KERAMIDA
ENVIRONMENTAL, INC.
ENGINEERING • CONSULTING • REMEDIATION
AIR • LAND • WATER • WASTE

330 North College Avenue
Indianapolis, Indiana 46202
(317) 685-6600 • Fax (317) 685-6610
1-800-508-8034
email: keramida@keramida.com
web page: www.keramida.com

PHASE II INVESTIGATION REPORT
FORMER GENERAL MOTORS CORPORATION
ALLISON GAS TURBINE DIVISION PLANT 10
700 NORTH OLIN AVENUE, INDIANAPOLIS, INDIANA
VOLUNTARY REMEDIATION PROGRAM NO. 6991004
KERAMIDA PROJECT NO. 2829E

Submitted To:

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Voluntary Remediation Program
Office of Land Quality
100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46204-6015

VOLUME 2
ATTACHMENTS 1 THROUGH 8

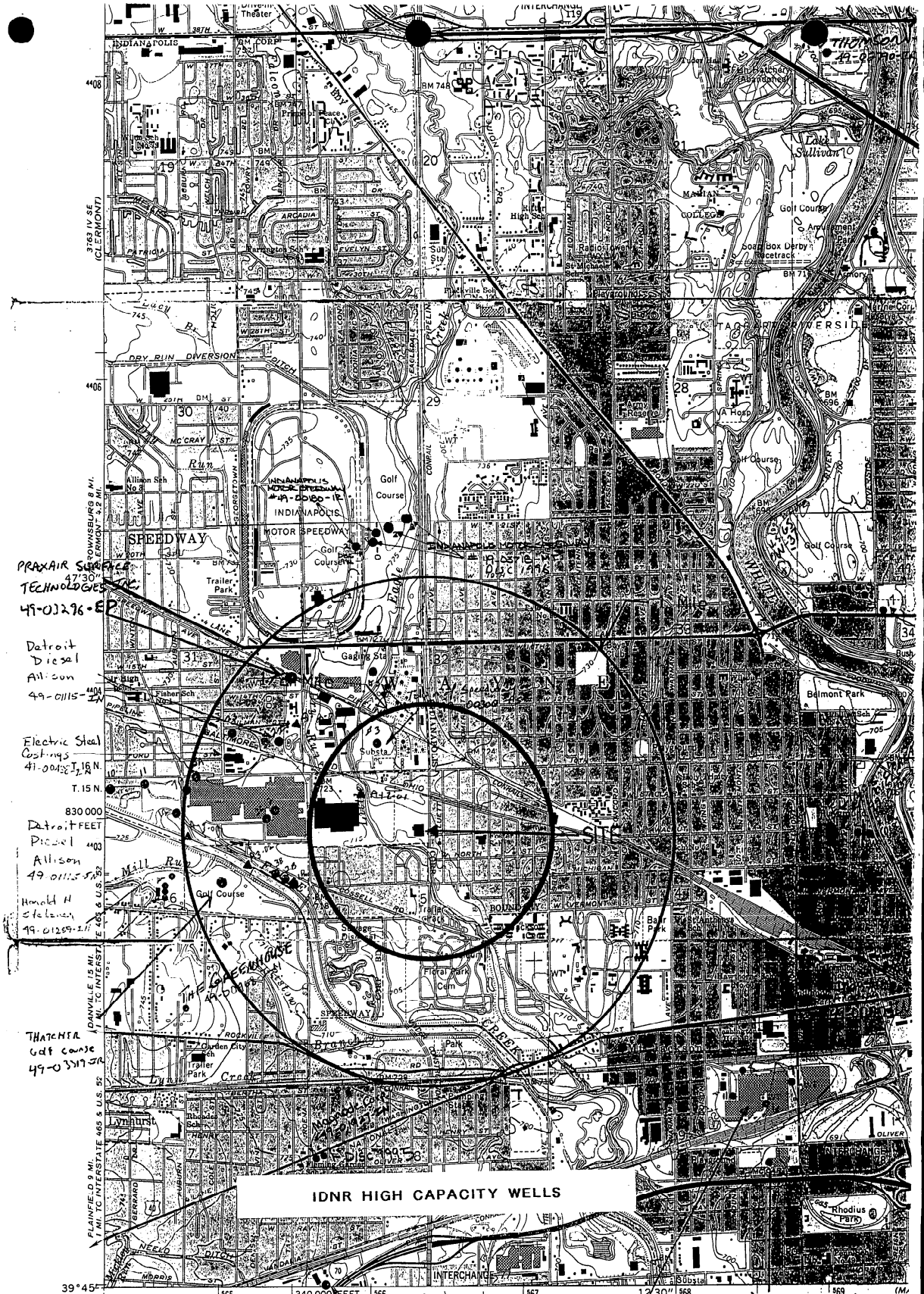
Submitted For:

GENUINE PARTS COMPANY
Mr. Bob Lewis
Environmental, Safety and DOT Compliance Manager
2999 Circle 75 Parkway
Atlanta, Georgia 30339

Submitted By:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
(317) 685-6600

March 29, 2002



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and Indiana Flood Control and Water Resources Commission

Planimetry by photogrammetric methods from aerial photographs taken 1941. Topography by planetable surveys 1946
Revised from aerial photographs taken 1966. Field checked 1967

Polyconic projection
10,000-foot grid based on Indiana coordinate system, east zone
1000-meter Universal Transverse Mercator grid ticks, zone 16, shown in blue. 1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 1 meter south and 1 meter west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

49-00300-PS

SIGNIFICANT WATER WITHDRAWAL FACILITY REGISTRATION

State Form 20094

SEND TO: INDIANA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER
ROOM 605 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
TELEPHONE (317) 232-4160

AUTHORITY: IC 13-2-6.1-7 requires that every person who has a significant water withdrawal facility shall register it with the Natural Resources Commission. A "significant water withdrawal facility" means the water withdrawal facilities of a person that, in the aggregate from all sources and by all methods, has the capability of withdrawing more than one hundred thousand (100,000) gallons of ground water, surface water or ground and surface water combined in one (1) day; however, this does not include water withdrawal facilities located in or on an off-stream impoundment that is principally supplied by a significant water withdrawal facility.

NOTE: GPM = Gallons Per Minute, GPD = Gallons Per Day, MGD = Million Gallons Per Day
DETAILED DIRECTIONS ARE PROVIDED ON THE SEPARATE ENCLOSED INSTRUCTION SHEET

1 (Please Type or Print) OWNER OF WATER WITHDRAWAL FACILITY

Owner's Name	Phone	Contact Person (If other than owner)	Phone
Town of Speedway	241-9766	Michael Littlejohn Supt.	241-9766
Mailing Address: 1450 N. Lynhurst Dr.		Mailing Address: Same	
City, State, Zip: Speedway, In. 46224		City, State, Zip: Same	

2 WATER USE

Water to be used for the following purposes. Check one or more as appropriate (GW = Ground water/SW = Surface water)

	Supply sources/circle			Supply sources/circle			Supply sources/circle	
☒ Public Water Supply	GW	SW	☐ Livestock Watering	GW	SW	☐ Power Generation	GW	SW
☒ Drinking Water/Sanitary Facilities	GW	SW	☐ Cooling Water	GW	SW	☐ Heating/Air Conditioning	GW	SW
☐ Agricultural Irrigation	GW	SW	☐ Process Water	GW	SW	☐ Recreational Use	GW	SW
☐ Golf Course Irrigation	GW	SW	☐ Coal Preparation	GW	SW	☐ Other (Specify) _____	GW	SW
☐ Waste Assimilation	GW	SW	☐ Oil Recovery	GW	SW			
			☐ Mineral Extraction	GW	SW			

GM 1-12-90

WATER WITHDRAWAL FACILITY CAPABILITY

Total withdrawal capability of withdrawal facilities: ~~12.46~~ ~~[illegible]~~ GPD or MGD (Circle one) ~~11.766~~ 10.603 ~~11.767~~ MGD

NOTE: This total is the sum of the capabilities of all wells and surface water intakes.

4 SUPPLY SOURCES

12

Ground Water Sources	Surface Water Sources
Total number of wells ~~[illegible]~~ ~~6077~~	Total number of intakes 1
Total withdrawal capability of all wells ~~9.46~~ ~~[illegible]~~ 5263 9,462,240 ~~[illegible]~~ GPM MGD or GPM (Circle one)	Total withdrawal capability of all surface water intakes ~~3.0~~ ~~3024000~~ 2100 MGD or GPM (Circle one)

FOR EACH WELL PROVIDE THE FOLLOWING: (Additional entries are provided on page 2)

A Owner's well number 2 | Pump Capacity 800 GPM
Well depth 78 (ft) | Well diameter 42 (in)

Aquifer utilized (check one)
☒ Sand and gravel ☐ Limestone
☐ Sand ☐ Shale
☐ Sandstone ☐ Other (Specify) _____

LOCATION OF WELL:	County	Civil Township
	Marion	Wayne
Township	Range	Section
T 16 N or S (Circle one)	R 2 E or W (Circle one)	36

Nearest city or town: Speedway

Describe location of well (Attach map or plat if possible): N403975 E564125

FOR EACH SURFACE WATER INTAKE PROVIDE THE FOLLOWING: (Additional entries are provided on page 2)

A Owner's intake number 1
Intake capacity 2,100 GPM

Source utilized (check one)
☒ River or stream ☐ Pond
☐ Drainage ditch ☐ Reservoir
☐ Lake ☐ Other (Specify) _____

Name of body of water: Big Eagle Creek

LOCATION OF INTAKE:	County	Civil Township
	Marion	Wayne
Township	Range	Section
T 16 N or S (Circle one)	R 2 E or W (Circle one)	36

Nearest city or town: Speedway

Describe location of intake (Attach map or plat if possible): N403450 E563400

Space is provided on the back of this form for a location sketch. Attach additional location sketches or maps as necessary.

SOURCE INFORMATION *(CONTINUED)*

B Owner's well number 3 **Pump Capacity** 400 GPM
Well depth 62.5 (ft) **Well diameter** 42 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)*

LOCATION OF WELL: County: Marion; Civil Township: Wayne
Township: T 16 N or S *(Circle one)*; Range: R ~~2~~ 3 E or W *(Circle one)*; Section: ~~36~~ 32
Nearest city or town: Speedway
Describe location of well *(Attach map or plat if possible)*: N403675 E566025

B Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)*

Name of body of water

LOCATION OF INTAKE: County; Civil Township
Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section
Nearest city or town
Describe location of intake *(Attach map or plat if possible)*

C Owner's well number 4 **Pump Capacity** 200 GPM
Well depth 69 (ft) **Well diameter** 42 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)*

LOCATION OF WELL: County: Marion; Civil Township: Wayne
Township: T 16 N or S *(Circle one)*; Range: R 2 E or W *(Circle one)*; Section: 36
Nearest city or town: Speedway
Describe location of well *(Attach map or plat if possible)*: N403500 E563500

C Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)*

Name of body of water

LOCATION OF INTAKE: County; Civil Township
Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section
Nearest city or town
Describe location of intake *(Attach map or plat if possible)*

ABANDONED 12-1-90 GM

D Owner's well number 5 **Pump Capacity** 500 GPM
Well depth 129 (ft) **Well diameter** 50 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)*

LOCATION OF WELL: County: Marion; Civil Township: Wayne
Township: T 16 N or S *(Circle one)*; Range: R ~~2~~ 3 E or W *(Circle one)*; Section: ~~36~~ 32
Nearest city or town: Speedway
Describe location of well *(Attach map or plat if possible)*: N404075 E565975

D Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)*

Name of body of water

LOCATION OF INTAKE: County; Civil Township
Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section
Nearest city or town
Describe location of intake *(Attach map or plat if possible)*

If owner has more than 4 wells, attach separate sheets providing above information for each additional well.

If owner has more than 4 intakes, attach separate sheets providing above information for each intake.

49-0300-PS

SOURCE INFORMATION *(CONTINUED)*

B Owner's well number 6 Pump Capacity 500 GPM

Well depth 70.5 (ft) Well diameter 42 (in)

Aquifer utilized *(check one)*
- ☒ Sand and gravel
- ☐ Sand
- ☐ Sandstone
- ☐ Limestone
- ☐ Shale
- ☐ Other *(Specify)* _____

LOCATION OF WELL: County: Marion; Civil Township: Wayne

Township: T 16 (N) or S *(Circle one)*; Range: R 2 (E) or W *(Circle one)*; Section: 36

Nearest city or town: Speedway

Describe location of well *(Attach map or plat if possible)*: N403900 E564075

B Owner's intake number _____

Intake capacity _____ GPM

Source utilized *(check one)*
- ☐ River or stream
- ☐ Drainage ditch
- ☐ Lake
- ☐ Pond
- ☐ Reservoir
- ☐ Other *(Specify)*

Name of body of water

LOCATION OF INTAKE: County; Civil Township

Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section

Nearest city or town

Describe location of intake *(Attach map or plat if possible)*

C Owner's well number 7 Pump Capacity 600 GPM

Well depth 65.5 (ft) Well diameter 18 (in)

Aquifer utilized *(check one)*
- ☒ Sand and gravel
- ☐ Sand
- ☐ Sandstone
- ☐ Limestone
- ☐ Shale
- ☐ Other *(Specify)* _____

LOCATION OF WELL: County: Marion; Civil Township: Wayne

Township: T 16 (N) or S *(Circle one)*; Range: R 2 (E) or W *(Circle one)*; Section: 36

Nearest city or town: Speedway

Describe location of well *(Attach map or plat if possible)*: N404025 E563825

C Owner's intake number _____

Intake capacity _____ GPM

Source utilized *(check one)*
- ☐ River or stream
- ☐ Drainage ditch
- ☐ Lake
- ☐ Pond
- ☐ Reservoir
- ☐ Other *(Specify)*

Name of body of water

LOCATION OF INTAKE: County; Civil Township

Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section

Nearest city or town

Describe location of intake *(Attach map or plat if possible)*

D Owner's well number 8 Pump Capacity 305 GPM

Well depth 60 56 (ft) Well diameter 36 (in)

Aquifer utilized *(check one)*
- ☒ Sand and gravel
- ☐ Sand
- ☐ Sandstone
- ☐ Limestone
- ☐ Shale
- ☐ Other *(Specify)* _____

LOCATION OF WELL: County: Marion; Civil Township: Wayne

Township: T 16 (N) or S *(Circle one)*; Range: R 2 (E) or W *(Circle one)*; Section: 36

Nearest city or town: Speedway

Describe location of well *(Attach map or plat if possible)*: N403800 E563100

If owner has more than 4 wells, attach separate sheets providing above information for each additional well.

D Owner's intake number _____

Intake capacity _____ GPM

Source utilized *(check one)*
- ☐ River or stream
- ☐ Drainage ditch
- ☐ Lake
- ☐ Pond
- ☐ Reservoir
- ☐ Other *(Specify)*

Name of body of water

LOCATION OF INTAKE: County; Civil Township

Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section

Nearest city or town

Describe location of intake *(Attach map or plat if possible)*

If owner has more than 4 intakes, attach separate sheets providing above information for each intake.

49-03600-PS

SOURCE INFORMATION *(CONTINUED)*

B Owner's well number 9 **Pump Capacity** 305 GPM
Well depth ~~60~~ 64 (ft) **Well diameter** 36 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)* _____

B Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)* _____

Name of body of water

LOCATION OF WELL:	County	Civil Township
	Marion	Wayne

Township	Range	Section
T 16 (N) or S *(Circle one)*	R 2 (E) or W *(Circle one)*	36

Nearest city or town: Speedway

Describe location of well *(Attach map or plat if possible)*: N404050 E562950

LOCATION OF INTAKE:	County	Civil Township

Township	Range	Section
T ____ N or S *(Circle one)*	R ____ E or W *(Circle one)*	

Nearest city or town:

Describe location of intake *(Attach map or plat if possible)*:

C Owner's well number 10 **Pump Capacity** 596 GPM
Well depth 60 (ft) **Well diameter** 36 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)* _____

C Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)* _____

Name of body of water

LOCATION OF WELL:	County	Civil Township
	Marion	Wayne

Township	Range	Section
T 16 (N) or S *(Circle one)*	R 2 (E) or W *(Circle one)*	36

Nearest city or town: Speedway

Describe location of well *(Attach map or plat if possible)*: N404175 E563225

LOCATION OF INTAKE:	County	Civil Township

Township	Range	Section
T ____ N or S *(Circle one)*	R ____ E or W *(Circle one)*	

Nearest city or town:

Describe location of intake *(Attach map or plat if possible)*:

D Owner's well number 11 **Pump Capacity** 682 GPM
Well depth ~~50~~ 46 (ft) **Well diameter** 18 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)* _____

D Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)* _____

Name of body of water

LOCATION OF WELL:	County	Civil Township
	Marion	Wayne

Township	Range	Section
T 16 (N) or S *(Circle one)*	R 2 (E) or W *(Circle one)*	36

Nearest city or town: Speedway

Describe location of well *(Attach map or plat if possible)*: N404675 E562800

LOCATION OF INTAKE:	County	Civil Township

Township	Range	Section
T ____ N or S *(Circle one)*	R ____ E or W *(Circle one)*	

Nearest city or town:

Describe location of intake *(Attach map or plat if possible)*:

If owner has more than 4 wells, attach separate sheets providing above information for each additional well.

If owner has more than 4 intakes, attach separate sheets providing above information for each intake.

49-0300-PS

SOURCE INFORMATION *(CONTINUED)*

B Owner's well number 12 **Pump Capacity** 656 GPM
Well depth 72 (ft) **Well diameter** 36 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)* _____

LOCATION OF WELL: County: Marion; Civil Township: Wayne
Township: T 16 (N) or S *(Circle one)*; Range: R 2 (E) or W *(Circle one)*; Section: 36
Nearest city or town: Speedway
Describe location of well *(Attach map or plat if possible)*: N404850 E562725

B Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)* _____

Name of body of water

LOCATION OF INTAKE: County; Civil Township
Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section
Nearest city or town
Describe location of intake *(Attach map or plat if possible)*

C Owner's well number 13 **Pump Capacity** 503 GPM
Well depth 58 (ft) **Well diameter** 36/16 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)* _____

LOCATION OF WELL: County: Marion; Civil Township: Wayne
Township: T 16 (N) or S *(Circle one)*; Range: R 2 (E) or W *(Circle one)*; Section: 36
Nearest city or town: Speedway
Describe location of well *(Attach map or plat if possible)*: N404825 E563100

C Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)* _____

Name of body of water

LOCATION OF INTAKE: County; Civil Township
Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section
Nearest city or town
Describe location of intake *(Attach map or plat if possible)*

D Owner's well number 14R **Pump Capacity** 524 GPM
Well depth 61 (ft) **Well diameter** 18/30 (in)

Aquifer utilized *(check one)*
- [x] Sand and gravel
- [ ] Sand
- [ ] Sandstone
- [ ] Limestone
- [ ] Shale
- [ ] Other *(Specify)* _____

LOCATION OF WELL: County: Marion; Civil Township: Wayne
Township: T 16 (N) or S *(Circle one)*; Range: R 2 (E) or W *(Circle one)*; Section: 36
Nearest city or town: Speedway
Describe location of well *(Attach map or plat if possible)*: N404930 E563050

If owner has more than 4 wells, attach separate sheets providing above information for each additional well.

D Owner's intake number _____
Intake capacity _____ GPM

Source utilized *(check one)*
- [ ] River or stream
- [ ] Drainage ditch
- [ ] Lake
- [ ] Pond
- [ ] Reservoir
- [ ] Other *(Specify)* _____

Name of body of water

LOCATION OF INTAKE: County; Civil Township
Township: T ____ N or S *(Circle one)*; Range: R ____ E or W *(Circle one)*; Section
Nearest city or town
Describe location of intake *(Attach map or plat if possible)*

If owner has more than 4 intakes, attach separate sheets providing above information for each intake.

5 **LOCATION OF WATER USE**

Is the location of water use the same as the withdrawal facility? ☐ Yes ☒ No

If no, please complete	State	County	Civil Township
	Indiana	Marion	Wayne

Describe location of water use *(Attach map or plat if possible)*

Town of Speedway (See Attached Map)

6 **LOCATION OF DISCHARGE POINT(S)**

Is a portion of the water withdrawn returned to some source through a discharge facility? ☒ Yes ☐ No

If yes is checked, please complete the following. If no is checked, please proceed to section 7.

Estimated percentage of water withdrawn which is returned to some source 9.0 %

Water will be discharged to the following: *(Check one or more as appropriate)*

☐ Well ☐ Lake ☐ Drainage Ditch ☐ Storm Sewer ☐ Land Application
☐ Pond ☐ Reservoir ☐ River or Stream ☒ Sanitary Sewer ☐ Customer Service Connections
☐ Other *(Specify)* _____

Location of discharge facility:	State	County	Civil Township
	Indiana	Marion	Wayne

Township	Range	Section
T 16 N or S *(Circle one)*	R 2 E or W *(Circle one)*	36

Describe location of discharge facility *(Attach map or plat if possible)*

Discharge facillity located at water plant. (See Map)

If more than one point of discharge, please attach separate sheets providing the above information for each discharge point.

7 **STATEMENT OF AFFIRMATION**

I hereby swear or affirm, under the penalties for perjury, that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Owner or authorized representative's signature	Date
Michael Feinholm	8/31/84

TK

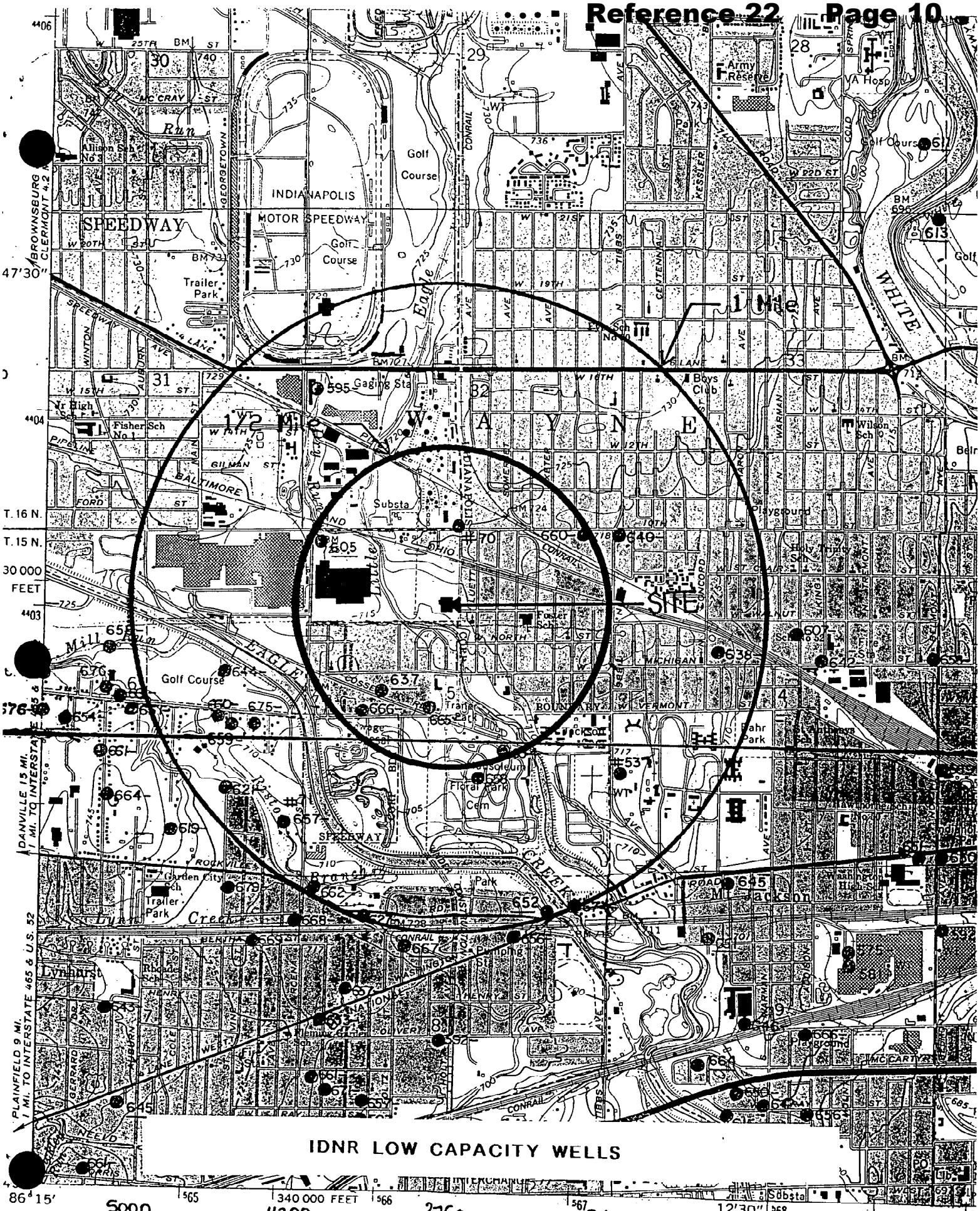
WATER WITHDRAWAL FACILITY LOCATION SKETCH (Locate facility with reference to water supply, numbered roads, highways, buildings, or distinctive landmarks.) This section may be divided for additional maps or separate maps or plats may be attached.

N

FOR OFFICE USE ONLY					
UTM.N ~~403450~~ 403975	UTM.E ~~563400~~ 564125	Date Received 9-4-84	County Marion	Basin West Frok White	Registration No. 49-00300-PS
		Township 16N	Range 2E	Section 36	Topographic Map Indpls. West & Clermont

WM07

SEP 1984
RECEIVED
DEPT OF
NATURAL RESOURCES
DIVISION OF WATER



IDNR LOW CAPACITY WELLS

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and Indiana Flood Control and Water Resources Commission

Planimetry by photogrammetric methods from aerial photographs

~~[illegible]~~
~~[illegible]~~

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

Permit 910

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

3908 N Cossell Road
300 N

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Fred Strait Address

Building Contractor Address

Name of Well Drilling Contractor: Hamilton Bros., Inc.

P.O. Box 24181, Indpls, Ind. 46224

Name of Drilling Equipment Operator: Henry Arthur

WELL INFORMATION

Depth of well: 50'

Date well was completed: 11/13/77

Diameter of casing or drive pipe: 4" P.V.C. material Total Length: 47'

Diameter of liner (if used): Total Length:

Diameter of Screen: 4" Length: 3' Slot Size: .060

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [X] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) feet

Water Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 1 Rate 13 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE ...

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Topsoil and Clay	0	10
Gravel	10	38
Clay	38	50

FOR AL 01 54037 LY
(Wc

COUNTY MARION TWP. 15N RGE. 3E NE ¼ NE ¼ SW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by BRUNS 2-17-73

Ft W of EL. Ground Elevation 715

Ft N of SL. Depth to bedrock

Ft E of WL. Bedrock elevation

Ft S of NL. Aquifer elevation 665 Lot Number

UTM NORTH 4402560
UTM EAST 566215
**COMMENTS MC 665

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

JUN 1966
RECEIVED
Dept. of Nat. Resources
Division of Water

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: Marion Civil Township: _____

Congressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: Southeast edge of Speedway at 4010 Cossell Road.

Name of owner: Cossell Florists Address: 4010 Cossell Road Indianapolis, Indiana

Name of Well Drilling Contractor: Willard English & Son

Address: R. R. # 1 Clayton, Indiana

Name of Drilling Equipment Operator: Dester Harnesss

INFORMATION ON THE WELL

Completed depth of well: 270 ft. Date well was completed: June 3, 1966

Diameter of outside casing or drive pipe: ~~4½ in.~~ 4.5 Length: 80 ft.

Diameter of inside casing or liner: 4 ~~in.~~ Length: _____

Diameter of Screen: _____ Length: _____ Slot size: _____

Type of Well: Drilled [x] Gravel Pack [ ] Driven [ ] Other _____

Use of Well: For home [x] For industry [ ] For public supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [x] Rev. Rotary [ ] Jet [ ] Driven [ ]

Static water level in completed well (Distance from ground to water level) 70 ft.

Bailer Test: Hours tested _____ Rate 10 g.p.m. Drawdown 220 ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

9

Signature Dester Harness

Date June 3, 1966

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

RMATIONS (Color, type of material, hardness, etc.)	From	To
Clay Gray	1	10
Sand Brown	10	37
Clay Blue	37	80
Shale Black	80	190
Limestone	190	270

~~717~~
~~190~~
~~527~~ ~~Dev. Ls. Top~~ ?

RKS:
~~Dotted on Morton's bedrock map by WSH 3-4-69~~

01-01 180311 MINISTRATIVE USE ONLY
ller does not fill out)

COUNTY: [illegible] TWP. 15N RGE. 3E SW ¼ SE ¼ NW ¼ SEC. 5

Topo Map: [illegible]

Well log classified By CB Date 2-66
Courthouse located By ____ Date ____
Field located By [illegible] Date 1-74
Acc. w/o verification By ____ Date ____

Ft W of EL. Ground elevation 717±
2800 Ft N of SL. Depth to bedrock 80
1700 Ft E of WL. Bedrock elevation 637
Ft S of NL. Aquifer elevation ____

UTM NORTH ____
UTM EAST ____
**COMMENTS MC ✓

Tops

9

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a well. We request that you be as accurate as possible in recording this information as y be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. e include all information possible in the space provided for well location. As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted thirty days after the completion of a well to the Division of Water Resources, Indiana ment of Conservation.

~~402 525 N~~
~~565 555 E~~

(11)

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

(Completely)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion		Wayne		

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side (From Indianapolis)

W on Michigan Rd. from Holt Rd. to Gasoline Alley, South go straight to Vermont East to 4120 (Do Not Cross River)

OWNER - CONTRACTOR

Name of well owner: Mr. & Mrs. Fred Mueller 400N
Telephone Number: (317) 244-7590
Address (Street and number, city, state): 4120 W. Vermont 4100W Indpls IN
ZIP code: 46222
Name of building contractor: —
Telephone number: ( )
Address (Street and number, city, state): —
ZIP code: —
Name of drilling contractor: Joseph Huser Services Inc.
Telephone number: (317) 784-4264
Address (Street and number, city, state): 5728 S. Emerson Indpls IN
ZIP code: 46237
Name of equipment operator: [illegible]awn R Corey
License number: 436
Date of completion: 9/89

CONSTRUCTION DETAILS

Use of well: ☒ Home ☐ Industry ☐ Test ☐ Irrigation ☐ Public supply ☐ Stock ☐ Other (specify):
Method of drilling: ☒ Rotary ☐ Rev. rotary ☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other
Casing length: 48 CAL feet — Material: PVC — Diameter: 5 inches
Screen length: 3 feet — Material: ~~STAINLESS~~ SS — Diameter: 4 inches
Screen slot size: .035 — Total depth of well: 50 FT.
Depth of pump setting: 45 FT. — Water quality (Clear, cloudy, odor, etc.): OK
Type of pump: ☐ Shallow-well jet ☒ Submersible ☐ Deep-well jet ☐ Other (specify):

WELL CAPACITY TEST

Check one: ☒ Air ☐ Bailing ☐ Pumping
Test rate: 20 gpm 1 hrs.
Drawdown: feet
Static level (depth to water): 18 feet

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
Brown Clay	0	7
Sandy Clay	7	11
Sand + Gravel	11	39
Grey Clay	39	45
Sand + Gravel	45	50

(Additional space for well log on reverse side)

ROUTING INFORMATION

Material	Depth of grout	Sealing material	Depth filled
Stonite	From 4 To 40		From To

Method of installation	Number of bags used	Method of installation	Number of bags used
Pumped	1 1/2		

WELL ABANDONMENT

Sealing material: — Depth filled: From To

Hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative: Joseph B Huser

Date: 10/31/89

RECEIVED NOV 1989 DEPT OF NATURAL RESOURCES DIVISION OF WATER

FOR A/ (wel 01 54027

County	Township	Range		Section
Marion	15N	3E	NE ¼ NW ¼ SW	5

Topo map: Lindpls. West	Ft. W of EL	Ground elevation: 716	Subdivision name
Field located By: MCBN Date: 1992	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation: 666	

(continued from front side)

WELL LOG Formations: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

UTM NORTH 440 2525
UTM EAST 565885
**COMMENTS MC 666

W

E

(Well drillers do not fill out)

COUNTY MARION TWP. 15N RGE. 3E ¼ SW ¼ NW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST ~~7½~~

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by BRUNS 12-21-82

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL RECORD

COUNTY: MARION

CIVIL TOWNSHIP:

PERMIT NO.:

DRIVING DIRECTIONS: 4140 W. VERMONT

WELL OWNER:

BUILDING CONTRACTOR: DONALD STEVENS

DRILLING EQUIPMENT OPERATOR: DESTER HARNESS

WELL INFORMATION

LL TH	CASING DIAMETER	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
36	4" PVC (material)	32			4	4	60	DRILLED	HOME	ROTARY	11/08/82

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
20				1	10	~~25 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	15
GRAVEL	15	36

STATE COPY

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209

RECEIVED
DEPT. OF NATURAL RESOURCES
DIVISION OF WATER

WATER WELL RECORD

Permit # 1488

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

e of owner: Floral Park Cemetery Address: 3659 Cossell Rd

e of Well Drilling Contractor: Hamilton Bros Inc

e of Drilling Equipment Operator: Rash

INFORMATION ON THE WELL

pleted depth of well: 48' ft. Date well was completed: 8-24-71

meter of outside casing or drive pipe: 4" Blk Length: 45'

meter of inside casing or liner: _____ Length: _____

meter of Screen: 3" Length: 5' PVC material Slot size: #40

e of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) _____ ft.

er Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ing Test: Hours tested 2 Rate 10 g.p.m. ~~Drawdown~~ PC 17 ft.

