, 1978:

1. The material is not ignitable.
2. The material is not corrosive. A water suspension is pH 7.
3. The material is not reactive. It does not generate toxic gases, vapors or fumes when mixed with water. It cannot be detonated.
4. The extract obtained by applying the Extraction Procedure (para. 250.13 (A) indicates the following contaminants and amounts. The method used was Atomic Absorption. (Perkins-Elmer model 5000. Analyst Bob Perrin).

CONTAMINANT	EXTRACT LEVEL (mg/l)
Arsenic	< 0.05
Barium	0.1
Cadmium	0.05
Chromium	0.01
Lead	< 0.01
Mercury	0.0025
Selenium	< 0.5
Silver	0.01

We are unable to analyze for Organic Contaminants.

EAGLE PICHER

5. An Emission Spectrographic analysis (using a Jarrell-Ash Mark IV. Analyst Preston Madden.) of the solid, as received, indicated the following:

CONTAMINANT	%
Calcium	major
Aluminum	0.05
Nickel	0.007
Iron	0.07
Silicon	3.
Magnesium	6.
Manganese	0.01
Boron	0.1
Copper	0.001
Sodium	0.5
Chromium	0.002
Barium	0.03

If I can be of further assistance, do not hesitate to call on me.

Yours truly,

A. L. Fluesmeier
Chief Chemist

cc: Mr. John Wade

Subscribed and sworn to before me this 11th day of May, 1979.

Mary Jeanette Kruse
Notary Public

My Commission Expires: August 31, 1982

HOWARD LABORATORIES, INC.

3601 S. DIXIE DRIVE
DAYTON, OHIO 45439
(513) 294-6856

MAILING ADDRESS:
POST OFFICE BOX 369
DAYTON, OHIO 45449

December 11, 1979

ANALYTICAL RESULTS

No. 3625

CHI-VIT CORPORATION
720 South Edgewood Avenue
Urbana, Ohio 43078

Re: Fluoride Leachate Analysis for Chi-Vit Corporation

On September 17, 1979 a sludge sample was received from Chi-Vit Corporation to be subjected to a modified RCRA Extraction Procedure in accordance with methodology suggested by Mr. Tom Winston, Southwest District, Ohio Environmental Protection Agency. The procedure modification was for a 24-hour continuous extraction at pH 7.0 as opposed to pH 5.0 as stipulated in the RCRA procedure. The extraction and subsequent analysis were performed and Chi-Vit Corporation was informed of the results.

On October 30, 1979, additional leachate testing was requested by Chi-Vit Corporation on the same sludge sample. The testing was to consist of a 72-hour continuous extraction at pH 7.0 with the leachate fluoride concentration being monitored at 24-hour intervals, as again suggested by Mr. Tom Winston. This procedure was executed in duplicate and the results are enclosed with this report.

Due to the great deviation in the results of the duplicated aliquots, a third leachate analysis was performed, being a 72-hour continuous extraction with fluoride concentrations being monitored at 24-hour intervals with one replicate at pH 7.0 and another at pH 5.0. A fresh sludge sample was collected on November 21, 1979 for this analysis. The results are as tabulated below.

	Fluoride (mg/L/100 g Sludge)
pH 7.0	
Day 1	29.80
Day 2	7.46
Day 3	5.44
pH 5.0	
Day 1	17.20
Day 2	10.40
Day 3	6.40

It is our feeling that due to a change in sampling procedures outside the laboratory, and sample handling and splitting within, these results are the most reliable and accurate. Analysis of the leachates for sodium and calcium suggests that the sludge received November 21, 1979 is a more homogeneous sample and is, therefore, more indicative of the true nature of Chi-Vit Corporation's sludge on a daily basis.

Approved

HOWARD LABORATORIES, INC.

3601 S. DIXIE DRIVE
DAYTON, OHIO 45439
(513) 294-6858

MAILING ADDRESS:
POST OFFICE BOX 369
DAYTON, OHIO 45449

December 11, 1979

ANALYTICAL RESULTS

No. 3626

CHI-VIT CORPORATION
720 South Edgewood Avenue
Urbana, Ohio 43078

Sample: Additional Leachate Testing on Sample Received 9-17-79 - Requested 10-30-79
P. O. 10105

pH 7.0

FLUORIDE (mg/L/100 g Sludge)

	Leachate 1 24-Hour (Day 1)	Leachate 2 48-Hour (Day 2)	Leachate 3 72-Hour (Day 3)
Duplicate #1	73.5	57.5	35.8
Duplicate #2	315.0	230.0	80.4

Approved

Chi-Vit Corporation 720 South Edgewood Avenue Urbana, Ohio 43078
513 652-1341

January 7, 1980

Dr. James F. McAvoy, Director
State of Ohio Environmental Protection Agency
361 E. Broad Street
Columbus, Ohio 43216

Dear Dr. McAvoy,

On behalf of Chi-Vit Corporation, I would like to express our appreciation for the manner in which Mr. Thomas Winston of the Southwest District handled the City of Urbana's P.T.I. application to receive Chi-Vit's scrubber sludge.

It might sound strange to hear a regulator being praised, but Mr. Winston's professional approach to this matter was exemplary. His attitude and cooperation were a great help in getting the proper tests run to assure everyone that our scrubber sludge was environmentally safe.

Again, I would like to express our thanks to both you and Mr. Winston for all the help.

Yours,

CHI-VIT CORPORATION

David S. Cameron,
Director, Environmental
Affairs & Safety

DSC/sk

OhioEPA

Re: Solid Waste
Champaign County
RCRA Inventory

March 20, 1981

James Rinker, General Manager
Chi Vit Corporation
720 S Edgewood Avenue
Urbana, Ohio 43078

Dear Mr. Rinker:

The Office of Land Pollution Control, Southwest District Office of the Ohio Environmental Protection Agency, is presently conducting a survey of industrial waste disposal practices in those counties within our jurisdiction. The results of this survey will be used for the purpose mandated by the Resource Conservation and Recovery Act (RCRA). On site and off site facilities will later be evaluated in accordance with criteria published in Volume 44, No. 179, of the Federal Register.

For our information, please briefly answer the questions on the enclosed form, and return to the address given below as soon as possible. Use additional paper if necessary. Thank you for your cooperation. If you have any questions or comments, please contact this office.

Sincerely,

Donald S. Marshall

Donald S. Marshall
Environmental Scientist
Office of Land Pollution Control

DSM:lmp

Enclosure

State of Ohio Environmental Protection Agency
Southwest District Office
7 East Fourth Street, Dayton, Ohio 45402 • (513) 461-4670

James A. Rhodes, Governor
James F. McAvoy, Director

1[illegible] INDUSTRIAL WASTE SURVEY

Company Information

1. Company Name: CHI-VIT CORPORATION.

2. Company Address: 720 SOUTH EDGEWOOD AVE., URBANA, OHIO 43078

3. County in which company located: CHAMPAIGN

4. Name of person responding to survey: DAVID S. CAMERON Telephone: (513) 652-13[illegible]

3. Description of wastes currently produced:

Waste name	quantity generated	solid, sludge liquid, hazardous	on-or off-site disposal	method (pit, incinerator, landfill, etc.)
GENERAL TRASH (SKIDS, BAGS, ETC.)	20-40 CU. YDS./WK.	SOLID, NON-HAZARDOUS	OFF-SITE	LANDFILL

Off-site: Give haulers name and address, and site of ultimate disposal, for each of the above listed wastes.

W.B.T., INC. P.O. BOX 354 CELINA, OHIO 45822

to

LOGAN COUNTY LANDFILL ROUTE #2, BELLEFONTAINE, OHIO 43311

D. Closed sites: Give waste descriptions and approximate quantities for any wastes previously disposed in a now closed or inactive on-site facility. Give dates site used and closed.

NONE

E. If you were unable to answer any above questions because the information is considered confidential by your company, indicate this here and we will contact you personally.

Company Information

1. Company Name: CHI-VIT CORPORATION.

2. Company Address: 720 SOUTH EDGEWOOD AVE., URBANA, OHIO 43078

3. County in which company located: CHAMPAIGN

4. Name of person responding to survey: DAVID S. CAMERON Telephone: (513) 652-13

B. Description of wastes currently produced:

Waste name	quantity generated	solid, sludge liquid, hazardous	on-or off-site disposal	method (pit, incinerator, landfill, etc.)
GENERAL TRASH (SKIDS, BAGS, ETC.)	20-40 CU. YDS./WK.	SOLID, NON-HAZARDOUS	OFF-SITE	LANDFILL

C. Off-site: Give haulers name and address, and site of ultimate disposal, for each of the above listed wastes.

W.B.T., INC. P.O. BOX 354 CELINA, OHIO 45822

to

LOGAN COUNTY LANDFILL ROUTE #2, BELLEFONTAINE, OHIO 43311

D. Closed sites: Give waste descriptions and approximate quantities for any wastes previously disposed in a now closed or inactive on-site facility. Give dates site used and closed.

NONE

E. If you were unable to answer any above questions because the information is considered confidential by your company, indicate this here and we will contact you personally.

Re: Logan County
Rush Creek Township
Application for Modification of the Type of Waste Disposed to Include Dried Scrubber Sludge from the Chi-Vit Corporation
Received January 18, 1980
From Mr. Delaine Gehle

CERTIFIED MAIL

February 27, 1980

Logan County Landfill
R.R. #2
Bellefontaine, Ohio 43311

Dear Sirs:

Enclosed is the Ohio EPA Permit to Install which will allow you to install the described source in the manner indicated in the permit. Because this permit contains several conditions and restrictions, I urge you to read it carefully.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency and the Environmental Law Division of the Office of the Attorney General within three (3) days of filing with the Board. An appeal may be filed with the Environmental Board of Review at the following address (temporary):

Environmental Board of Review
240 Parsons Avenue
Suite 123
Columbus, Ohio 43215

If you have any questions, please contact the Ohio EPA District Office or local air pollution control agency to whom you submitted your application.

Yours truly,

Donald E. Day, P.E.
Chief
Office of Land Pollution Control

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL
FEB 27 1980

DED/pam

cc: Chi-Vit Corporation
cc: Southwest District Office

I certify this to be a true and accurate copy of the official document filed in the records of the Ohio Environmental Protection Agency.

[illegible] Date 2-27-80

OHIO ENVIRONMENTAL PROTECTION AGENCY

Permit To Install

Application No. 05-381

Permit Fee: $ None

Applicants Name: Mr. Delaine Gehle
Logan County Landfill

Address: R. R. #2

City: Bellefontaine State: Ohio 43311

Telephone: (513) 593-6806

Description of Proposed Source: Modification of the type of waste disposed to include dried scrubber sludge from the Chi-Vit Corporation

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL

FEB 27 1980

Issuance Date: February 27, 1980

Effective Date: February 27, 1980

The above named entity is hereby granted a permit to install for the above described source pursuant to Chapter 3745-31 of the Ohio Administrative Code (former Ohio EPA Regulation EP-30). Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the above described source of environmental pollutants will operate in compliance with applicable State and Federal laws and regulations, and does not constitute expressed or implied assurance that if constructed or modified in accordance with those plans and specifications, the above described source of pollutants will be granted the necessary operating permits. This permit is granted subject to the following conditions attached hereto:

Ohio Environmental Protection Agency

by James F. McAvoy
Director
361 East Broad Street
Columbus, Ohio 43215

I hereby certify this to be a true and accurate copy of the original document filed in the records of the Ohio Environmental Protection Agency.

Date 2-27-80

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL

FEB 27 1980

Substantial construction for installation must take place within eighteen months of the effective date of this permit. This deadline may be extended by up to twelve months, if application is made to the Director no less than sixty days before the expiration of this permit and the party shows good cause for any such extension.

The Director of the Ohio Environmental Protection Agency, or his authorized representatives, may enter upon the premises of the above named applicant during construction and operation at any reasonable time for the purpose of making inspections, conducting tests, examining records or reports pertaining to the construction, modification or installation of the above described source of environmental pollutants.

The proposed source shall be constructed in strict accordance with the plans and application submitted for this permit to the Director of the Ohio Environmental Protection Agency. There may be no deviation from the approved plans without the express, written approval of the Agency. Any deviations from the approved plans or the above conditions may lead to such sanctions and penalties as provided under Ohio law. Approval of these plans does not constitute an assurance that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed sources are inadequate or cannot meet applicable standards.

A report, which provides a technical appraisal of the normal operating conditions of the new facilities shall be submitted to the appropriate District Office of the Ohio Environmental Protection Agency no later than three months after the new facilities are placed into operation.

The owner shall be responsible for the proper operation and maintenance of the sludge disposal facilities.

Daily records of operation shall be maintained and submitted to the Ohio Environmental Protection Agency at the end of each month.

The owner shall provide for the proper maintenance and operation of the solid waste disposal site or source in accordance with the provisions of Rule 3745-27 of the Ohio Administrative Code.

No liquids, sludges, or toxic or hazardous wastes other than those set forth in the approved specifications and plans shall be accepted for disposal without the written approval of the Agency.

Monitor wells shall be installed by the owner or operator if requested by the Ohio Environmental Protection Agency. Locations, depths, and characteristics of such wells shall be as required by the Ohio Environmental Protection Agency.

I certify this to be a true and accurate copy of the official document filed in the records of the Ohio Environmental Protection Agency.

By: [illegible] Date 2-27-80

The solid waste disposal site or facility shall be completed and ready for operation before the acceptance of solid wastes. Notification that this condition has been met, shall be submitted in writing, to the appropriate Ohio Environmental Protection Agency District Office at least thirty (30) days prior to the acceptance of any solid wastes.

This permit shall apply only to the source shown on the plans approved by the Ohio Environmental Protection Agency. Approval is for the disposal of dried sludge generated at Chi-Vit Corporation as described in the Permit to Install application and detail plans.

If leachate is detected on the site, or is draining from the site, in such quantities that the Director or his authorized representative or the Health Commissioner believes, based on a review of geologic, hydrologic, engineering, and other factors, that a substantial threat of water pollution exists, the leachate shall be contained on the site and properly treated or shall be collected and transported from the site for proper treatment and all necessary action shall be taken to minimize, control, or eliminate the conditions which contribute to the production of leachate.

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL

FEB 27 1980

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.

By: [illegible] Date 2-27-80

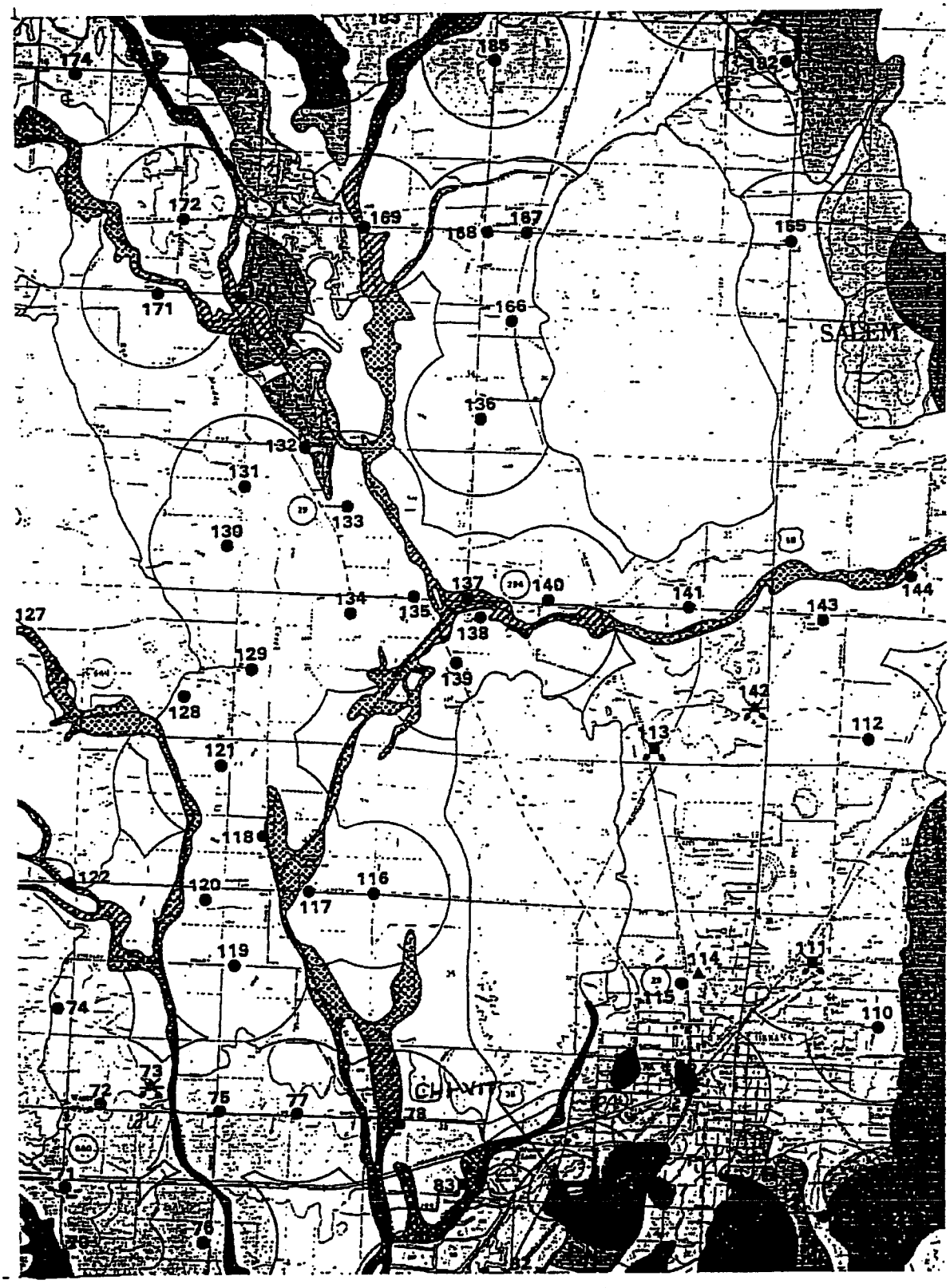
APPENDIX F

GEOLOGY/HYDROLOGY DATA

SAND AND GRAVEL RESOURCES OF CHAMPAIGN COUNTY, OHIO

by Richard A. Struble

1987

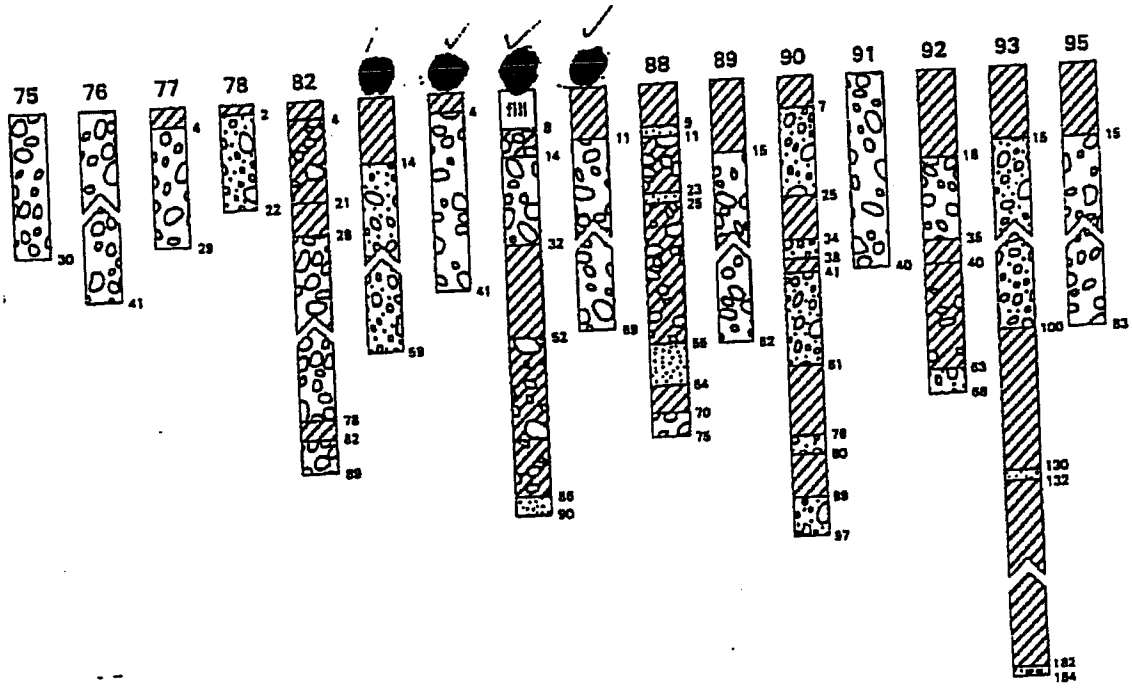


SAND AND GRAVEL RESOURCES OF CHAMPAIGN COUNTY, OHIO

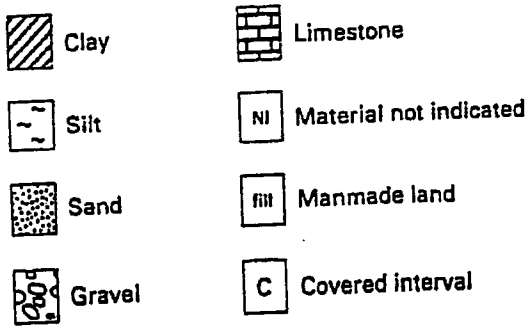
by Richard A. Struble

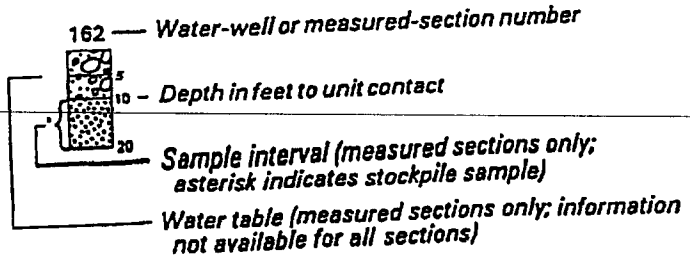
1987

Water-well logs



EXPLANATION





State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK

№ 342889

County Champaign Township Urbana Section of Township 28

Owner Smith Douglas Corp Address Edgewood Ave Urbana

Location of property South west edge of Urbana

CONSTRUCTION DETAILS

Casing diameter 2 1/4" Length of casing 160'

Type of screen — Length of screen —

Type of pump —

Capacity of pump —

Depth of pump setting —

Date of completion —

BAILING OR PUMPING TEST

Pumping Rate 12 G.P.M. Duration of test 2 hrs

Drawdown None ft. Date Mar 3, 1966

Static level-depth to water 56 ft

Quality (clear, cloudy, taste, odor) Clear

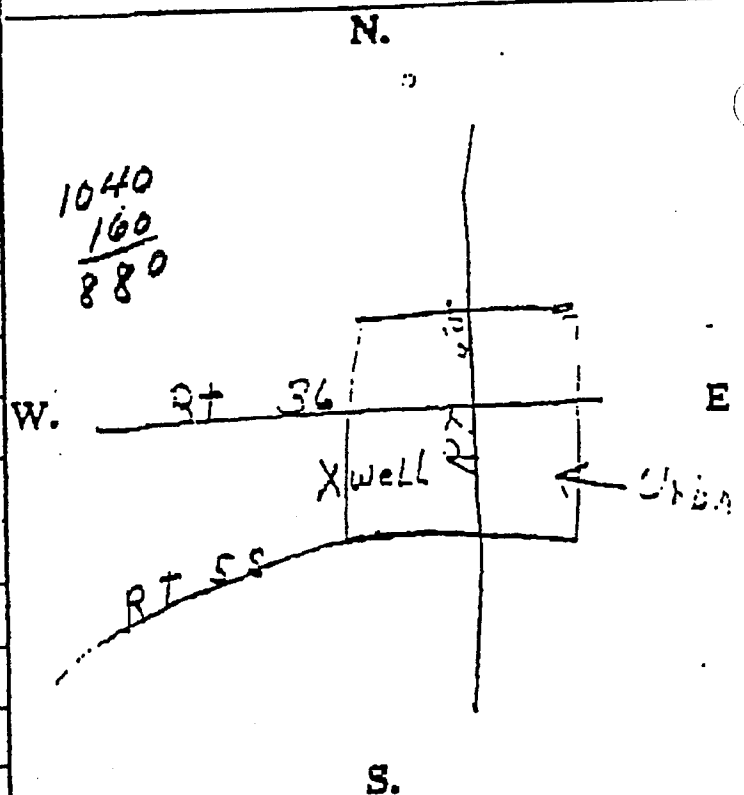
Pump installed by —

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Red clay	0 Feet	20 Ft.
Muddy gravel	20	30
gravel	30	65
Muddy sand	65	90
Sandy clay	90	125
Quick sand	125	145
Sandy clay	145	160
Limestone	160	170

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm —

Address Box 75 Rosewood, O

Date Mar 3, 1966

Signed [illegible]

*If additional space is needed to complete well log, use next consecutive numbered form

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

№ 332298

County Champaign Township Urbana Section of Township

Owner City of Urbana Address Urbana, Ohio

Location of property 250 ft east of river & 50 ft south of highway in new field

CONSTRUCTION DETAILS

Casing diameter 38"x26" Length of casing 31'

Type of screen shutter Length of screen 30'

Type of pump Layne

Capacity of pump 1520 GPM

Depth of pump setting

Date of completion 9-23-66

BAILING OR PUMPING TEST

Pumping Rate 1500 G.P.M. Duration of test ____ hr.

Drawdown 3'3" ft. Date

Static level ~~depth to water~~ 15 ft

Quality (clear, ~~cloudy, taste, odor~~)

Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Fill	0 Feet	7 Ft.
Clay	7	12
Heavy gravel	12	15
Sand & gravel	15	25
Boulders	25	30
Sand & gravel	30	58
Sandy clay & gravel	58	62

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

W. E

S.

See reverse side for instructions

Drilling Firm Layne Ohio Co Date 12-29-66

Address Columbus, Ohio Signed [illegible]

*If additional space is needed to complete well log, use next consecutive numbered form

OH000163

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

№ 332299

County Champaign Township Urbana Section of Township

Owner City of Urbana Address Urbana

Location of property 400' east of No 7 well

CONSTRUCTION DETAILS

Casing diameter 38"x26" Length of casing 30'

Type of screen Shutter Length of screen 30'

Type of pump Layne

Capacity of pump 1500 GPM

Depth of pump setting

Date of completion 10-13-66

BAILING OR PUMPING TEST

Pumping Rate 1500 G.P.M. Duration of test 8 hr.

Drawdown 4'1" ft. Date

Static level ~~depth to water~~ 12 f

Quality (clear, ~~cloudy, taste, odor~~)

Pump installed by Layne Ohio

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Fill	0 Feet	7 Ft.
Top soil	7	12
Sand & gravel	12	20
Boulders	20	25
Sand & some gravel	25	30
Sand & gravel	30	61
Clay & gravel	61	63

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

W. E

S.

See reverse side for instructions

Drilling Firm Layne Ohio Co. Date 12-29-66

Address Columbus, Ohio Signed [illegible]

*If additional space is needed to complete well log, use next consecutive numbered form

OH000164

DIVISION OF WATER
815 OHIO DEPARTMENTS BLDG.
COLUMBUS, OHIO 43215

WELL LOG AND DRILLING REPORT

State of Ohio
Department of Natural Resources
Division of Water
~~[illegible]~~
Columbus, Ohio

LAYNE # 1371

NO. 233161

County Champaign Township Urbana Section of Township

Owner City of Urbana Address

Location of property Water Works

Well #7

CONSTRUCTION DETAILS

Casing diameter 38" 26" Length of casing 50' 52'

Type of screen Shutt Length of screen 20'

Type of pump

Capacity of pump

Depth of pump setting 72'

Date of completion 10-20-57

BAILING OR PUMPING TEST

Pumping rate 1100 G.P.M.

Duration of test Hrs.

Drawdown 2'6" ft. Date

Static level - depth to water 20 Ft.

Quality

Pump installed by

WELL LOG

Formation	From	To
Top Soil	0	5
Sand	5	10
Clay & gravel	10	25
Yellow clay	25	30
Clay, gravel & boulder	30	50
Sand & coarse gravel	50	70
Blue clay	70	72

20 Tons of pea gravel used

SKETCH SHOWING LOCATION

N.

W. E.

S.

Drilling Firm Layne-Ohio Co. Date 5-14-71

Address Columbus, Ohio Copied by JAN

OH000165

Industrial

WELL LOG AND DRILLING REPORT

NO. 155888

County Champaign Township Urbana Section of Township

Owner City of Urbana Address Ohio

Location of property SW edge of city at sewage plant

CONSTRUCTION DETAILS

Casing diameter 8" Length of casing 1'

Type of screen Johnson Length of screen 5'

Type of pump D.W.Turbine

Capacity of pump 75 G.P.M.

Depth of pump setting 45'

Date of completion

BAILING OR PUMPING TEST

Pumping rate 105 G.P.M.

Duration of test 12 Hrs.

Drawdown 5 ft. Date 6-3-55

Developed capacity Above

Static level - depth to water 30 Ft.

Pump installed by

WELL LOG

Formation	From	To
Top Soil	0	2
Gravel & Clay	2	20
Sand & Gravel	20	56

SKETCH SHOWING LOCATION

N.

W. E.

S.

Drilling Firm G.M.Baker & Son

Address Cols.Ohio

Date 10-15-58

Copied by J.C.

APPENDIX G

INDUSTRIAL HYGIENE SAMPLING REPORTS

RESULTS OF AIR SAMPLING FOR SILICA ON 6/26/85 - URBANA

JOB TITLE/LOCATION	CASSETTE #	TIME MINUTES	VOLUME 1.7	WEIGHT MG	TOTAL WEIGHT MG	CONCEN-TRATION	% QUARTZ
GROUND COAT WEIGHER	014-12	320	544	.1049	.487	.192	21.56
GROUND COAT SMELTER OPERATOR	014-14	285	484.5	.0309	.237	.063	13.08
COVER COAT WEIGHER	054-1	90	153	.0439	.139	.286	31.65
COVER COAT SMELTOR OPERATOR	054-11	325	552.5	ND	.140	----	----
EDS OPERATOR	074-1	260	442	.2502	.446	.566	5.61
CATWALK/COVER COAT MIXER	084-2	285	484.5	.083	.200	.171	41.5

JOB TITLE/LOCATION	CASSETTE	TIME MINUTES	MATERIAL SAMPLED FOR	WEIGHT	WEIGHTED AVERAGE	LEVEL	INDEX
URBANA - 6/85 COVER COAT SMELTER OPERATOR	CV-4	285	DUST	6.0	10.526	15.	.70
			LITHIUM	.0003	.0005	.025	.02
			MANGANESE	.0007	.0012	5.	.0002
			CADIUM	< .0002	.0003	.2	.002
			COBALT	< .0005	.0008	.01	.09
			NICKEL	< .0005	.0008	1.	.0008
			ARSENIC	< .001	.0017	.01	.17
			BORON	< .02	.035	15.	.002
SPECIALTY WEIGHER	CV-5	180	DUST	5.4	15.	15.	1.0 *
			LITHIUM	.0002	.0005	.025	.022
			MANGANESE	.0098	.027	5.	.005
			CADIUM	< .0002	.0005	.2	.002
			COBALT	.0028	.0077	.01	.77
			NICKEL	< .0005	.0013	1.	.0013
			ARSENIC	< .001	.0027	.01	.27
			BORON	< .02	.055	15.	.004
CATWALK AT GROUND COAT MIXER	CV-6	265	DUST	5.6	10.56	15.	.704
			LITHIUM	.0005	.0009	.025	.037
			MANGANESE	.0006	.0011	5.	.0002
			CADIUM	< .0002	.0003	.2	.001
			COBALT	.0010	.0018	.01	.19
			NICKEL	< .0005	.0009	1.	.0009
			ARSENIC	< .001	.0018	.01	.19
			BORON	< .02	.037	15.	.003

				WEIGHT	WEIGHTED AVERAGE	LEVEL	INDEX
URBANA - 6/85 GROUND COAT WEIGHER	CV-1	300	DUST	5.3	8.83	15.	.58
			LITHIUM	.0003	.0005	.025	.02
			MANGANESE	.0037	.0061	5.	.001
			CADIUM	< .0002	.0003	.2	.001
			COBALT	.0008	.0013	.01	.13
			NICKEL	.0029	.0048	1.	.004
			ARSENIC	< .001	.0016	.01	.16
			BORON	< .02	.0033	15.	.002
GROUND COAT SMELTER OPERATOR	CV-2	315	DUST	5.2	8.25	15.	.55
			LITHIUM	.0016	.0025	.025	.10
			MANGANESE	.0029	.0046	5.	.0009
			CADIUM	< .0002	.0003	.2	.001
			COBALT	.0009	.0014	.01	.14
			NICKEL	.0065	.0103	1.	.01
			ARSENIC	< .001	.0015	.01	.15
			BORON	< .02	.0317	15.	.002
COVER COAT WEIGHER	CV-3	322	DUST	6.0	9.31	15.	.62
			LITHIUM	.0006	.0009	.025	.04
			MANGANESE	.0013	.0020	5.	.0004
			CADIUM	< .0002	.0003	.2	.002
			COBALT	.0042	.0065	.01	.65
			NICKEL	.0007	.001	1.	.001
			ARSENIC	< .001	.0015	.01	.15
			BORON	< .02	.031	15.	.002

JOHN WADE

April 24, 1980

MR. BURNETT D. BRUCE
CHI-VIT CORPORATION
OAK BROOK, ILL.

These are the results of the air monitoring done at your plant on March 5, 6, & 7, 1980.

JOHN B. WADE

PLANT: URBANA, OHIO

TYPE OF SAMPLE: RESPIRABLE AIRBORNE DUST QUART.

FILTER: 37mm x 5 micron @ 2 lpm.

ANALYTICAL METHOD: X-RAY DIFFRACTION

TLV = $\frac{10}{SiO_2\% + 2}$

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME (M)	CONTAMINANT	Weight in mg	TWA mg/m³	TLV mg/m³	EXPOSURE INDEX
HAROLD RICKARDS Clock No. 4001 Filter No. 010-13	Weigher Ground Coat	1st 7:00AM 2:28PM	448	Total Dust Res. Quartz % Res. Quartz wt	1.840 13.8% 0.253	0.282	0.63	0.45
RONALD TOMBLIN Clock No. 4063 Filter No. 010-2	Weigher Cover Coat	1st 7:03AM 2:27 PM	444	Total Dust Res. Quartz % Res. Quartz wt	2.292 10.2% 0.233	0.262	0.82	0.32
WAYNE KEELER Clock No. 4036 Filter No. 109-9	Operator Cover Coat	2nd 3:00PM 10:24PM	444	Total Dust Res. Quartz % Res. Quartz wt	0.904 N.D. N.D.	N.D.	5.0	N.E.
TIM HERRON Clock No. 4024 Filter No. 109-10	Operator Ground Coat	2nd 3:00PM 10:27PM	447	Total Dust Res. Quartz % Res. Quartz wt	1.023 4.7% 0.048	0.054	1.49	0.04

OH000172

PLANT: URBANA, OHIO

TYPE OF SAMPLE: RESPIRABLE AIRBORNE DUST QUARTZ

FILTER: 37mm x 5 micron @ 2Lpm

ANALYTICAL METHOD: X-RAY DIFFRACTION

$TLV = \frac{10}{SiO_2 + 2}$

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME(M)	CONTAMINANT	Weight in mg	TWA mg/m^3	TLV mg/m^3	EXPOSURE INDEX
B. RODGRIGUES Clock No. Filter No. 010-11	Sweeper Weigh Area	1st 7:15 AM 11:24 AM ↓ 12:00 N 1:00 PM	309	Total Dust Res. Quartz % Res. Quartz wt	0.613 N.D. N.D.	N.D.	5.0	N.E.
AREA SAMPLE Pillar 8' West of #2 Weigh Station Filter No. 010-15		1st 12:01 PM 2:31 PM	150	Total Dust Res. Quartz % Res. Quartz wt	0.259 N.D. N.D.	N.D.	5.0	N.E.
J. LATTIMER Clock No. 4083 Filter No. 010-5	Shipping " and Receiving	1st 7:35 AM 11:30 AM ↓ 12:05 PM 3:58 PM	468	Total Dust Res. Quartz % Res. Quartz wt	0.465 9.9% 0.046	0.005	0.84	0.06

OH000173

JOHN WADE

March 27, 1980

Mr. Burnett D. Bruce,
Chi-Vit Corporation,
Oak Brook, Ill.

PLANT: URBANA, OHIO

TYPE OF SAMPLE: AIRBORNE DUST

ANALYTICAL METHOD: ATOMIC ABSORPTION

$TWA = \frac{wt - mg}{2\ lpm \times TX\ .001}$

37mm x .8 micron @ 2lpm

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME (M)	CONTAMINANT	Weight in mg	TWA mg/m³	TLV mg/m³	EXPOSURE INDEX
DALE TAYLOR Clock No. 4025 Filter No. ACF-12	Weigher Cover Coat Smelter	2nd 3:42 PM 10:32 PM	410	Arsenic Nickel Cobalt Barium Lithium Fluorides	<0.01 0.067 0.006 0.023 0.026 0.08	0.010 0.081 0.007 0.028 0.03 0.10	0.010 1.0 1.0 0.5 0.025* 2.5	1.0 0.08x ----- 0.06x 1.27x 0.04x
BILL BURBA Clock No. 4003 Filter No. ACF-10	Weigher Ground Coat Smelter	2nd 3:50 PM 10:25 PM	395	Arsenic Nickel Cobalt Barium Lithium Fluorides	<0.01 0.355 0.70 0.063 0.10 0.04	0.01 0.45 0.89 0.08 0.13 0.05	0.010 1.0 1.0 0.5 0.025* 2.5	1.0 0.45x 0.89x 0.16x 5.06x 0.02x
MICKEY GARDNER Clock No. 4018 Filter No. ACF-11	Specialty Weigher	MAR. 6 1st 7:00 AM 11:25 AM	265	Arsenic Nickel Cobalt Barium Lithium Fluorides	<0.01 0.008 0.35 0.005 0.003 0.09	0.015 0.015 0.66 0.009 0.006 0.17	0.010 1.0 1.0 0.5 0.025* 2.5	1.5x ---- 0.66x ---- 0.22x 0.07x

OH000175

PLANT: URBANA, OHIO

TYPE OF SAMPLE: AIRBORNE DUST

ANALYTICAL METHOD: ATOMIC ABSORPTION

$TWA = \frac{wt - mg}{2\ \ell pm \times TX\ .001}$

37 mm x .8 micron @ 2 ℓpm

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME (M)	CONTAMINANT	Weight in mg	TWA mg/m^3	TLV mg/m^3	EXPOSUR INDEX
WAYNE KEELER	Operator	2nd	425	Arsenic	<0.01	0.01	0.01	1.0
Clock No. 4036	Cover	3:04 PM		Nickel	0.003	0.003	1.0	----
	Coat	10:09 PM		Cobalt	0.001	0.001	1.0	----
Filter No. 15	Smelter			Barium	0.005	0.006	0.5	----
				Lithium	0.002	0.002	0.025*	0.09x
				Fluorides	0.06	0.07	2.5	0.03x
JIM HERRON	Operator	2nd	360	Arsenic	<0.01	0.01	0.01	1.0
Clock No. 4024	Ground	3:01 PM		Nickel	0.019	0.026	1.0	0.03x
	Coat	9:01 PM		Cobalt	0.01	0.014	1.0	0.01x
Filter No: 16	Smelter			Barium	0.035	0.049	0.5	0.09x
				Lithium	0.009	0.013	0.025*	0.5x
				Fluorides	0.05	0.07	2.5	0.03x

* TLV - 0.025 mg/m^3 is for Lithium Hydride. If other Lithium compounds are used, there is NO over exposure.

OH000176

JOHN WADE

Sept. 12, 1979

MR. B. D. BRUCE,
EXEC. VICE PRESIDENT,
CHI-VIT CORPORATION,
OAK BROOK, ILL.

For your information.

JBW

OH000177

PLANT: URBANA, OHIO

TYPE OF SAMPLE: RESPIRABLE AIRBORNE DUST

ANALYTICAL METHOD: X-RAY DIFFRACTION

TLV = $\frac{10}{SiO_2\% + 2}$ RESPIRABLE QUARTZ

37mm x 5 micron pore @ 2 LPM

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME(M)	CONTAMINANT	Weight in mg	TWA mg/m³	TLV mg/m³	EXPOSURE INDEX
R. BURNHAM Clock No. 4035 Filter #128-13 Remarks: Filter plugged at 4:30 AM - pump stopped.	WEIGHER #2 Smelter	3rd 11-7	293	Total Dust	0.408	0.819		
				Respirable Quartz - wt.	0.166			
				Respirable Quartz - %	40.7%		0.234	350.0%
P. SKAGGS Clock No. 4045 Filter #128-17	WEIGHER #4 Smelter	3rd 11-7	436	Total Dust	0.756	0.866		
				Respirable Quartz - wt.	0.058			
				Respirable Quartz - %	7.7%		1.03	84.0%

OH000178

PLANT: URBANA, OHIO

TYPE OF SAMPLE: RESPIRABLE AIRBORNE DUST

ANALYTICAL METHOD: X-RAY DIFFRACTION

$TLV = \frac{10}{SiO_2\% + 2}$ RESPIRABLE QUARTZ

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME(M)	CONTAMINANT	Weight in mg	TWA mg/m^3	TLV mg/m^3	EXPOSU INDE
R. TOMBLIN	WEIGHER #4	1st	447	Total Dust	0.588	0.656		
Clock No. 4063	Smelter	7 - 3		Respirable Quartz - wt.	0.057			
Filter #049-3				Respirable Quartz - %	9.7%		0.855	76.7%
H. RICKARDS	WEIGHER	1st	440	Total Dust	0.780	0.886		
Clock No. 4001	#2	7 - 3		Respirable Quartz - wt.	0.088			
Filter #049-1	Smelter			Respirable Quartz - %	11.4%		0.746	118.0%
D. PROPST	WEIGHER	2nd	443	Total Dust	0.614	0.693		
Clock No. 4015	#2	3 - 11		Respirable Quartz - wt.	0.071			
Filter No. 128-20	Smelter			Respirable Quartz - %	11.6%		0.735	94.2%
W. BURBA	WEIGHER	2nd	444	Total Dust	0.49	0.55		
Clock No. 4003	#4	3 - 11		Respirable Quartz - wt.	0.014			
Filter No. 43216194	Smelter			Respirable Quartz - %	3.0%		2.0	27.5%

OH000179

JOHN WADE

AUGUST 7, 1979

MR. BURNETT D. BRUCE
CHI-VIT CORPORATION
OAK BROOK

PLANT: URBANA, OHIO

TYPE OF SAMPLE: RESPIRABLE AIRBORNE DUST

FILTERS: 37mm x 5 micron pore @ 1.7 LPM

ANALYTICAL METHOD: X-RAY DIFFRACTION

TLV = $\frac{10}{SiO_2\% + 2}$ RESPIRABLE QUARTZ

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME(M)	CONTAMINANT	Weight in mg	TWA mg/m³	TLV mg/m³	EXPOSUI INDE
BILL BURBA Clock No. 4003	Weigher #3 Smelter	2nd 3-11	430	Total Dust	0.6	0.821		
				Respirable Quartz - wt.	0.07			
Filter #43434472				Respirable Quartz - %	11.7%		0.729	113.0%
KEITH CAMPBAL Clock No. 4009	Operator #3 Smelter	2nd 3-11	423	Total Dust	0.4	0.556		
				Respirable Quartz - wt.	0.0			
Filter #43434477				Respirable Quartz - %	N. D.		5.00	11.1%
MICKEY GARDNER Clock No. 4018	Specialty Weigher	JUNE 14 1st. 7-3:30	422	Total Dust	0.6	0.836		
				Respirable Quartz - wt.	0.0			
Filter #43434798				Respirable Quartz - %	N. D.		5.00	16.7%
HAROLD RICKARDS Clock No. 4001	Weigher #2 Smelter	1st 7-3:00	435	Total Dust	1.7	2.29		
				Respirable Quartz - wt.	0.114			
Filter #43434799				Respirable Quartz - %	6.7%		1.15	199.0%

OH000181

TYPE OF SAMPLE: RESPIRABLE AIRBORNE DUST

PLANT: URBANA, OHIO

FILTERS: 37mm x 5 micron pore @ 1.7 LPM

ANALYTICAL METHOD: X-RAY DIFFRACTION

TLV = $\frac{10}{SiO_2\% + 2}$ RESPIRABLE QUARTZ

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME (M)	CONTAMINANT	Weight in mg	TWA mg/m^3	TLV mg/m^3	EXPOSURE INDEX
RICK KEELER Clock No. 4011	Operator #2 Smelter	3rd 11-7	427	Total Dust	0.3	0.413		
				Respirable Quartz - wt.	0.0			
Filter #43432995				Respirable Quartz - %	N. D.		5	8.2%
PAUL SKAGGS Clock No. 4045	Weigher #2 Smelter	3rd 11-7	430	Total Dust	1.1	1.50		
				Respirable Quartz - wt.	0.067			
Filter #43434801				Respirable Quartz - %	6.1%		1.23	122.0%

OH000182

EAGLE PICHER

INTRA-COMPANY CORRESPONDENCE

OFFICE CINCINNATI, OHIO

DATE JULY 5, 1979

MR. JAMES F. RINKER,
GENERAL MANAGER,
CHI-VIT CORPORATION,
URBANA, OHIO.

Dear Jim:

The attached is the tabulation of the air-monitoring that we did last June 15.

All exposure indices appear to be in line, with the exception of arsenic - all past tests have shown compliance.

It is my opinion that the tube used during analysis was not the proper wave length. Since we have not been cited for Arsenic, we don't have to concern ourselves with this discrepancy at this time.

Sincerely,

John

JOHN B. WADE

jbw/amw
enc.

cc - Mr. B. Bruce
Mr. D. Cameron

Form 1590

DIVISION: CHI-VIT CORPORATION DATE: June 15, 1979 PRODUCT: FRIT

PLANT: URBANA, OHIO TYPE OF SAMPLE: AIRBORNE DUST

ANALYTICAL METHOD: ATOMIC ABSORPTION

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME(M)	CONTAMINANT	Weight in mg	TWA mg/m^3	TLV mg/m^3	EXPOSU INDI
AREA #4 WEIGH STATION TABLE	----	1st	250	Nickel	<0.001	.002	1.0	0.2
				Manganese	<0.001	.002	5.0	0.04
				Cadmium	<0.001	.002	0.2	1.0
				Cobalt	<0.001	.002	0.1	2.0
				Boron	<0.02	.047	15.0	0.3
				Arsenic	<0.01	0.023	0.005	460.0
				"	<0.01	0.023	0.010	230.0
AREA #1 WEIGH STATION TABLE	---	1st	250	Nickel	<0.001	.002	1.0	0.2
				Manganese	0.006	.014	5.0	0.28
				Cadmium	<0.001	.002	0.2	1.0
				Cobalt	<0.001	.002	0.1	2.0
				Boron	<0.02	.047	15.0	0.3
				Arsenic	0.01	.023	0.005	460.0
				"	0.01	.023	0.01	230.0

OH000184

PLANT: URBANA, OHIO

TYPE OF SAMPLE: AIRBORNE DUST

FILTERS: 37mm x 5 Micron @ 2 LPM

ANALYTICAL METHOD: X-RAY DIFFRACTION

$TLV = \frac{10}{SiO_2\% + 2}$ Respirable Quartz

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME (M)	CONTAMINANT	Weight in mg	TWA mg/m³	TLV mg/m³	EXPOSURE INDEX
PAT EPPING Clock No. 4047	OPERATOR #3 SMELTER	2nd 3-11	427	Total Dust	0.251	0.300		
				Respirable Quartz	0.027			
Filter #028-21				Respirable Quartz	10.8%		0.781	38.4%
PAUL SKAGGS Clock No. 4045	WEIGHER #3 SMELTER	2nd 3-11	430	Total Dust	1.552	1.80		
				Respirable Quartz	0.558			
Filter #028-27				Respirable Quartz	36.0%		.263	684.0%
RICHARD BURNHAM Clock No. 4035	OPERATOR #4 SMELTER	3rd 11-7	430	Total Dust	0.293	0.300		
				Respirable Quartz	0.015			
Filter #028-17				Respirable Quartz	5.1%		1.40	21.0%
MATT MILLER Clock No. 4013	WEIGHER #4 SMELTER	3rd 11-7	432	Total Dust	1.963	2.30		
				Respirable Quartz	0.47			
Filter #028-19				Respirable Quartz	24.0%		0.384	599.0%

OH000185

DIVISION: CHI-VIT CORPORATION DATE: NOV. 9, 1978 PRODUCT:

PLANT: URBANA, OHIO TYPE OF SAMPLE: AIRBORNE DUST

FILTERS: 37mm x 5 micron @ 2 LPM ANALYTICAL METHOD: X-RAY DIFFRACTION TLV = $\frac{10}{SiO_2\% + 2}$ Respirable Quartz

NAME and CLOCK NO.	JOB CLASSIF.	SHIFT	SAMP. TIME(M)	CONTAMINANT	Weight in mg	TWA mg/m³	TLV mg/m³	EXPOS INI
MICKEY GARDNER Clock No. 4018	SPECIALTY WEIGHER	1st 7-3:30	403	Total Dust	0.635	0.80		
				Respirable Quartz	0.027			
Filter #028-24				Respirable Quartz	4.3%		1.58	50.0
RON BROWN Clock No. 4002	MATERIALS HANDLER	1st 7:30-4:00	365	Total Dust	0.290	0.40		
				Respirable Quartz	0.022			
Filter #098-6				Respirable Quartz	7.6%		1.04	38.0
DON VANHOOSE Clack No. 4019	WEIGHER #4 SMELTER	2nd 3-11	430	Total Dust	0.731	0.90		
				Respirable Quartz	0.17			
Filter #028-8				Respirable Quartz	23.3%		0.395	228.0
PAUL SKAGGS Clock No. 4045	WEIGHER #3 SMELTER	2nd 3-11	435	Total Dust	1.354	1.6		
				Respirable Quartz	0.598			
Filter #028-18				Respirable Quartz	44.2%		0.216	741.0

OH000186

APPENDIX H

QSOURCE CHECKLIST

SITE ASSESSMENT CHECKLIST

(Check, initial, date each item)

I. ALL PROPERTY - HISTORY

Y 1. Ownership to 1940 (verbal)
N 2. Ownership documents checked
Y 3. Historic site plans AERIAL PHOTOS
Y 4. Aerial photographs
Y 5. Personal interviews

II. ALL PROPERTY - LAND

Y 1. Site plan (current
Y 2. Grading & surface water flow
Y 3. Stream on/near property (NONE)
Y 4. Location of storm sewers (NONE)
Y 5. Holding ponds
Y 6. Wells in area?
Y 7. Soil Staining (COMPRESSED DISCHARGE)
Y 8. Odors (NONE)
Y 9. Dead vegetation (COMPRESSED DISCHARGE
Y 10. Walk perimeter/note neighbors
Y 11. Evidence of dumping
Y 12. Metal detector scan
13. Underground tanks
Y 14. Aboveground tanks
Y 15. Preliminary samples taken

III. ALL PROPERTY - BUILDINGS

Y 1. Construction type
Y 2. Recent remodeling (1983)
Y 3. Building insulation
Y 4. Heating system (type)
Y 5. Heating system (insulation)
N 6. Ventilation rates (if known)
NA 7. Tenant complaints (sick building)
Y 8. Previous internal testing
Y 9. Transformers on-site
Y 10. Samples taken (INSULATION)
Y 11. Inside sanitary or storm drains
Y 12. Waste management
N 13. Building department code violations
N 14. Fire department code violdations
Y 15. Superfund site (NONE)

IV. INDUSTRIAL/COMMERCIAL PROCESSES

Y 1. List of chemicals used
Y 2. Inspect materials receiving area
Y 3. Inspect materials storage area
Y 4. Inspect waste storage area
Y 5. Description of process
Y 6. Air pollution discharge (list)
Y 7. Discharge to POTW
Y 8. NPDES discharge (COMPRESSED DISCHARGE)
Y 9. Hazardous waste generator
Y 10. Hazardous waste storage (NONE ACCUM.)

V. INDUSTRIAL/COMMERCIAL - REGULATORY

N 1. USEPA records
Y 2. State pollution control authority (SWDE)
Y 3. Local pollution control authority (SWDC)
Y 4. Local health department
Y 5. Local sewer/water offices

QSOURCE ENGINEERING, INC.

REPORT OF
ENVIRONMENTAL SITE ASSESSMENT - PHASE I
CHICAGO VITREOUS CORPORATION
URBANA, OHIO

FOR

EAGLE-PICHER INDUSTRY, INC.

CINCINNATI, OHIO

1989

INVESTIGATION BY

THE H. C. NUTTING COMPANY

GEO—ENVIRONMENTAL GROUP

THE H. C. NUTTING COMPANY

GEOTECHNICAL, GEO-ENVIRONMENTAL AND TESTING ENGINEERS
SINCE 1921

CORPORATE CENTER
4120 AIRPORT ROAD
CINCINNATI, OHIO 45226
(513) 321-5816

May 31, 1989

Work Order No. 12485.001

Mr. James A. Ralston, Esq.,
Vice President and General Council
Eagle-Picher Industry, Inc.
P.O. Box 779
Cincinnati, Ohio 45201

Re: Report of
Environmental Site Assessment -
Phase I
Chicago Vitreous Corporation,
Urbana, Ohio Site

Dear Mr. Ralston:

The H. C. Nutting Company is pleased to submit our report on the initial Environmental Site Assessment of the Urbana, Ohio site. This report identifies information on the initial records review and site reconnaissance performed on their respective dates. This draft contains information on the site location, available records review, site reconnaissance and personnel discussions.

The purpose of this investigation is to provide general information on any potential environmental concerns and improper permitting determined present at the site. The H. C. Nutting Company performed an Environmental Site Assessment and site reconnaissance to aide Eagle-Picher Industries, Inc. in adequately preparing a complete site disclosure. All information presented in this report was provided by plant personnel, site reconnaissance and/or documents made available.

In preparing this assessment, The H. C. Nutting Company is relying on reasonably obtainable information from the site visit and information made available as part of the paper review. We cannot warrant the accuracy of the publicly documented information or the opinions and information of plant personnel consultanted during the study. All discovered information has been disclosed and a good faith effort has been made to review all pertinent information. The findings and conclusions of this assessment are based upon

the limited scope of work, existing conditions of the property and documents made available by Chicago Vitrious Corporation personnel.

This report has been prepared by The H. C. Nutting Company for Eagle-Picher Industries, Inc. in accordance with the letter dated November 14, 1988 and a scope of work detailed by Mr. Paul D. Harper on October 19, 1988. The report and findings contain herein shall not be disseminated to or relied upon by any other party nor used by any other party without prior written consent of The H. C. Nutting Company.

We appreciate the opportunity of providing these services to you. If you have any questions or comments concerning the contents of this report, please feel free to contact the writer. Upon completing your review of this report, if you desire additional services, please contact us to discuss the needed scope of work.

Respectfully submitted,

THE H. C. NUTTING COMPANY

Michael D. Weinstein,
Senior Staff Environmental Geologist

Reviewed by:

Barry J. Franz, P.E., P.G.
Manager
Geo-Environmental Group

MDW/BJF/pm

Enclosure

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URBANA, OHIO SITE

PURPOSE

The purpose of this investigation is to conduct an initial environmental audit for the sale of the Chicago Vitreous Corporation, Subsidiary of Eagle-Picher. This audit was performed to determine if the presence of gross environmental concerns and/or serious permitting violations exist at the facility. The audit was conducted in two phases. The first being a review of applicable documents: MSDS, permits, analytical reports, manifests and disposal records which relate to material handled and processes conducted at the plant. The second phase of the investigation was a site reconnaissance conducted to evaluate processes and materials involved with the manufacturing of products. This reconnaissance was performed to observe any visual evidence indicative of environmental incidences associated with these processes.

SITE LOCATION

The Chicago Vitreous Corporation's Urbana facility is located at 720 South Edgewood Avenue in Urbana, Ohio. The site is located approximately one to two miles west of S.R. 68 and approximately 25 miles northeast of Fairborn, Ohio. The site is situated in an area which has historically been used for farming purposes and, in recent times, developed into industrial manufacturing properties.

SITE RECONNAISSANCE

The site reconnaissance was conducted on November 17, 1988 by Messrs. Andrew S. Janiak and Michael D. Weinstein of The H. C. Nutting Company. Upon arrival at the site, representatives of The H. C. Nutting Company met with Mr. Bruce Woods of Chi-Vit, Inc. During this meeting, Mr. Woods briefly discussed details of plant operations. According to Mr. Woods, powdered raw materials are blended and then placed and smelted in large furnaces. The resultant liquid is extracted, pressed between rollers and then water cooled. These vitrified materials are then crushed and bagged as the final product identified as frit.

Additional processing occurs at the raw material stage and at the finished product stage. Raw materials are blended in 2500 pound lots and carried by conveyor belts into the smelting ovens. The blended raw products become molten and are extruded through a series of water cooled rollers. As the product leaves the smelters, it is cooled by streams of quenching water. The quenching water is then recycled and the vitrified product broken and crushed by conveyors and rollers. Metal fragments which may be present are removed prior to bagging by a magnetic separator. The final product (frit) is again lifted by a bag lifter, dispensed into 100 pound bags and prepared for shipping.

Mr. Woods indicated that considerable amounts of water are associated with the manufacturing operation. Potable city water is pumped through the bricks into the smelters and onto the rollers where the glass is extrud-

ed. This processing water is then recirculated through the venturi scrubber and put into a lime water bath where the metal oxides and particulates are allowed to precipitate. This water is put into a lamella system where the calcium carbonate, flourspars and metal oxide particulates settle out. This water is then recirculated back through the scrubber. Eight (8) to ten (10) gallons of processed water, per minute, are estimated lost due to evaporation.

Upon entering the manufacturing facility, the first observation concerned levels of dust present in the atmosphere surrounding the work environment. Layers of dust were observed on many horizontal surfaces with a considerable amount of particulates suspended in the air.

An inventory of raw materials used in the glass manufacturing process are warehoused in the facility. A list of these materials are included as Appendix A. Typically, the raw materials used fall into the categories of metal oxides, silica, flourspars, Borax and small amounts of polymers. These materials are generally contained in 100 pound paper bags stacked on pallets or in thirty (30) or 55 gallon drums. Many of the bags observed were broken with some contents scattered on the floor. It is possible that the materials from these broken bags are contributing to the airborne particulates observed inside the facility.

The facility also houses a quality control (QC) operation. Typically, QC operations involve the finished products particularly regarding the properties of adhesion to substratum, flow characteristics, color and

other specifications required by the individual customers.

An additional operation observed at the facility involves several large ball mills, which reduce the finished product to a -200 mesh material. This process is also used to grind and blend the product and polymers together. During this procedure, hydrogen is produced as a by-product. Mr. Woods indicated that previous accidents associated with spontaneous combustion of the hydrogen have taken place and extreme caution is now used when opening the ball mill doors.

Once the interior of the plant had been examined, HCN personnel proceeded to examine the grounds surrounding the facility. The first facility observed was a surface impoundment, approximately 0.5 acres in size. According to Mr. Woods, this body of water was initially used as discharge and cooling water, used to cool the bricks and rollers of the smelters in place of the cooling tower. Also an 8-inch O.D. monitoring well was observed at the west end of the surface impoundment. The date of construction of the surface impoundment, whether it is lined or unlined, nor the depth was retained by HCN personnel. Furthermore, the depth of the monitoring well located at the west end of the surface impoundment is not known. This information will be ascertained during Phase II if deemed necessary.

To the north of the surface impoundment is a cooling tower which is now used in placed of the impoundment. However, according to Mr. Woods, the piping is still in place which may allow overflowing water to be discharged into the impoundment. Due to the time of year

(fall season) HCN personnel were unable to determine if vegetative stress has occurred around the impoundment. The date of installment regarding the cooling tower was not ascertained during this reconnaissance investigation but may be obtained during Phase II if deemed necessary.

Paralleling the impoundment, a railroad spur runs westward towards the back of the main plant. A gravity car containing Borax was presently unloading at the the time of the site reconnaissance. Evidence of vegetative stress was observed in this area and as reported by Mr. Woods, a release of powdered Borax occurred approximately one year earlier. This release involved an estimated 1000 pounds of Borax. Most of this material was recovered but intervening rain showers dissolved a certain amount of this Borax and has assumed to have penetrated the subsurface. An area approximately 25'x60' of stress vegetation was observed. Large quantities of Borax, being basic and having a pH of 9.5 could cause vegetation to become stressed.

Approximately 30 feet southwest of the railroad spur a small concrete and brick incinerator was noted. According to Mr. Woods, this incinerator was used to burn paperbags which once contained raw materials used in their operations. Mr. Woods also reported that the ash from this operation was landfilled on-site. Additional discussions with Mr. Woods indicates that usable products along with drums of recycled frit and some unused raw materials and miscellaneous trash were placed in the landfill.

To the best of his knowledge (Mr. Woods), this process consisted of digging a pit and Chi-Vit employees placing the incinerated ash, empty metal oxide drums, unusable recycled frit and any other miscellaneous trash into the pit. As described to HCN personnel, the location of this landfill operation took place in the southwest portion of the site near the municipal water tower. This area is approximately 50'x 100' in size and operated from 1965 to 1971.

Information relayed by maintenance workers at the facility indicates that unknown quantities and types of spent solvents used on-site were dumped onto the ground. This process consisted of using several ounces to one or two quarts of solvent to clean and degrease various manufacturing parts. Once they finished using the solvent, they simply poured the mixture onto the ground and/or the asphalt surface of the parking lot. There is no information to date indicating that solvents were disposed of in the landfill area. Finally, due to recent tillage of the landfill area and the time of year in which the investigation was conducted, there was no visual evidence indicating vegetative stress.

The next observation was from the area behind the building. This area (uncontained) is devoted to storing unused and spent raw materials, numerous wooden pallets, pieces of machinery, a drum of spent solvent, stockpiled refractory bricks and a large dumpster which contain sediment from the lamella system. All materials present behind the facility were stored on pallets and/or asphalt. The only potential concern noted in this area was the large stack of pallets resting against or immediately adjacent to the building which may potentially create a fire hazard.

In addition to landfilling the fly ash and other miscellaneous compounds, a second landfill operation, located 75 yards north of the water tower has been and is still taking place at the site. This landfilling operation consist of burying the used refractory bricks. The origin, magnitude and extent of waste buried is not known. This landfilling operation does not appear to pose a substantial threat to the site environment since residual metals in the bricks would be contained within the vitrified matrix. The last observation was made in the area next to the brick landfill. An 8-inch O.D. production well which fed the plant at one time was examined.

The final observations made during the site reconnaissance was an area of highly stressed vegetation which resulted from an unknown quantity of lime water released approximately two weeks prior to this investigation. Two other areas consisting of a small concrete settling tank outside the Research and Development facility where metal oxides, sludges and other compounds accumulate and are removed on a periodic basis and a small transformer station where three, pad-mounted transformers were housed. These transformers appear to be in good condition at the time of the site reconnaissance. The transformers were contained in a fenced in area. If a leak was to occur, although contained, the contents would be absorbed onto the ground surface if such contents escaped from the pad. An observation made within the Research and Development building revealed a concrete floor drain which collected used materials from inside and transported them to the external settling tank. Final observation within

the Research and Development facility was of three periodically operated rotary kilns which emit their exhaust directly to the atmosphere without emission treatment.

RECORD REVIEW

The initial record review conducted at the Urbana facility was performed by Mr. Walter W. Becker of The H. C. Nutting Company. This review was conducted on November 17, 1988. Information made available for this review was provided by Mr. Bruce W. Larson, Manager of Environmental Affairs for the Chi-Vit Corporation.

General Wastes

Sludge resulting from the scrubbers which clean air emissions emanating from the smelters is generated as a by-product of Chi-Vit's manufacturing of frit. Wooden skids, paperbags, office trash along with other nonreusable materials result as solid waste. These materials are hauled to the Logan Waste Control, Logan County Landfill for disposal by Buckeye Waste Control. Permits to haul and dispose of the sludge and other aforementioned wastes is presented in Appendix B.

A 1979 analysis of the scrubber sludge revealed this sludge to be noncorrosive, nonignitable, nonreactive and nontoxic. Analysis of extract obtained from an EP Toxicity test revealed the following concentrations:

ANALYSIS OF EXTRACT

Arsenic	<0.05 mg/liter
Barium	0.1 mg/liter
Cadmium	0.05 mg/liter
Chromium	0.01 mg/liter
Lead	<0.01 mg/liter
Mercury	0.0025 mg/liter
Selenium	<0.5 mg/liter
Silver	0.01 mg/liter

Furthermore, an emissions spectrographic analysis was performed and indicated the following:

AN ANALYSIS OF THE SCRUBBER SLUDGE

Calcium	Major Component (50%+)
Aluminum	0.05%
Nickel	0.007%
Iron	0.07%
Silicon	3.00%
Magnesium	6.00%
Maganese	0.01%
Boron	0.1%
Copper	0.001%
Sodium	0.5%
Chromium	0.002%
Barium	0.03%

Mr. A. L. Fluesmeier, Chief Chemist for Miami Research Laboratory at the time of analysis, states the laboratory was unable to analyze the material for organic contaminates. Based on information obtained during the initial site reconnaissance, it does—not appear as though a potential for high levels of hazardous organic contaminates are probable.

Air Emissions

Air emissions which emanate from the Urbana Chicago Vitreous Corporation facility are produced by three large manufacturing smelters and the rotary kilns found in the Research and Development Center. The rotary kilns in the Research and Development Center do not appear to be permitted in accordance with documents presented to us during the file search and review. However, at this time, The H. C. Nutting Company has not determined whether actual permitting for this discharge is necessary since pollutant exhaust generating from the stacks appear to be minimal. Appendix D is information on the three manufacturing smelters which are permitted by Ohio Environmental Protection Agency (EPA) and are fired by natural gas.

Other permitted sources identified at the Urbana facility are: specialty chemical weigh station, dry milling-screening and baggage equipment, conveyors and baggers, mixers and feeders and raw batching equipment (seven weigh and batch stations).

Chi-Vit records show eleven shutdowns of the stack emissions control system so far this year. The shutdowns ranged from 10 minutes to 3.5 hours in length. In accordance with information presented to us, they are permitted by the Ohio EPA for emergency shutdowns of up to 4 hours maximum.

According to Michael Zimmerman, Ohio EPA Wastewater Division, a discharge permit (NPDES) was rendered to Chi-Vit, Urbana Plant prior to 1976. This permit was revoked due to elimination of the discharge and installation of the cooling tower.

Wastewater

In accordance with discussions held with Messrs. Bruce Woods and Bruce Larson, the actual Urbana Manufacturing facility is a completely self contained system and does not discharge any wastewater. However, some small amounts of sanitary wastewater are discharged to the sanitary sewer system owned and operated by the City of Urbana and has been approved by the director of the Urbana Wastewater Treatment Facility. Sanitary wastewaters from the manufacturing facility and the Research and Administration building are discharged into the City of Urbana's sewer system. This wastewater is monitored by Chi-Vit on a quarterly basis with the results of the analysis furnished to the City for incorporation into their permit program. Summarized below is a breakdown of the quarterly analysis:

WASTEWATER QUARTERLY BREAKDOWN

CHEMICAL PARAMETER	LOW	HIGH	AVERAGE
Arsenic	0.008 mg/liter	0.173 mg/liter	0.162 mg/liter
Cadmium	0.004 mg/liter	0.185 mg/liter	0.049 mg/liter
Chromium	0.015 mg/liter	0.058 mg/liter	0.039 mg/liter
Copper	0.056 mg/liter	4.48 mg/liter	0.624 mg/liter
Nickel	0.073 mg/liter	6.37 mg/liter	2.017 mg/liter
Zinc	0.170 mg/liter	3.39 mg/liter	1.49 mg/liter
Selenium	<0.003 mg/liter	0.021 mg/liter	0.006 mg/liter

CHEMICAL PARAMETER	LOW	HIGH	AVERAGE
Tin	0.028 mg/liter	1.73 mg/liter	0.530 mg/liter
pH	7.75	8.35	8.10

Because of the limited discharged to the City of Urbana, Ohio's sewage system, a discharge permit is not required. The analysis on the samples obtained by Chi-Vit are performed by Howard Laboratories of Dayton, Ohio.

Materials Safety Data Sheets

In accordance with our review of the material safety data sheets, Mr. Larson maintains an MSDS for each chemical compound purchased by Chi-Vit. An alphabetical listing of each purchased chemical is located in Appendix E. The list was prepared by Mr. Larson and was last updated in May of 1986.

From discussions with plant personnel, it is known that Stoddard solvent is now used at the facility and there may potentially be other compounds used on-site which do not appear in Appendix E.

Violations

In accordance to our review, records made available and as discussed with Mr. Larson, Urbana Chi-Vit facility has never received a citation for air or wastewater discharge violation. Information obtained during the site reconnaissance indicates there are wells present on-site, for which no permits to install (PTI's) were found. Additionally, our record review revealed no permits, EPA letters of approval or records which may refer-

ence to the on-site waste dumps. Finally, there were no past or present permits for the use of incinerators on-site.

PHOTOGRAPHS

The following discussion relates to the photographs found in Appendix G. These photographs were taken during the site reconnaissance performed on November 17, 1988 and are a pictorial representation of the facility, its grounds and potential environmental concerns.

Photograph Nos. 1 through 3 are of the Urbana exhaust stack and scrubbing operation. Photograph No. 4 is the back portion of the Chi-Vit facility and part of its grounds. Photograph No. 5 is of an underground concrete vault, which was once used as part of the lamella system.

Photograph No. 6 was taken from behind the facility and represents the types of materials disposed and the refractory brick landfill previously discussed. Photograph No. is of the production well. Photograph No. 8 is of the monitoring well utilized for the former holding impoundment. Photograph No. 9 is the holding impoundment. Photograph Nos. 10 and 11 are of the spent refractory brick landfill observed during the site reconnaissance. Photograph Nos. 12 and 13 are of areas of stressed vegetation. No. 12 being a recent lime water spill and No. 13 being the area of the Borax spill.

Photograph Nos. 14 through 22 are of the raw materials storage area, types of materials and the manner in which they are stored.

Photograph Nos. 23 through 29 are of the actual smelting operation and smelters. Photograph No. 30 is of a smelter sludge dryer. Photograph No. 31 is of the ball mills. Photograph No. 32 is a poly-mixer machine, photograph No. 33 is a frit spray booth.

Photograph Nos. 34 and 35 are of new and used air filters and the final photograph No. 36 shows the type of piping installations within the facility.

CONCLUSIONS AND RECOMMENDATIONS

All documents, visual evidence and discussions held at and about the Urbana Chicago Vitreous facility indicate the potential for some environmental concerns and minor permit violations. It is the opinion of The H. C. Nutting Company that the potential exists for minimal environmental concern based on the study conducted, limited scope of work performed and information provided by Messrs. Bruce Woods and Bruce Larson of the Urbana Chicago Vitreous Corporation facility.

- There are several unanswered questions regarding disposal practices of unknown quantities and types of maintenance cleaning solvents along with exact types and known quantities of materials into the fly ash landfill located on the southwestern portion of the property. HCN personnel did not observe the use and/or storage of any chlorinated solvents at the facility, but the potential does

exist regarding the improper disposal of such solvents. Also, it has been noted that spent refractory brick from the smelters are landfilled on-site. The potential for toxic or hazardous leachate to occur appears to be minimal.

- All surface impoundments located on-site should be accurately characterized by waste characterization sampling to discern whether or not hazardous constituents, if present, are being contained. Furthermore, it should be discerned whether or not the impoundments are lined. If the impoundments are not lined, subsurface integrity could be jeopardized.

- The scrubber sludge disposal area (pond) should be properly closed if no future use is envisioned. The nonhazardous nature of the sludge analysis indicates a low potential for leaching from this source.

- Numerous permits (PTO/PTI) and discharge permits should be reevaluated and readily adhered to by the Chi-Vit Corporation in order to eliminate the potential of gross environmental concerns arising in the future.

It is the recommendation of The H. C. Nutting Company that terrain conductivity and potentially subsurface/ground penetrating radar be conducted to completely define limits and accurately locate landfilled areas. Furthermore, it is recommended that test pits along with soil sampling be conducted in the located landfilled areas. Soil samples should be analyzed by

the Toxicity Characteristic Leachate Procedure (TCLP) and/or EPA Hazardous Wastes Characteristics to determine the potential of hazardous leachates potentially being generated in the landfilled areas. In accordance with the analytical results, the potential for a full scale hydrogeologic investigation may be advisable.

Prior to finalizing this report, The H. C. Nutting Company did make every attempt to obtain copies of the personal health monitoring information from the Urbana Chicago Vitreous Corporation.

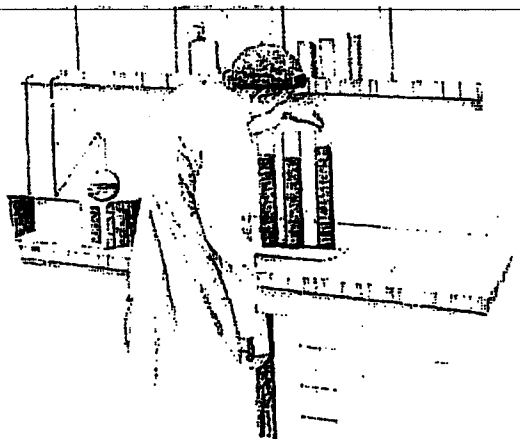
Urbana site investigation performed by:

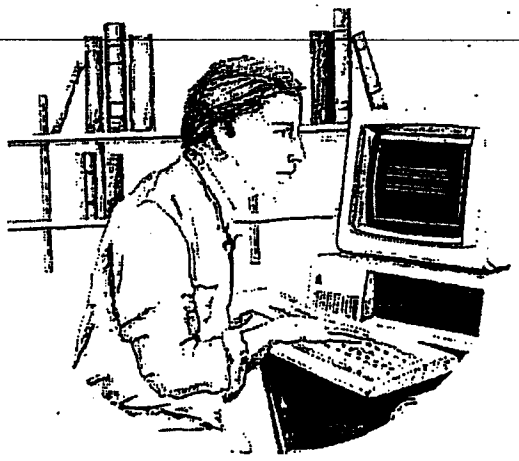
Walter W. Becker,
Senior Engineer

Andrew S. Janiak,
Environmental Geologist

Michael D. Weinstein,
Environmental Geologist

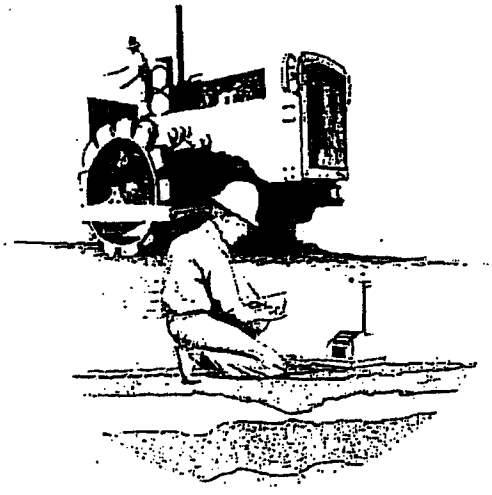
FIGURES AND TABLES

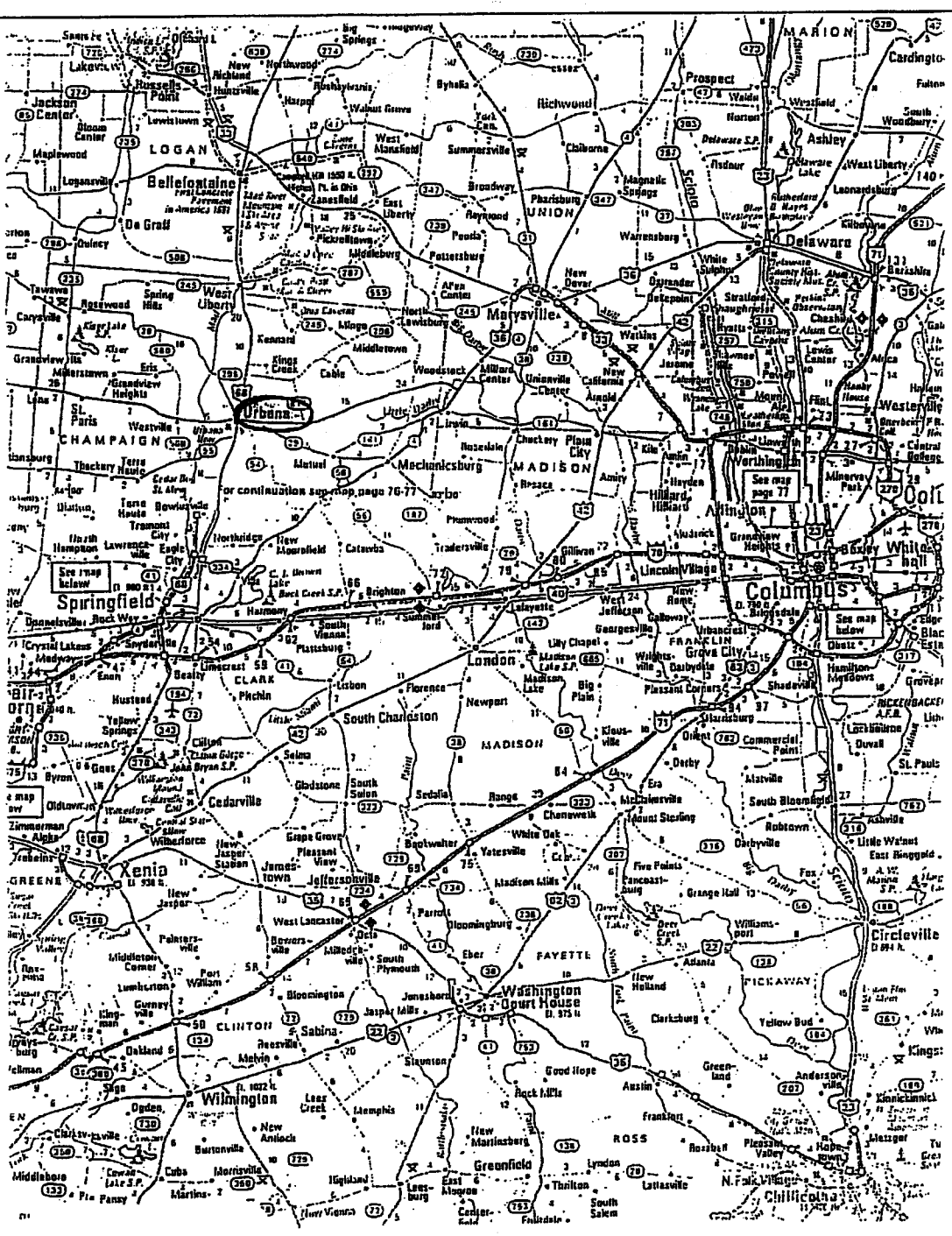




Contents

FIGURE 1 - SITE LOCATION





NOTE: Base Map copied from 7.5 minute topographic map Urbana, Ohio East and West Quadrangle.

SCALE: 1" = 2000'

12485.001	THE H.C. NUTTING CO. GEO—ENVIRONMENTAL GROUP	SITE LOCATION	FIG.1

APPENDIX

Appendix A - Raw Materials List

Appendix B - Permit for Disposal of General Waste and Scrubber Sludge

Appendix C - Letter from Miami Research Laboratory

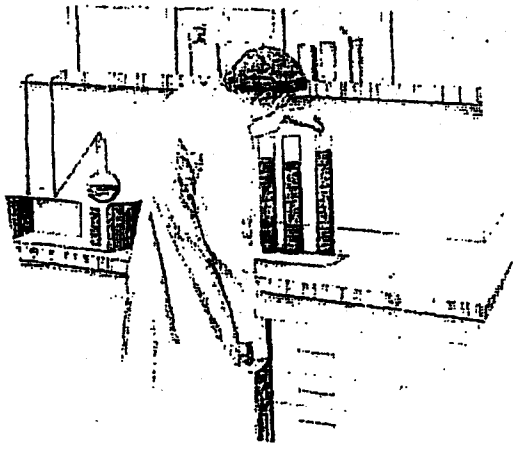
Appendix D - Smelter Information

Appendix E - Alphabetical List of Chemicals

Appendix F - PTI/PTO Permits

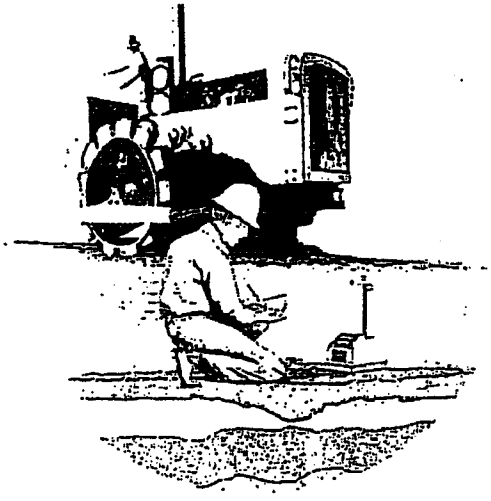
Appendix G - Photographs

APPENDIX A



Contents

Raw Materials List



SMELTING OXIDE MIXES

PUTER NO. / SMELTER NO.	IDENTIFICATION	RAW MATERIAL	% COMP.	RATIO
30245 / 450	P-45	77 GOLD METAL 1 SILICA	0.1499 99.8501	1 666
30376 / 376	SILVER MIX	76 SILVER OXIDE 1 SILICA	5.00 95.00	1 19
30350 / 350	SOD. TUNG. MIX	50 SOD. TUNGSTATE 1 SILICA	12.50 87.50	1 7
30201 / 201	20-1 MIX	20 SOD. ANTIMONATE 1 SILICA	6.25 93.75	1 15
36031 / 6031	603-1 TUNG. MIX	603 TUNGTIC OXIDE 1 SILICA	5.333 94.667	1 17.75
30346 / 346	46-1 MIX	46 ARSENIC OXIDE 1 SILICA	6.25 93.75	1 15
30381 / 381	SiC-6 MIX	SILICON CARBIDE 6 FLOURSPAR	20.00 80.00	1 4
30387 / 387	20087 BROWN			
30920 / 920	20092 BLUE MIX	20092 BLUE #1 SILICA	10.00 90.00	1 9
30643 / 643	643 MANGANESE "B"	30043 MANGANESE #1 SILICA	25.00 75.00	1 3
30482 / 482	20082 BROWN MIX	20082 BROWN #1 SILICA	10.00 90.00	1 9

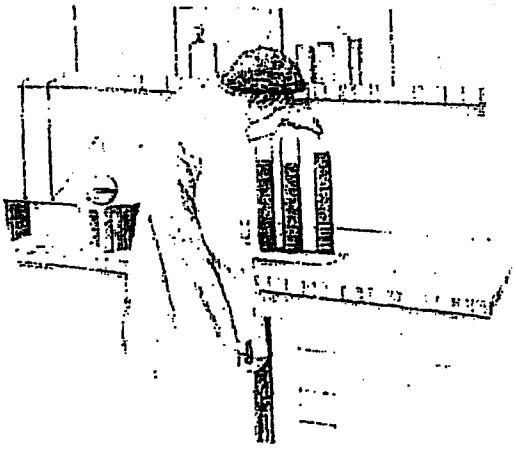
PROD. $\frac{5.3337}{94.667} = \frac{16\#}{284\#}$

050185

SHELTING OXIDE MIXES

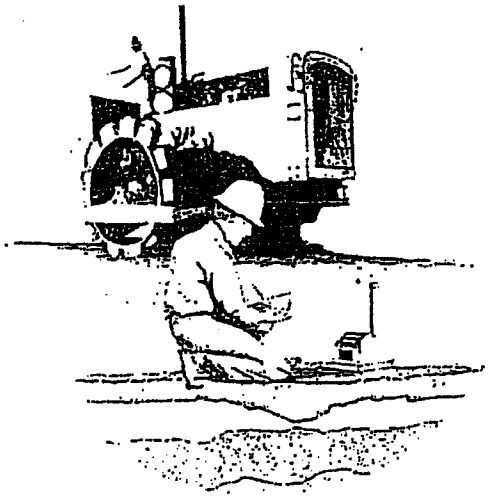
COMPUTER NO. / Smelter No.	IDENTIFICATION	RAW MATERIAL	%COMP.	RATIO	
30310 / 310	ANTIMONY MIX	#10 ANTIMONY OXIDE #1 SILICA	12.50 87.50	1 7	
30301 / 301	ANTIMONY "C"	10 ANTIMONY OXIDE 1 SILICA	6.25 93.75	1 15	
30570 / 570	CHROME MIX	57 20033 CHROME OXIDE 1 SILICA	0.625 99.375	1 159	
30571 / 571	CHROME "A"	57 20033 CHROME OXIDE 1 SILICA	5.00 95.00	1 19	
30420 / 420	COBALT MIX	42 COBALT OXIDE 1 SILICA	6.25 93.75	1 15	
33110 / 3110	COPPER MIX	311 BLK. CUPRIC OXIDE 1 SILICA	25.00 75.00	1 3	
32064 / 2064	CN MIX	64 CN COMPOUND 1 SILICA	0.625 99.375	1 159	
30~~64~~ / 640	64-C	64 CN COMPOUND 1 SILICA	6.25 93.75	1 15	PROD. 6.25%/93.75 = 18.75# / 281.25#
Canada		64 CN COMPOUND 1 SILICA	25.00 75.00	1 3	
30430 / 430	MANGANESE MIX	43 MANGANESE OXIDE 1 SILICA	6.25 93.75	1 15	
32430 / 243	MANGANESE "A"	43 MANGANESE OXIDE 1 SILICA	50.00 50.00	1 1	
35381 / 470	TIN "C"	WHITE STANNIC OXIDE 1 SILICA	6.25 93.75	1 15	
30244 / 441	MOLY MIX	44 MOLYBDENUM OXIDE 1 SILICA	12.50 87.50	1 7	
30344 / [illegible]	MOLY "A"	44 MOLYBDENUM OXIDE 1 SILICA	6.25 [illegible]	1 [illegible]	

APPENDIX B



Contents

Permit for Disposal of General Waste and Scrubber Sludge



Re: Logan County
Rush Creek Township
Application for Modification of the Type of Waste Disposed to Include Dried Scrubber Sludge from the Chi-Vit Corporation
Received January 18, 1980
From Mr. Delaine Gehle

CERTIFIED MAIL

February 27, 1980

Logan County Landfill
R.R. #2
Bellefontaine, Ohio 43311

Dear Sirs:

Enclosed is the Ohio EPA Permit to Install which will allow you to install the described source in the manner indicated in the permit. Because this permit contains several conditions and restrictions, I urge you to read it carefully.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the Director's action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency and the Environmental Law Division of the Office of the Attorney General within three (3) days of filing with the Board. An appeal may be filed with the Environmental board of Review at the following address (temporary):

Environmental Board of Review
240 Parsons Avenue
Suite 123
Columbus, Ohio 43215

If you have any questions, please contact the Ohio EPA District Office or local air pollution control agency to whom you submitted your application.

Yours truly,

Donald E. Day, P.E.
Chief
Office of Land Pollution Control

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL

FEB 27 1980

DED/pam

cc: Chi-Vit Corporation
cc: Southwest District Office

I certify this to be a true and accurate copy of the official document filed in the records of the Ohio Environmental Protection Agency.

By [illegible] Date 02-27-80

OH000216

OHIO ENVIRONMENTAL PROTECTION AGENCY

Permit To Install

Application No. 05-381

Permit Fee: $ None

Applicants Name: Mr. Delaine Gehle
Logan County Landfill

Address: R. R. #2

City: Bellefontaine State: Ohio 43311

Telephone: (513) 593-6806

Description of Proposed Source: Modification of the type of waste disposed to include dried scrubber sludge from the Chi-Vit Corporation

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL

FEB 27 1980

Issuance Date: February 27, 1980

Effective Date: February 27, 1980

The above named entity is hereby granted a permit to install for the above described source pursuant to Chapter 3745-31 of the Ohio Administrative Code (former Ohio EPA Regulation EP-30). Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the above described source of environmental pollutants will operate in compliance with applicable State and Federal laws and regulations, and does not constitute expressed or implied assurance that if constructed or modified in accordance with those plans and specifications, the above described source of pollutants will be granted the necessary operating permits. This permit is granted subject to the following conditions attached hereto:

Ohio Environmental Protection Agency

by James F. McAvoy
Director
361 East Broad Street
Columbus, Ohio 43215

I hereby certify this to be a true and accurate copy of the original document filed in the records of the Ohio Environmental Protection Agency.

Date 2-27-80

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL

FEB 27 1980

Substantial construction for installation must take place within eighteen months of the effective date of this permit. This deadline may be extended by up to twelve months, if application is made to the Director no less than sixty days before the expiration of this permit and the party shows good cause for any such extension.

The Director of the Ohio Environmental Protection Agency, or his authorized representatives, may enter upon the premises of the above named applicant during construction and operation at any reasonable time for the purpose of making inspections, conducting tests, examining records or reports pertaining to the construction, modification or installation of the above described source of environmental pollutants.

The proposed source shall be constructed in strict accordance with the plans and application submitted for this permit to the Director of the Ohio Environmental Protection Agency. There may be no deviation from the approved plans without the express, written approval of the Agency. Any deviations from the approved plans or the above conditions may lead to such sanctions and penalties as provided under Ohio law. Approval of these plans does not constitute an assurance that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed sources are inadequate or cannot meet applicable standards.

A report, which provides a technical appraisal of the normal operating conditions of the new facilities shall be submitted to the appropriate District Office of the Ohio Environmental Protection Agency no later than three months after the new facilities are placed into operation.

The owner shall be responsible for the proper operation and maintenance of the sludge disposal facilities.

Daily records of operation shall be maintained and submitted to the Ohio Environmental Protection Agency at the end of each month.

The owner shall provide for the proper maintenance and operation of the solid waste disposal site or source in accordance with the provisions of Rule 3745-27 of the Ohio Administrative Code.

No liquids, sludges, or toxic or hazardous wastes other than those set forth in the approved specifications and plans shall be accepted for disposal without the written approval of the Agency.

Monitor wells shall be installed by the owner or operator if requested by the Ohio Environmental Protection Agency. Locations, depths, and characteristics of such wells shall be as required by the Ohio Environmental Protection Agency.

I certify this to be a true and accurate copy of the official document filed in the records of the Ohio Environmental Protection Agency.

The solid waste disposal site or facility shall be completed and ready for operation before the acceptance of solid wastes. Notification that this condition has been met, shall be submitted in writing, to the appropriate Ohio Environmental Protection Agency District Office at least thirty (30) days prior to the acceptance of any solid wastes.

This permit shall apply only to the source shown on the plans approved by the Ohio Environmental Protection Agency. Approval is for the disposal of dried sludge generated at Chi-Vit Corporation as described in the Permit to Install application and detail plans.

If leachate is detected on the site, or is draining from the site, in such quantities that the Director or his authorized representative or the Health Commissioner believes, based on a review of geologic, hydrologic, engineering, and other factors, that a substantial threat of water pollution exists, the leachate shall be contained on the site and properly treated or shall be collected and transported from the site for proper treatment and all necessary action shall be taken to minimize, control, or eliminate the conditions which contribute to the production of leachate.

Ohio Environmental Protection Agency
ENTERED DIRECTOR'S JOURNAL

FEB 27 1980

I certify this to be a true and accurate copy of the official document filed in the records of the Ohio Environmental Protection Agency.

By: Amelia Shaw Date 2-27-80

LOGAN WASTE CONTROL

June 27, 1985

Mr. Philip S. Monteith
Chi-Vit Corp.
720 South Edgewood Ave.
Urbana, Ohio 43078

Re: Disposal of Scrubber Sludge:

Dear Mr. Monteith:

As per our meeting on Monday please find enclosed a copy of our Special Waste Policy. As I related to you at our meeting section G of the Special Waste Policy will be waived as this is an existing permitted waste.

I have contacted Buckeye Waste Control and informed them that all sludge delivered from Chi-Vit will be at the rate of $8.00 per cubic yard. I must emphasize to you that all sludge must be segregated from your normal waste stream. If sludge is encountered in your compacted boxes we will have no choice but to charge the sludge disposal rate on the entire compacted box.

If you have any questions or if I can be of further service please do not hesitate to call.

Sincerely,

Max Gehle

Max Gehle
President

Enclosures:

cc: Buckeye Waste Control, Inc.

MG/pf

1130 TWP. RD. 57E
BELLEFONTAINE, OHIO 43311
513-593-3566
513-593-9772
NON—HAZARDOUS SOLID WASTE DISPOSAL

GAN WASTE CONTROL

SPECIAL WASTE POLICY

I. The purpose of this policy is to implement procedures by which the flow of waste to LWC can be controlled so that:

A) LWC is reasonably sure it is not accepting hazardous waste or other wastes prohibited by local, state and federal law.

B) The safety of site personnel is insured.

C) Complete records of the nature of and activity connected with specified waste are maintained.

II. Special waste to which this policy applies are those wastes about which there is sufficient question as to its hazardous vs. non-hazardous classification that acceptance for disposal is preceded by laboratory analysis and written permission from Ohio EPA, or waste that if improperly handled, may be a safety hazard to landfill personnel. Such waste include moisture bearing wastes, asbestos bearing waste, wastes that come in drums, etc.

III. The following procedures will be complied with in the handling of all special wastes except if deviations are approved in writing by the Landfill Manager or General Manager.

A) Written verification by Ohio EPA or Logan County Health District, the laboratory analysis, and non-hazardous certifications from the hauler and generator are required before a waste can be approved by LWC for disposal.

B) Written approval by the Landfill Manager or General Manager is required before waste can be accepted for disposal. At this time a special waste control number will be assigned by the window attendant and a file implemented. The hauler will receive a copy of LWC's approval which will contain the Special Waste Control Number.

we will receive

1130 TWP. RD. 57E
BELLEFONTAINE, OHIO 43311
513-593-3566
513-593-9772
NON—HAZARDOUS SOLID WASTE DISPOSAL

C) Twenty-four hours notification will be given by haulers to LWC before bringing the waste for disposal. The majority of special waste will be accepted Monday thru Friday between the hours of 8:00 A.M. and 11:00 A.M. However, asbestos bearing waste will only be accepted between 8:00 A.M. and 9:00 A.M., Monday thru Friday. Other arrangements can be made on a load-by-load basis with Operations Manager. The Operations Manager will be responsible for informing the window attendant when deviations occur.

D) All special waste loads will be processed by the window attendant before dumping. The driver will identify the special waste by its Special Waste Control Number, or the specific Generator's name and location. The attendant will complete a Special Waste Disposal Acceptance form. The driver will sign the form and a copy will be given to the driver.

E) The driver must give the form to an operator on the working face. The form will then be signed by the Operator and given to the Operations Manager at the end of each shift. If any vehicle with suspicious material is brought to the working face without a Special Waste Disposal Acceptance form the load and driver will be detained until it is determined if the load is an approved waste. The Operations Manager can make that determination and will make a written report of each incident.

F) If a load is determined not to be an approved waste LWC's cost to reload the material for removal will be passed on to the hauler. The amount of the charge will be determined by the Landfill Manager or General Manager, however a minimum charge equaling the fee will always be made.

G) Special waste as described in this policy will be priced by the Landfill Manager or General Manager. In addition to the price per yard, drum or ton (unit ~~price) there~~ will be a one-time service charge of $300.00 per product which will compensate LWC for the cost involved in processing paperwork. Please include payment with your request. No request will be processed without payment.

waived as prior T.P.I. in place.

OH000222

SERVICE AGREEMENT
NON HAZARDOUS WASTES

1146 Delaware Avenue
Marysville, Ohio 43040
614/889-9622

BUCKEYE WASTE CONTROL

Effective Service Date 11-1-84
Equipment Delivery Date
Customer P.O. No.

ACCOUNT NAME CHI-VIT CORP.
BILLING NAME SAME
SERVICE ADDRESS 720 So. Edgewood Ave. Urbana, OH.
BILLING ADDRESS SAME
CONTACT PHILIP G. MONTEITH
CONTACT RON McALLISTER
TELEPHONE 513-652-1341
TELEPHONE

EQUIPMENT/SERVICE SPECIFICATIONS

QTY.	CUBIC YARD CAPACITY	CONTAINER TYPE: FRONT	BEAR	OPEN	CLOSED	COMPACTOR TYPE	OPTIONAL ACCESSORIES: LOCK	CASTERS	SERVICE SCHEDULE: ON CALL	SU	M	TU	W	T	F	S
1	47				X	X			X							
1	20			X					X							

☐ NEW ACCOUNT
☐ CHANGE OF SERVICE
☐ CANCEL
☐ TEMPORARY
☐ EXCHANGE
☐ OTHER

SPECIAL INSTRUCTIONS

LOGAN WASTE CONTROL - BELLEFONTAINE IS LANDFILL UTILIZED

☐ CUSTOMER OWNED ☐ BWC OWNED ☐ OTHER

SCHEDULE OF CHARGES

Service Charge per Month	$
Extra Pick-up Charges Per Lift	$
Per Yard	$
Hauling per Load	$ 90.00 PER LOAD PLUS
Disposal per Load	$ ~~DISPOSAL~~
Total per Load	$
Delivery Charge	$
Equipment Rental Reciever Container	$
Compactor	$
Open Top	$ 80.00
Other	$
	$

THE TERMS AND CONDITIONS ON THE REVERSE SIDE ARE PART OF THIS AGREEMENT

CUSTOMER

X Philip G. Monteith
(AUTHORIZED SIGNATURE)

DATE Oct 29, 1984 TITLE Vice Pres - Mfg

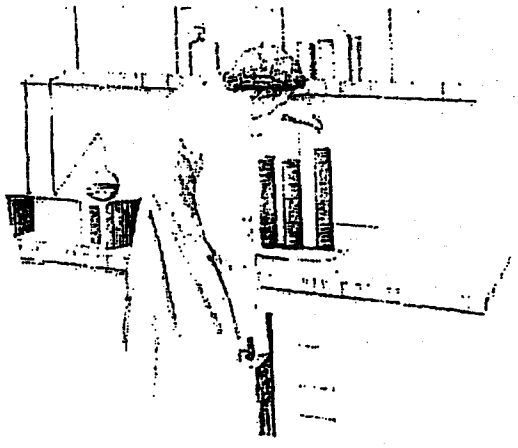
BUCKEYE WASTE CONTROL

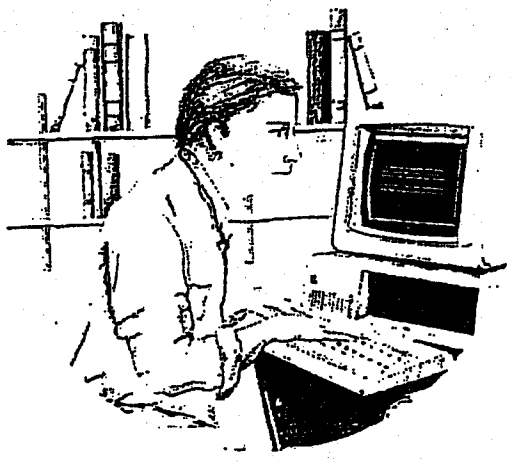
Brian D. Riley
(AUTHORIZED SIGNATURE)

DATE 10/29/84 TITLE SALES + MKTG. MGR.

WHITE - OFFICE CANARY - CUSTOMER PINK - SALES GOLD - OPERATIONS

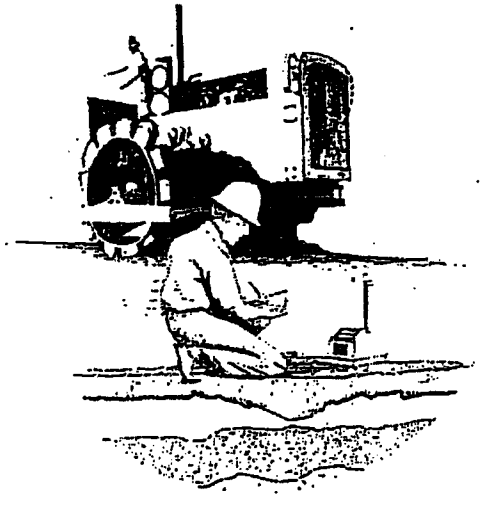
APPENDIX C





Contents

Letter from Miami Research Laboratory



6-86-3

Eagle-Picher Industries, Inc.

SPECIALTY MATERIALS DIVISION

MIAMI RESEARCH LABORATORY

P. O. Box 1090 Miami, Oklahoma 74354 918-542-1801

May 11, 1979

Mr. David S. Cameron
Director of Environmental Affairs & Safety
Chi-Vit Corporation
720 South Edgewood Avenue
Urbana, Ohio 43078

Dear Mr. Cameron:

The material received from you May 3, 1979 labeled 1212 Scrubber Sludge has been analyzed by this laboratory to demonstrate possible non-inclusion in Subtitle C.

An X-Ray Diffraction analysis using a Rigaku 3064 Dataflex was made which indicated that this material was essentially all Calcium Fluoride(CaF_2).

The following determinations were made according to paragraph 250.13 of the Federal Register, Vol. 43, No. 243, Monday, December 18, 1978:

1. The material is not ignitable.
2. The material is not corrosive. A water suspension is pH 7.
3. The material is not reactive. It does not generate toxic gases, vapors or fumes when mixed with water. It cannot be detonated.
4. The extract obtained by applying the Extraction Procedure (para. 250.13 (A) indicates the following contaminants and amounts. The method used was Atomic Absorption. (Perkins-Elmer model 5000. Analyst Bob Perrin).

CONTAMINANT	EXTRACT LEVEL (mg/l)
Arsenic	<0.05
Barium	0.1
Cadmium	0.05
Chromium	0.01
Lead	<0.01
Mercury	0.0025
Selenium	<0.5
Silver	0.01

EAGLE PICHER We are unable to analyze for Organic Contaminants.

5. An Emission Spectrographic analysis (using a Jarrell-Ash Mark IV. Analyst Preston Madden.) of the solid, as received, indicated the following:

CONTAMINANT	%
Calcium	major
Aluminum	0.05
Nickel	0.007
Iron	0.07
Silicon	3.
Magnesium	6.
Manganese	0.01
Boron	0.1
Copper	0.001
Sodium	0.5
Chromium	0.002
Barium	0.03

If I can be of further assistance, do not hesitate to call on me.

Yours truly,

A. L. Fluesmeier
Chief Chemist

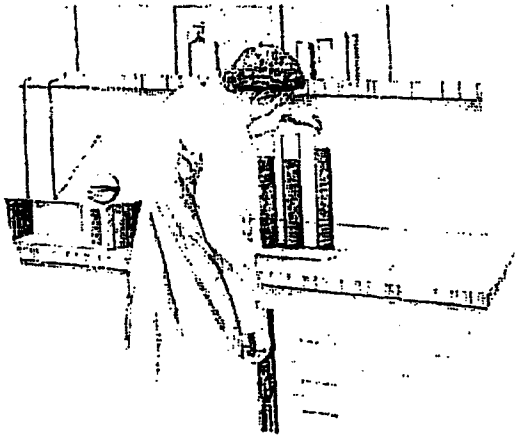
cc: Mr. John Wade

Subscribed and sworn to before me this 11th day of May, 1979.

Mary Jeanette Kruse
Notary Public

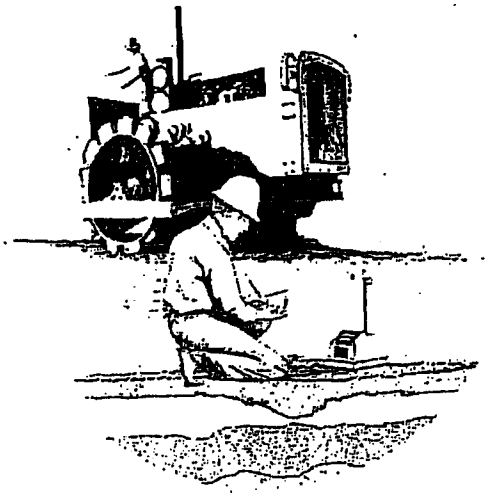
My Commission Expires: August 31, 1982

APPENDIX D



Contents

Smelter Information



Chi-Vit

Chi-Vit Corporation 720 South Edgewood Avenue Urbana, Ohio 43078
513 652-1341

May 20, 1986

Mr. Phillip B. Spotts
Air Pollution Control Unit
Ohio EPA
Southwest District Office
7 East Fourth Street
Dayton, Ohio 45402-2086

Dear Mr. Spotts:

Enclosed is the information requested for the three frit smelters at Chi-Vit Corporation.

If you have any questions, please feel free to contact me.

Bruce W. Larson

Bruce W. Larson,
Manager Environmental Affairs

DIVISION OF
EAGLE PICHER

EMISSIONS INVENTORY SYSTEM FOR CALENDAR YEAR 1985

PROCESS INFORMATION SHEET

Application No.: 05110100000-P001

Company I.D.: E-3

Equipment Description: Frit Smelter

I. Production Data

A. Product	FRIT			
B. Annual Operating rate for 1985 (tons/yr., etc.)	3,424.68			
C. Maximum hourly (designed) operating rate (tons/hr., etc.)	1.25			
	Dec-Feb	Mar-May	June-Aug	Sept-Nov
D. % Annual thruput	25	25	25	25
E. Normal operating schedule	24 Hrs/Day	5 Days/Wk	50 Wks/Yr	
F. Date Constructed, Modified, or Permanently shutdown, indicate which, (if after 2/15/72)	CONSTRUCTED 1966			

II. In-Process Fuel (complete if applicable to process)

A. Type(s) of fuel (1)	NATURAL GAS	
B. % Ash		
C. % Sulphur		
D. Heat Content (BTU/lb, BTU/hal, BTU/cf)		
E. Annual usage (tons/yr, gals/yr, mmcf/yr)	43.597	mmcf/yr
F. Maximum hourly usage (tons/hr, gals/hr, mmcf/hr)	0.012	mmcf/yr

III. Stack Information (2)

A. Height above ground (ft.)	92' 3 1/2"	
B. Inside diameter or dimensions (ft.)	45.5"	
C. Temperature at avg/max operating conditions (°F)	139 avg °F/	max °F
D. Flowrate at avg/max operating conditions (acfm)	22874 avg acfm/	max acfm
E. Other sources with common stack	None	

IV. Control Equipment

	Primary	Secondary
A. Type	VENTURI-SCRUBBER	
B. Date placed in operation	1978	
C. Efficiency (%) Design (D), Estimated (E), Tested (T)	90 (D)	92 (E)
D. Shut-down or malfunction time during calendar year (hrs.)	7.97	

(1) if more than one type of fuel was used throughout the year in question, data must be supplied for each type.

(2) if process is vented to more than one stack, data must be supplied for each stack.

Prepared by: BRUCE W. LARSON

Phone No.: 513-652-1341

Date: 5-20-86

EMISSIONS INVENTORY SYSTEM FOR CALENDAR YEAR 1985

PROCESS INFORMATION SHEET

Application No.: 05110100000-P002

Company I.D.: E-7

Equipment Description: Frit Smelter

I. Production Data

A. Product	FRIT
B. Annual Operating rate for 1985 (tons/yr., etc.)	3,424.68
C. Maximum hourly (designed) operating rate (tons/hr., etc.)	1.25
D. % Annual thruput	Dec-Feb: 25; Mar-May: 25; June-Aug: 25; Sept-Nov: 25
E. Normal operating schedule	24 Hrs/Day; 5 Days/Wk; 50 Wks/Yr
F. Date Constructed, Modified, or Permanently shutdown, indicate which, (if after 2/15/72)	CONSTRUCTED 1966

II. In-Process Fuel (complete if applicable to process)

A. Type(s) of fuel (1)	NATURAL GAS	
B. % Ash		
C. % Sulphur		
D. Heat Content (BTU/lb, BTU/hal, BTU/cf)		
E. Annual usage (tons/yr, gals/yr, mmcf/yr)	43.597	mmcf/yr
F. Maximum hourly usage (tons/hr, gals/hr, mmcf/hr)	0.012	mmcf/hr

III. Stack Information (2)

A. Height above ground (ft.)	92' 3 1/2"
B. Inside diameter or dimensions (ft.)	45.5"
C. Temperature at avg/max operating conditions (°F)	139 avg °F/ max °F
D. Flowrate at avg/max operating conditions (acfm)	22874 avg acfm/ max acfm
E. Other sources with common stack	NONE

IV. Control Equipment

	Primary	Secondary
A. Type	VENTURI-SCRUBBER	
B. Date placed in operation	1978	
C. Efficiency (%) Design (D), Estimated (E), Tested (T)	90 (D)	92 (E)
D. Shut-down or malfunction time during calendar year (hrs.)	7.97	

(1) if more than one type of fuel was used throughout the year in question, data must be supplied for each type.

(2) if process is vented to more than one stack, data must be supplied for each stack.

Prepared by: BRUCE W. LARSON

Phone No.: 513-652-1341

Date: 5-20-86

EMISSIONS INVENTORY SYSTEM FOR CALENDAR YEAR 1985

PROCESS INFORMATION SHEET

Application No.: 05110100000 P003

Company I.D.: E-11

Equipment Description: Smelter

I. Production Data

A. Product	FRIT	
B. Annual Operating rate for 1985 (tons/yr., etc.)	1,712.34	
C. Maximum hourly (designed) operating rate (tons/hr., etc.)	1.25	
D. % Annual thruput	Dec-Feb 25	Mar-May 25 / June-Aug 25 / Sept-Nov 25
E. Normal operating schedule	24 Hrs/Day	5 Days/Wk 50 Wks/Yr
F. Date Constructed, Modified, or Permanently shutdown, indicate which, (if after 2/15/72)	CONSTRUCTED 1966	

II. In-Process Fuel (complete if applicable to process)

A. Type(s) of fuel (1)	NATURAL GAS	
B. % Ash		
C. % Sulphur		
D. Heat Content (BTU/lb, BTU/hal, BTU/cf)		
E. Annual usage (tons/yr, gals/yr, mmcf/yr)	43.597	mmcf/yr
F. Maximum hourly usage (tons/hr, gals/hr, mmcf/hr)	0.012	mmcf/hr

III. Stack Information (2)

A. Height above ground (ft.)	92' 3 1/2"	
B. Inside diameter or dimensions(ft.)	45.5"	
C. Temperature at avg/max operating conditions(°F)	139 avg °F/	max °F
D. Flowrate at avg/max operating conditions (acfm)	22874avg acfm/	max acfm
E. Other sources with common stack	None	

IV. Control Equipment

	Primary	Secondary
A. Type	VENTURI-SCRUBBER	
B. Date placed in operation	1978	
C. Efficiency (%) Design (D), Estimated (E), Tested (T)	90 (D)	92 (E)
D. Shut-down or malfunction time during calendar year (hrs.)	7.97	

(1) if more than one type of fuel was used throughout the year in question, data must be supplied for each type.

(2) if process is vented to more than one stack, data must be supplied for each stack.

Prepared by: BRUCE W. LARSON

Phone No.: 513-652-1341

Date: 5-20-86

TABLE 5.1

SUMMARY OF STACK GAS CONDITIONS

THREE SMELTERS OPERATING

Run No.	DATE 1987	VELOCITY (fps)[a]	FLOW RATE (acfm)[b]	FLOW RATE (dscfm)[c]	TEMP. (°F)	MOISTURE (%)	O_2 (%)	CO_2 (%)
3-1	12/17	22.6	17,040	10,925	149	24.3	20.9	ND
3-2	12/17	19.0	14,325	9,378	149	22.7	20.0	ND
3-3	12/18	19.6	14,778	9,534	150	23.7	19.5	0.5
AVERAGE		20.4	15,381	9,946	149	23.4	20.1	0.2

[a] Feet per second at stack conditions
[b] Actual cubic feet per minute at stack conditions
[c] Dry standard cubic feet per minute at 68°F and 29.92" Hg.

OH000232

TABLE 5.2

SUMMARY OF FILTERABLE PARTICULATE EMISSIONS

THREE SMELTERS OPERATING

SITE/ Run #	CONCENTRATION (gr/dscf)	CONCENTRATION (lb/dscf)	MASS EMISSION RATE (lb/hr)
3-1	0.0342	4.89 E-06	3.20
3-2	0.0384	5.49 E-06	3.09
3-3	0.0403	5.76 E-06	3.29
AVERAGE	0.0376	5.38 E-06	3.19

OH000233

TABLE 5.3

SUMMARY OF STACK GAS CONDITIONS

TWO SMELTERS OPERATING

Run No.	DATE 1987	VELOCITY (fps)[a]	FLOW RATE (acfm)[b]	FLOW RATE (dscfm)[c]	TEMP. (°F)	MOISTURE (%)	O_2 (%)	CO_2 (%)
2-1	12/21	14.1	10,631	6,963	145	22.7	19.5	0.5
2-2	12/21	22.0	16,587	11,093	144	21.2	19.5	0.5
2-3	12/21	25.4	19,151	12,580	144	22.6	19.5	0.5
AVERAGE		20.5	15,456	10,212	144	22.2	19.5	0.5

[a] Feet per second at stack conditions
[b] Actual cubic feet per minute at stack conditions
[c] Dry standard cubic feet per minute at 68°F and 29.92" Hg.