Signature Rash

Date 8-24-71

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180256

Cement. #2

COUNTY: Marion TWP. 15N RGE. 31 ___ ¼ ___ ¼ ___ ¼ SEC. 5

Topo Map: ~~T. West~~ Adolph West

Well log classified By 4 Date 3-23
Courthouse located By ___ Date ___
Field located By ___ Date ___
Acc. w/o verification By ___ Date ___

___ Ft W of EL.
___ Ft N of SL.
___ Ft E of WL.
___ Ft S of NL.

Ground elevation ___
Depth to bedrock ___
Bedrock elevation ___
Aquifer elevation ___

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To

REMARKS:

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a ter well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ease include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted thin thirty days after the completion of a well to the Division of Water

~~402415N~~
~~566495E~~
525

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

47

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: MARION Civil Township: WAYNE

Congressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: AT MAUSOLEUM FLORAL PARK CEMETERY COSSEL DR.

Name of owner: FLORAL PARK CEMETERY Address: COSSEL DR.

Name of Well Drilling Contractor: HARLAN MILLER WELL & PUMP CO.

Address: 1726 HAMBLEN W. DR. INDIANAPOLIS 31, IND.

Name of Drilling Equipment Operator: JOHN WINKLER

INFORMATION ON THE WELL

Completed depth of well: 53' ft. Date well was completed: 8-1-61

Diameter of outside casing or drive pipe: 4" Length: 50'

Diameter of inside casing or liner: — Length: —

Diameter of Screen: 3" Length: 6' Slot size: #6

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

Static water level in completed well (Distance from ground to water level) 14 ft.

Bailer Test: Hours tested 1 Rate 20 g.p.m. Drawdown 21 ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested — Rate — g.p.m. Drawdown — ft.

11

Signature Harlan Miller

Date 8-30-61

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMI' 01-01 32 Y
(Well Dril out)

COUNTY: Marion TWP. 13N RGE. 3E SW ¼ NW ¼ SE ¼ SEC. 5

Topo. Map: Indianapolis West Loc. accepted w/o verification Yes ✓ No ___

El. of grnd. surface at well: 711 Courthouse Loc. By ___ Date ___

Depth to bedrock: ___ Field Located By MCBH Date 1992

Well Log processed by: [illegible] 1/30/62 Placed in Master Well Log File Date 2-3-62

(Ag el-658)

FORMATIONS (Color, type of material, hardness, etc.)	From	To
CLAY	0	33'
GRAVEL & WATER	33'	53'

UTM NORTH 4402215
UTM EAST 566490
**COMMENTS MC 658

MARKS:

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a
er well. We request that you be as accurate as possible in recording this information as
may be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log.
ase include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted
in thirty days after the completion of a well to the Division of Water Resources, Indiana
rtment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

38

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS 9, INDIANA

OCT 1971
RECEIVED
NATURAL RESOURCES
DIVISION OF WATER

WATER WELL RECORD

~~#1~~

Permit # 1487

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township:

ongressional township: Range: Number of section:

(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets r distinctive landmarks:

ame of owner: Floral Park Cemetery Address: 3659 Cossell Rd

ame of Well Drilling Contractor: Hamilton Bros Inc

:

ame of Drilling Equipment Operator: Rash

INFORMATION ON THE WELL

mpleted depth of well: 50' ft. Date well was completed: 8-23-71

ameter of outside casing or drive pipe: 4" Blk Length: 52'

ameter of inside casing or liner: Length:

ameter of Screen: 3" Length: 5' PVC material Slot size: #42

pe of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

e of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) ft.

ler Test: Hours tested Rate g.p.m. Drawdown ft. (Difference between static level and water level at end of test)

ping Test: Hours tested 2 Rate 10 g.p.m. ~~Drawdown~~ 22' ft.

Signature Rash

Date 8-23-71

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

01-01 180326

FOR ADMINISTRATIVE U[illegible] ONLY
(Well driller does not fill out)

Complete #1

COUNTY: Marion TWP. 15 N RGE. 3 E ___ ¼ ___ ¼ ___ ¼ SEC. 5

Topo Map: ~~I. West 7½~~ Indianapolis West

Well log classified By n Date 3-23
Courthouse located By ___ Date ___
Field located By ___ Date ___
Acc. w/o verification By ___ Date ___

___ Ft W of EL. Ground elevation ___
___ Ft N of SL. Depth to bedrock ___
___ Ft E of WL. Bedrock elevation ___
___ Ft S of NL. Aquifer elevation ___

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Topsoil	0	1
Sand	1	24
Clay	24	40
Sand	40	43
Clay	43	47
Sand	47	50

MARKS:

I

INSTRUCTIONS

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As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted hin thirty days after the completion of a well to the Division of Water Resources, Indiana artment of Conservation.

P 1970
RECEIVED
DIV. OF
NATURAL RESOURCES
DIVISION OF WATER

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209

39

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: MARION Civil Township: _____

Congressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: 3659 W. Cossell Road (300N)

Name of owner: FLORAL PARK CEMETARY Address: 3659 COSSELL RD

Name of Well Drilling Contractor: HAMILTON BROS INC

Address: _____

Name of Drilling Equipment Operator: JOE STOVALL

INFORMATION ON THE WELL

Completed depth of well: 46 ft. Date well was completed: 7/23/70

Diameter of outside casing or drive pipe: 4" ~~N/A~~ Length: 43'

Diameter of inside casing or liner: _____ Length: _____

Diameter of Screen: 3' Length: 5' PVC material Slot size: #40

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For home ☐ For industry ☐ For public supply ☐ Other HANDPUMP ☑

Method of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

Static water level in completed well (Distance from ground to water level) _____ ft.

Bailer Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested 2 Rate 10 g.p.m. ~~Drawdown~~ ~~N/A~~ ft.

Signature [illegible]

Date 7/23/70

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	5
Sand	5	15
Clay	15	30
Sand	30	46

MARKS:

FOR ADMIN: 01-01 4033
(Well driller ... ut)

COUNTY: Marion TWP. 15N RGE. 3E SE ¼ NW ¼ SE ¼ SEC. 5

Topo Map: Emerson West

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By MCBN Date 1992
Acc. w/o verification By ____ Date ____

Ft W of EL. Ground elevation 710
Ft N of SL. Depth to bedrock ____
Ft E of WL. Bedrock elevation ____
Ft S of NL. Aquifer elevation 664

UTM NORTH 4402385
UTM EAST 566615
**COMMENTS MC 664

J

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water

(1)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

State Form 35680

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Guy Crawford Address 4018 West Vermont

Building Contractor Address

Name of Well Drilling Contractor: Matlock Well Drilling

Address 401 West Morris St.

Name of Drilling Equipment Operator: Jerry Oakley

WELL INFORMATION

Depth of well: 75' Date well was completed: 1/15/81

Diameter of casing or drive pipe: 4" Total Length: 75'

Diameter of liner (if used): Total Length:

Diameter of Screen: 4" Length: 5' Slot Size: #6

Type of Well: Drilled [x] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [x] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [x] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 20 feet

Water Test: Hours Tested 1 Rate 5 g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Allen Matlock

Date 1/15/81

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

01-01 180316

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY MARION TWP. 15N RGE. 3E ¼ NW ¼ SW SEC. 5 Subdivision Name

Topo Map INDIANAPOLIS WEST ~~7½~~

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by BRUNS 2-19-81

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil	0	3
Overburden	~~10~~ 3	10
Gravel	10	38
Overburden	38	75

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

(2)

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: _____

ongressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets

r distinctive landmarks: Speedway

me of owner: Chas Green Address: 4042 W. Vermont St

me of Well Drilling Contractor: Mayford Dean

dress: 841 West Summer ave

Drilling Equipment Operator: Noles Creed

INFORMATION ON THE WELL

ıpleted depth of well: 35 ft. Date well was completed: Sept 22-1961

ımeter of outside casing or drive pipe: ~~4½~~ 4.5 Length: 35

meter of inside casing or liner: 4 Length: 35

meter of Screen: 3" Length: ~~4'5"~~ 4.5 Slot size: 6

e of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

ıod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

:ic water level in completed well (Distance from ground to water level) 20 ft.

.er Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ıing Test: Hours tested ~~1½~~ 1.5 Rate 10 g.p.m. Drawdown 0 ft.

Signature Mayford Dean

Date Dec 16-61

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Yellow clay	0	5
Sandy Hard pan	5	18
Dry Sand	18	25
Sand and Gravel	25	35

MARKS: [illegible]

graphic log

01 180630

FOR ADMINISTRATIVE USE ONLY
(Well Driller does not fill out)

COUNTY: Marion TWP. 15N RGE. 3E SE ¼ SW ¼ NW ¼ SEC. 5

Topo. Map: Indianapolis West Loc. accepted w/o verification Yes ✓ No ___

El. of grnd. surface at well: ___ Courthouse Loc. By ___ Date ___

Depth to bedrock: ___ Field Located By ___ Date ___

Well Log processed by: [illegible] Placed in Master Well Log File Date 4-3-67

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana artment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

4

(3)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

State Form 35680

RECEIVED DEC 1982 DEPT. OF NATURAL RESOURCES DIVISION OF WATER

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

South of Michigan St. on Roena to Vermont. East to 4044 W. Vermont

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Albert Ray Address 4044 W. Vermont Indianapolis, Indiana

Building Contractor Address

Name of Well Drilling Contractor: Mills Pump & Well Drilling, Inc.

Address 2508 W. Michigan St. Indianapolis, Indiana a

Name of Drilling Equipment Operator: Russell Mills

WELL INFORMATION

Depth of well: 75 ~~ft.~~ Date well was completed: Jan. 29, 1981

Diameter of casing or drive pipe: 4 ~~in.~~ Total Length: 72 ~~ft.~~

Diameter of liner (if used): Total Length:

Diameter of Screen: 4 ~~in.~~ Length: 3 ~~ft.~~ Slot Size: 40

Type of Well: Drilled [x] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [x] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [x] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 20 feet

Bailer Test: Hours Tested 1 Rate 10 g.p.m. Drawdown 10 ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Russell Mills

Date Jan. 29, 1981

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR AD 01 (We 54035 LY

COUNTY MARION TWP. 15N RGE. 3E NW ¼ NE ¼ SW ¼ SEC. 5

Topo Map INDIANAPOLIS WEST

Field Located By MCBK Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by PCWS 12-21-92

Ft W of EL. _____ Ft N of SL. _____ Ft E of WL. _____ Ft S of NL. _____

Ground Elevation 717 Depth to bedrock _____ Bedrock elevation _____ Aquifer elevation 642

Subdivision Name _____ Lot Number _____

UTM NORTH 4402525

UTM EAST 566010

**COMMENTS MC-

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay Gray	1	21
Clay Blue	21	70
Sand Bleu	70	75

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

1974 RECEIVED OCT 02 NATURAL RESOURCES DIVISION OF WATER

Permit 2969

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Gerald Peacock Address 4060 W. Vermont

Building Contractor Address

Name of Well Drilling Contractor: Hamilton Bros, Inc.

Address 4025 Rockville Road

Name of Drilling Equipment Operator: John Osborne

WELL INFORMATION

Depth of well: 57'

Date well was completed: 11-22-73

Diameter of casing or drive pipe: 4" ~~Blk.~~ Total Length: 55

Diameter of liner (if used): Total Length:

Diameter of Screen: 4" Length: 2' Slot Size: .060

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☑ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☑ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 1 Rate 10 g.p.m. ~~Drawdown~~ ~~30~~ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	6
Sand & gravel	6	40
Clay	40	57
B		

COUNTY _____ TWP. _____ RGE. _____ ¼ ____ ¼ ____ SEC ____

Topo Map _____

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

Ft W of EL. _____ Ft N of SL. _____ Ft E of WL. _____ Ft S of NL. _____

Ground Elevation _____ Depth to bedrock _____ Bedrock elevation _____ Aquifer elevation _____

Subdivision Name _____ Lot Number _____

01-01 180615 ADMINISTRATIVE USE ONLY

(Well driller does not fill out)

4M25254
565915E

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

RECEIVED

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ity in which well was drilled: Marion Civil Township: Wayne

gressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

cribe in your own words the well location with respect to nearby towns, roads, streets

listinctive landmarks: South of Eagle Creek Park

of owner: Mr Kenneth Boyer Address: 4110 W. Vermont St.

of Well Drilling Contractor: Indianapolis Pump & Equip. Co.
9720 Brill Rd.

of Drilling Equipment Operator: Joe Storall

INFORMATION ON THE WELL

leted depth of well: 40 ft. Date well was completed: 6-15-61

eter of outside casing or drive pipe: 4.5 ~~4½~~ Length: 37

eter of inside casing or liner: _____ Length: _____

eter of Screen: 3" Length: ~~5-5~~ 5.4 Slot size: #6 ga

of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) 20 ft.

er Test: Hours tested 3 Rate 15 g.p.m. Drawdown 30 ft. (Difference between static level and water level at end of test)

ing Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature Violet R Storall

Date 8-3-61

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

~~4025 25N~~ (Well 01-01 180281 ONLY out) ~~54031~~

COUNTY: Marion ~~565915 E~~ TWP. 15N RGE. 3E SE ¼ SW ¼ NW ¼ SEC. 35

Topo. Map: Indianapolis West Loc. accepted w/o verification Yes ___ No ___

El. of grnd. surface at well: 715 Courthouse Loc. By ___ Date ___

Depth to bedrock: ___ Field Located ✓ By D. Jordan Date 2/1962

Well Log processed by: Hak Placed in Master Well Log File Date ___

~~1000' WL & 2750' SL~~

From	To	FORMATIONS (Color, type of material, hardness, etc.)
0	18	Red Clay
18	28	Gravel & Sand
28	34	Blue Mud
34	36	Sand
36	40	Red Gravel

UTM NORTH 4402525
UTM EAST 565915
**COMMENTS MC

FEET W OF EL ___
FEET N OF SL 2750
FEET E OF WL 1000
FEET S OF NL ___
BEDROCK ELEV. ___
UTM NORTH ___
UTM EAST ___
SUBDIVISION ___
LOT # ___
**COMMENTS MC ___

MARKS: graphic log

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana rtment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

RECEIVED
DEPT OF NATURAL RESOURCES
DIVISION OF WATER

(8)

Permit #2925

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Ken Boger Address 4110 W. Vermont

Building Contractor Address

Name of Well Drilling Contractor: Hamilton Bros. Inc.

Address 4025 Rockville Rd.

Name of Drilling Equipment Operator: Warren Harness

WELL INFORMATION

Depth of well: 60' Date well was completed: 11-28-73

Diameter of casing or drive pipe: 4" Blk Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: 4 Length: 2' Slot Size: .060

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☑ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☑ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 1 Rate 15 g.p.m. Drawdown ~~25~~ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	7
Sand + gravel	7	44
Clay	44	60

A

FOR ADMIN
(Well dr. -01 54030

COUNTY _____ TWP. 15 N RGE. _____ ¼ _____ ¼ _____ SEC _____ Subdivision Name

Topo Map _____

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

(a)

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

(completely)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion		Wayne		

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.

GO WEST ON MICHIGAN STREET FROM HOLT ROAD TO GASOLINE ALLEY, 500 1/2
GO SOUTH AND STRAIGHT (DO NOT CROSS RIVER) TO VERMONT, THEN EAST 410
TO 4110.

OWNER - CONTRACTOR

Name of well owner: M/M Ken Boger
Telephone Number: (317) 244-9707
Address (Street and number, city, state): 4110 W. Vermont Indpls IN
ZIP code: 46222
Name of building contractor: —
Telephone number: ( ) —
Address (Street and number, city, state): —
ZIP code: —
Name of drilling contractor: Joseph Huser Services Inc.
Telephone number: (317) 784-4264
Address (Street and number, city, state): 5728 S. Emerson Indpls IN
ZIP code: 46237
Name of equipment operator: [illegible]WN R. COREY
License number: 436
Date of completion: 10/89

CONSTRUCTION DETAILS

Use of well: ☒ Home ☐ Industry ☐ Test ☐ Irrigation ☐ Public supply ☐ Stock ☐ Other (specify):
Method of drilling: ☒ Rotary ☐ Rev. rotary ☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other
Casing length: 36 feet — Material: PVC — Diameter: 5 inches
Screen length: 3 feet — Material: ~~STAINLESS~~ SS — Diameter: 4 inches
Screen slot size: .035 — Total depth of well: 38 ~~FT~~
Depth of pump setting: 34 ~~FT.~~ — Water quality (Clear, cloudy, odor, etc.): OK
Type of pump: ☐ Shallow-well jet ☐ Submersible ☐ Deep-well jet ☐ Other (specify):

WELL CAPACITY TEST

Check one: ☒ Air ☐ Pumping — Test rate: 20 gpm 1 hrs.
Bailing down: feet — Static level (depth to water): 13 feet

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
CLAY	0	15
SAND + GRAVEL	15	38

[illegible]ING INFORMATION

[illegible]	Depth of grout	Sealing material	Depth filled
[illegible]TONITE	From 4 To 30		From To
Method of installation	Number of bags used	Method of installation	Number of bags used
[illegible]PED	1.5 ~~1/2~~		

WELL ABANDONMENT

(Additional space for well log on reverse side)

[illegible]by swear or affirm, under the penalties for perjury that information submitted herewith is to the best of my [illegible]ledge and belief, true, accurate and complete.

Signature of owner of authorized representative: Joseph B Huser

Date: [illegible]

DEC 1989 RECEIVED DIV. OF NATURAL RESOURCES DIVISION OF WATER

01-01 180271

FOR ADMIN[illegible]ATIVE USE ONLY ~~54029~~
(well drille[illegible]es not fill out)

County	Township	Range		Section
Marion	15N	3E	NW ¼ NW ¼ SW	5

Topo map: Unaywood ~~7½~~	Ft. W of EL	Ground elevation: 716	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation: 678	

(continued from front side)

WELL LOG Formations: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W E

S

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

MAY 1974 RECEIVED DEPT. OF NATURAL RESOURCES DIVISION OF WATER

Permit #2925

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

ıty in which well was drilled Marion Civil Township

ıng directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

IE OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Ken Boger Address 4110 W. Vermont

Building Contractor Address

e of Well Drilling Contractor: Hamilton Bros. Inc.
4025 Lockville Rd.

e of Drilling Equipment Operator: Warren Barnes

LL INFORMATION

h of well: 60' Date well was completed: 11-28-73

ıeter of casing or drive pipe: 4" Total Length:

ıeter of liner (if used): Total Length:

ıeter of Screen: 4" Length: 2' Slot Size: .060

: of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other

ɔf Well: For Home ☑ For Industry ☐ For Public Supply ☐ Stock ☐

:od of Drilling: Cable Tools ☐ Rotary ☑ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

c water level in completed well (Distance from ground to water level) feet

r Test: Hours Tested Rate g.p.m. Drawdown ft.

ai Test: Hours Tested 1 Rate 15 g.p.m. Drawdown ~~25~~ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	7
Sand + gravel	7	44
Clay	44	60

COUNTY Marion TWP. 15 N RGE. 3 E ¼ SW ¼ NW SEC 5

Topo Map [illegible]

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

716 Ft W of EL. _____ Ft N of SL.

_____ Ft E of WL. _____ Ft S of NL.

Ground Elevation _____ Depth to bedrock _____

Bedrock elevation _____ Aquifer elevation _____

Subdivision Name _____ Lot Number _____

FOR ADMINISTRATIVE USE ONLY (Well drillers not fill out)

1-01 180276

A

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

State Form 35680

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

North of Washington St. on Tibbs Ave. to Cossell Road. West to 3910 Cossell Road.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner _____ Address _____

Building Contractor Andrew Kerl Address 3910 Cossell Road Indianapolis, Indiana

Name of Well Drilling Contractor: Mills Pump & Well Drilling, Inc.

Address 2508 West Michigan St. Indianapolis, Indiana

of Drilling Equipment Operator: Russell Mills

WELL INFORMATION

Depth of well: 53 ft. Date well was completed: Feb. 25, 1981

Diameter of casing or drive pipe: 4 ~~in.~~ Total Length: 50 ft.

Diameter of liner (if used): _____ Total Length: _____

Diameter of Screen: 4 ~~in.~~ Length: 3 ~~ft.~~ Slot Size: 40

Type of Well: Drilled [x] Gravel Pack [ ] Driven [ ] Other _____

Use of Well: For Home [x] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [x] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 15 feet

Bailer Test: Hours Tested 1 Rate 10 g.p.m. Drawdown 25 ft.

Pumping Test: Hours Tested _____ Rate _____ g.p.m. Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature _____

Date Feb. 25, 1981

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay Gray	1	17
Clay Blue	17	45
Sand Blue	45	53

01-01 180321

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY MARION TWP. 15N RGE. 5E ¼ NE ¼ SW SEC. 5

Topo Map INDIANAPOLIS WEST

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____

Subdivision Name _____

Lot Number _____

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

Permit # 477

RECEIVED MAY 1977 DEPT. OF NATURAL RESOURCES DIVISION OF WATER

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, Lot Number, distinctive landmarks, etc.

4012 Cossell Raod

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Leon Pedigo Address

Building Contractor Pedigo & Young Address

Name of Well Drilling Contractor: Hamilton Bros., Inc

Address P.O. Box 24181, Indpls., Ind 46224

Name of Drilling Equipment Operator: Ed Randolph

WELL INFORMATION

Depth of well: 62' Date well was completed: 1/13/77

Diameter of casing or drive pipe: 4" ~~steel~~ SS material Total Length: 59'

Diameter of liner (if used): Total Length:

Diameter of Screen: 4" Length: 3' Slot Size: .060

Type of Well: Drilled [XX] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [XX] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [XX] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 1 Rate 10 g.p.m. ~~Drawdown 25~~ Pal ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR AI 01-0 54036 ONLY
(W

COUNTY Marion TWP. 15 N RGE. 3E SW ¼ SE ¼ NW SEC 5 Subdivision Name

Topo Map Implis, West

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by W.H. 7/7/77

_____ Ft W of EL. Ground Elevation 717

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation 655 Lot Number _____

UTM NORTH 4402600
UTM EAST 566060
**COMMENTS MC

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Topsoil and Clay	0	1
Sand and Gravel	1	35
Brown Clay	35	62

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

Permit # 417

WATER WELL RECORD

(Fill in completely - Refer to instruction sheet)

WELL LOCATION

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

~~West~~ ~~300 N~~

4012 W. Cossell Rd. (300 N)

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Address

Building Contractor Address

Name of Well Drilling Contractor:

Address

Name of Drilling Equipment Operator:

WELL INFORMATION

Depth of well: Date well was completed:

Diameter of casing or drive pipe: 55 material Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☒ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180246

COUNTY MARION TWP. 15 N RGE. 3E ¼ ¼ SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by BRONS 2-11-77

Ft W of EL. Ground Elevation

Ft N of SL. Depth to bedrock

Ft E of WL. Bedrock elevation

Ft S of NL. Aquifer elevation Lot Number

WATER WELL LOG

To	From	FORMATIONS (Color, type of material, hardness, etc.)
1	0	[illegible]
55	1	[illegible]
62½	35½	[illegible]

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

4017 [illegible]

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Albert Coleman Address

Building Contractor Address

Name of Well Drilling Contractor: [illegible] Inc.

Address P.O. Box 24181, Indpls., Ind. 46224

Name of Drilling Equipment Operator: [illegible]

WELL INFORMATION

Depth of well: 54' Date well was completed: 3/25/77

Diameter of casing or drive pipe: ~~[illegible]~~ 55 material Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: 3' Length: ~~[illegible]~~ 3' Slot Size: .060

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable-Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 1 Rate 13 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR AT 01- 54034 ILY
(W

COUNTY Marion TWP. 15N RGE. 3E NW ¼ NE ¼ SW ¼ SEC 17 Subdivision Name

Topo Map Indpls. West

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by WH 7/7/77

_____ Ft W of EL. Ground Elevation 717

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation 663 Lot Number _____

UTM NORTH 4402550
UTM EAST 566060
**COMMENTS MC

WATER WELL LOG

From	To	FORMATIONS (Color, type of material, hardness, etc.)
0	35	Topsoil and Clay
35	[illegible]	Sand and Gravel

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

1975 SEP 8 RECEIVED NATURAL RESOURCES DIVISION OF WATER

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

4019 W. Cossell Road, Indianapolis, In. 46222

~~Soell~~

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Darell Gillaspie Address 4019 Cossell Road Indianapolis, In. 46222

Building Contractor Address

Name of Well Drilling Contractor: Clayton Ottinger

Address Route # 3, Box 162, Zionsville, In. 46077

Name of Drilling Equipment Operator: Jim Stovall

WELL INFORMATION

Depth of well: 41 ~~ft.~~ Date well was completed: Sept. 5, 1975

Diameter of casing or drive pipe: 4 ~~in.~~ Total Length: 41 ~~ft.~~

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size: # 40 Cooks

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 22 feet

Bailer Test: Hours Tested ~~2~~ Rate ~~500~~ ~~g.p.m.~~ Drawdown ~~8~~ ft.

Pumping Test: Hours Tested 2 Rate ~~500~~ 10 GPM ~~g.p.m.~~ Drawdown 8 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Clayton Ottinger

Date Sept. 8, 1975

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

1 180236

FOR ADMINIS TIVE USE ONLY
(Well drille oes not fill out)

COUNTY MARION TWP. 15N RGE. 3E ¼ NE ¼ SW SEC 5

Topo Map INDIANAPOLIS WEST

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by TMB 9-15-75

_____ Ft W of EL.
_____ Ft N of SL.
_____ Ft E of WL.
_____ Ft S of NL.

Ground Elevation _____
Depth to bedrock _____
Bedrock elevation _____
Aquifer elevation _____

Subdivision Name _____
Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Brown clay	0	6
Dry Gravel	6	15
Brown clay & gravel	15	18
Sand, water	18	23
Gray clay	23	25
Water gravel	25	41
~~T.D.~~	~~41~~	

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

MAR 22 REC'D
BUREAU
ENVIRONMENTAL

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Eugene Williams Address 4020 Cornell Rd

Building Contractor Address

Name of Well Drilling Contractor: Hamilton Bros Inc.

Address

Name of Drilling Equipment Operator: Rack

WELL INFORMATION

Depth of well: 51'

Date well was completed: 1-30-73

Diameter of casing or drive pipe: 4" Total Length: 51

Diameter of liner (if used): Total Length:

Diameter of Screen: 4" Length: 3' Slot Size:

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☑ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) ~~[illegible]~~ feet

Bailer Test: Hours Tested ~~[illegible]~~ 5 Rate 15 g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINI[illegible]TIVE USE ONLY
(Well driller does not fill out)

01401 180241

COUNTY Marion TWP. 15N RGE. 3 E ____ ¼ ____ ¼ ____ SEC 5 Subdivision Name

Topo Map ~~I. West~~ ~~7½~~ Indpls West

Field Located By ____ Date ____

Courthouse Location By ____ Date ____

Location accepted w/o verification by ____

____ Ft W of EL.
____ Ft N of SL.
____ Ft E of WL.
____ Ft S of NL.

Ground Elevation ____
Depth to bedrock ____
Bedrock elevation ____
Aquifer elevation ____ Lot Number ____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
[illegible] rail + clay	0	5
Sand	5	35
Clay	35	51

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209

Perm. # 1028

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: MARION Civil Township: _____

Congressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: _____

Name of owner: Robert Thomas Address: 4024 COSSELL Rd

Name of Well Drilling Contractor: Hamilton Pump Inc.

Address: _____

Name of Drilling Equipment Operator: Tony Hamilton

INFORMATION ON THE WELL

Completed depth of well: 59' ft. Date well was completed: 11/7/70

Diameter of outside casing or drive pipe: 4" Length: 57'

Diameter of inside casing or liner: _____ Length: _____

Diameter of Screen: 3" Length: 2' PVC material Slot size: #6

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☑ Rev. Rotary ☐ Jet ☐ Driven ☐

Static water level in completed well (Distance from ground to water level) _____ ft.

Bailer Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested 2 Rate 10 g.p.m. Drawdown 20 ft.

Signature Tony Hamilton

Date 11/7/70

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	30
Sand	30	40
Clay	40	57
Sand	57	60

EMARKS:

FOR ADMIN 01-01 5 8
(Well drille.

COUNTY: Marion TWP. 15N RGE. 3E SE ¼ SW ¼ NW ¼ SEC. 5

Topo Map: Indianapolis West

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By MCBN Date 1992
Acc. w/o verification By ____ Date ____

____ Ft W of EL. Ground elevation 718
____ Ft N of SL. Depth to bedrock ____
____ Ft E of WL. Bedrock elevation ____
____ Ft S of NL. Aquifer elevation 658

UTM NORTH 4402625
UTM EAST 565960
**COMMENTS MC

D

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a ter well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ease include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted hin thirty days after the completion of a well to the Division of Water

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

23

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: MARION Civil Township: _____

Congressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: 4025 COSSEL RD

Name of owner: LOU MATHIS Address: 2

Name of Well Drilling Contractor: HAMILTON BROS INC

Address: 4025 ROCKVILLE RD

Name of Drilling Equipment Operator: WHEELER

INFORMATION ON THE WELL

Completed depth of well: 40 ft. Date well was completed: _____

Diameter of outside casing or drive pipe: ~~[illegible]~~ 4.25 Length: _____

Diameter of inside casing or liner: _____ Length: _____

Diameter of Screen: ~~[illegible]~~ 4.25 Length: 3 Slot size: _____

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Driven ☐

Static water level in completed well (Distance from ground to water level) _____ ft.

Bailer Test: Hours tested 1 Rate 10 g.p.m. Drawdown 23 ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

ORMATIONS (Color, type of material, hardness, etc.)	From	To
LAY	0	11
AND	11	22
LAY	22	26
AND	26	40

IARKS:

FOR ADMINISTRATIVE U[illegible]NLY
(Well Driller does not [illegible]ll out)

01-01 180251

COUNTY: Marion TWP. 15N RGE. 3E ¼ ¼ NW ¼ SEC. 5

Topo. Map: Mangrove Loc. accepted w/o verification Yes ✓ No ___

El. of grnd. surface at well: ___ Courthouse Loc. By ___ Date ___

Depth to bedrock: ___ Field Located By ___ Date ___

Well Log processed by: LWD 1/26/62 M Placed in Master Well Log File Date 2-3-62

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana rtment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

01-01 180231

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

(24)

COUNTY Marion TWP. 15N RGE. 3 ¼ SW ¼ NW SEC 5 Subdivision Name

Topo Map Indpls W 7½

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by [illegible]

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL RECORD

COUNTY MARION CIVIL TOWNSHIP PERMIT NO.

DRIVING DIRECTIONS 4036 COSSELL ROAD (N 300 & [illegible])

WELL OWNER BUILDING CONTRACTOR CAPITOL BUILDERS DRILLING EQUIPMENT OPERATOR JAMES HERMAN

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
40	4" PVC (material)	36			4	4	60	DRILLED	HOME	ROTARY	5/03/84

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
15				1	10	~~25 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	3
GRAVEL	3	40

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

(25

WATER WELL RECORD

State Form 35680

Mail completed record within 30 days to:
DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
605 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
PHONE (317) 232-4160

RECEIVED FEB 1984 DEPT. OF NATURAL RESOURCES DIVISION OF WATER

WELL LOCATION
(Fill in completely)

unty where drilled: Marion

il Township:

iving directions to the well location (Include county road names, numbers, subvisions, lot number with consideration to intersecting roads and trip origina-on) There is space for a map on reverse side.

between Roena & Holt Rd
off Michigan N300 3400 W

OWNER — CONTRACTOR

Well owner: Clarence Gregory

Address: 4239 W. Cassell

Building contractor: —

Address: —

Drilling contractor: DEAN WELL DRILLING, INC.

Address: 1834 FRIENDSHIP DR. INDIANAPOLIS, INDIANA 46217

Equipment operator: John Aufderheide

Completion date: 10-28-79

CONSTRUCTION DETAILS

y of well:
Drilled ☐ Gravel pack ☐ Driven ☐ Other

of well:
☐ Industry ☐ Test ☐ Irrigation
upply ☐ Stock ☐ Other (specify) ____

od of drilling:
Cable tool ☐ Rotary ☐ Jet ☐ Rev. rotary ☐ Bucket rig

ng length 50 feet	Diameter 4 inches
en length 5 feet	Diameter 3 inches
en slot size 30	
h of pump setting 40	

of pump
ubmersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (specify) ____

WELL CAPACITY TEST

k one)
ailing ☐ Pumping

ate 10 gpm 1 hrs	Drawdown 12 feet
level to water) 23 feet	

r quality (clear, cloudy, odor, etc.)
clear

WELL LOG

Formations: type of material	From	To
Clay	0 ft.	10 ft.
Sand & gravel	10	35
Clay	35	45
Soupy Sand	45	49
Sand & gravel	49	52

(Additional space for Well Log on reverse side)

John F. Aufderheide

Date 12-13-83

01-01 180590

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

County	Twp.	Rge.		Sec.
Marion	15N	[illegible]	¼ [illegible] ¼ NW	5

Topo map: [illegible] West	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot no.
Courthouse location By Date	Ft. E of WL	Bedrock elevation	
Location accepted w/o verification by [illegible]	Ft. S of NL	Aquifer elevation	

WELL LOG
(Continued from front side)

Formations: type of material	From	To
	ft	ft

SKETCH SHOWING LOCATION
Locate with reference to highways, intersecting county roads, and distinctive landmarks.

N

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RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

[illegible]mpletely)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
MARION				

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.

LYNHURST TO RAYMOND, GO EAST TO RYBOLT, GO NORTH, HOUSE IS ON THE WEST SIDE OF THE STREET

~~17: H-16~~

OWNER - CONTRACTOR

Name of well owner: Mike Back	Telephone Number: (317)638-6404
Address (Street and number, city, state): 2946 S. RYBOLT	ZIP code: 46241
Name of building contractor:	Telephone number: ( )
Address (Street and number, city, state):	ZIP code: 46241
Name of drilling contractor: WATER WELLS BY WILHITE	Telephone number: (317) 257 2393
Address (Street and number, city, state): 5455 N. ALTON AVE. INDPLS, IN.	ZIP code: 46208

Name of equipment operator	License number	Date of completion
DAN WILHITE	844	4-18-90

CONSTRUCTION DETAILS

Use of well: ☒ Home ☐ Industry ☐ Test ☐ Irrigation ☐ Public supply ☐ Stock ☐ Other (specify): _____

Method of drilling: ☒ Rotary ☐ Rev. rotary ☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other

Casing length	Material	Diameter
37 feet	pvc	4 inches

Screen length	Material	Diameter
4 feet	pvc	4 inches

Screen slot size: .060

Total depth of well: 41'

Depth of pump setting: 15'

Water quality (Clear, cloudy, odor, etc.):

Type of pump: ☒ Shallow-well jet ☐ Submersible ☐ Deep-well jet ☐ Other (specify): _____

WELL CAPACITY TEST

Check one: ☒ Air ☐ Bailing ☐ Pumping

Test rate: 20 gpm 1 hrs.

Drawdown: 0 feet

Static level (depth to water): 10 feet

GROUTING INFORMATION

Material	Depth of grout
Enviroplug	From 0 To 30

Method of installation	Number of bags used
pump	2

WELL ABANDONMENT

Sealing material	Depth filled
	From To
Method of installation	Number of bags used

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
CLAY	0	15
GRAVEL	15	41

(Additional space for well log on reverse side)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner or authorized representative: [signature]

Date:

RECEIVED JUL 1990 DEPT. OF NATURAL RESOURCES DIVISION OF WATER

FOR ADMINI... (well driller does 01-01 180266

County	Township	Range		Section
Marion	15N	3E	¼ SW ¼ NW	5

Topo map: Maywood 7½	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG	FROM	TO
Formations: type of material	Feet	Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

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RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

(completely)

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion				

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.

3216 S. Lybolt

OWNER - CONTRACTOR

Name of well owner: James Davis — Telephone Number: (247-8749

Address (Street and number, city, state): 3216 S. Lybolt Indianapolis, In — ZIP code: 46241

Name of building contractor: — Telephone number: ( )

Address (Street and number, city, state): — ZIP code:

Name of drilling contractor: Hamilton Bros. Inc. — Telephone number: (241-2571

Address (Street and number, city, state): 4025 Rockville Rd - Indpls, In — ZIP code: 46222

Name of equipment operator: David R. Harness — License number: #35 — Date of completion: 3/9/89

CONSTRUCTION DETAILS

Use of well: ☒ Home ☐ Industry ☐ Test ☐ Irrigation ☐ Public supply ☐ Stock ☐ Other (specify): _____

Method of drilling: ☒ Rotary ☐ Rev. rotary ☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other

Casing length	Material	Diameter
34 feet	P.V.C.	4 inches

Screen length	Material	Diameter
4 feet	P.V.C.	4 inches

Screen slot size: .060 — Total depth of well: 38'

Depth of pump setting: 30' — Water quality (Clear, cloudy, odor, etc.): Clear

Type of pump: ☐ Shallow-well jet ☐ Submersible ☐ Deep-well jet ☐ Other (specify): _____

WELL CAPACITY TEST

Check one: ☐ Air ☐ Bailing ☐ Pumping

Test rate: 10 gpm 1 hrs.

Drawdown: 10' feet — Static level (depth to water): 20 feet

GROUTING INFORMATION

Material	Depth of grout	Sealing material	Depth filled
Bentonite	From 5 To 30		From To

Method of installation	Number of bags used	Method of installation	Number of bags used
Pommie	2		

WELL ABANDONMENT

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
Topsoil + Clay	0	6
Gravel	6	38

(Additional space for well log on reverse side)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative: _____ Date: _____

FOR ADMINISTRATIVE USE ONLY 01-01 180261
(well driller does not fill out)

County	Township	Range		Section
Marion	15N	3E	¼ SW ¼ NW	5

Topo map Indpls. West 7½	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG	FROM	TO
Formations: type of material	Feet	Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

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129.

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

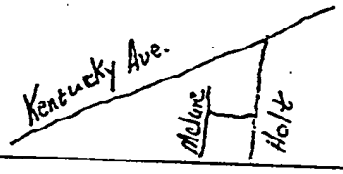
completely)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion				

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.



OWNER - CONTRACTOR

Name of well owner

Address (Street and number, city, state) 3248 McClure — Telephone Number ( )

Name of building contractor — ZIP code

Address (Street and number, city, state) — Telephone number ( )

Name of drilling contractor — ZIP code

Water Wells By Wilhite — Telephone number ( )

Address (Street and number, city, state) 7453 N. Dobson — ZIP code

Name of equipment operator: Charlie Sullivan — License number: 843 — Date of completion

CONSTRUCTION DETAILS

Use of well: ☒ Home ☐ Industry ☐ Test ☐ Irrigation ☐ Public supply ☐ Stock ☐ Other (specify):

Method of drilling: ☒ Rotary ☐ Rev. rotary ☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other

	Material	Diameter
Casing length 25 feet	PVC	4 inches
Screen length 5 feet	PVC	4 inches

Screen slot size .060 — Total depth of well 30'

Depth of pump setting — Water quality (Clear, cloudy, odor, etc.) clear

Type of pump: ☐ Shallow-well jet ☐ Submersible ☐ Deep-well jet ☐ Other (specify):

WELL CAPACITY TEST

Check one: ☒ Air ☐ Bailing ☐ Pumping

Test rate 7 gpm 6 hrs.

Drawdown feet — Static level (depth to water) 13 feet

GROUTING INFORMATION

Material	Depth of grout	Sealing material	Depth filled
110-Bag	From 0 To 20		From To
Method of installation: Pumped	Number of bags used: 3	Method of installation	Number of bags used

WELL ABANDONMENT

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
~~0-4~~ clay	0	4
~~4-30~~ gravel	4	30

(Additional space for well log on reverse side)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative: Charlie Sullivan — Date

FOR ADMINISTRATIVE U
(well driller does not f 01-01 180605

County	Township	Range		Section
Marion	15N	3E	NE ¼ NE ¼ NW	5

Topo map Maywood 7½	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG	FROM	TO
Formations: type of material	Feet	Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

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01-01 180220

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY Marion TWP. 15N RGE. 3E ____ ¼ ____ ¼ NW SEC 5 Subdivision Name

Topo Map Indy West ½

Field Located By ____ Date ____

Courthouse Location By ____ Date ____

Location accepted w/o verification by SLP-SAW 6-14-79

____ Ft W of EL. Ground Elevation ____

____ Ft N of SL. Depth to bedrock ____

____ Ft E of WL. Bedrock elevation ____

____ Ft S of NL. Aquifer elevation ____ Lot Number ____

WATER WELL RECORD

COUNTY MARION

CIVIL TOWNSHIP

PERMIT NO.

DRIVING DIRECTIONS 4050 W. VERMONT

WELL OWNER

BUILDING CONTRACTOR JEFF LE MAR

DRILLING EQUIPMENT OPERATOR DESTER HARNESS

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	CASING LENGTH (material)	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
70	4" PVC	67			4	3	60	DRILLED	HOME	ROTARY	5/31/79

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
25				1	10	~~35 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	5
GRAVEL	5	40
CLAY	40	70

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

~~JAR 5 111~~

SAFE COPY

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

S

WATER WELL RECORD

3750 W

OCT 1966
RECEIVED
Dept. of Nat. Resources
Division of Water

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township:

ongressional township: Range: Number of section:

(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets r distinctive landmarks:

(3750 W)

ame of owner: Harding Address: 1039 N Tuett

ame of Well Drilling Contractor: Hamilton Bros Well drillers

dress: 4025 Rockville Rd

ame of Drilling Equipment Operator: John Gelladay

INFORMATION ON THE WELL

ompleted depth of well: 58 ft. Date well was completed: August 12, 1966

iameter of outside casing or drive pipe: 4 Inch Length: 55 ft

iameter of inside casing or liner: MATERIAL PVC Length:

iameter of Screen: 3 inch Length: 5 ft ~~Plastic~~ Slot size:

ype of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

se of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

ethod of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tatic water level in completed well (Distance from ground to water level) 29 ft.

ailer Test: Hours tested Rate g.p.m. Drawdown f . (Difference between static level and water level at end of test)

umping Test: Hours tested Rate 10 g.p.m. Drawdown 1 ft.

Signature John Gelladay

Date August 12, 1966

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Fill	0	10
Gravel	10	58
30+		
50 est		
130'		

REMARKS: graphic log

FOR ADMINIS 01-01 3779
(Well driller does not fill out)

COUNTY: Marion TWP. 16N RGE. 3E SW ¼ SW ¼ SE ¼ SEC. 32

Topo Map: Indian West

Well log classified By JR Date 10-66
Courthouse located By ___ Date ___
Field located By ___ Date ___
Acc. w/o verification By ___ Date ___

___ Ft W of EL. Ground elevation ___
___ Ft N of SL. Depth to bedrock ___
___ Ft E of WL. Bedrock elevation ___
___ Ft S of NL. Aquifer elevation ___

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a water well. We request that you be as accurate as possible in recording this information as it may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. Please include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted within thirty days after the completion of a well to the Division of Water

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

S

WATER WELL RECORD

'ELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Indpls. Park Bd. Address
Little Eagle Creek Park

Building Contractor Address

ame of Well Drilling Contractor:

ame of Drilling Equipment Operator:

ELL INFORMATION

epth of well: 65' Date well was completed:

ameter of casing or drive pipe: 2 Total Length:

ameter of liner (if used): Total Length:

ameter of Screen: Length: Slot Size:

'pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

e of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

ethod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

atic water level in completed well (Distance from ground to water level) feet

iler Test: Hours Tested Rate g.p.m. Drawdown ft.

ng Test: Hours Tested Rate Few g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Source of Data: Mr. Geo. Adams, Indpls. Park Bd.

~~Signature~~

~~Date~~ McGuinness, USGS, 11-4-41

Copied from Card log 7-19-82 DSH

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
~~Sand & gravel~~		
~~marks: In community house, also 41¼" driven wells, 1 outside comm. house, 23' deep; on bank of Eagle Cr. E. of comm. house, 2 across creek to west Latter are 22-25' deep.~~	C	

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ NW SEC 5 Subdivision Name

Topo Map Indianapolis West

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

FOR ADM 01-01 180625 Y
(Well driller [illegible])

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

East of Grande Street, South of 10th Street, 150' North of South Fence, 12' W. of E. Fence

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Div. Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Company

Address Mishawaka, IN

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 108 Date well was completed: 3/27/75

Diameter of casing or drive pipe: Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from driller's log

Date 11-16-95

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Brown Clay	0	10
Gray Clay	10	13
Coarse Medium to fine gravel	13	28
Gray Clay	28	42
Very Dark Gray Clay with Sand		
Traces of Gravel	42	50
Gray Clay	50	96
Light Gravel with Gray Clay	96	106
Gray Clay	106	108
Brown Shale	108	

01-01 265026

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By _____ Date _____ Ft W of EL. _____ Ground Elevation _____

Courthouse Location By _____ Date _____ Ft N of SL. _____ Depth to bedrock _____

Location accepted w/o verification by TMB 7-75 Ft E of WL. _____ Bedrock elevation _____

Ft S of NL. _____ Aquifer elevation _____ Lot Number _____

C (Detm. Diesel) Layout 75-D Test

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

E. of Grande Street, South of 10th Street, 25' N. of 75-B.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Company

Address Mishawaka, IN

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 100' Date well was completed: 4/12/75

Diameter of casing or drive pipe: 12" Total Length: 91'

Diameter of liner (if used): Total Length:

Diameter of Screen: 12" Length: 10' material (SS) Slot Size: .050

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For ~~Public Supply~~ TGSS ☒ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from driller's log

Date 11-16-95

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

01-01 265031

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

C (Detro Diesel) Layne 75-12-B

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

(TENTATIVE LOC BY TMB 7-75) c

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soft Brown Clay	0	6
Coarse Medium and fine gravel	6	41
Soft Gray Clay (No gravel)	41	90
Coarse Medium and fine gravel with light traces of gray clay	90	100

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

S

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

E. of Grande St., S of 10th Street, 65' N. of U line, and 12' West of East Fence

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Division Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Company

Address Mishawaka, IN

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 100' Date well was completed: 3/26/75

Diameter of casing or drive pipe: Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For ~~Public Supply~~ TEST ☒ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from driller's log

Date 11-16-95

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 265036

C (Detroit Diesel Layer 75-B Test)

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by TMB 7-75

_____ Ft W of EL. Ground Elevation 715±

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Brown Clay + Very light traces of medium gravel	0	10
Coarse to fine gravel	10	11.5
Soft Gray Clay, no gravel	11.5	15
Coarse to fine gravel	15	24
Soft Gray Clay	24	34
Sand + Gravel with 60% Gray	34	44
Soft Gray Clay	44	90
Sand + Gravel with light traces of soft green clay	90	100
Dark Brown Shale	100	

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

170' East of West Fence, 45' N. of South Fence

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Division Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Company

Address Mishawaka, IN

of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 106 Date well was completed: 3/27/75

Diameter of casing or drive pipe: 12" Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: 12" Length: 10' Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For ~~Public Supply~~ TEST ☒ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate 50 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from driller's log

Date 11-16-95

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil and Sand	0	7
Medium Sand and Gravel with Boulder	7	29
Clay	29	45
Dirty Sand + Gravel - Some Clay	45	50
Clay	98	106
Blank	50	98

01-01 265016

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NW SEC 5 Subdivision Name

Topo Map Indianapolis West 7½

Field Located By _____ Date _____ Ft W of EL _____ Ground Elevation _____

Courthouse Location By _____ Date _____ Ft N of SL _____ Depth to bedrock _____

Location accepted w/o verification by TMB 7-75 Ft E of WL _____ Bedrock elevation _____

Ft S of NL _____ Aquifer elevation _____ Lot Number _____

Signature _____

Date _____

Lapse 75-12-17 Test

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

East of Grande Street, South of 10th Street, 65' North of U line, and 12' West of East Fence

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Div. Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Company

Address Mishawaka, IN

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 24 Date well was completed: 4/11/75

Diameter of casing or drive pipe: 12" Total Length: 25'

Diameter of liner (if used): Total Length:

Diameter of Screen: 12" Length: 10' Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from driller's log

Date 11-16-95

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY 01-01 265021 C (Detroit Diesel Test 75-12-B Shallow)
(Well driller does not fill out)

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NW SEC 5 Subdivision Name Layne

Topo Map INDIANAPOLIS WEST PK

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

(TENTATIVE LOC. BY TMB) c

Ft W of EL. Ft N of SL. Ft E of WL. Ft S of NL.

Ground Elevation Depth to bedrock Bedrock elevation Aquifer elevation Lot Number

FORMATIONS (Color, type of material, hardness, etc.) WATER WELL LOG	From	To
Brown Clay + Very light trace of medium gravel	0	10
Coarse Medium to fine gravel	10	11.5
Soft Gray Clay, No Gravel	11.5	15
Coarse Medium to fine gravel	15	29

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

S

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

East of Grande St., South of 10th street, 5' North of Test well 75-12-A

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Div. Address Speedway, IN

Building Contractor _____ Address _____

Name of Well Drilling Contractor: Layne Northern Company

Address Mishawaka, IN

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 50' Date well was completed: 4/7/75

Diameter of casing or drive pipe: 4" Total Length: 51'

Diameter of liner (if used): _____ Total Length: _____

Diameter of Screen: 4" Length: 5' Slot Size: _____

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For Home ☐ For Industry ☐ For ~~Public Supply~~ TEST ☒ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) _____ feet

Bailer Test: Hours Tested _____ Rate _____ g.p.m. _____ Drawdown _____ ft.

Pumping Test: Hours Tested _____ Rate _____ g.p.m. _____ Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from drillers log

Date 11-16-95

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY 01-01 265011
(Well driller does not fill out)

C (Detroit Diesel Layne 75-4-A Test)

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST ~~7½~~

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by TMB 7-75

Ft W of EL. Ft N of SL. Ft E of WL. Ft S of NL.

Ground Elevation 715 ± Depth to bedrock Bedrock elevation Aquifer elevation Lot Number

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil and Sand	0	7
Medium Sand and Gravel with Boulder	7	29
Clay	45	50

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

E. of Grande Street, South of 10th Street

12' East of West Fence, 10' North of north gate

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Div. Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Company

Address Mishawaka, IN

of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 136' Date well was completed: 3/25/75

Diameter of casing or drive pipe: 8.75" Total Length: 20'

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ ~~For Public Supply~~ Test ☒ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from driller's log

Date 11-16-95

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 265041 C (Detroit Diesel ~~Layne~~ 75-C Test)

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NW SEC 5 Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by TMB 7-75

Ft W of EL. Ft N of SL. Ft E of WL. Ft S of NL.

Ground Elevation

Depth to bedrock

Bedrock elevation

Aquifer elevation Lot Number

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To

13

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

WATER WELL RECORD

APR 1967

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: 4200 W — 400 N.

me of owner: Swalley Address: 4200 W. Vermont

me of Well Drilling Contractor: Hamilton Cross Welldrilling Co

s: 4025 Rockville Rd

me of Drilling Equipment Operator: John Galladay

INFORMATION ON THE WELL

mpleted depth of well: 150 ft. Date well was completed: Dec. 27, 1966

ameter of outside casing or drive pipe: 4 [illegible] Length: 97 ft

ameter of inside casing or liner: _____ Length: _____

ameter of Screen: [illegible] Length: 5 ft [illegible] PVC material Slot size: _____

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

e of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) _____ ft.

iler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ f. (Difference between static level and water level at end of test)

mping Test: Hours tested _____ Rate 70 g.p.m. Drawdown 60 ft.

E

Signature John Galladay

Date Dec. 27 1966

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	6
Gravel	6	34
Clay	34	96
Gravel	96	100

ARKS:

E

180595

FOR ADMINISTRATIVE U[illegible]ONLY
(Well driller does not [illegible] out)

COUNTY: Marion TWP. 15N RGE. 3E ¼ ¼ W ¼ SEC. 5

Topo Map: Ishdplse West 7½

Well log classified By Hob Date 5/67
Courthouse located By ___ Date ___
Field located By ___ Date ___
Acc. w/o verification By ___ Date ___

___ Ft W of EL. Ground elevation ___
___ Ft N of SL. Depth to bedrock ___
___ Ft E of WL. Bedrock elevation ___
___ Ft S of NL. Aquifer elevation ___

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location. As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted n thirty days after the completion of a well to the Division of Water

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: Wayne

ongressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: 3445 W. 10th St.

me of owner: William H. Walker Address: 2738 Hichorywood Ct.

me of Well Drilling Contractor: Earl H. Merritt Well Drilling Co., Inc.

dress: 2998 Westlane Road

e of Drilling Equipment Operator: Don Kennedy

INFORMATION ON THE WELL

pleted depth of well: 59 ft. Date well was completed: 7/27/69

meter of outside casing or drive pipe: 4" Length: 56

meter of inside casing or liner: _____ Length: _____

meter of Screen: 3" Length: 4' Slot size: No.8

e of Well: Drilled [x] Gravel Pack [ ] Driven [ ] Other _____

of Well: For home [ ] For industry [x] For public supply [ ] Stock [ ]

hod of Drilling: Cable Tools [x] Rotary [ ] Rev. Rotary [ ] Jet [ ] Driven [ ]

tic water level in completed well (Distance from ground to water level) 25 ft.

ler Test: Hours tested ~~1~~ Rate ~~10~~ g.p.m. Drawdown ~~5~~ 2 ft. (Difference between static level and water level at end of test)

ping Test: Hours tested 2 Rate 30 g.p.m. Drawdown 5 ft.

Signature Thomas B Hadley

Date August 27, 1969

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
top soil & clay	0	6
brown gravel	6	21
yellow gravel	21	40
gray gravely clay	40	43
gray dirty gravel (little water)	43	47
yellow sand & gravel	47	59

ARKS:

~~719~~
~~59~~
~~660 ago~~

FOR ADMINI[illegible] (Well drille[illegible] 01-01 5[illegible]8:)

COUNTY: MARION TWP. 15N RGE. 3E NE ¼ NE ¼ NE ¼ SEC. 5

Topo Map: INDIANAPOLIS WEST 7½

Well log classified By — Date —
Courthouse located By — Date —
Field located By MCBN Date 1992
Acc. w/o verification By — Date —

Ft W of EL. Ground elevation 719
Ft N of SL. Depth to bedrock
Ft E of WL. Bedrock elevation
Ft S of NL. Aquifer elevation 660

UTM NORTH 4403450
UTM EAST 566975
**COMMENTS MC 660

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location. As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted n thirty days after the completion of a well to the Division of Water

01-01 [redacted] 0296

FOR ADMIN[redacted]ATIVE USE ONLY
(Well dr[redacted]oes not fill out)

[redacted]30

COUNTY Marion TWP. 16N RGE. [illegible] ___ ¼ ___ ¼ ___ SEC ___ Subdivision Name

Topo Map Indpls [illegible]

Field Located By ___ Date ___ ___ Ft W of EL. Ground Elevation ___

Courthouse Location By ___ Date ___ ___ Ft N of SL. Depth to bedrock ___

___ Ft E of WL. Bedrock elevation ___

Location accepted w/o verification by [illegible] ___ Ft S of NL. Aquifer elevation ___ Lot Number ___

WATER WELL RECORD

COUNTY: MARION

CIVIL TOWNSHIP

PERMIT NO.

DRIVING DIRECTIONS: 150 N. ROENA W 1/2 mi S side

WELL OWNER

BUILDING CONTRACTOR: SKILES ELECTRIC

DRILLING EQUIPMENT OPERATOR: WARREN HARNESS

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	CASING LENGTH (material)	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
55	4" PVC	51			4	4	60	DRILLED	COMMERCIAL	ROTARY	9/04/84

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
15				1	10	~~30 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	40
GRAVEL	40	55

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

3

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

E. of Grande St south of 10th St.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Co., Inc.

Address Mishawaka

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 110 Date well was completed: 5/7/75

Diameter of casing or drive pipe: Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☒ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from Driller's log

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

01-01 180286 S... ...IVE USE ONLY
(... ...iller does not fill out)

~~Detroit Diesel~~
~~Layne 75-E Test~~

COUNTY Marion TWP. 15N RGE. 3E NE ¼ NW ¼ NW SEC. 5

Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

~~TENTATIVE LOC 734 TMB 7-75~~

_____ Ft W of EL.

_____ Ft N of SL.

1100 Ft E of WL.

200 Ft S of NL.

Ground Elevation _____

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____

Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
...l clay	0	9
...ity gravel	9	11
...ue clay	11	13
...lium sand and gravel	13	31
...ney clay	31	39
...ritty clay	39	55
...and strip	55	57
...ney clay	57	83
...and strip	83	85
...ney clay	85	95
...lack clay	95	99
...ney clay	99	102
...ritty clay	102	105
...ity sand and gravel	105	108
...lack shale	108	110

C (20 feet S.W. of N.E. fence post, 50 feet W. of W. bank of creek)

•C APPROX. LOCATION

C (similar test wells on site)

32

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

East of Grande, South of 10th St.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Division Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Co., Inc

Address Mishawaka

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 152 Date well was completed: 3/24/75

Diameter of casing or drive pipe: Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☒ Other

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
c (170 feet east of west fence, 45 feet north of south fence)		
~~715~~ ~~715~~		
~~110~~ ~~152~~		
~~605 Br(NA) 563 Dev Ls Top~~		
ipsoil and sand	0	7
edium sand and gravel with boulder	7	29
lay	29	45
ity sand and gravel with some clay	45	50
lay	50	98
oarse gravel with clay strip	98	106
grey clay	106	110
black shale	110	152
dark limestone	152	

•C APPROX. LOCATION

similar test wells on site)

UTM NORTH

UTM EAST

**COMMENTS MC X

COUNTY Marion TWP. 15N RGE. 3E NW ¼ NW ¼ NW SEC. 5 Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By WDH Date 7/26/76

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

~~TENTATIVE LOCATION BY TWP 7-75~~

FOR ADMINISTRATIVE USE ONLY 01-01 180221
(Well driller does not fill out)

200 Ft W of EL. Ground Elevation 715

Ft N of SL. Depth to bedrock 110

Ft E of WL. Bedrock elevation 605

300 Ft S of NL. Aquifer elevation _____ Lot Number _____

~~Retro Diesel~~ ~~Layne 75A Test~~

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township:

ngressional township: 15N Range: 3E Number of section: SW 5

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: SW 1/4 Sec 5 — 180' W. of E. property line. 660' S. of Vermont St.

Test #21

me of owner: Speedway Water Co. Address:

me of Well Drilling Contractor: Ness

ds: s:

e of Drilling Equipment Operator:

INFORMATION ON THE WELL

mpleted depth of well: 73 ft. Date well was completed: 2-5-43

ameter of outside casing or drive pipe: Length:

ameter of inside casing or liner: Length:

ameter of Screen: Length: Slot size:

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other Test

e of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) 12 ft.

iler Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

mping Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft.

Signature Layne-Northern

Date State GWD

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
soil-dirt	0	4
med gravel	4	31
hard clay	31	40
gravel	40	43
hardpan	43	73
shale	73	—

ARKS: (Test #21) c

~~ted on Marion Co. bedrock map by 3~~

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180620

COUNTY: Marion TWP. 15N RGE. 3E ¼ ¼ SW ¼ SEC. 5

Topo Map: Chrysler West ¼

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By ____ Date ____

Ft W of EL. ____ Ft N of SL. ____ Ft E of WL. ____ Ft S of NL. ____

Ground elevation 710
Depth to bedrock 73
Bedrock elevation 637
Aquifer elevation ____

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a
r well. We request that you be as accurate as possible in recording this information as
ay be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log.
se include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted
n thirty days after the completion of a well to the Division of Water

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

unty in which well was drilled Marion Civil Township

iving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Test #19

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Speed way Water Co. Address

Building Contractor Address

ne of Well Drilling Contractor:

lres

e of Drilling Equipment Operator: Ness

LL INFORMATION

:h of well: 91' Date well was completed: 1-27-43

ıeter of casing or drive pipe: Total Length:

ıeter of liner (if used): Total Length:

ıeter of Screen: Length: Slot Size:

of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

ıf Well: ~~For Home~~ Dom. ☒ For Industry ☐ For Public Supply ☐ Stock ☐

od of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

: water level in completed well (Distance from ground to water level) 14 feet

Test: Hours Tested Rate g.p.m. Drawdown ft.

ing Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Layne-Northern

~~Date~~ Collected by: Ground water Div.

copied from card log 7-19-52 DSH

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soil & Gravel	0	8
boulders & gravel	8	14
hard clay	14	27
Sand - gravel	27	35
Hard clay	35	45
Sand	45	52
Gravel	52	54
Hard pan	54	64
Gravel	64	65
Hard pan	65	89
Gravel	89	90
Shale	90	91

01-01 180301

ATIVE USE ONLY
es not fill out)

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ SW SEC 5 Subdivision Name

Topo Map Indpls. West 7½

Field Located By _____ Date _____ Ft W of EL. _____ Ground Elevation 714

Courthouse Location By JMH Date 3-61 Ft N of SL. _____ Depth to bedrock _____

Location accepted w/o verification by JMH 3-61 Ft E of WL. _____ Bedrock elevation _____

Ft S of NL. _____ Aquifer elevation _____ Lot Number _____

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township:

ngressional township: 15N Range: 3E Number of section: 5

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: SW¼ Sec 5 – SW Corner of Area South of Eagle Creek, 150' E. of Roena St.

Test #22

e of owner: Speedway Water Co. Address:

e of Well Drilling Contractor: Ness

e of Drilling Equipment Operator:

INFORMATION ON THE WELL

pleted depth of well: 88 ft. Date well was completed: 2-22-42

meter of outside casing or drive pipe: Length:

meter of inside casing or liner: Length:

meter of Screen: Length: Slot size:

e of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) 10 ft.

er Test: Hours tested Rate g.p.m. Drawdown ft. (Difference between static level and water level at end of test)

ing Test: Hours tested Rate g.p.m. Drawdown ft.