OH000234

TABLE 5.4

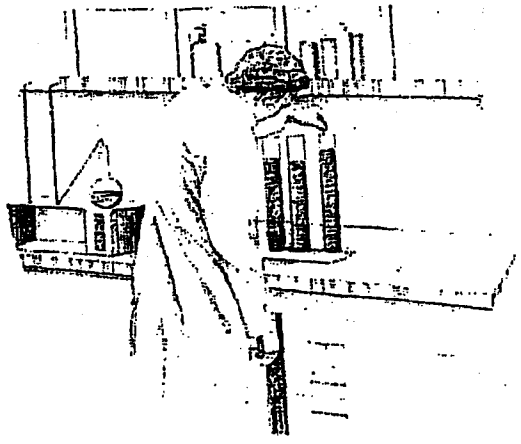
SUMMARY OF FILTERABLE PARTICULATE EMISSIONS

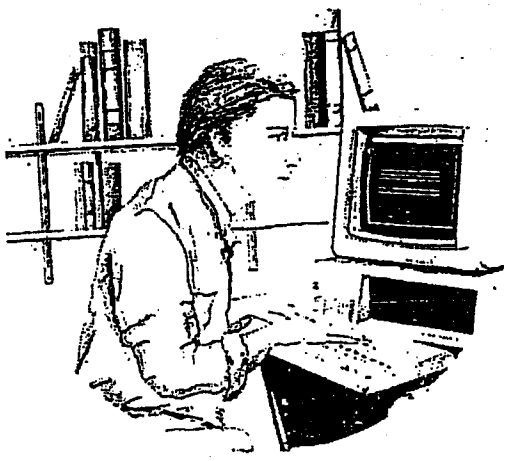
TWO SMELTERS OPERATING

SITE/ Run #	CONCENTRATION (gr/dscf)	CONCENTRATION (lb/dscf)	MASS EMISSION RATE (lb/hr)
2-1	0.0424	6.06 E-06	2.53
2-2	0.0370	5.29 E-06	3.52
2-3	0.0320	4.57 E-06	3.45
AVERAGE	0.0371	5.31 E-06	3.17

OH000235

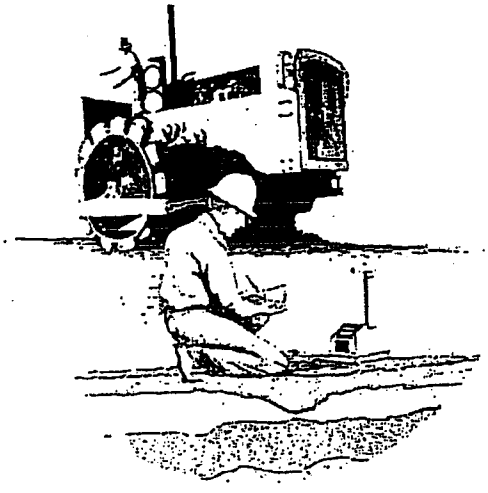
APPENDIX E





Contents

Alphabetical List of Chemicals



LISTING OF ALL CHEMICALS, OXIDES, IN ALPHABETIC ORDER

A1 CALCINED ALUMINA	SEE MSDS FOR 30623
A13 CALACINED ALUMINA	SEE MSDS FOR 30517
A17 REACTIVE ALUMINA	SEE MSDS FOR 30617
ACG TITANIUM DIOXIDE	SEE MSDS FOR 30929
AFW POWDERED GLASS	SEE MSDS FOR 30599
ALCONOX #12302	SEE MSDS FOR 30561
ALUMINA F1 ACTIVATED	SEE MSDS FOR 30657
ALUMINA T64 TABULAR	SEE MSDS FOR 30514
ALUMINUM HYDRATE C 31	SEE MSDS FOR 30036
ALUMINUM SULFATE #12304	SEE MSDS FOR 30566
ANTIMONY 'C'	SEE MSDS FOR 30301
ANTIMONY 'C' MIX	SEE MSDS FOR 30311
ANTIMONY MIX	SEE MSDS FOR 30310
ANTIMONY OXIDE	SEE MSDS FOR 30010
ARSENIC MIX	SEE MSDS FOR 30346
ARSENIC TRIOXIDE	SEE MSDS FOR 30046
B CLAY	SEE MSDS FOR 30500
BB CLAY	SEE MSDS FOR 30614
BANDY BLACK CLAY	SEE MSDS FOR 30614
BARIUM CARBONATE	SEE MSDS FOR 30013
BARIUM CHLORIDE	SEE MSDS FOR 30515
BENILITE	SEE MSDS FOR 30089
BENTONITE HPM 20	SEE MSDS FOR 30615
BISMUTH NITRATE	SEE MSDS FOR 30014
BISMUTH TRIOXIDE	SEE MSDS FOR 30015
BLANC FIXE	SEE MSDS FOR 30540
BLUE OXIDE (20092)	SEE MSDS FOR 20092
BLUE TUNGSTIC MIX	SEE MSDS FOR 30136
BOND SAND	SEE MSDS FOR 30075
BORAX #135	SEE MSDS FOR 30135
BORAX 10 MOLE	SEE MSDS FOR 30002
BORIC ACID	SEE MSDS FOR 30018
BORIC ACID ANHY.	SEE MSDS FOR 30078
BROWN OXIDE (20082)	SEE MSDS FOR 20082
BROWN OXIDE (20087)	SEE MSDS FOR 20087
C 31 ALUMINUM HYDRATE	SEE MSDS FOR 30036
CMC 7L	SEE MSDS FOR 30550
CN MIX	SEE MSDS FOR 30264

CN OXIDE	SEE MSDS FOR 30064
CADMIUM OXIDE	SEE MSDS FOR 30074
CALCIUM CARBONATE	SEE MSDS FOR 30012
CALCIUM SILICIDE	SEE MSDS FOR 30632
CARBON BLACK SUBSTITUTE	SEE MSDS FOR 30609
CERIUM CONCENTRATE	SEE MSDS FOR 30063
CESIUM SULFATE	SEE MSDS FOR 30065
CHROME GREEN OXIDE	SEE MSDS FOR 20033
CHROME MIX	SEE MSDS FOR 30570
CHROME 'A' MIX	SEE MSDS FOR 30571
CITRIC ACID	SEE MSDS FOR 30661
COBALT OXIDE	SEE MSDS FOR 30042
COBALT MIX	SEE MSDS FOR 30420
COPPER OXIDE	SEE MSDS FOR 30311
CORAL OXIDE 14M200	SEE MSDS FOR 30637
CYANAMER #370	SEE MSDS FOR 30521
CYROLITE	SEE MSDS FOR 30009
D CLAY	SEE MSDS FOR 30502
DOLOMITE #16 GRD. LIMESTONE	SEE MSDS FOR 30832
DOLOMITE LIMESTONE OHSO	SEE MSDS FOR 30083
F CLAY	SEE MSDS FOR 30503
F1 ACTIVATED ALUMINA	SEE MSDS FOR 30657
FELDSPAR F4	SEE MSDS FOR 30300
FERRIC AMMONIUM CITRATE	SEE MSDS FOR 30663
FLUORSPAR	SEE MSDS FOR 30006
FLY ASH	SEE MSDS FOR 30673
FLY ASH #4621	SEE MSDS FOR 30674
G CLAY	SEE MSDS FOR 30618
GL70 CULLET GLASS	SEE MSDS FOR 30600
GOLD	SEE MSDS FOR 30077
GRAPHITE	SEE MSDS FOR 30620
GRAPHITE CC89	SEE MSDS FOR 30605
GRAPHITE F280H	SEE MSDS FOR 30626
GRAPHITE JD3	SEE MSDS FOR 30640
H CLAY	SEE MSDS FOR 30505
IRON OXIDE	SEE MSDS FOR 30021
J CLAY	SEE MSDS FOR 30504
K CLAY	SEE MSDS FOR 30616
KELTEX	SEE MSDS FOR 30525
KELZAN	SEE MSDS FOR 30555
KYANITE, RAW	SEE MSDS FOR 30658
L CLAY	SEE MSDS FOR 30506
LADLESHIELD MP78	SEE MSDS FOR 30638
LADLESHIELD MN 41	SEE MSDS FOR 30641
LAMPBLACK RAVEN 22	SEE MSDS FOR 30601
LAMPKIN CLAY	SEE MSDS FOR 30619
LATEX 2150	SEE MSDS FOR 30164
LITHIUM CARBONATE	SEE MSDS FOR 30052
LITHIUM FLUORIDE	SEE MSDS FOR 30085
M CLAY	SEE MSDS FOR 30613
MAG OX 98LR	SEE MSDS FOR 30634
MAG CHEM #10	SEE MSDS FOR 30633
MAGNESIUM OXIDE 98LR	SEE MSDS FOR 30634
MAGNESIUM CHEM #10 GRANULAR	SEE MSDS FOR 30633

MAGNETITE	SEE MSDS FOR 30321
MAGNESITE	SEE MSDS FOR 30088
MAGNESIUM CARBONATE	SEE MSDS FOR 30016
MALACHITE GREEN DYE	SEE MSDS FOR 30527
MANGANESE MIX	SEE MSDS FOR 30430
MANGANESE 'A' MIX	SEE MSDS FOR 30243
MANGANESE DIOXIDE	SEE MSDS FOR 30043
MANGANOUS OXIDE	SEE MSDS FOR 30433
MANGANOUS CARBONATE	SEE MSDS FOR 30627
MANNITOL	SEE MSDS FOR 30625
METAL COKE 4072-C	SEE MSDS FOR 30670
METHYL VIOLET DYE	SEE MSDS FOR 30529
MOLY 'A' MIX	SEE MSDS FOR 30344
MOLY MIX	SEE MSDS FOR 30244
MOLYBDENUM 'A' MIX	SEE MSDS FOR 30344
MOLYBDENUM MIX	SEE MSDS FOR 30244
MOLYBDENUM OXIDE	SEE MSDS FOR 30044
MONO POTASSIUM PHOSPHATE	SEE MSDS FOR 30059
MONO SODIUM PHOSPHATE	SEE MSDS FOR 30058
NALCAST	SEE MSDS FOR 30621
NEPHELINE SYENITE	SEE MSDS FOR 30028
NICKEL OXIDE	SEE MSDS FOR 30061
P CLAY	SEE MSDS FOR 30612
P2 RAW BATCH	SEE MSDS FOR 30546
P2	SEE MSDS FOR 30547
P45	SEE MSDS FOR 30245
POTASSIUM CARBONATE	SEE MSDS FOR 30017
POTASSIUM NITRATE	SEE MSDS FOR 30019
POTASSIUM NITRITE	SEE MSDS FOR 30533
POTASSIUM SILICO FLUORIDE	SEE MSDS FOR 30024
POTASSIUM SILICO FLUORIDE (WET)	SEE MSDS FOR 30024
Q CLAY	SEE MSDS FOR 30507
QUICKLIME, GRANULAR	SEE MSDS FOR 30630
QUICKLIME, VERTICAL PULVERIZED	SEE MSDS FOR 30629
R CLAY	SEE MSDS FOR 30508
RAVEN 22, LAMPBLACK	SEE MSDS FOR 30601
RAVEN 1020	SEE MSDS FOR 30606
RAVEN 2000	SEE MSDS FOR 30607
RUTILE	SEE MSDS FOR 30069
S CLAY	SEE MSDS FOR 30509
SEQLENE #540	SEE MSDS FOR 30548
SETIT HK	SEE MSDS FOR 30535
SILICA #1	SEE MSDS FOR 30001
SILICA 400 MESH	SEE MSDS FOR 30400
SILICONE FLUID	SEE MSDS FOR 30562
SILVER MIX	SEE MSDS FOR 30376
SODA ASH	SEE MSDS FOR 30007
SODIUM ALUMINATE	SEE MSDS FOR 30536
SODIUM ANTIMONATE MIX	SEE MSDS FOR 30201
SODIUM FLUORIDE	SEE MSDS FOR 30026
SODIUM META BORAE	SEE MSDS FOR 30545
SODIUM NITRATE	SEE MSDS FOR 30008
SODIUM NITRITE	SEE MSDS FOR 30537
SODIUM SILICO FLUORIDE	SEE MSDS FOR 30022

SODIUM SILICATE N	SEE MSDS FOR 30608
SODIUM SULFATE	SEE MSDS FOR 30047
SODIUM TUNGSTIC MIX	SEE MSDS FOR 30350
SPODUMENE, 200 MESH	SEE MSDS FOR 30669
SPODUMENE, 50/200	SEE MSDS FOR 30671
SPODUMENE (AMALAGMET)	SEE MSDS FOR 30672
STERLING R	SEE MSDS FOR 30610
STANNOUS OXIDE, BLACK	SEE MSDS FOR 30636
STRONTIUM CARBONATE	SEE MSDS FOR 30060
SPARTAN SAND	SEE MSDS FOR 30097
SUPERPAX	SEE MSDS FOR 30631
T CLAY	SEE MSDS FOR 30510
T64 TABULAR ALUMINA	SEE MSDS FOR 30514
TALC	SEE MSDS FOR 30082
TETRA POTASSIUM PYRO PHOSPHATE	SEE MSDS FOR 30055
TETRA SODIUM PYRO PHOSPHATE	SEE MSDS FOR 30054
TICALOID	SEE MSDS FOR 30163
TIN OXIDE, WHITE	SEE MSDS FOR 30538
TIN 'C' MIX	SEE MSDS FOR 30539
TIONA VC	SEE MSDS FOR 30922
TITANIUM DIOXIDE-ACG	SEE MSDS FOR 30929
TITANIUM LW	SEE MSDS FOR 30918
TITANIUM 29-7	SEE MSDS FOR 30907
TRIS NITRO SOLIDS	SEE MSDS FOR 30551
TUNGSTIC BLUE OXIDE	SEE MSDS FOR 30603
UREA	SEE MSDS FOR 30541
UVERITE 20-H	SEE MSDS FOR 30542
VEE GUM, CERAMIC	SEE MSDS FOR 30666
WOLLASTONITE W10	SEE MSDS FOR 30087
WOLLASTONITE WL 9750	SEE MSDS FOR 30086
X CLAY	SEE MSDS FOR 30511
Z CLAY	SEE MSDS FOR 30512
ZINC OIXDE	SEE MSDS FOR 30544
ZINC OXIDE	SEE MSDS FOR 30011
ZINC SULFIDE	SEE MSDS FOR 30217
ZIRCON	SEE MSDS FOR 30032
29-T TITANIUM	SEE MSDS FOR 30921
64-C CANADA	SEE MSDS FOR 30642
64-C MIX	SEE MSDS FOR 30364

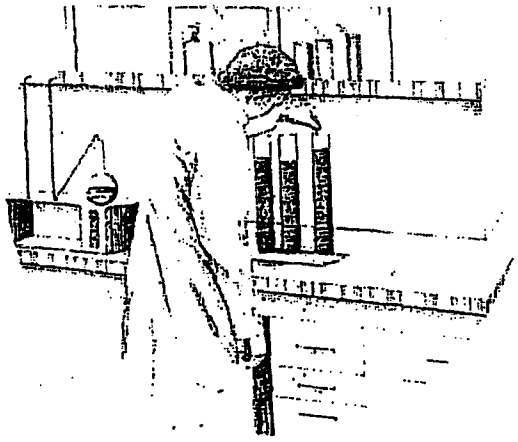
URBANA MISCELLANEOUS INDEX

AQUA FLOC 425
BATTERY CLEANER #2025
BOILER SOLDER
BOILER STOP LEAK
CO CONTACT CLEANER
CO CONTACT CEANER BULK
CLEANER, ALL PURPOSE
CLEANER, PLASTIC PIPE AND FITTINGS
CLEANER, TF CONTACT #30000
CUTTING OIL HERCULES DRK
CUTTING OIL HERCULES CLEAR
DURABOND C-60 PRIMER
DRAIN CLEANER, DOUBLE AGENT
FILLER, WHITE VINYL BLOCK
FLOCULITE #551
FLUX SCORE PASTE
FURNACE CEMENT
GREASE, BR-2 PLUS
GREASE, BLOCK
HAND CLEANER, LAN-LIN
HAND CEANER, WATERLESS
KUVERITE-WHITE
LUBRICANT, WIRE PULLING
OIL, CUTTING
OIL, LUBE
LUBRICANT, TRI-FLOW
LUBRICANT, GEAR W/EP ADDITIVE
METHOCEL 20-121
NALCO 2327
OXIDIZING GAS
PVC CEMENT, CLEAR
PIPE CEMENT, CPVC
PENETRATING OIL
PETROLEUM WAX
PIPE CEMENT
PIPE CEMENT, PVC
PIPE CEMENT, DUROBOND
PIPE JOINT COMPOUND
PLASTIC SEAL
PRIMER, PVC AND CPCV
REFRACTRY ALUMINA 80
REFRACTORY CERAMIC FIBER
REFRACTORY INSWOOL BLANKET
RAST-O-LITE 30 PLUS
RUZITE CASTABLE
ROOF AND FLASHING CEMENT

20/86 0840 HRS
235

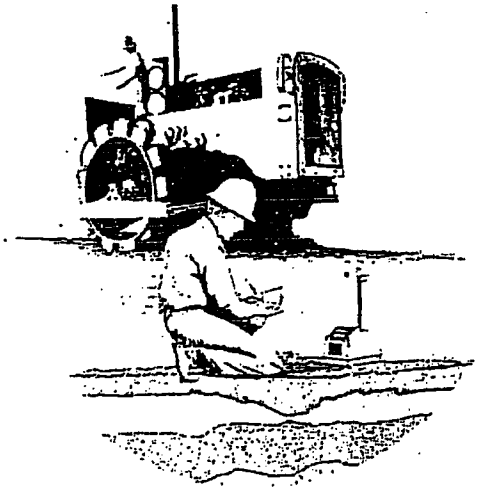
ROOT DESTROYER (R-D)
SEAL-COAT RED URETHANE
SEAL-COAT CLEAR URETHANE
SEALANT CONSTRUCTION
SEALANT #242
SEALING PUTTY
SEALANT SILICONE
SWIF SOLDER 50/50 ← SLUDGE 1212
SWIF 95
STA-PUT PUTTY
WD-40
WHAM
ZINC-IT #2018

APPENDIX F



Contents

PTI/PTO Permits



For Office Use Only
Check Appropriate Box(es)

___ Air Discharge

___ Water Discharge to New Source Treatment Works

___ Solid Waste Disposal Facility

___ Hazardous Waste Disposal Facility

Jan 24, 1983

For Office Use Only

PTI Application No. _____

Date Received _____

Premise No. _____

OHIO ENVIRONMENTAL PROTECTION AGENCY
Application for Permit to Install

CHI-VIT CORPORATION, DIVISION OF EAGLE-PICHER INDUSTRIES, INC.
Applicant's Name

P.O. BOX 270
Mailing Address

URBANA	CHAMPAIGN	OHIO	43078	(513) 652-1341
City	County	State	Zip Code	Telephone Number

DAVID S. CAMERON, DIRECTOR OF ENVIRONMENTAL AFFAIRS (513) 652-1341
Person to contact (Name and Title and Telephone Number)

The source will be constructed within the present Chi-Vit facility located at 720
Location of Proposed Facility (State the location as completely and precisely as possible)*

South Edgewood Ave.

URBANA	CHAMPAIGN	43078
City or Township	County	Zip Code

Directions: A Permit to Install is required for new or modified sources of pollution under the provisions of OAC Rule 3745-31. An application cannot be considered complete unless all applicable questions are answered and the required information has been submitted. This application must be signed in accordance with OAC Rule 3745-31-04(B) or it cannot be accepted.

Applicants for permits involving air emissions or wastewater treatment facilities will be required to pay a permit to install fee as shown in Section 3745.11(B) and (C) of the Ohio Revised Code. This fee is payable fifteen days after the date of final issuance of the permit.

Name of new or modified source or facility: Speciality Chemical Weigh Station

Product of new or modified source/facility: Batch Chemicals for Manufacture of Porcelain Frit

Will the proposed source/facility involve any of the following: Check all that apply.

A. X Air Discharge

B. ___ Wastewater Treatment Works

C. ___ Solid Waste Disposal Facility

D. ___ Hazardous Waste Disposal Facility

*Example: "The source will be constructed on a 20 Acre plot to be located on Franklin Township Road No. 17, approximately 1 1/4 miles north of the intersection of State Route 99 and Franklin Township Road No. 17."

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The following information must be submitted on a separate piece of paper and attached to this application.

FOR ALL PERMITS TO INSTALL

1. Describe the product or service to be produced by the applicant along with a description of the proposed source/facility.

2. List the name and quantity of all materials and chemicals (solid, liquid, or gaseous) that will be used or produced by the source/facility.

3. State the reason for the application. Is this a new installation, modification to an existing source/facility, reconstruction of an existing source/facility, or startup of a source/facility that has been permanently shutdown for _____ years? (State number of years)

4. Has a previous Ohio EPA application or plan submission been filed for this source/facility? If so, state the date and type of the application previously submitted.

5. Will the proposed source/facility comply with all rules, laws, and regulations of Ohio EPA and U.S. EPA?

FOR AIR POLLUTION SOURCES

6. State the amount of each air contaminant (actual emissions) from each source in pounds per hour and tons per year at maximum and average conditions.

7. Are the proposed sources required to comply with the following federal requirements?
   i. New Source Performance Standards (NSPS)
   ii. National Emission Standards for Hazardous Air Pollutants (NESHAPS)
   iii. Prevention of Significant Deterioration (PSD)
   iv. Appendix "S" - Emission Offset Policy

8. Will the proposed sources employ best available technology?

9. Will the proposed sources cause the significant degradation of air quality?

10. Will the proposed sources interfere with the attainment and maintenance of the ambient air quality standards?

11. Describe any source monitoring, emission monitoring, or control equipment monitoring devices to be installed by the applicant.

12. Will the proposed sources involve the use of asbestos, benzene, beryllium, mercury, or vinyl chloride?

13. Complete and attach an anticipated construction schedule for each proposed source. (See attached).

14. Please include the estimated cost of any air pollution control equipment to be installed on the proposed sources.

15. An appendix for each air contaminant source must accompany this application. From the following description of the appendices, determine which should accompany your application.

Appendix A - Process: for sources not included in the other appendices.

Appendix B - Fuel-Burning Equipment: for any furnace, boiler, apparatus, and all appurtenances thereto, used in the process of burning fuel with the primary purpose of producing heat or power by indirect heat transfer.

Appendix C - Incinerator: for any equipment, machine, device, article, contrivance, structure or part of a structure used to burn refuse or to process refuse material by burning other than by open burning.

Appendix D - Surface Coating or Printing Operation: for a surface coating operation not included under Appendix K or for a printing operation.

Appendix E - Storage Tank: a storage tank for petroleum liquids.

Appendix H - Gasoline Dispensing Facility: any site where gasoline is dispensed to motor vehicle gasoline tanks from stationary storage tanks.

Appendix J - Loading Rack at a Bulk Gasoline Plant or Terminal: an operation for transferring gasoline to a delivery vessel.

Appendix K - Surface coating line: a coating line consists of one or more coating applicators, flash-off areas or ovens to be used for the following: an automobile or light-duty truck assembly plant; can manufacturing; coil-coating; fabric coating; large appliance coating; magnet wire coating; metal furniture coating; paper coating; vinyl coating.

Appendix L - Solvent Metal Cleaning: an operation employing solvent for cleaning metal surfaces; wipe-cleaning is excluded.

Appendix M - Fugitive Dust Emission Sources

General:

M1-1 - Plant Roadways and Parking Areas
M1-2 - Aggregate Storage Piles
M1-3 - Material Handling
M1-4 - Mineral Extraction

Iron and Steel Mills:

M2-1 - Coke Manufacturing
M2-2 - Iron Production
M2-3 - Steel Manufacture

M3 - Lime Plants
M4 - Power Plants
M5 - Grain Terminals
M6 - Country Grain Elevators
M7 - Gray Iron Foundries
M8 - Steel Foundries
M9 - Glass Manufacturing Plants
M10 - Fiberglass Manufacturing
M11 - Secondary Aluminum Processing Plants
M12 - Fertilizer Mixing/Blending Plants
M13 - Cement Manufacturing and Blending Plants
M14 - Ferroalloy Production
M15 - Metal Salvage Operations
M16 - Pulp and Paper Mills
M17 - Woodworking Operations
M18 - Aggregates Processing Plants
M19 - Coal Processing Plants
M20 - Brick and Related Clay Product Manufacturing Plants
M21 - Asphaltic Concrete Plants
M22 - Concrete Batching Plants
M23 - Sandblasting Operations
M24 - Petroleum Refineries
M25 - Agricultural Chemical Manufacturing Plants
M26 - Bulk Gasoline Terminals and Plants
M27 - Carbon Black Plants
M28 - Municipal Incineration
M29 - Salt Processing Operations
M30 - Galvanizing Plants

Appendix O - Dry Cleaning Facility

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FOR WASTEWATER DISCHARGES

16. State the anticipated quality of all types of environmental pollutants to be discharged by the facility.

17. State in detail the method for disposal for all environmental pollutants listed in the question above. This should include a complete description of any control equipment to be employed.

18. If wastewater is to be discharged to a surface water, state the anticipated concentration (mg/l) and loading (lbs/day) in the discharge, and the effect this discharge will have on the surface water under critical conditions.

19. If wastewater is to be discharged to the groundwater, state the anticipated concentration (mg/l) and loading (lbs/day) in the wastewater, and the effect this wastewater will have on the groundwater.

20. If wastewater is to be discharged to a sewerage system, what will be the effect on the sewerage system and wastewater treatment system.

21. Describe any monitoring equipment to be installed at the facility.

22. Will the proposed source conform with area-wide waste management plans for wastewater treatment?

23. General plans for approval of the proposed source should be submitted to demonstrate compliance with OAC Rule 3745-31-05.

24. The following information should be included with the application (if applicable).

    i. Appendix G. Extended Aeration Wastewater Treatment Facility Data Sheet
    ii. Pump Station Data Sheet
    iii. Sanitary Sewer Data Sheet
    iv. Application for Approval of Plans for collection, treatment, and disposal of wastewater.

FOR SOLID WASTE DISPOSAL FACILITIES

25. State the anticipated quality of all types of environmental pollutants to be discharged by the facility.

26. State in detail the method for disposal for all environmental pollutants listed in the question above. This should include a complete description of any control equipment to be employed.

27. Describe any groundwater or surface stream monitoring systems to be installed at the facility.

28. State the local zoning requirements.

29. Will the proposed source conform with area-wide waste management plans for solid waste?

30. An Appendix F - Solid Wastes Disposal Facility must be included with this application.

OHIO ENVIRONMENTAL PROTECTION AGENCY

INSTALLATION SCHEDULE

TO ACCOMPANY APPLICATION FOR PERMIT TO INSTALL

THIS FORM CONSTITUTES PART OF THE APPLICATION OF:

FACILITY NAME: CHI-VIT CORPORATION

ADDRESS: 720 SOUTH EDGEWOOD AVE., URBANA, OHIO 43078

FOR A PERMIT TO INSTALL THE FOLLOWING AIR CONTAMINANT SOURCE:

IDENTIFICATION: E-16

DESCRIPTION: Special Chemical Weigh Station

THE INSTALLATION OF THE ABOVE AIR CONTAMINANT SOURCE IS PLANNED TO FOLLOW THE TIME SCHEDULE DESCRIBED BELOW:

	DATE
1. EQUIPMENT ORDERED - - - - - - - - - - -	On Hand
2. COMMENCE CONSTRUCTION - - - - - - - - -	Feb. 1, 1983
3. STARTUP - - - - - - - - - - - - - - - - -	Feb. 18, 1983
4. PERFORMANCE TESTING - - - - - - - - - -	Feb. 21, 1983

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Under OAC 3745-31-04, These signatures shall constitute personal affirmation that all statements or assertions of fact made in the application are true and complete, comply fully with applicable state requirements, and shall subject the signatory to liability under applicable state laws forbidding false or misleading statements.

Jan. 24, 1983

Authorized Signature (for facility) — Date

G-neral Manager

Title

P.O. Box 270 Urbana, Ohio 43078

Address

N/A

For Wastewater Treatment Plants: Signature of General Contractor or Agent Performing installation, if selected. — Date

N/A

Company

N/A

Address

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1. The source is used to weigh special chemicals as smelting additions in the manufacture of porcelain frits. Source is to be used intermittently on an "as needed" basis.

2.

Copper oxide	60,000 lbs./yr.
Cobalt oxide	16,000
Gold and Bond Sand mix	15,000
Arsenic Trioxide	4,000
Lithium Carbonate	28,000
Nickel oxide	27,000

3. The growing use of special chemicals as smelting additions as well as the proximity of the weighing area to exhaust fans led the company to believe pollution control equipment was desirable.

4. No

5. Yes

6. Since the source is used intermittently, no firm calculations can be made. However, all exhausts from the source will go through a dust collection system.

7.

i	No
ii	No
iii	No
iv	No

8. Yes

9. No

10. No

11. None

12. No

13. Project completion date is Feb. 18, 1983.

14. $5,000.00

For Official Use Only

Premise No._____
urce No._____

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Special Chemical Weigh Station
2. End product of this process Batch chemicals for manufacture of porcelain frits.
3. Primary process equipment Scales and chemicals in drums

   Your identification E-16 Year Installed 1983
4. Manufacturer N/A Make or Model N/A
5. Capacity of equipment (lbs./hr): Rated N/A Max. N/A
6. Method of exhaust ventilation: [] Stack [] Window fan [] Roof vent [] Other, describe _____

   Are there multiple exhausts? [] Yes [X] No

OPERATING DATA

7. Normal operating schedule: 1 hrs./day, 5 days/wk., 50 wks./year.
8. Percent annual production (finished units) by season: Winter 25 Spring 25 Summer 25 Fall 25
9. Hourly production rates (lbs.): Average 600 Maximum 1,000
10. Annual production (indicate units) 150,000 lbs.
    Projected percent annual increase in production 5%
11. Type of operation: [] Continuous [X] Batch
12. If batch, indicate Minutes per cycle 1 Minutes between cycles 2
13. Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr.)
Copper oxide	Smelting addition	0-1,000
Cobalt oxide	" "	"
Mix of Gold & Bond Sand	" "	"
Arsenic Trioxide	" "	"
Lithium Carbonate	" "	"
Nickel oxide	" "	"

14. A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products. Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

(continued on reverse side)

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CONTROL EQUIPMENT

Control Equipment Code:

(A) Settling chamber
(B) Cyclone
(C) Multiple cyclone
(D) Electrostatic precipitator
(E) Fabric filter
(F) Spray chamber
(G) Cyclonic scrubber
(H) Impingement scrubber
(I) Orifice scrubber
(J) Venturi scrubber
(K) Plate or tray tower
(L) Packed tower
(M) Adsorber
(N) Condenser
(O) Afterburner - catalytic
(P) Afterburner - thermal
(Q) Other, describe _____

15. Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	E	N/A
(b) Manufacturer	Flex-Kleen	
(c) Model No.	84BV-9	
(d) Year installed	1983	
(e) Your identification	E-16	
(f) Pollutant Controlled	Dust	
(g) Controlled pollutant emission rate (if known)	UNK	
(h) Pressure drop	3-5"	
(i) Design efficiency	99.9%	
(j) Operating efficiency	99.9%	

~~STACK DATA~~

16. Your stack identification E-16

17. Are other sources vented to this stack: [] Yes [X] No
If yes, identify sources _____

18. Type: [X] Round, top inside diameter dimension 7"
[] Rectangular, top inside dimensions (L) _____ x (W) _____

19. Height: Above roof 5 ft., above ground 30 ft.

20. Exit gas: Temp. Ambient °F, Volume 1,000 ACFM, Velocity 3,750 ft./min.

21. Continuous monitoring equipment: [] Yes [X] No
If yes, indicate: Type _____, Manufacturer _____
Make or Model _____, Pollutant(s) monitored _____

22. Emission data: Emissions from this source have been determined and such data is included with this appendix: [] Yes [X] No

If yes, check method: [] Stack Test [] Emission factor [] Material balance

Completed by _____, Date 1/24/83

EPA 3100

INSTRUCTIONS FOR APPENDIX A - PROCESS

Appendix A is a general appendix and should be completed for a source operation for which there is no specific appendix. Refer to the listing of appendices in the instructions to the Permit to Operate/Variance application to determine if another one applies (e.g. Appendix B - Fuel Burning Equipment, Appendix C - Incinerator, Appendix D - Surface Coating or Printing Operation, Appendix E - Storage Tank/Loading Facility, or others).

Rule 3745-15-01(X) of the Ohio Administrative Code defines a "source operation" as "... the last operation preceeding emission which operation: (1) results in the separation of the air contaminant from the process materials or in the conversion of the process materials into air contaminants, as in the case of combustion fuel; and (2) is not an air pollution abatement operation."

General Instructions: Answer or complete all items. If the item does not apply to the source operation write in "not applicable" or "NA". If the answer is not known write in "not known" or "NK". The appendix form may be returned to you if all items are not completed or answered.

Specific Instructions:

Item Process Data: Items (1) thru (6) refer to general process information.

(1) Complete the generally accepted name for the process (e.g. asphalt batching, glass manufacturing, oil refining, electroplating, rendering, etc.).

(2) Specify the end product of this process (e.g. asphaltic concrete, glassware, benzene, chrome plated bumpers, soaps, etc.).

(3) Name the specific process equipment for this appendix along with the company's identifying name or code and the year it was or will be installed (e.g. basic oxygen furnace - furnace #1 - 1965).

(4) Name the manufacturer and model number (if any) of the process equipment in item (3).

(5) State the "rated" (normal) and "maximum" capacity, in pounds per hour (lbs/hr), of the process equipment. The capacity refers to the input capacity of materials entering the process equipment.

(6) Indicate the method of exhaust ventilation and indicate if there are more than one exhaust.

Operating Data: Items (7) thru (14) refer to the operating information for the process equipment.

(7) Complete the process equipment's normal operating schedule in hours per day, days per week, and weeks per year.

(8) Complete the percent annual production by season for a years production of finished units. The four seasons should total to 100% and include: Winter (December, January, February), Spring (March, April, May), Summer (June, July, August), Fall (September, October, November).

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OH000253

Item

(9) Specify the average and maximum hourly production rates in pounds. The average is the years production rate divided by the total yearly hours of production or operation.

(10) Specify the annual production for this process equipment and indicate the appropriate units (e.g., 10,000 tons of steel, 150,000 barrels of benzene, etc.). Estimate the annual increase in production.

(11) & (12) Check whether the process is continuous or batch. A batch operation normally has significant down time between completion and startup of each operation or cycle. If batch, complete the minutes per production cycle and minutes between the production cycles. A "cycle" refers to the time the equipment is in operation.

(13) List all general types of raw materials employed in the process, indicate the principle use (i.e., product, binder, catalyst, fuel, etc.) and specify the normal amount used in pounds per hours (lbs/hr). List any specific materials containing lead, asbestos, beryllium, or mercury.

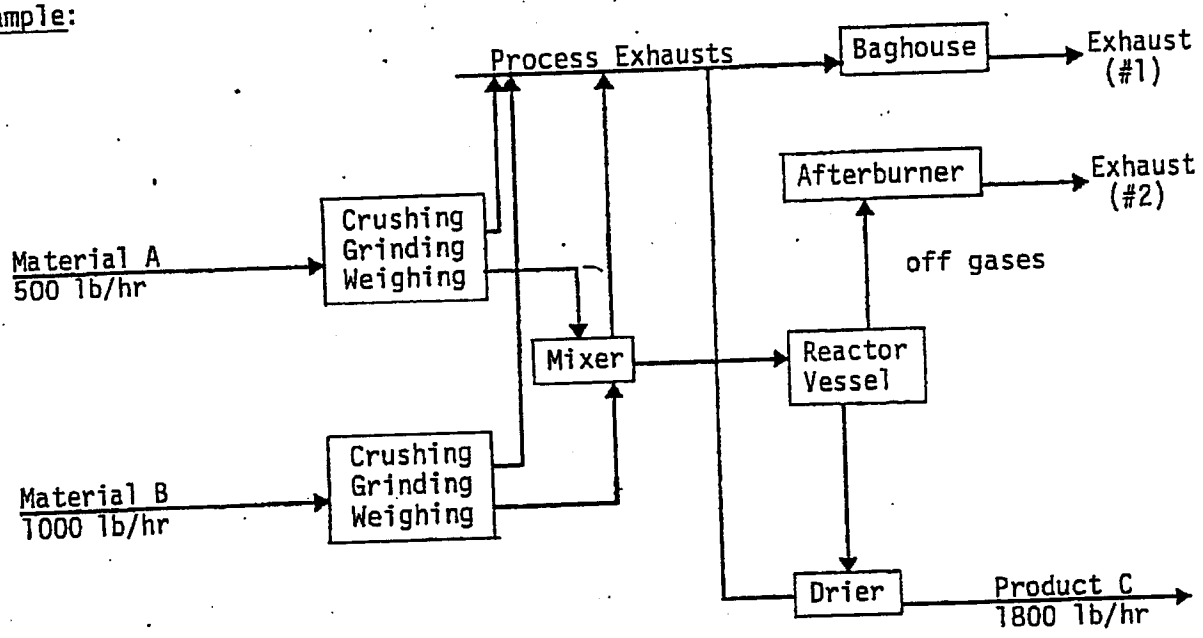
(14) A process flow diagram is to be included with this appendix and should be sketched on a separate sheet. The diagram should include:

(a) Entry and exit points of all raw materials, intermediate products, by-products, and finished products.

(b) Labelling of all materials (products, waste, and airborne contaminants).

(c) Labelling of process equipment and control equipment:

Example:



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OH000254

Control Equipment: Items (15) (a) thru (j) refer to the control equipment information.

15) Complete items (a) thru (j) for any air pollution control device or equipment related to the process equipment of this appendix. The primary collector and secondary collector refer to separate control devices or equipment for collecting similar or different air pollutants. If there is a third collector, complete the same data for that collector on a separate sheet. Additional information (e.g., drawings, design data, etc.) may be attached to this appendix.

(a) Insert the control equipment code letter.
(b) Name the manufacturer of the control equipment.
(c) Name the manufacturer's model number (if any).
(d) Fill in the year the control was or will be installed.
(e) Fill in the company's identifying name or number for the control device or equipment.
(f) Specify only the pollutant (air contaminant) controlled.
(g) Specify the controlled pollutant emission rate if known or measured, in pounds per hour (lbs/hr) or grains per standard cubic foot dry (g/scfd) or other appropriate units. Specify units.
(h) Specify the pressure drop, in inches H_2O, across the collector.
(i) Specify the design collection or removal efficiency of the collector for the controlled pollutant.
(j) Specify the operating collection or removal efficiency of the collector for the controlled pollutant. The operating efficiency is normally determined from a stack test.

Stack Data: Items (16) thru (22) refer to information for the stack or exhaust of this process.

(16) Indicate the company's identification for the stack or exhaust.

(17) If other sources are also vented to this same stack or exhaust indicate so and identify those sources.

(18) Specify the inside dimensions of the stack or exhaust at the outlet to the atmosphere.

(19) Specify the stack's or exhaust's height, in feet (ft.), above ground and above the attached roof.

(20) For the stack's or exhaust's exit gas complete the temperature in degrees Farenheit (^oF), the volume flow rate in actual cubic feet per minute (ACFM), and the velocity in feet per minute (ft/min). If the properties of the exit gas vary use the average values.

(21) Indicate if the stack or exhaust is equipped with air pollution monitoring equipment and if so specify the type, manufacturer, make or model, and the pollutant or pollutants monitored.

EPA 3100

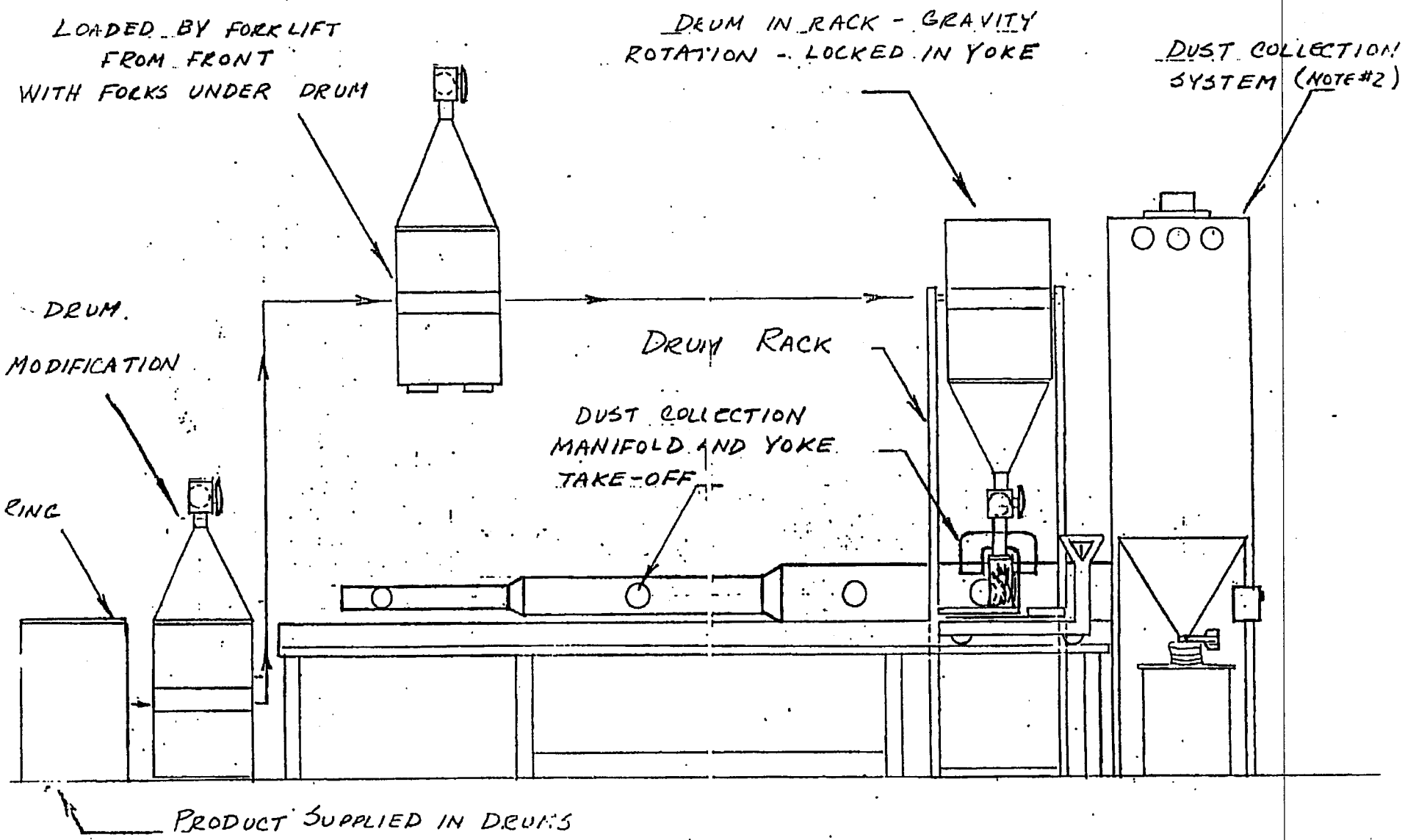
OH000255

tem

22) If air pollution emissions for this process have been determined and the data is included with (attached to) this appendix indicate so and check the method of determination (i.e. stack test, emission factor, or material balance). The stack test may be from either this reported process or a similar one located elsewhere. The emission factor calculation and determination should include a reference to the process emission factor and data relative to the collection or removal efficiency of any control equipment. The material balance method should include measurement methods and a flow diagram.

Completed by and Date: Write in the name of the person completing this form and the date.

EPA 3100



NOTE:

(1) ONLY SHOWING ONE UNIT. 7 WILL BE FABRICATED.

(2) FLEX-KLEEN MODEL BV-9 SN MK2-1494

GENERAL DATA
N.T.S. 1/21/83 . FEL

OH000257

t Office Use Only
Appropriate Box(es)

ir Discharge

ater Dischage to New
ource Treatment Works

olid Waste Disposal Facility

App F

For ice Use Only

APS Premise No. _____

PTI Appl. No. _____

Date Appl. Received _____

OHIO ENVIRONMENTAL PROTECTION AGENCY
Application for Permit to Install

CHI-VIT CORPORATION
cant's Name

P.O.Box 270
ing Address

Urbana | Champaign County | Ohio 43078 State | (513) 652-1341 Telephone Number

David S. Cameron, Director of Environmental Affairs (513) 652-1341
on to Contact (Name, Title and Telephone Number)

The source is installed in the southwest corner of the manufacturing
ion of Proposed Facility (State the location as completely and precisely as possible)*

facility located at 720 South Edgewood Ave., Urbana, Ohio 43078

Urbana city (City or Township) | Champaign (County)

DIRECTIONS: A Permit to Install is required under the provisions of OAC Rule 3745-31. Complete each item on this application form. An application cannot be considered unless all questions are answered and required supplemental information submitted. If any of the information requested does not apply to your situation, then state the reasons why it does not apply. This application must be signed as provided for in OAC Rule 3745-31-04(B) or it will not be accepted. Applicants for permits which involve air emissions or waste water treatment facilities are advised they will be required to pay a fee upon approval of their applications as provided for in OAC Rule 3745-45-02.

Name of Source: Dry milling-screening & bagging equipment

oduct or Use of Source: powdered vitreous enamel frit

Will the proposed source involve any of the following: Check all that apply.

A. X Air Discharge

B. _____ Waste Water Treatment Works

C. _____ Solid Waste Disposal Facility

AMPLE: "The source will be constructed on a 20 Acre plot to be located on Franklin Township Road No. 17, approximately 1 1/4 miles north of the intersection of State Route 99 and Franklin Township Road No. 17."

Date construction to begin, if known: 1976

Equipment Description (boiler, incinerator, etc.):

Vibro-mill ; Screen-packer

Your Identification for Source:

E-14, E-14A

Manufacturer: Sweco

Make or Model No.: Mill DM-70, Screen TS-30

Operating Schedule: Hours/Day 24 Days/Week 5 Days/Year 250

Percentage of Total Use by Season:

Winter 25 Spring 25 Summer 25 Fall 25

Type of Process:

Continuous X Batch

Does process involve the use of (check all applicable):

Lead NO Asbestos NO Beryllium NO Mercury NO

The following information must be submitted on a separate piece of paper and attached to this application. Each and every item must be completed, labeled, and listed in order stated.

Describe the product or service to be produced by the applicant along with a description of the proposed source.

List the name and quantity of all materials and chemicals, dry, wet, or gaseous, that will be used or produced by the source.

State the anticipated quality of all types of environmental pollutants to be emitted by the source. (This includes all wastewater discharges, all air emissions and solid waste regardless of disposal method.).

State in detail the method for disposal of all environmental pollutants listed in response to Question 15. (This should include a complete description of any control equipment to be employed.).

(a) If wastewater is an anticipated waste and it is to be discharged to a surface water, state the anticipated concentration (mg/l) and loading (lbs/day) in the discharge and the effect this discharge will have on the surface water under critical conditions.

(b) If wastewater is an anticipated waste and it is to be discharged to the groundwater, state the anticipated concentration (mg/l) and loading (lbs/day) in the wastewater and the effect this wastewater will have on the groundwater.

If wastewater is to be discharged to a sewerage system, what will be the effect on the sewerage system and wastewater treatment system.

19. Describe any proposed monitoring devices to be installed by the applicant.

20. State the local zoning requirements.

21. Will the proposed source comply with all laws, rules and regulations of the Ohio EPA and U.S. EPA?

22. Will the proposed source employ the best available technology and not cause significant degradation of any air or water which at the time of installation meets or is better than applicable air or water standards?

23. Will the proposed source conform with area-wide waste management plans for wastewater treatment and solid waste?

24. If the proposed source is a wastewater treatment facility submit general plans for approval for the proposed source in conformity with the requirements of OAC Rule 3745-31-05.

25. With regard to the source described in Question No. 1 of this application, has a previous plan submission or OEPA application of any type been filed prior to the submission of the present Permit to Install application? If so, state the date and type of the application previously submitted.

26. If the proposed source is a Process, complete Appendix A.

If the proposed source is a Fuel-fired Indirect Heat Exchanger (e.g boiler etc.), complete Appendix B.

If the proposed source is an Incinerator, complete Appendix C.

If the proposed source is a Spray Booth, complete Appendix D.

If the proposed source is a Storage Tank, complete Appendix E.

If the proposed source is a Solid Waste Disposal Facility, complete Appendix F.

James F. Roiser
Signature of Applicant

General Manager
Title

P.O.Box 270, Urbana, Ohio 43078
Address

Signature of General Contractor or Agent Performing installation, if selected. (See OAC Rule 3745-31-04(B)

Company

Address

Chi-Vit

Chi-Vit Corporation 720 South Edgewood Avenue Urbana, Ohio 43078
513 652-1341

Ohio EPA PTI Application Answers

13. Dry milled vitreous enamel frit for the appliance industry produced in a Sweco Vibro-mill and Screen-packer.
14. Powdered vitreous enamel frit produced from flaked vitreous enamel frit. Materials and process are all dry.
15. Non-hazardous dust from dry ball mill operation.
16. See Question 15 (Control Equipment data) on page A-2 of Appendix "A". Dust collected is then returned to smelter for resmelting.
17. N/A
18. N/A
19. No monitoring devices are to be installed.
20. See Section 150.92 City of Urbana, Ohio, Code of Ordinances (attached).
21. Yes.
22. Yes.
23. N/A
24. N/A
25. Yes. See cover letter.

DIVISION OF
EAGLE PICHER

ise No. ___/___/___/___
ce No. ___/___
ication No. ___/___

APPENDIX A, PROCESS

PROCESS DATA

Name of process Dry milling-screening & bagging

End product of this process powdered vitreous enamel frit

Primary process equipment Vibro-mill ; Screen-packer

Your identification E-14, E-14A Year Installed 1976

Manufacturer Sweco Make or model Mill DM-70; Screen TS30

Capacity of equipment (lbs./hr): Rated 1,000. Max. ___

Method of exhaust ventilation: ☐ Stack ☐ Window fan ☐ Roof vent
☒ Other, describe Bag house

Are there multiple exhausts? ☐ Yes ☐ No

OPERATING DATA

Normal operating schedule: 24 hrs./day, 5 days/wk., 50 wks./year.

Percent annual production (finished units) by season:
Winter 25 Spring 25 Summer 25 Fall 25

Hourly production rates (lbs.): Average 750 Maximum 850

Annual production (indicate units) Unknown
Projected percent annual increase in production Unknown

Type of operation: ☒ Continuous ☐ Batch

If batch, indicate Minutes per cycle ___ Minutes between cycles ___

Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr.)
See Attachment "A" of	0511010000P001	

A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products, Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

See Drawing D-U-78-9 Attachment "B"

CONTROL EQUIPMENT

Control Equipment Code:

(A) Settling chamber
(B) Cyclone
(C) Multiple cyclone
(D) Electrostatic precipitator
(E) Fabric filter
(F) Spray chamber
(G) Cyclonic scrubber
(H) Impingement scrubber
(I) Orifice scrubber
(J) Venturi scrubber
(K) Plate or tray tower
(L) Packed tower
(M) Adsorber
(N) Condenser
(O) Afterburner - catalytic
(P) Afterburner - thermal
(Q) Other, describe _____

15. Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	(E) Fabric filter	
(b) Manufacturer	Mikro pul	
(c) Model No.	25 S 8-30	
(d) Year installed	1976	
(e) Your identification	C-9	
(f) Pollutant Controlled	Particulate	
(g) Controlled pollutant emission rate (if known)	0.04 lb/hr.	
(h) Pressure drop	6".	
(i) Design efficiency	99.9	
(j) Operating efficiency	99.9	

STACK DATA

Your stack identification S-9

17. Are other sources vented to this stack? ☐ Yes ☒ No
If yes, identify sources _____

18. Type: ☐ Round, top inside diameter dimension _____
☒ Rectangular, top inside dimensions (L) 9" x (W) 9"

19. Height: Above roof 2'6" ft., above ground 24'11" ft.

20. Exit gas: Temp Ambient °F, Volume 1600 ACFM, Velocity 2842 ft./min.

21. Continuous monitoring equipment: ☐ Yes ☒ No
If yes, indicate: Type _____, Manufacturer _____
Make or Model _____, Pollutant(s) monitored _____

22. Emission data: Emissions from this source have been determined and such data is included with this appendix: ☐ Yes ☐ No
If yes, check method: ☐ Stack Test ☐ Emission factor ☒ Material balance

Completed by [signature], Date June 25, 1981

conditional use. Residential development is prohibited. Other commercial and industrial development may be introduced under the Planned Unit Development approach. Central water and sewer facilities are required. (Ord. 3328, passed 3-14-78)

150.88 LOCAL BUSINESS DISTRICT (B-2).

The purpose of the Local Business District is to provide land for small retail and personal service establishments offering convenience-type goods and services for the daily needs of the people in the immediate neighborhood or area. Residential and other commercial developments are prohibited unless introduced under the Planned Unit Development approach. Central water and sewer facilities are required. (Ord. 3328, passed 3-14-78)

150.89 CENTRAL BUSINESS DISTRICT (B-3).

The purpose of the Central Business District is to provide land for retail, service, office, institutional, commercial, recreational, and cultural facilities that are fully compatible in an intensely developed or developing commercial center and for a logical expansion of the compacted core. Multi-family housing is permitted in downtown overhead business area, other residential and commercial developments are prohibited unless introduced under the Planned Unit Development approach. Manufacturing or industrial development is prohibited. Central water and sewer facilities are required. (Ord. 3328, passed 3-14-78)

150.90 MANUFACTURING DISTRICTS.

Manufacturing districts are established to meet the purposes set forth in §§ 150.91 and 150.92. (Ord. 3328, passed 3-14-78)

150.91 LIGHT MANUFACTURING DISTRICT (M-1).

The purpose of the Light Manufacturing District is to provide land for manufacturing or industrial establishments which are clean, quiet, and free of hazardous or objectionable elements such as noise, odor, dust, smoke, etc.; operate within enclosed structures; and generate little industrial traffic. Heavy manufacturing or industrial development is prohibited. Commercial activities compatible with light manufacturing uses are permitted, other commercial development is prohibited unless introduced under the Planned Unit Development approach. Central water and sewer facilities are required. (Ord. 3328, passed 3-14-78)

150.92 HEAVY MANUFACTURING DISTRICT (M-2).

The purpose of the Heavy Manufacturing District is to provide land for major manufacturing, processing, storage, warehousing, research, and testing establishments which require large sites, extensive community services and facilities, ready access to regional transportation; have large, open storage and service areas;

generate heavy traffic; and create no nuisance discernible beyond the district to any large extent. Residential development is prohibited. Light manufcturing or industrial uses are permitted as conditional uses. Commercial activities compatible with the heavy manufacturing uses are permitted, other commercial development is prohibited unless introduced under the Planned Unit Development approach. Central water and sewer facilities are required. (Ord. 3328, passed 3-14-78)

DISTRICT REGULATIONS

§ 150.95 COMPLIANCE WITH REGULATIONS.

The regulations for each district set forth by this chapter shall be minimum regulations and shall apply uniformly to each class or kind of structure or land, except as hereinafter provided; or as otherwise granted by the board of zoning appeals.

(A) No building, structure, or land shall be used or occupied and no building or structure or part thereof shall be erected, constructed, reconstructed, moved, or structurally altered except in conformity with all of the regulations herein specified for the district in which it is located.

(B) No building or other structure shall be erected or altered for any of the following reasons, or in any other manner be contrary to the provisions of this chapter.

(1) To provide for greater height or bulk;

(2) To accommodate or house a greater number of families;

(3) To occupy a greater percentage of lot area;

(4) To have narrower or smaller rear yards, front yards, side yards, or other open spaces.

(C) No yard or lot existing at the time of passage of this chapter shall be reduced in dimension or area below the minimum requirements set forth herein. Yards or lots created after the effective date of this chapter shall meet at least the minimum requirements set forth herein. (Ord. 3328, passed 3-14-78)

§ 150.96 OFFICIAL SCHEDULE OF DISTRICT REGULATIONS ADOPTED.

District regulations shall be as set forth in the official schedule of district regulations hereby adopted and declared to be a part of this chapter and in §§ 150.100 through 150.122, "Supplementary District Regulations." Regulations for mobile home parks shall be those specified in §§ 150.190 through 150.194. (Ord. 3328, passed 3-14-78)

OhioEPA

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

FOR OHIO EPA USE ONLY

APS APPL NO _____
DATE RECEIVED _____

CHI-VIT CORPORATION
Facility Name

DAVID S. CAMERON
Person to Contact

720 SOUTH EDGEWOOD AVE.
Facility Address

P.O. BOX 270
Mailing Address

City	County	Zip	City	State	Zip
URBANA	CHAMPAIGN	43078	URBANA	OHIO	43078

Telephone	Area	Number	Telephone	Area	Number
	513	652-1341		513	652-1341

(Application No., if this is a renewal application)

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

- X Appendix A, Process
- ____ Appendix B, Fuel-Burning Equipment
- ____ Appendix C, Incinerator
- ____ Appendix D, Surface Coating or Printing Operation
- ____ Appendix E, Storage Tank
- ____ Appendix H, Gasoline Dispensing Facility
- ____ Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
- ____ Appendix K, Surface Coating Line or Printing Line
- ____ Appendix L, Solvent Metal Cleaning
- ____ Appendix M, Fugitive Dust Emission Sources (Specify Appendix No.) _____
- ____ Appendix N, Rubber Tire Manufacturing
- ____ Appendix O, Dry Cleaning Facility
- ____ Appendix P, Synthesized Pharmaceutical Manufacturing
- ____ Other Appendix _____
- ____ Compliance Time Schedule

2. Description of Source (same as used on appendix): Vibro-mill; Screen-packer

3. Your Identification for Source (same as used on appendix): E-14,E-14A

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Authorized Signature*

GENERAL MANAGER
Title

JUNE 25, 1981
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

EPA 3161

ise No. ___/___/___/___
ce No. ___/___
ication No. ___/___

APPENDIX A, PROCESS

PROCESS DATA

Name of process Dry milling-screening & bagging

End product of this process powdered vitreous enamel frit

Primary process equipment Vibro-mill ; Screen-packer

Your identification E-14, E-14A Year Installed 1976

Manufacturer Sweco Make or model Mill DM-70; Screen TS30

Capacity of equipment (lbs./hr): Rated 1,000. Max. ___

Method of exhaust ventilation: ☐ Stack ☐ Window fan ☐ Roof vent
☒ Other, describe Bag house

Are there multiple exhausts? ☐ Yes ☐ No

OPERATING DATA

Normal operating schedule: 24 hrs./day, 5 days/wk., 50 wks./year.

Percent annual production (finished units) by season:
Winter 25 Spring 25 Summer 25 Fall 25

Hourly production rates (lbs.): Average 750 Maximum 850

Annual production (indicate units) Unknown
Projected percent annual increase in production Unknown

Type of operation: ☒ Continuous ☐ Batch

If batch, indicate Minutes per cycle ___ Minutes between cycles ___

Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr.)
See Attachment "A" of	0511010000P001	

A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products. Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

See Drawing D-U-78-9 Attachment "B"

CONTROL EQUIPMENT

Control Equipment Code:

(A) Settling chamber
(B) Cyclone
(C) Multiple cyclone
(D) Electrostatic precipitator
(E) Fabric filter
(F) Spray chamber
(G) Cyclonic scrubber
(H) Impingement scrubber
(I) Orifice scrubber
(J) Venturi scrubber
(K) Plate or tray tower
(L) Packed tower
(M) Adsorber
(N) Condenser
(O) Afterburner - catalytic
(P) Afterburner - thermal
(Q) Other, describe _____

Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	(E) Fabric filter	
(b) Manufacturer	Mikro pul	
(c) Model No.	25 S 8-30	
(d) Year installed	1976	
(e) Your identification	C-9	
(f) Pollutant Controlled	Particulate	
(g) Controlled pollutant emission rate (if known)	0.04 lb/hr.	
(h) Pressure drop	6"	
(i) Design efficiency	99.9	
(j) Operating efficiency	99.9	

STACK DATA

6. Your stack identification S-9

7. Are other sources vented to this stack? ☐ Yes ☒ No
   If yes, identify sources _____

8. Type: ☐ Round, top inside diameter dimension _____
   ☒ Rectangular, top inside dimensions (L) 9" x (W) 9"

9. Height: Above roof 2'6" ft., above ground 24'11" ft.

10. Exit gas: Temp Ambient °F, Volume 1600 ACFM, Velocity 2842 ft./min.

11. Continuous monitoring equipment: ☐ Yes ☒ No
    If yes, indicate: Type _____, Manufacturer _____
    Make or Model _____, Pollutant(s) monitored _____

12. Emission data: Emissions from this source have been determined and such data is included with this appendix: ☐ Yes ☐ No
    If yes, check method: ☐ Stack Test ☐ Emission factor ☒ Material balance

Completed by [signature], Date June 25, 1981

OhioEPA

State of Ohio Envir[illegible]ental Protection Agency
James A. Rhodes, G[illegible]nor
James F. McAvoy, Director

01

[illegible]mit to Operate an Air Contaminant Source

[illegible]rms and Conditions

of Issuance 02/02/79 Application Number 0511010000P007

[illegible]ctive Date 02/02/79 Permit Fee $ 50

[illegible] document constitutes issuance to: CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

permit to operate:
[illegible]Y MILLING-SCREENING & BAGGING
[illegible]14, E-14A

following terms and conditions are hereby expressly incorporated into this permit to operate:

[illegible]dition 1

above described air contaminant source is now operating, and over the period covered by the permit will be [illegible]ated, in full compliance with all applicable state and federal laws and regulations.