Signature Layne-Northern

Date State GWD

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

~~B~~

~~Speed. by City~~

FOR ADMINI 01-01 67069 :)
(Well driller -

COUNTY: Marion TWP. 15N RGE. 3E ¼ SW ¼ SW ¼ SEC. 5

Topo Map: Indpls. West ~~7½~~

Well log classified By _____ Date _____
Courthouse located By _____ Date _____
~~Field~~ office located By JMH Date 3-61
Acc. w/o verification By _____ Date _____
~~Copied by well~~ ~~4-15-69~~

_____ Ft W of EL. Ground elevation 708
_____ Ft N of SL. Depth to bedrock 88
_____ Ft E of WL. Bedrock elevation 620
_____ Ft S of NL. Aquifer elevation _____

WATER WELL LOG

RMATIONS (Color, type of material, hardness, etc.)	From	To
soil - clay	0	6
gravel	6	9
hardpan	9	28
fine gravel	28	32
hardpan	32	38
gravel	38	47
"	47	57
hardpan	57	63
gravel	63	64
hardpan	64	88
shale	88	—

~~707~~
~~139~~
~~10~~

ARKS: Test #22

Station Marion to bedrock map by:
graphic log

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log.
se include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

Telephone 317-232-4160

36

State Form 35680

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

nty in which well was drilled Marion Civil Township

ving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

200' from E. Fence 185' from Vermont St on N. side of Test Well.
Test #18

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Speedway Water Co. Address

Building Contractor Address

e of Well Drilling Contractor: E. Poole

ess

rilling Equipment Operator:

L INFORMATION

n of well: 80' Date well was completed: 1-9-43

eter of casing or drive pipe: Total Length:

eter of liner (if used): Total Length:

eter of Screen: Length: Slot Size:

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

Well: ~~For Home~~ Dom. [X] For Industry [ ] For Public Supply [ ] Stock [ ]

d of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

water level in completed well (Distance from ground to water level) 18 feet

Test: Hours Tested Rate g.p.m. Drawdown ft.

ng Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Layne-Northern
Collected by:
~~Date~~ Ground Water Div.

Copied from Card log 7-19-82 DSH

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

01-01 180306 **FOR ADMINISTRATIVE USE ONLY**
(Well driller does not fill out)

COUNTY Marion TWP. 15N RGE. 3E ¼ NE ¼ SW SEC. 5 Subdivision Name

Topo Map Indpls. west ~~1/2~~

Field Located By _____ Date _____

~~Courthouse~~ office Location By JMH Date 3/61

Location accepted w/o verification by JMH

_____ Ft W of EL. Ground Elevation 712

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil	0	2.5
Gravel - Clay	2.5	7
Gravel and Clay	7	11
Boulders	11	13
Sand & Gravel	13	26
Sand and Gravel	26	34
Boulders	34	37
Clay	37	52
hard pan	52	75
Clay	75	79
Shale	79	80

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

JAN 1968
RECEIVED
Dept. of Nat. Resources
Division of Water

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: Marion Civil Township: Wayne

Congressional township: T15N Range: R3E Number of section: 4

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: Mt Jackson cemetery on Hills Just north of Hi Way 40

Name of owner: Wayne Trenchy Trustee Address: [illegible]

Name of Well Drilling Contractor: Claude Royston

Address: RR 2 Box 125 Greenwood

Name of Drilling Equipment Operator: Same

INFORMATION ON THE WELL

Completed depth of well: 54 ft. Date well was completed: Oct 9 [illegible]

Diameter of outside casing or drive pipe: 2" Length: 51

Diameter of inside casing or liner: _____ Length: _____

Diameter of Screen: ~~1"~~ 1.25 Length: 30 Slot size: 60 gauge

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☒ Driven ☐

Static water level in completed well (Distance from ground to water level) 25 ft.

Bailer Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested 1 Rate 10 g.p.m. Drawdown _____ ft.

Signature Claude Royston

Date Jan 4 1968

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
(all gravel)		
~~720±~~		

MARKS: [illegible]

graphic log

FOR ADM[illegible] Y
(Well dri[illegible] 01-01 6707. [illegible]ut)

COUNTY: [illegible] TWP. 15N RGE. 3E ¼ ¼ ¼ SE ¼ SEC. 5

Topo Map: [illegible]

Well log classified By [illegible] Date
Courthouse located By Date
Field located By Date
Acc. w/o verification By Date

Ft W of EL. Ground elevation
Ft N of SL. Depth to bedrock
Ft E of WL. Bedrock elevation
Ft S of NL. Aquifer elevation

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a [illegible]er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. [illegible]ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted [illegible]hin thirty days after the completion of a well to the Division of Water

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

WATER WELL RECORD

JAN 1968 RECEIVED Dept. of Nat. Resources Division of Water

INFORMATION ON WELL LOCATION

County in which well was drilled: Marion Civil Township: Wayne

Congressional township: T 15 N Range: R 3 E Number of section: 4

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: [illegible] Cemetery [illegible] Just South of [illegible] 40

Name of owner: [illegible] Address: 5707 [illegible]

Name of Well Drilling Contractor: Claude Royston

Address: R R 2 Box 125 [illegible]

Name of Drilling Equipment Operator: Claude Royston

INFORMATION ON THE WELL

Completed depth of well: 45 ft. Date well was completed: [illegible]

Diameter of outside casing or drive pipe: 2 Length: 41

Diameter of inside casing or liner: Length:

Diameter of Screen: 1.25 Length: 30 Slot size: 60 gauge

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

Use of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☒ Driven ☐

Static water level in completed well (Distance from ground to water level) 25 ft.

Bailer Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested 1 Rate 16 g.p.m. Drawdown ____ ft.

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

ORMATIONS (Color, type of material, hardness, etc.)	From	To
[illegible]		

MARKS: [illegible]

[illegible]

FOR ADMIN 01-01 67
(Well drille. t)

COUNTY: [illegible]

TWP. 15N RGE. 3E ¼ ¼ SE ¼ SEC. 5

Topo Map: INDIANAPOLIS WEST

Well log classified By WPK Date

Courthouse located By Date

Field located By Date

Acc. w/o verification By BRUNS Date 2.27.76

Ft W of EL. Ground elevation

Ft N of SL. Depth to bedrock

Ft E of WL. Bedrock elevation

Ft S of NL. Aquifer elevation

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a ;er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ;ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted hin thirty days after the completion of a well to the Division of Water

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

Telephone 317-232-4160

State Form 35680

3/6 43

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

nty in which well was drilled Marion Civil Township

ring directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

~~Test #20~~

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Speedway Water Co. Address

Building Contractor Address

ne of Well Drilling Contractor:

re

of Drilling Equipment Operator: NCSS

LL INFORMATION

th of well: 76' Date well was completed: 2-1-43

meter of casing or drive pipe: Total Length:

meter of liner (if used): Total Length:

meter of Screen: Length: Slot Size:

e of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

of Well: ~~For Home~~ Dom. [X] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

c water level in completed well (Distance from ground to water level) 8 feet

r Test: Hours Tested Rate g.p.m. Drawdown ft.

ping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Layne-Northern

~~Date~~ Ground Water Div.

Copied from card log 7-19-82 OSH

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soil dirt	0	5
Gravel	5	9
Hard clay	9	20
Sand & Gravel	20	45
Hard pan	45	74
Shale	74	76

FOR AD
(W 01-01 180610 NLY
...out)

COUNTY Marion TWP. 15N RGE. 3E ¼ SE ¼ SW SEC. S Subdivision Name

Topo Map Indpls. West 7½

Field Located By _____ Date _____ Ft W of EL. Ground Elevation _____

~~Courthouse~~ Office Location By JMH Date 3-61 Ft N of SL. Depth to bedrock _____

Location accepted w/o verification by JMH 3-61 Ft E of WL. Bedrock elevation _____

Ft S of NL. Aquifer elevation _____ Lot Number _____

(test well #2c)

(44)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS 9, INDIANA

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: [illegible] Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: _____

e of owner: Carl Preston Address: 4500 W Vermont St

e of Well Drilling Contractor: [illegible]

e of Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

pleted depth of well: 35 ft. Date well was completed: May 10 1962

meter of outside casing or drive pipe: 8.5 Length: 22 ft

eter of inside casing or liner: _____ Length: 22 ft

eter of Screen: 7.5 Length: 14.92 Slot size: .010

of Well: Drilled ☐ Gravel Pack ☐ Driven ☑ Other _____

of Well: For home ☐ For industry ☑ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) 6 ft.

er Test: Hours tested — Rate — g.p.m. Drawdown — ft. (Difference between static level and water level at end of test)

ing Test: Hours tested 2 Rate 150 g.p.m. Drawdown 20 ft.

3

Signature 5/27/62

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR ADMINISTRATIVE USE ONLY
(Well Driller does not fill out)

01-01 180378

COUNTY: Marion TWP. 15 N RGE. 3 E ¼ NW ¼ NE ¼ SE SEC. 6

Topo Map: Indianapolis West SE Loc. accepted w/o verification Yes ✓ No

Well log classified By K Date 8-62 Ground elevation 710 875 Ft W of EL
Courthouse located By Date Depth to bedrock 2550 Ft N of SL
Field located By DRH Date 8-31-78 Bedrock elevation Ft E of WL
Placed in master well log file Date 26-8-62 Aquifer elevation 675 Ft S of NL

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top soil	0	2
yellow sand	2	15
sand gravel	15	35
clay	35	
		C. (NC)

REMARKS:

~~graphic log~~

3

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a well. We request that you be as accurate as possible in recording this information as y be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. e include all information possible in the space provided for well location. As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted n thirty days after the completion of a well to the Division of Water Resources, Indiana tment of Conservation.

(45)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS 9, INDIANA

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: _____

ongressional township: 15N Range: 3E Number of section: 6

(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks:

Century Block Co.

me of owner: C. J. Brinley Address: 4511 W. Vermont

me of Well Drilling Contractor: _____

: _____

me of Drilling Equipment Operator: Woodie

INFORMATION ON THE WELL

npleted depth of well: 51 ft. Date well was completed: 1-31-61

ameter of outside casing or drive pipe: 4 Galv. ← MATERIAL Length: _____

ameter of inside casing or liner: _____ Length: _____

ameter of Screen: _____ Length: _____ Slot size: _____

e of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) _____ ft.

ler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ping Test: Hours tested _____ Rate 10 g.p.m. Drawdown 19 ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

RMATIONS (Color, type of material, hardness, etc.)	From	To
Sandy Clay	0	15
Gravel	15	51

RKS: graphic log

FOR ADMINISTRATIVE USE ...Y
(Well Driller does not fill out)

01-01 180424

COUNTY: Morrison TWP. 15N RGE. 3E ¼ ¼ SE ¼ SEC. 6

Topo Map: Sandy Gravel Loc. accepted w/o verification Yes ✓ No

Well log classified By JMM Date 2/19/62 Ground elevation ___ Ft W of EL
Courthouse located By ___ Date ___ Depth to bedrock ___ Ft N of SL
Field located By ___ Date ___ Bedrock elevation ___ Ft E of WL
Placed in master well log file Date 4-3-62 Aquifer elevation ___ Ft S of NL

INSTRUCTIONS

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An accurate location of the well is equally as important as an accurate well log.
ıe include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted n thirty days after the completion of a well to the Division of Water Resources, Indiana tment of Conservation.

~~02 415N~~
~~Ref 115E~~

(46)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

RECEIVED DEPT. OF NATURAL RESOURCES DIVISION OF WATER

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: MARION Civil Township: _____

Congressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: _____

Name of owner: INDPLS PARK DEPT Address: 4625 W Vermont

Name of Well Drilling Contractor: Hamilton Bros Inc

Address: _____

Name of Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

Completed depth of well: 51 ft. Date well was completed: 11/26/68

Diameter of outside casing or drive pipe: 4" [illegible] Length: 51'

Diameter of inside casing or liner: _____ Length: _____

Diameter of Screen: 3" Length: 5' PVC. ← MATERIAL Slot size: #40

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

Static water level in completed well (Distance from ground to water level) _____ ft.

Bailer Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested 2 Rate 10 g.p.m. ~~Drawdown~~ 20 ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	17
Sand	17	30
Clay	30	42
Sand & gravel	42	54

ARKS:

UTM NORTH 4402475
UTM EAST 565115
COMMENTS MC 660

FOR ADMI 01-01 54(Y
(Well drill ut)

COUNTY: MARION TWP. 15N RGE. 3E NE ~~SE~~ ¼ NW ~~SW~~ ¼ SE ~~NE~~ ¼ SEC. 6

Topo Map: INDIANAPOLIS WEST ~~XX~~

Well log classified By — Date —
Courthouse located By — Date 1991
Field located By MCBH Date 5-74
Acc. w/o verification By — Date —

1400 Ft W of EL. Ground elevation 718
2500 Ft N of SL. Depth to bedrock
Ft E of WL. Bedrock elevation
Ft S of NL. Aquifer elevation 660

INSTRUCTIONS

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Park Dept.

(47)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

WATER WELL RECORD

OCT 1966
RECEIVED
Dept. of Nat. Resources
Division of Water

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

4703 Doesn't Know

ne of owner: Harold SITZNER Address: 4700 W VERMONT

ne of Well Drilling Contractor: Hamilton Bros Inc

: 4025 Rockville Rd.

ne of Drilling Equipment Operator: _____

INFORMATION ON THE WELL

npleted depth of well: 57 ft. Date well was completed: 6-27-66

meter of outside casing or drive pipe: 8" Length: 47

meter of inside casing or liner: _____ Length: _____

meter of Screen: 7.87 ~~7 7/8~~ Length: 11' ~~cook~~ Slot size: #60

e of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☐ For ~~industry~~ Irrigation ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) 6 ft.

ler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ f. (Difference between static level and water level at end of test)

ping Test: Hours tested 6 Rate 200 g.p.m. Drawdown 35' ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top soil	0	6
Clay - Rocky	6	10
Clay	10	32
Sand Gravel	32	41
Clay	41	45
Sand & Gravel	45	57

ARKS:

graphic log

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180383

COUNTY: [illegible] TWP. 15N RGE. 3E NE ¼ SE ¼ NW ¼ SEC. 6

Topo Map: Indian West 7½

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By ____ Date ____

3250 Ft W of EL. Ground elevation 715
3750 Ft N of SL. Depth to bedrock ____
____ Ft E of WL. Bedrock elevation ____
____ Ft S of NL. Aquifer elevation 658

C. (MC)

INSTRUCTIONS

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48

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180370

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ SE SEC 6 Subdivision Name

Topo Map Indianapolis West ~~7½'~~

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by JR 7-11-80

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL RECORD

UNTY MARION CIVIL TOWNSHIP PERMIT NO. 0322

IVING DIRECTIONS 4717 W. VERMONT

LL OWNER BUILDING CONTRACTOR JIM HARDING DRILLING EQUIPMENT OPERATOR DESTER HARNESS

WELL INFORMATION

CASING DIAMETER	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
4" PVC (MATERIAL)	[illegible]			4	3	60	DRILLED	PUBLIC SUP	ROTARY	[illegible]

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
30				1	10	~~[illegible]~~

MATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
P SOIL & CLAY	0	55
ND	55	60
AY	60	92

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

~~564665F~~

(49)

WATER WELL RECORD

State Form 35680

Mail completed record within 30 days to:
DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
605 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
PHONE (317) 232-4160

RECEIVED JUN 1985 DEPT. OF NATURAL RESOURCES DIVISION OF WATER

WELL LOCATION
(Fill in completely)

nty where drilled: Marion

Township: Wayne

ving directions to the well location (Include county road names, numbers, sub-sions, lot number with consideration to intersecting roads and trip origina-) There is space for a map on reverse side.

East of Lyndhurst

[illegible] 8800 W

OWNER — CONTRACTOR

Well owner: Moose Lodge 500

Address: 4917 W. Vermont

Building contractor:

Address:

Drilling contractor: Matlock Well Drilling

Address: 4701 W Morris

Equipment operator: Larry Oakley

Completion date: 5-13-85

CONSTRUCTION DETAILS

f well:

lled ☐ Gravel pack ☐ Driven ☐ Other

well:

me ☐ Industry ☐ Test ☐ Irrigation

y ☐ Stock ☐ Other (specify)

of drilling:

le tool ☑ Rotary ☐ Jet ☐ Rev. rotary ☐ Bucket rig

length 87 feet	Diameter 4 inches
length 4 feet	Diameter 4 inches
slot size #6	

pump setting 65

pump

ersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (specify)

WELL LOG

Formations: type of material	From	To
[illegible]	ft.	3 ft.
Clay		65
Gravel	65	68
Clay	68	74
Gravel	74	84

(Additional space for Well Log on reverse side)

WELL CAPACITY TEST

e)

g ☐ Pumping

10 gpm 1 hrs | Drawdown feet

el

vater) 41 feet

ality (clear, cloudy, odor, etc.)

Allen Matlock

Date 5-13-85

FOR AI 01-01 54046
(Wel.

County	Twp.	Rge.		Sec.
Marion	15N	3E	NE NE ¼ (SW)	6

Topo map: Ind Pls 7.0	Ft. W of EL	Ground elevation: 735	Subdivision name
Field located By: MCBH Date: 1992 3/10	Ft. N of SL	Depth to bedrock	Lot no.
Courthouse location By Date	Ft. E of WL	Bedrock elevation	
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation: 651	

WELL LOG
(Continued from front side)

Formations: type of material	From	To
	ft	ft

SKETCH SHOWING LOCATION
Locate with reference to highways, intersecting county roads, and distinctive landmarks.

N

UTM NORTH 4402800
UTM EAST 564665
COMMENTS MC 651

W E

50

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317 permit #

RECEIVED MAY 1978 DEPT. OF NATURAL RESOURCES DIVISION OF WATER

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, Lot Number, distinctive landmarks, etc.

4923 W. Vermont

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner James Gurley Address

Building Contractor Address

ame of Well Drilling Contractor: Hamilton Bros. Inc.

dd-ss PO Box 24181 Indpls. IN 46224

me of Drilling Equipment Operator: Henry Arthur

ELL INFORMATION

pth of well: ~~Drill~~ 62' ~~4" pvc well~~ Date well was completed:

ameter of casing or drive pipe: 4" pvc ← MATERIAL Total Length: 59

ameter of liner (if used): Total Length:

ameter of Screen: 4" pvc ← MATERIAL Length: 3' Slot Size: .060

pe of Well: Drilled XX Gravel Pack ☐ Driven ☐ Other

e of Well: For Home XX For Industry ☐ For Public Supply ☐ Stock ☐

thod of Drilling: Cable Tools ☐ Rotary XX Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tic water level in completed well (Distance from ground to water level) feet

ler Test: Hours Tested Rate g.p.m. Drawdown ft.

aping Test: Hours Tested 1 Rate 1-9 g.p.m. ~~Drawdown 50~~ PL ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINI[illegible]ITIVE USE ONLY
(Well driller does not fill out)

01-01 180374[illegible]

COUNTY MARION TWP. 15N RGE. 3E ¼ ¼ SW SEC 6 Subdivision Name

Topo Map TOMANAPOLIS [illegible]

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by BRONS 7-16-78

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation _____

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____ Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
clay	0	57
gravel	57	62

DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

NOV 1974 RECEIVED

(51)

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

IAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner David Hurley Address 4725 W. Vermont

Building Contractor Address

ame of Well Drilling Contractor: Mattlock Well Drilling

ddress 4701 W. Morris St.

ame of Drilling Equipment Operator: Allen Mattlock

ELL INFORMATION

epth of well: 85' Date well was completed: 7-27-74

iameter of casing or drive pipe: 4" Total Length: 85'

iameter of liner (if used): 4" Total Length: 85'

iameter of Screen: 4" Length: 5' Slot Size: #6

ype of Well: Drilled [✓] Gravel Pack [ ] Driven [ ] Other

se of Well: For Home [✓] For Industry [ ] For Public Supply [ ] Stock [ ]

ethod of Drilling: Cable Tools [ ] Rotary [✓] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

atic water level in completed well (Distance from ground to water level) 45 feet

iler Test: Hours Tested Rate g.p.m. Drawdown ft.

mping Test: Hours Tested Rate 15 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Allen Mattlock

Date 11-19-74

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180405

COUNTY Marion TWP. 15N RGE. 3E ¼ NE ¼ SW SEC 6 Subdivision Name

Topo Map [illegible]

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by [illegible] 7/21/72

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Topsoil	0	3
Clay	3	79
Gravel	79	85

~~402 560 N~~
~~564 620 E~~

(52)

FOR ADMIN 01-01 ONLY
(Well dri.. 54041

COUNTY Marion TWP. 15N RGE. 3E NE ¼ NE ¼ SW SEC 6 Subdivision Name

Topo Map Indpls W

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL. Ground Elevation 725

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation 661 Lot Number _____

WATER WELL RECORD

UTM NORTH 4402560
UTM EAST 564620
**COMMENTS MC 661

PERMIT NO.

COUNTY MARION CIVIL TOWNSHIP

DRIVING DIRECTIONS 4930 W. VERMONT

N400 8800W

WELL OWNER

BUILDING CONTRACTOR RALPH PETER

DRILLING EQUIPMENT OPERATOR JAMES HERMAN

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
64	4" PVC (MATERIAL)	60			4	4	60	DRILLED	HOME	ROTARY	4/10/96

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
[illegible]				1	10	~~40 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	40
GRAVEL	40	64

HAMILTON BROS. INC.
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46222

(53)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209

~~Permit 943~~

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: _____

ongressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

me of owner: Curtis Crump Address: 4933 W Vermont

me of Well Drilling Contractor: Hamilton Bros Inc

: _____

ne of Drilling Equipment Operator: Woodrow Burkhart

INFORMATION ON THE WELL

pleted depth of well: 74' ft. Date well was completed: 9/21/70

meter of outside casing or drive pipe: 4 Length: 71'

meter of inside casing or liner: _____ Length: _____

neter of Screen: 3' Length: 5' PVC ← MATERIAL Slot size: #40

e of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) _____ ft.

er Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ing Test: Hours tested 2 Rate 10 g.p.m. ~~Drawdown~~ _____ ft.

Signature [illegible]

Date [illegible]

FOR WELL LOG [illegible]

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	51
Sand	51	56
Clay	56	64
Sand + gravel	64	74

MARKS:

FOR ADMINISTRATIVE ONLY
(Well driller does not fill out)

01-01 180349

COUNTY: Madison TWP. 15N RGE. 3E SW ¼ SW ¼ NE ¼ SEC. 6

Topo Map: INDPLS. (W) EST.

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By ____ Date ____

____ Ft W of EL. Ground elevation ____
____ Ft N of SL. Depth to bedrock ____
____ Ft E of WL. Bedrock elevation ____
____ Ft S of NL. Aquifer elevation ____

INSTRUCTIONS

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(54)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

RECEIVED SEP 1965 Dept. of Nat. Resources Division of Water

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: _____ Civil Township: _____

Congressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: _____

Name of owner: Gillispie Address: 4937 W. Vermont

Name of Well Drilling Contractor: Hamilton Bros Welldrilling

ss: 4025 Rockville Rd

Name of Drilling Equipment Operator: John Galladay

INFORMATION ON THE WELL

Completed depth of well: 72 ft. Date well was completed: April 21-65

Diameter of outside casing or drive pipe: 4 Inch Length: 69 ft

Diameter of inside casing or liner: _____ MATERIAL Length: _____

iameter of Screen: 3 Inch Length: 4 ft PVC Slot size: _____

ype of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

se of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

ethod of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) 31 ft.

iler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

mping Test: Hours tested _____ Rate 10 g.p.m. Drawdown 35 ft.

Signature John Galladay

Date April 21, 1965

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Yellow Rocky Clay	0	20
Gray Clay	20	64
Gravel	64	72

EMARKS:

FOR ADMINISTRATIVE U NLY
(Well driller does not fill out)

01-01 180389

COUNTY: Madison TWP. 15 N RGE. 3 E ¼ ¼ ¼ SEC. 6

Topo Map: INDPLS. 1 Col. 7½

Well log classified By U Date 10-65
Courthouse located By ___ Date ___
Field located By ___ Date ___
Acc. w/o verification By U Date 10-65

___ Ft W of EL. Ground elevation ___
___ Ft N of SL. Depth to bedrock ___
___ Ft E of WL. Bedrock elevation ___
___ Ft S of NL. Aquifer elevation ___

INSTRUCTIONS

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~~402550N~~
~~64575E~~

(55)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

DEC 1959
RECEIVED
Dept. of Conservation
Division of
Water Resources

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: Wayne

ongressional township: 15N Range: 3 Number of section: 6
(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets
distinctive landmarks: 4948 W. Vermont St

ame of owner: Harold Stelzner Address: 4948 W. Vermont

ame of Well Drilling Contractor: Noel Plunkett

s: 4930 W. Vermont

ame of Drilling Equipment Operator: Joe Consamus

INFORMATION ON THE WELL

mpleted depth of well: 55 ft. Date well was completed: Nov 28 1959

ameter of outside casing or drive pipe: 2" Length: 52 ft

ameter of inside casing or liner: Length:

ameter of Screen: 1.25 ~~1/4~~ Length: ~~30"~~ 2.5 Slot size: #18

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

e of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☒

thod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☒ Driven ☐

atic water level in completed well (Distance from ground to water level) 21 ft.

iler Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

mping Test: Hours tested 14 Rate 11 g.p.m. Drawdown 3 ft.

5

Signature Noel Plunkett

Date 12/18/59

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Loam dark soft	0	12
Yellow Clay soft	12	18
Blue Clay soft	18	24
Sandy blue Clay soft	24	29
Gravel (water 4 GPM)	29	35
Sand and blue Clay	35	40
Blue Clay soft	40	49
Course gravel	49	55

FOR ADMIN 01-01 40Y
(Well Drill... out)

COUNTY: Marion TWP. 15N RGE. 3E NE ¼ NE ¼ SW ¼ SEC. 6

Topo. Map: Indpls. West Loc. accepted w/o verification Yes ✓ No 4x

El. of grnd. surface at well: ~~735~~ 731 Courthouse Loc. By ____ Date ____

Depth to bedrock: ____ Field Located By ____ Date 8-31-70

Well Log processed by: H.C. Kostan Placed in Master Well Log File Date 2-3-62

Agency FTR 676

FEET W OF EL 3250
FEET N OF SL 3150
FEET E OF WL
FEET S OF NL
BEDROCK ELEV
UTM NORTH
UTM EAST

UTM NORTH 4402550
UTM EAST 564575
RECOMMENTS MC 676

REMARKS:

~~[illegible]~~

~~[illegible]~~

~~[illegible]~~

~~graphic log~~

INSTRUCTIONS

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As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted hin thirty days after the completion of a well to the Division of Water Resources, Indiana artment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180365

COUNTY Marion TWP. 15 N RGE. 1 ¼ SE ¼ NW SEC 6

Topo Map Indianapolis West

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by 6-15-80 DSH

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____

Subdivision Name _____ Lot Number _____

WATER WELL RECORD

COUNTY MARION

CIVIL TOWNSHIP

PERMIT NO. 0255

DRIVING DIRECTIONS 4948 W. VERMONT
N. 400

WELL OWNER HAROLD STELZNER

BUILDING CONTRACTOR HAROLD STELZNER

DRILLING EQUIPMENT OPERATOR DESTER HARNESS

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	CASING LENGTH (MATERIAL)	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
78	4"	PVC 74			4	4	60	DRILLED	HOME	ROTARY	10/19/81

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
35				1	10	~~50 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	70
GRAVEL	70	78

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

57

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

RECEIVED 1974 DEPT. OF NATURAL RESOURCES DIVISION OF WATER

~~Permit~~ #2950

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

455 N

5020 W. Vermont

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Carl Adams Address Same

Building Contractor Address

ame of Well Drilling Contractor: [illegible]

ddress 4075 Rockville Rd.

f Drilling Equipment Operator: [illegible]

ELL INFORMATION

epth of well: 76' Date well was completed: 1-22-74

ameter of casing or drive pipe: 4" ~~F~~ Total Length: 74

ameter of liner (if used): Total Length:

ameter of Screen: 4' Length: 2' Slot Size: .060

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

e of Well: For Home ☒ For Industry ☐ For Public Supply ☐ Stock ☐

thod of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tic water level in completed well (Distance from ground to water level) feet

iler Test: Hours Tested Rate g.p.m. Drawdown ft.

mping Test: Hours Tested 1 Rate 10 g.p.m. ~~Drawdown~~ ~~50~~ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180448

COUNTY [illegible] TWP. 15N RGE. [illegible] ¼ [illegible] ¼ [illegible] SEC 6 Subdivision Name

Topo Map [illegible]

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by [illegible]

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation _____

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____

Lot Number _____

WATER WELL LOG

To	From	FORMATIONS (Color, type of material, hardness, etc.)
66	0	Clay
76	66	Sand & gravel

58

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180344

COUNTY [illegible] TWP. [illegible] RGE. [illegible] ¼ [illegible] ¼ NW SEC 6 Subdivision Name

Topo Map Indpls W

Field Located By ____ Date ____

Courthouse Location By ____ Date ____

Location accepted w/o verification by [illegible]

____ Ft W of EL. Ground Elevation ____

____ Ft N of SL. Depth to bedrock ____

____ Ft E of WL. Bedrock elevation ____

____ Ft S of NL. Aquifer elevation ____ Lot Number ____

WATER WELL RECORD

COUNTY: MARTON

CIVIL TOWNSHIP:

PERMIT NO.:

DRIVING DIRECTIONS: 5020 N. VERMONT N 4/30

WELL OWNER:

BUILDING CONTRACTOR: WATERFIELD MORTGAG

DRILLING EQUIPMENT OPERATOR: HARRIS HARNESS

WELL INFORMATION

MATERIAL

WELL DEPTH	CASING DIAMETER	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
81	4" PVC	77			4	4	60	DRILLED	DOMC	ROTARY	10/12/84

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
[illegible]				1	10	[illegible]

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	70
GRAVEL	70	81

RECEIVED
OCT 1984
DEPT. OF NATURAL RESOURCES
DIVISION OF WATER

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

(59)

WATER WELL RECORD

State Form 35680R2

Mail completed record within 30 days to:
DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
2475 DIRECTORS ROW
INDIANAPOLIS, INDIANA 46241
PHONE (317) 232-4160

APR 1988 RECEIVED DEPT. OF NATURAL RESOURCES DIVISION OF WATER

Job 88-45

WELL LOCATION
(Fill in completely)

unty where drilled: Marion

l Township:

iving directions to the well location (Include county road names, numbers, subdivisions, lot number with consideration to intersecting roads and trip originan) There is space for a map on reverse side.

1st house E. of Lynhurst on N. Side 400N 5100W

OWNER — CONTRACTOR

Well owner: Dennis Powell

Address: 5136 W. Vermont

Building contractor:

Address:

Drilling contractor: Matlock Well Drilling

Address: 4701 W. Morris

Equipment operator: Tim Davis

Completion date:

CONSTRUCTION DETAILS

of well:
rilled ☐ Gravel pack ☐ Driven ☐ Other

f well:
o ☐ Industry ☐ Test ☐ Irrigation
ic supply ☐ Stock ☐ Other (specify) _____

d of drilling:
able tool ☑ Rotary ☐ Jet ☐ Rev. rotary ☐ Bucket rig

g length 64 feet	Diameter 4" inches
length feet	Diameter inches
slot size	Total depth

of pump setting

f pump
mersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (specify) _____

WELL CAPACITY TEST

one)
g ☐ Pumping

e _____ gpm _____ hrs | Drawdown feet

vel
water) 40' feet

uality (clear, cloudy, odor, etc.)