[illegible]dition 2

to any physical change in, or change in the method of operation of, this air contaminant source which increases amount of any air pollutant emitted, or results in the emission of any air pollutant not previously emitted, a permit [illegible] must be granted by the Ohio Environmental Protection Agency (See Chapter 3745-31 of the Ohio Administra-[illegible]

[illegible]ition 3

Director of the Ohio Environmental Protection Agency, or his authorized representative, may enter upon the [illegible]ises of the source operation at any reasonable time and subject to safety requirements of the person in control [illegible] premises for the purpose of making inspections, conducting tests, examining records or reports pertaining to [illegible]mission of air contaminants and determining compliance with all applicable State and Federal air pollution laws regulations and the terms and conditions of this permit.

[illegible]ition 4 (This condition applicable if checked: ☐)

[illegible] declaration of an Air Pollution Alert, Warning or Emergency Episode this air contaminant source will follow [illegible]e emission reduction procedures enumerated in the Emergency Action Plan approved by the Director for this [illegible]e.

[illegible]dition 5

[illegible]permit to operate shall be effective until 02/02/82. You will be contacted approximately six months to this date regarding the renewal of this permit. If you are not contacted, please write to this agency.

[illegible]dition 6

[illegible]mit fee in the amount specified above must be remitted within fifteen (15) days of the effective date of this permit.

[illegible]dition 7

[illegible]ansferee of this permit shall, personally, assume the responsibilities of the original permit holder-transferor. The Ohio EPA [illegible]e notified in writing of any transfer of this permit.

[illegible]dition 8 (This condition is applicable if checked: ☐)

permit is subject to the supplementary conditions attached.

[illegible]VIRONMENTAL PROTECTION AGENCY

EXHIBIT E

[illegible]IRECTOR

AP-PS-202
4/12/78

OhioEPA

'IO ENVIRONMENTAL PROTECTION AC TY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

FOR OHIO EPA USE ONLY

APS APPL NO _____
DATE RECEIVED _____

CHI-VIT CORPORATION
Facility Name

DAVID S. CAMERON
Person to Contact

720 SOUTH EDGEWOOD AVE.
Facility Address

P.O. BOX 270
Mailing Address

URBANA	CHAMPAIGN	43078
City	County	Zip

URBANA	OHIO	43078
City	State	Zip

	513	652-1341
Telephone	Area	Number

	513	652-1341
Telephone	Area	Number

0511010000P006
(Application No., if this is a renewal application)

1. Complete and attach any of the following appendices most appropriate to the air contaminan source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

____Appendix A, Process
____Appendix B, Fuel-Burning Equipment
____Appendix C, Incinerator
____Appendix D, Surface Coating or Printing Operation
____Appendix E, Storage Tank
____Appendix H, Gasoline Dispensing Facility
____Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
____Appendix K, Surface Coating Line or Printing Line
____Appendix L, Solvent Metal Cleaning
____Appendix M, Fugitive Dust Emission Source
_____ (Specify Appendix No.)
____Appendix N, Rubber Tire Manufacturing
____Appendix O, Dry Cleaning Facility
____Appendix P, Synthesized Pharmaceutical Manufacturing
____Other Appendix _____
____Compliance Time Schedule

2. Description of Source (same as used on appendix): CONVEYORS & BAGGERS

3. Your Identification for Source (same as used on appendix): _____

E-4,E-5,E-8,E-9,E-12,E-13

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereb apply for a Permit to Operate the air contaminant source(s) described herein. As required, th following additional documents are submitted as part of this application (describe all attach- nents):

James F. Parker
Authorized Signature*

GENERAL MANAGER
Title

JUNE 25, 1981
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

EPA 3161

OhioEPA

State of Ohio Envir ntal Protection Agency
James A. Rhodes, G or
James F. McAvoy, Director

01

ermit to Operate an Air Contaminant Source

rms and Conditions

e of Issuance 02/02/79 Application Number 0511010000P006

ctive Date 02/02/79 Permit Fee $ 90

s document constitutes issuance to: CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

permit to operate:
ONVEYORS & BAGGERS
E-4, E-5, E-8, E-9, E-12, E-13

following terms and conditions are hereby expressly incorporated into this permit to operate:

ndition 1

above described air contaminant source is now operating, and over the period covered by the permit will be erated, in full compliance with all applicable state and federal laws and regulations.

dition 2

r to any physical change in, or change in the method of operation of, this air contaminant source which increases amount of any air pollutant emitted, or results in the emission of any air pollutant not previously emitted, a permit n must be granted by the Ohio Environmental Protection Agency (See Chapter 3745-31 of the Ohio Administra-).

dition 3

Director of the Ohio Environmental Protection Agency, or his authorized representative, may enter upon the ises of the source operation at any reasonable time and subject to safety requirements of the person in control e premises for the purpose of making inspections, conducting tests, examining records or reports pertaining to emission of air contaminants and determining compliance with all applicable State and Federal air pollution laws regulations and the terms and conditions of this permit.

dition 4 (This condition applicable if checked: ☐)

on declaration of an Air Pollution Alert, Warning or Emergency Episode this air contaminant source will follow se emission reduction procedures enumerated in the Emergency Action Plan approved by the Director for this ce.

ndition 5

permit to operate shall be effective until 02/02/82. You will be contacted approximately six months to this date regarding the renewal of this permit. If you are not contacted, please write to this agency.

ndition 6

rmit fee in the amount specified above must be remitted within fifteen (15) days of the effective date of this permit.

ndition 7

ransferee of this permit shall, personally, assume the responsibilities of the original permit holder-transferor. The Ohio EPA be notified in writing of any transfer of this permit.

ndition 8 (This condition is applicable if checked: ☐)

permit is subject to the supplementary conditions attached.

IVIRONMENTAL PROTECTION AGENCY

ITRECTOR

EXHIBIT D

AP-PS-202

OhioEPA

'10 ENVIRONMENTAL PROTECTION AG TY
APPLICATION FOR A PERMIT TO OPE.TE
AN AIR CONTAMINANT SOURCE

FOR OHIO EPA USE ONLY

APS APPL NO _____
DATE RECEIVED _____

CHI-VIT CORPORATION
Facility Name

720 SOUTH EDGEWOOD AVE.
Facility Address

URBANA — City
CHAMPAIGN — County
43078 — Zip

513 — Area
652-1341 — Number
Telephone

DAVID S. CAMERON
Person to Contact

P.O. BOX 270
Mailing Address

URBANA — City
OHIO — State
43078 — Zip

513 — Area
652-1341 — Number
Telephone

0511010000P005
(Application No., if this is a renewal application)

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

____Appendix A, Process
____Appendix B, Fuel-Burning Equipment
____Appendix C, Incinerator
____Appendix D, Surface Coating or Printing Operation
____Appendix E, Storage Tank
____Appendix H, Gasoline Dispensing Facility
____Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
____Appendix K, Surface Coating Line or Printing Line
____Appendix L, Solvent Metal Cleaning
____Appendix M, Fugitive Dust Emission Sources
(Specify Appendix No.)
____Appendix N, Rubber Tire Manufacturing
____Appendix O, Dry Cleaning Facility
____Appendix P, Synthesized Pharmaceutical Manufacturing
____Other Appendix _____
____Compliance Time Schedule

2. Description of Source (same as used on appendix): MIXERS & FEEDERS

3. Your Identification for Source (same as used on appendix): E-2,E-6,E-10

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

James F. Rinker
Authorized Signature*

GENERAL MANAGER
Title

JUNE 25, 1981
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).
EPA 3161

OH000272

State of Ohio Envi[illegible]nental Protection Agency
James A. Rhodes, G[illegible]nor
James F. McAvoy, Director

01

'mit to Operate an Air Contaminant Source
'ms and Conditions

of Issuance 02/02/79

Application Number 0511010000P005

ive Date 02/02/79

Permit Fee $ 90

document constitutes issuance to: CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

permit to operate:
XERS & FEEDERS
, E-6, E-10

..llowing terms and conditions are hereby expressly incorporated into this permit to operate:

..ion 1
bove described air contaminant source is now operating, and over the period covered by the permit will be ated, in full compliance with all applicable state and federal laws and regulations.

.ion 2
any physical change in, or change in the method of operation of, this air contaminant source which increases [illegible]nt of any air pollutant emitted, or results in the emission of any air pollutant not previously emitted, a permit [illegible]ll must be granted by the Ohio Environmental Protection Agency (See Chapter 3745-31 of the Ohio Administra- de).

..ion 3
Director of the Ohio Environmental Protection Agency, or his authorized representative, may enter upon the es of the source operation at any reasonable time and subject to safety requirements of the person in control premises for the purpose of making inspections, conducting tests, examining records or reports pertaining to emission of air contaminants and determining compliance with all applicable State and Federal air pollution laws regulations and the terms and conditions of this permit.

ion 4 (This condition applicable if checked: ☐)
declaration of an Air Pollution Alert, Warning or Emergency Episode this air contaminant source will follow e emission reduction procedures enumerated in the Emergency Action Plan approved by the Director for this

dition 5
ermit to operate shall be effective until 02/02/82. You will be contacted approximately six months this date regarding the renewal of this permit. If you are not contacted, please write to this agency.

dition 6
it fee in the amount specified above must be remitted within fifteen (15) days of the effective date of this permit.

dition 7
nsferee of this permit shall, personally, assume the responsibilities of the original permit holder-transferor. The Ohio EPA notified in writing of any transfer of this permit.

dition 8 (This condition is applicable if checked: ☐)
ermit is subject to the supplementary conditions attached.

ENVIRONMENTAL PROTECTION AGENCY

EXHIBIT C

AP-PS-202

OhioEPA

'IO ENVIRONMENTAL PROTECTION AC TY
APPLICATION FOR A PERMIT TO OPE...TE
AN AIR CONTAMINANT SOURCE

FOR OHIO EPA USE ONLY

APS APPL NO _____
DATE RECEIVED _____

CHI-VIT CORPORATION
Facility Name

DAVID S. CAMERON
Person to Contact

720 SOUTH EDGEWOOD AVE.
Facility Address

P.O. BOX 270
Mailing Address

URBANA	CHAMPAIGN	43078	URBANA	OHIO	43078
City	County	Zip	City	State	Zip

	513	652-1341		513	652-1341
Telephone	Area	Number	Telephone	Area	Number

0511010000P004
(Application No., if this is a renewal application)

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

____Appendix A, Process
____Appendix B, Fuel-Burning Equipment
____Appendix C, Incinerator
____Appendix D, Surface Coating or Printing Operation
____Appendix E, Storage Tank
____Appendix H, Gasoline Dispensing Facility
____Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
____Appendix K, Surface Coating Line or Printing Line
____Appendix L, Solvent Metal Cleaning
____Appendix M, Fugitive Dust Emission Sources
_____ (Specify Appendix No.)
____Appendix N, Rubber Tire Manufacturing
____Appendix O, Dry Cleaning Facility
____Appendix P, Synthesized Pharmaceutical Manufacturing
____Other Appendix _____
____Compliance Time Schedule

2. Description of Source (same as used on appendix): _____

RAW BATCHING - 7 WEIGH & BATCH STATIONS

3. Your Identification for Source (same as used on appendix): _____

E-1

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

James F. Parker
Authorized Signature*

GENERAL MANAGER
Title

JUNE 25, 1981
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

EPA 3161

State of Ohio Envi[illegible]mental Protection Agency
James A. Rhodes, G[illegible]rnor
James F. McAvoy, D[illegible]ector

01

'mit to Operate an Air Contaminant Source
ms and Conditions

[illegible]f Issuance 02/02/79

Application Number 0511010000P004

[illegible]ive Date 02/02/79

Permit Fee $ 90

[illegible]ocument constitutes issuance to: CHI VIT CORPORATION
720 SOUTH EDGEWOOD AVENUE
URBANA OHIO 43078

[illegible]ermit to operate:
[illegible] BATCHING - 7 WEIGH & BATCH STATIONS

[illegible]llowing terms and conditions are hereby expressly incorporated into this permit to operate:

[illegible]ition 1
[illegible]bove described air contaminant source is now operating, and over the period covered by the permit will be [illegible]ed, in full compliance with all applicable state and federal laws and regulations.

[illegible]ion 2
[illegible]o any physical change in, or change in the method of operation of, this air contaminant source which increases [illegible]nt of any air pollutant emitted, or results in the emission of any air pollutant not previously emitted, a permit [illegible] must be granted by the Ohio Environmental Protection Agency (See Chapter 3745-31 of the Ohio Administra[illegible]de).

[illegible]ion 3
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[illegible] declaration of an Air Pollution Alert, Warning or Emergency Episode this air contaminant source will follow [illegible]e emission reduction procedures enumerated in the Emergency Action Plan approved by the Director for this [illegible].

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[illegible]dition 8 (This condition is applicable if checked: ☐)
[illegible]ermit is subject to the supplementary conditions attached.

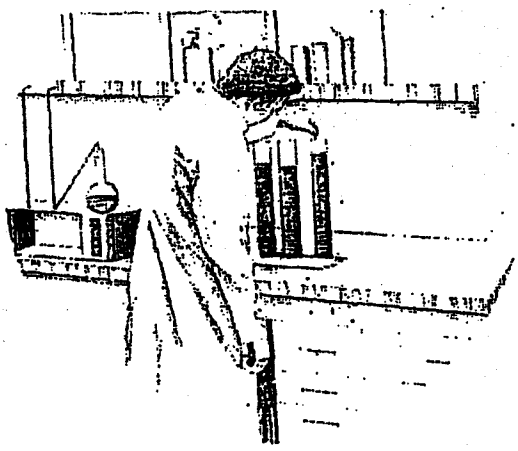
ENVIRONMENTAL PROTECTION AGENCY

EXHIBIT B

[illegible]RECTOR

AP-PS-202
4/12/78

APPENDIX G



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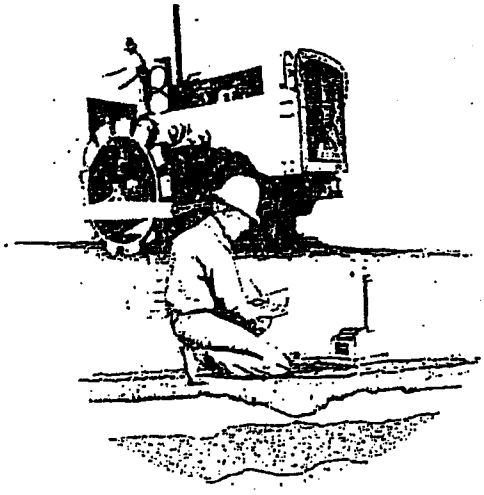

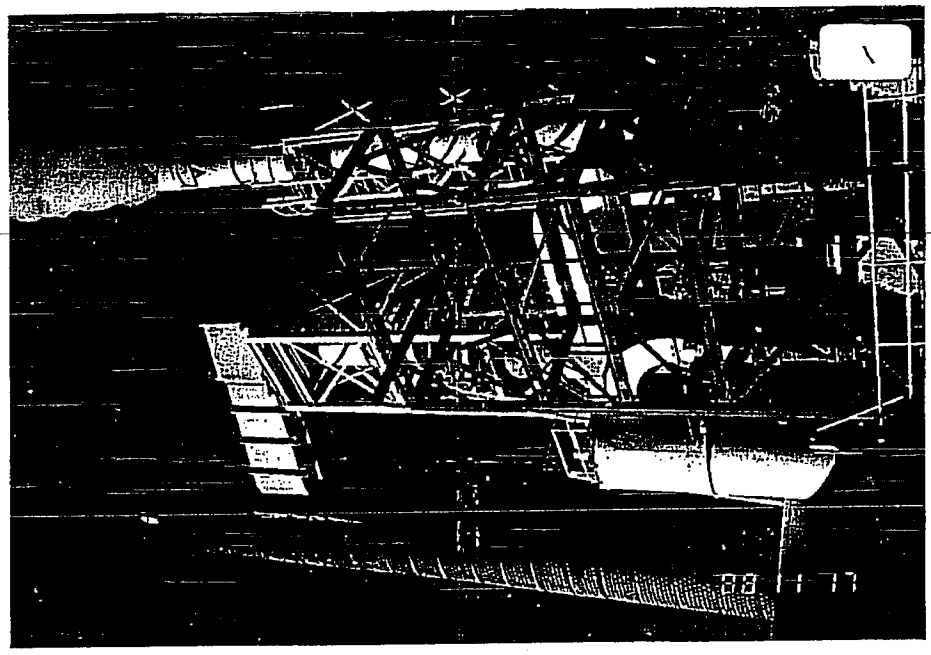
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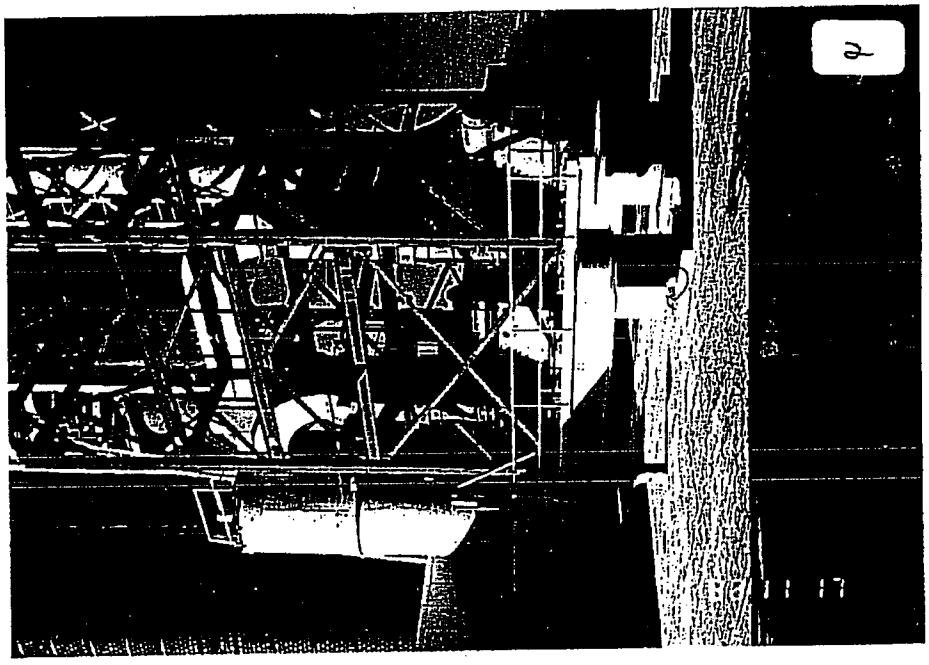
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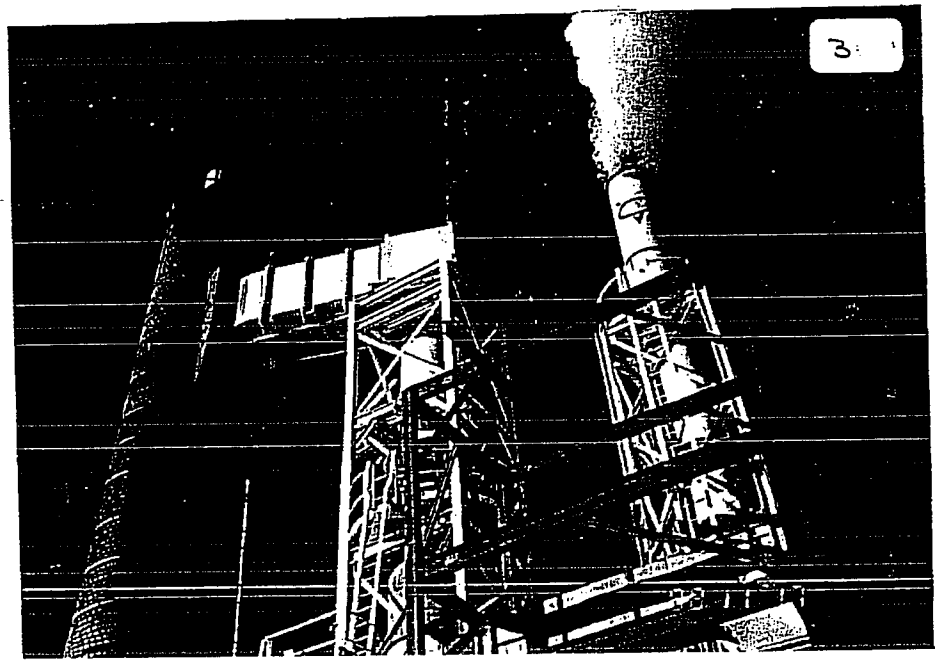
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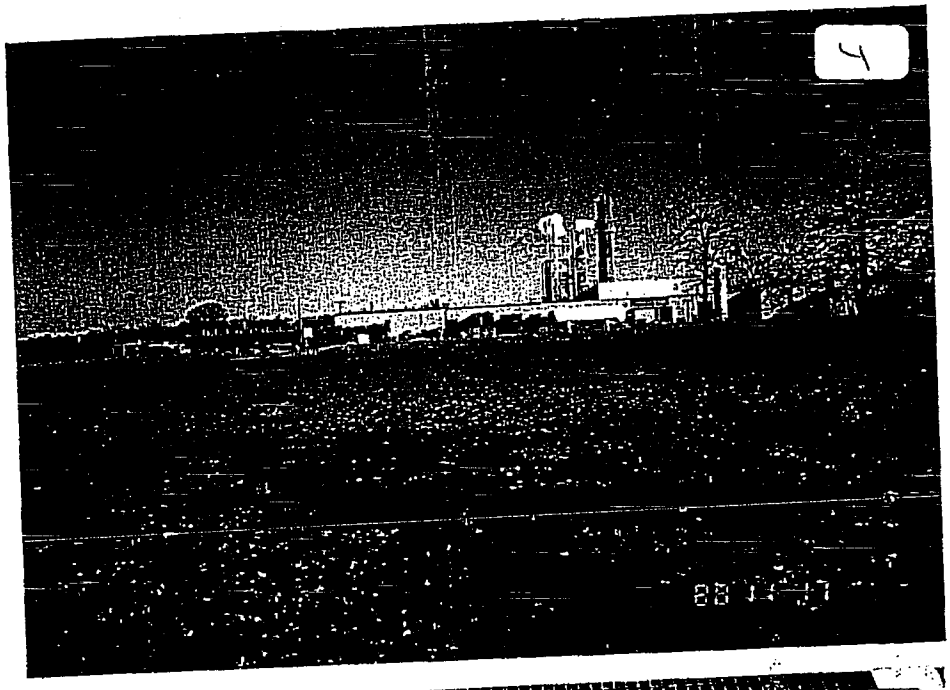
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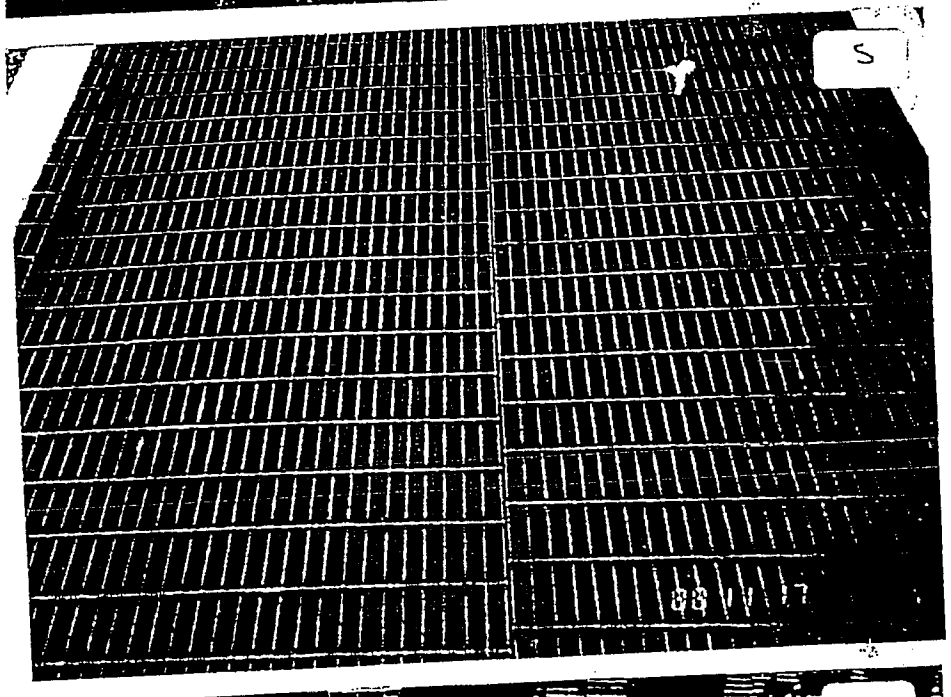
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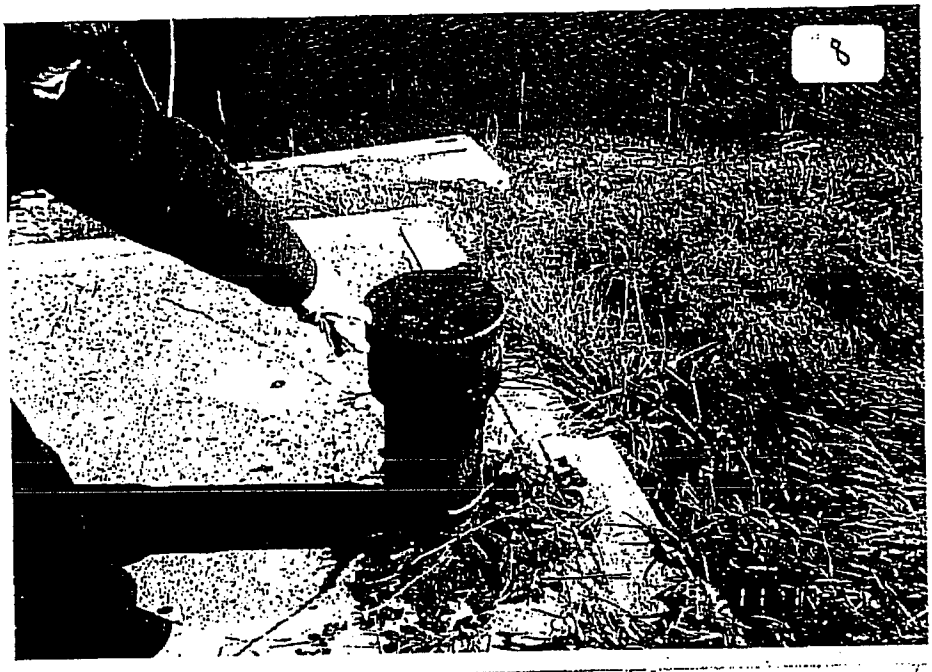
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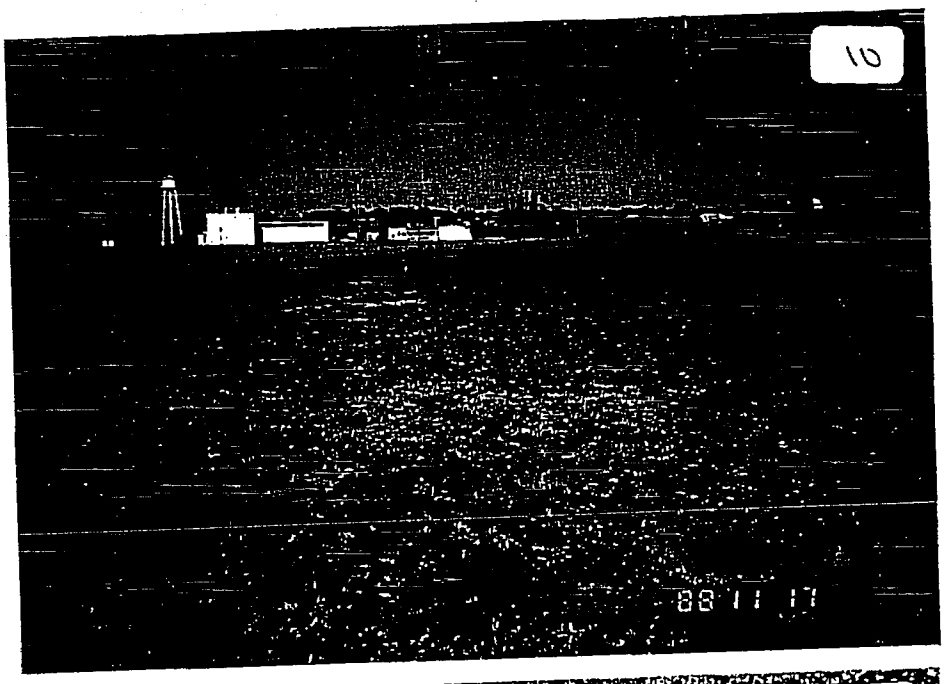
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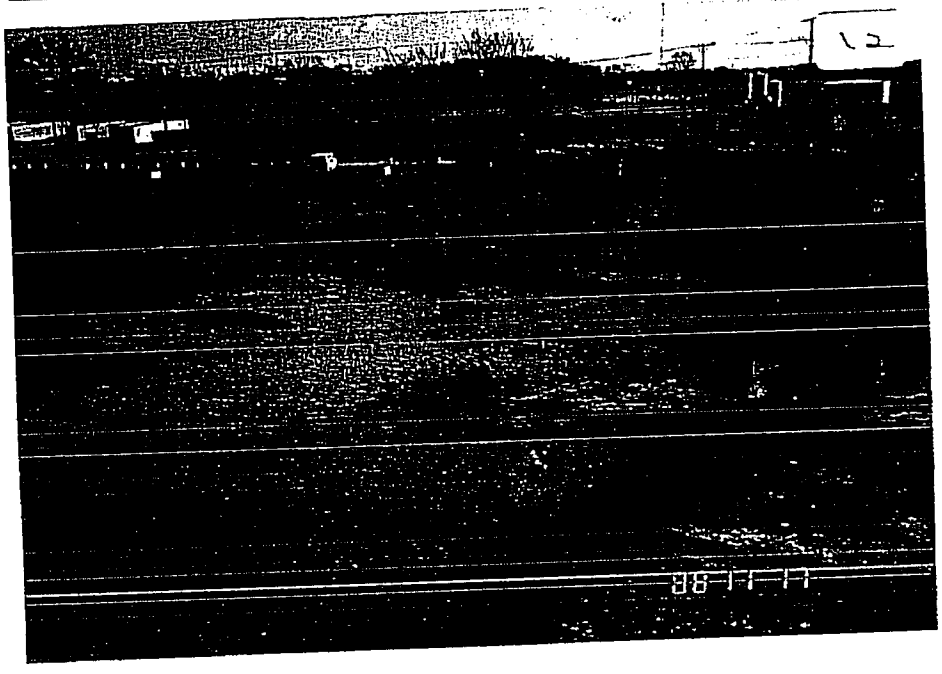
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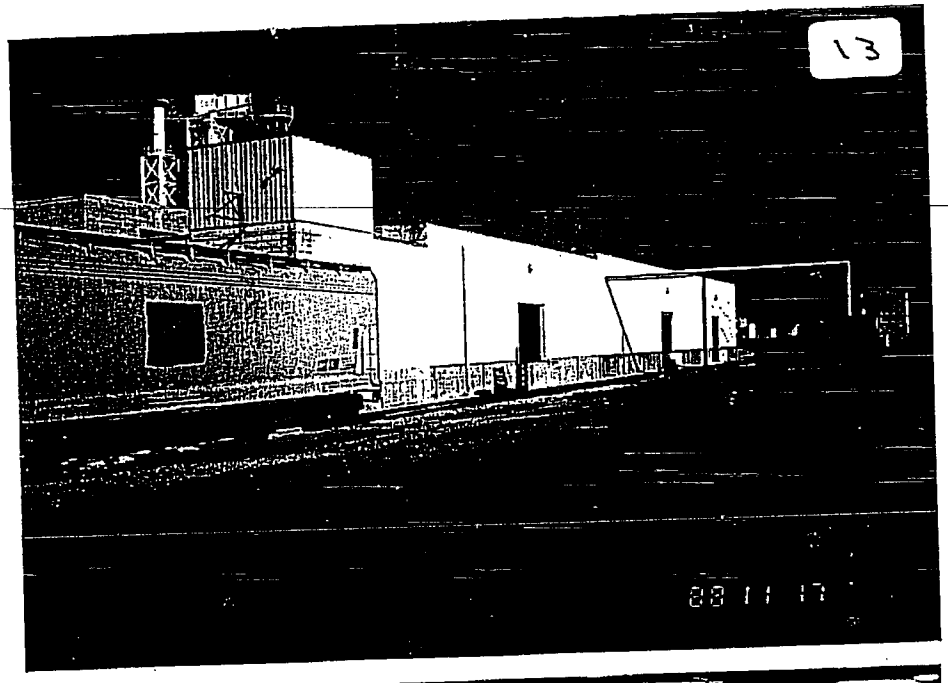
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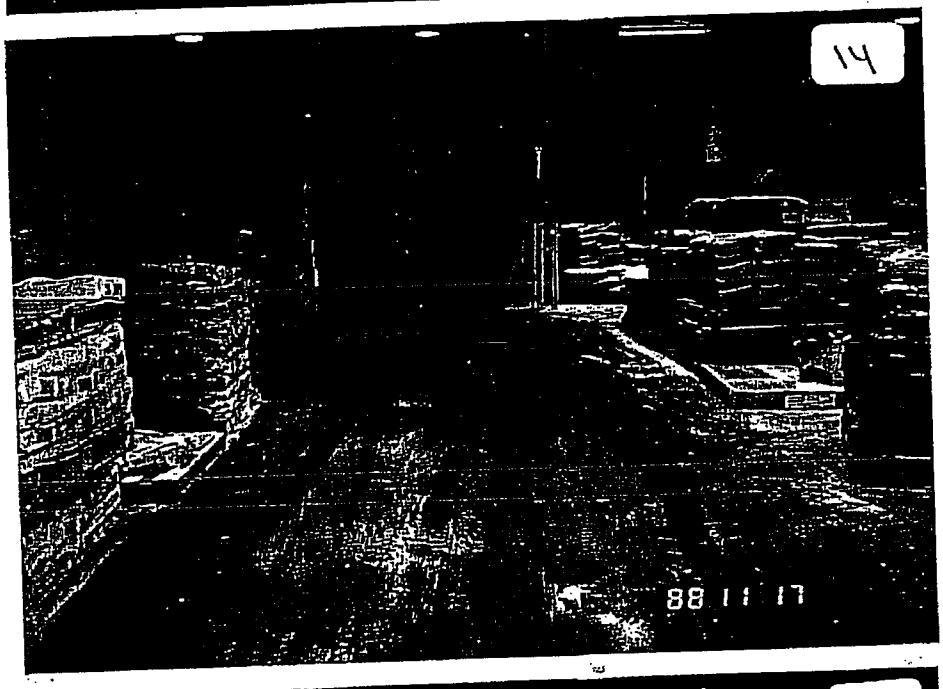
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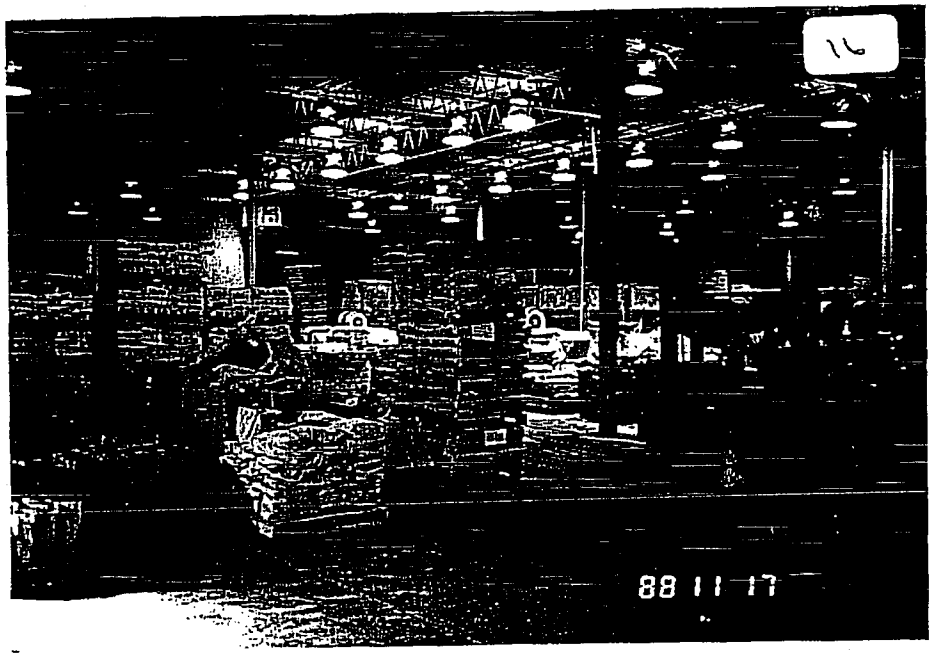
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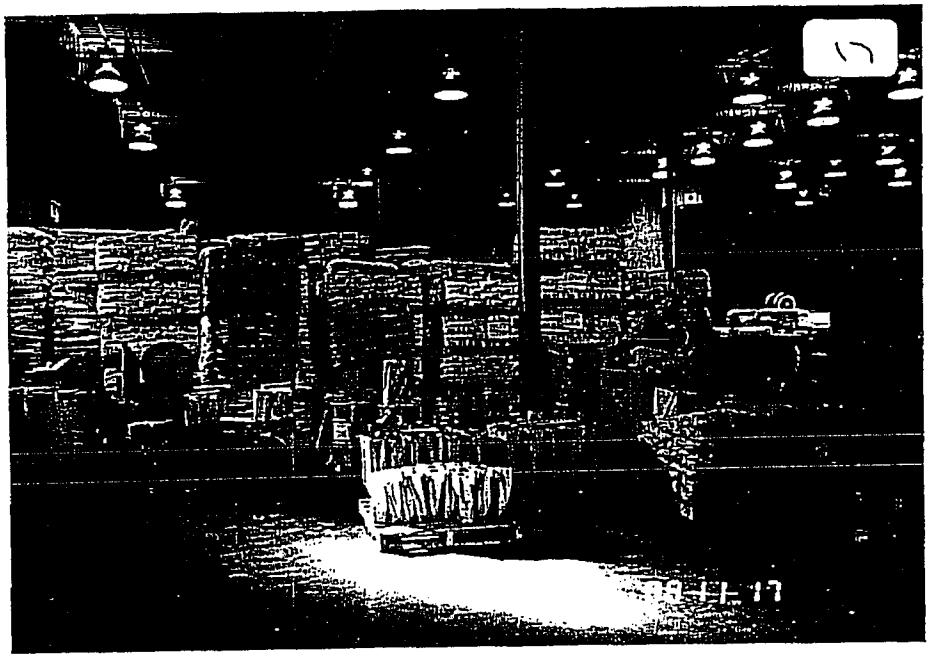
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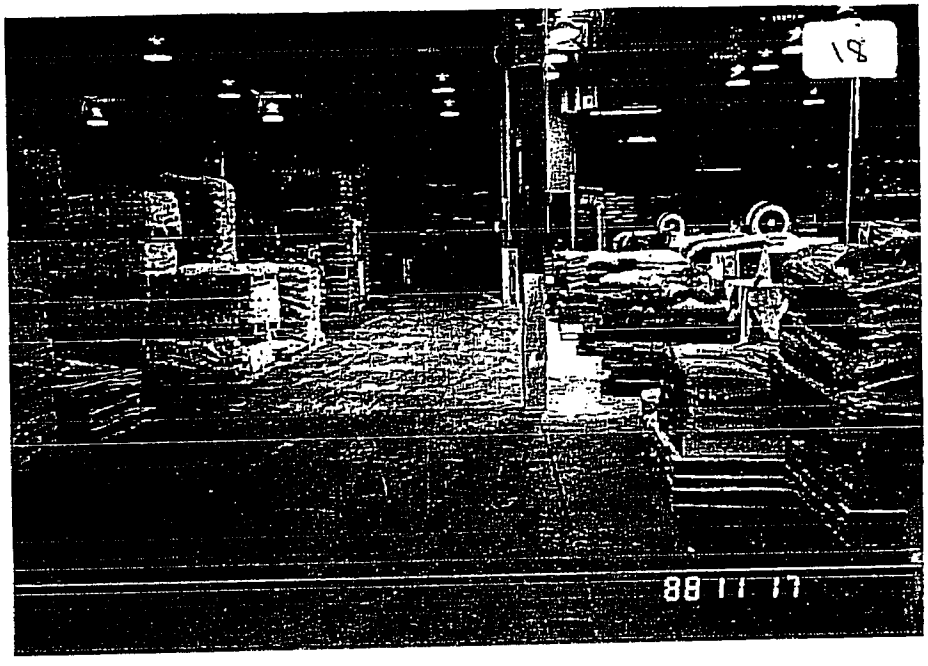
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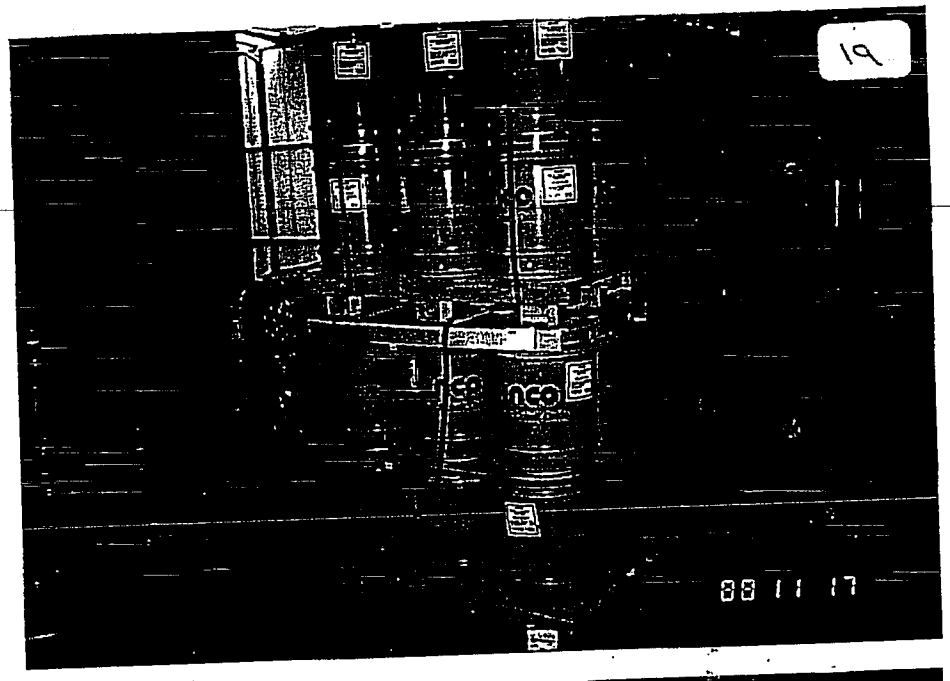
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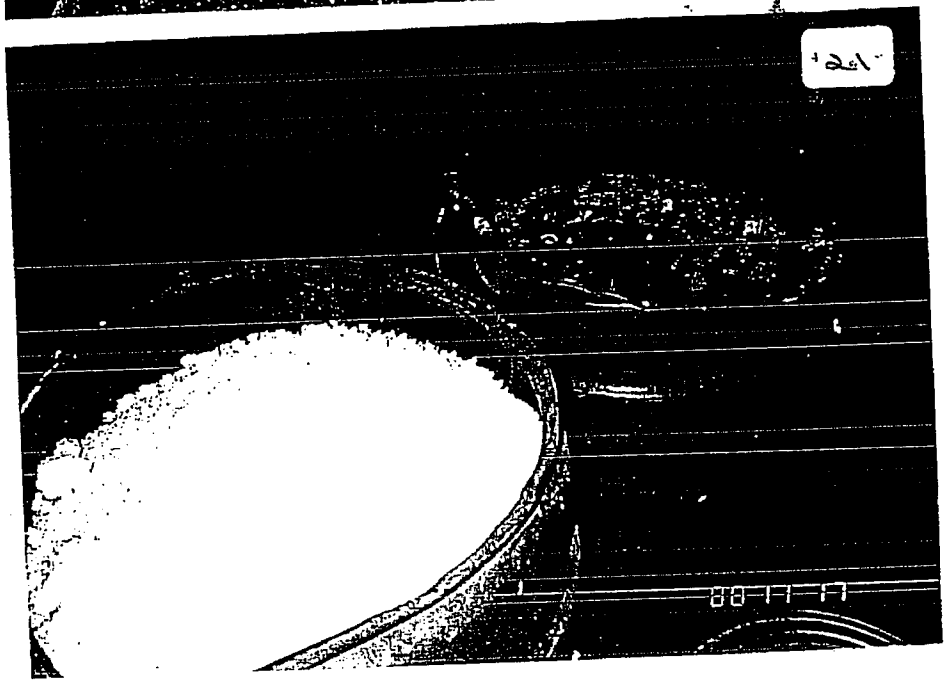
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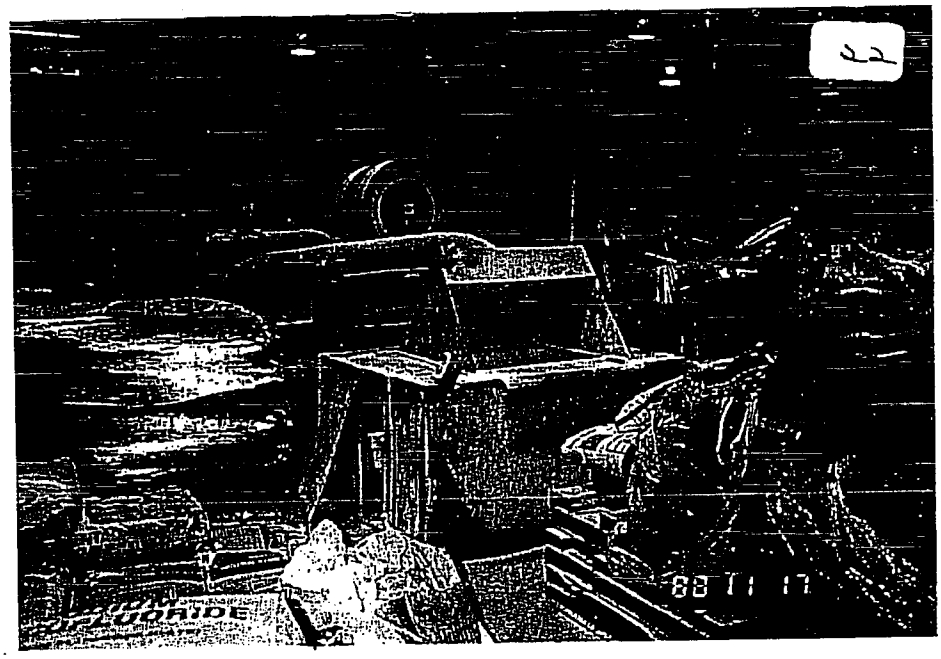
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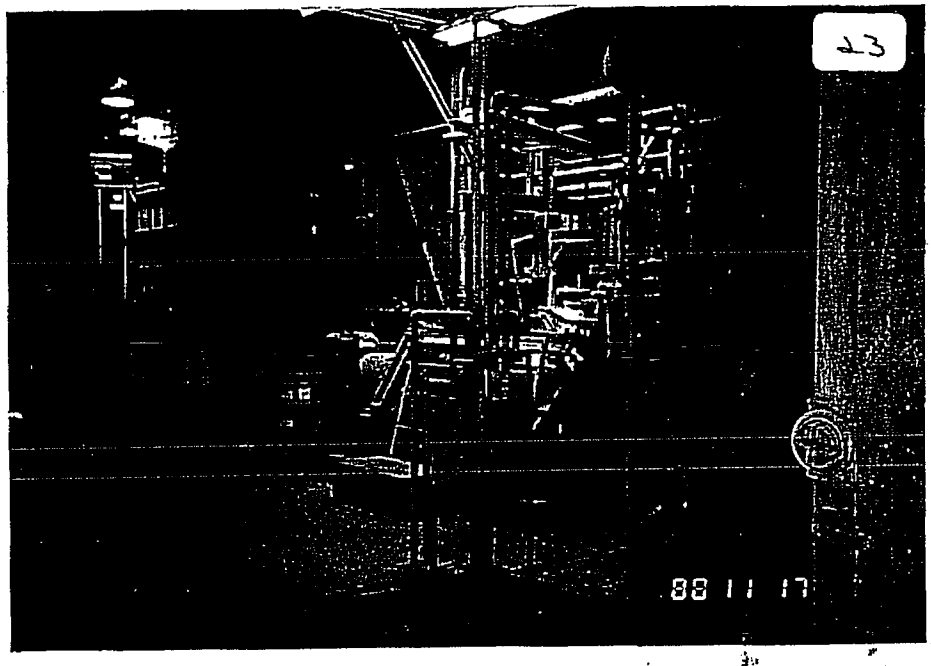
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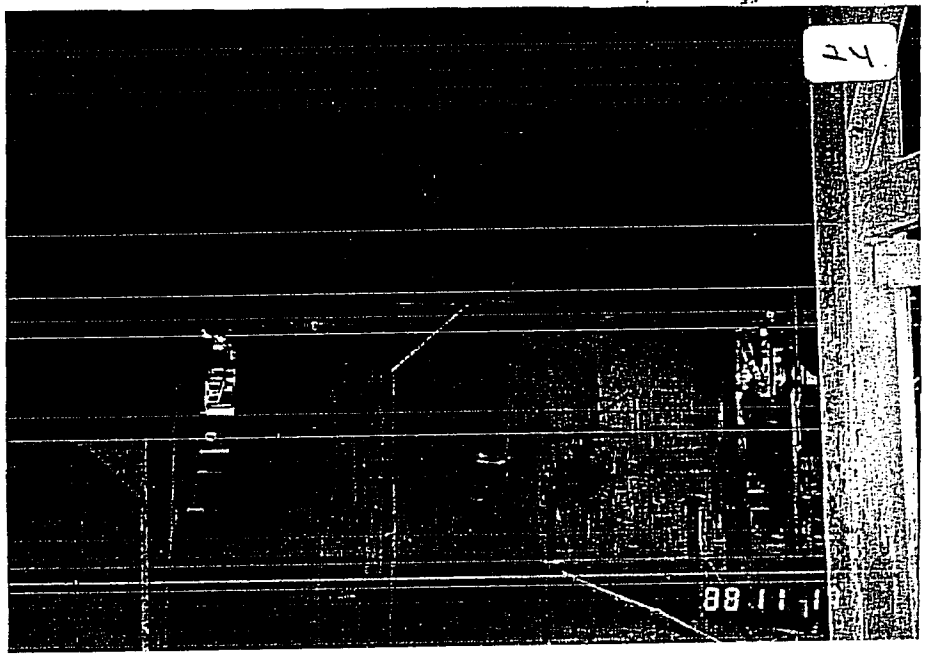
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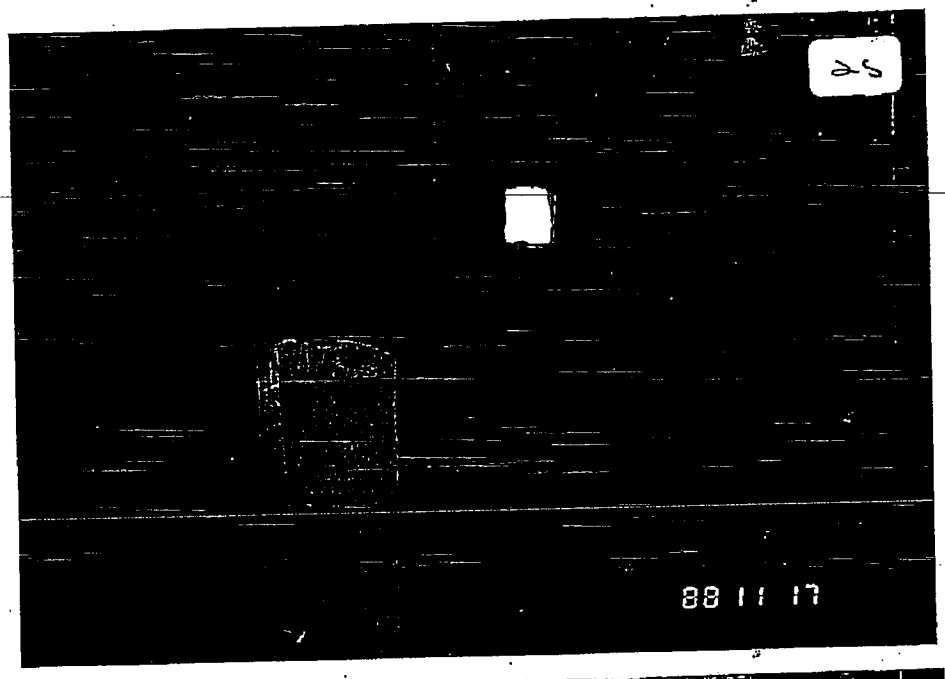
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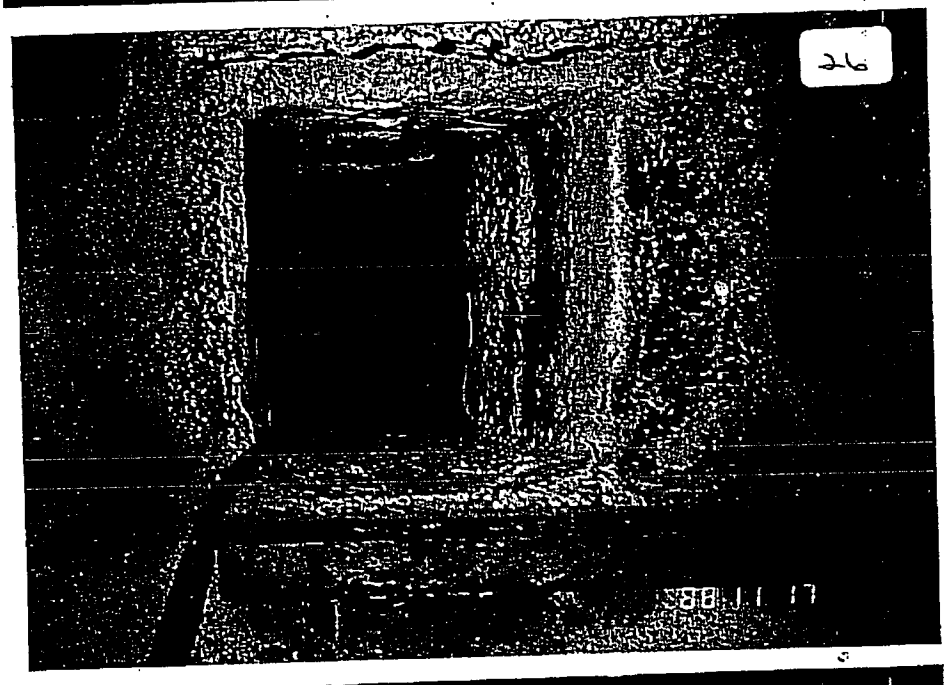
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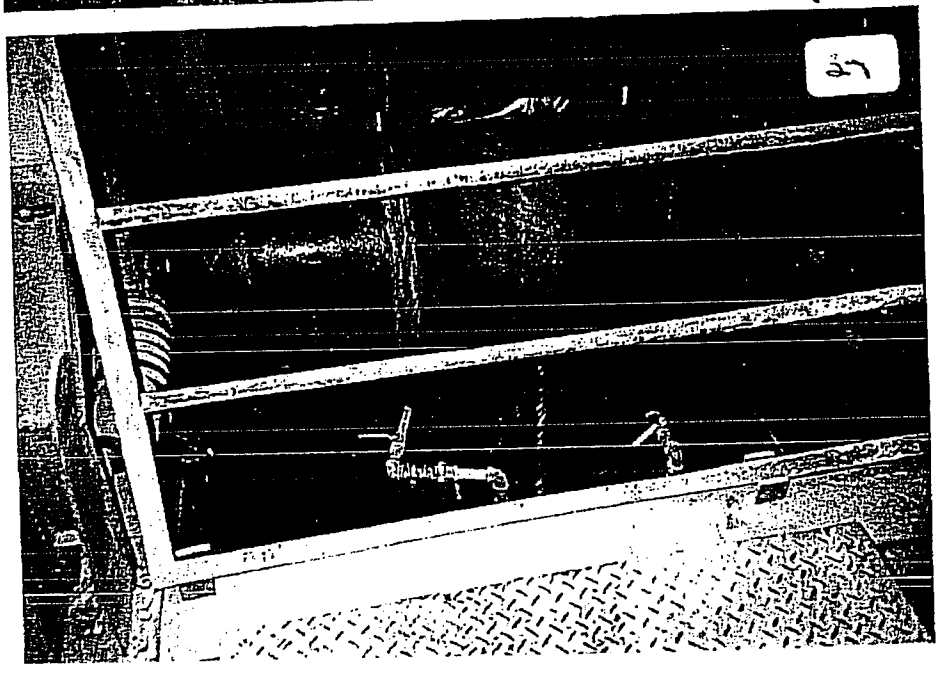
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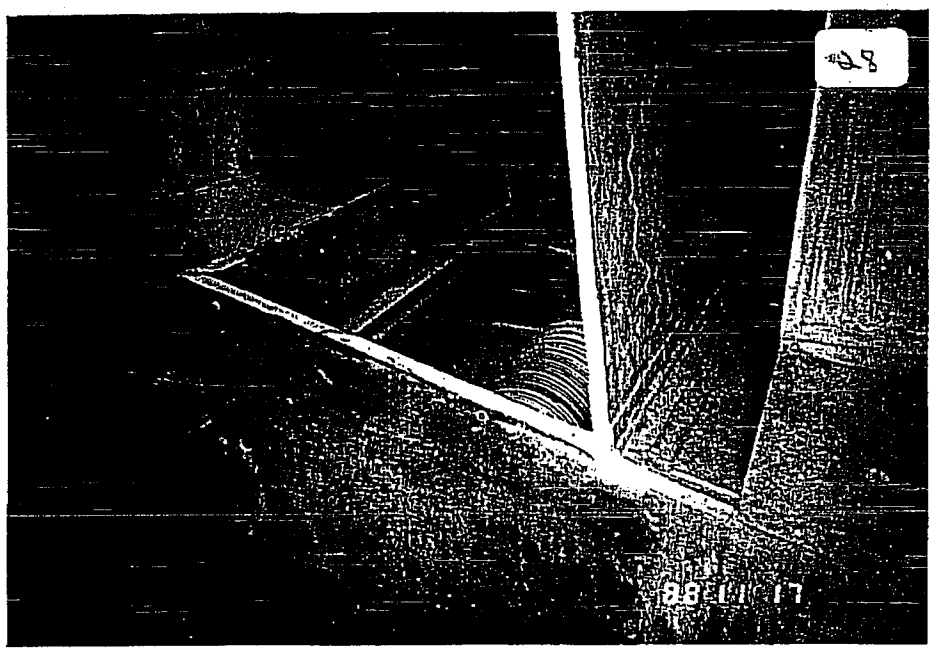
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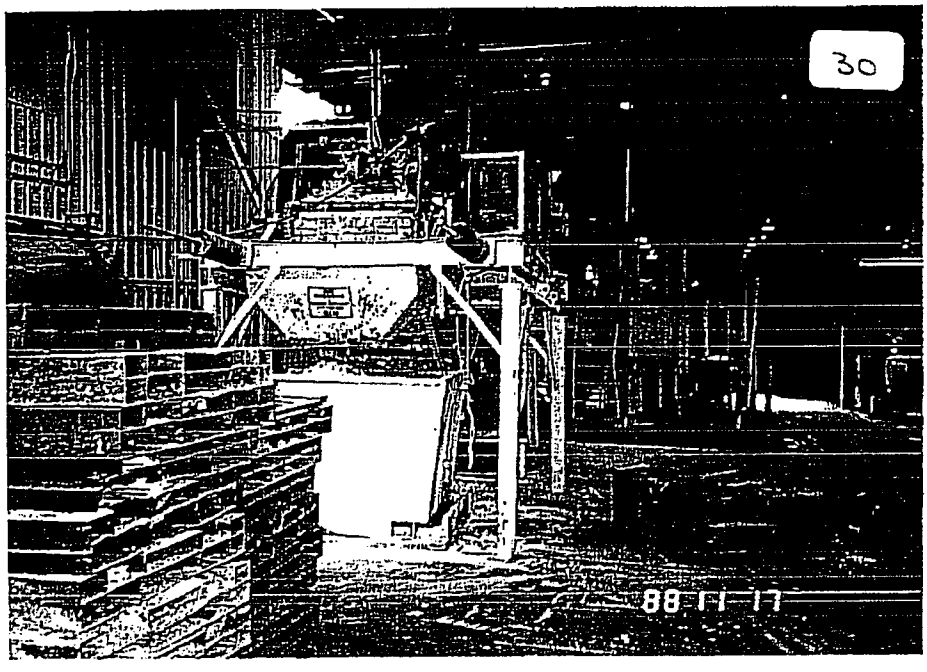
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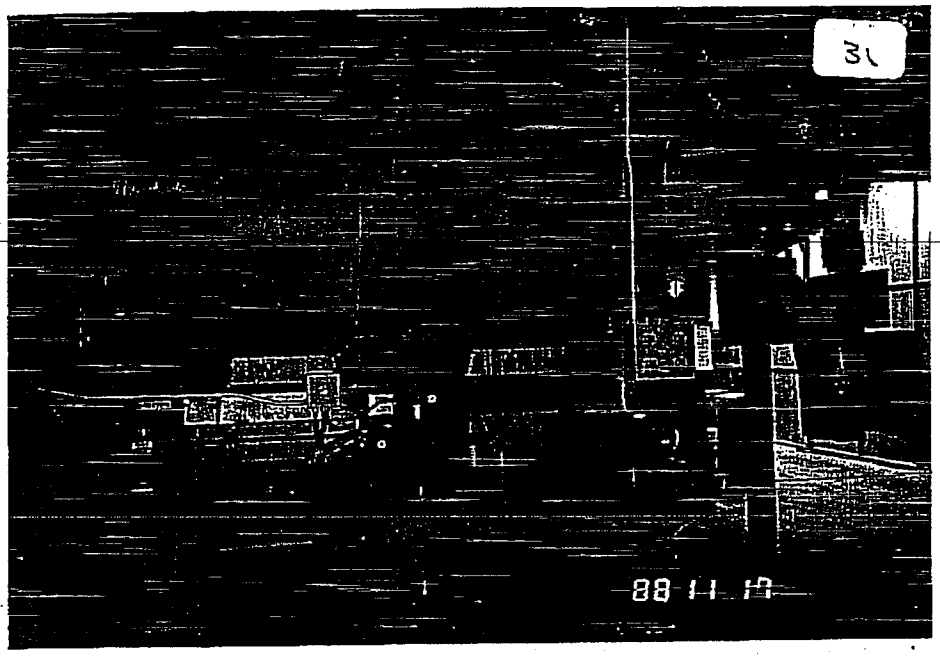
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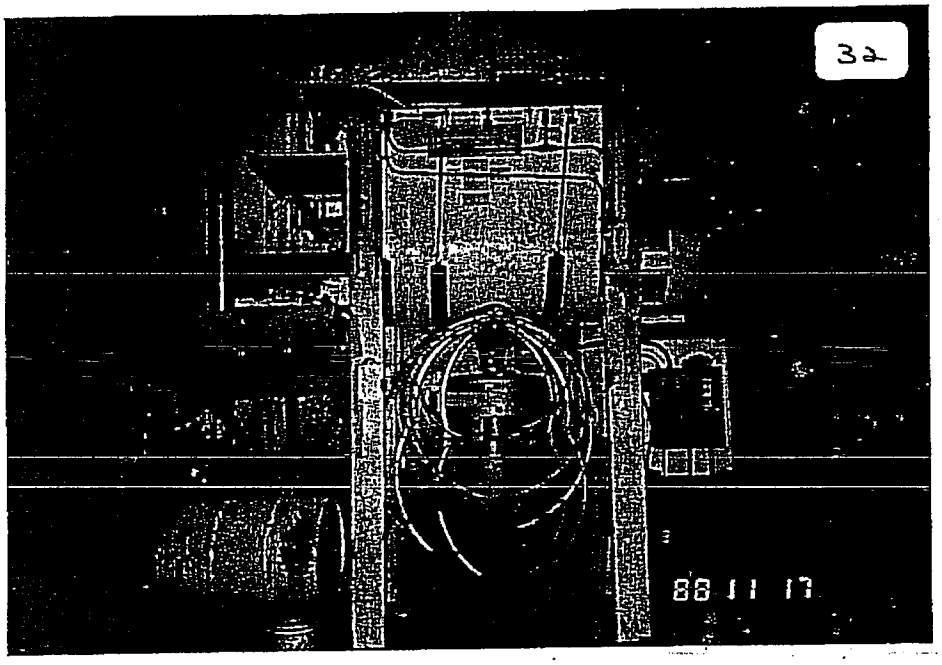
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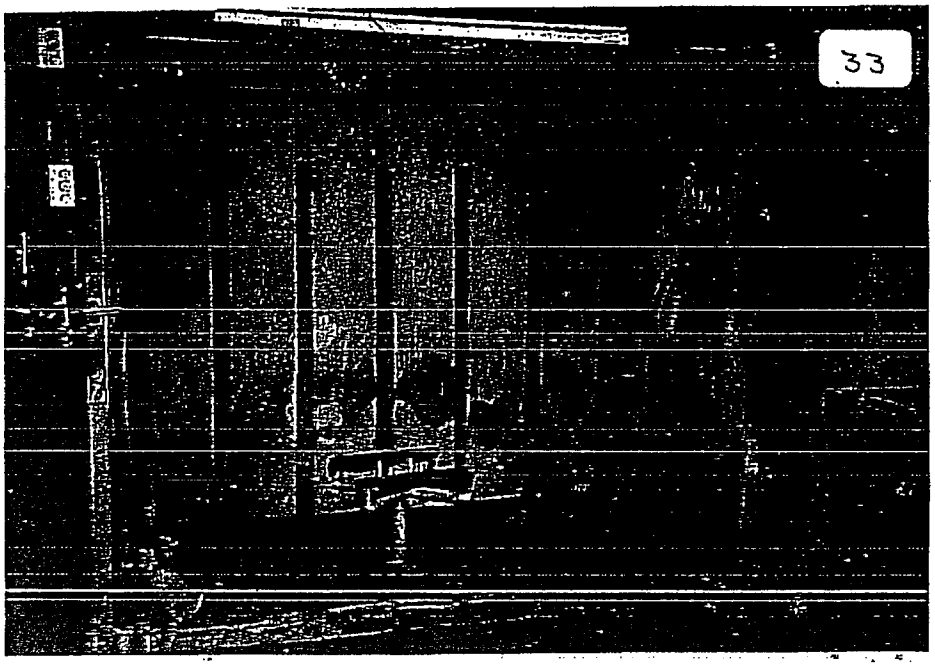
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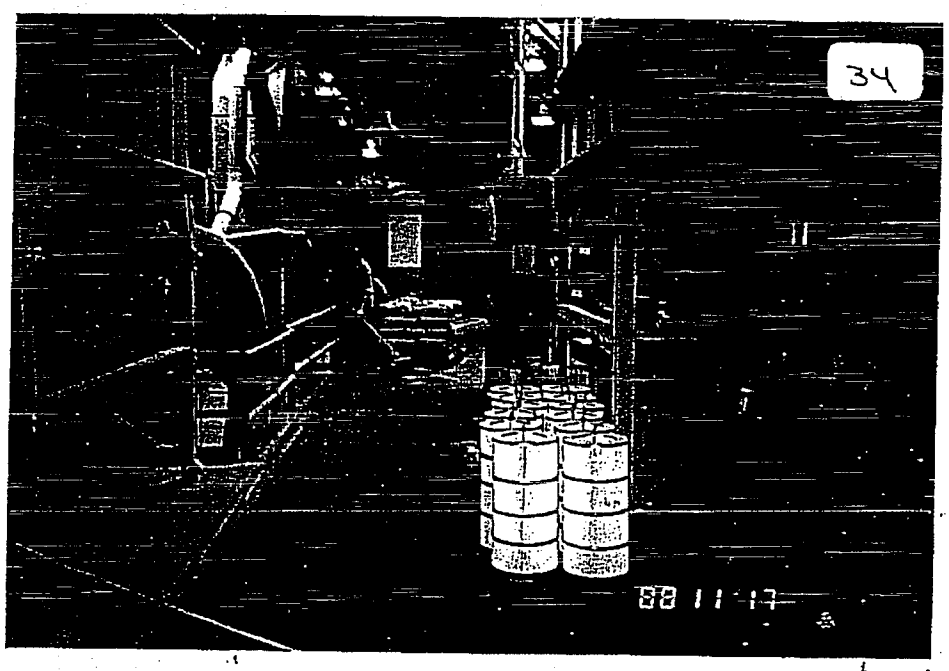
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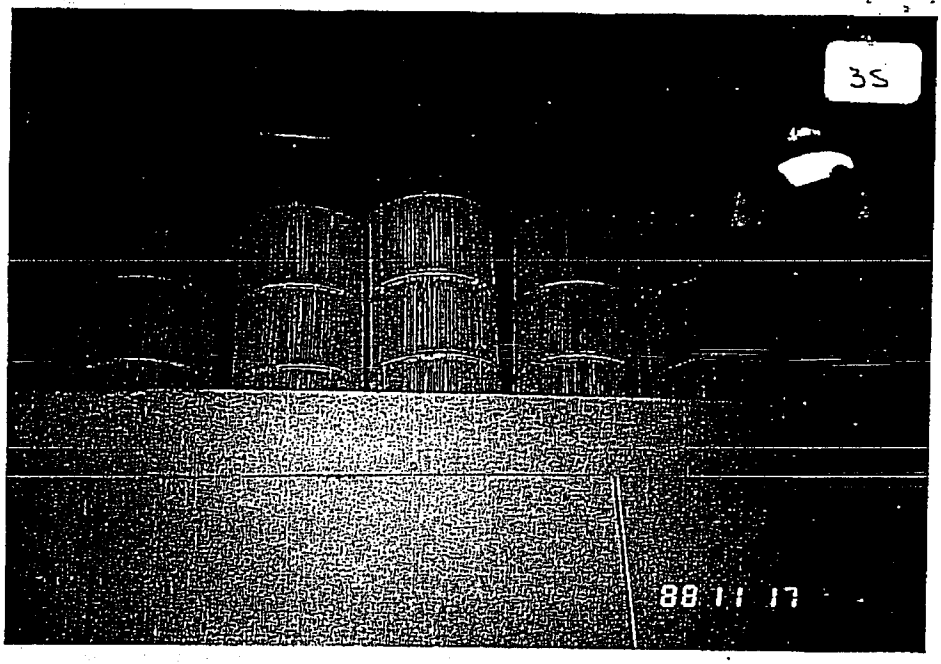
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FINAL REPORT
PHASE I DISPOSAL SITE INVESTIGATION
CHI-VIT CORPORATION, URBANA, OHIO

PREPARED FOR EAGLE-PICHER INDUSTRIES, INC.
JULY 5, 1989
14570-008-121

DAMES & MOORE

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TABLES
(follow text)

Number	
1	ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (µg/L)
2	ANALYTICAL RESULTS - INORGANIC PARAMETERS (mg/L)
3	WELL CONSTRUCTION DETAILS AND SURVEY DATA

FIGURES
(follow tables)

Number	
1	SITE VICINITY MAP
2	SITE PLAN WITH WELL LOCATIONS
3	PIEZOMETRIC MAP

APPENDICES
(follow figures)

Number	
A	BORING LOGS WITH WELL CONSTRUCTION DETAILS
B	ANALYTICAL RESULTS

1.0 INTRODUCTION

Eagle-Picher Industries, Inc. (EPI) retained Dames & Moore to conduct a site investigation of a small (approximately 2.8 acres) parcel of property located at the Chi-Vit Corporation in Urbana, Ohio. The plant is located at 720 South Edgewood Avenue on the southwestern edge of Urbana (Figure 1). Chi-Vit manufactures porcelain enamel frit, which is ultimately used to coat appliances.

EPI recently sold the Urbana facility to Chi-Vit, retaining the small parcel of property to the southwest of the plant (Figure 2). This property includes an area approximately 75 feet wide by 200 feet in length that was used for disposal of general plant refuse and raw materials from approximately 1966 to 1976. This area, referred to herein as the "disposal site," was the subject of the investigation.

The disposal site apparently originated as a borrow pit, from which fill was used to level the ground where the plant is situated. The plant was constructed in 1966, thus, use of the borrow area is reported to have begun about the same time. It is reported that dumping of off-spec metal oxides and other raw materials were in powdered form and usually were in containers (wooden and metal drums, pails, etc.). The rubbish was reportedly burned and then covered with dirt on a fairly regular basis. Dumping ceased in approximately 1976 when the plant switched to Urbana trash collection.

The area is presently level and mostly grass covered. A few bricks and scattered frit were observed. The city of Urbana owns a small parcel of fenced property due south of the disposal site where the city water tower sits.

1.2 PURPOSE

As part of the purchase agreement between EPI and Chi-Vit, the subject property was to be investigated to characterize the upgradient and downgradient ground water quality and flow pattern under and in the immediate vicinity of the disposal site. The water quality characterization was to enable a determination of the absence or presence of contaminants in the ground water.

OH000291

2.0 GEOLOGIC SETTING

Physiographically, the site is within the Glaciated Till Plains Section of the Central Lowlands Province. The region has undergone several episodes of glaciation, which deposited thick sequences of unconsolidated sediments. Bedrock consists of thinly-bedded Silurian limestone, dolomite, and shale.

According to soil maps generated by the U.S. Department of Agriculture, the surficial soil at the site is classified as a silty loam. Although these soils have been classified as medium-textured and well-drained, onsite observations indicated poor-moderate drainage capacity with considerable surface ponding following extensive rain.

The site is located on an upland on the east side of the Mad River Valley. Topography of the site is nearly level to gently sloping to the northwest and southwest.

3.0 FIELD INVESTIGATION

The Dames and Moore field coordinator and project manager mobilized to the site on May 18, 1989. Drilling services were provided by R & R International Inc. of Akron, Ohio. Prior to drilling, the locations for the four monitoring wells were selected and staked. Based on the local topography, three of the four wells (MW-2, 3 &4) were located in the assumed downgradient direction from the disposal site. MW-1 was drilled in the assumed upgradient direction from the disposal site. Spacing of the monitoring wells was between 30-50 feet (Figure 2).

3.1 DRILLING AND SOIL SAMPLING

A CME-75 hollow-stem auger rig was used to advance the boreholes. The rig utilized 4 1/4- inch I.D. hollow-stem augers in conjunction with the standard penetration test (SPT) sampling methods.

The SPT method was used to sample all but the shallowest portion of each borehole, which was characterized by grab samples . The method consists of driving a 2-inch O.D., 24 inch long split spoon a total of four 6-inch increments using a 140 lb. hammer that is dropped 30 inches. The number of blows required to drive the spoon each

OH000292

6-inch increment was recorded on the drill log. Sampling was generally performed at 5-foot intervals unless otherwise directed by the supervising geologist. As each split spoon was advanced (by the hammer) at 5-foot intervals, the barrel filled up with in-situ soil. The barrel was then removed, split open lengthwise, and the contents examined.

As samples were removed from the sampling tools, each sample was described and documented on standard Dames and Moore field log forms, and a representative sample was retained in a sample container for future reference. Each boring was advanced and sampled until a suitable depth for screen placement was attained.

3.2 MONITOR WELL INSTALLATION

Monitor wells were installed in each of the boreholes for MW-1, MW-2, MW-3 and MW-4 at the completion of drilling and sampling to the desired depth. Upon removal of the final split spoon sample and rod, a 10 foot section of 2 inch I.D. PVC (0.010-inch slot) screen and bottom plug was lowered into the auger stem. All wells were installed with a 10-foot-long screen except for MW-1 which has a 5-foot-long screen. As the PVC screen was inserted in the auger stem, 10 foot sections of 2 inch I.D. PVC riser were threaded together onto the top of the screen until the riser stick-up was several feet above ground-level. A PVC cap was secured to the top of the riser to prevent entry of sand, bentonite, or other sources of contamination.

At this point, a coarse silica sand was used to fill the annulus to a height of approximately 2 feet above the top of the screen. Augers were simultaneously partially withdrawn to allow the sand pack to fall in place around the screen. In some instances, wall collapse of natural coarse sand and gravel became admixed with the introduced sand pack.

A 2 to 3-foot thick bentonite seal was then placed above the sand pack by dropping 3/8-inch-diameter bentonite pellets into the annulus between the well and the inside of the augers while the augers were gradually withdrawn. The pellets were allowed to expand for at least one hour (in the case of MW-1, 2 & 3 it was overnight) before grout was placed.

The grout, a mixture of powdered bentonite, Portland cement and water, was pumped into the annular space (after the remaining augers were removed) and allowed to

OH000293

cure overnight. Shortly after the grout was poured into each well, a 5-inch-I.D. steel casing with a lockable lid was installed in order to protect and secure the PVC riser. The following morning, the remaining annular space was topped off with cement. In addition, each protective casing was centered in a 2-foot x 2-foot concrete pad which was constructed by pouring cement into a square wood-form mold to a 4-inch height above the ground surface. Locks were placed on each well, and each well was identified by marking the protective well casing lid with the appropriate identification number.

Depths to the well construction features (top of sand pack, bentonite, ect.) were measured with a weighted nylon tape and recorded by the field geologist.

3.3 DECONTAMINATION PROCEDURES

All drilling and sampling equipment and tools were steam-cleaned and inspected prior to drilling activities to ensure that the equipment would not introduce contamination from other sources to each new well. The drill rig was steam cleaned before each well location. Drilling operations progressed in the numerical order of the wells.

3.4 WELL DEVELOPMENT

Standard hand bailing techniques were used to develop wells MW-1, MW-2 and MW-3. A minimum of 3 well volumes of groundwater were purged from the wells prior to any groundwater sampling. The purpose of bailing and surging the wells was to help remove any fine sand, silt and clay particles from the screen, surrounding sand pack and formation lithologies. MW-4 did not respond effectively to hand bailing due to the presence of large amounts of silt and clay. An alternative method of development using forced-(nitrogen) air purging techniques was attempted but was also unsuccessful. Additional well development techniques will be attempted in the near future.

3.5 GROUND WATER SAMPLING

Each well was measured for a water level, then purged and sampled on May 26 and May 27, 1989. Water levels were measured to a 0.01-foot accuracy with an electronic well probe. Field measurements for temperature, pH, and conductivity were made on samples

OH000294

from MW-1, MW-2, and MW-4. Logistical problems* prevented MW-3 from being included in the field measurements. The wells were sampled using the same teflon bailer for MW-2, MW-3 and MW-4, and a separate teflon bailer for MW-1. The bailers were decontaminated using dilate HNO_3 and distilled water rinse. A new bailer cord was used for each well. A wash-blank sample was collected after sampling MW-1 to test the effectiveness of the field procedures of decontaminating the bailers. In order to further avoid any cross-contamination between wells, sampling personnel wore clean, disposable latex gloves and avoided contact with the sample and sample containers.

Proper field protocol was maintained in the field by the samplers at all times during sampling. Samples for volatile organics were poured directly from the bailer into the 40-ml glass vials. The dissolved metals sample was initially poured directly from the bailer into several clean, styrofoam cups. The sample was processed through a peristaltic pump and 0.45 μm filter before finally entering the sample bottle.

A sample for dissolved metals was not collected from MW-4 because of extreme turbidity in the well. As mentioned earlier, the well will be developed in the near future.

All sample containers were labeled with sample I.D., parameter to be analyzed, date of sampling, and type of preservative added. Sample vials and plastic jars were placed immediately in an ice-filled cooler to be kept cool throughout sampling and shipment. Proper chain of custody was maintained throughout. Samples were hand-delivered to Wadsworth Laboratories in Canton, Ohio on May 30, 1989 by Dames & Moore.

3.6 LABORATORY ANALYSIS

All samples were analyzed for volatile organic compounds and metals of U.S. EPA's Target Compound List (TCL), fluoride, sulfate, and total cyanide.

3.7 SURVEY

The wells were surveyed for location and elevation by Lee Surveying and Mapping Co., Bellefontaine, Ohio. The elevations were established from Urbana City Bench Mark

* MW-3 was surrounded by a 30 foot diameter pond following heavy rains the night before sampling was performed.

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No. 13 (Elevation 1014.36 feet, mean sea level). A temporary benchmark was established at the site for future use on the top of the southeast bonnet bolt of the fire hydrant approximately 75 feet south of MW-14 (elevation 1001.57 feet, msl). Elevations of the wells, water levels, and ground water elevations are presented in Table 3.

4.0 FINDINGS

4.1 GEOLOGIC CONDITIONS

The site is underlain by a 20 to 30 foot unit of dark-brown to gray silty clay mixed with minor amounts of sand and pebbles. The unit contains occasional thin sand gravelly zones that are interpreted to be lenses based on their seemingly random occurrence.

Based on the geologic history of the area, this unit is interpreted to be glacial till, a fairly ubiquitous material found in the glaciated portion of Ohio that was deposited directly by the glacial ice sheets. Because of its mode of deposition, till is characteristically fine-grained and consolidated.

The bottom of the till grades to a clayey gravel with a thickness that ranges from approximately 20 to 5 feet. The bottom of this unit forms a sharp contact with an underlying sandy gravel that grades to a poorly sorted sand. The boring for MW-3 intercepted a 5-foot silt layer within this unit. All the borings were terminated within the basal sand unit.

4.2 GROUND WATER

A shallow zone of saturated conditions was encountered in the upper till unit that is believed to represent a perched water table. The sand and gravel lenses within the till were found to be wet while the fine-grained silty clay matrix was moist. The underlying clayey gravel was generally damp to moist.

The top half of the sandy gravel unit was found to be dry to moist. Ground water was encountered at a depth of approximately 48 feet below ground surface in all four borings. This zone of saturation is interpreted to be the uppermost aquifer for the area.

OH000296

Figure 3 presents a map of the piezometric surface. As it shows, the gradient is very small (0.0045) and ground water flow direction is to the southwest. This direction is approximately 90 degrees different than what was expected when the well locations were selected and as such, well MW-1 is located downgradient of the disposal site and wells MW-2, MW-3, and MW-4 are located upgradient.

4.3 GROUND WATER QUALITY

Results of the analyses for volatile organic compounds are presented on Table 1. Trichloroethene (TCE) was detected at 61 µg/L in the sample from MW-1. TCE was also detected in the sample from MW-2 (20 µg/L), as was benzene at 6 µg/L. The National Primary Drinking Water Regulation (NPDWR) for both TCE and benzene is 5 µg/L.

Results of the analyses for inorganic parameters are presented on Table 2. One RCRA metal, barium, was detected in all the samples ranging from 0.04 to 0.12 mg/L. The NPDWR of 1 mg/L was not exceeded.

The only National Secondary Drinking Water Regulation that was exceeded is manganese (0.18 mg/L vs. 0.05 mg/L) in the sample from MW-2, an upgradient well.

As for non-regulated parameters, all detected parameters in the downgradient well are either less than concentrations in the upgradient wells, or are very close and appear to be within the range expected for natural ground water. The only exception is potassium, which at 75 mg/L in MW-1 is more than 10 times higher than the concentrations in the upgradient wells.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The study described in this report can be concluded as follows:

- A fine-grained unit of silty clay with minor amounts of sand and gravel is present beneath the site to a depth of approximately 20 to 30 feet. This unit is partially saturated and constitutes a perched water table.

OH000297

- The sand and gravel aquifer beneath the upper silty clay is unsaturated for approximately 20 feet before the water table is encountered at approximately 48 feet below ground surface.

- The gradient of the water table is very low, on the order of 0.0045.

- The ground water flow direction in the aquifer around and below the disposal site is to the southwest.

- Downgradient water quality indicates the presence of TCE in excess of the NPDWS, and potassium at concentrations above background.

- Upgradient water quality indicates the presence of TCE and benzene in excess of the NPDWS.

The data are not conclusive as to whether or not the organics and potassium are associated with releases from the disposal site. Therefore, it is recommended that a second phase of study be conducted to allow this determination. The appropriate scope of work to meet this objective is anticipated to include:

- Four shallow monitoring wells screened in the perched water table (20-25 foot depths)

Based on the results of samples collected from the shallow wells, a third phase of work may or may not be required to further define the extent of contamination in the deep aquifer. If so, the scope is anticipated to include:

- An additional deep well(s) downgradient of MW-1
- An additional upgradient deep well near Edgewood Avenue

OH000298

TABLE 1

ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (µg/L)

Parameter	Method	Detection limit	MW-1	MW-2	MW-3	MW-4	Wash Blank
Acetone	8240	50	-	-			
Benzene	8240	5	-	-	-	-	-
Bromodichloromethane	8240	5	-	6	-	-	-
Bromoform	8240	5	-	-	-	-	-
Bromomethane	8240	10	-	-	-	-	-
2-Butanone	8240	50	-	-	-	-	-
Carbon disulfide	8240	5	-	-	-	-	-
Carbon tetrachloride	8240	5	-	-	-	-	-
Chlorobenzene	8240	5	-	-	-	-	-
Chloroethane	8240	10	-	-	-	-	-
Chloroform	8240	5	-	-	-	-	-
Chloromethane	8240	10	-	-	-	-	-
1,1-Dichloroethane	8240	5	-	-	-	-	-
1,2-Dichloroethane	8250	5	-	-	-	-	-
1,1-Dichloroethene	8240	5	-	-	-	-	-
1,2-Dichloroethene	8240	5	-	-	-	-	-
1,2-Dichloropropane	8240	5	-	-	-	-	-
cis-1,3-Dichloropropene	8240	5	-	-	-	-	-
trans-1,3-Dichloropropene	8240	5	-	-	-	-	-
Dibromochloromethane	8240	5	-	-	-	-	-
Ethylbenzene	8240	5	-	-	-	-	-
2-Hexanone	8240	50	-	-	-	-	-
4-Methyl-2-pentanone	8240	50	-	-	-	-	-
Methylene chloride	8240	5	-	-	-	-	-
Styrene	8240	5	-	-	-	-	-
1,1,1-Trichloroethane	8240	5	-	-	-	-	-
1,1,2-Trichloroethane	8240	5	-	-	-	-	-
1,1,2,2-Tetrachloroethane	8240	5	-	-	-	-	-
Tetrachloroethene	8240	5	-	-	-	-	-
Trichloroethene	8240	5	61	20	-	-	-
Toluene	8240	50	-	-	-	-	-
Vinyl acetate	8240	50	-	-	-	-	-
Vinyl chloride	8240	10	-	-	-	-	-
Total Xylenes	8240	5	-	-	-	-	-

Notes:
"-" indicates compound not detected.
Samples collected May 26-27, 1989.
Laboratory Analysis by Wadsworth/Alert Laboratories, Inc.

TABLE 2

ANALYTICAL RESULTS - INORGANIC PARAMETERS (mg/L)

Parameter	Method	Detection limit	MW-1	MW-2	MW-3	MW-4	Wash Blank
Aluminum	200.7/6010	0.1	-	-	-	NS	-
Antimony	200.7601	0.2	-	-	-	NS	-
Arsenic	206.2/7060	0.005	-	-	-	NS	-
Barium	200.7/6010	0.01	0.04	0.12	0.12	NS	-
Beryllium	200.7/6010	0.005	-	-	-	NS	-
Cadmium	7131	0.005	-	-	-	NS	-
Calcium	7140	0.1	25	84	80	NS	0.22
Chromium	200.7/6010	0.02	-	-	-	NS	-
Cobalt	200.7/6010	0.05	-	-	-	NS	-
Copper	200.7/6010	0.01	-	0.01	-	NS	0.02
Iron	200.7/6010	0.05	-	-	-	NS	-
Lead	7421	0.005	-	-	-	NS	-
Magnesium	200.7/6010	0.01	27	37	29	NS	0.1
Manganese	200.7/6010	0.01	-	0.18	0.03	NS	-
Mercury	7470	0.0002	-	-	-	NS	-
Nickel	200.7/6010	0.04	-	-	-	NS	-
Potassium	200.7/6010	0.05	95	7.7	3.4	NS	-
Selenium	270.2/7740	0.005	-	-	-	NS	-
Silver	200.7/6010	0.01	-	-	-	NS	-
Sodium	200.7/6010	0.01	36	31	42	NS	0.47
Thallium	200.7/6010	0.01	-	-	-	NS	-
Vandium	200.7/6010	0.05	-	-	-	NS	-
Zinc	200.7/6010	0.01	0.07	0.06	0.06	NS	0.08
Tin	200.7/6010	0.1	-	-	-	NS	-
Cyanide	335.2/9010	0.005	-	-	-	-	-
Sulfate	375.4	5	70	120	110	180	-
Fluoride	340.2	0.1	0.3	0.4	0.4	1.5	-

Notes:
"-" indicates compound not detected.
Samples collected May 26-27, 1989.
Laboratory Analysis by Wadsworth/Alert Laboratories, Inc.
NS = Not sampled.

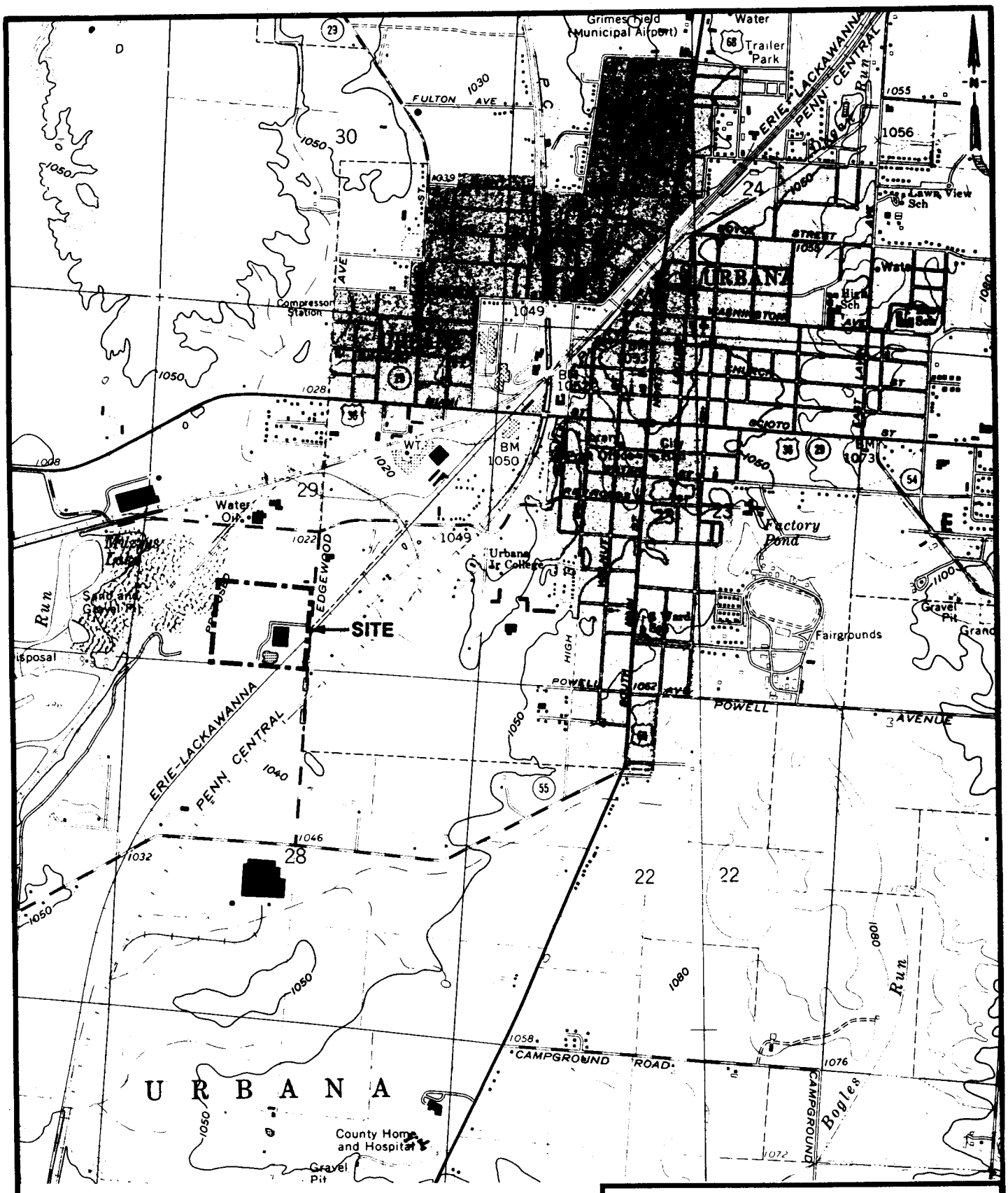
TABLE 3

WELL CONSTRUCTION DETAILS AND SURVEY DATA

Well No.	Date	Ground surface elevation (feet, msl)	Top of casing elevation (feet, msl)	Well depth (feet)	Depth to water	Ground water elevation (feet, msl)
1	5/22	997.20	998.65	56.5	49.32	949.33
1	5/24	997.20	998.65	56.5	49.32	949.42
1	6/2	997.20	998.65	56.5	48.15	950.50
2	5/22	997.40	999.60	61.92	49.38	950.22
2	5/24	997.40	999.60	61.92	49.32	950.28
2	6/2	997.40	999.60	61.92	48.29	951.31
3	5/22	997.10	999.02	55.08	49.07	949.95
3	5/24	997.10	999.02	55.08	48.97	950.05
3	6/2	997.10	999.02	55.08	47.95	951.07
4		998.0	1000.31	53.75		

Note:
Water level measurements from well MW-4 are not accurate due to excess silt in the screen. Measurements will be taken after the well is developed.

OH000301



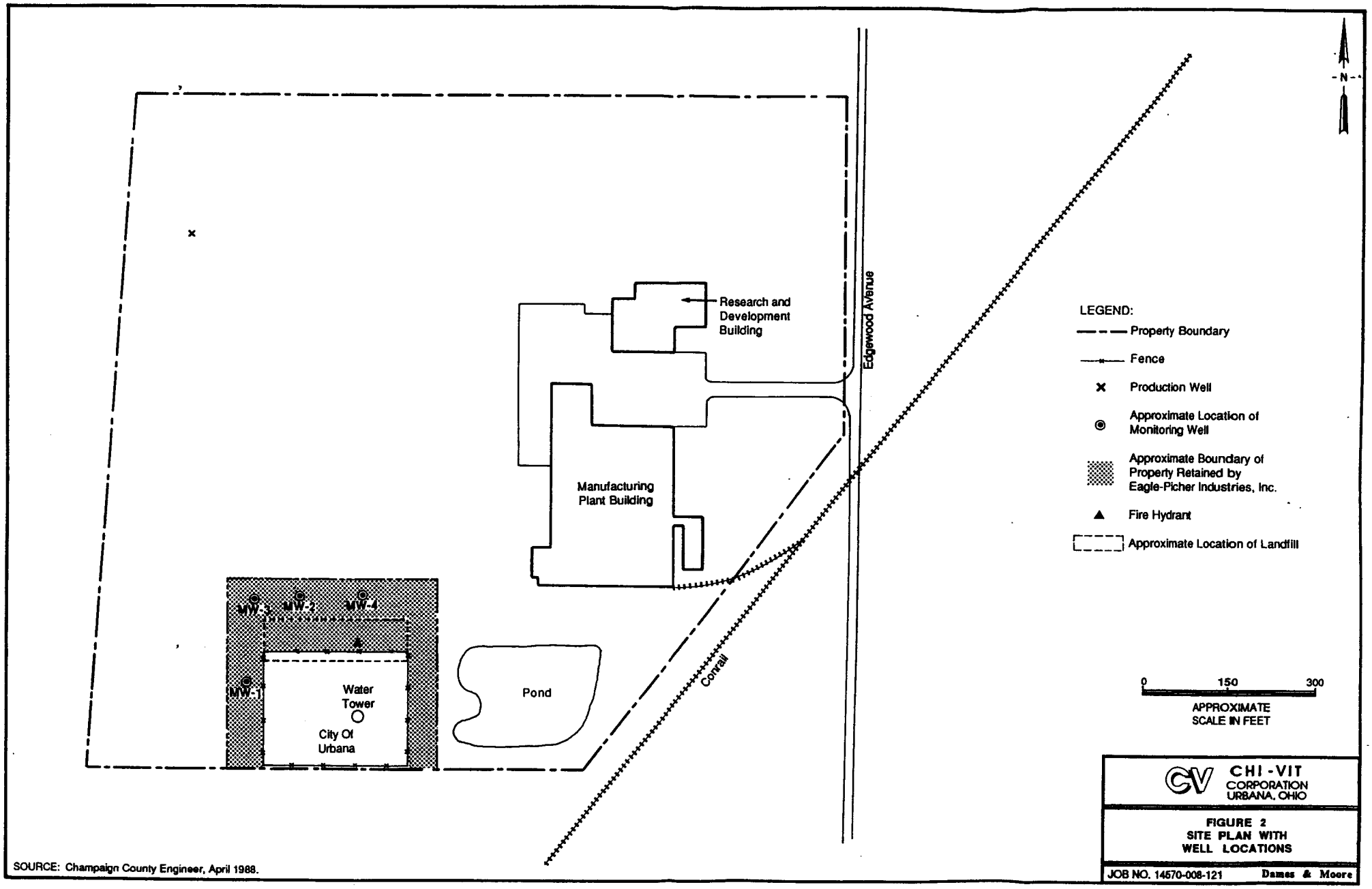
BASE MAP SOURCE: Compiled from the following USGS 7 1/2 minute topographic quadrangle maps: Urbana West, Ohio, 1961, photorevised 1973; Urbana East, Ohio 1961, photorevised 1973.

CHI-VIT CORPORATION
URBANA, OHIO

FIGURE 1

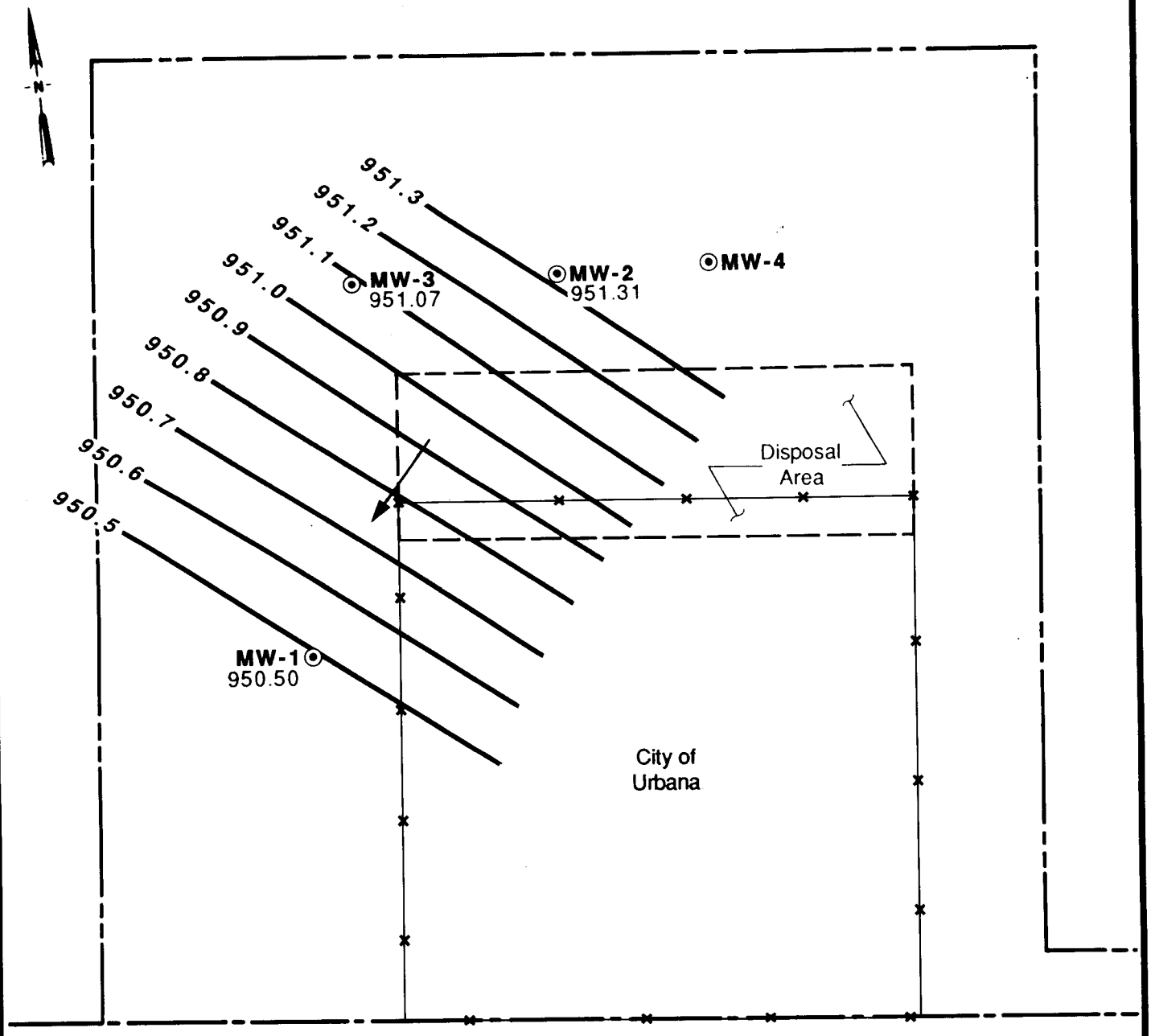
SITE VICINITY MAP

JOB NO. 14570-008-121 Dames & Moore



SOURCE: Champaign County Engineer, April 1988.

OH000303



LEGEND:

- Property Boundary
- Fence
- Property Retained by Eagle-Picher Industries, Inc.
- Approximate Location of Disposal Area
- Existing Monitoring well Location
- 950.50 Water Level Measured June 2, 1989
- 951.3 Piezometric Contour, Contour Interval = 0.1 foot
- Ground Water Flow Direction

0 60 120

APPROXIMATE SCALE IN FEET

SOURCE: Lee Surveying and Mapping Company, Bellefontaine, Ohio.

CHI-VIT CORPORATION URBANA, OHIO

FIGURE 3
PIEZOMETRIC MAP
JUNE 2, 1989

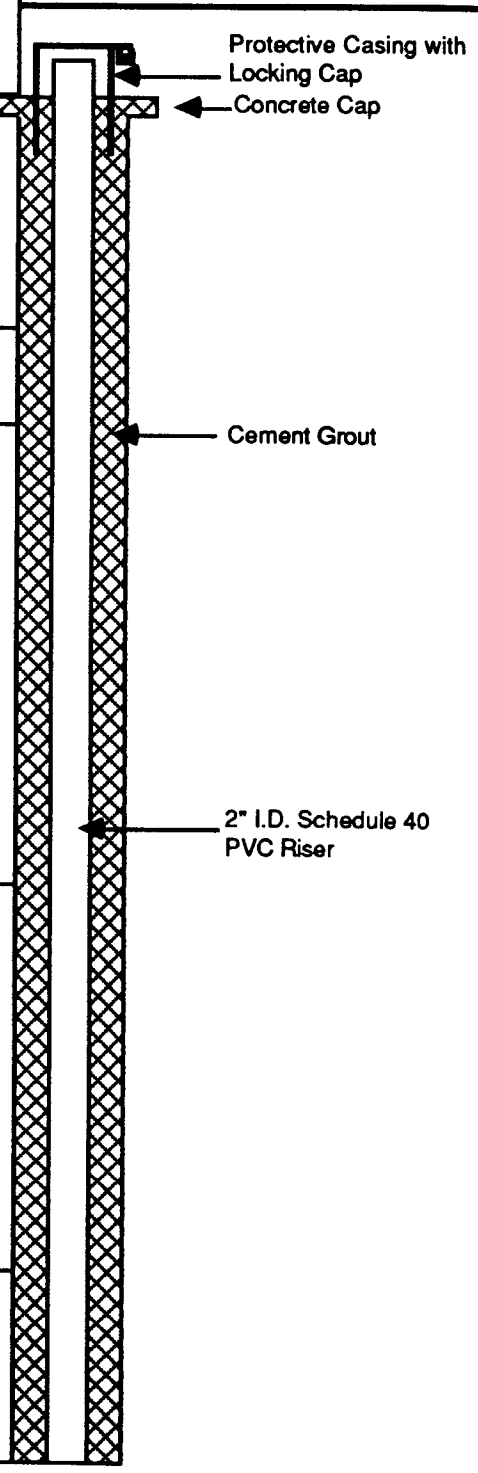
JOB NO. 14570-008-121 Dames & Moore

APPENDIX A

BORING LOGS WITH WELL CONSTRUCTION DETAILS

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown silty CLAY with trace gravel (slightly moist)
				grades to mottled dark and light brown silty clay
5		32		grades wet
				Light brown to tan clayey GRAVEL (wet)
				Dark brown silty CLAY with organic matter (wet to moist)
10		39		grades to gray silty CLAY with gravel
				lenses of gray gravel
15		44		
				very soft
				stiff at 19.5 feet
20		68		Light gray clayey GRAVEL (slightly moist, iron stains)
				driller reports hitting gravel and cobbles at 22.0 feet
25		50/2"		split spoon refusal at 24.5 feet
		50/4"		grades to gravel with coarse sand (damp)
30				Light gray sandy GRAVEL (dry)
		80		
35				

WELL CONSTRUCTION DETAIL



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Job No. 14570-008-121

CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL MW-1

page 1 of 2

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	WELL CONSTRUCTION DETAIL
35					
40		82		driller noted more cobbles at 40.0 feet	41.7' Bentonite Seal
45					46.5' Water Level Measured at 48.15 Feet on 6/2/89
50		92			2" I.D. 0.010"-Slotted PVC Screen; Filter Sand Pack; 56.5'
55				Light brown SAND and medium to coarse gravel (wet)	Natural Formation Collapse; 57.0'
		58			
60				Boring completed at 59.0 feet on 5/18/89 Monitoring well installed 5/18/89	
65					
70					

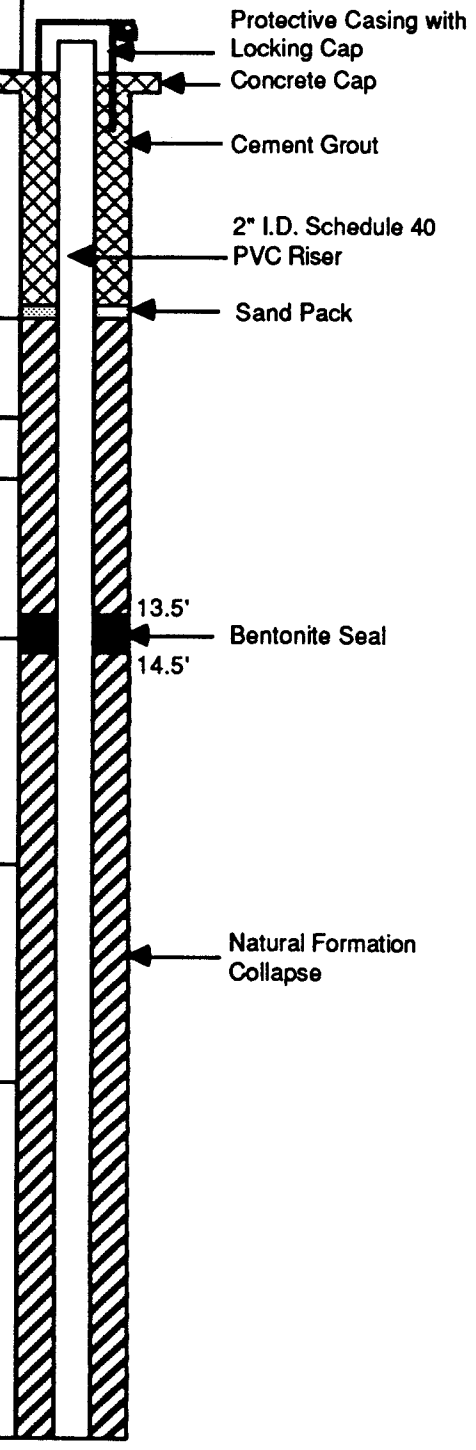
LEGEND:

Split Spoon Sample

Dames & Moore Job No. 14570-008-121	CHI-VIT CORPORATION URBANA, OHIO	MONITOR WELL MW-1 page 2 of 2

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown silty CLAY with abundant organics (moist)
				grades to mottled tan and brown
5		32		Dark brown clayey GRAVEL (wet)
				Tan to light brown silty CLAY (soft, wet)
10		35		Tan to light brown clayey GRAVEL (wet)
15		35		Dark brown grading to gray silty CLAY with some sand and gravel (moist)
				grades to tan (soft)
20		31		Driller reports GRAVEL from 19.0 to 20.0 feet
				wet at 25.0 feet
25		50/2"		Sandy GRAVEL with interbeds of clayey gravel (damp)
		77		
30		50/3"		
35				

WELL CONSTRUCTION DETAIL



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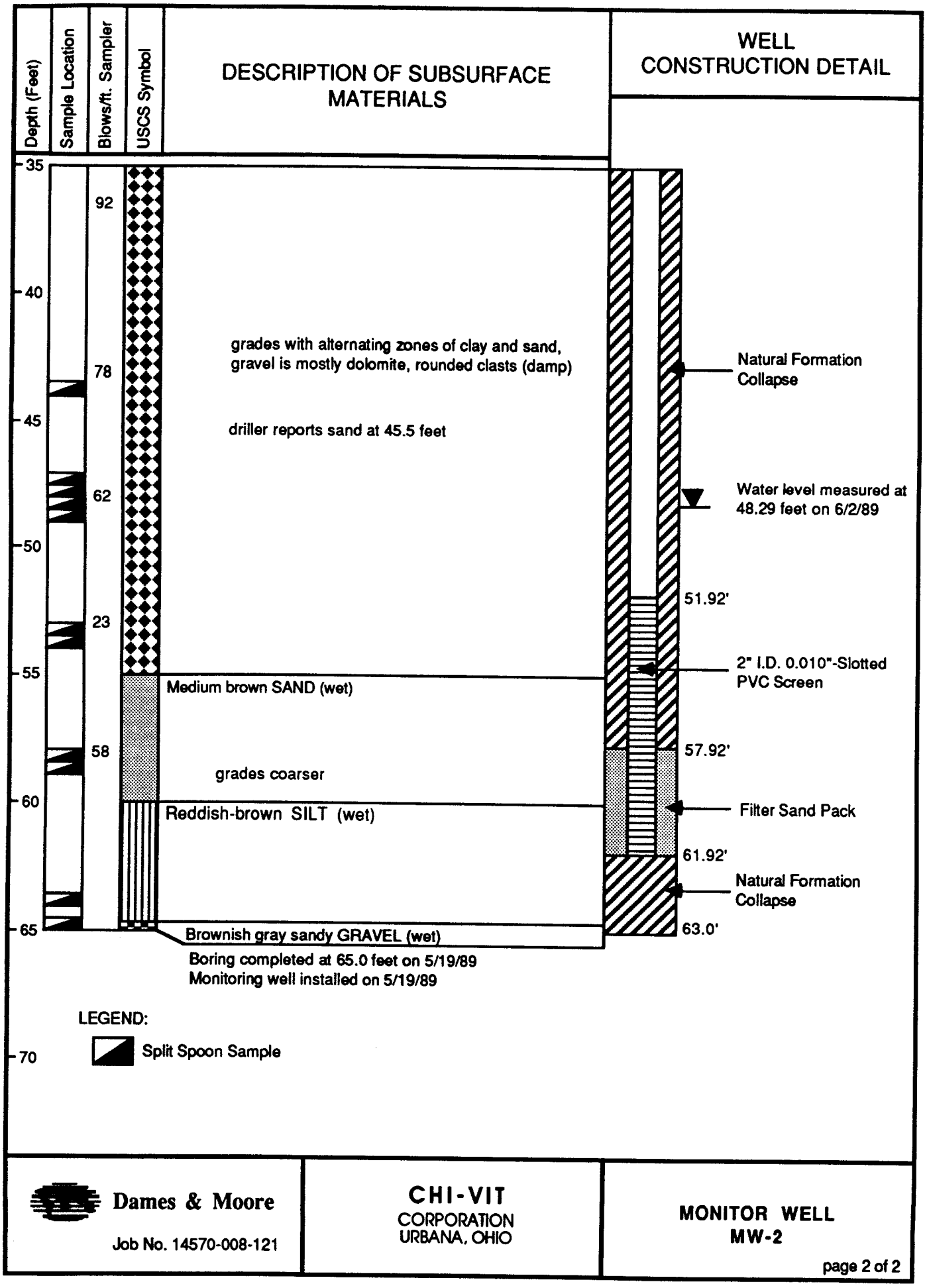
CHI-VIT CORPORATION URBANA, OHIO

MONITOR WELL MW-2



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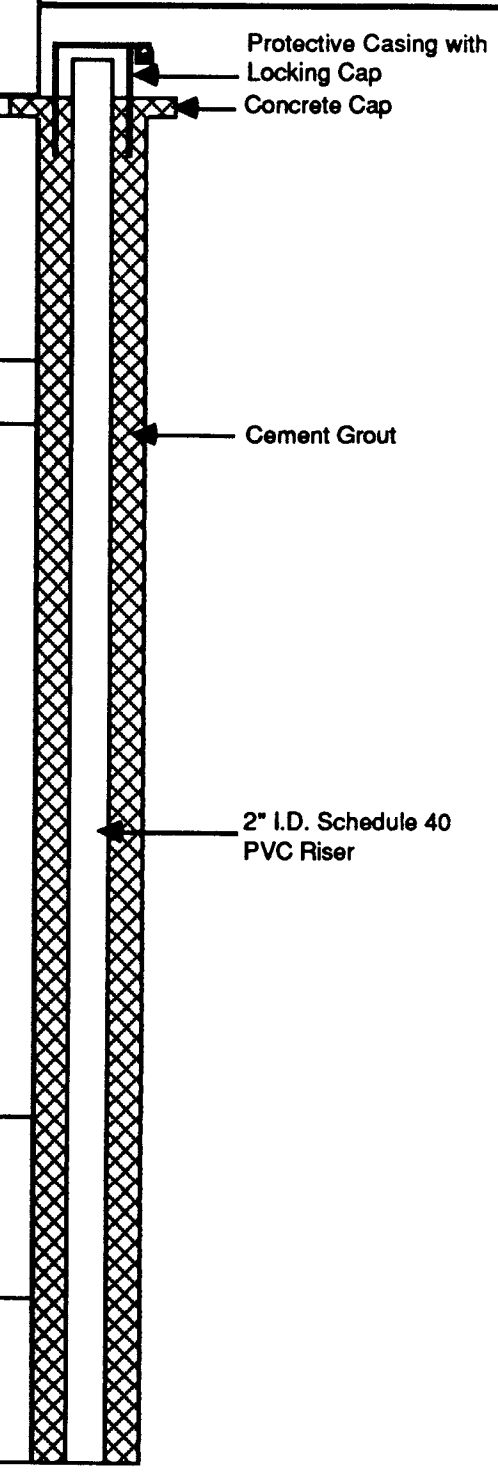
CHI-VIT CORPORATION URBANA, OHIO

MONITOR WELL MW-2

page 2 of 2

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown silty CLAY with abundant organics (moist)
5		25		
				Sandy GRAVEL (wet)
				Tan to light brown slity CLAY with some sand and gravel
10		38		grades to dark brown
				very wet (soft)
15		80		
20		75		sand and gravel increases with depth
25		50/2"		Clayey sandy GRAVEL (damp)
30		75		Brownish gray sandy GRAVEL (damp) grades with thin interbeds of dark brown clay
35				

WELL CONSTRUCTION DETAIL



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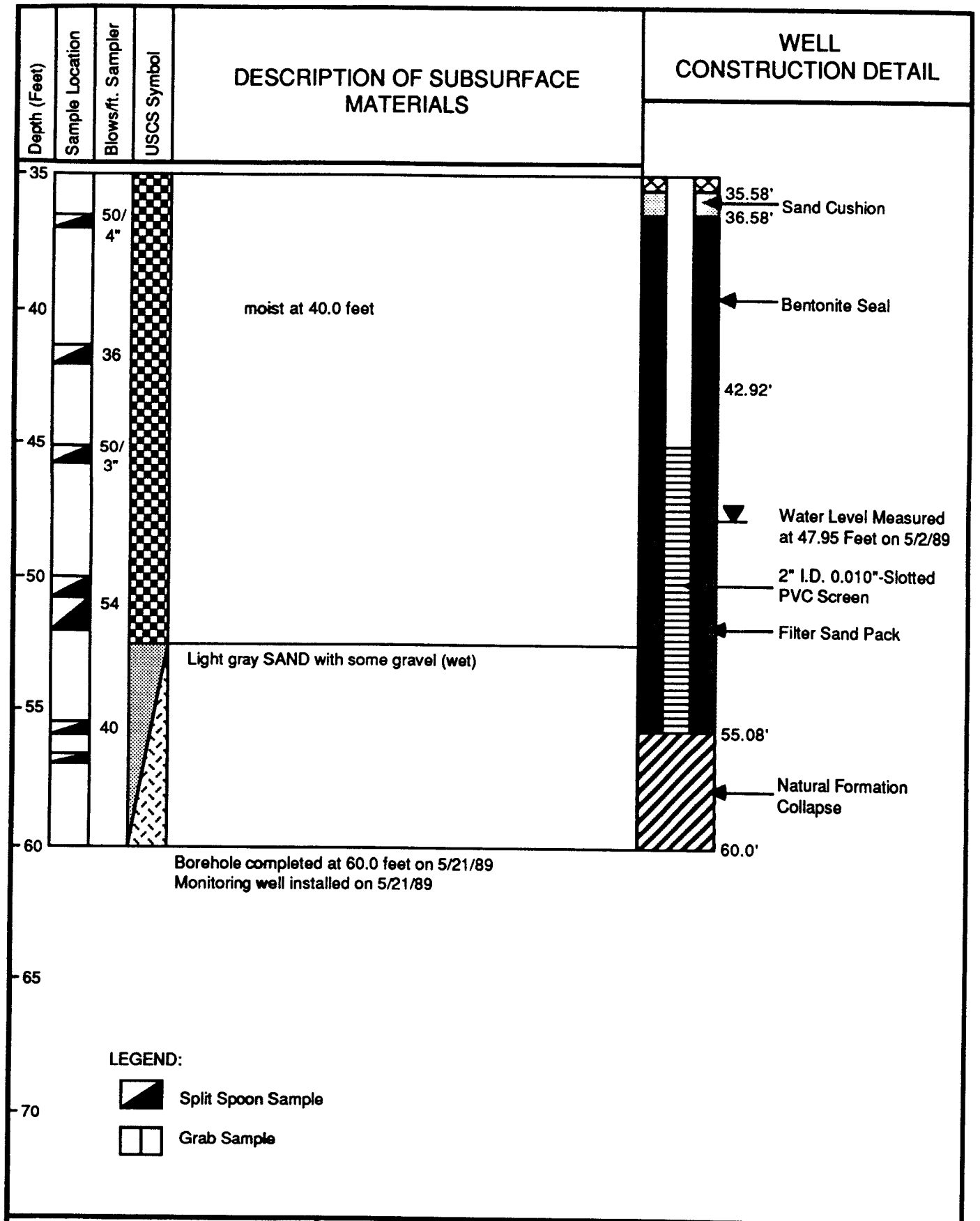
Job No. 14570-008-121

CHI-VIT CORPORATION URBANA, OHIO

MONITOR WELL MW-3

page 1 of 2



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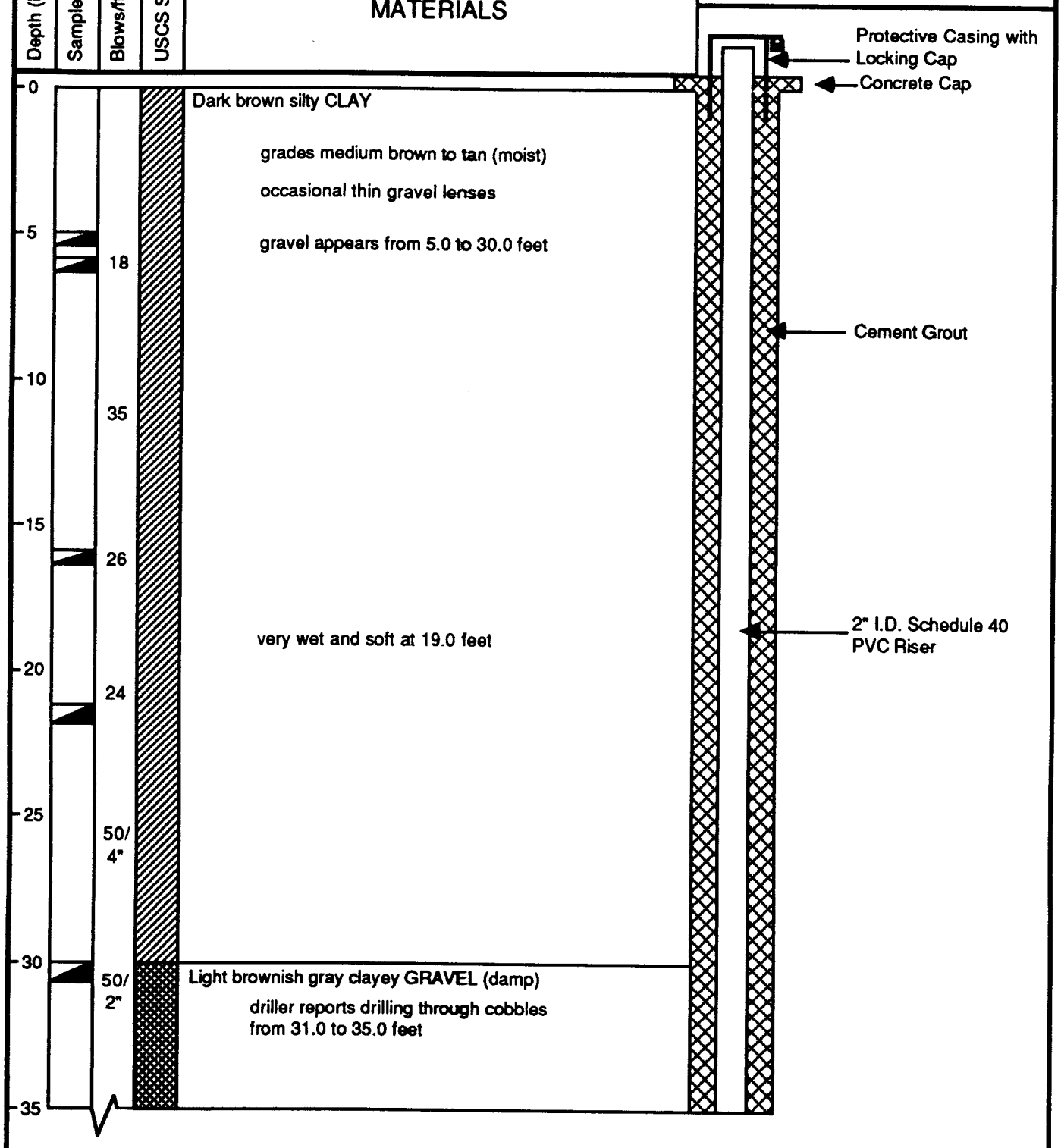
Job No. 14570-008-121

CHI-VIT CORPORATION URBANA, OHIO

MONITOR WELL MW-3

page 2 of 2

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	WELL CONSTRUCTION DETAIL



Dames & Moore

Job No. 14570-008-121

CHI-VIT CORPORATION URBANA, OHIO

MONITOR WELL MW-4

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	WELL CONSTRUCTION DETAIL
35		56		Light brownish gray GRAVEL with coarse sand	
40		22		driller reports cobbles from 42.0 to 45.0 feet	40.08' Bentonite Seal; 42.17'
45		40		water at 48 feet	43.75 2" I.D. 0.010"-Slotted PVC Screen
50		30		Brownish gray SAND with some gravel (wet)	
55		50/3"		grades uniform from 52.5 to 53.8 feet	53.75' Natural Formation Collapse; 55.25'
60					
65					
70					

Boring completed at 55.25 feet on 5/22/89
Monitoring Well installed on 5/24/89

LEGEND:

Split Spoon Sample

Dames & Moore

Job No. 14570-008-121

CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL
MW-4

APPENDIX B

ANALYTICAL RESULTS

1938-1988
50 YEARS
WADSWORTH/ALERT
LABORATORIES, INC.
Sampling, testing, mobile labs
4101 Shuffel Drive N.W. / North Canton, Ohio 44720

ANALYTICAL REPORT

PROJECT NO. 14570-008

CHI-VIT/EAGGLE PICHER

Presented to :

JENNIFER JOHNSON

DAMES & MOORE

WADSWORTH/ALERT LABORATORIES, INC.