WELL LOG

Formations: type of material	From	To
Top Soil	0 ft.	3 ft.
Overburden	3	57
Gravel	57	64

(Additional space for Well Log on reverse side)

Allen Matlock

Date 4/6/88

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out) 01-01 180438

County	Twp.	Rge.		Sec.
Marion	15 N	[illegible]	¼ SW ¼ NW	6

Topo map: Lindpes West	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot no.
Courthouse location By Date	Ft. E of WL	Bedrock elevation	
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

WELL LOG
(Continued from front side)

Formations: type of material	From	To
	ft	ft

SKETCH SHOWING LOCATION
Locate with reference to highways, intersecting county roads, and distinctive landmarks.

N

W E

(60)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

Telephone 317-232-4160

State Form 35680

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

unty in which well was drilled Marion Civil Township

iving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Austin Address 5151 W. Vermont

Building Contractor Address

ıe of Well Drilling Contractor: Hamilton Bros.

re Rockville Rd

e of Drilling Equipment Operator:

LL INFORMATION

h of well: 67'

Date well was completed: 6-7-56

ıeter of casing or drive pipe: 4 Total Length: 64'

eter of liner (if used): Total Length:

eter of Screen: 3" Length: ~~4' 3"~~ 4.25 Slot Size:

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

f Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

ɔd of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

water level in completed well (Distance from ground to water level) feet

Test: Hours Tested Rate g.p.m. Drawdown ft.

ng Test: Hours Tested Rate 10 gpm ~~g.p.m.~~ Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Hamilton Bros.

~~Date~~ TMK 10-8-56

Copied from card log 7-19-82 DSH

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS

WATER WELL LOG

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180403

COUNTY Marion TWP. 15N RGE. 3E SW ¼ SE ¼ NW SEC 6 Subdivision Name

Topo Map _____

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil	0	58
Same	58	67

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

State Form 35680

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

iving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

North of Michigan St. on Concord to Arnolda. East and north to 519 N. Arnolda.

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Ronald Crippen Address 519 N. Arnolda Indianapolis, Indiana

Building Contractor Address

me of Well Drilling Contractor: Mills Pump & Well Drilling, Inc'

dress 2508 W. Michigan St. Indianapolis, Indiana

ne of Drilling Equipment Operator: Russell Mills

LL INFORMATION

th of well: 79 ft. Date well was completed: July 30, 1980

meter of casing or drive pipe: 4in. Total Length: 76 ft.

meter of liner (if used): Total Length:

meter of Screen: 4 in. Length: 3 ft. Slot Size: 30

e of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [ ] Rotary [X] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

c water level in completed well (Distance from ground to water level) 30 feet

r Test: Hours Tested ~~2~~ 2 Rate ~~5~~ 5 g.p.m. Drawdown ~~45~~ 45 ft.

ping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Russell Mills

Date July 30, 1980

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS

FOR AD 01 54023 LY
(Wel

COUNTY MARION TWP. 15N RGE. 3E NW ¼ SE ¼ NW SEC 4 Subdivision Name

Topo Map INDIANAPOLIS WEST

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by BOUNS 10-16-80

_____ Ft W of EL. Ground Elevation 717

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation 638 Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay Gray	1	31
Clay Blue	31	65
Sand Blue	65	79

UTM NORTH 4402885
UTM EAST 567685
**COMMENTS MC 638

(62)

FOR ADN 01-01 54024 NLY
(Wel.

COUNTY Marion TWP. 15N RGE. 3E NW ¼ SE ¼ NW SEC. 4

Topo Map Andy West X½

Field Located By MCBH Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by SCT-SAW 6-14-79

_____ Ft W of EL. Ground Elevation 716

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation 669

Subdivision Name _____

Lot Number _____

WATER WELL RECORD

COUNTY MARION

CIVIL TOWNSHIP

PERMIT NO.

DRIVING DIRECTIONS 525 N. ARNOLDA

WELL OWNER

BUILDING CONTRACTOR ALLEN WATTS

DRILLING EQUIPMENT OPERATOR DESTER HARNESS

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
47	4" PVC (material)	45			4	3	60	DRILLED	HOME	ROTARY	4/19/79

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
35				1	10	~~40 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
SAND & GRAVEL	0	47

UTM NORTH 4402915

UTM EAST 567700

**COMMENTS MC _____

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

63

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

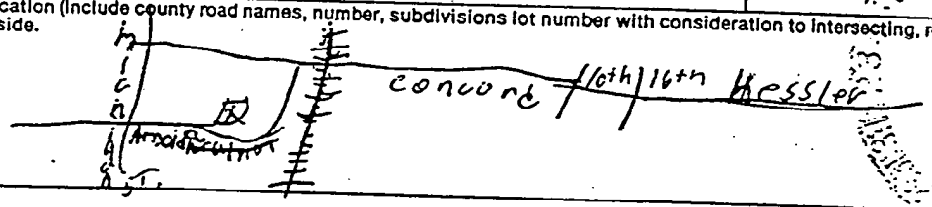
Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

(Completely)

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion				

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.



OWNER - CONTRACTOR

Name of well owner: Niblock — Telephone Number: (E) 635-5623

Address (Street and number, city, state): 530 N Arnolda ~~Walnut~~ Indpls. — ZIP code:

Name of building contractor: — Telephone number: ( )

Address (Street and number, city, state): — ZIP code:

Name of drilling contractor: Water Wells by Wilhite — Telephone number: (317) 257-3393

Address (Street and number, city, state): 7453 W Dobson — ZIP code:

Name of equipment operator: Charlie Sullivan — License number: 843 — Date of completion:

CONSTRUCTION DETAILS

Use of well: [X] Home [ ] Industry [ ] Test [ ] Irrigation [ ] Public supply [ ] Stock [ ] Other (specify):

Method of drilling: [X] Rotary [ ] Rev. rotary [ ] Cable tool [ ] Jet [ ] Bucket rig [ ] Other

Casing length	Material	Diameter
44 feet	PVC	4 inches

Screen length	Material	Diameter
5 feet	PVC	4 inches

Screen slot size: .050 — Total depth of well: 44

Depth of pump setting: — Water quality (Clear, cloudy, odor, etc.): clear

Type of pump: [ ] Shallow-well jet [ ] Submersible [ ] Deep-well jet [ ] Other (specify):

WELL CAPACITY TEST

Check one: [X] Air [ ] Bailing [ ] Pumping

Test rate: 30 gpm 2 hrs.

Drawdown: feet — Static level (depth to water): 24 feet

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
~~0 4~~ Sand	0	4
~~4 44~~ Sand & gravel	4	44

GROUTING INFORMATION

Material	Depth of grout From To	Sealing material	Depth filled From To
Method of installation	Number of bags used	Method of installation	Number of bags used

WELL ABANDONMENT

(Additional space for well log on reverse side)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative: Charlie Sullivan — Date:

FOR 01-L 54025 ILY

County	Township	Range		Section
Marion	15N	3E	NW ¼ SE ¼ NW	4

Topo map: Ludpla, West ~~7½~~	Ft. W of EL	Ground elevation: 718	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation: 674	

(continued from front side)

WELL LOG Formations: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

UTM NORTH 4402910
UTM EAST 567635
**COMMENTS MC

(104)

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

. completely

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion		15N	3E	4

Giving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a map on reverse side.

80 feet west of permanent well #1

OWNER - CONTRACTOR

Name of well owner: National Malleable and Steel Castings Co.
Telephone number:
Address (*number and street, city, state, ZIP code*): 546 N. Holmes, Indianapolis

Name of building contractor:
Telephone number:
Address (*number and street, city, state, ZIP code*):

Name of drilling contractor: Layne Northern, Inc.
Telephone number:
Address (*number and street, city, state, ZIP code*): Michigan

Name of equipment operator: John Shepard
License number:
Date of completion: 10/26/51

CONSTRUCTION DETAILS

Use of well: Home ☐ Industry ☒ Test ☐ Irrigation ☐ Public supply ☐ Stock ☐ Other (*specify*):

Method of drilling: Rotary ☐ Jet ☐ Bucket rig ☐ Cable tool ☐ Rev. rotary ☐ Other

Casing length feet — Material — Diameter inches
Screen length feet — Material — Diameter inches
Screen slot size — Total depth of well: 110
Depth of pump setting — Water quality (*clear, cloudy, odor, etc.*)

Type of pump: Submersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (*specify*):

WELL CAPACITY TEST

Done: Bailing ☐ Air ☐ Pumping
Test rate: _____ gpm _____ hrs.
Drawdown: feet
Static level (*depth of water*) feet

GROUTING INFORMATION

Depth of grout: From to
Method of installation
Number of bags used

WELL ABANDONMENT

Sealing material
Depth filled: From To
Method of installation
Number of bags used

WELL LOG

FORMATIONS: Type of material	From (feet)	To (feet)
Brick, concrete, fill	0	3
Dry sand and gravel	3	18
Clay strip	18	20
Muddy gravel	20	25
Coarse gravel, boulders and sand	25	43
Hard blue gritty clay	43	64
Coarse sand and gravel, active	64	70
Coarse gravel and boulders, active	70	73
Coarse sand and fine to med. gravel, active	73	91
(Very coarse sand and coarse gravel, some boulders, active)	91	110

(*Additional space for well log on reverse side*)

I swear or affirm, under the penalties of perjury that the information submitted on this is to the best of my knowledge and true, accurate and complete.

Signature of owner or authorized representative: Copied from driller's log 3/21/95

Date

FOR ADMINISTRATIVE USE ONLY (well driller does not fill out) 01-01 180619

County	Township	Range	1/4	1/4	Section
Marion	15N	3E			4

Topo map: Indianapolis west	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS, type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION (Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

65

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

completely

WELL LOCATION

County where drilled: Marion
Civil township:
Township: 15N
Range: 3E
Section: 4

Driving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a map on reverse side.

80' feet west of permanent well #1
100 feet south and 10 feet west of water tank

OWNER - CONTRACTOR

Name of well owner: National Malleable and Steel Casting Co.
Telephone number:
Address (*number and street, city, state, ZIP code*): 546 N. Holmes, Indianapolis
Name of building contractor:
Telephone number:
Address (*number and street, city, state, ZIP code*):
Name of drilling contractor: Layne Northern Co., Inc.
Telephone number:
Address (*number and street, city, state, ZIP code*): Mishawaka
Name of equipment operator: Miller/Smith
License number:
Date of completion: 11/20/51

CONSTRUCTION DETAILS

Use of well: Home ☐ Industry ☒ Test ☐ Irrigation; Public supply ☐ Stock ☐ Other (*specify*):

Method of drilling: Rotary ☐ Jet ☐ Bucket rig; Cable tool ☐ Rev. rotary ☐ Other

Casing length feet — Material — Diameter inches
Screen length feet — Material — Diameter inches
Screen slot size
Total depth of well: 109
Depth of pump setting
Water quality (*clear, cloudy, odor, etc.*)
Type of pump: Submersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (*specify*):

WELL CAPACITY TEST

Done: Bailing ☐ Air ☐ Pumping
Test rate: _____ gpm _____ hrs.
Drawdown: feet
Static level: (*depth of water*) feet

GROUTING INFORMATION

Depth of grout: From to
Method of installation
Number of bags used

WELL ABANDONMENT

Sealing material
Depth filled: From To
Method of installation
Number of bags used

WELL LOG

FORMATIONS: Type of material	From (feet)	To (feet)
Top dry sand and gravel	0	16
Clay	16	20
Coarse sand, gravel and boulders	20	38
Gritty clay	38	64
Coarse gravel and boulders	64	73
Fine to medium gravel	73	106
Coarse gravel and boulders	106	109

(*Additional space for well log on reverse side*)

I swear or affirm, under the penalties for perjury that the information submitted herein is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner or authorized representative: Copied from driller's log 3/21/95

Date:

FOR ADMINISTRATIVE USE ONLY (well driller does not fill out) 01-01 180609

County	Township	Range	1/4	1/4	Section
Marion	15N	3E			4

Topo map: Indianapolis West	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS (type of material)	FROM Feet	TO Feet

SKETCH SHOWING LOCATION (Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

(e 6)

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township Center

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner National Malleable and Steel Castings Co. Address 546 N. Holmes, Indianapolis

Building Contractor _____ Address _____

ame of Well Drilling Contractor: Layne Northern Co., Inc.

Milwaukee

ame of Drilling Equipment Operator: _____

ELL INFORMATION

epth of well: 94 Date well was completed: 11/24/44

iameter of casing or drive pipe: 30 Total Length: 49

iameter of liner (if used): 12 Total Length: 30

iameter of Screen: 12 Length: 15 Slot Size: #6

ype of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other _____

se of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

ethod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

atic water level in completed well (Distance from ground to water level) 22 feet

iler Test: Hours Tested _____ Rate _____ g.p.m. _____ Drawdown _____ ft.

mping Test: Hours Tested _____ Rate _____ g.p.m. 600 Drawdown 14 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

R 01-01 180600 E ONLY
(when driller does not fill out)

COUNTY MARION TWP. 15N RGE. 3E NW ¼ SW ¼ NE SEC 4

Topo Map Indianapolis West

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation _____

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____

Subdivision Name _____

Lot Number _____

WATER WELL LOG

To	From	FORMATIONS (Color, type of material, hardness, etc.)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

Telephone 317-232-4160

(67)

State Form 35680

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

nty in which well was drilled Marion Civil Township

ring directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner National Malleable & Steel Castings Co. Address 546 No. Holmes, Indpls.

Building Contractor Address

e of Well Drilling Contractor: Layne - Northern

of Drilling Equipment Operator:

L INFORMATION

h of well: 89 Date well was completed: 1936

eter of casing or drive pipe: 30-18 Total Length:

eter of liner (if used): Total Length:

eter of Screen: ✓ Length: Slot Size:

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

f Well: For Home [ ] For Industry [X] For Public Supply [ ] Stock [ ]

d of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

water level in completed well (Distance from ground to water level) 23 feet

Test: Hours Tested Rate g.p.m. Drawdown ft.

ng Test: Hours Tested Rate 300 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Mr. Gavin, Plant Eng.

~~Date~~ McGuinness, USGS 10-5-38

Copied from card log 7-19-52 RSH

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS

WATER WELL LOG

FOR AD 01-01 54018 LY
(Wel.

COUNTY Marion TWP. 15N RGE. 3E NW ¼ SW ¼ NE SEC. 4

Topo Map LINDY WEST

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

Ft W of EL. _____ Ft N of SL. _____ Ft E of WL. _____ Ft S of NL. _____

Ground Elevation 708 Depth to bedrock _____ Bedrock elevation _____ Aquifer elevation 607

Subdivision Name _____ Lot Number _____

UTM NORTH _____
UTM EAST _____
**COMMENTS MC 607

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Cinder Fill	0	4
Soil & Gravel	4	43
Clay	43	59
Coarse Sand	59	62
Coarse gravel	62	101

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

(68)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

[redacted]etely

WELL LOCATION

ounty where drilled	Civil township	Township	Range	Section
Marion		15N	3E	4

riving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a ap on reverse side.

In yard storage area alongside water storage reservoir

OWNER - CONTRACTOR

me of well owner: National Malleable and Steel Castings Co.
Telephone number:
dress (*number and street, city, state, ZIP code*): 546 N. Holmes, Indianapolis

me of building contractor:
Telephone number:
dress (*number and street, city, state, ZIP code*):

me of drilling contractor: Layne Northern Co., Inc.
Telephone number:
ress (*number and street, city, state, ZIP code*): Mishawaka

e of equipment operator: C. Kimble
License number:
Date of completion: 9/15/86

[redacted]

CONSTRUCTION DETAILS

well:
Home ☒ Industry ☐ Test ☐ Irrigation
Public supply ☐ Stock ☐ Other (*specify*):

od of drilling
Rotary ☐ Jet ☐ Bucket rig
Cable tool ☐ Rev. rotary ☐ Other

g length feet | Material | Diameter inches
en length feet | Material | Diameter inches

en slot size | Total depth of well

of pump setting | Water quality (*clear, cloudy, odor, etc.*)

of pump ☐ Shallow-well jet ☐ Other (*specify*):
ubmersible ☐ Deep-well jet

WELL CAPACITY TEST

one ☐ Air
ailing ☐ Pumping
Test rate: _____ gpm _____ hrs.

own feet
Static level (*depth of water*) 24 feet

GROUTING INFORMATION

[redacted] | Depth of grout From to
of installation | Number of bags used

WELL ABANDONMENT

Sealing material | Depth filled From To
Method of installation | Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
~~Gravel~~	~~0~~	~~43~~
~~Clay~~	~~16~~	~~59~~
~~Course Sand~~	~~59~~	
Gravel	0	43
Clay	43	59
Course sand	59	62
Course gravel	62	101

(*Additional space for well log on reverse side*)

y swear or affirm, under the penalties jury that the information submitted h is to the best of my knowledge and rue, accurate and complete.

Signature of owner or authorized representative: Copied from drillers log 3/21/95

Date

FOR ADMINISTRATIVE USE ONLY
(well driller does not fill out)

01-01 180614

County	Township	Range		Section
Marion	15N	3E	NW 1/4 SW 1/4 NE	4

Topo map: Indianapolis West	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M. 4402990 N 568160 E
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

(69)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR 546 N. Holme

Well Owner National Malleable and Steel Casting Co. Address Indianapolis

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern Co., Inc.
Mishawaka

Name of Drilling Equipment Operator: J. Miller and D. Smith

WELL INFORMATION

Depth of well: 106 Date well was completed: 11/20/51

Diameter of casing or drive pipe: 30 Total Length: 65.5

Diameter of liner (if used): 12 Total Length: 20.5

Diameter of Screen: 12 Length: 20 Slot Size: #6

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) 23 feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Air Test: Hours Tested Rate 576 g.p.m. Drawdown 10.5 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Copied from driller's log 3/21/95

Date

WATER WELL LOG

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180685

COUNTY MARION TWP. 15N RGE. 3E NW ¼ SW ¼ NE SEC. 4 Subdivision Name

Topo Map Indianapolis West

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

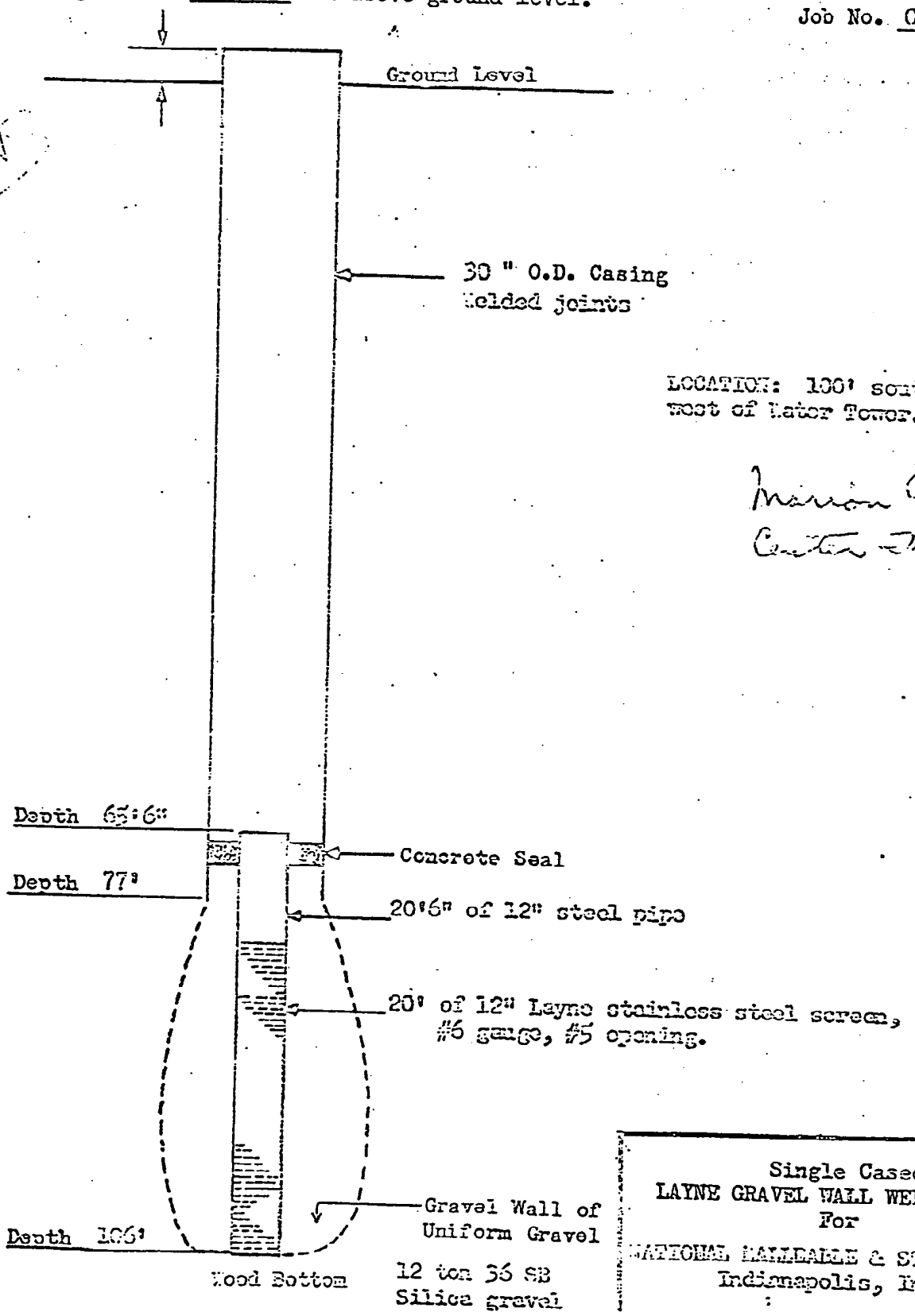
c (Located 100 feet south and 10 feet west of water tower) c (well #2)

To	From	FORMATIONS (Color, type of material, hardness, etc.)

15-3-4 NW SW NE

Casing extends _____ feet above ground level.

Job No. C-3355



LOCATION: 100' south and 10' west of Water Tower.

Marion Co.
Center Twp.

Single Cased
LAYNE GRAVEL WALL WELL No. 2
For
NATIONAL MALLEABLE & STEEL CASTS.CO
Indianapolis, Indiana

Driller J. Miller - D. Smith

Date Finished 11/20/51

Not drawn to Scale
All depths measured from ground level

Static Level 23'

Pumped 572 GPM
at 33'6" Pumping Level

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY

DRAWING NO.
C-3355-2

(10)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

unty in which well was drilled Marion Civil Township

ving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Ronald Gales Machine Co. Address 4400 W. Michigan, Indpls.

Building Contractor Address

e of Well Drilling Contractor: Fox & Sons

r R.6, Shelbyville

e of Drilling Equipment Operator: Thompson

LL INFORMATION

h of well: 46' Date well was completed: 8-11-52

eter of casing or drive pipe: 4 Total Length:

eter of liner (if used): Total Length:

eter of Screen: ~~3 3/4~~ 3.75 Length: 3 Slot Size: #30

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

f Well: For Home [ ] For Industry [ ] For Public Supply [ ] Stock [ ]

d of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

water level in completed well (Distance from ground to water level) 26 feet

Test: Hours Tested Rate ~~7~~ g.p.m. Drawdown ~~3~~ ft.

Test: Hours Tested Rate 12 g.p.m. Drawdown 6 ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Drillers Log

~~Date~~ Kost 1958

Copied from Card log 7-19-82 DSH

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180373

COUNTY Marion TWP. 15N RGE. 3E SE ¼ NW ¼ NE SEC. 6

Topo Map Indpls. West ~~7½~~

Field Located By Don Jordan Date 2-62

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL.
4200 Ft N of SL.
2900 Ft E of WL.
_____ Ft S of NL.

Ground Elevation _____
Depth to bedrock _____
Bedrock elevation _____
Aquifer elevation _____

Subdivision Name _____
Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
...ill Gravel	0	1
...lay	1	5
...y Gravel	5	30
...ravel & Sand – only sm show of water	30	37
...andy clay	37	43
...and & Gravel W.B.	43	46

~~...well at west end of machine shop.~~

~~...ells E well supposed to be deeper.~~

(71)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

unty in which well was drilled Marion Civil Township

ving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Ronald Gales Machinery Address 4400 W. Michigan

Building Contractor Address

ne of Well Drilling Contractor:

ne of Drilling Equipment Operator: Woodie

LL INFORMATION

th of well: 60' Date well was completed: 8-22-57

meter of casing or drive pipe: 4 Total Length:

meter of liner (if used): Total Length:

meter of Screen: Shop Length: Slot Size:

e of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

c water level in completed well (Distance from ground to water level) feet

r Test: Hours Tested Rate g.p.m. Drawdown ft.

Test: Hours Tested Rate 10 g.p.m. Drawdown 30 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

Copied from card log 7-19-82 DSH

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Gravel	0	34
Clay	34	54
Gravel	54	60

COUNTY Marion TWP. 15N RGE. 3E ¼ SE ¼ NW ¼ NE SEC 6

Topo Map Indpls West

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180368

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

Subdivision Name

(72)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

unty in which well was drilled Marion Civil Township

ving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Everett Sheffer Address 300 N. Vine St.

Building Contractor Address

ne of Well Drilling Contractor: Hamilton Bros.

ne of Drilling Equipment Operator:

LL INFORMATION

th of well: 43' Date well was completed: 6-23-55

meter of casing or drive pipe: 4 Total Length:

meter of liner (if used): Total Length:

meter of Screen: Shop Length: Slot Size:

e of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

c water level in completed well (Distance from ground to water level) feet

r Test: Hours Tested Rate g.p.m. Drawdown ft.

ping Test: Hours Tested Rate 10 g.p.m. Drawdown 15 ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Driller

~~Date~~ TMK, Ind. Dept. of Conserv.

Copied from Cord log 7-19-82 DSH

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
gravel	0	19
Clay	19	24
gravel	24	30
Clay	30	36
gravel	36	43

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180404

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ SE SEC 6 Subdivision Name

Topo Map

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

Ft W of EL. Ground Elevation

Ft N of SL. Depth to bedrock

Ft E of WL. Bedrock elevation

Ft S of NL. Aquifer elevation Lot Number

WATER WELL RECORD

State Form 35680R2

Mail completed record within 30 days to:
DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
2475 DIRECTORS ROW
INDIANAPOLIS, INDIANA 46241
PHONE (317) 232-4160

73

APR 1988 RECEIVED DEPT. OF NATURAL RESOURCES DIVISION OF WATER

Job 88-38

WELL LOCATION (Fill in completely)

y where drilled: Marion

Township:

ng directions to the well location (include county road names, numbers, subions, lot number with consideration to intersection roads and original. There is space for a map on reverse side.

4500 W

300 N

OWNER — CONTRACTOR

Well owner: Paul Johnson

Address: 322 N. Dixie St.

Building contractor:

Address:

Drilling contractor: Matlock Well Drilling

Address: 4701 S. Morris

Equipment operator: Jim Davis

Completion date: 3/28/88

CONSTRUCTION DETAILS

f well:
illed ☐ Gravel pack ☐ Driven ☐ Other

well:
me ☐ Industry ☐ Test ☐ Irrigation
ly ☐ Stock ☐ Other (specify) _____

ing:
ble tool ☑ Rotary ☐ Jet ☐ Rev. rotary ☐ Bucket rig

length 46' feet	Diameter 4" inches
length 5 feet	Diameter 4" inches
slot size #6	Total depth

of pump setting 40'

f pump
bmersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (specify) _____

WELL CAPACITY TEST

one)
iling ☐ Pumping

te 10 gpm _____ hrs	Drawdown feet

level
to water) 20' feet

quality (clear, cloudy, odor, etc.)

WELL LOG

Formations: type of material	From	To
Top Soil	0 ft.	3 ft.
Clay	3	42
Gravel	42	46

(Additional space for Well Log on reverse side)

Allen Matlock

Date

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out) 01-01 180390

County: Marion	Twp.: 15 N	Rge.: 3E	¼ NE ¼ SE	Sec.: 6
Topo map: Dudley West	Ft. W of EL	Ground elevation	Subdivision name	
Field located By Date	Ft. N of SL	Depth to bedrock	Lot no.	
Courthouse location By Date	Ft. E of WL	Bedrock elevation		
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation		

WELL LOG
(Continued from front side)

Formations: type of material	From	To
	ft	ft

SKETCH SHOWING LOCATION
Locate with reference to highways, intersecting county roads, and distinctive landmarks.

N

W

E

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

74

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: _____

ongressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets r distinctive landmarks: 329 N. Vine, East on Vermont off Lynhurst to Vine South

ame of owner: Sheffer Address: 329 Vine (N.)

ame of Well Drilling Contractor: Merritt Well Drilling Co., Inc.

ddress: 2998 Westlane Rd., Indianapolis, Indiana 46268

f Drilling Equipment Operator: Don Kennedy

INFORMATION ON THE WELL

ompleted depth of well: 35 ft. Date well was completed: May 28, 1968

iameter of outside casing or drive pipe: 4.25 ~~4¼ in.~~ Length: _____

iameter of inside casing or liner: _____ Length: _____

iameter of Screen: _____ Length: ~~4½ ft.~~ 4.5 Slot size: No. 8

ype of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other _____

se of Well: For home [X] For industry [ ] For public supply [ ] Stock [ ]

ethod of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Driven [ ]

tatic water level in completed well (Distance from ground to water level) 15 ft.

ailer Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

umping Test: Hours tested _____ Rate ~~1800 g.p.m.~~ 30 gpm Drawdown 6 ft.

Signature Thomas B. Hadley

Date 7/26/68

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

COUNTY: [illegible] TWP. 15N RGE. 3E W½ ¼ ¼ ¼ SEC. [illegible]

Topo Map: [illegible]

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180355

Well log classified By [illegible] Date [illegible]
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By ____ Date ____

Ft W of EL. ____ Ground elevation ____
Ft N of SL. ____ Depth to bedrock ____
Ft E of WL. ____ Bedrock elevation ____
Ft S of NL. ____ Aquifer elevation ____

ORMATIONS (Color, type of material, hardness, etc.)	From	To
Top soil and clay	0	16
Brown gravel	16	20
Gray gravely clay	20	32
Gray gravel add sand	32	35

KS:

INSTRUCTIONS

his Water Well Record form is designed to record the most essential data concerning a well. We request that you be as accurate as possible in recording this information as be of great assistance in the planning and development of new water supplies. accurate location of the well is equally as important as an accurate well log. include all information possible in the space provided for well location. specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted thirty days after the completion of a well to the Division of Water

~~402430N~~
~~565250E~~

75

WATER WELL RECORD
State Form 35680

Mail completed record within 30 days to:
DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
605 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
PHONE (317) 232-4160

WELL LOCATION
(Fill in completely)

nty where drilled: Marion

l Township:

ving directions to the well location (Include county road names, numbers, sub-isions, lot number with consideration to intersecting roads and trip origina-n) There is space for a map on reverse side.

off of Vermont

-104500 40N

OWNER — CONTRACTOR

Well owner: Barb Padgett

Address: 340 N Vine

Building contractor:

Address:

Drilling contractor: Matlock

Address: 4701 W Morris

Equipment operator: Jerry Oakley

Completion date: 8-29-85

CONSTRUCTION DETAILS

of well:
Drilled ☐ Gravel pack ☐ Driven ☐ Other

of well:
☐ Industry ☐ Test ☐ Irrigation
lic supply ☐ Stock ☐ Other (specify)

ncd of drilling:
Cable tool ☑ Rotary ☐ Jet ☐ Rev. rotary ☐ Bucket rig

ing length 89 feet	Diameter 4 inches
en length 5 feet	Diameter 4 inches
en slot size #6	

th of pump setting:

of pump
Submersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (specify)

WELL CAPACITY TEST

ck one)
Bailing ☐ Pumping

rate 10 gpm 1 hrs	Drawdown feet

c level
th to water) 10 feet

er quality (clear, cloudy, odor, etc.)

WELL LOG

Formations: type of material	From	To
Top Soil	0 ft.	3 ft.
Clay	3	18
Gravel	18	30
Clay	30	89

(Additional space for Well Log on reverse side)

ed: Allen Matlock

Date: 8-29-85

FOR ADM 01-01 54050 (2)
(Well d.

County: Marion	Twp.: 15N	Rge.: 3E	NW ¼ NE ¼ SE	Sec.: 6
Topo map: Indpls. W		Ft. W of EL	Ground elevation: 710	Subdivision name
Field located By: MCBN Date: 1992		Ft. N of SL	Depth to bedrock	Lot no.
Courthouse location By: Date		Ft. E of WL	Bedrock elevation	
Location accepted w/o verification by		Ft. S of NL	Aquifer elevation: 621	

WELL LOG
(Continued from front side)

Formations; type of material	From	To
	ft	ft

SKETCH SHOWING LOCATION
Locate with reference to highways, intersecting county roads, and distinctive landmarks.

N

W

E

UTM NORTH 4402430
UTM EAST 565250
**COMMENTS MC

(76)

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

Mail complete record within
INDIANA DEPARTMENT OF NATURA
Division of Water
402 W.Washington St., Rm. W.
Indianapolis, IN 46204
(317) 232-4160

...mpletely

WELL LOCATION

...where drilled	Civil township	Township	Range	Section
Marion		15N	3E	4

...g directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a ...on reverse side.

15 feet west of pump house

OWNER - CONTRACTOR

...of well owner: Central State Hospital	Telephone number
...ss (*number and street, city, state, ZIP code*)	
...of building contractor	Telephone number
...ss (*number and street, city, state, ZIP code*)	
...of drilling contractor: Layne Northern Co. Inc.	Telephone number
...ss (*number and street, city, state, ZIP code*): Mishawaka	
...of equipment operator: A.D. Hall	License number / Date of completion: 7/30/55

CONSTRUCTION DETAILS

...r well:
...lome ☐ Industry ☒ Test ☐ Irrigation
...ublic supply ☐ Stock ☐ Other (*specify*):

...od of drilling
...otary ☐ Jet ☐ Bucket rig
...able tool ☐ Rev. rotary ☐ Other

...g length	Material	Diameter
feet		inches
...n length	Material	Diameter
feet		inches

...n slot size | Total depth of well

...of pump setting | Water quality (*clear, cloudy, odor, etc.*)

...of pump ☐ Shallow-well jet ☐ Other (*specify*):
...ubmersible ☐ Deep-well jet

WELL CAPACITY TEST

...ore ☐ Air
...ailing ☐ Pumping

Test rate _____ gpm _____ hrs.

...own feet | Static level (*depth of water*) feet

...OUTING INFORMATION

	Depth of grout From to
...d of installation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
Sandy Fill	0	1
Soft brown gritty clay	1	5
Brown sand and gravel	5	34
Grey sand and gravel	34	47
Sand and gravel with boulders	47	51
Clay balls	51	56
Sand and coarse gravel	56	59
Brown shale	59	61

(*Additional space for well log on reverse side*)

...by swear or affirm, under the penalties ...rjury that the information submitted ...h is to the best of my knowledge and ...rue, accurate and complete.

Signature of owner or authorized representative: Copied from driller's log 3/21/95

Date

01-01 80690

FOR ADMINISTRATIVE USE ONLY
(well driller does not fill out)

County	Township	Range		Section
Marion	15N	3E	SW 1/4 NW 1/4 SW	4

Topo map: Indianapolis West	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

(77)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

unty in which well was drilled Marion Civil Township

ving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Sheffer Address 300 N. Fleming St.

Building Contractor Address

ne of Well Drilling Contractor: Hamilton Bros.

ne of Drilling Equipment Operator:

LL INFORMATION

th of well: 51' Date well was completed: 4-27-54

meter of casing or drive pipe: 4 Total Length: 51'

meter of liner (if used): Total Length:

meter of Screen: Length: Slot Size:

e of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

c water level in completed well (Distance from ground to water level) 16 feet

r Test: Hours Tested Rate g.p.m. Drawdown ft.

Test: Hours Tested Rate 10 g.p.m. Drawdown 2 ft.

(Drawdown is the difference between static level and water level at end of test)

Source of Data: Driller
~~Signature~~

~~Date~~ TMK, Ind. Dept. of Conserv.

Copied from card log 7-19-82 DSH

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180408

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ SE SEC 6

Topo Map

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

Ft W of EL.

Ft N of SL.

Ft E of WL.

Ft S of NL.

Ground Elevation

Depth to bedrock

Bedrock elevation

Aquifer elevation

Subdivision Name

Lot Number

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
fill dirt & clay	0	7
blue clay	7	36
sandy clay	36	42
sand & gravel	42	51
...rks: Screen:		

(18)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

16th St West to Lyndhurst Dr. & go S. to Vermont St. & go East to Fleming & go N.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Mary Wood Address 302 N. Fleming

Building Contractor _____ Address _____

Name of Well Drilling Contractor: Matlock Well Drilling

Address 1201 East Morris St.

Name of Drilling Equipment Operator: Chandler White

WELL INFORMATION

Depth of well: [illegible] Date well was completed: 12/27/78

Diameter of casing or drive pipe: 6" Total Length: _____

Diameter of liner (if used): _____ Total Length: _____

Diameter of Screen: 6" Length: [illegible] Slot Size: 36

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other _____

Use of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [X] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 15 feet

Bailer Test: Hours Tested [illegible] Rate [illegible] g.p.m. Drawdown _____ ft.

Pumping Test: Hours Tested _____ Rate _____ g.p.m. Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Allen Matlock

Date 12/28/78

FOR WELL LOG SPACE USE REVERSE

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil	0	3
Clay	3	8
Gravel	8	15
Clay	15	54
Gravel & Sand	54	57
Clay	57	64
Gravel & sand	64	70

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180420

COUNTY MARION TWP. 15N RGE. 3E ¼ ¼ SE SEC 6 Subdivision Name

Topo Map Indianapolis West

Field Located By _____ Date _____ Ft W of EL. Ground Elevation _____

Courthouse Location By _____ Date _____ Ft N of SL. Depth to bedrock _____

Location accepted w/o verification by Bruns 3-7-99 Ft E of WL. Bedrock elevation _____

Ft S of NL. Aquifer elevation _____ Lot Number _____

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180449

COUNTY Marion TWP. 15N RGE. 3E ¼ NE ¼ SW SEC 6 Subdivision Name

Topo Map Indpls W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by 1/87

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL RECORD

PERMIT NO.

COUNTY: MARION

CIVIL TOWNSHIP

DRIVING DIRECTIONS: 325 N. FLEMING

WELL OWNER: [illegible] 4000N

BUILDING CONTRACTOR: GLORIA BREEDON

DRILLING EQUIPMENT OPERATOR: JAMES HERMAN

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	MATERIAL	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
55	4"	PVC	51			4	4	60	DRILLED	HOME	ROTARY	11/20/85

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
10				1	10	~~30 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	40
GRAVEL	40	55

HAMILTON BROS. INC.

4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46222

WATER WELL RECORD

State Form 35680R2

Mail completed record within 30 days to:
DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
2475 DIRECTORS ROW
INDIANAPOLIS, INDIANA 46241
PHONE (317) 232-4160

80

87-111

WELL LOCATION (Fill in completely)

unty where drilled: Marion

l Township: Wayne

iving directions to the well location (include county road names, numbers, subvisions, lot number with consideration to intersecting roads and trip originan) There is space for a map on reverse side.

N of Rockville Rd
off of Vermont St
4400 W
300 N

OWNER — CONTRACTOR

Well owner: Henry Bellard

Address: 3320 N Fleming

Building contractor:

Address:

Drilling contractor: Mattock Well

Address: 4701 W Morris

Equipment operator: Jerry Oakley

Completion date: 8/20/87

CONSTRUCTION DETAILS

e of well: ☐ Drilled ☐ Gravel pack ☐ Driven ☐ Other

of well: ☐ Home ☐ Industry ☐ Test ☐ Irrigation
P supply ☐ Stock ☐ Other (specify) _____

rilling: ☐ able tool ☑ Rotary ☐ Jet ☐ Rev. rotary ☐ Bucket rig

ing length: 68 feet — Diameter: 4 inches

en length: 4 feet — Diameter: 4 inches

en slot size: #6 — Total depth:

th of pump setting: 45

e of pump: ☐ Submersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (specify) _____

WELL CAPACITY TEST

ck one) ☐ Bailing ☐ Pumping

rate: 10 gpm — 1 hrs — Drawdown: feet

c level (th to water): 20 feet

er quality (clear, cloudy, odor, etc.)

WELL LOG

Formations: type of material	From	To
Top Soil	0 ft.	3 ft.
Clay	3	18
Gravel	18	30
Clay	30	40
Gravel	40	55
Clay	55	68

(Additional space for Well Log on reverse side)

Allen Mattock

Date: 8/17/87

FOR ADMINISTRATIVE USE ONLY 01-01 180282
(Well driller does not fill out)

inty Marion	Twp. 15N	Rge. 3E	¼ NE ¼ SE	Sec. 6
o map Indianapolis West ~~Ya~~				
d located		Ft. W of EL	Ground elevation	Subdivision name
Date		Ft. N of SL	Depth to bedrock	Lot no.
irthouse location		Ft. E of WL	Bedrock elevation	
Date		Ft. S of NL	Aquifer elevation	
ation accepted w/o verification by				

WELL LOG
(Continued from front side)

Formations: type of material	From	To
	ft	ft

SKETCH SHOWING LOCATION
Locate with reference to highways, intersecting county roads, and distinctive landmarks.

N

W

E

~~02 4101~~
~~65350F~~

(81)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner William Carroll Address 336 N. Fleming

Building Contractor _____ Address _____

Name of Well Drilling Contractor: Allen Matlock Well Drilling

Address 4701 West Morris St.

Name of Drilling Equipment Operator: Allen Matlock

VELL INFORMATION

Depth of well: 65' Date well was completed: 3/4/81

Diameter of casing or drive pipe: 4" Total Length: 65'

Diameter of liner (if used): _____ Total Length: _____

Diameter of Screen: 4" Length: 5' Slot Size: #6

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other _____

Use of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [X] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 20 feet

Bailer Test: Hours Tested 1 Rate 15 g.p.m. Drawdown _____ ft.

Pumping Test: Hours Tested _____ Rate _____ g.p.m. Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Allen Matlock

Date 3/4/81

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR AD 01 54053 Y
(Wel..

COUNTY MARION TWP. 15N RGE. 3E NW ¼ NE ¼ SE SEC 6

Topo Map INDIANAPOLIS WEST

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by [signature] 5/11/81

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation 711

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation 646

Subdivision Name _____

Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil	0	3
Clay	3	50
Gravel	50	54
Clay	54	65

UTM NORTH 4402410
UTM EAST 565350
**COMMENTS MC

~~64910E~~

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

State Form 35680

(82)

WATER WELL RECORD

'ELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Off Vermont East of Lyndhurst on Cole St.

'AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Thomas Stanfield Address 111 N. Cole St.

Building Contractor _____ Address _____

ame of Well Drilling Contractor: Matlock W 11 Drilling

ddress 4801 West Morris St.

f Drilling Equipment Operator: Charles White

'ELL INFORMATION

epth of well: 76' Date well was completed: 5/13/80

iameter of casing or drive pipe: 4" Total Length: 76'

iameter of liner (if used): _____ Total Length: _____

iameter of Screen: 4" Length: 5' Slot Size: #6

ype of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other _____

se of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

ethod of Drilling: Cable Tools [ ] Rotary [X] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

atic water level in completed well (Distance from ground to water level) 32 feet

iler Test: Hours Tested 1 Rate 20 g.p.m. Drawdown _____ ft.

imping Test: Hours Tested _____ Rate _____ g.p.m. Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Allen Matlock

Date 5/15/80

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR / (01-01 180413) NLY

COUNTY Marion TWP. 15N RGE. 3E SW ¼ ~~NW~~ SW ¼ ~~NE~~ SE SEC. ~~X~~6

Subdivision Name

Topo Map Indianapolis West ~~XE~~'

Field Located By MCBH Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by JR 7-11-80

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation 737

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation 619

Lot Number _____

From	To	FORMATIONS (Color, type of material, hardness, etc.)
0	3	Soil
3	31	y
31	41	vel & Sand
41	107	y
107	117	vel
117	118	le

UTM NORTH 4401900

UTM EAST 564910

**COMMENTS MC 619

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

(83)

RECEIVED JUN 1960

WATER WELL RECORD

INFORMATION ON WELL LOCATION

nty in which well was drilled: Marion Civil Township: Wayne

gressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

cribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: _____

e of owner: Harold Snapp Address: 111 N. Cole

e of Well Drilling Contractor: Allen Maddock

ress: 4701 W. Morris

e Drilling Equipment Operator: Woodrow Goode

INFORMATION ON THE WELL

leted depth of well: 78 ft. Date well was completed: 6-15-60

eter of outside casing or drive pipe: 4" Length: _____

eter of inside casing or liner: ~~None~~ Length: _____

eter of Screen: 3" Length: 4' Slot size: #6

of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) 15 ft.

er Test: Hours tested 1 Rate 1 g.p.m. Drawdown 15 ft. (Difference between static level and water level at end of test)

ing Test: Hours tested 1 Rate 10 g.p.m. Drawdown 15 ft.

Signature Allen Maddock

Date 6-21-60

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil	0	3
Clay - Yellow	3	20
Clay - Brown	20	45
Sand + gravel	45	78

ARKS:

graphic log

FOR ADMINISTRATIVE USE
(Well Driller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E NW 1/4 SW 1/4 SE 1/4 SEC. 6

Topo. Map: Indianapolis W

El. of grnd. surface at well: _____ Loc. accepted w/o verification Yes ✓ No ___

Depth to bedrock: _____ Courthouse Loc. By _____ Date _____

Well Log processed by: 073 Field Located By _____ Date _____

Placed in Master Well Log File Date 24-3-62

01-01 180385

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a
- well. We request that you be as accurate as possible in recording this information as
ay be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log.
e include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted
n thirty days after the completion of a well to the Division of Water Resources, Indiana
tment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

FOR ADMINISTRATIVE USE ONLY
(Well driller do[illegible] fill out)

01-01 180380

COUNTY Marion TWP. 15N RGE. 3[illegible] ¼ [illegible] ¼ [illegible] SEC [illegible] Subdivision Name

Topo Map Indpls W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by [illegible]

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL RECORD

ITY MARION CIVIL TOWNSHIP PERMIT NO.

NG DIRECTIONS 115 N. COLE ST.

W 47[illegible] [illegible]

OWNER BUILDING CONTRACTOR CARL MERKLE DRILLING EQUIPMENT OPERATOR LESTER HARNESS

WELL INFORMATION

CASING DIAMETER	MATERIAL LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
4" PVC	75			4	4	60	DRILLED	HOME	ROTARY	10/31/83

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
40				1	10	~~[illegible]~~

IONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
OIL & CLAY	0	25
& GRAVEL	25	50
	50	70
& GRAVEL	70	78

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

STATE COPY

84

Reference 22 Page 185

85

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209

~~Permit # 789~~

WATER WELL RECORD

INFORMATION ON WELL LOCATION

nty in which well was drilled: MARION Civil Township: _____

gressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

cribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

(4900 W)

of owner: CARL MERKLE Address: 265 N COLE ST

of Well Drilling Contractor: Hamilton Bros Inc

ess: _____

of Drilling Equipment Operator: Bill Powell

INFORMATION ON THE WELL

leted depth of well: 60 ft. Date well was completed: 6/30/70

eter of outside casing or drive pipe: 4" ~~[illegible]~~ Length: 5[illegible]'

eter of inside casing or liner: _____ Length: _____

eter of Screen: 4" Length: 2' Slot size: #6

of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

d of Drilling: Cable Tools ☐ Rotary ☑ Rev. Rotary ☐ Jet ☐ Driven ☐

c water level in completed well (Distance from ground to water level) _____ ft.

r Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ng Test: Hours tested 2 Rate 10 g.p.m. ~~Drawdown~~ TC [illegible] ft.

Signature Bill Powell

Date 6/30/70

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

RMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	48
Sand & gravel	48	60
~~4 = 703~~		
~~4"~~		
~~Section #10 - Middle Unit (B)~~		
ARKS:		

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out) 01-01 180400

COUNTY: Marion TWP. 15N RGE. 3E SW ¼ NW ¼ SE ¼ SEC. 6

Topo Map: Elmdale West

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By ____ Date 5-74
Acc. w/o verification By [illegible] Date 7-17-70

2100 Ft W of EL. Ground elevation 735
1400 Ft N of SL. Depth to bedrock ____
____ Ft E of WL. Bedrock elevation ____
____ Ft S of NL. Aquifer elevation 687

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water

FOR ADMI[illegible]RATIVE USE ONLY
(Well [illegible] does not fill out)

01-01 180394

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ SE SEC 6 Subdivision Name

Topo Map Indianapolis West

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by SAW-SLP 5/16/79

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL RECORD

COUNTY MARION

CIVIL TOWNSHIP

PERMIT NO.

DRIVING DIRECTIONS 279 N COLE ST 4900W

WELL OWNER

BUILDING CONTRACTOR MR MERKLE

DRILLING EQUIPMENT OPERATOR CHARLES ARTHUR

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
61	4" PVC (MATERIAL)	58			4	3	60	DRILLED	HOME	ROTARY	9/05/78

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
30				1	10	~~40 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	48
GRAVEL	48	50
CLAY	50	56
GRAVEL	56	61

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

(87)

Replacement well dropped something into top of Sub

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

West on Michigan to Big Eagle Creek Park South Tabernacle West again to Cole about 1 mi, goes south, (Dead end)

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Earl Merkle Address 279 Cole St

Building Contractor Address

ame of Well Drilling Contractor: Cinda Drilling

ddress 2746 E. Edgewood

f Drilling Equipment Operator: Roy Cinlee

ELL INFORMATION

pth of well: 70 Date well was completed: 8-81

ameter of casing or drive pipe: 4" Total Length: 67

ameter of liner (if used): Total Length:

ameter of Screen: ~~3" OD~~ 3.75 Length: 5' Slot Size: #40

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

e of Well: For Home ☒ For Industry ☐ For Public Supply ☐ Stock ☐

thod of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tic water level in completed well (Distance from ground to water level) 27 feet

ler Test: Hours Tested 1 Rate ~~10~~ g.p.m. Drawdown 4 ft.

nping Test: Hours Tested 1 Rate 10 g.p.m. Drawdown 4 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature R J Cinlee

Date Aug 30, 82

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINI[illegible]TIVE USE ONLY
(Well drille[illegible] does not fill out)

01-01 180354

COUNTY MARION TWP. 15 N RGE. 3E ¼ NW ¼ SE SEC 6

Subdivision Name

Topo Map INDPLS. WEST

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by BCONS 12-21-82

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation _____

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____

Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Yellow Clay	0	20
Brown Clay	20	NH
Sandy Clay	NH	65
Gravel	65	70

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209

88

JUL 1971 RECEIVED

Permit # 1182

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

ne of owner: Joe Hunter Address: 300 N Cole

ne of Well Drilling Contractor: Hamilton Bros Inc

iress: _____

Drilling Equipment Operator: Rash

INFORMATION ON THE WELL

ıpleted depth of well: 60 ft. Date well was completed: 3-11-71

ımeter of outside casing or drive pipe: 4" Bit Length: 57'

ımeter of inside casing or liner: _____ Length: _____

ımeter of Screen: 3" Length: 5' Slot size: #40

ɔe of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other ~~22' Pt. 600 gpd~~

: of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) _____ ft.

ler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature Rash

Date 3-11/71

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

RMATIONS (Color, type of material, hardness, etc.)	From	To
Top soil & clay	0	4
Sand	4	8
Clay	8	18
Sand	18	19
Clay	19	45
Sand	45	60

RKS:

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY: Martin TWP. [illegible] RGE. [illegible] ¼ ¼ ¼ SEC. [illegible]

Topo Map: NDPLS. WEST

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By ____ Date 5/74
Acc. w/o verification By ____ Date ____

2300 Ft W of EL. Ground elevation 722
1800 Ft N of SL. Depth to bedrock ____
Ft E of WL. Bedrock elevation ____
Ft S of NL. Aquifer elevation ____

01-01 180415

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a well. We request that you be as accurate as possible in recording this information as y be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log.
e include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted ı thirty days after the completion of a well to the Division of Water

(89)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

nty in which well was drilled Marion Civil Township

ing directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

IE OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Bauman Address 301 N. Cole St.

Building Contractor Address

e of Well Drilling Contractor: Hamilton Bros.

e

e of Drilling Equipment Operator:

L INFORMATION

of well: 46' Date well was completed: 1955

eter of casing or drive pipe: 4 Total Length: 43

eter of liner (if used): Total Length:

eter of Screen: Length: Slot Size:

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

f Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

d of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

water level in completed well (Distance from ground to water level) feet

Test: Hours Tested Rate g.p.m. Drawdown ft.

ng Test: Hours Tested Rate 10 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Driller

~~Date~~ THK, Ind. Dept. of Conserv.

Copied from card log 7-19-82 WSR

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
	0	40
gravel	40	46
~~rks: Sremi shop~~		

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ SE SEC. 6

Topo Map _____

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL. _____ Ft N of SL. _____ Ft E of WL. _____ Ft S of NL.

Ground Elevation _____

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____

Lot Number _____

Subdivision Name _____

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180399

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

(90)

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: MARION Civil Township: WAYNE

ongressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: _____

Wm. Shelton

me of owner: BEST CONST. CO. Address: 345 COLE

me of Well Drilling Contractor: HARLAN MILLER WELL & PUMP CO.

dress: 1726 HAMBLEN W. DR. INDIANAPOLIS 31, IND.

r Drilling Equipment Operator: A. C. BOWEN

INFORMATION ON THE WELL

mpleted depth of well: 53' ft. Date well was completed: 5-11-61

ameter of outside casing or drive pipe: 4" Length: 49'

ameter of inside casing or liner: — Length: —

ameter of Screen: 3" Length: 5' Slot size: #6

pe of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

e of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) 7' ft.

ler Test: Hours tested 1 Rate 14 g.p.m. Drawdown 4' ft. (Difference between static level and water level at end of test)

ping Test: Hours tested — Rate — g.p.m. Drawdown — ft.

Signature Harlan Miller

Date 7-31-61

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
CLAY	0	32'
SAND	32'	39'
CLAY	39'	47'
SAND - WATER	47'	49'
SAND & GRAVEL & WATER	49'	53'

FOR ADMINISTRATIVE USE ONLY
(Well Driller does not fill out) 01-01 180375

COUNTY: [illegible] TWP. 15 RGE. [illegible] SW ¼ NW ¼ SE ¼ SEC. 6

Topo. Map: [illegible] Loc. accepted w/o verification Yes ___ No ___

El. of grnd. surface at well: 715 Courthouse Loc. By ___ Date ___

Depth to bedrock: ( ) Field Located ✓ By D. Jordan Date 2/196[illegible]

Well Log processed by: [illegible] Placed in Master Well Log File Date ___

2450' WL, 2150' SL.

Pg. [illegible] 662

FEET W [illegible]
FEET N [illegible] 2150
FEET E [illegible] WL 2450
FEET S OF NL
BEDROCK ELEV
UTM NORTH
UTM EAST
SUBDIVISION
**COMMENTS [illegible] MC

MARKS: ~~graphic log~~

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana rtment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

(91)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

MAY 1961 RECEIVED

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: MARION Civil Township: WAYNE

ngressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: 347 N COLE ST EAST SIDE ST

H800W

ne of owner: C.E DAVIS Address: 350 W 16 St.

ne of Well Drilling Contractor: HARLAN MILLER

: 1726 W HAMBLEN DR

e of Drilling Equipment Operator: A. BOWEN

INFORMATION ON THE WELL

pleted depth of well: 55 ft. Date well was completed: 3/31/60

meter of outside casing or drive pipe: 4" Length: 52'

meter of inside casing or liner: _____ Length: _____

meter of Screen: ~~3½~~ 3.5 Length: 5' Slot size: No 6

e of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) 10 ft.

ler Test: Hours tested 1 Rate 12 g.p.m. Drawdown 0 ft. (Difference between static level and water level at end of test)

ping Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft.

Signature [illegible]

Date 4/11/60

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR ADMINISTRATIVE U NLY
(Well Driller does not ...l out)

01--01 180439

COUNTY: Marion TWP. 15N RGE. 3E ¼ ¼ SE ¼ SEC. 6

Topo. Map: Cleveland

El. of grnd. surface at well: _____ Loc. accepted w/o verification Yes ✓ No ____

Depth to bedrock: _____ Courthouse Loc. By _____ Date _____

Well Log processed by: — Field Located By _____ Date _____

Placed in Master Well Log File Date 2-8-62

FORMATIONS (Color, type of material, hardness, etc.)	From	To
CLAY	0	44'
GRAVEL	44'	55'

EMARKS:

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a ter well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. ease include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted hin thirty days after the completion of a well to the Division of Water Resources, Indiana artment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

(92)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

RECEIVED MAY 1960 Dept. of Conservation Div. of Water Resources

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ity in which well was drilled: MARION Civil Township: WAYNE

ressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

ribe in your own words the well location with respect to nearby towns, roads, streets

listinctive landmarks: 349 N COLE ST EAST SIDE ST.

of owner: D. E. DAVIS CONTR. Address: 350 W 16TH ST

of Well Drilling Contractor: HARLAN MILLER

ess: 1726 W HAMILEN DR

Drilling Equipment Operator: A. BOWEN

INFORMATION ON THE WELL

leted depth of well: 54 ft. Date well was completed: 3/30/60

eter of outside casing or drive pipe: 4" Length: 51'

eter of inside casing or liner: _____ Length: _____

eter of Screen: ~~3½"~~ 3.5 Length: 5' Slot size: No 6

of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) 7 ft.

er Test: Hours tested 1 Rate 10 g.p.m. Drawdown 3 ft. (Difference between static level and water level at end of test)

ing Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature [illegible]

Date 4/11/60

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	44
GRAVEL	44	54

ARKS:

FOR ADMINISTRATIVE USE ONLY
(Well Driller does not fill out) 01-01 180345

COUNTY: Marion TWP. 15N RGE. 3 ¼ ¼ SE ¼ SEC. 6

Topo. Map: Indy West

El. of grnd. surface at well: Loc. accepted w/o verification Yes ✓ No

Depth to bedrock: Courthouse Loc. By Date

Well Log processed by: 21 Field Located By Date

Placed in Master Well Log File Date 21-8-62

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a · well. We request that you be as accurate as possible in recording this information as ıy be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. e include all information possible in the space provided for well location. As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted ı thirty days after the completion of a well to the Division of Water Resources, Indiana tment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

(93)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

nty in which well was drilled Marion Civil Township _____

ing directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

_____

_____

_____

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Litzman Address 3006 N. Cole

Building Contractor _____ Address _____

e of Well Drilling Contractor: Robert Edwards

_____

e of Drilling Equipment Operator: _____

LL INFORMATION

h of well: 56' Date well was completed: _____

eter of casing or drive pipe: 4 Total Length: _____

eter of liner (if used): _____ Total Length: _____

eter of Screen: ~~Step~~ Length: _____ Slot Size: _____

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other _____

f Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

: water level in completed well (Distance from ground to water level) _____ feet

: Test: Hours Tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Test: Hours Tested _____ Rate 10 g.p.m. Drawdown 20 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature _____

Date _____

Copied from Card log 7-19-82 DSH

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180418

COUNTY Marion TWP. 15N RGE. 3E SW ¼ NW ¼ SE SEC 6

Subdivision Name

Topo Map

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by WJS 10-18-57

Ft W of EL.

Ft N of SL.

Ft E of WL.

Ft S of NL.

Ground Elevation

Depth to bedrock

Bedrock elevation

Aquifer elevation

Lot Number

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
lay	0	10
and	10	14
ay	14	35
and - Gravel	35	39
ay	39	45
and - Gravel	45	56

COU MARION TWP. 15 N RGE. 3E SE ¼ NE ¼ SW SEC. 6 Subdivision Name

Topo Map INDNPLS. WEST

Field Located By MCBN Date 1992

Courthouse Location By _____ Date _____

Location accepted w/o verification by JMB 7-11-80

_____ Ft W of EL. Ground Elevation 742

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation 656 Lot Number _____

WATER WELL RECORD

UTM NORTH 4402350
UTM EAST 564675
**COMMENTS MC

PERMIT NO. 0357

COUNTY MARION CIVIL TOWNSHIP

DRIVING DIRECTIONS 213 N. AUBURN

WELL OWNER ARLIE PICKARD

BUILDING CONTRACTOR ARLIE PICKARD

DRILLING EQUIPMENT OPERATOR DESTER HARNESS

WELL INFORMATION

CASING DIAMETER	CASING LENGTH (MATERIAL)	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
4"	PVC 82			4	3	60	DRILLED	HOME	ROTARY	3/03/10

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
40				1	10	~~65 P/C~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOP SOIL & CLAY	0	70
GRAVEL	70	86

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

STATE COPY

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS 9, INDIANA

SEP 1965
RECEIVED
Dept. of Nat. Resources
Division of Water

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: _____ Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

5000 ft

me of owner: William Duziak Address: [illegible]

me of Well Drilling Contractor: H R

dress: _____

Drilling Equipment Operator: Les Harness

INFORMATION ON THE WELL

mpleted depth of well: 68 ft. Date well was completed: 8-28-65

ameter of outside casing or drive pipe: 4" Length: 66

ameter of inside casing or liner: — Length: _____

ameter of Screen: 4" Length: 2' Slot size: #60

pe of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

e of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☐ Rotary ☑ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) _____ ft.

iler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

mping Test: Hours tested 4 Rate 10 g.p.m. ~~Drawdown _____ ft.~~

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	60
Sand & gravel	60	68

MARKS:

FOR ADMINISTRATIVE USE O
(Well driller does not fill out) 01-01 180395

COUNTY: Marion TWP. 15N RGE. 3E ¼ ¼ ¼ SEC. 6

Topo Map: Indpls. Col. X

Well log classified By 21 Date 10-65
Courthouse located By ___ Date ___
Field located By ___ Date ___
Acc. w/o verification By 4 Date 10-65

___ Ft W of EL. Ground elevation ___
___ Ft N of SL. Depth to bedrock ___
___ Ft E of WL. Bedrock elevation ___
___ Ft S of NL. Aquifer elevation ___

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana rtment of Conservation.

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS 9, INDIANA

(ale)

WATER WELL RECORD

INFORMATION ON WELL LOCATION

nty in which well was drilled: Marion Civil Township: _____

gressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: 310 N Auburn

5500 W

e of owner: Paul White Address: _____

e of Well Drilling Contractor: Hamilton Bros Inc

ress: 4025 Rockville Rd

Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

pleted depth of well: 66' ft. Date well was completed: _____

meter of outside casing or drive pipe: ~~4.10~~ (4.25) Length: 64

meter of inside casing or liner: _____ Length: _____

meter of Screen: 4" Length: 2' ~~20~~ Slot size: _____

e of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) 30' ft.

er Test: Hours tested _____ Rate _____ g.p.m. Drawdown 30 ft. (Difference between static level and water level at end of test)

ing Test: Hours tested 1 Rate 10 g.p.m. Drawdown _____ ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR ADMINISTRATIVE USE ONL...
(Well Driller does not fill out)

01-01 180410

COUNTY: Marion TWP. 15 RGE. 3E NE ¼ NE ¼ SW ¼ SEC. 6

Topo Map: Clermont ~~7½~~ Loc. accepted w/o verification Yes ✓ No ___

Well log classified By U Date 5-64 Ground elevation ___ ___ Ft W of EL
Courthouse located By ___ Date ___ Depth to bedrock ___ ___ Ft N of SL
Field located By ___ Date ___ Bedrock elevation ___ ___ Ft E of WL
Placed in master well log file Date 2-5-64 Aquifer elevation ___ ___ Ft S of NL

ORMATIONS (Color, type of material, hardness, etc.)	From	To
clay	0	25
sand	25	27
clay	27	60
sand	60	66

MARKS:

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a
er well. We request that you be as accurate as possible in recording this information as
may be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log.
ase include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted
in thirty days after the completion of a well to the Division of Water Resources, Indiana
rtment of Conservation.