Bryce Custer
Project Manager

Marvin W. Stephens, Ph.D.
Vice President & Corporate Technical Director

June 8, 1989

CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Bartow, Florida (813) 533-2150
SOUTHEAST REGIONAL OFFICE: Lexington, South Carolina (803) 957-9590

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5767-19251
MATRIX: WATER

DATE RECEIVED: 5/30/89
DATE EXTRACTED: NA
DATE ANALYZED: 6/ 2/89

SAMPLE ID: MW-1 5-27-89

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	61
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
- ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
- ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
- ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
- J (Detected, but below quantitation limit; quantitation suspect)
- B (Compound detected in method blank associated with this sample)
- -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
1,2-Dichloroethane-d4	98	(76-114)	(70-121)
Toluene-d8	99	(88-110)	(81-117)
Bromofluorobenzene	100	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19251
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-1 5-27-89

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	5/31- 6/ 1/89	ND	0.01	mg/l
Aluminum	5/31- 6/ 1/89	ND	0.1	mg/l
Arsenic	5/31- 6/ 1/89	ND	0.005	mg/l
Barium	5/31- 6/ 1/89	0.04	0.01	mg/l
Beryllium	5/31- 6/ 1/89	ND	0.005	mg/l
Calcium	5/31- 6/ 1/89	25	0.01	mg/l
Cobalt	5/31- 6/ 1/89	ND	0.05	mg/l
Chromium	5/31- 6/ 1/89	ND	0.02	mg/l
Copper	5/31- 6/ 1/89	ND	0.01	mg/l
Iron	5/31- 6/ 1/89	ND	0.05	mg/l
Mercury	5/31- 6/ 1/89	ND	0.005	mg/l
Potassium	5/31- 6/ 1/89	95	0.5	mg/l
Magnesium	5/31- 6/ 1/89	27	0.01	mg/l
Manganese	5/31- 6/ 1/89	ND	0.01	mg/l
Sodium	5/31- 6/ 1/89	36	0.01	mg/l
Nickel	5/31- 6/ 1/89	ND	0.04	mg/l
Antimony	5/31- 6/ 1/89	ND	0.2	mg/l
Selenium	5/31- 6/ 1/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19251
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-1 5-27-89

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Thallium	5/31- 6/ 1/89	ND	0.1	mg/l
Vanadium	5/31- 6/ 1/89	ND	0.05	mg/l
Zinc	5/31- 6/ 1/89	0.07	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19251
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-1 5-27-89

METALS ANALYTICAL REPORT
GRAPHITE FURNACE SELECTED LIST

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cadmium	5/31- 6/ 1/89	ND	0.001	mg/l
Lead	5/31- 6/ 2/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19251
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-1 5-27-89

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	6/ 2/89	ND	0.005	mg/l
Fluoride	6/ 1/89	0.3	0.1	mg/l
Sulfate	6/ 2/89	70	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5767-19252
MATRIX: WATER

DATE RECEIVED: 5/30/89
DATE EXTRACTED: NA
DATE ANALYZED: 6/ 2/89

SAMPLE ID: MW-2 5-26-89

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	6	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	20
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
- ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
- ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
- ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
- J (Detected, but below quantitation limit; quantitation suspect)
- B (Compound detected in method blank associated with this sample)
- -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
1,2-Dichloroethane-d4	98	(76-114)	(70-121)
Toluene-d8	99	(88-110)	(81-117)
Bromofluorobenzene	99	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19252
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-2 5-26-89

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	5/31- 6/ 1/89	ND	0.01	mg/l
Aluminum	5/31- 6/ 1/89	ND	0.1	mg/l
Arsenic	5/31- 6/ 1/89	ND	0.005	mg/l
Barium	5/31- 6/ 1/89	0.12	0.01	mg/l
Beryllium	5/31- 6/ 1/89	ND	0.005	mg/l
Calcium	5/31- 6/ 1/89	84	0.01	mg/l
Cobalt	5/31- 6/ 1/89	ND	0.05	mg/l
Chromium	5/31- 6/ 1/89	ND	0.02	mg/l
Copper	5/31- 6/ 1/89	0.01	0.01	mg/l
Iron	5/31- 6/ 1/89	ND	0.05	mg/l
Mercury	5/31- 6/ 1/89	ND	0.005	mg/l
Potassium	5/31- 6/ 1/89	7.7	0.5	mg/l
Magnesium	5/31- 6/ 1/89	37	0.01	mg/l
Manganese	5/31- 6/ 1/89	0.18	0.01	mg/l
Sodium	5/31- 6/ 1/89	31	0.01	mg/l
Nickel	5/31- 6/ 1/89	ND	0.04	mg/l
Antimony	5/31- 6/ 1/89	ND	0.2	mg/l
Selenium	5/31- 6/ 1/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19252
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-2 5-26-89

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Thallium	5/31- 6/ 1/89	ND	0.1	mg/l
Vanadium	5/31- 6/ 1/89	ND	0.05	mg/l
Zinc	5/31- 6/ 1/89	0.06	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19252
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-2 5-26-89

METALS ANALYTICAL REPORT
GRAPHITE FURNACE SELECTED LIST

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cadmium	5/31- 6/ 1/89	ND	0.001	mg/l
Lead	5/31- 6/ 2/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19252
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-2 5-26-89

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	6/ 2/89	ND	0.005	mg/l
Fluoride	6/ 1/89	0.4	0.1	mg/l
Sulfate	6/ 2/89	120	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5767-19253
MATRIX: WATER

DATE RECEIVED: 5/30/89
DATE EXTRACTED: NA
DATE ANALYZED: 6/ 2/89

SAMPLE ID: MW-3 5-26-89

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
- ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
- ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
- ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
- J (Detected, but below quantitation limit; quantitation suspect)
- B (Compound detected in method blank associated with this sample)
- -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
1,2-Dichloroethane-d4	100	(76-114)	(70-121)
Toluene-d8	101	(88-110)	(81-117)
Bromofluorobenzene	98	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19253
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-3 5-26-89

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	5/31- 6/ 1/89	ND	0.01	mg/l
Aluminum	5/31- 6/ 1/89	ND	0.1	mg/l
Arsenic	5/31- 6/ 1/89	ND	0.005	mg/l
Barium	5/31- 6/ 1/89	0.12	0.01	mg/l
Beryllium	5/31- 6/ 1/89	ND	0.005	mg/l
Calcium	5/31- 6/ 1/89	80	0.01	mg/l
Cobalt	5/31- 6/ 1/89	ND	0.05	mg/l
Chromium	5/31- 6/ 1/89	ND	0.02	mg/l
Copper	5/31- 6/ 1/89	ND	0.01	mg/l
Iron	5/31- 6/ 1/89	ND	0.05	mg/l
Mercury	5/31- 6/ 1/89	ND	0.005	mg/l
Potassium	5/31- 6/ 1/89	3.4	0.5	mg/l
Magnesium	5/31- 6/ 1/89	29	0.01	mg/l
Manganese	5/31- 6/ 1/89	0.03	0.01	mg/l
Sodium	5/31- 6/ 1/89	42	0.01	mg/l
Nickel	5/31- 6/ 1/89	ND	0.04	mg/l
Antimony	5/31- 6/ 1/89	ND	0.2	mg/l
Selenium	5/31- 6/ 1/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19253
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-3 5-26-89

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Thallium	5/31- 6/ 1/89	ND	0.1	mg/l
Vanadium	5/31- 6/ 1/89	ND	0.05	mg/l
Zinc	5/31- 6/ 1/89	0.06	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19253
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-3 5-26-89

METALS ANALYTICAL REPORT
GRAPHITE FURNACE SELECTED LIST

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cadmium	5/31- 6/ 1/89	ND	0.001	mg/l
Lead	5/31- 6/ 2/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19253
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-3 5-26-89

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	6/ 2/89	ND	0.005	mg/l
Fluoride	6/ 1/89	0.4	0.1	mg/l
Sulfate	6/ 2/89	110	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5767-19254
MATRIX: WATER

DATE RECEIVED: 5/30/89
DATE EXTRACTED: NA
DATE ANALYZED: 6/ 2/89

SAMPLE ID: MW-4 5-27-89

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
- ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
- ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
- ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
- J (Detected, but below quantitation limit; quantitation suspect)
- B (Compound detected in method blank associated with this sample)
- -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
1,2-Dichloroethane-d4	101	(76-114)	(70-121)
Toluene-d8	102	(88-110)	(81-117)
Bromofluorobenzene	98	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19254
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : MW-4 5-27-89

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	6/ 2/89	ND	0.03	mg/l
Fluoride	6/ 1/89	1.5	0.1	mg/l
Sulfate	6/ 2/89	180	10	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5767-19255
MATRIX: WATER

DATE RECEIVED: 5/30/89
DATE EXTRACTED: NA
DATE ANALYZED: 6/ 2/89

SAMPLE ID: WASH BLANK 5-27-89

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
- ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
- ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
- ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
- J (Detected, but below quantitation limit; quantitation suspect)
- B (Compound detected in method blank associated with this sample)
- -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
1,2-Dichloroethane-d4	100	(76-114)	(70-121)
Toluene-d8	102	(88-110)	(81-117)
Bromofluorobenzene	99	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19255
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : WASH BLANK 5-27-89

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	5/31- 6/ 1/89	ND	0.01	mg/l
Aluminum	5/31- 6/ 1/89	ND	0.1	mg/l
Arsenic	5/31- 6/ 1/89	ND	0.005	mg/l
Barium	5/31- 6/ 1/89	ND	0.01	mg/l
Beryllium	5/31- 6/ 1/89	ND	0.005	mg/l
Calcium	5/31- 6/ 1/89	0.22	0.01	mg/l
Cobalt	5/31- 6/ 1/89	ND	0.05	mg/l
Chromium	5/31- 6/ 1/89	ND	0.02	mg/l
Copper	5/31- 6/ 1/89	0.02	0.01	mg/l
Iron	5/31- 6/ 1/89	ND	0.05	mg/l
Mercury	5/31- 6/ 1/89	ND	0.005	mg/l
Potassium	5/31- 6/ 1/89	ND	0.5	mg/l
Magnesium	5/31- 6/ 1/89	0.1	0.01	mg/l
Manganese	5/31- 6/ 1/89	ND	0.01	mg/l
Sodium	5/31- 6/ 1/89	0.47	0.01	mg/l
Nickel	5/31- 6/ 1/89	ND	0.04	mg/l
Antimony	5/31- 6/ 1/89	ND	0.2	mg/l
Selenium	5/31- 6/ 1/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19255
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : WASH BLANK 5-27-89

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Thallium	5/31- 6/ 1/89	ND	0.1	mg/l
Vanadium	5/31- 6/ 1/89	ND	0.05	mg/l
Zinc	5/31- 6/ 1/89	0.08	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19255
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : WASH BLANK 5-27-89

METALS ANALYTICAL REPORT
GRAPHITE FURNACE SELECTED LIST

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cadmium	5/31- 6/ 1/89	ND	0.001	mg/l
Lead	5/31- 6/ 2/89	ND	0.005	mg/l

NOTE: ND (None Detected) .

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 5767-19255
MATRIX : WATER

DATE RECEIVED: 5/30/89

SAMPLE ID : WASH BLANK 5-27-89

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	6/ 2/89	ND	0.005	mg/l
Fluoride	6/ 1/89	ND	0.1	mg/l
Sulfate	6/ 2/89	ND	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

QUALITY CONTROL SECTION

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
	GC/MS VOLATILE COMPOUNDS				
890601	1,1-Dichloroethene	94	94	WATER	(61-145)
	Trichloroethene	96	96		(71-120)
	Chlorobenzene	98	99		(75-130)
	Toluene	98	101		(76-125)
	Benzene	109	110		(76-127)

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
19253	Silver	94	93	WATER	(67-110)
19253	Aluminum	93	94	WATER	(70-129)
19253	Arsenic	99	102	WATER	(60-137)
19253	Barium	93	93	WATER	(72-112)
19253	Beryllium	84	83	WATER	(75-108)
19253	Calcium	84	90	WATER	(73-121)
19253	Cobalt	93	91	WATER	(73-106)
19253	Chromium	91	90	WATER	(74-110)
19253	Copper	85	84	WATER	(74-106)
19253	Iron	100	98	WATER	(71-113)
19253	Mercury	96	96	WATER	(59-132)
19253	Potassium	102	97	WATER	(70-127)
19253	Magnesium	103	118	WATER	(65-129)
19253	Manganese	95	94	WATER	(72-112)
19253	Sodium	119	91	WATER	(65-123)
19253	Nickel	97	95	WATER	(72-106)
19253	Antimony	109	99	WATER	(43-122)
19253	Selenium	86	87	WATER	(45-106)
19253	Thallium	86	87	WATER	(67-109)
19253	Vanadium	88	88	WATER	(75-109)
19253	Zinc	101	96	WATER	(74-107)
890531	Cadmium	102	98	WATER	(74-108)
890531	Lead	94	87	WATER	(72-113)

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
890531	Cyanide	58	45	WATER	(45-120)
890601	Fluoride	91	96	WATER	(76-126)
890530	Sulfate	84	83	WATER	(83-114)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9089-90602
MATRIX: WATER

DATE RECEIVED: 6/ 2/89
DATE EXTRACTED: NA
DATE ANALYZED: 6/ 2/89

SAMPLE ID: INTRA-LAB BLANK , 6 /2 /89

VOLATILE ORGANICS
BLANK COMPOUND LIST - GC/MS

Acetone	ND**	1,1-Dichloroethane	ND
Acrolein	ND**	1,2-Dichloroethane	ND
Acrylonitrile	ND**	1,1-Dichloroethene	ND
2-Butanone	ND**	1,2-Dichloroethene (total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND*	Ethylbenzene	ND
Carbon disulfide	ND	2-Hexanone	ND**
Carbon tetrachloride	ND	4-Methyl-2-pentanone	ND**
Chlorobenzene	ND	Methylene chloride	ND
Chloroethane	ND*	Styrene	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
2-Chloroethyl vinyl ether	ND	Tetrachloroethene	ND
Chloromethane	ND*	Toluene	ND
Chloromethyl methyl ether	ND*	1,1,1-Trichloroethane	ND
Dibromochloromethane	ND	1,1,2-Trichloroethane	ND
1,2-Dichlorobenzene	ND	Trichloroethene	ND
1,3-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,4-Dichlorobenzene	ND	Vinyl acetate	ND**
Dichlorodifluoromethane	ND*	Vinyl chloride	ND*
		Total xylenes	ND

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected , but below quantitation limit; quantitation suspect)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER	SOLID
1,2-Dichloroethane-d4	99	(76-114)	(70-121)
Toluene-d8	101	(88-110)	(81-117)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/Alert Laboratories, Inc. RECEIVING DATE : 5/31/89
LABORATORY ID : 9089-90531
SAMPLE MATRIX : WATER

SAMPLE ID : INTRA-LAB BLANK , 5 /31/89

METALS ANALYTICAL BLANK REPORT

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	5/31- 6/ 1/89	ND	0.01	mg/l
Aluminum	5/31/89	ND	0.1	mg/l
Arsenic	5/31- 6/ 1/89	ND	0.005	mg/l
Barium	5/31- 6/ 1/89	ND	0.01	mg/l
Beryllium	5/31- 6/ 1/89	ND	0.005	mg/l
Calcium	5/31- 6/ 1/89	0.08	0.01	mg/l
Cobalt	5/31- 6/ 1/89	ND	0.05	mg/l
Chromium	5/31- 6/ 1/89	ND	0.02	mg/l
Copper	5/31- 6/ 1/89	ND	0.01	mg/l
Iron	5/31- 6/ 1/89	ND	0.05	mg/l
Mercury	5/31- 6/ 1/89	ND	0.005	mg/l
Potassium	5/31- 6/ 1/89	ND	0.5	mg/l
Magnesium	5/31- 6/ 1/89	0.14	0.01	mg/l
Manganese	5/31- 6/ 1/89	ND	0.01	mg/l
Sodium	5/31- 6/ 1/89	0.29	0.01	mg/l
Nickel	5/31- 6/ 1/89	ND	0.04	mg/l
Antimony	5/31- 6/ 1/89	ND	0.2	mg/l
Selenium	5/31- 6/ 1/89	ND	0.005	mg/l
Thallium	5/31- 6/ 1/89	ND	0.1	mg/l
Vanadium	5/31- 6/ 1/89	ND	0.05	mg/l
Zinc	5/31- 6/ 1/89	0.01	0.01	mg/l
Cadmium	5/31- 6/ 1/89	ND	0.001	mg/l
Lead	5/31- 6/ 2/89	ND	0.005	mg/l

ND - NONE DETECTED

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/Alert Laboratories **DATE RECEIVED:** 6/ 1/89
LAB #: 9089-90601
MATRIX : WATER

SAMPLE ID : INTRA-LAB BLANK , 6 /1 /89

GENERAL ANALYTICAL BLANK REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Chloride	6/ 1/89	ND	2	mg/l
Chemical Oxygen Demand	6/ 1/89	ND	5	mg/l
Fluoride	6/ 1/89	ND	0.1	mg/l
Methylene Blue Active Substances	6/ 1/89	ND	0.1	mg/l
Nitrite Nitrogen	6/ 1/89	ND	0.04	mg/l
Nitrate Nitrogen	6/ 1/89	ND	0.1	mg/l
Nitrate-Nitrite Nitrogen	6/ 1/89	ND	0.1	mg/l
Oil and Grease	6/ 1- 6/ 2/89	ND	1	mg/l
Total Dissolved Solids	6/ 1- 6/ 2/89	ND	5	mg/l
Total Kjeldahl Nitrogen	6/ 1/89	ND	0.3	mg/l
Total Organic Halogen	6/ 1/89	ND	10	ug/l
Total Solids	6/ 1- 6/ 2/89	ND	0.5	%
Total Suspended Solids	6/ 1- 6/ 2/89	ND	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/Alert Laboratories
LAB #: 9089-90602
MATRIX : WATER

DATE RECEIVED: 6/ 2/89

SAMPLE ID : INTRA-LAB BLANK , 6 /2 /89

GENERAL ANALYTICAL BLANK REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Alkalinity (CaCO3 to pH 4.5)	6/ 2/89	ND	20	mg/l
Cyanide	6/ 2/89	ND	0.005	mg/l
Bicarbonate	6/ 2/89	ND	5	mg/l
Ammonia Nitrogen	6/ 2/89	ND	0.2	mg/l
Nitrite Nitrogen	6/ 2/89	ND	0.04	mg/l
Nitrate Nitrogen	6/ 2/89	ND	0.1	mg/l
Nitrate-Nitrite Nitrogen	6/ 2/89	ND	0.1	mg/l
Sulfate	6/ 2/89	ND	5	mg/l
Sulfide	6/ 2/89	ND	1	mg/l
Total Dissolved Solids	6/ 2- 6/ 5/89	ND	5	mg/l
Tot Recoverable Pet Hydrocarbons	6/ 2/89	ND	0.5	mg/l
Total Solids	6/ 2- 6/ 5/89	ND	0.5	%
Total Suspended Solids	6/ 2- 6/ 5/89	ND	5	mg/l

NOTE: ND (None Detected)

CHAIN OF CUSTODY RECORD

NO.

Project No.: 14570-008 Project Name: Chr-Vit / Eagle Picher

Samplers: (signature) Stuart R. Hollyton

Sta. No.	Date	Time	Comp	Grab	Station Location	Number of Containers	TCL Metals (Dissolved)	8240 Volatiles					Remarks
MW-1	5/27			X	MW-1	1	✓						
MW-2	5/26			X	MW-2	1	✓						
MW-3	5/26			X	MW-3	1	✓						
MW-1	5/27			X	MW-1	2		✓					
MW-2	5/26			X	MW-2	2		✓					
MW-3	5/26			X	MW-3	2		✓					
MW-4	5/27			X	MW-4	2		✓					
	5/27				WASH BLANK	3	✓	✓					

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Stuart R. Hollyton	5/27/89 8:35	[illegible]	5/27/89 [illegible]
Relinquished by: (signature)	**Date/Time**	**Received for Laboratory by: (signature)**	**Date/Time**
[illegible]	5/30/89 9:24	Tom Schaffner	5-30-89 9:26

Remarks:

Distribution: Original accompanies shipment; Copy to: Relinquished + Tom Schaffner

Field Files Sarah James 5-30-89 3:23

Dames & Moore

CHAIN OF CUSTODY RECORD

NO.

Project No.: 14570-003
Project Name: Chi-Vit / Eagle Picher
Samplers: (signature) [signature]

Sta. No.	Date	Time	Comp	Grab	Station Location	Number of Containers	Fluoride + Nitrate	Cyanide						Remarks
MW-1	5/27			X	MW-1 (SW)	1	✓							
MW-2	5/26			X	MW-2 (NC[illegible])	1	✓							
MW-3	5/26			X	MW-3 (NW)	1	✓							
MW-4	5/27			X	MW-4 (NE)	1	✓							
MW-1	5/27			X	MW-1	1		✓						
MW-2	5/26			X	MW-2	1		✓						
MW-3	5/26			X	MW-3	1		✓						
MW-4	5/27			X	MW-4	1		✓						
	5/27				~~FIELD~~ WASH BLANK	2	✓	✓						

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	5/27/89 8:35	[signature]	5/27 8:35
Relinquished by: (signature) [signature]	Date/Time 5/30/89 9:26	Received for Laboratory by: (signature) [signature]	Date/Time 5-30-8 926

Remarks:

Dames & Moore

Distribution: Original accompanies shipment; Copy to: Field Files

Relinquished Tom Schaffner

Rec for Lab Sarah James 5-30-89 3:23

REPORT
PHASE III DISPOSAL SITE INVESTIGATION
CHI-VIT CORPORATION, URBANA, OHIO

PREPARED FOR EAGLE-PICHER INDUSTRIES, INC.
14570-011-121
APRIL 30, 1990

DAMES & MOORE

DAMES & MOORE A PROFESSIONAL LIMITED PARTNERSHIP
644 EAST STREET, SUITE 501 CINCINNATI, OHIO 45203 (513) 651-3440

May 1, 1990

Paul D. Harper
Eagle-Picher Industries, Inc.
580 Walnut Street
Cincinnati, OH 45202

Dear Paul:

Re: Final Report - Phase III
Chi-Vit Corporation

This letter transmits five copies of our final report of the Phase III investigation of the disposal site at Chi-Vit Corporation, Urbana, Ohio.

In summary, we believe the data from the three phases of investigation support the conclusion that the disposal site does not adversely impact ground water quality. The findings from Phase III indicate that there is an offsite source for volatile organic compounds (VOCs) that are present in the regional sand and gravel aquifer. There is no evidence to associate the VOCs with the disposal site.

It has been our pleasure to perform this study for Eagle-Picher Industries. We remain available to respond to any questions or comments that may arise regarding the report.

Very truly yours,

DAMES & MOORE

Jennifer D. Johnson

Jennifer D. Johnson
Project Manager

Stuart Edwards/JJ

Stuart Edwards, P.E.
Partner (Ltd.)

JDJ/SE/CJ-7
14570-011-121

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(follow figures)

Appendix

A BORING LOGS WITH WELL CONSTRUCTION DETAILS

B ANALYTICAL LABORATORY REPORT

1.0 INTRODUCTION

This document reports on the third phase of a ground water investigation at the Chi-Vit Corporation in Urbana, Ohio. The plant is located at 720 South Edgewood Avenue on the southwestern edge of Urbana (Figure 1). Chi-Vit manufactures porcelain enamel frit, which is ultimately used to coat appliances.

The investigation was conducted for Eagle-Picher Industries, Inc. (EPI) which sold the Urbana facility to Chi-Vit in 1989, retaining the small parcel of property to the southwest of the plant (Figure 2). This property includes an area approximately 75 feet wide by 200 feet in length that was used for disposal of general plant refuse and raw materials from approximately 1966 to 1976. This area, referred to herein as the "disposal site," was the subject of a Phase I investigation to characterize the upgradient and downgradient ground water quality and flow patterns under and in the immediate vicinity of the disposal site. The purpose of the water quality characterization was to enable a determination of the absence or presence of contaminants in the ground water. This determination was needed to meet the requirements of the purchase agreement between EPI and Chi-Vit.

Results of the Phase I investigation showed that ground water in the sand and gravel aquifer below the disposal site contained two volatile organic compounds, (VOCs) trichloroethylene (TCE) and benzene, in excess of National Primary Drinking Water Regulations (NPDWR). Both TCE and benzene were found in a sample from an upgradient well (MW-2). A sample from the downgradient well, MW-1, also contained TCE.

The detection of VOCs in the aquifer below the site prompted a second phase of investigation to ascertain if the shallow perched water table in the vicinity was similarly affected, which would suggest that the disposal site was the source.

The Phase II investigation involved the installation of six shallow wells surrounding the disposal site. No VOCs were detected in samples from the shallow wells, indicating that the source of VOCs in the deep aquifer was other than the disposal site. In order to make a definitive determination as required by the purchase agreement, conclusive evidence was needed to establish one of the following possible scenarios: either the VOC

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source is offsite, or, the source is onsite, but is hydrologically lateral to or upgradient to the disposal site.

The purpose of the Phase III investigation was to address the first scenario. Two wells, MW-11 and MW-12, were installed in the northeastern corner of the site, which is hydraulically upgradient of the disposal site (Figure 2).

2.0 FIELD INVESTIGATION

Field activities commenced on January 30, 1990 and continued through February 3, 1990. Drilling services were provided by R & R International Inc. of Akron, Ohio. Prior to drilling, the locations for the two monitoring wells were selected and staked.

2.1 DRILLING AND SOIL SAMPLING

Initial attempts to advance the borings with mud rotary methods were unsuccessful because of circulation problems and borehole collapse. Eventually a Davey-Kent 5 rig was used to advance the borings with 4 1/4- inch I.D. hollow-stem augers in conjunction with the standard penetration test (SPT) sampling methods.

The SPT method was used to sample approximately the upper 40 feet of each boring. It was not possible to sample below approximately 40 feet because of drilling difficulties. The SPT consists of driving a 2-inch O.D., 18 inch long split spoon a total of three 6-inch increments using a 140 lb. hammer that is dropped 30 inches. The number of blows required to drive the spoon each 6-inch increment was recorded on the drill log. Sampling was generally performed at 5-foot intervals unless otherwise directed by the supervising geologist. As each split spoon was advanced (by the hammer) at 5-foot intervals, the barrel was filled with in-situ soil. The barrel was then removed, split open lengthwise, and the contents examined.

As samples were removed from the sampling tools, each sample was described and documented on standard Dames and Moore field log forms, and a representative sample was retained in a sample container for future reference. Each boring was advanced until a suitable depth for screen placement was attained.

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2.2 MONITOR WELL INSTALLATION

Monitor wells were installed in each of the boreholes at the completion of drilling and sampling. Upon removal of the rods, a 10 foot section of 2 inch I.D. PVC (0.010-inch slot) screen with a bottom plug was lowered into the auger stem. As the PVC screen was inserted in the auger stem, a section of 2 inch I.D. PVC riser was threaded together onto the top of the screen until the riser stick-up was several feet above ground-level. A PVC cap was secured to the top of the riser to prevent entry of sand, bentonite, or other sources of contamination.

At this point, a coarse silica sand was used to fill the annulus to a height of approximately 2 feet above the top of the screen. Augers were simultaneously partially withdrawn to allow the sand pack to fall in place around the screen. In both wells, wall collapse of natural coarse sand and gravel became mixed with the introduced sand pack.

A 2 to 3-foot thick bentonite seal was then placed above the sand pack by dropping 3/8-inch-diameter bentonite pellets into the annulus between the well and the inside of the augers while the augers were gradually withdrawn.

Grout, a mixture of powdered bentonite, Portland cement and water, was pumped into the annular space (after the remaining augers were removed). Shortly after the grout was poured into each well, a 5-inch-I.D. steel casing with a lockable lid was installed in order to protect and secure the PVC riser. Locks were placed on each well, and each well was identified by marking the protective well casing lid with the appropriate identification number.

Depths to the well construction features (top of sand pack, bentonite, etc.) were measured with a weighted nylon tape and recorded by the field geologist. Drafted boring logs showing well construction details are presented as Appendix A.

2.3 DECONTAMINATION PROCEDURES

All drilling and sampling equipment and tools were steam-cleaned and inspected prior to drilling activities to ensure that the equipment would not introduce contamination

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from other sources to each new well. The drill rig was steam cleaned before each well location.

2.4 WELL DEVELOPMENT

Standard hand bailing techniques were used to develop the wells. In addition, a minimum of 3 well volumes of ground water was purged from the wells prior to ground water sampling. The purpose of bailing and surging the wells was to help remove any fine sand, silt and clay particles from the screen, surrounding sand pack, and formation lithologies.

2.5 GROUND WATER SAMPLING

Each well was measured for a water level, then purged and sampled on February 21, and 22, 1990. Water levels were measured to a 0.01-foot accuracy with an electronic well probe. Field measurements for pH and conductivity were made on samples and are reported on Table 1. The wells were sampled using a PVC bailer. The bailer was decontaminated between wells using dilute HNO_3 and distilled water rinses. In order to further avoid cross-contamination between wells, sampling personnel wore clean, disposable latex gloves and avoided contact with the sample and sample containers.

Proper field protocol was maintained in the field by the samplers at all times during sampling. Samples for volatile organics were poured directly from the bailer into 40-ml glass vials. A duplicate sample was collected from MW-1 as a check of sampling reproducibility.

All sample containers were labeled with sample I.D., parameter to be analyzed, and date of sampling. Sample vials and plastic jars were placed immediately in an ice-filled cooler to be kept cool throughout sampling and shipment. Proper chain of custody was maintained throughout. Samples were shipped by overnight courier to Wadsworth/Alert Laboratories in Canton, Ohio on February 22, 1990.

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2.6 LABORATORY ANALYSIS

Samples from wells MW-1, MW-2, MW-3, MW-4, MW-11, and MW-12 were analyzed for VOCs of U.S. EPA's Target Compound List (TCL). A field wash blank sample was also analyzed to monitor the adequacy of the field decontamination procedures. The laboratory analyzed a matrix spike sample and matrix spike duplicate on MW-4 and reported acceptable recoveries. The intralab blank samples did not contain any target compounds. The laboratory report is presented as Appendix B.

2.7 SURVEY

The wells were surveyed for location and elevation by Lee Surveying and Mapping Co., Bellefontaine, Ohio. The elevations were established from Urbana City Bench Mark No. 13 (Elevation 1057.10 feet, mean sea level*). Elevations of the wells and water levels are presented in Table 2.

3.0 FINDINGS

3.1 GEOLOGIC CONDITIONS

As previously reported, the site is underlain by a 20 to 30 foot unit of dark-brown to gray silty clay mixed with minor amounts of sand and pebbles. The unit contains occasional thin sand gravelly zones that are interpreted to be lenses based on their seemingly random occurrence. Based on the geologic history of the area, this unit is interpreted to be glacial till, a fairly ubiquitous material found in the glaciated portion of Ohio that was deposited directly by the glacial ice sheets. Because of its mode of deposition, till is characteristically fine-grained and consolidated.

The borings for MW-11 and MW-12 extended below the upper fine-grained stratum and showed the same sandy gravel unit that was encountered in the wells MW-1 through MW-4 in the southwestern portion of the site. Because of the similar sequence and low-relief topography, these units are interpreted to be continuous across the site, as reflected in the geologic cross section shown in Figure 3.

---

* An error was discovered in the previously reported elevation of Bench Mark #13 (1,014.36 feet). The correct value is 1,057.10 feet, msl.

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3.2 GROUND WATER

The occurrence of ground water in wells MW-11 and MW-12 is similar to the conditions found in the southwestern portion of the site: a perched water table within 5 feet of the ground surface and a water table in the sand and gravel stratum at a depth of approximately 45 feet. The lower zone of saturation is interpreted to be the uppermost aquifer for the area. Figure 2 presents a map of the deep piezometric surface. As it shows, the gradient is very small (0.003) and the ground water flow direction is to the southwest.

As reported in the Phase II report, a shallow zone of saturated conditions was encountered in the upper till unit that is believed to represent a perched water table. The sand and gravel lenses within the till were found to be wet while the fine-grained silty clay matrix was moist. Well MW-5 through MW-10 were screened in this upper saturated zone and showed the water level to be approximately 5 to 9 feet below ground surface. Figure 4 is a contour map showing the water table surface. The surface slopes west at a gradient of approximately 1 foot per 100 feet (0.01).

3.3 GROUND WATER QUALITY

Results of the analyses for VOCs are presented on Table 3. Four different VOCs were detected in samples from the deep wells as summarized below and shown on Figure 2.

Well	VOCs/ Concentration (µg/L)
MW-1	TCE, 56 Tetrachloroethene, 4 Carbon disulfide, 15
MW-2	TCE, 41
MW-3	TCE, 7
MW-4	TCE, 34 Acetone, 56 Carbon disulfide, 6
MW-11	None detected
MW-12	TCE, 10

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TCE was detected in wells MW-1 and MW-2 on two previous occasions, (May and August, 1989), and in wells MW-3 and 4 on one previous occasion (August, 1989). The other three compounds, carbon disulfide, acetone, and tetrachloroethene, showed a similar pattern of occurrence, with the exception of carbon disulfide in MW-4, where it was detected for the first time.

The presence of TCE in upgradient well MW-12 is evidence that the source of TCE, and by association, other VOCs, in wells MW-1 through MW-4, originates offsite. The absence of VOCs in MW-11 suggests that the source is located northeast of MW-12.

4.0 CONCLUSIONS

Conclusions of this three-phase project are discussed with reference to the work plan requirements (Schedule 2) of the purchase agreement.

S1. A number of wells shall be drilled at strategic locations in and around the disposal site, and a number of samples shall be analyzed for a range of contaminant parameters sufficient to characterize upgradient and downgradient ground water quality and to determine depth and direction of flow of ground water under, and in the immediate vicinity of, the disposal site.

Wells MW-1, MW-2, MW-3, and MW-4 were installed around the disposal site and screened in the regional sand and gravel aquifer between depths of approximately 40 to 60 feet below ground surface. Wells MW-5 through MW-10 were also installed around the disposal site and screened in a perched water table between 10 to 20 feet below ground surface. Based on water level measurements collected during the course of the three-phase investigation, the hydrologic locations of the wells relative to the disposal site are as follows:

Upgradient	Lateral	Downgradient
MW-2	MW-6	MW-1
MW-3	MW-7	MW-5
MW-4	MW-9	
MW-8	MW-10	

Ground water in the regional aquifer flows to the southwest; the perched water table flows to the west.

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Samples were collected from each well for the following parameters:

TCL volatile organic compounds (VOCs)
TCL metals
Cyanide
Sulfate
Fluoride

Two additional sets of samples for VOCs and one additional set of samples for potassium were collected from wells MW-1 through MW-4.

To summarize the water quality data, VOCs were detected in samples from wells MW-1 and MW-2 on all three occasions. VOCs were detected in wells MW-3 and MW-4 on two of three occasions. No VOCs were detected in wells MW-5 through MW-10. No elevated inorganic parameters were found in any of the wells (MW-1 through MW-10).

S2. *If the work performed under S1 shows ground water contamination related to the disposal site, in excess of the Safe Drinking Water Act Maximum Contaminant Levels or Maximum Contaminant Level Goals for the contaminants identified, or background, as applicable, such additional wells shall be drilled, and such additional, samples shall be taken and analyzed for such contaminant parameters as are necessary to determine the nature and extent of ground water contamination, and if feasible and practicable, to determine the location(s) in the disposal site of contamination source(s). Available sources, if any, of pertinent information shall be consulted to obtain detailed information on the nature and amounts of materials disposed in the disposal site, and the point(s) in the disposal site where particular wastes or types of wastes were disposed. For the purpose of this work plan, ground water contamination shall be deemed to be related to the disposal site unless EPI's consultant(s) shall have issued their written opinion to EPI, Chi-Vit, and the Lenders that such contamination is the result of causes or sources other than the disposal site.*

It is concluded that the VOC ground water contamination detected in wells MW-1 through MW-4 is not related to the disposal site for the following reasons:

- Absence of VOCs in Shallow Wells

  Because of the high perched water table (within 5 feet of ground surface) and reported depth of filling in the disposal site (approximately 11 feet), it would be expected that if the VOCs had originated from the disposal site, they also would be present in the shallow wells. However, no VOC contamination was found in the shallow wells.

- Presence of TCE in MW-12

  The primary VOC contaminant in the ground water in deep wells around the disposal site, TCE, was also detected in a deep well sufficiently upgradient to eliminate the possibility of being associated with the disposal site, or, based on what is known about the plant, any other

OH000359

potential source at the Chi Vit facility. The presence of TCE in MW-12 supports the conclusion that the VOC source is located offsite.

- Hydrogeologic Conditions

  The hydrogeologic conditions at the site are supportive of the conclusion that the disposal site is not associated with the VOC contamination. The presence of a thick, laterally continuous, relatively impermeable clay and silt-rich barrier followed by an unsaturated zone in the sand and gravel aquifer indicates the high degree of hydrologic separation that exists between the perched water table (and disposal site itself) and the regional sand and gravel aquifer.

OH000360

TABLE 1

GROUND WATER CHARACTERISTICS

CHI-VIT CORPORATION

Well I.D.	pH (S.U.)	Specific Conductance (μmhos/cm)	Appearance/Odor
MW-1	7.59	1,077	Brown, turbid/no odor
MW-2	8.01	998	Brown, turbid/no odor
MW-3	7.16	1,586	Brown, turbid/no odor
MW-4	12.01*	2,360*	Light grayish-brown, turbid/no odor
MW-11	7.53	1,255	Brown, turbid/no odor
MW-12	7.75	1,102	Brown, turbid/no odor

* Slow well recovery prevented complete purging prior to measurement. Well appears to be contaminated with grout.

TABLE 2

WELL CONSTRUCTION DETAILS AND SURVEY DATA

CHI-VIT CORPORATION

Well No.	Ground Surface Elevation (ft, msl)	Top of Casing Elevation (ft, msl)	Well Depth (ft)	Depth to water (ft)	Ground Water elevation (ft, msl)
1	1,039.9	1,041.39	56.50	48.71	992.68
2	1,040.1	1,042.34	61.92	48.85	993.49
3	1,039.8	1,041.76	55.08	48.49	993.27
4	1,040.7	1,043.05	53.75	49.33	993.72
5	1,039.6	1,042.37	17.55	4.95	1,037.42
6	1,040.2	1,043.16	19.58	4.78	1,038.38
7	1,041.2	1,043.44	19.10	4.45	1,038.99
8	1,042.1	1,044.55	16.29	5.12	1,039.43
9	1,043.4	1,046.36	17.25	7.55	1,038.81
10	1,044.9	1,046.61	19.20	8.37	1,038.24
11	1,041.7	1,043.08	59.80	46.35	996.73
12	1,043.7	1,045.19	59.00	48.25	996.84

Note: Water level measurements taken on February 21, 1990

OH000362

TABLE 3

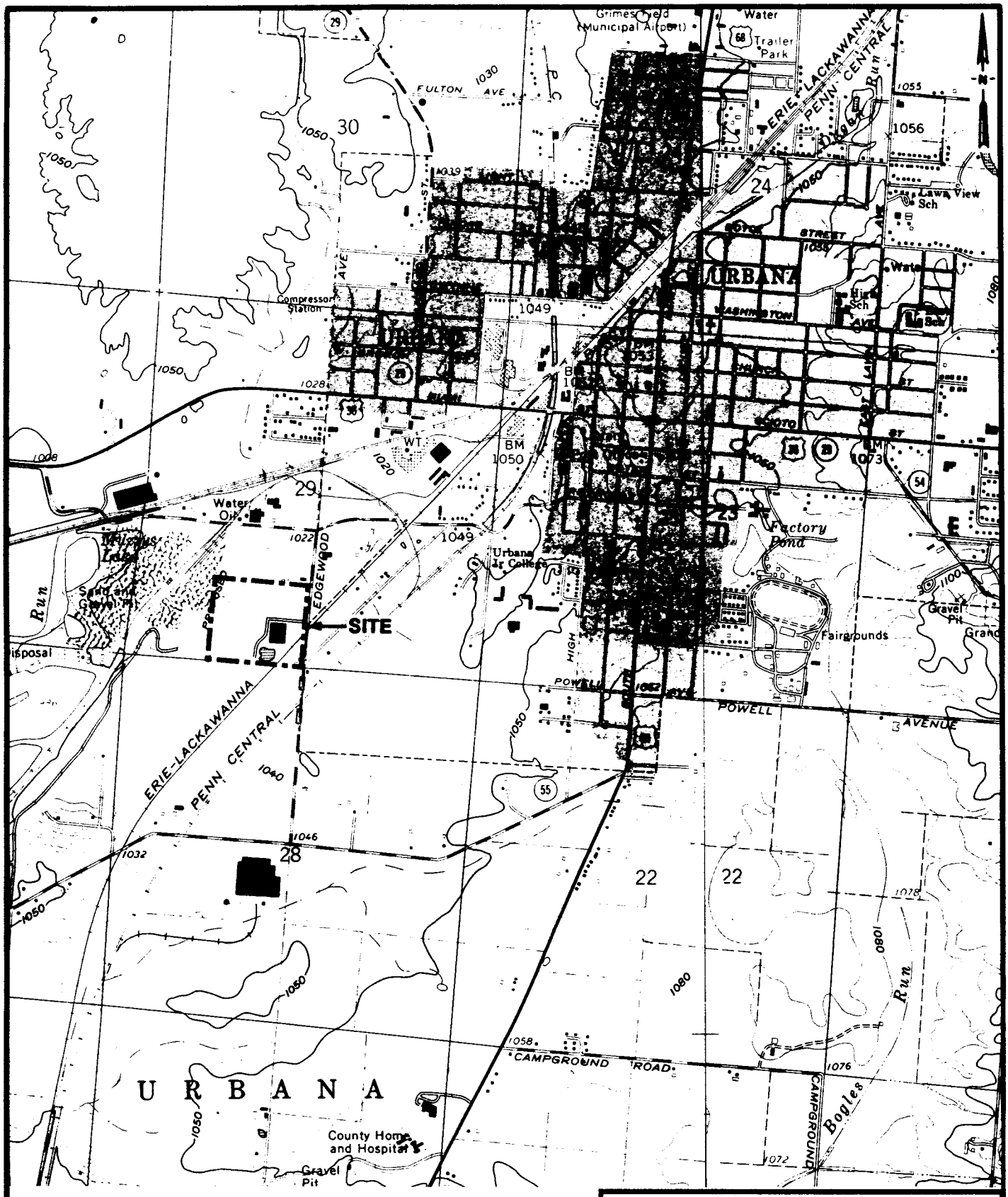
ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (µg/L)

CHI-VIT CORPORATION

Parameter	MW-1			MW-2			MW-3			MW-4			MW-11	MW-12	Wash Blank
	May	August	February	May	August	February	May	August	February	May	August	February	February	February	
Acetone	-	-	-	-	-	-	-	-	-	-	94	56	-	-	-
Benzene	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	-	24	15/-	-	-	-	-	-	-	-	-	6	-	-	-
Carbon tetrachloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	-	3	4/-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	61	111	56/53	20	71	41	-	7	7	-	26	34	-	10	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl acetate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Xylenes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

"-" indicates compound not detected.
Samples collected May 26-27, 1989, August 23, 1989, and February 21-22, 1990.
Laboratory Analysis by Wadsworth/Alert Laboratories, Inc.
Method for analysis: 8240
Duplicate sample results for MW-1 are shown following the original sample result (e.g. 56/53).

OH000363



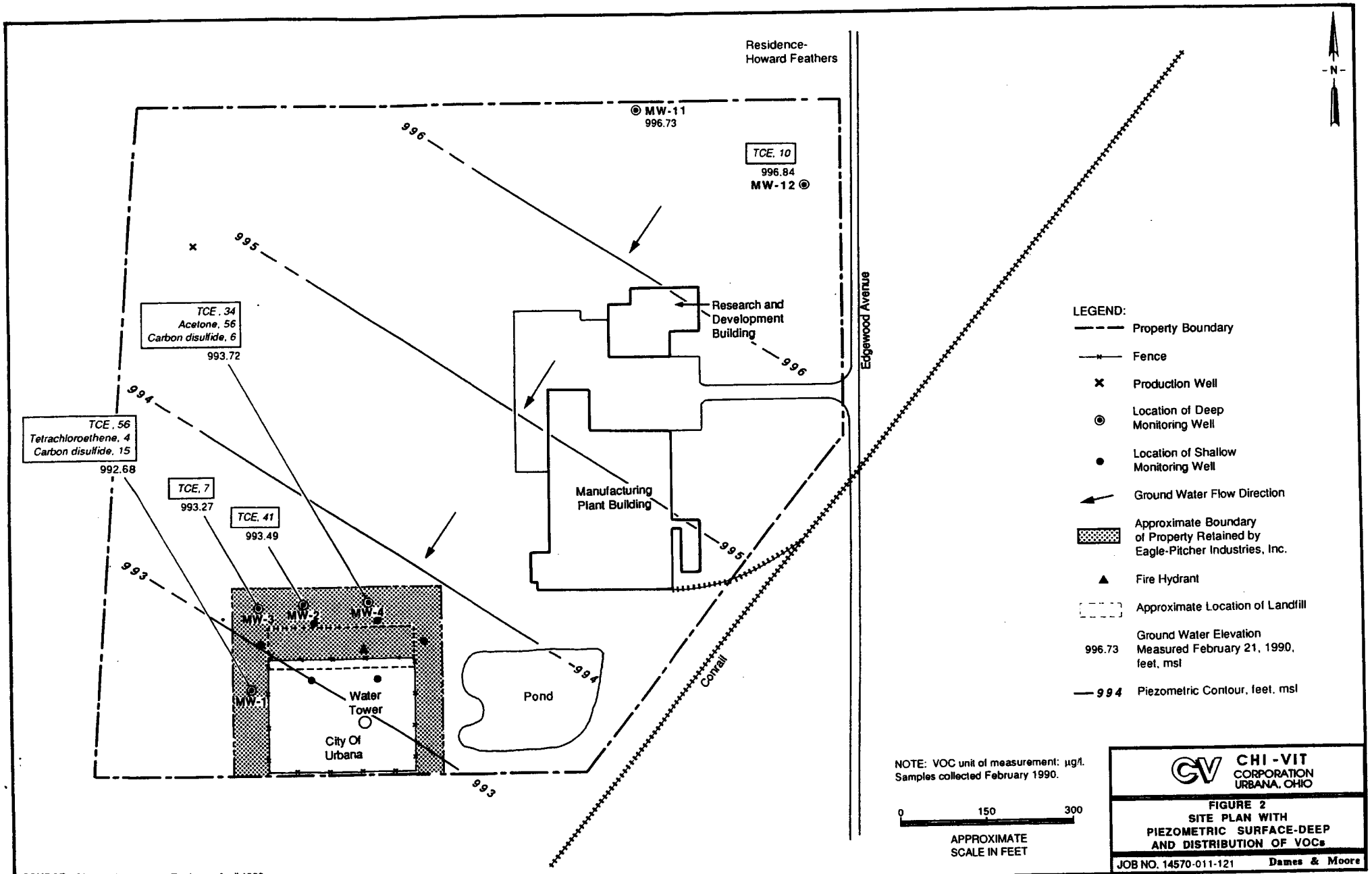
BASE MAP SOURCE: Compiled from the following USGS 7 1/2 minute topographic quadrangle maps: Urbana West, Ohio, 1961, photorevised 1973; Urbana East, Ohio 1961, photorevised 1973.

CHI-VIT CORPORATION
URBANA, OHIO

FIGURE 1

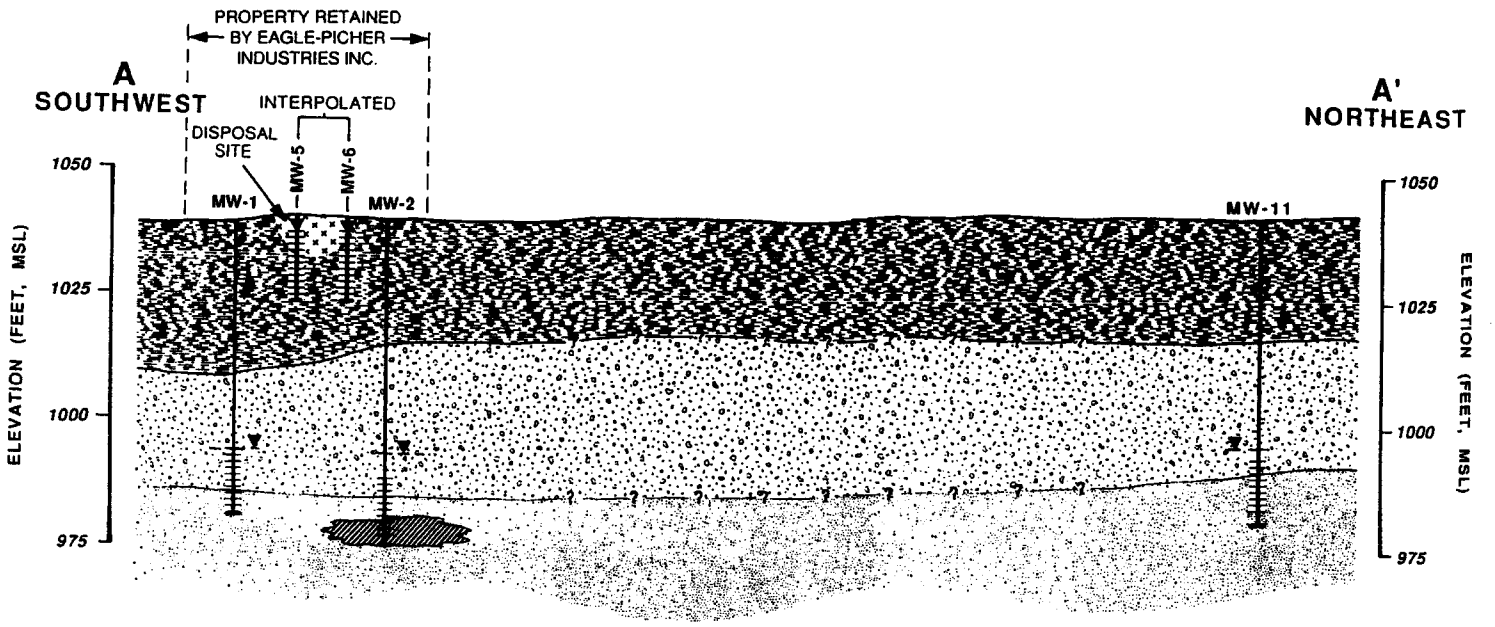
SITE VICINITY MAP

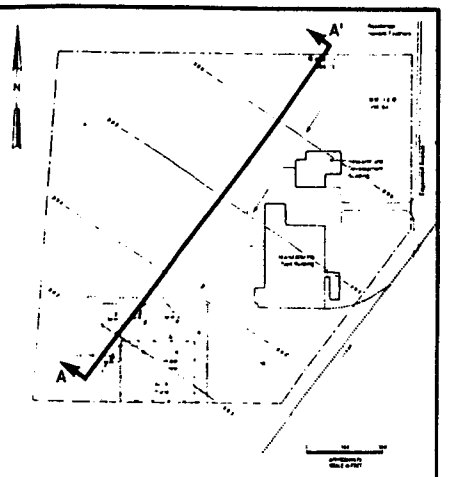
JOB NO. 14570-008-121 Dames & Moore



SOURCE: Champaign County Engineer, April 1988.