97

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

Telephone 317-232-4160

State Form 35680

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Ristow Address 4910 Rockville Rd.

Building Contractor Address

Name of Well Drilling Contractor:

Name of Drilling Equipment Operator: Robert Edwards

WELL INFORMATION

Depth of well: 89'

Date well was completed:

Diameter of casing or drive pipe: 8 Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: 600# Length: 11' Slot Size: 70#

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

Use of Well: Dom. For Home ☒ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Pump Test: Hours Tested Rate g.p.m. Drawdown ft.

Bailer Test: Hours Tested Rate 200 g.p.m. Drawdown 66 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

Copied from card log

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	10
Sandy clay	10	20
Clay	20	76
Sand Gravel	76	89

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180388

COUNTY Marion TWP. 15N RGE. 3E SE ¼ SE ¼ SE SEC 6

Topo Map _____ Ft W of EL. _____ Ground Elevation _____ Subdivision Name _____

Field Located By _____ Date _____ Ft N of SL. _____ Depth to bedrock _____

Courthouse Location By _____ Date _____ Ft E of WL. _____ Bedrock elevation _____

Location accepted w/o verification by _____ Ft S of NL. _____ Aquifer elevation _____ Lot Number _____

(98)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

unty in which well was drilled Marion Civil Township

ving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

ME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Bistow Address Rd. 36

Building Contractor Address

ne of Well Drilling Contractor: Hamilton Bros

ne of Drilling Equipment Operator: John Golloday

LL INFORMATION

th of well: 90' Date well was completed: 8-20-53

neter of casing or drive pipe: 4 Total Length:

neter of liner (if used): Total Length:

neter of Screen: ~~Slop Screen~~ Length: Slot Size:

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

of Well: Dom. For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

c water level in completed well (Distance from ground to water level) feet

r Test: Hours Tested Rate g.p.m. Drawdown ft.

Test: Hours Tested Rate 10 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Driller

~~Date~~ TMK, Ind. Dept. of Conservation

Copied from card log 7-19-[illegible]

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	15
Sand	15	25
Clay	25	84
gravel	84	90

COUNTY Marion TWP. 15N RGE. 3E NW ¼ SE ¼ SE SEC 6

Topo Map

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180419

Ft W of EL. Ground Elevation

Ft N of SL. Depth to bedrock

Ft E of WL. Bedrock elevation

Ft S of NL. Aquifer elevation

Subdivision Name

Lot Number

~~102910N~~
~~765135E~~

(990)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: Wayne

ongressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets

r distinctive landmarks: 1320' west of Grande Ave. & 200' south of Eagle Creek

ame of owner: City of Indianapolis Address: Board of Park Commissioners
1426 West 29th St., Indianapolis, Ind.

ame of Well Drilling Contractor: Clark Drilling Co.

ddress: 1015 East 28th St., Indianapolis 5, Ind.

f Drilling Equipment Operator: R. Hansen

INFORMATION ON THE WELL

mpleted depth of well: 53 Ft. Date well was completed: April 12, 1962

ameter of outside casing or drive pipe: 8" Length: ~~43'8"~~ 43.66

ameter of inside casing or liner: _____ Length: _____

ameter of Screen: 8" Length: 10' Slot size: 60 slot

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

e of Well: For home ☐ For industry ☐ For public supply ☒ (For sprinkling) Stock ☐

thod of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) 9'6" Ft.

iler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ Ft. (Difference between static level and water level at end of test)

mping Test: Hours tested 4 Rate 153 g.p.m. Drawdown ~~18'6"~~ 18.5 Ft.

Signature F. K. Clark

Date July 9, 1962

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top soil	0	1'
Sandy brown clay	1'	6'
Muddy sand	6'	13'
Sandy brown clay	13'	20'
Sand & gravel	20'	22'
Blue clay	22'	28'
Sand & gravel	28'	34'
Gray clay	34'	37'
Medium coarse sand)	37'	41'
Clean medium sand & gravel) active, clean 37' - 52'6"	41'	48'
Coarse sand & gravel)	48'	52.5
Clay	52.5	67'
Hard grey clay	67'	70'

C.

MARKS: (Backfilled hole 70' to 53' with sand & gravel)

graphic log

FOR ADMIN 01-01 54
(Well Driller does not fill out)

COUNTY: [illegible] TWP. 15N RGE. 3E N½ SN½ NE¼ SEC. 6

Topo. Map: Indy West [illegible] Loc. accepted w/o verification Yes ✓ No

El. of grnd. surface at well: 714 Courthouse Loc. By Date

Depth to bedrock: Field Located By MCBN Date 1992

Well log processed by: [illegible] Placed in Master Well Log File Date [illegible]

Agel-644

UTM NORTH 4402910
UTM EAST 565135
**COMMENTS MC 644

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a well. We request that you be as accurate as possible in recording this information as y be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. e include all information possible in the space provided for well location. As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted n thirty days after the completion of a well to the Division of Water Resources, Indiana ment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

~~59-40013~~

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

(100)

(completely)

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion				

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.

approx. 1 block east of Tibbs & 10th St

OWNER - CONTRACTOR

Name of well owner: Williams Bait & Tackle	Telephone Number: (317) 632-5881
Address (Street and number, city, state): 3337 W. 10th St. Indpls.	ZIP code:
Name of building contractor: –	Telephone number: ( )
Address (Street and number, city, state):	ZIP code:
Name of drilling contractor: Dean Well Drilling, Inc.	Telephone number: 317 787-4146
Address (Street and number, city, state): 841 W. Sumner Ave. Indpls.	ZIP code: 46217

Name of equipment operator	License number	Date of completion
John Aufderheide	231	Feb. 7, 1990

CONSTRUCTION DETAILS

Use of well:
☐ Home ☐ Industry ☐ Test ☐ Irrigation
☐ Public supply ☑ Stock ☑ Other (specify): minnow tank

Method of drilling:
☑ Rotary ☐ Rev. rotary
☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other

Casing length	Material	Diameter
66 feet	~~SDR 21~~ PVC	5 inches

Screen length	Material	Diameter
3 feet	SS ~~Stainless steel~~	5 inches

Screen slot size: .030
Total depth of well: 69'
Depth of pump setting: 40'
Water quality (Clear, cloudy, odor, etc.): clear

Type of pump:
☑ Submersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (specify):

WELL CAPACITY TEST

Check one: ☑ Air ☐ Bailing ☐ Pumping
Test rate: 30 gpm 2 hrs.
Drawdown: 16' feet
Static level (depth to water): 24 feet

GROUTING INFORMATION

Material	Depth of grout	Sealing material	Depth filled
bentonite	From 0 To 38	bentonite	From 0 To 46

Method of installation	Number of bags used	Method of installation	Number of bags used
tremmie	4	tremmie	1

WELL ABANDONMENT

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
brown clay	0	5
fine sand	5	35
brown clay	35	46
sand & gravel	46	47
sandy brown clay	47	66
sand & gravel (~~did not bottom out~~)	66	78
Abandoned existing 4" steel casing well 0-46 where pump is lodged		

(Additional space for well log on reverse side)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative: John T. Aufderheide

Date: Feb. 7, 1990

F 01-01 54026 ONLY ut)

County	Township	Range		Section
Marion	15N	3E	NW ¼ NW ¼ NW	4

Topo map		Ground elevation	Subdivision name
Cendpls. West ~~7½~~	Ft. W of EL	718	
Field located By MCBN Date 1992	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation 640	

(continued from front side)

WELL LOG Formations: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

UTM NORTH 4403460
UTM EAST 567160
**COMMENTS MC 640

101

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

unty in which well was drilled: Marion Civil Township: Wayne

iving directions to the well location:
34 feet West of West Side of #5 Well House
31 feet South of center line of 10th Street

e of property owner (if known): Allison Division G.M.C. Plant No. 3
ress of owner:
e of building contractor (if known):
Well Drilling Contractor: Layne Northern
ress: Mishawaka, IN
e of drilling equipment operator: Ewing Allen

INFORMATION ON THE WELL

:h of well: 121 Date well was completed: October 10, 1968
neter of casing or drive pipe: 16 Total length: 106
neter of liner (if used): Total length:
eter of Screen: 16 Length: 15 Slot size: .130
of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other
of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐
od of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☑ Jet ☐ Bucket Rig ☐
ic water level in completed well (Distance from ground to water level) 38 ft.
r Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)
Test: Hours tested 12 Rate 316 g.p.m. Drawdown 88 ft.

Signature
Date

MINISTRATIVE ; ONLY
01-01 183325 .iller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E NW ¼ NW ¼ NE ¼ SEC. 6

Topo Map: I W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

2400 Ft W of EL. Ground elevation 724.4'

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

100 Ft S of NL. Aquifer elevation _____

C. (addt'l info stapled to log

Subdivision Name: Allison Gmc

Plant #3

Lot Number _____

WATER WELL LOG

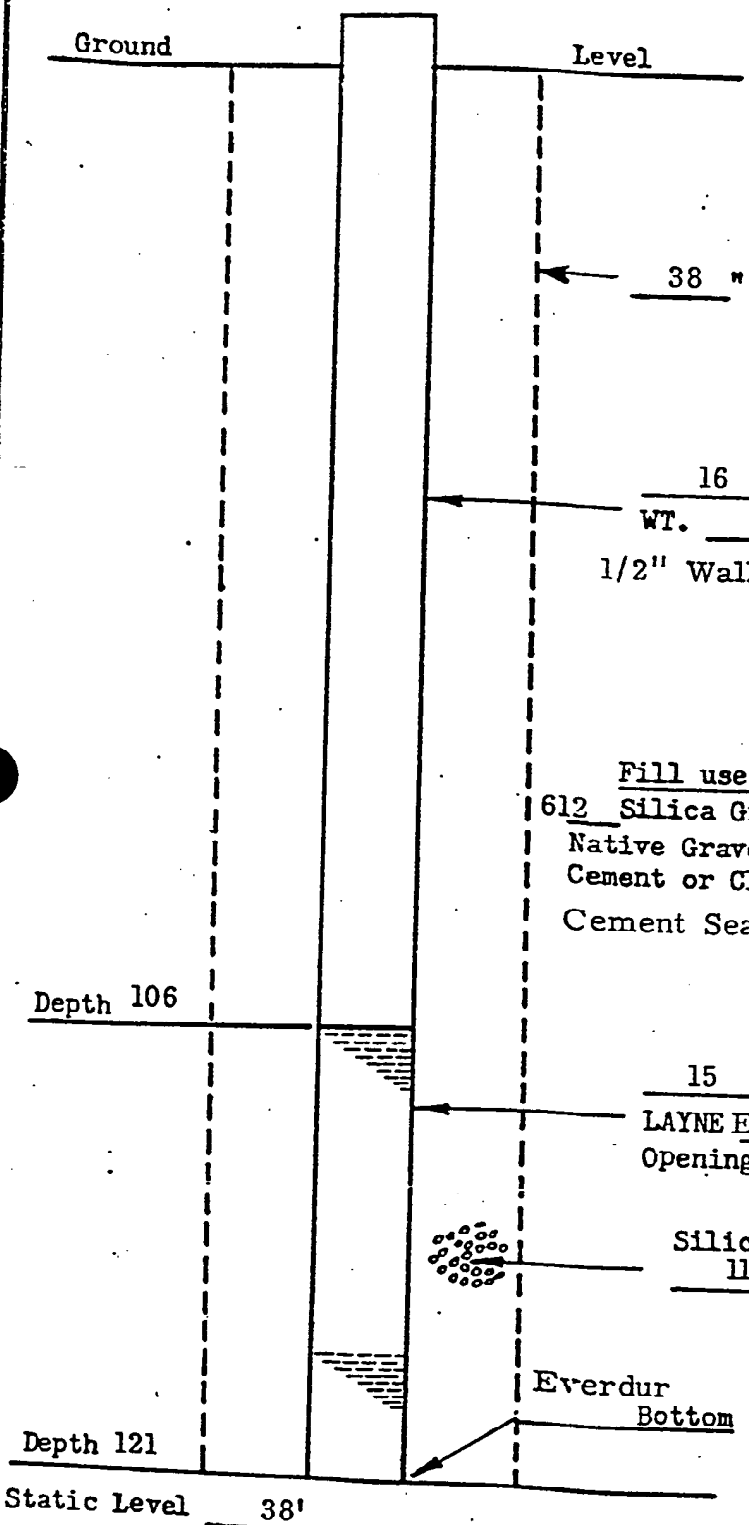
From	To	ORMATIONS (Color, type of material, hardness, etc.)
0	14	Top Gravel
14	35	Clay
35	46	~~Sand~~ S + Clay
46	62	S + G
62	80	Clay and Sand
80	87	S + G
87	95	Clay and Sand
95	108	Clay
108	114	Fine Sand
114	116.5	Sand and Clay
116.5	121	Fine Gravel

MARKS:

Pipe extends 1.5 feet above ground level

Job No. C-2.

Location:
34' W. of W. Side of #5 Well Hse.
81' S. of centerline of 10th St.



Pipe Tally	Welded Threaded
Bottom	

Fill used from Bottom Up:

612	Silica Gravel	121	to	84 ft.
	Native Gravel	74	to	3 ft.
	Cement or Clay	3	to	0 ft.
	Cement Seal	84	to	74 ft.

Static Level 38'
Pumped 316 GPM
at 88 pumping level

Driller Ewing Allen
Date Finished October 10, 1968

Not drawn to scale.
All depths measured from Ground Level

LAYNE GRAVEL WALL WELL NO. 5A
for
ALLISON DIV. G.M.C.
PLANT NO. 3

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE

DRAWING NO.

102

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

County in which well was drilled: Marion Civil Township: Wayne

Driving directions to the well location:
Plant #3 - between #6 and #7 Layne well.

Name of property owner (if known): Allison Engineering Division
Address of owner:
Name of building contractor (if known):
Name of Well Drilling Contractor: Layne Northern
Address: Mishawaka, IN
Name of drilling equipment operator: Charles E. Poole

INFORMATION ON THE WELL

Depth of well: 117 Date well was completed: Dec. 4, 1940
Diameter of casing or drive pipe: 16 Total length: 90.75
Diameter of liner (if used): Total length:
Diameter of Screen: 8 Length: 25.25 Slot size: NO. 4
Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other
Use of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐
Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐
Static water level in completed well (Distance from ground to water level) 26 ft.
Bailer Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)
Pumping Test: Hours tested ____ Rate 285 g.p.m. Drawdown 37 ft.

Signature
Date

FOR WELL LOG SPACE USE REVERSE SIDE

C. (Well No. 2)

01-01 3395

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E NW ¼ NW ¼ NE ¼ SEC. 6

Topo Map: I 4

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

[illegible] Ft W of EL. Ground elevation [illegible]

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

[illegible] Ft S of NL. Aquifer elevation _____

Subdivision Name ~~Allison GMC~~ ~~Plant #3~~

Lot Number _____

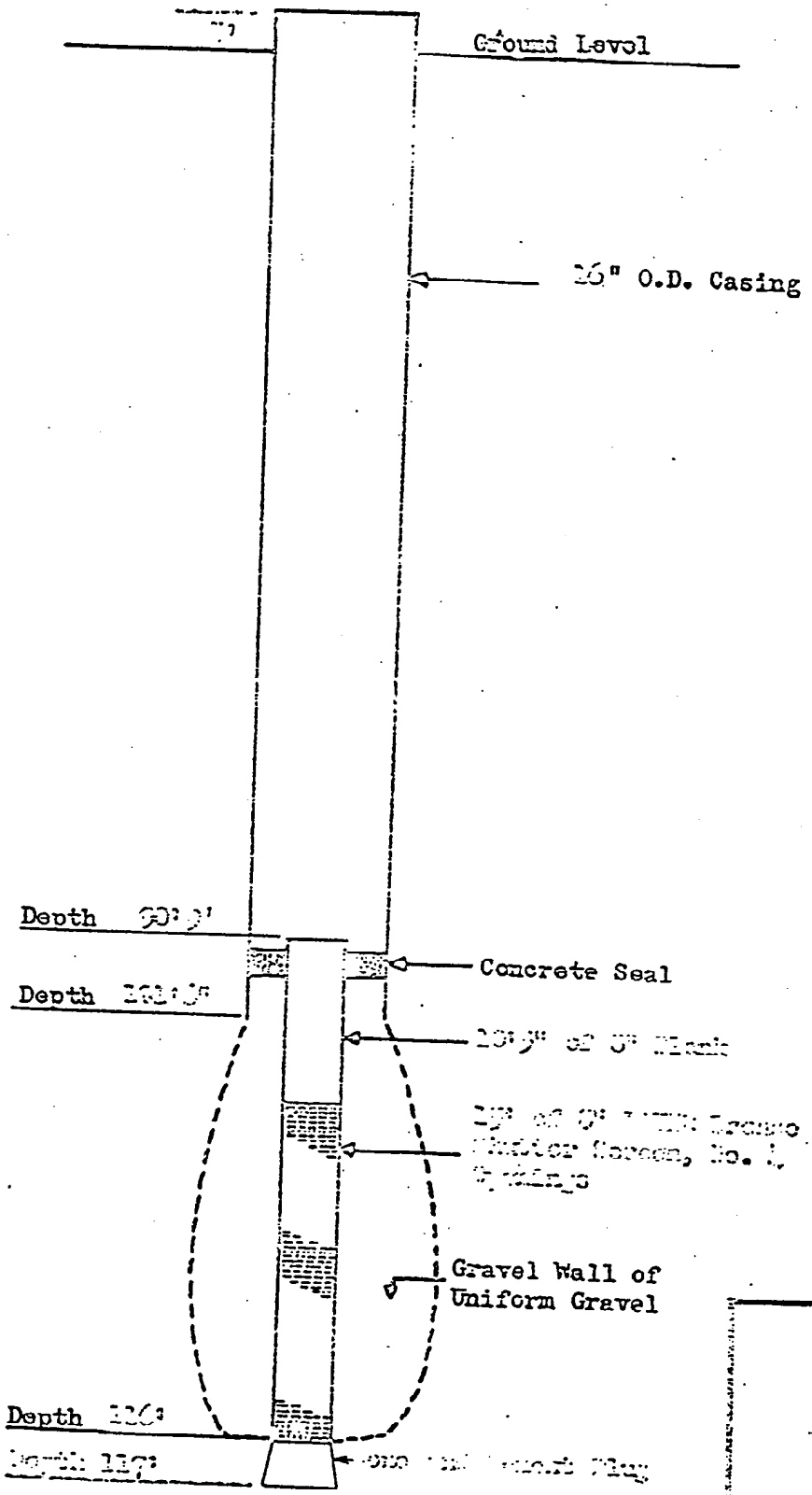
C. (Casing extends above ground)
C. (addt'l info stapled to log)

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
S+G	0	34
Clay	34	37
S+G	37	42
Clay	42	47
Sand	47	48
Clay	48	52
S+G	52	59
Hard Gritty Clay	59	92
S+G	92	93
Hard Gritty Clay	93	100
Sand and Gravel	100	103
Sand and Gravel	103	117

REMARKS:

C-1580E



Marion Co.
Wayne Twp

9 Single Cased
LAYNE GRAVEL WALL WELL
for

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE
DRAWING NO.

Driller
Date Finished

Not drawn to Scale
All depths measured
from ground level

Static Level 27'
Pumped 285 GPM
at 64' Pumping Level

1426

103

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: Marion Civil Township: Wayne

Congressional township: 15N Range: 3E Number of section: 6

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: 35 feet South of South Side of #7 Well House, 35 feet East of center line of Cossell Road

Name of owner: Allison Division G.M.C. Plant #3 Address:

Name of Well Drilling Contractor: Layne Northern

Address: Mishawaka, IN

Name of Drilling Equipment Operator: Ewing Allen

INFORMATION ON THE WELL

Completed depth of well: 117 ft. Date well was completed: October 21, 1968

Diameter of outside casing or drive pipe: 18 Length: 117

Diameter of inside casing or liner: Length:

Diameter of Screen: 18 Length: 15 Slot size: .130

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: ☒ Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐ Reverse Circular

Static water level in completed well (Distance from ground to water level) 37 ft.

Bailer Test: Hours tested Rate g.p.m. Drawdown ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested 12 Rate 361 g.p.m. Drawdown 95 ft.

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Gravel and Boulders	0	35
Clay	35	37
S+G	37	64
Clay	64	101
Fine Sand	101	107
Medium Sand and Gravel	107	117

REMARKS:

~~graphic log~~

COUNTY: Marion TWP. 15N RGE. 3E NW¼ NW¼ NE¼ SEC. 6

Topo Map: Tudyls. West

Well log classified By [illegible] Date 11/68
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By [illegible] Date 11/68

2650 Ft W of EL. Ground elevation 1211±
____ Ft N of SL. Depth to bedrock ____
____ Ft E of WL. Bedrock elevation ____
~650 Ft S of NL. Aquifer elevation ____

C. (well No. 7A)

C. (Casing extends 2 feet above ground)

C. (addt'l info stapled to log)

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a water well. We request that you be as accurate as possible in recording this information as it may be of great assistance in the planning and development of new water supplies.

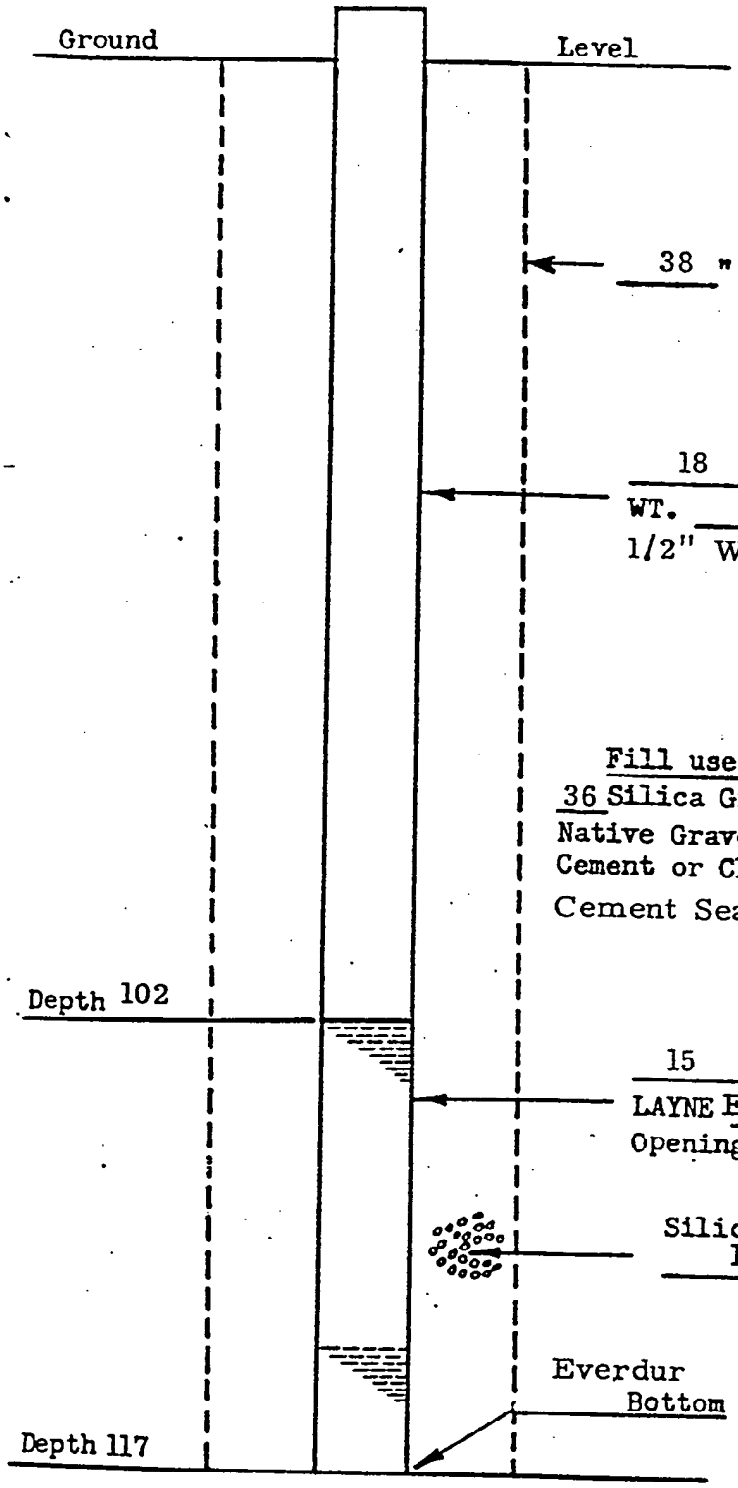
An accurate location of the well is equally as important as an accurate well log. Please include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted within thirty days after the completion of a well to the Division of Water

Pipe extends 2 feet above ground level

Job No. C-21426

Location:
35' S. of S. Side of #7 Well Hse.
35' E. of center line of Cossell



Pipe Tally	Welded Threaded
Bottom	

Fill used from Bottom Up:

36 Silica Gravel	117	to	80	ft.
Native Gravel	78	to	3	ft.
Cement or Clay	3	to	0	ft.
Cement Seal	80	to	78	ft.

Static Level 37
Pumped 361 GPM
at 95 pumping level

Driller Ewing Allen
Date Finished October 21, 1968

Not drawn to scale
All depths measured from Ground Level

LAYNE GRAVEL WALL WELL NO. 7A
for
ALLISON DIV. G.M.C.
PLANT NO. 3

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE

DRAWING NO.

(104)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

ounty in which well was drilled: Marion Civil Township: Wayne

iving directions to the well location:
ft Test well site #22, Cassell Road, Plant #3.

me of property owner (if known): Allison Engineering Company
dress of owner:
me of building contractor (if known):
Well Drilling Contractor: Layne Northern
ress:
me of drilling equipment operator: James Young

INFORMATION ON THE WELL

pth of well: 59 Date well was completed: Oct 9, 1940
ameter of casing or drive pipe: 42 Total length: 21
ameter of liner (if used): Total length:
ameter of Screen: 18 Length: 38 Slot size:
e of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other
of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐
hod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐
tic water level in completed well (Distance from ground to water level) 18 ft.
ler Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)
Test: Hours tested ____ Rate 300 g.p.m. Drawdown 14 ft.

Signature
Date

01-01 183320 FOR ADMINISTRATIVE ONLY
(Well driller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E NW ¼ NW ¼ NE ¼ SEC. 6

Topo Map: I W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

2300 Ft W of EL. Ground elevation 723'

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

1300 Ft S of NL. Aquifer elevation _____

Subdivision Name ~~Allison Gmc~~ ~~Plant #3~~

Lot Number _____

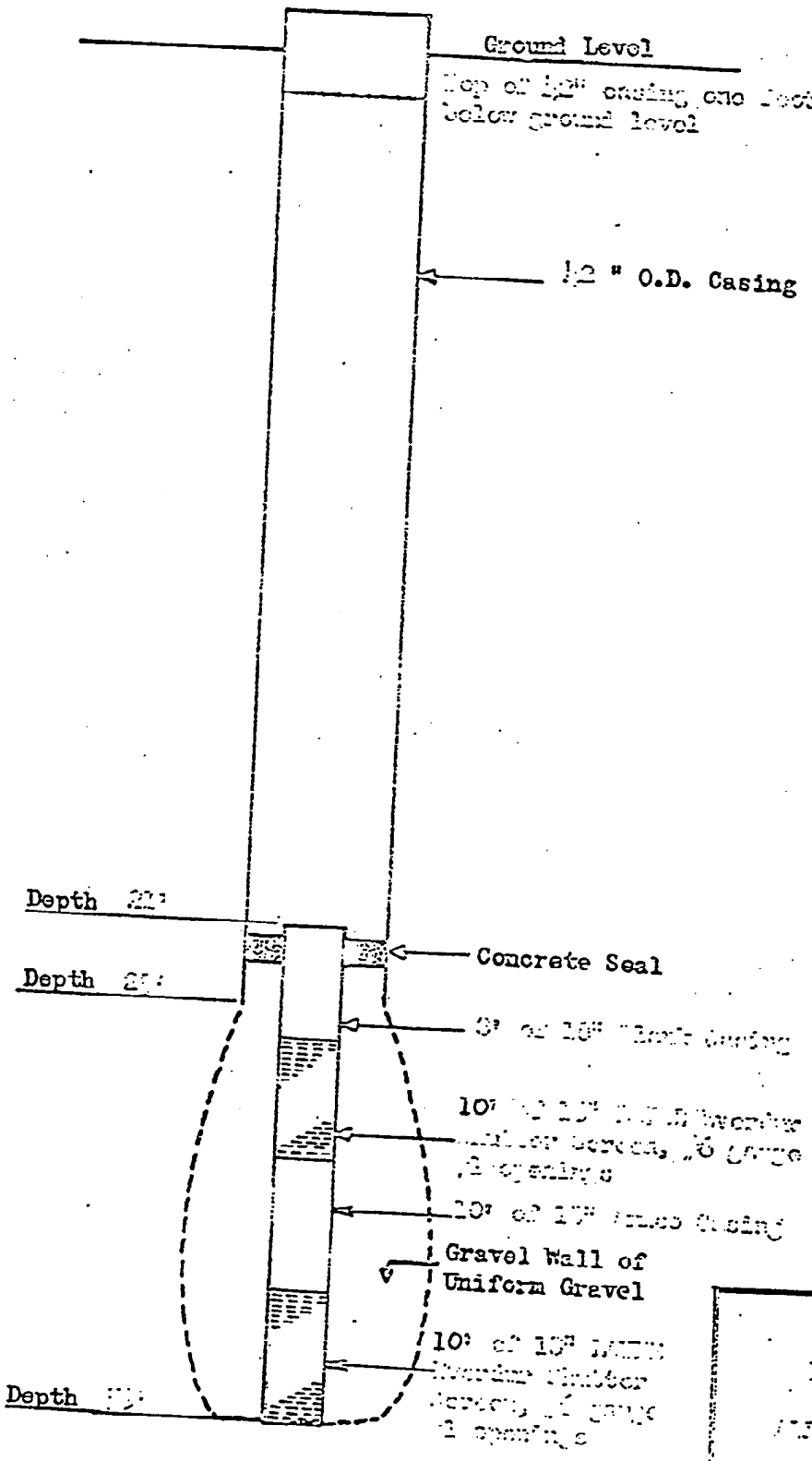
C. (Well No. 8)
C. (Casing is one feet below surface)
C. (addt'l info stapled to log)

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soil and Clay	0	4
Dry Gravel and Sand	4	16
Gravel and Sand	16	32
Gravel with boulders	32	40
Gravel and fine sand	40	42
Fine Sand	42	44
Clay	44	48
S + G	48	59

REMARKS:

C-1580D



Marion Co.
Wayne Twp.

Single Cased
LAYNE GRAVEL WALL WELL
for

Driller
Date Finished

Not drawn to Scale
All depths measured from ground level

Static Level 18(2)
Pumped 300 GPM

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY

105

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

ounty in which well was drilled: Marion Civil Township: Wayne

riving directions to the well location: 600 feet South of #6 Well - Plant #3

ame of property owner (if known): Allison Engineering Company

ldress of owner:

ame of building contractor (if known):

f Well Drilling Contractor: Layne Northern

ress:

ame of drilling equipment operator: James Young

INFORMATION ON THE WELL

pth of well: 59 Date well was completed: Sept. 23, 1940

ameter of casing or drive pipe: 42 Total length: 26

ameter of liner (if used): Total length:

ameter of Screen: 18 Length: 33 Slot size:

pe of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

nod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tic water level in completed well (Distance from ground to water level) 46 ft.

er Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and wate level at end of test

Test: Hours tested ____ Rate 600 g.p.m. Drawdown 8 ft.