OH000365





CROSS SECTION LOCATION

LEGEND:

- BROWN SILTY CLAY WITH SAND AND GRAVEL
- LIGHT BROWNISH-GRAY GRAVEL WITH SAND
- BROWN SAND WITH GRAVEL
- REDDISH BROWN SILT
- MW-2 — MONITORING WELL AND NUMBER SCREEN INTERVAL
- GROUND WATER LEVEL MEASURED

25
0
0 150
SCALE IN FEET
VERTICAL EXAGGERATION = 6X

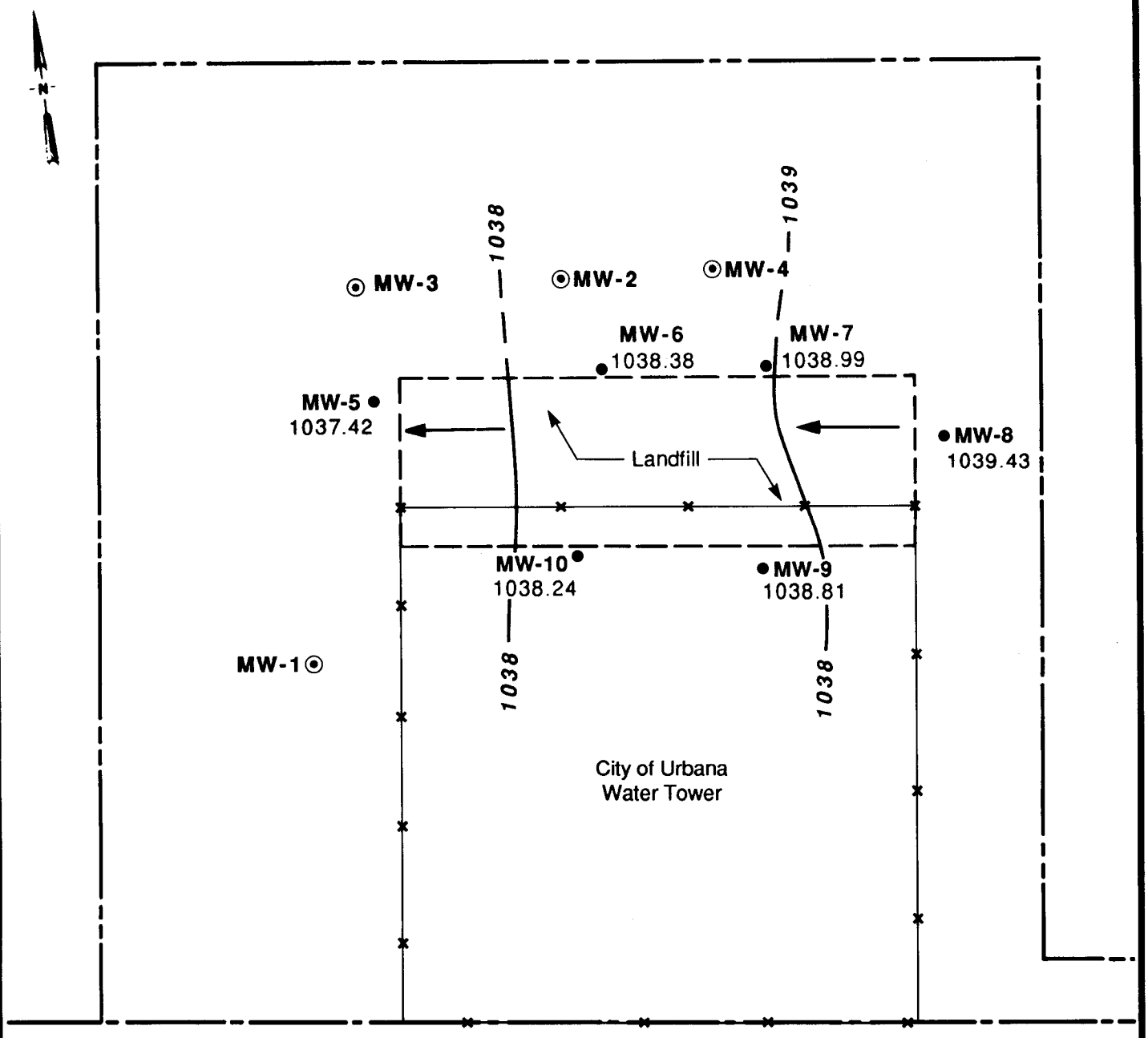
NOTES:
•The depth and thickness of the strata indicated on the subsurface section were obtained by interpolating between test borings. Information on actual conditions exists only at the locations of the test borings and it is possible that the conditions may vary from those indicated.

CHI-VIT CORPORATION
URBANA, OHIO

FIGURE 3
GEOLOGIC CROSS SECTION
A-A'

JOB NO. 14570-011-121 Dames & Moore

OH000366



LEGEND:

- Property Boundary
- Fence
- Property Retained by Eagle-Picher Industries, Inc.
- Approximate Location of Landfill
- Deep Monitoring Well Location
- Shallow Monitoring Well Location
- 1038.24 Ground Water Elevation Measured February 21,1990, feet msl
- 1038 Piezometric Contour, feet, msl
- Ground Water Flow Direction

SOURCE: Lee Surveying and Mapping Co., Bellefontaine, Ohio.

0 60 120

APPROXIMATE SCALE IN FEET

CHI-VIT CORPORATION URBANA, OHIO

FIGURE 4
SITE PLAN WITH PIEZOMETRIC SURFACE-SHALLOW FEBRUARY 21, 1990

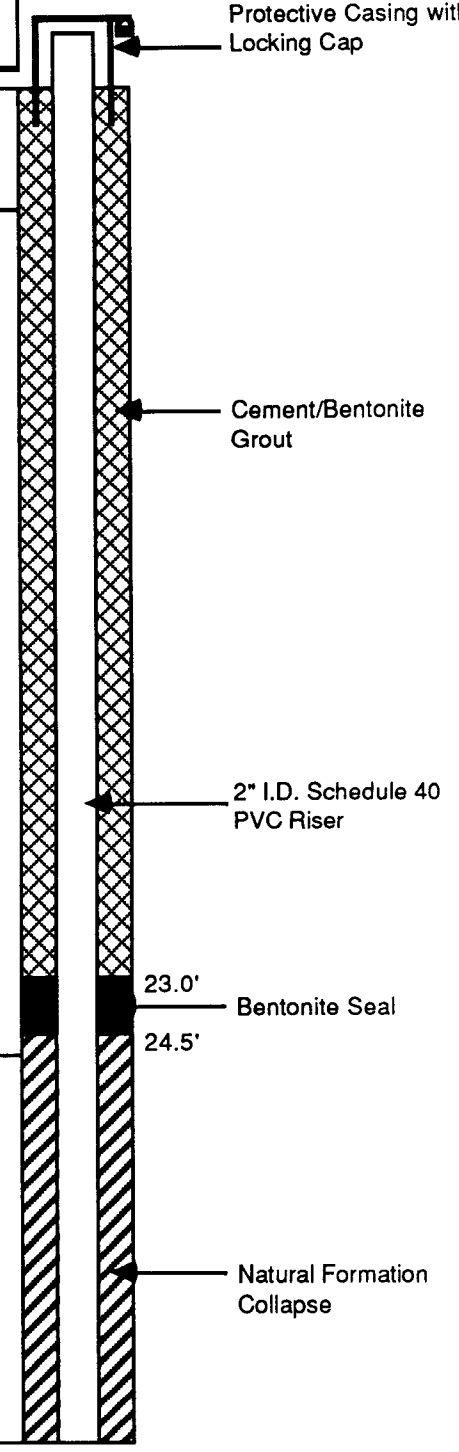
JOB NO. 14570-011-121 Dames & Moore

APPENDIX A

BORING LOGS WITH WELL CONSTRUCTION DETAILS

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0		11		Dark brown sandy SILT with clay, roots, and organics (moist) (topsoil)
				Light brown and mottled gray gravelly, sandy CLAY and SILT with some roots (moist)
5		25		
				grades to grayish brown (moist)
10		43		
15		89/ 10"		
20		82		
25		59		Brownish gray sandy GRAVEL and gravelly SAND, gravel is mostly fine-grained dolomite, up to 3 centimeters in recovered samples (dry)
30		50/ 4.5"		grades to less sand, coarser gravel (dry)
35				

WELL CONSTRUCTION DETAIL



Dames & Moore

Job No. 14570-008-121

CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL
MW-11

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	WELL CONSTRUCTION DETAIL
35		93		wet at 45.0 feet	Natural Formation Collapse; Water level measured at 45.0 feet on 2/3/90; 48.0'; 49.0'; 2" I.D. 0.010"-Slotted PVC Screen; Filter Sand Pack; 58.0'; 59.0'; Natural Formation Collapse; 61.0'
40					
45					
50				Brown sandy GRAVEL interbedded with sand (wet)	
55					
60				Brown SAND, medium to coarse grained (wet)	
65					
70					

Boring completed at 61.0 feet on 2/2/90.
Monitoring well installed at 59.0 feet on 2/2/90.

LEGEND:

Split Spoon Sample

Dames & Moore

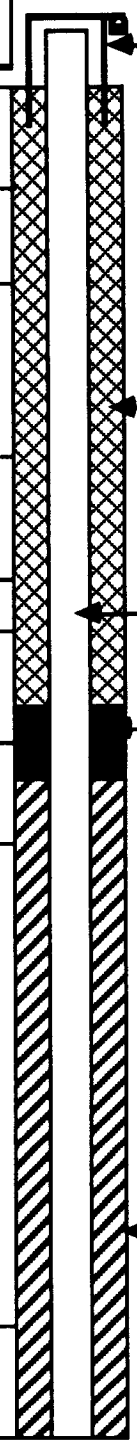
Job No. 14570-008-121

CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL
MW-11

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown SILT with sand and clay (moist) (topsoil)
				Brown gravelly CLAY with sand and silt
5		28		Brown sandy GRAVEL gravel ranges up to 3 centimeters in recovered sample wet at 8 feet
10		52		Dark brown silty CLAY (moist) sample included caved materials, e.g. glass fragments, rotten fiberous material (paper?), and grayish clay-till
				Brown SAND, medium-grained (wet)
15		50		Dark brown silty CLAY (moist) becomes gravelly
				Brown gravelly SAND, fine to medium grained (wet)
20		84		Brown sandy, silty CLAY with gravel (moist)
25		98/ 10"		very soft zone from 27.0 to 28.0 feet
30		53		
				GRAVEL with sand
35				

WELL CONSTRUCTION DETAIL



Dames & Moore

Job No. 14570-008-121

CHI-VIT CORPORATION
URBANA, OHIO

MONITOR WELL
MW-12

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	WELL CONSTRUCTION DETAIL
35		50/3"			
40					
45					46.0'
					Water level measured at 48.5 feet on 2/3/90
					48.5'
50					
				SAND and GRAVEL	2" I.D. 0.010"-Slotted PVC Screen
					Filter Sand Pack
55					56.5'
				GRAVEL	58.5'
				SAND and GRAVEL	Natural Formation Collapse
60					61.0'
65					
70					

Boring completed at 61.0 feet on 2/3/90.
Monitoring well installed at 58.5 feet on 2/3/90.

LEGEND:

Split Spoon Sample

Grab Sample

Dames & Moore

Job No. 14570-008-121

CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL
MW-12

APPENDIX B
ANALYTICAL LABORATORY REPORT

1938-1988
50 YEARS
WADSWORTH/ALERT
LABORATORIES, INC.
Sampling, testing, mobile labs
4101 Shuffel Drive N.W. / North Canton, Ohio 44720

ANALYTICAL REPORT

PROJECT NO. 14570-011-121

EAGLE-PICHER(CHI-VIT)URBANA

Presented to :

TOM HUDSON

DAMES & MOORE

WADSWORTH/ALERT LABORATORIES, INC.

Jay Bernarding

Jay Bernarding
Project Manager

Marvin W Stephens

Marvin W. Stephens, Ph.D.
Vice President & Corporate Technical Director

March 9, 1990

CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Bartow, Florida (813) 533-2150
SOUTHEAST REGIONAL OFFICE: Lexington, South Carolina (803) 957-6590
24-HOUR ALERT LINE: (216) 497-9338

WADSWORTH/ALERT
LABORATORIES, INC.

WADSWORTH/ALERT
LABORATORIES, INC.

NARRATIVE

The following report contains the analytical results for eight water samples submitted to Wadsworth/ALERT Laboratories, Inc. by Dames & Moore from the Eagle-Picher (Chi-Vit) Urbana Site, project number 14570-011-121. The samples were received on February 23, 1990, in accordance with documented sample acceptance procedures.

Wadsworth/ALERT Laboratories, Inc. utilizes only USEPA approved methods and instrumentation in all analytical work. The samples presented in this study were analyzed for volatile organic compounds using SW846 Method 8240. A summary of QC data for this analysis is included at the rear of the report.

References:

SW846. "Test methods for Evaluating Solid Waste Physical/Chemical Methods," Third Edition, September, 1986.

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49570
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/27/90

SAMPLE ID: MW-1 2-22-90 0845

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	15	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	4 J
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	56
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	107	(76-114)	(70-121)
Toluene-d8	107	(88-110)	(81-117)
Bromofluorobenzene	103	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49571
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/28/90

SAMPLE ID: MW-1B 2-22-90 0935

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	53
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	102	(76-114)	(70-121)
Toluene-d8	100	(88-110)	(81-117)
Bromofluorobenzene	100	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49572
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/27/90

SAMPLE ID: MW-2 2-21-90 1645

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	41
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	107	(76-114)	(70-121)
Toluene-d8	104	(88-110)	(81-117)
Bromofluorobenzene	102	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49573
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/28/90

SAMPLE ID: MW-3 2-22-90 0800

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	7
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	100	(76-114)	(70-121)
Toluene-d8	99	(88-110)	(81-117)
Bromofluorobenzene	97	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49574
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/28/90

SAMPLE ID: MW-4 2-21-90 1600

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	56	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	6	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	34
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	98	(76-114)	(70-121)
Toluene-d8	98	(88-110)	(81-117)
Bromofluorobenzene	95	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49575
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/28/90

SAMPLE ID: MW-11 2-21-90 1450

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	94	(76-114)	(70-121)
Toluene-d8	99	(88-110)	(81-117)
Bromofluorobenzene	99	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49576
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/28/90

SAMPLE ID: MW-12 2-21-90 1200

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	10
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	95	(76-114)	(70-121)
Toluene-d8	98	(88-110)	(81-117)
Bromofluorobenzene	98	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 5753-49577
MATRIX: WATER

DATE RECEIVED: 2/23/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/28/90

SAMPLE ID: WB-1 2-21-90 1220

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	97	(76-114)	(70-121)
Toluene-d8	102	(88-110)	(81-117)
Bromofluorobenzene	95	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

QUALITY CONTROL SECTION

WADSWORTH/ALERT
LABORATORIES, INC.

March 7, 1990

QUALITY CONTROL NARRATIVE

Wadsworth/ALERT Laboratories received samples from Dames & Moore on February 23, 1990. Samples 49573, 49575, 49577 were received with air bubbles. Laboratory sampling criteria for volatile analysis requires that the sample must have zero headspace from sample meniscus to vial cap.

Darlene L. Stanley
Q.C. Coordinator

lg

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
	GC/MS VOLATILE COMPOUNDS				
49574	1,1-Dichloroethene	82	83	WATER	(61-145)
	Trichloroethene	94	96		(71-120)
	Chlorobenzene	99	100		(75-130)
	Toluene	102	104		(76-125)
	Benzene	93	94		(76-127)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9090-90227
MATRIX: WATER

DATE RECEIVED: 2/27/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/27/90

SAMPLE ID: INTRA-LAB BLANK , 2 /27/90

VOLATILE ORGANICS
BLANK COMPOUND LIST - GC/MS

Acetone	ND**	1,1-Dichloroethane	ND
Acrolein	ND**	1,2-Dichloroethane	ND
Acrylonitrile	ND**	1,1-Dichloroethene	ND
2-Butanone	ND**	1,2-Dichloroethene (total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND*	Ethylbenzene	ND
Carbon disulfide	ND	2-Hexanone	ND**
Carbon tetrachloride	ND	4-Methyl-2-pentanone	ND**
Chlorobenzene	ND	Methylene chloride	ND
Chloroethane	ND*	Styrene	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
2-Chloroethyl vinyl ether	ND*	Tetrachloroethene	ND
Chloromethane	ND*	Toluene	ND
Chloromethyl methyl ether	ND	1,1,1-Trichloroethane	ND
Dibromochloromethane	ND	1,1,2-Trichloroethane	ND
1,2-Dichlorobenzene	ND	Trichloroethene	ND
1,3-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,4-Dichlorobenzene	ND	Vinyl acetate	ND**
Dichlorodifluoromethane	ND*	Vinyl chloride	ND*
		Total xylenes	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected , but below quantitation limit; quantitation suspect)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	101	(76-114)	(70-121)
Toluene-d8	104	(88-110)	(81-117)
Bromofluorobenzene	99	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9090-90228
MATRIX: WATER

DATE RECEIVED: 2/28/90
DATE EXTRACTED: NA
DATE ANALYZED: 2/28/90

SAMPLE ID: INTRA-LAB BLANK , 2 /28/90

VOLATILE ORGANICS
BLANK COMPOUND LIST - GC/MS

Acetone	ND**	1,1-Dichloroethane	ND
Acrolein	ND**	1,2-Dichloroethane	ND
Acrylonitrile	ND**	1,1-Dichloroethene	ND
2-Butanone	ND**	1,2-Dichloroethene (total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND*	Ethylbenzene	ND
Carbon disulfide	ND	2-Hexanone	ND**
Carbon tetrachloride	ND	4-Methyl-2-pentanone	ND**
Chlorobenzene	ND	Methylene chloride	ND
Chloroethane	ND*	Styrene	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
2-Chloroethyl vinyl ether	ND*	Tetrachloroethene	ND
Chloromethane	ND*	Toluene	ND
Chloromethyl methyl ether	ND	1,1,1-Trichloroethane	ND
Dibromochloromethane	ND	1,1,2-Trichloroethane	ND
1,2-Dichlorobenzene	ND	Trichloroethene	ND
1,3-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,4-Dichlorobenzene	ND	Vinyl acetate	ND**
Dichlorodifluoromethane	ND*	Vinyl chloride	ND*
		Total xylenes	ND

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected , but below quantitation limit; quantitation suspect)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	96	(76-114)	(70-121)
Toluene-d8	99	(88-110)	(81-117)
Bromofluorobenzene	99	(86-115)	(74-121)

WADSWORTH/ALERT LABORATORIES

4101 SHUFFEL DRIVE N.W./NORTH CANTON, OHIO 44720
(216) 497-9396

Chain-of Custody Record

№ 5808

PROJ. NO.: 14570-01-12

PROJECT NAME/LOCATION: Eagle-Picher (Chi-Vit) Urbana, OH

SAMPLERS: (Signature) Thomas Hudson

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	PARAMETER: VOCs						REMARKS
MW-1	2/22	0845		✓			2						Analyze by SW-846 Method 8240
MW-1B	2/22	0935		✓			2						
MW-2	2/21	1645		✓			2						
MW-3	2/22	0800		✓			2						
MW-4	2/21	1600		✓			2						
MW-11	2/21	1450		✓			2						
MW-12	2/21	1200		✓			2						
WB-1	2/21	1220		✓			2						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Thomas Hudson	2/22/90 13:40				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		[illegible]	2/23/90 9:15 AM		

Distribution Original Accompanies Shipment. Copy returned with Report.

OH000390

REPORT
PHASE II DISPOSAL SITE INVESTIGATION
CHI-VIT CORPORATION, URBANA, OHIO

PREPARED FOR EAGLE-PICHER INDUSTRIES, INC.
14570-009-121
NOVEMBER 9, 1989

DAMES & MOORE

DAMES & MOORE A PROFESSIONAL LIMITED PARTNERSHIP
644 LINN STREET, SUITE 501, CINCINNATI, OHIO 45203 (513) 651-3440

November 9, 1989

Mr. Paul D. Harper
Eagle-Picher Industries, Inc.
P.O. Box 779
580 Walnut Street
Cincinnati, OH 45201

Dear Paul,

Re: Report
Phase II Investigation
Chi-Vit Corporation

This letter transmits four copies of our report entitled *Phase II Disposal Site Investigation, Chi-Vit Corporation, Urbana, Ohio.*

To summarize our conclusions of the study, based on the absence of volatile organic compounds (VOCs) in the shallow ground water surrounding the disposal site, we believe it is highly unlikely that the site is the source of VOCs detected in the deeper aquifer. However, more information regarding the upgradient extent of the VOC plume is needed before a definitive statement can be made. Our recommendations include an outline of a program to provide the necessary information.

Very truly yours,

DAMES & MOORE

Jennifer D. Johnson
Project Manager

Stuart Edwards, P.E.
Partner (Ltd.)

JDJ/SE/C-B
14570-009-121

Enclosure

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	2.2 MONITOR WELL INSTALLATION	2
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	3.3 GROUND WATER QUALITY	6
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5.0	RECOMMENDATIONS	7

TABLES
(follow text)

Number	
1	GROUND WATER CHARACTERISTICS
2	WELL CONSTRUCTION DETAILS AND SURVEY DATA
3	ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS
4	ANALYTICAL RESULTS - INORGANIC PARAMETERS

FIGURES
(follow tables)

Number	
1	SITE VICINITY
2	PIEZOMETRIC SURFACE - SHALLOW, AUGUST 23, 1989
3	PIEZOMETRIC SURFACE - DEEP, AUGUST 23, 1989
4	SITE PLAN WITH PROPOSED WELL LOCATIONS

CONTENTS (Continued)

APPENDICES
(follow figures)

Appendix

A BORING LOGS WITH WELL CONSTRUCTION DETAILS

B ANALYTICAL LABORATORY REPORT

1.0 INTRODUCTION

This document reports on the second phase of a ground water investigation at the Chi-Vit Corporation in Urbana, Ohio. The plant is located at 720 South Edgewood Avenue on the southwestern edge of Urbana (Figure 1). Chi-Vit manufactures porcelain enamel frit, which is ultimately used to coat appliances.

The investigation was conducted for Eagle-Picher Industries, Inc. (EPI) which recently sold the Urbana facility to Chi-Vit, retaining the small parcel of property to the southwest of the plant (Figure 2). This property includes an area approximately 75 feet wide by 200 feet in length that was used for disposal of general plant refuse and raw materials from approximately 1966 to 1976. This area, referred to herein as the "disposal site," was the subject of a phase I investigation to characterize the upgradient and downgradient ground water quality and flow patterns under and in the immediate vicinity of the disposal site. The water quality characterization was to enable a determination of the absence or presence of contaminants in the ground water. This determination was needed to meet the requirements of the purchase agreement between EPI and Chi-Vit.

Results of the phase I investigation showed that ground water in the sand and gravel aquifer below the disposal site contained two volatile organic compounds, (VOCs) trichloroethylene (TCE) and benzene, in excess of National Primary Drinking Water Regulations (NPDWR). Both TCE and benzene were found in a sample from an upgradient well (MW-2). A sample from the downgradient wells, MW-1, also contained TCE.

The detection of VOCs in the aquifer below the site prompted a second phase of investigation to ascertain if the shallow perched water table in the vicinity was similarly affected, which would suggest that the disposal site was the source. This report presents the results of the second investigation.

2.0 FIELD INVESTIGATION

Field activities commenced on August 3, 1989 and continued through August 7, 1989. Drilling services were provided by R & R International Inc. of Akron, Ohio. Prior to drilling, the locations for the six monitoring wells were selected and staked. The City of

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Urbana granted permission to drill two of the wells (MW-9 and MW-10), which are located on city property near the water tower.

2.1 DRILLING AND SOIL SAMPLING

A CME-75 hollow-stem auger rig was used to advance the boreholes. The rig utilized 4 1/4- inch I.D. hollow-stem augers in conjunction with the standard penetration test (SPT) sampling methods.

The SPT method was used to sample all but the shallowest portion of each borehole, which was characterized by grab samples . The method consists of driving a 2-inch O.D., 24 inch long split spoon a total of four 6-inch increments using a 140 lb. hammer that is dropped 30 inches. The number of blows required to drive the spoon each 6-inch increment was recorded on the drill log. Sampling was generally performed at 5-foot intervals unless otherwise directed by the supervising geologist. As each split spoon was advanced (by the hammer) at 5-foot intervals, the barrel filled up with in-situ soil. The barrel was then removed, split open lengthwise, and the contents examined.

As samples were removed from the sampling tools, each sample was described and documented on standard Dames and Moore field log forms, and a representative sample was retained in a sample container for future reference. Each boring was advanced and sampled until a suitable depth for screen placement was attained.

2.2 MONITOR WELL INSTALLATION

Monitor wells were installed in each of the boreholes at the completion of drilling and sampling. Upon removal of the final split spoon sample and rod, a 10 foot section of 2 inch I.D. PVC (0.010-inch slot) screen with a bottom plug was lowered into the auger stem. As the PVC screen was inserted in the auger stem, a section of 2 inch I.D. PVC riser was threaded together onto the top of the screen until the riser stick-up was several feet above ground-level. A PVC cap was secured to the top of the riser to prevent entry of sand, bentonite, or other sources of contamination.

At this point, a coarse silica sand was used to fill the annulus to a height of approximately 2 feet above the top of the screen. Augers were simultaneously partially

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withdrawn to allow the sand pack to fall in place around the screen. In some instances, wall collapse of natural coarse sand and gravel became mixed with the introduced sand pack.

A 2 to 3-foot thick bentonite seal was then placed above the sand pack by dropping 3/8-inch-diameter bentonite pellets into the annulus between the well and the inside of the augers while the augers were gradually withdrawn. The pellets were allowed to expand for at least one hour before grout was placed.

The grout, a mixture of powdered bentonite, Portland cement and water, was pumped into the annular space (after the remaining augers were removed) and allowed to cure overnight. Shortly after the grout was poured into each well, a 5-inch-I.D. steel casing with a lockable lid was installed in order to protect and secure the PVC riser. The following morning, the remaining annular space was topped off with cement. In addition, each protective casing was centered in a 2-foot x 2-foot concrete pad which was constructed by pouring cement into a square wood-form mold to a 4-inch height above the ground surface. Locks were placed on each well, and each well was identified by marking the protective well casing lid with the appropriate identification number.

Depths to the well construction features (top of sand pack, bentonite, etc.) were measured with a weighted nylon tape and recorded by the field geologist. Drafted boring logs showing well construction details are presented as Appendix A.

2.3 DECONTAMINATION PROCEDURES

All drilling and sampling equipment and tools were steam-cleaned and inspected prior to drilling activities to ensure that the equipment would not introduce contamination from other sources to each new well. The drill rig was steam cleaned before each well location.

2.4 WELL DEVELOPMENT

Standard hand bailing techniques were used to develop the wells. In addition, a minimum of 3 well volumes of ground water was purged from the wells prior to ground water sampling. The purpose of bailing and surging the wells was to help remove any fine

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sand, silt and clay particles from the screen, surrounding sand pack, and formation lithologies.

2.5 GROUND WATER SAMPLING

Each well was measured for a water level, then purged and sampled on August 23, and 24, 1989. Water levels were measured to a 0.01-foot accuracy with an electronic well probe. Field measurements for pH and conductivity were made on samples and are reported on Table 1. The wells were sampled using a stainless steel bailer. The bailer was decontaminated between wells using tri-sodium phosphate, dilute HNO_3 and distilled water rinses. A new bailer cord was used for each well. In order to further avoid cross-contamination between wells, sampling personnel wore clean, disposable latex gloves and avoided contact with the sample and sample containers.

Proper field protocol was maintained in the field by the samplers at all times during sampling. Samples for volatile organics were poured directly from the bailer into the 40-ml glass vials. The dissolved metals sample was poured directly from the bailer into several clean, styrofoam cups. The sample was then processed through a peristaltic pump and 0.45 μm filter before finally entering the sample bottle.

All sample containers were labeled with sample I.D., parameter to be analyzed, date of sampling, and type of preservative added. Sample vials and plastic jars were placed immediately in an ice-filled cooler to be kept cool throughout sampling and shipment. Proper chain of custody was maintained throughout. Samples were shipped by overnight courier to Wadsworth Laboratories in Canton, Ohio on August 24, 1989.

2.6 LABORATORY ANALYSIS

Samples from wells MW-5, MW-6, MW-7, MW-8, MW-9, and MW-10 were analyzed for VOCs and metals of U.S. EPA's Target Compound List (TCL), fluoride, sulfate, and total cyanide. Samples from wells MW-1, MW-2, MW-3, and MW-4 were analyzed for VOCs and dissolved potassium. The laboratory report is presented as Appendix B.

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2.7 SURVEY

The wells were surveyed for location and elevation by Lee Surveying and Mapping Co., Bellefontaine, Ohio. The elevations were established from Urbana City Bench Mark No. 13 (Elevation 1014.36 feet, mean sea level). A temporary benchmark was established at the site for future use on the top of the southeast bonnet bolt of the fire hydrant approximately 75 feet south of MW-4 (elevation 1,001.57 feet, msl). Elevations of the wells, water levels, and ground water elevations are presented in Table 2.

3.0 FINDINGS

3.1 GEOLOGIC CONDITIONS

The site is underlain by a 20 to 30 foot unit of dark-brown to gray silty clay mixed with minor amounts of sand and pebbles. The unit contains occasional thin sand gravelly zones that are interpreted to be lenses based on their seemingly random occurrence.

Based on the geologic history of the area, this unit is interpreted to be glacial till, a fairly ubiquitous material found in the glaciated portion of Ohio that was deposited directly by the glacial ice sheets. Because of its mode of deposition, till is characteristically fine-grained and consolidated.

During the initial phase of investigation, the borings were extended below the upper fine-grained stratum and showed that a clayey gravel exists followed by a sandy gravel that grades into a well-graded sand.

3.2 GROUND WATER

A shallow zone of saturated conditions was encountered in the upper till unit that is believed to represent a perched water table. The sand and gravel lenses within the till were found to be wet while the fine-grained silty clay matrix was moist. Well MW-5 through MW-10 were screened in this upper saturated zone and showed the water level to be approximately 5 to 9 feet below ground surface. Figure 2 is a contour map showing the water table surface. The surface slopes west at a gradient of approximately 1 foot per 100 feet (0.01).

OH000399

Ground water in the deep wells is encountered at a depth of approximately 48 feet below ground surface in the sandy gravel stratum. This zone of saturation is interpreted to be the uppermost aquifer for the area. Figure 3 presents a map of the deep piezometric surface. As it shows, the gradient is very small (0.005) and the ground water flow direction is to the southwest.

3.3 GROUND WATER QUALITY

Results of the analyses for VOCs are presented on Table 3. No VOCs were detected in samples from the shallow wells (MW-5 through MW-10). Four different VOCs were detected in samples from the deep wells as summarized below.

Well	VOCs/ Concentration (μg/L)
MW-1	TCE, 111 Tetrachloroethene, 3 Carbon disulfide, 24
MW-2	TCE, 71
MW-3	TCE, 7
MW-4	TCE, 26 Acetone, 94

The detection of TCE in MW-1 and MW-2 had previously occurred during the Phase I investigation (May, 1989). The higher concentrations detected during August and the first-time occurrence of TCE in samples from MW-3 and MW-4 suggests that the water sampled during the first round had probably not completely equilibrated following well installation and development. Large quantities of potable water were used to control formation heave during the well installation.

The detection of other VOCs (tetrachloroethene, carbon disulfide, and Acetone) is limited to individual wells on separate sampling dates.

Results of the analyses for inorganic parameters are presented in Table 4. The deep wells were resampled and analyzed for dissolved potassium only because of the seemingly elevated concentration of potassium in the sample from MW-1 (95 mg/L). The second

OH000400

round sample yielded a much lower concentration in MW-1 (6.9 mg/L), similar to that in the samples from MW-2 and MW-3. The August sample from MW-4 yielded a concentration of 100 mg/L, which suggests that potassium levels in the aquifer may have a rather wide range of natural concentrations.

Lead was detected in the sample from MW-6 at 0.020 mg/L. This concentration is below the NPDWR for lead of 0.050 mg/L.

Arsenic was detected in samples from wells MW-9 and MW-10 at concentrations of 0.03 and 0.007 mg/L, respectively. Both values are below the NPDWR for arsenic of 0.050 mg/L.

4.0 CONCLUSION

As mentioned in Section 1, the occurrence of VOCs in the aquifer prompted the second phase of investigation to ascertain if the shallow perched water table was similarly affected. It was anticipated to conclude that if VOCs were detected in the shallow ground water, the likely source would be the disposal site. However, no VOCs were detected. Therefore, it seems highly unlikely that the VOCs in the aquifer are associated with releases from the disposal site.

5.0 RECOMMENDATIONS

In spite of the evidence gathered to date, the most conclusive evidence needed to make a definitive determination as required by the purchase agreement, is to establish any one of the following possible scenarios:

1. Determine that the TCE plume originates offsite.
2. Determine that the TCE plume originates onsite, but is hydraulically lateral to or upgradient to the disposal site.
3. Locate the actual source of the TCE (assuming it is not the disposal site).

At this time it is recommended that further investigation be conducted to address scenario number 1 listed above. Two wells at the locations shown in Figure 4 are recommended along the upgradient property boundary. Proposed well MW-11 will be

OH000401

located in the projected upgradient flow path and well MW-12 will be located offset to the east, to allow for variability in the upgradient piezometric surface.

The wells will be constructed in a similar fashion to those installed during Phase I. Ground water samples will be collected for analysis of VOCs only. It is recommended to resample the existing wells at the time the new wells are sampled.

TABLE 1

GROUND WATER CHARACTERISTICS

CHI-VIT CORPORATION

Well I.D.	pH (S.U.)	Specific Conductance (μmhos/cm)	Appearance/Odor
MW-1	7.25	763	Slightly turbid, light reddish brown/none
MW-2	7.26	767	Slightly turbid, light reddish brown/none
MW-3	7.25	812	Slightly turbid, light reddish brown/none
MW-4	10.19*	1,078*	Slightly turbid, light brown/ none
MW-5	7.17	713	Slightly turbid, light brown/ none
MW-6	7.46*	777*	Slightly turbid, light brown/ none
MW-7	7.19*	819*	Slightly turbid, light brown/ none
MW-8	6.92	792	Slightly turbid, light brown/ none
MW-9	7.58	839	Slightly turbid, light brown/ none
MW-10	6.82	1,088	Slightly turbid, light brown/ none

* Slow well recovery prevented complete purging prior to measurement. Date of measurements: August 24, 1989.

TABLE 2

WELL CONSTRUCTION DETAILS AND SURVEY DATA

CHI-VIT CORPORATION

Well No.	Ground Surface Elevation (ft, msl)	Top of Casing Elevation (ft, msl)	Well Depth (ft)	Depth to water (ft)	Ground Water elevation (ft, msl)
1	997.20	998.65	56.50	48.56	950.09
2	997.40	999.60	61.92	48.61	950.99
3	997.10	992.02	55.08	48.27	950.75
4	998.00	1,000.31	53.75	49.12	951.19
5	996.90	999.63	17.55	5.28	994.35
6	997.50	1,000.42	19.58	5.72	994.70
7	998.50	1,000.70	19.10	5.34	995.36
8	999.40	1,001.81	16.29	5.80	996.01
9	1,000.70	1,083.62	17.25	8.21	995.41
10	1,001.20	1,003.87	19.20	9.15	994.72

Note: Water level measurements taken on August 23, 1989

OH000404

TABLE 3

ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (µg/L)

CHI-VIT CORPORATION

Parameter	MW-1 May	MW-1 August	MW-2 May	MW-2 August	MW-3 May	MW-3 August	MW-4 May	MW-4 August	Wash Blank	MW-5 August	MW-6 August	MW-7 August	MW-8 August	MW-9 August	MW-10 August
Acetone	-	-	-	-	-	-	-	94	-	-	-	-	-	-	-
Benzene	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	61	111	20	71	-	7	-	26	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl acetate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Xylenes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
"-" indicates compound not detected.
Samples collected May 26-27, 1989 and August 23, 1989.
Laboratory Analysis by Wadsworth/Alert Laboratories, Inc.
Method for analysis: 8240

OH000405

TABLE 4

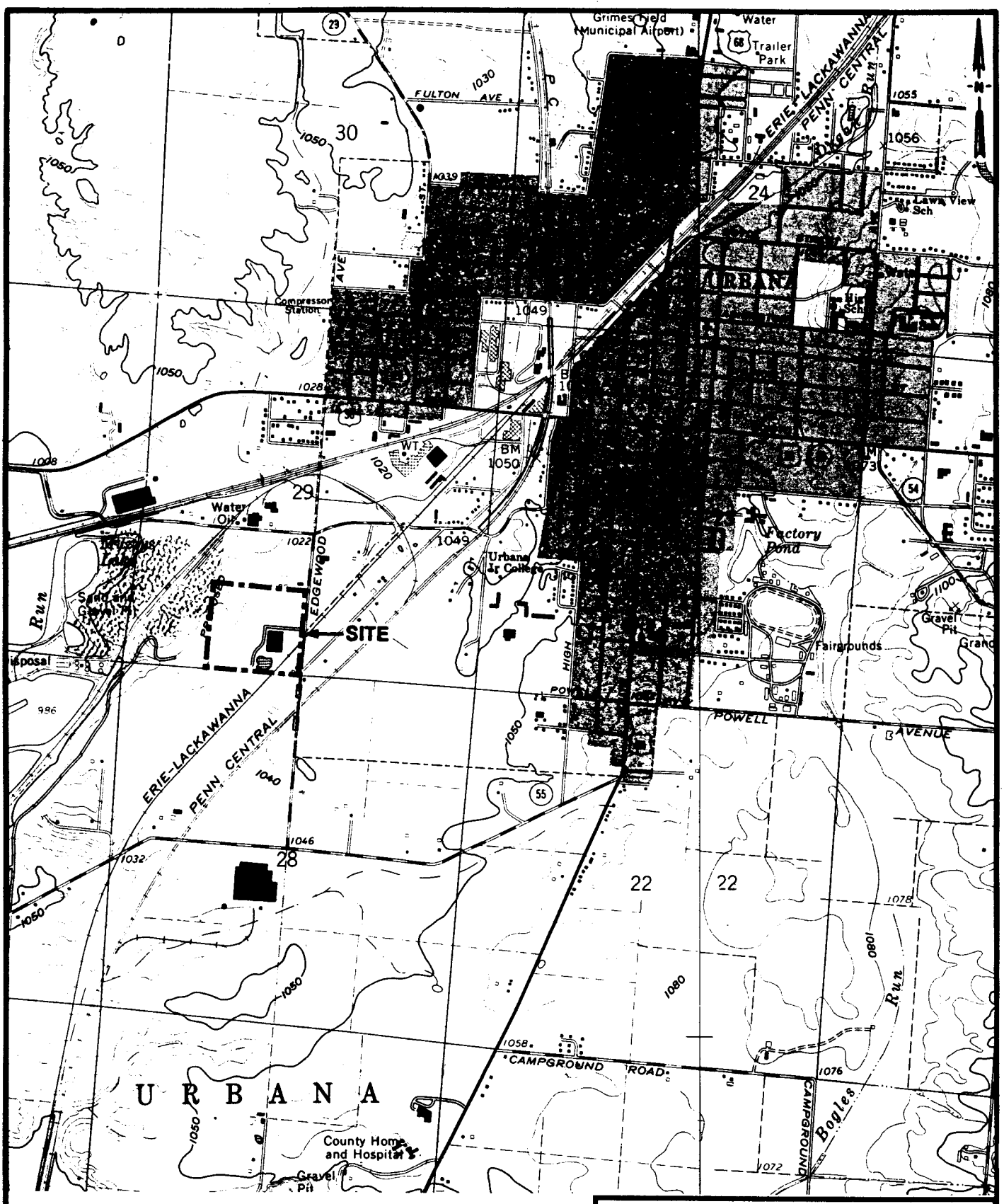
ANALYTICAL RESULTS - INORGANIC PARAMETERS (mg/L)

CHI-VIT CORPORATION

Parameter	Detection limit	MW-1		MW-2		MW-3		MW-4		Wash Blank	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
		May	August	May	August	May	August	May	August	May	August	August	August	August	August	August
Aluminum	0.1	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Antimony	0.2	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Arsenic	0.005	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	0.03	0.007
Barium	0.01	0.04	NA	0.12	NA	0.12	NA	NS	NA	-	0.04	0.06	0.06	0.08	0.1	0.14
Beryllium	0.005	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Cadmium	0.005	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Calcium	0.1	25	NA	84	NA	80	NA	NS	NA	0.22	-	51	59	75	36	68
Chromium	0.02	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Cobalt	0.05	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Copper	0.01	-	NA	0.01	NA	-	NA	NS	NA	0.02	-	-	-	-	-	-
Iron	0.05	-	NA	-	NA	-	NA	NS	NA	-	0.2	0.07	0.11	0.06	0.16	2.1
Lead	0.005	-	NA	-	NA	-	NA	NS	NA	-	-	0.02	-	-	-	-
Magnesium	0.01	27	NA	37	NA	29	NA	NS	NA	0.1	22	27	24	30	16	28
Manganese	0.01	-	NA	0.18	NA	0.03	NA	NS	NA	-	0.47	0.21	0.38	0.47	0.67	1.4
Mercury	0.0002	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Nickel	0.04	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Potassium	0.05	95	6.9	7.7	1.9	3.4	2.2	NS	100	-	0.7	2	1.9	0.6	3.8	6.8
Selenium	0.005	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Silver	0.01	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Sodium	0.01	36	NA	31	NA	42	NA	NS	NA	0.47	43	41	55	37	84	110
Thallium	0.01	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Vandium	0.05	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Zinc	0.01	0.07	NA	0.06	NA	0.06	NA	NS	NA	0.08	0.03	0.06	0.03	0.08	0.04	0.06
Tin	0.1	-	NA	-	NA	-	NA	NS	NA	-	-	-	-	-	-	-
Cyanide	0.005	-	NA	-	NA	-	NA	-	NA	-	-	-	-	-	-	-
Sulfate	5	70	NA	120	NA	110	NA	180	NA	-	64	46	69	63	56	76
Fluoride	0.1	0.3	NA	0.4	NA	0.4	NA	1.5	NA	-	3.9	2.5	4.2	1.4	13	2.8

Notes:
"-" indicates compound not detected.
Samples collected May 26-27, 1989 and August 23, 1989.
Laboratory Analysis by Wadsworth/Alert Laboratories, Inc.
NS = Not sampled.
NA = Not analyzed.

OH000406



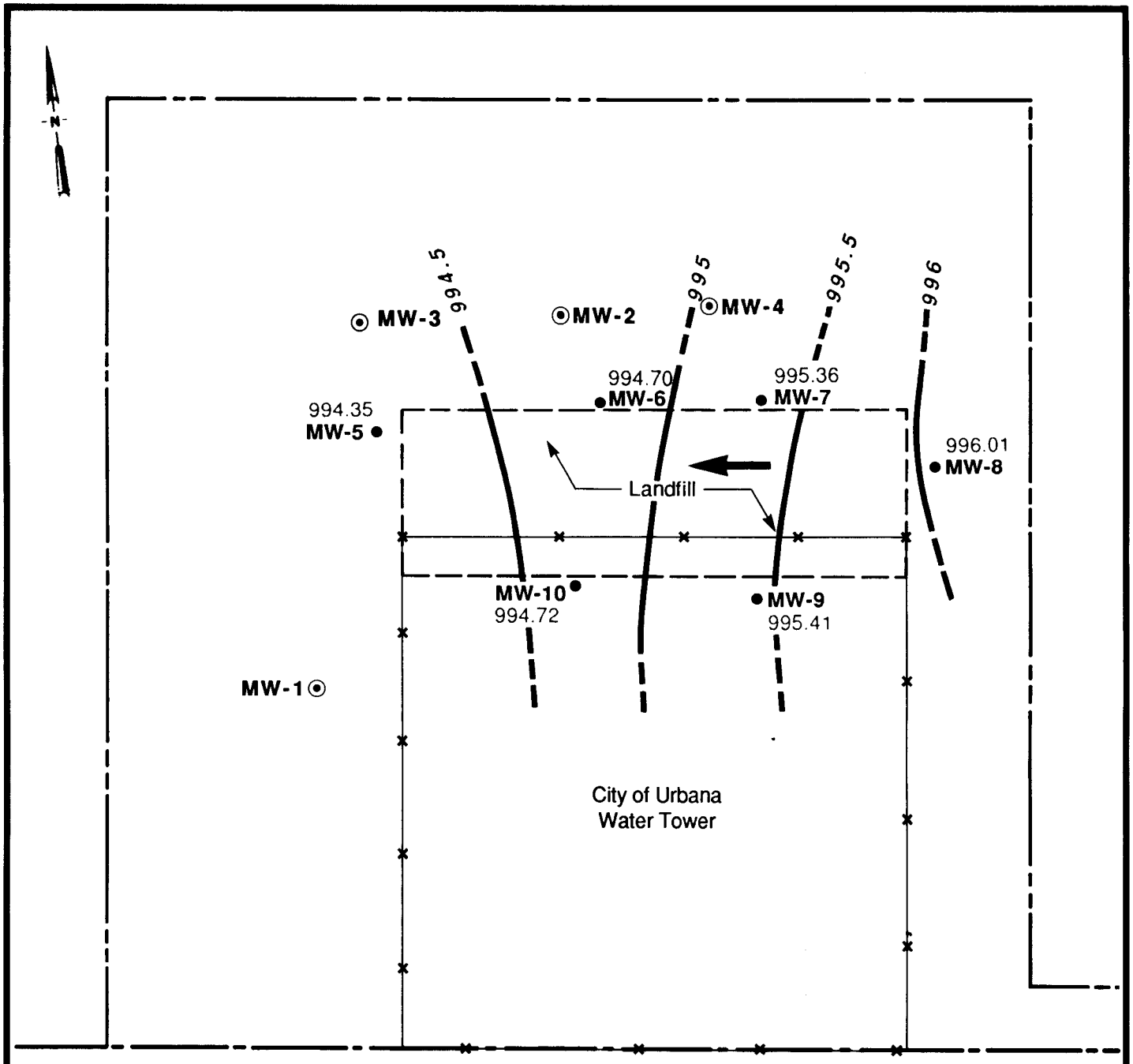
BASE MAP SOURCE: Compiled from the following USGS 7 1/2 minute topographic quadrangle maps: Urbana West, Ohio, 1961, photorevised 1973; Urbana East, Ohio 1961, photorevised 1973.

CHI-VIT CORPORATION
URBANA, OHIO

FIGURE 1

SITE VICINITY MAP

JOB NO. 14570-008-121 Dames & Moore



LEGEND:

- Property Boundary
- Fence
- Property Retained by Eagle-Picher Industries, Inc.
- Approximate Location of Landfill
- Existing Deep Monitoring Well Location
- 994.35 Existing Shallow Monitoring Well Location (water level measured August 23, 1989)
- 994.5 Piezometric Contour (contour interval=0.5 feet)
- Ground Water Flow Direction

SOURCE: Lee Surveying and Mapping Co., Bellefontaine, Ohio.

0 60 120

APPROXIMATE SCALE IN FEET

CHI-VIT CORPORATION URBANA, OHIO

FIGURE 2
PIEZOMETRIC SURFACE-SHALLOW
AUGUST 23, 1989

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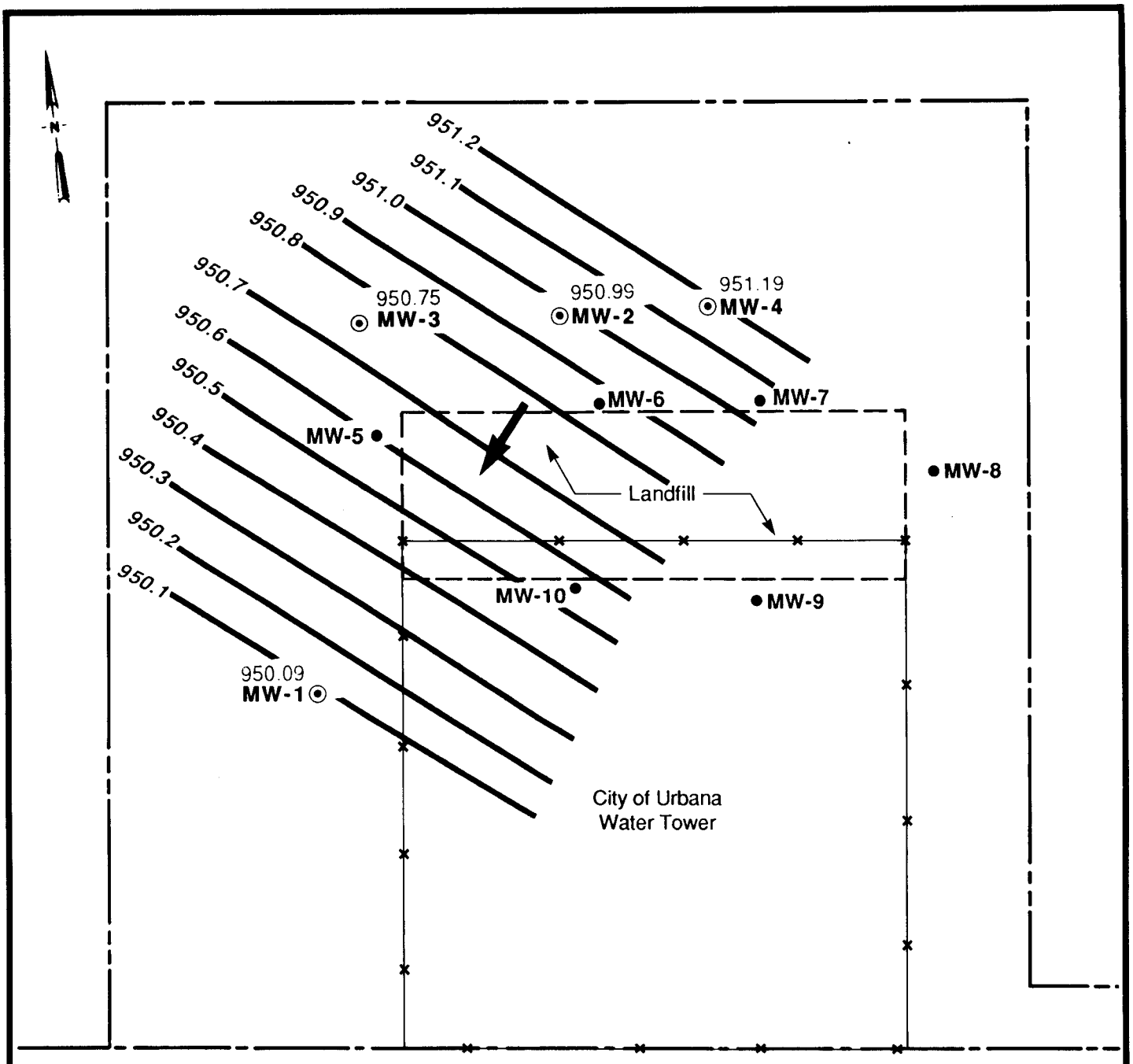


LEGEND:

- Property Boundary
- Fence
- Property Retained by Eagle-Picher Industries, Inc.
- Approximate Location of Landfill
- 950.09 Existing Deep Monitoring Well Location (water level measured August 23, 1989)
- Existing Shallow Monitoring Well Location
- 950.1 Piezometric Contour (contour interval=0.1 foot)
- Ground Water Flow Direction

SOURCE: Lee Surveying and Mapping Co., Bellefontaine, Ohio.

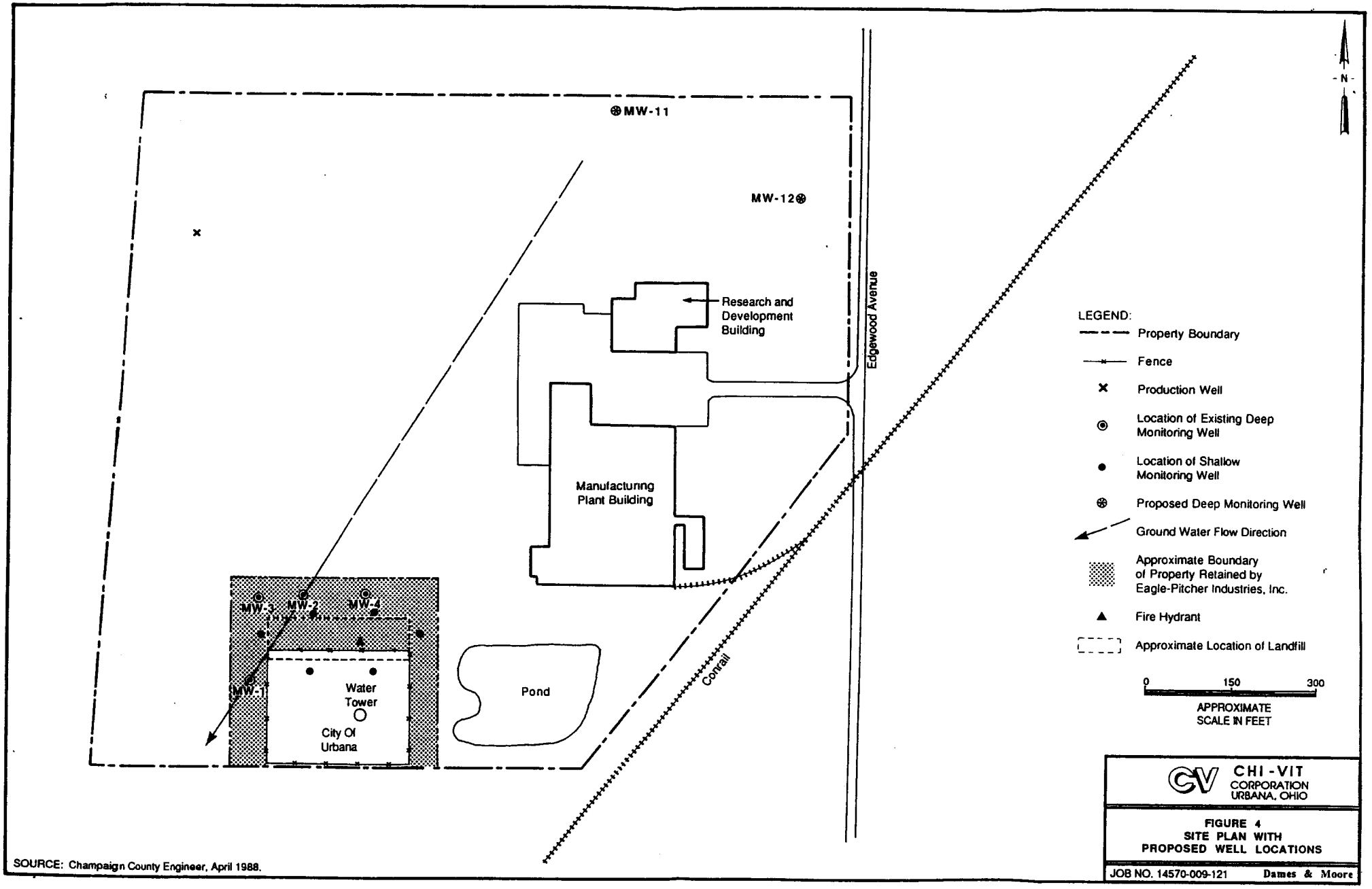
0 60 120

APPROXIMATE SCALE IN FEET

CHI-VIT CORPORATION URBANA, OHIO

FIGURE 3
PIEZOMETRIC SURFACE-DEEP
AUGUST 23, 1989

JOB NO. 14570-009-121 Dames & Moore



SOURCE: Champaign County Engineer, April 1988.

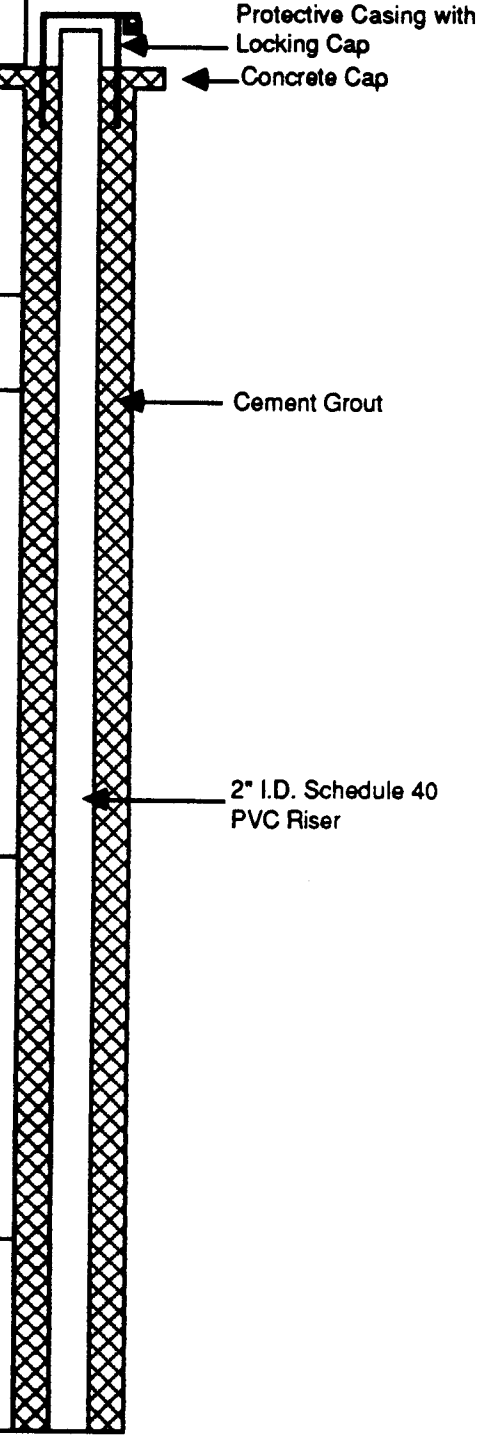
OH000410

APPENDIX A

BORING LOGS WITH WELL CONSTRUCTIONS DETAILS

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown silty CLAY with trace gravel (slightly moist)
				grades to mottled dark and light brown silty clay
5		32		grades wet
				Light brown to tan clayey GRAVEL (wet)
				Dark brown silty CLAY with organic matter (wet to moist)
10		39		grades to gray silty CLAY with gravel
				lenses of gray gravel
15		44		
				very soft
				stiff at 19.5 feet
20		68		Light gray clayey GRAVEL (slightly moist, iron stains)
				driller reports hitting gravel and cobbles at 22.0 feet
25		50/2"		split spoon refusal at 24.5 feet
		50/4"		grades to gravel with coarse sand (damp)
30				Light gray sandy GRAVEL (dry)
35		80		

WELL CONSTRUCTION DETAIL



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CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL
MW-1

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	WELL CONSTRUCTION DETAIL
35					
40		82		driller noted more cobbles at 40.0 feet	41.7' Bentonite Seal
45					46.5' Water Level Measured at 48.15 Feet on 6/2/89
50		92			2" I.D. 0.010"-Slotted PVC Screen; Filter Sand Pack 56.5'
55				Light brown SAND and medium to coarse gravel (wet)	Natural Formation Collapse 57.0'
		58			
60				Boring completed at 59.0 feet on 5/18/89 Monitoring well installed 5/18/89	
65					
70					

LEGEND:

Split Spoon Sample

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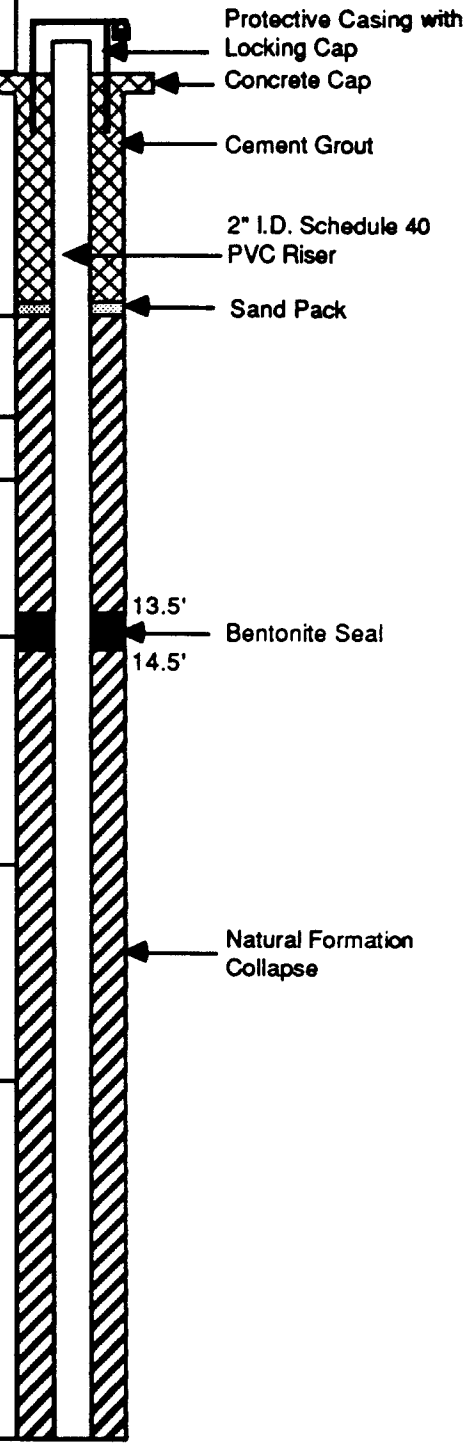
Job No. 14570-008-121

CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL
MW-1

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown silty CLAY with abundant organics (moist)
				grades to mottled tan and brown
5		32		Dark brown clayey GRAVEL (wet)
				Tan to light brown silty CLAY (soft, wet)
10		35		Tan to light brown clayey GRAVEL (wet)
15		35		Dark brown grading to gray silty CLAY with some sand and gravel (moist)
				grades to tan (soft)
20		31		Driller reports GRAVEL from 19.0 to 20.0 feet
				wet at 25.0 feet
25		50/2"		Sandy GRAVEL with interbeds of clayey gravel (damp)
		77		
30		50/3"		
35				

WELL CONSTRUCTION DETAIL



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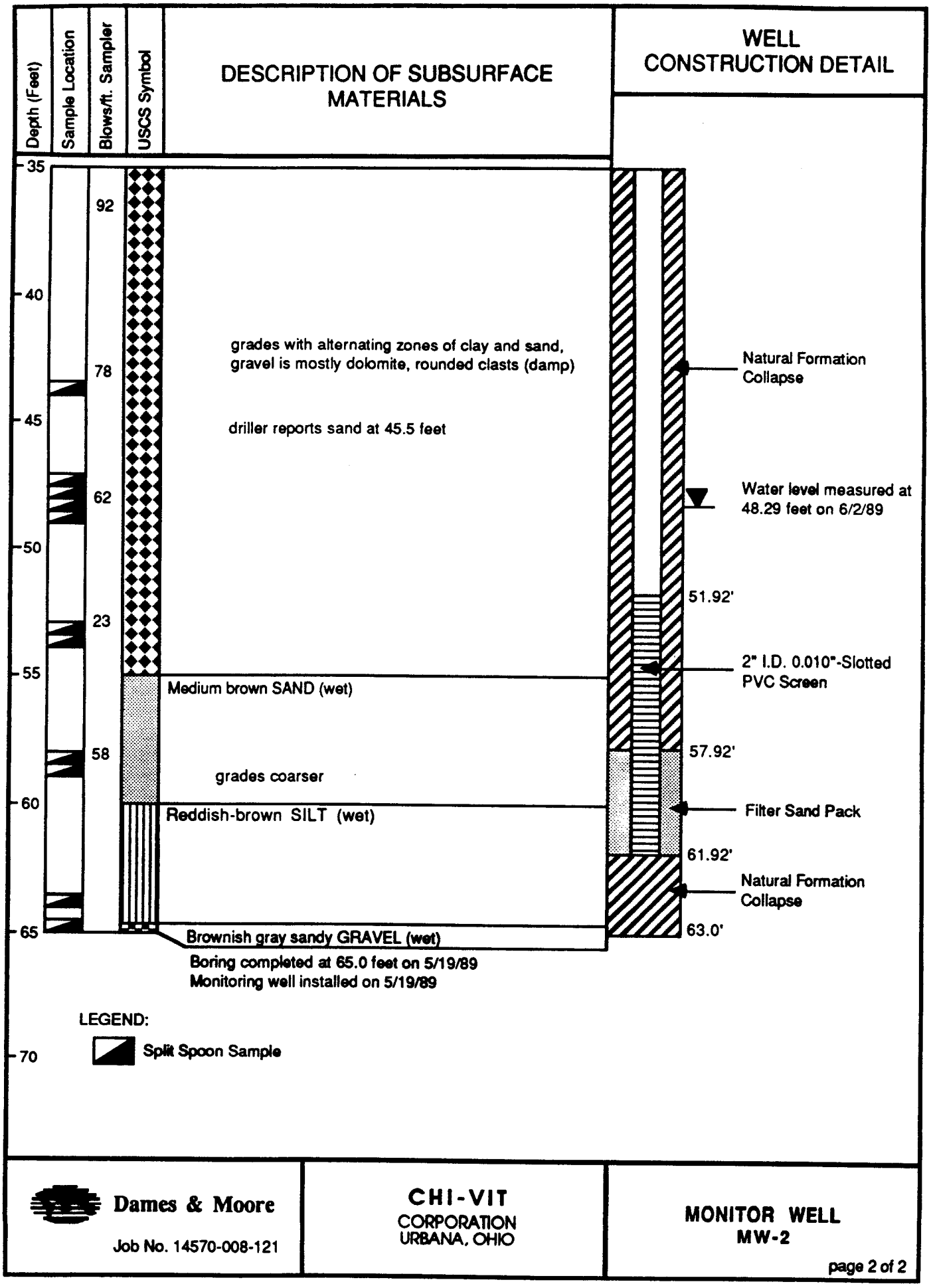
CHI-VIT CORPORATION
URBANA, OHIO

MONITOR WELL
MW-2



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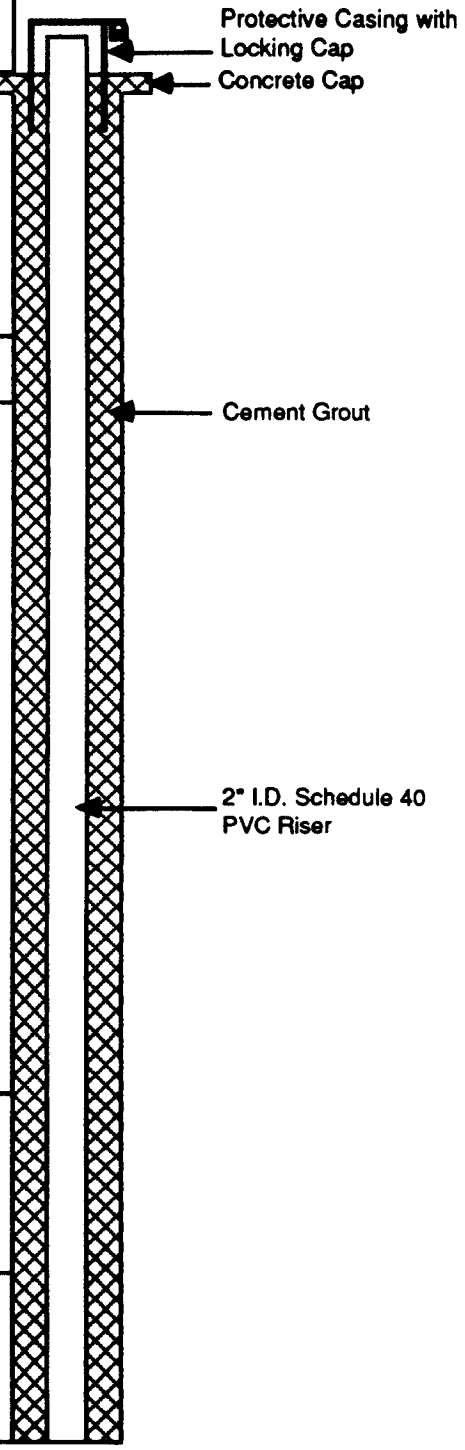
CHI-VIT CORPORATION URBANA, OHIO

MONITOR WELL MW-2

page 2 of 2

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown silty CLAY with abundant organics (moist)
5		25		
				Sandy GRAVEL (wet)
				Tan to light brown slity CLAY with some sand and gravel
10		38		grades to dark brown
				very wet (soft)
15		80		
20		75		sand and gravel increases with depth
25		50/ 2"		Clayey sandy GRAVEL (damp)
30		75		Brownish gray sandy GRAVEL (damp) grades with thin interbeds of dark brown clay
35				

WELL CONSTRUCTION DETAIL



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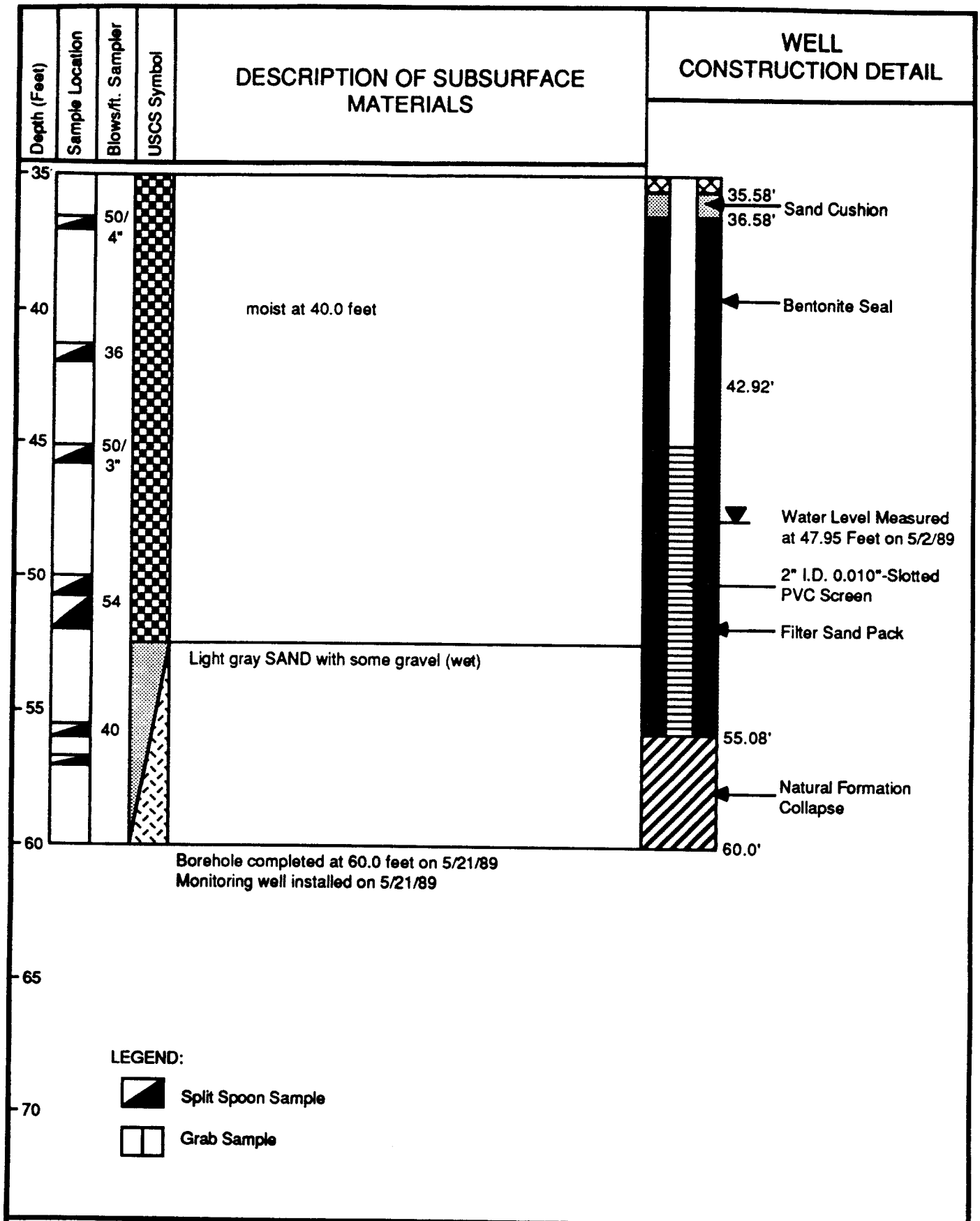
CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL MW-3



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Job No. 14570-008-121

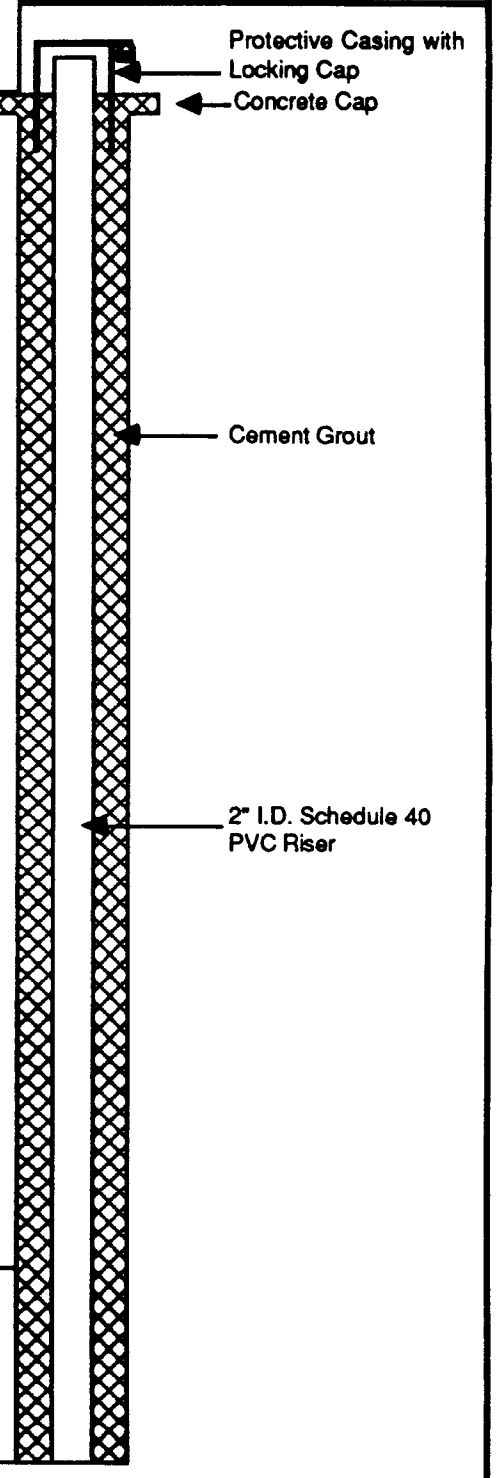
CHI-VIT CORPORATION URBANA, OHIO

MONITOR WELL MW-3

page 2 of 2

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Dark brown silty CLAY
				grades medium brown to tan (moist)
				occasional thin gravel lenses
5				gravel appears from 5.0 to 30.0 feet
		18		
10		35		
15		26		
				very wet and soft at 19.0 feet
20		24		
25		50/ 4"		
30		50/ 2"		Light brownish gray clayey GRAVEL (damp)
				driller reports drilling through cobbles from 31.0 to 35.0 feet
35				

WELL CONSTRUCTION DETAIL



Dames & Moore

Job No. 14570-008-121

CHI-VIT
CORPORATION
URBANA, OHIO

MONITOR WELL
MW-4

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS	WELL CONSTRUCTION DETAIL
35		56		Light brownish gray GRAVEL with coarse sand	
40		22		driller reports cobbles from 42.0 to 45.0 feet	40.08' Bentonite Seal; 42.17'
45		40		water at 48 feet	43.75; 2" I.D. 0.010"-Slotted PVC Screen
50		30		Brownish gray SAND with some gravel (wet); grades uniform from 52.5 to 53.8 feet	
55		50/3"			53.75' Natural Formation Collapse; 55.25'
60					
65					
70					

Boring completed at 55.25 feet on 5/22/89
Monitoring Well installed on 5/24/89

LEGEND:

Split Spoon Sample

Dames & Moore

Job No. 14570-008-121

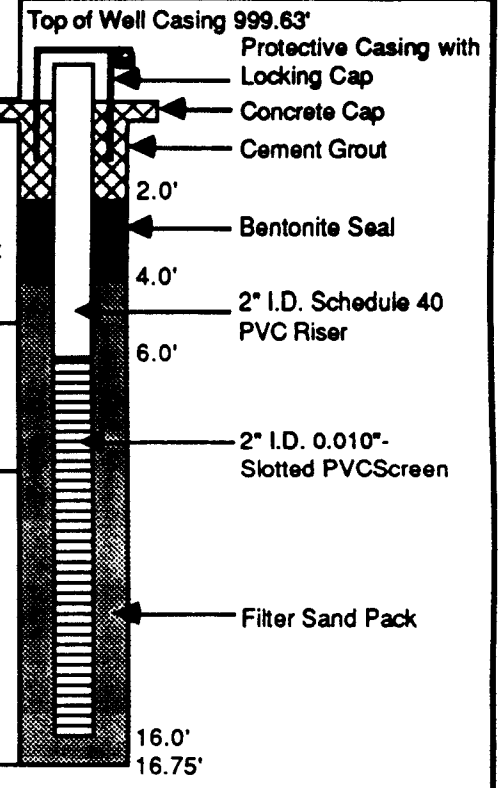
CHI-VIT CORPORATION
URBANA, OHIO

MONITOR WELL
MW-4

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Mottled dark to medium brown silty CLAY with some sand and pebbles (moist)
		11		Water level measured at 5.0 feet on 8/4/89
5				Light grayish brown gravelly SAND (wet)
				grades light brownish gray, medium grained
		37		Medium brown silty CLAY with sand and pebbles
10				
		91/9		grades light brown to light gray with more sand
15				
20				

Boring Completed at 16.75 feet on 8/4/89.
Monitoring Well Installed on 8/4/89.

WELL CONSTRUCTION DETAIL



LEGEND:

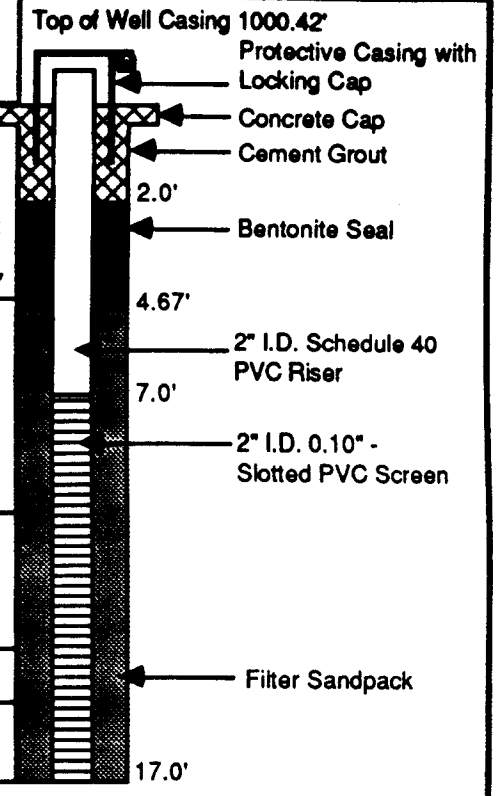
Split Spoon Sample

Dames & Moore Job No. 14570-008-121	CHI-VIT CORPORATION URBANA, OHIO	MONITOR WELL MW-5

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Mottled dark brown silty CLAY, (moist)
				Water level measured at 4.5 feet on 8/4/89
		29		thin silty sandy gravel lens
5				
		72		grades with some gravel
10				Light brown fine SAND (moist)
		90/ 11		
				Medium gray silty CLAY with some pebbles
15				Sandy GRAVEL (wet)
20				

Boring Completed at 17.0 feet on 8/4/89.
Monitoring Well Installed on 8/4/89.

WELL CONSTRUCTION DETAIL



LEGEND:

Split Spoon Sample

Dames & Moore

Job No. 14570-008-121

CHI-VIT CORPORATION
URBANA, OHIO

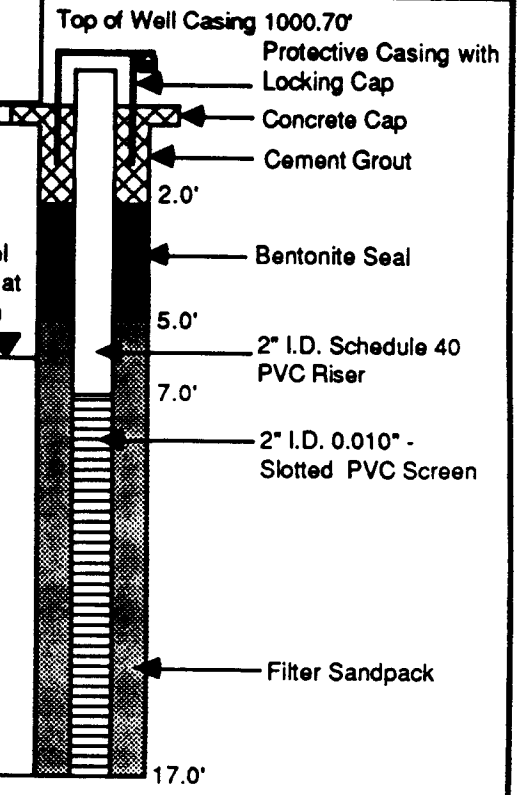
MONITOR WELL
MW-6

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Mottled dark brown silty CLAY
		6		grades light brownish gray, very silty
5				
		37		grades with some coarse sand and small pebbles
10				
		86		
15				
20				

Boring Completed at 17.0 feet on 8/3/89.
Monitoring Well Installed on 8/3/89.

Water level measured at 6.0 feet on 8/3/89

WELL CONSTRUCTION DETAIL



LEGEND:

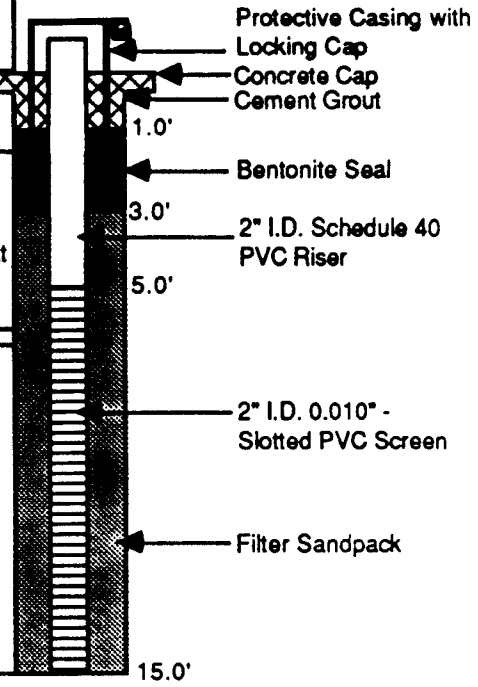
Split Spoon Sample

Dames & Moore Job No. 14570-008-121	CHI-VIT CORPORATION URBANA, OHIO	MONITOR WELL MW-7

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Light brown gravelly SAND, fill (dry)
				Dark brown silty CLAY with some gravel (moist)
		17		Water level measured at 6.0 feet on 8/3/89
5				Light brownish gray gravelly SAND with trace of clay (wet)
				Light brown silty CLAY with some gravel (moist)
		25		
10				
		52		
15				

Boring Completed at 15.0 feet on 8/3/89.
Monitoring Well Installed on 8/3/89.

WELL CONSTRUCTION DETAIL



LEGEND:

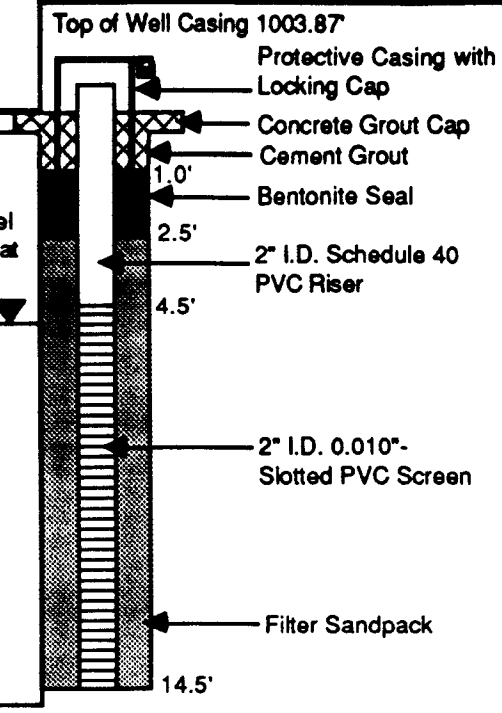
Split Spoon Sample

Dames & Moore Job No. 14570-008-121	CHI-VIT CORPORATION URBANA, OHIO	MONITOR WELL MW-8

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Medium brown silty CLAY with some sand and gravel (dry to moist)
		20		
5				Water Level Measured at 5.0 feet on 8/5/89
		27		
10				
		50/5		grades with more sand and less gravel
15				

Boring Completed at 15.0 feet on 8/5/89.
Monitoring Well Installed on 8/5/89.

WELL CONSTRUCTION DETAIL



LEGEND:

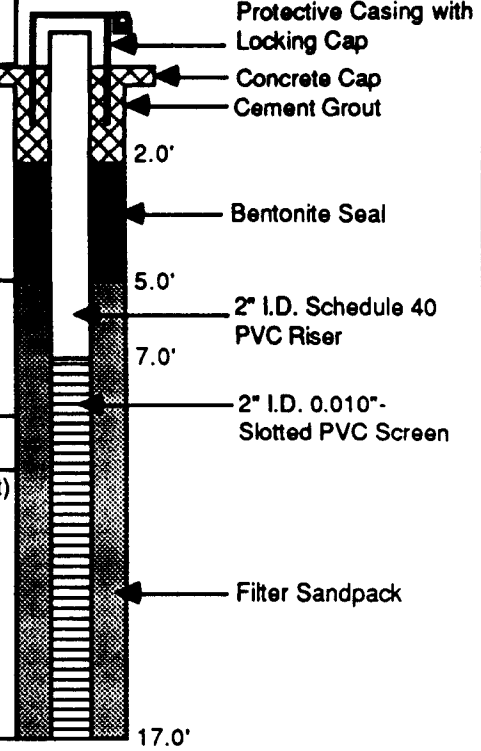
Split Spoon Sample

Dames & Moore Job No. 14570-008-121	CHI-VIT CORPORATION URBANA, OHIO	MONITOR WELL MW-9

Depth (Feet)	Sample Location	Blows/ft. Sampler	USCS Symbol	DESCRIPTION OF SUBSURFACE MATERIALS
0				Medium brown silty CLAY with coarse sand (moist)
				grades gray
		6		Water level measured at 6.0 feet on 8/5/89
5				
		29		Light brownish gray SAND, medium to well graded (wet)
10				Medium brown silty CLAY with fine to coarse sand (very moist)
		85/ 9"		
15				
20				

Boring Completed at 17.0 feet on 8/5/89.
Monitoring Well Installed on 8/6/89.

WELL CONSTRUCTION DETAIL



LEGEND:

Split Spoon Sample

Dames & Moore

Job No. 14570-008-121

CHI-VIT CORPORATION
URBANA, OHIO

MONITOR WELL
MW-10

APPENDIX B
ANALYTICAL LABORATORY REPORT

1938-1988
50 YEARS
WADSWORTH/ALERT
LABORATORIES, INC.
Sampling, testing, mobile labs
4101 Shuffel Drive N.W. / North Canton, Ohio 44720

ANALYTICAL REPORT

PROJECT NO. 14570-009-5002

CHI-VIT/URBANA, OHIO

Presented to :

JENNIFER JOHNSON

DAMES & MOORE

WADSWORTH/ALERT LABORATORIES, INC.

Bryce A. Custer

Bryce Custer
Project Manager

Marvin W. Stephens

Marvin W. Stephens, Ph.D.
Vice President & Corporate Technical Director

September 12, 1989

CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Bartow, Florida (813) 533-2150
SOUTHEAST REGIONAL OFFICE: Lexington, South Carolina (803) 957-6590
24-HOUR ALERT LINE: (216) 497-9338

WADSWORTH/ALERT
LABORATORIES, INC.

WADSWORTH/ALERT
LABORATORIES, INC.

NARRATIVE

The following report contains the analytical results for samples submitted to Wadsworth/ALERT Laboratories, Inc. The samples were received into the laboratory in accordance with documented sample acceptance procedures.

Wadsworth/ALERT Laboratories, Inc. utilizes USEPA approved methods and instrumentation in all analytical work. The methods used for the analyses presented in this study can be found on the following pages. A summary of QC data for these analyses is included at the rear of the report.

WADSWORTH/ALERT
LABORATORIES, INC.

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories, Inc. utilizes only USEPA approved analytical methods and instrumentation. The analytical methods used in the analyses of these samples are listed below.

Parameters	Methods
Organics:	
Volatile Organic Compounds	SW846 8240
Metals:	
Aluminum	SW846 6010
Antimony	SW846 6010
Arsenic	SW846 7060
Barium	SW846 6010
Beryllium	SW846 6010
Cadmium	SW846 6010
Calcium	SW846 6010
Chromium	SW846 6010
Cobalt	SW846 6010
Copper	SW846 6010
Iron	SW846 6010
Lead	SW846 6010
Magnesium	SW846 6010
Manganese	SW846 6010
Mercury	SW846 7470
Nickel	SW846 6010
Potassium	SW846 6010
Selenium	SW846 7740
Silver	SW846 6010
Sodium	SW846 6010
Thallium	SW846 6010
Vanadium	SW846 6010
Zinc	SW846 6010
Inorganics:	
Cyanide	SW846 9010
Fluoride	USEPA 340.2
Sulfate	SW846 9030

SW846. "Test Methods for Evaluating Solid Waste Physical/Chemical Methods," Third Edition, September, 1986.

USEPA. EPA 600/4-79-02, "Methods for Chemical Analysis of Water and Wastes," March, 1983.

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29107
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: MW-1 8-24-89 1:05

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	24	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	3
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	111
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	84	(76-114)	(70-121)
Toluene-d8	98	(88-110)	(81-117)
Bromofluorobenzene	98	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29107
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-1 8-24-89 1:05

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Potassium	8/28- 8/29/89	6.9	0.5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29108
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: MW-2 8-24-89 12:45

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	71
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	82	(76-114)	(70-121)
Toluene-d8	97	(88-110)	(81-117)
Bromofluorobenzene	101	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29108
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-2 8-24-89 12:45

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Potassium	8/28- 8/29/89	1.9	0.5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29109
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 9/ 1/89

SAMPLE ID: MW-3 8-24-89 12:05

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	7
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	89	(76-114)	(70-121)
Toluene-d8	97	(88-110)	(81-117)
Bromofluorobenzene	98	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29109
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-3 8-24-89 12:05

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Potassium	8/28- 8/29/89	2.2	0.5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29110
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: MW-4 8-24-89 11:40

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	94	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	26
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	84	(76-114)	(70-121)
Toluene-d8	96	(88-110)	(81-117)
Bromofluorobenzene	97	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29110
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-4 8-24-89 11:40

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Potassium	8/28- 8/30/89	100	0.5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29111
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: MW-5 8-24-89 10:55

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	87	(76-114)	(70-121)
Toluene-d8	96	(88-110)	(81-117)
Bromofluorobenzene	96	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29111
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-5 8-24-89 10:55

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	8/28- 8/30/89	ND	0.01	mg/l
Aluminum	8/28- 8/30/89	ND	0.1	mg/l
Arsenic	8/28- 8/30/89	ND	0.005	mg/l
Barium	8/28- 8/30/89	0.04	0.01	mg/l
Beryllium	8/28- 8/30/89	ND	0.005	mg/l
Calcium	8/28- 8/30/89	60	0.01	mg/l
Cadmium	8/28- 8/30/89	ND	0.001	mg/l
Cobalt	8/28- 8/30/89	ND	0.05	mg/l
Chromium	8/28- 8/30/89	ND	0.02	mg/l
Copper	8/28- 8/30/89	ND	0.01	mg/l
Iron	8/28- 8/30/89	0.2	0.05	mg/l
Potassium	8/28- 8/30/89	0.7	0.5	mg/l
Magnesium	8/28- 8/30/89	22	0.01	mg/l
Manganese	8/28- 8/30/89	0.47	0.01	mg/l
Sodium	8/28- 8/30/89	43	0.01	mg/l
Nickel	8/28- 8/30/89	ND	0.04	mg/l
Lead	8/28- 8/30/89	ND	0.005	mg/l
Antimony	8/28- 8/30/89	ND	0.2	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29111
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-5 8-24-89 10:55

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Selenium	8/28- 8/30/89	ND	0.005	mg/l
Thallium	8/28- 8/30/89	ND	0.1	mg/l
Vanadium	8/28- 8/30/89	ND	0.05	mg/l
Zinc	8/28- 8/30/89	0.03	0.01	mg/l
Mercury	8/28- 8/29/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29111
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-5 8-24-89 10:55

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	8/28/89	ND	0.005	mg/l
Fluoride	8/28/89	3.9	0.1	mg/l
Sulfate	8/28/89	64	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29112
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: MW-6 8-24-89 10:35

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	97	(76-114)	(70-121)
Toluene-d8	100	(88-110)	(81-117)
Bromofluorobenzene	94	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29112
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-6 8-24-89 10:35

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	8/28- 8/30/89	ND	0.01	mg/l
Aluminum	8/28- 8/30/89	ND	0.1	mg/l
Arsenic	8/28- 8/30/89	ND	0.005	mg/l
Barium	8/28- 8/30/89	0.06	0.01	mg/l
Beryllium	8/28- 8/30/89	ND	0.005	mg/l
Calcium	8/28- 8/30/89	51	0.01	mg/l
Cadmium	8/28/89	ND	0.001	mg/l
Cobalt	8/28- 8/30/89	ND	0.05	mg/l
Chromium	8/28- 8/30/89	ND	0.02	mg/l
Copper	8/28- 8/30/89	ND	0.01	mg/l
Iron	8/28- 8/30/89	0.07	0.05	mg/l
Mercury	8/28- 8/29/89	ND	0.005	mg/l
Potassium	8/28- 8/30/89	2	0.5	mg/l
Magnesium	8/28- 8/30/89	27	0.01	mg/l
Manganese	8/28- 8/30/89	0.21	0.01	mg/l
Sodium	8/28- 8/30/89	41	0.01	mg/l
Nickel	8/28- 8/30/89	ND	0.04	mg/l
Lead	8/28- 8/29/89	0.02	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29112
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-6 8-24-89 10:35

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Antimony	8/28- 8/30/89	ND	0.2	mg/l
Selenium	8/28- 8/31/89	ND	0.005	mg/l
Thallium	8/28- 8/30/89	ND	0.1	mg/l
Vanadium	8/28- 8/30/89	ND	0.05	mg/l
Zinc	8/28- 8/30/89	0.06	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29112
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-6 8-24-89 10:35

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	8/28/89	ND	0.005	mg/l
Fluoride	8/28/89	2.5	0.1	mg/l
Sulfate	8/28/89	46	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29113
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: MW-7 8-24-89 10:10

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	96	(76-114)	(70-121)
Toluene-d8	95	(88-110)	(81-117)
Bromofluorobenzene	98	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29113
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-7 8-24-89 10:10

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	8/28- 8/30/89	ND	0.01	mg/l
Aluminum	8/28- 8/30/89	ND	0.1	mg/l
Arsenic	8/28- 8/30/89	ND	0.005	mg/l
Barium	8/28- 8/30/89	0.06	0.01	mg/l
Beryllium	8/28- 8/30/89	ND	0.005	mg/l
Calcium	8/28- 8/30/89	59	0.01	mg/l
Cadmium	8/28/89	ND	0.001	mg/l
Cobalt	8/28- 8/30/89	ND	0.05	mg/l
Chromium	8/28- 8/30/89	ND	0.02	mg/l
Copper	8/28- 8/30/89	ND	0.01	mg/l
Iron	8/28- 8/30/89	0.11	0.05	mg/l
Mercury	8/28- 8/29/89	ND	0.005	mg/l
Potassium	8/28- 8/30/89	1.9	0.5	mg/l
Magnesium	8/28- 8/30/89	24	0.01	mg/l
Manganese	8/28- 8/30/89	0.38	0.01	mg/l
Sodium	8/28- 8/30/89	55	0.01	mg/l
Nickel	8/28- 8/30/89	ND	0.04	mg/l
Lead	8/28- 8/29/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29113
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-7 8-24-89 10:10

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Antimony	8/28- 8/30/89	ND	0.2	mg/l
Selenium	8/28- 8/31/89	ND	0.005	mg/l
Thallium	8/28- 8/30/89	ND	0.1	mg/l
Vanadium	8/28- 8/30/89	ND	0.05	mg/l
Zinc	8/28- 8/30/89	0.03	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29113
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-7 8-24-89 10:10

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	8/28/89	ND	0.005	mg/l
Fluoride	8/28/89	4.2	0.1	mg/l
Sulfate	8/28/89	69	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29114
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/31/89

SAMPLE ID: MW-8 8-24-89 9:40

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	96	(76-114)	(70-121)
Toluene-d8	95	(88-110)	(81-117)
Bromofluorobenzene	97	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29114
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-8 8-24-89 9:40

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	8/28- 8/30/89	ND	0.01	mg/l
Aluminum	8/28- 8/30/89	ND	0.1	mg/l
Arsenic	8/28- 8/30/89	ND	0.005	mg/l
Barium	8/28- 8/30/89	0.08	0.01	mg/l
Beryllium	8/28- 8/30/89	ND	0.005	mg/l
Calcium	8/28- 8/30/89	75	0.01	mg/l
Cadmium	8/28/89	ND	0.001	mg/l
Cobalt	8/28- 8/30/89	ND	0.05	mg/l
Chromium	8/28- 8/30/89	ND	0.02	mg/l
Copper	8/28- 8/30/89	ND	0.01	mg/l
Iron	8/28- 8/30/89	0.06	0.05	mg/l
Mercury	8/28- 8/29/89	ND	0.005	mg/l
Potassium	8/28- 8/30/89	0.6	0.5	mg/l
Magnesium	8/28- 8/30/89	30	0.01	mg/l
Manganese	8/28- 8/30/89	0.47	0.01	mg/l
Sodium	8/28- 8/30/89	37	0.01	mg/l
Nickel	8/28- 8/30/89	ND	0.04	mg/l
Lead	8/28- 8/30/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29114
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-8 8-24-89 9:40

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Antimony	8/28- 8/30/89	ND	0.2	mg/l
Selenium	8/28- 8/31/89	ND	0.005	mg/l
Thallium	8/28- 8/31/89	ND	0.1	mg/l
Vanadium	8/28- 8/30/89	ND	0.05	mg/l
Zinc	8/28- 8/30/89	0.08	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29114
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-8 8-24-89 9:40

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	8/28/89	ND	0.005	mg/l
Fluoride	8/28/89	1.4	0.1	mg/l
Sulfate	8/28/89	63	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29115
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/31/89

SAMPLE ID: MW-9 8-24-89 9:10

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	84	(76-114)	(70-121)
Toluene-d8	96	(88-110)	(81-117)
Bromofluorobenzene	100	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29115
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-9 8-24-89 9:10

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	8/28- 8/30/89	ND	0.01	mg/l
Aluminum	8/28- 8/30/89	ND	0.1	mg/l
Arsenic	8/28- 8/30/89	0.03	0.005	mg/l
Barium	8/28- 8/30/89	0.1	0.01	mg/l
Beryllium	8/28- 8/30/89	ND	0.005	mg/l
Calcium	8/28- 8/30/89	36	0.01	mg/l
Cadmium	8/28- 8/30/89	ND	0.001	mg/l
Cobalt	8/28- 8/30/89	ND	0.05	mg/l
Chromium	8/28- 8/30/89	ND	0.02	mg/l
Copper	8/28- 8/30/89	ND	0.01	mg/l
Iron	8/28- 8/30/89	0.16	0.05	mg/l
Mercury	8/28- 8/29/89	ND	0.005	mg/l
Potassium	8/28- 8/30/89	3.8	0.5	mg/l
Magnesium	8/28- 8/30/89	16	0.01	mg/l
Manganese	8/28- 8/30/89	0.67	0.01	mg/l
Sodium	8/28- 8/30/89	84	0.01	mg/l
Nickel	8/28- 8/30/89	ND	0.04	mg/l
Lead	8/28- 8/30/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29115
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-9 8-24-89 9:10

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Antimony	8/28- 8/30/89	ND	0.2	mg/l
Selenium	8/28- 8/31/89	ND	0.005	mg/l
Thallium	8/28- 8/30/89	ND	0.1	mg/l
Vanadium	8/28- 8/30/89	ND	0.05	mg/l
Zinc	8/28- 8/30/89	0.04	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29115
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-9 8-24-89 9:10

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	8/28/89	ND	0.005	mg/l
Fluoride	8/28/89	13	0.5	mg/l
Sulfate	8/28/89	56	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: DAMES & MOORE
LAB #: 1317-29116
MATRIX: WATER

DATE RECEIVED: 8/25/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: MW-10 8-24-89 8:25

VOLATILE ORGANICS
USEPA METHOD 8240 - GC/MS

Acetone	ND**	cis-1,3-Dichloropropene	ND
Benzene	ND	trans-1,3-dichloropropene	ND
Bromodichloromethane	ND	Ethylbenzene	ND
Bromoform	ND	2-Hexanone	ND**
Bromomethane	ND*	Methylene chloride	ND
2-Butanone	ND**	4-Methyl-2-pentanone	ND**
Carbon disulfide	ND	Styrene	ND
Carbon tetrachloride	ND	1,1,2,2-Tetrachloroethane	ND
Chlorobenzene	ND	Tetrachloroethene	ND
Chlorodibromomethane	ND	Toluene	ND
Chloroethane	ND	1,1,1-Trichloroethane	ND
Chloroform	ND	1,1,2-Trichloroethane	ND
Chloromethane	ND*	Trichloroethene	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND*
1,2-Dichloroethane	ND	Xylene(Total)	ND
1,1-Dichloroethene	ND		
1,2-Dichloroethene(Total)	ND		
1,2-Dichloropropane	ND		

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected, but below quantitation limit; quantitation suspect)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	89	(76-114)	(70-121)
Toluene-d8	98	(88-110)	(81-117)
Bromofluorobenzene	95	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29116
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-10 8-24-89 8:25

METALS ANALYTICAL REPORT
SELECTED LIST

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	8/28- 8/30/89	ND	0.01	mg/l
Aluminum	8/28- 8/30/89	ND	0.1	mg/l
Arsenic	8/28- 8/30/89	0.007	0.005	mg/l
Barium	8/28- 8/30/89	0.14	0.01	mg/l
Beryllium	8/28- 8/30/89	ND	0.005	mg/l
Calcium	8/28- 8/30/89	68	0.01	mg/l
Cadmium	8/28/89	ND	0.001	mg/l
Cobalt	8/28- 8/30/89	ND	0.05	mg/l
Chromium	8/28- 8/30/89	ND	0.02	mg/l
Copper	8/28- 8/30/89	ND	0.01	mg/l
Iron	8/28- 8/30/89	2.1	0.05	mg/l
Mercury	8/28- 8/29/89	ND	0.005	mg/l
Potassium	8/28- 8/30/89	6.8	0.5	mg/l
Magnesium	8/28- 8/30/89	28	0.01	mg/l
Manganese	8/28- 8/30/89	1.4	0.01	mg/l
Sodium	8/28- 8/30/89	110	0.01	mg/l
Nickel	8/28- 8/30/89	ND	0.04	mg/l
Lead	8/28- 8/29/89	ND	0.005	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29116
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-10 8-24-89 8:25

METALS ANALYTICAL REPORT
SELECTED LIST - 2

Dissolved metals analysis results

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Antimony	8/28- 8/30/89	ND	0.2	mg/l
Selenium	8/28- 8/31/89	ND	0.005	mg/l
Thallium	8/28- 8/30/89	ND	0.1	mg/l
Vanadium	8/28- 8/30/89	ND	0.005	mg/l
Zinc	8/28- 8/30/89	0.06	0.01	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : DAMES & MOORE
LAB #: 1317-29116
MATRIX : WATER

DATE RECEIVED: 8/25/89

SAMPLE ID : MW-10 8-24-89 8:25

ANALYTICAL REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Cyanide	8/28/89	ND	0.005	mg/l
Fluoride	8/28/89	2.8	0.1	mg/l
Sulfate	8/28/89	76	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT
LABORATORIES, INC.

QUALITY CONTROL SECTION

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
	GC/MS VOLATILE COMPOUNDS				
29116	1,1-Dichloroethene	91	93	WATER	(61-145)
	Trichloroethene	95	95		(71-120)
	Chlorobenzene	102	104		(75-130)
	Toluene	100	103		(76-125)
	Benzene	100	102		(76-127)

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
29114	Silver	80	77	WATER	(60-112)
29114	Aluminum	89	95	WATER	(72-123)
29114	Arsenic	102	94	WATER	(65-129)
29114	Barium	90	94	WATER	(69-112)
29114	Beryllium	84	86	WATER	(73-110)
29114	Cadmium	86	88	WATER	(72-107)
29114	Cobalt	105	94	WATER	(71-105)
29114	Chromium	103	102	WATER	(73-108)
29114	Copper	82	85	WATER	(74-110)
29114	Iron	103	108	WATER	(71-113)
29114	Mercury	92	94	WATER	(63-138)
29114	Potassium	88	95	WATER	(73-123)
29114	Manganese	108	112	WATER	(70-112)
29114	Nickel	79	93	WATER	(72-109)
29114	Lead	76	74	WATER	(68-112)
29114	Antimony	108	109	WATER	(32-123)
29114	Selenium	69	72	WATER	(36-106)
29114	Thallium	83	85	WATER	(56-111)
29114	Vanadium	79	87	WATER	(73-107)
29114	Zinc	99	106	WATER	(70-113)
890823	Sodium	103	93	SOLID	(48-139)
890828	Magnesium	98	104	WATER	(68-124)
890828	Calcium	118	100	WATER	(75-120)

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
890828	Cyanide	88	80	WATER	(52-112)
890825	Fluoride	118	119	WATER	(78-127)
890824	Sulfate	81	89	WATER	(80-117)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9089-90830
MATRIX: WATER

DATE RECEIVED: 8/30/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/30/89

SAMPLE ID: INTRA-LAB BLANK , 8 /30/89

VOLATILE ORGANICS
BLANK COMPOUND LIST - GC/MS

Acetone	11 J	1,1-Dichloroethane	ND
Acrolein	ND**	1,2-Dichloroethane	ND
Acrylonitrile	ND**	1,1-Dichloroethene	ND
2-Butanone	ND**	1,2-Dichloroethene (total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND*	Ethylbenzene	ND
Carbon disulfide	ND	2-Hexanone	ND**
Carbon tetrachloride	ND	4-Methyl-2-pentanone	ND**
Chlorobenzene	ND	Methylene chloride	3 J
Chloroethane	ND*	Styrene	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
2-Chloroethyl vinyl ether	ND*	Tetrachloroethene	ND
Chloromethane	ND*	Toluene	ND
Chloromethyl methyl ether	ND	1,1,1-Trichloroethane	ND
Dibromochloromethane	ND	1,1,2-Trichloroethane	ND
1,2-Dichlorobenzene	ND	Trichloroethene	ND
1,3-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,4-Dichlorobenzene	ND	Vinyl acetate	ND**
Dichlorodifluoromethane	ND*	Vinyl chloride	ND*
		Total xylenes	ND

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected , but below quantitation limit; quantitation suspect)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	99	(76-114)	(70-121)
Toluene-d8	97	(88-110)	(81-117)
Bromofluorobenzene	101	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9089-90831
MATRIX: WATER

DATE RECEIVED: 8/31/89
DATE EXTRACTED: NA
DATE ANALYZED: 8/31/89

SAMPLE ID: INTRA-LAB BLANK , 8 /31/89

VOLATILE ORGANICS
BLANK COMPOUND LIST - GC/MS

Acetone	ND**	1,1-Dichloroethane	ND
Acrolein	ND**	1,2-Dichloroethane	ND
Acrylonitrile	ND**	1,1-Dichloroethene	ND
2-Butanone	ND**	1,2-Dichloroethene (total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND*	Ethylbenzene	ND
Carbon disulfide	ND	2-Hexanone	ND**
Carbon tetrachloride	ND	4-Methyl-2-pentanone	ND**
Chlorobenzene	ND	Methylene chloride	ND
Chloroethane	ND*	Styrene	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
2-Chloroethyl vinyl ether	ND*	Tetrachloroethene	ND
Chloromethane	ND*	Toluene	ND
Chloromethyl methyl ether	ND	1,1,1-Trichloroethane	ND
Dibromochloromethane	ND	1,1,2-Trichloroethane	ND
1,2-Dichlorobenzene	ND	Trichloroethene	ND
1,3-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,4-Dichlorobenzene	ND	Vinyl acetate	ND**
Dichlorodifluoromethane	ND*	Vinyl chloride	ND*
		Total xylenes	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected , but below quantitation limit; quantitation suspect)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	93	(76-114)	(70-121)
Toluene-d8	98	(88-110)	(81-117)
Bromofluorobenzene	101	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: Wadsworth/Alert Laboratories
LAB #: 9089-90901
MATRIX: WATER

DATE RECEIVED: 9/ 1/89
DATE EXTRACTED: 9/ 1/89
DATE ANALYZED: 9/ 1/89

SAMPLE ID: INTRA-LAB BLANK , 9 /1 /89

VOLATILE ORGANICS
BLANK COMPOUND LIST - GC/MS

Acetone	ND**	1,1-Dichloroethane	ND
Acrolein	ND**	1,2-Dichloroethane	ND
Acrylonitrile	ND**	1,1-Dichloroethene	ND
2-Butanone	ND**	1,2-Dichloroethene (total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND*	Ethylbenzene	ND
Carbon disulfide	ND	2-Hexanone	ND**
Carbon tetrachloride	ND	4-Methyl-2-pentanone	ND**
Chlorobenzene	ND	Methylene chloride	ND
Chloroethane	ND*	Styrene	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
2-Chloroethyl vinyl ether	ND*	Tetrachloroethene	ND
Chloromethane	ND*	Toluene	ND
Chloromethyl methyl ether	ND	1,1,1-Trichloroethane	ND
Dibromochloromethane	ND	1,1,2-Trichloroethane	ND
1,2-Dichlorobenzene	ND	Trichloroethene	ND
1,3-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,4-Dichlorobenzene	ND	Vinyl acetate	ND**
Dichlorodifluoromethane	ND*	Vinyl chloride	ND*
		Total xylenes	ND

NOTE:
ND (None Detected, lower detectable limit = 5 ug/l) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/l) as rec'd
ND** (None Detected, lower detectable limit = 50 ug/l) as rec'd
J (Detected , but below quantitation limit; quantitation suspect)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	99	(76-114)	(70-121)
Toluene-d8	99	(88-110)	(81-117)
Bromofluorobenzene	103	(86-115)	(74-121)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/Alert Laboratories, Inc. **RECEIVING DATE :** 8/28/89
LABORATORY ID : 9089-90828
SAMPLE MATRIX : WATER

SAMPLE ID : INTRA-LAB BLANK , 8 /28/89

METALS ANALYTICAL BLANK REPORT
SELECTED LIST

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Silver	8/28- 8/29/89	ND	0.01	mg/l
Aluminum	8/28- 8/29/89	ND	0.1	mg/l
Arsenic	8/28/89	ND	0.005	mg/l
Barium	8/28- 8/29/89	ND	0.01	mg/l
Beryllium	8/28- 8/29/89	ND	0.005	mg/l
Calcium	8/28- 8/29/89	0.03	0.01	mg/l
Cadmium	8/28/89	ND	0.001	mg/l
Cobalt	8/28- 8/29/89	ND	0.05	mg/l
Chromium	8/28- 8/29/89	ND	0.02	mg/l
Copper	8/28- 8/29/89	ND	0.01	mg/l
Iron	8/28- 8/29/89	ND	0.03	mg/l
Mercury	8/28- 8/29/89	ND	0.0002	mg/l
Potassium	8/28- 8/29/89	ND	0.5	mg/l
Magnesium	8/28- 8/29/89	ND	0.01	mg/l
Manganese	8/28- 8/29/89	ND	0.01	mg/l
Sodium	8/28- 8/29/89	0.02	0.01	mg/l
Nickel	8/28- 8/30/89	ND	0.02	mg/l
Lead	8/28- 8/29/89	ND	0.005	mg/l
Antimony	8/28- 8/29/89	ND	0.2	mg/l
Selenium	8/28- 8/29/89	ND	0.005	mg/l
Thallium	8/28- 8/29/89	ND	0.1	mg/l
Vanadium	8/28- 8/29/89	ND	0.05	mg/l
Zinc	8/28- 8/29/89	0.02	0.01	mg/l

ND - NONE DETECTED

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/Alert Laboratories
LAB #: 9089-90828
MATRIX : WATER

DATE RECEIVED: 8/28/89

SAMPLE ID : INTRA-LAB BLANK , 8 /28/89

GENERAL ANALYTICAL BLANK REPORT

PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Chloride	8/28/89	ND	2	mg/l
Cyanide	8/28/89	ND	0.005	mg/l
Chemical Oxygen Demand	8/28/89	ND	5	mg/l
Fluoride	8/28/89	ND	0.1	mg/l
Oil and Grease	8/28- 8/29/89	ND	1	mg/l
Sulfate	8/28/89	ND	5	mg/l
Sulfide	8/28/89	ND	1	mg/l
Total Dissolved Solids	8/28- 8/29/89	ND	5	mg/l
Total Organic Carbon	8/28/89	ND	1	mg/l
Tot Recoverable Pet Hydrocarbons	8/28- 8/29/89	ND	0.5	mg/l
Total Solids	8/28- 8/29/89	ND	0.5	%
Total Suspended Solids	8/28- 8/29/89	ND	5	mg/l

NOTE: ND (None Detected)

WADSWORTH/ALERT LABORATORIES

4101 SHUFFEL DRIVE N.W./NORTH CANTON, OHIO 44720
(216) 497-9396

№ 14557

Chain-of Custody Record

PROJ. NO. 14570-009 5002

PROJECT NAME/LOCATION: CHI-VIT URBANA OHIO

SAMPLERS: (Signature) Tom Schaffner & Steve Smith

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	VOC'S	POTASSIUM	DISSOLVED METALS	CYANIDE	SO_4, FLUORIDE	REMARKS
MW-1	8/24	1:05		✓	MW-1	3	2	1				2 of the potassium samples need to have preservative added to them on arrival. bottles are marked
MW-2	8/24	12:45		✓	MW-2	3	2	1				
MW-3	8/24	12:35		✓	MW-3	3	2	1				
MW-4	8/24	11:40		✓	MW-4	3	2	1				
MW-5	8/24	10:55		✓	MW-5	5	2		1	1	1	
MW-6	8/24	10:35		✓	MW-6	5	2		1	1	1	
MW-7	8/24	10:10		✓	MW-7	5	2		1	1	1	
MW-8	8/24	9:40		✓	MW-8	5	2		1	1	1	
MW-9	8/24	9:10		✓	MW-9	5	2		1	1	1	
MW-10	8/24	8:25		✓	MW-10	5	2		1	1	1	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Thomas Schaffner	8/24/89 4:40				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		R. Becker	8/25/89 8:15	Please return blue cooler.	

Distribution Original Accompanies Shipment. Copy returned with Report.

OH000472