Signature

Date

FOR ADMINISTRATIVE U[illegible] ONLY 01-01 183390
(Well driller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E NW ¼ NW ¼ NE ¼ SEC. 6

Topo Map: I W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

[illegible] Ft W of EL. Ground elevation [illegible]

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

600 Ft S of NL. Aquifer elevation _____

Subdivision Name

~~Allison Gmc~~

~~Plant #3~~

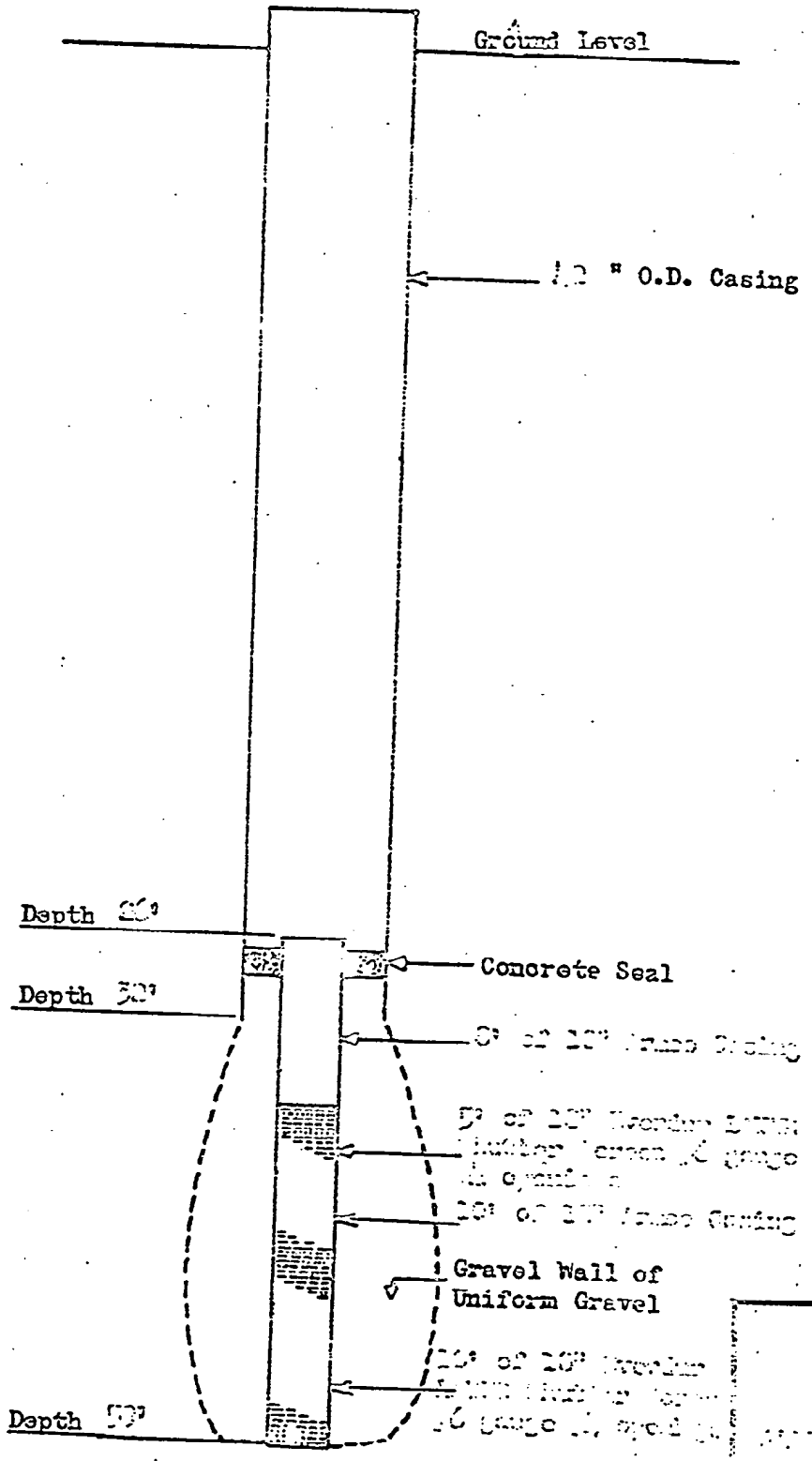
Lot Number _____

C. (Well NO. 7)
C. (Casing extends above ground)
C. (addt'l info stapled to log)

WATER WELL LOG

ORMATIONS (Color, type of material, hardness, etc.)	From	To

MARKS:



Marion Co.
Wayne Twp.

.7 Single Cased
LAYNE GRAVEL WALL WELL
for

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE

DRAWING No.

Driller
Date Finished

Not drawn to Scale
All depths measured
from ground level

Static Level 16'
Pumped 600 GPM
at 24 Pumping Level

(106)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

ounty in which well was drilled: Marion Civil Township: Wayne

iving directions to the well location: Corner 10th Street and Cassel Road

me of property owner (if known): Allison Engineering Company

dress of owner:

me of building contractor (if known):

me of Well Drilling Contractor: Layne Northern

s:

me of drilling equipment operator: James Young

INFORMATION ON THE WELL

pth of well: ~~57.5~~ 57.5 Date well was completed: August 24, 1940

ameter of casing or drive pipe: 42 Total length: 39.5

ameter of liner (if used): Total length:

ameter of Screen: 18 Length: 18 Slot size:

pe of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

e of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

atic water level in completed well (Distance from ground to water level) 19 ft.

ler Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

ping Test: Hours tested ____ Rate 335 g.p.m. Drawdown ~~47~~ 28.5 ft.

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out) 01-01 183385

COUNTY: MARION TWP. 15N RGE. 3E NW¼ NW¼ NE¼ SEC. 6

Topo Map: T W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

2650 Ft W of EL. Ground elevation 724±

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

150 Ft S of NL. Aquifer elevation _____

Subdivision Name: Allison GMC Plant #3

Lot Number _____

WATER WELL LOG

To	From	FORMATIONS (Color, type of material, hardness, etc.)
16	0	Clay and Soil
30	16	Gravel
46	30	Clay
57.5	46	S & G

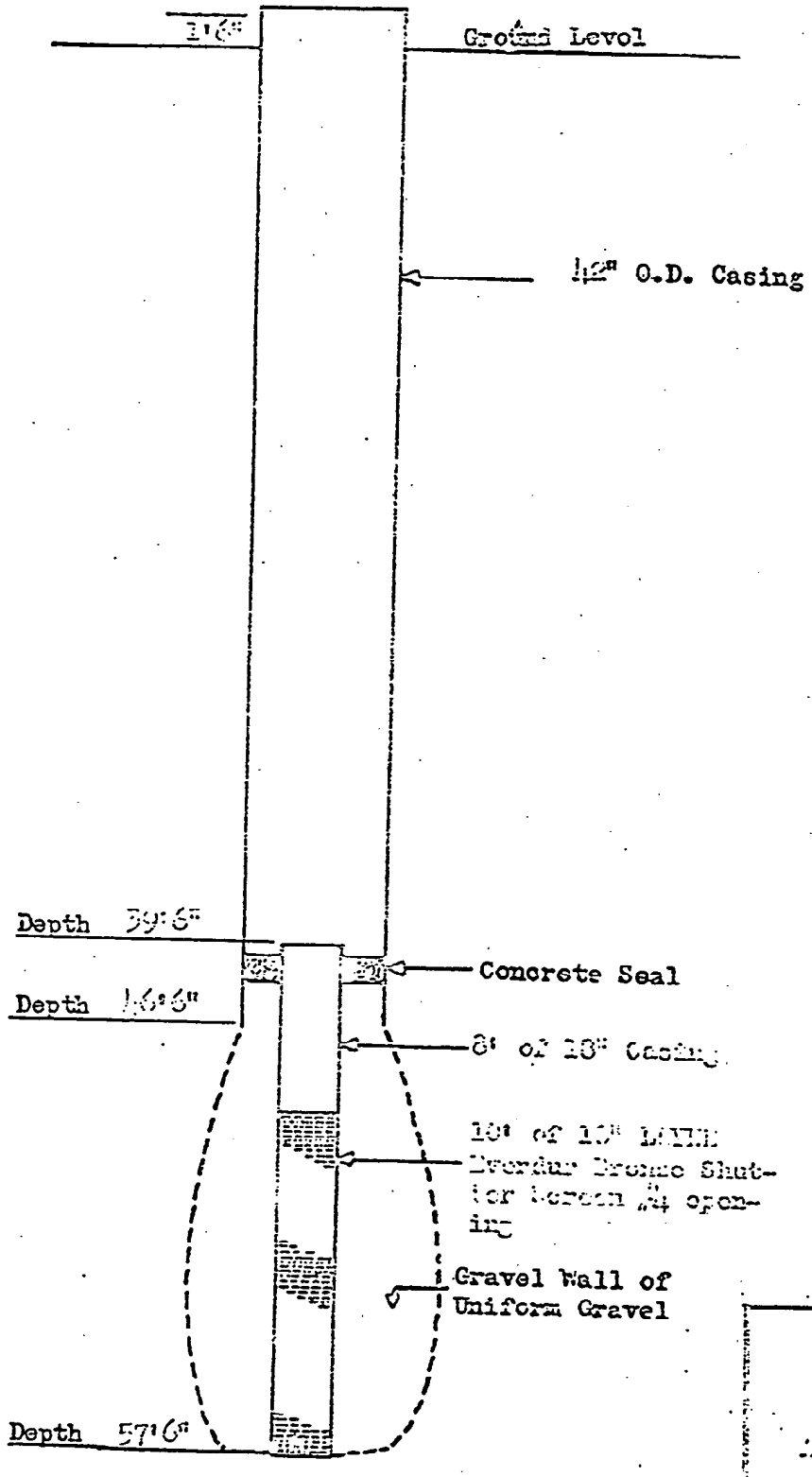
C (casing extends 1.5 feet above ground)

C. (addt'l info stapled to log) Well No. 6)

REMARKS:

Reference 22 Page 232

Our Order No. C-19



Marion Co.
Wayne Twp.

Single Cased
LAYNE GRAVEL WALL WELL
for
WILSON ENGINEERING DIVISION
CHRYSLER MOTORS CORP.
KOKOMO CITY, INDIANA

WELL NO. 5

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE 8-27-40

8/40

DRAWING No.
405

Driller James Young
Date Finished 8-24-40

Not drawn to Scale
All depths measured
from ground level

Static Level 19'
Pumped 335 GPM
at 47'6" Pumping Level

107

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

2000 ft. East and 5129 ft. North of SW Corner of Section 10 feet West of NW corner of Allison #5 Well House, 349 feet East of Cossell Road. 70 feet South of 10th Street.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Division General Motors Corp. Address Plant #3

Building Contractor _____ Address _____

Name of Well Drilling Contractor: Layne Northern

Address Mishawaka, IN

Name of Drilling Equipment Operator: Allen Matlock

WELL INFORMATION

Depth of well: 127 Date well was completed: November 15

Diameter of casing or drive pipe: 4 Total Length: _____

Diameter of liner (if used): _____ Total Length: _____

Diameter of Screen: _____ Length: _____ Slot Size: _____

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For Home ☐ For Industry ☐ ☒ TEST For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) _____ feet

Bailer Test: Hours Tested _____ Rate _____ g.p.m. _____ Drawdown _____ ft.

Pumping Test: Hours Tested _____ Rate _____ g.p.m. _____ Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Gravel	0	14
Blue Clay	14	35
Blue Clay and Sand	35	46
Gravel	46	55
Blue Clay and Sand	55	57
Gravel	57	62
Clay and Sand (Blue)	62	80
Gravel	80	87
Clay and Sand	87	94.5
Sand	94.5	96.5
Soft Blue Clay	96.5	107.5
Fine Gravel	107.5	122
Hard Pack Sandy Clay	122	127
Bed rock	127	

COUNTY Marion TWP. 15W RGE. 3E NW ¼ NW ¼ NE SEC 6

Topo Map I W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

FOR ADMINISTRATIVE USE ONLY (Well driller does not fill out) 01-01 183285

2400 Ft W of EL. Ground Elevation 724± Subdivision Name Allison Game

_____ Ft N of SL. Depth to bedrock _____ Plant #3

_____ Ft E of WL. Bedrock elevation _____

50 Ft S of NL. Aquifer elevation _____ Lot Number _____

108

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

County in which well was drilled: Marion Civil Township: Wayne

Driving directions to the well location: S.E. corner of property, plant #3

Name of property owner (if known): Allison Engineering

Address of owner:

Name of building contractor (if known):

Name of Well Drilling Contractor:

Address:

Name of drilling equipment operator: James Ness

INFORMATION ON THE WELL

Depth of well: 56 Date well was completed: Sept. 12, 1939

Diameter of casing or drive pipe: 42 Total length: 39

Diameter of liner (if used): Total length:

Diameter of Screen: 18 Length: Slot size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) 12 ft.

Bailer Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft.

Pumping Test: Hours tested ____ Rate 280 g.p.m. Drawdown 26 ft. (Difference between static level and water level at end of test)

Signature

Date

01-01-183330

FOR ADMINISTRATIVE ONLY
(Well driller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E SE ¼ NE ¼ NE ¼ SEC. 6

Topo Map: I W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

100 Ft W of EL. Ground elevation 720

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

1400 Ft S of NL. Aquifer elevation _____

Subdivision Name: ~~Allison Grac~~ ~~Plant #3~~

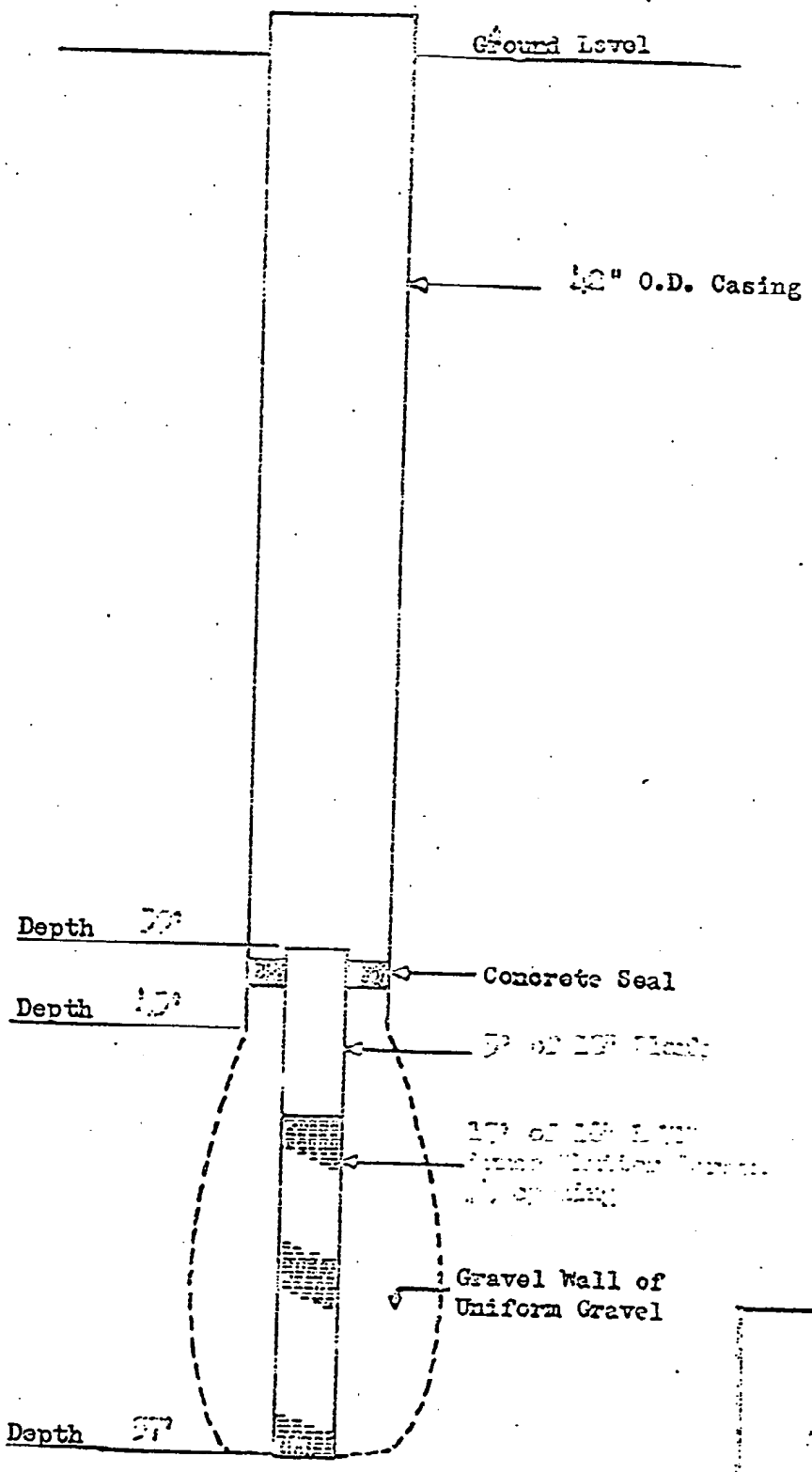
Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soil	0	4
Dry Gravel and Boulders	4	12
Gravel	12	35
Clay	35	43
Gravel and Sand	43	56

C. (Casing extends above ground)
C. (Well no. 3)
C. (addt'l info stapled to log)

MARKS:



Marion Co.
Wayne Twp.

Single Cased
LAYNE GRAVEL WALL WELL
for

Driller
Date Finished

Not drawn to Scale
All depths measured
from ground level

Static Level 12
Pumped 280 GPM
at 38 Pumping Level

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE

DRAWING NO.

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

109

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

215 feet South of #1 Well 25' feet East Center Line Grandie Avenue

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Engineering Company Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern

Address

Name of Drilling Equipment Operator: V. L. Kelly

WELL INFORMATION

Depth of well: 56 Date well was completed: 7-28-41

Diameter of casing or drive pipe: 30 Total Length: 20

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: 35 Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☑ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) 18 feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

180015

(Well driller does not fill out)

COUNTY MARION TWP. 15N RGE. 3E ¼ ¼ ¼ SEC 6?

Topo Map INDIANAPOLIS WEST

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

50 Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

1200 Ft S of NL.

Ground Elevation 700?

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____

Subdivision Name ~~Allison Grove~~

~~Plant #3~~

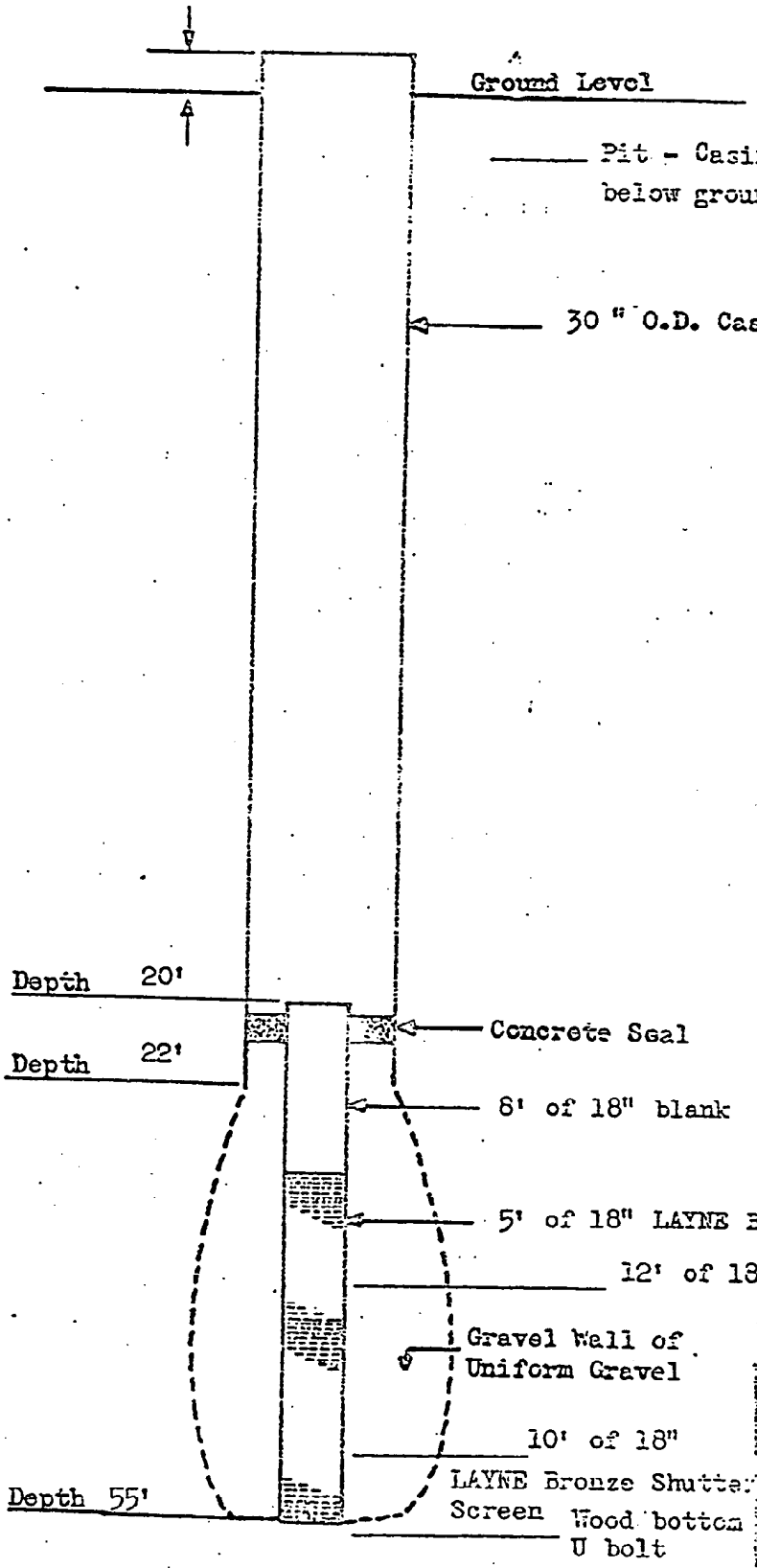
Lot Number _____

C. (addt'l info stapled to log)

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay Fill	0	2
Hard Clay	2	8
St G	8	12
Gritty Clay	12	28
St G	28	35
Gritty Clay	35	42
Fine Sand	42	48
Coarse Sand and Gravel	48	55
Clay	55	58

Our Orde



Marion G.
Wayne Twp.

11 LAYNE GRAVEL WALL WELL
Single Cased
For

ALLISON ENGINEERING COMPANY
PLANT NO. 3 Speedway
INDIANAPOLIS INDIANA
11 RETURN WELL

Drillery. L. Kelly
Date Finished 7/28/41

Not drawn to Scale
All depths measured from ground level

Static Level 18'
Pumped _____ GPM
at _____ Pumping Level

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE 11/27/41

DRAWING NO. 149

(110)

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

n completely

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion	Wayne	15N	3E	6

riving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a ap on reverse side.

Plant #3

OWNER - CONTRACTOR

me of well owner: ALLISON ENGINEERING DIVISION — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of building contractor: — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of drilling contractor: Layne-Northern Company — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of equipment operator: James Ness — License number: — Date of completion: 5-23-39

CONSTRUCTION DETAILS

of well:
] Home ☐ Industry ☒ Test ☐ Irrigation
] Public supply ☐ Stock ☐ Other (*specify*):

thod of drilling
] Rotary ☐ Jet ☐ Bucket rig
] Cable tool ☐ Rev. rotary ☐ Other

sing length feet — Material — Diameter inches

een length feet — Material — Diameter inches

een slot size — Total depth of well

pth of pump setting — Water quality (*clear, cloudy, odor, etc.*)

e of pump ☐ Shallow-well jet ☐ Other (*specify*):
Submersible ☐ Deep-well jet

WELL CAPACITY TEST

ck one ☐ Air
Bailing ☐ Pumping

Test rate _____ gpm _____ hrs.

wdown feet

Static level (*depth of water*) 15 feet

GROUTING INFORMATION

al	Depth of grout From to
od of installation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (feet)	To (feet)
Soil	0	5
Gravel + Sand	5	37
Gritty Clay	37	48
Sand + gravel	48	57
Gritty Clay	57	103
Shale	103	105

(*Additional space for well log on reverse side*)

reby swear or affirm, under the penalties perjury that the information submitted ewith is to the best of my knowledge and ef, true, accurate and complete.

Signature of owner or authorized representative — Date

FOR ADMINISTRATIVE USE ONLY (well driller does not fill out) 01-01 180430

County	Township	Range		Section
Marion	15N	3E	SE 1/4 NE 1/4 NE	6

Topo map	600 Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	1400 Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION (Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

C.

Test #1

(one of several test wells)

(111)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

ounty in which well was drilled: Marion Civil Township: Wayne

riving directions to the well location: 95 feet South of N.W. gate on 10th street, 50 feet East of West fence

ame of property owner (if known): Allison Engineering Company

ddress of owner:

ame of building contractor (if known):

f Well Drilling Contractor: Layne Northern

dress:

ame of drilling equipment operator: James Ness

INFORMATION ON THE WELL

epth of well: 62.5 Date well was completed: May 13, 1940

iameter of casing or drive pipe: 42 Total length: 38.5

iameter of liner (if used): Total length:

iameter of Screen: 18 Length: Slot size: #4

ype of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

se of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

ethod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tatic water level in completed well (Distance from ground to water level) 20 ft.

iller Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

ing Test: Hours tested ____ Rate 400 g.p.m. Drawdown 25 ft.

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

(Well driller does not fill out)

Su 01-01 183380

COUNTY: MARION TWP. 15N RGE. 3E NE ¼ NW ¼ NE ¼ SEC. 6

Allison Gmc

Plant #3

Topo Map: I W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

1500 Ft W of EL. Ground elevation 725

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

100 Ft S of NL. Aquifer elevation _____

Lot Number _____

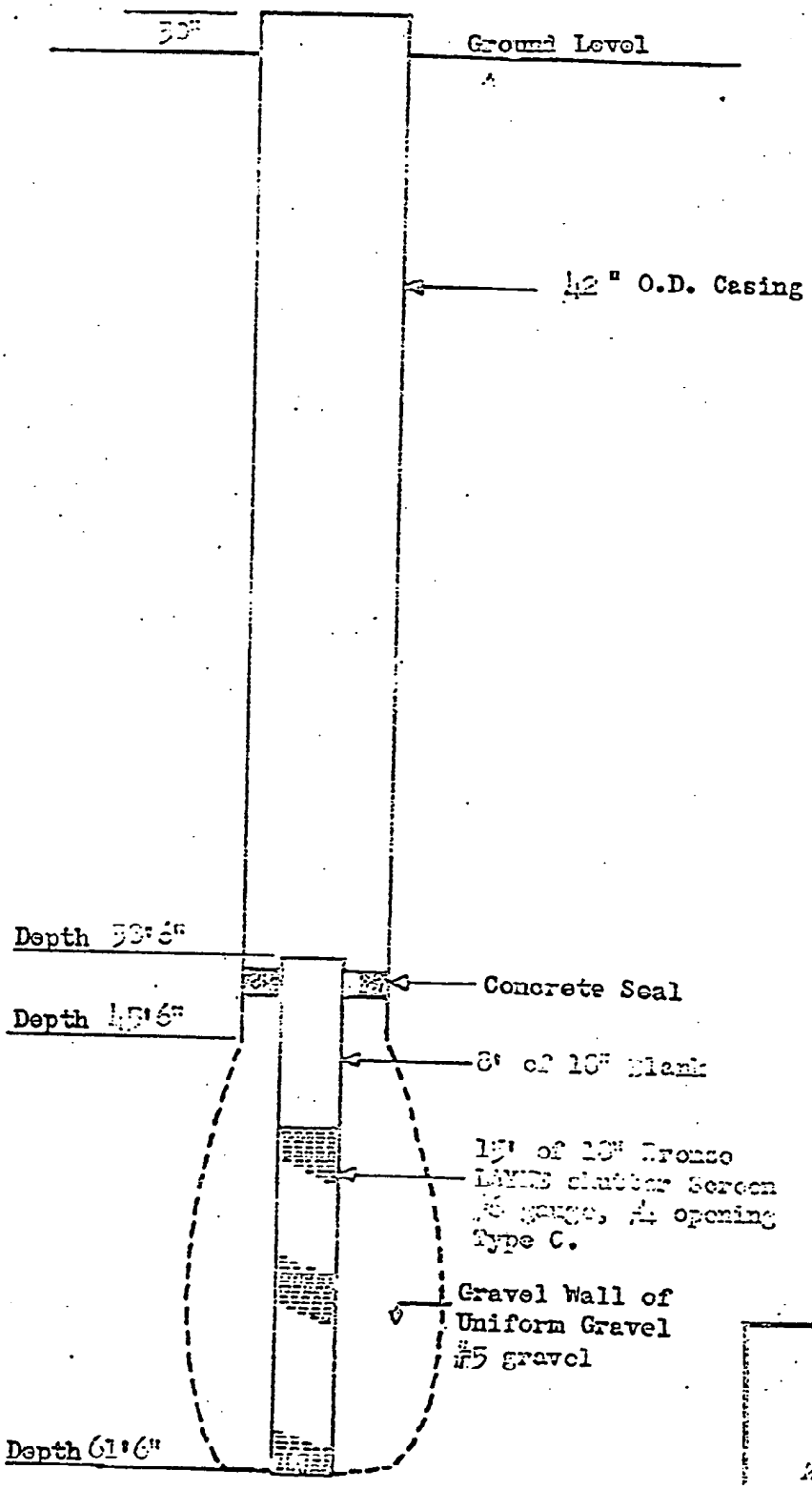
WATER WELL LOG

To	From	FORMATIONS (Color, type of material, hardness, etc.)
5	0	Soil and dirt
15	5	Gravel
31	15	Clay
62.5	31.5	Gravel

C (Casing extends above ground)
C (Well No. 4)
C (addt'l info stapled to log)

ARKS:

Reference 22 Page 245



Marion Co.
Wayne Twp.

Single Cased
LAYNE GRAVEL WALL WELL
for
ALLISON ENGINEERING DIVISION
GENERAL MOTORS CORP.
SPRINGFIELD CITY, INDIANA
PLAN NO. 3

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

Driller James Ross
Date Finished 5-16-40

Not drawn to Scale
All depths measured
from ground level

Static Level 20'
Pumped 400 GPM
at 45' Pumping Level

DRAWN BY
APPROVED BY
DATE 5-21-40

DRAWING No.
389

(112)

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

completely

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion	Wayne	15N	3E	6

Driving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a map on reverse side.

690 feet East of Cossel Road, and West 10th Street

OWNER-CONTRACTOR

Name of well owner: Allison Engineering Division — Telephone number:

Address (*number and street, city, state, ZIP code*):

Name of building contractor: — Telephone number:

Address (*number and street, city, state, ZIP code*):

Name of drilling contractor: Layne Northern — Telephone number:

Address (*number and street, city, state, ZIP code*):

Name of equipment operator: James Ness — License number: — Date of completion: May 21, 1940

CONSTRUCTION DETAILS

Use of well: ☐ Home ☐ Industry ☐ Test ☐ Irrigation ☐ Public supply ☐ Stock ☐ Other (*specify*):

Method of drilling: ☐ Rotary ☐ Jet ☐ Bucket rig ☐ Cable tool ☐ Rev. rotary ☐ Other

Casing length	Material	Diameter
feet		inches
Screen length	**Material**	**Diameter**
feet		inches

Screen slot size: — Total depth of well:

Depth of pump setting: — Water quality (*clear, cloudy, odor, etc.*):

Type of pump: ☐ Shallow-well jet ☐ Submersible ☐ Deep-well jet ☐ Other (*specify*):

WELL CAPACITY TEST

Check one: ☐ Air ☐ Bailing ☐ Pumping

Test rate: _____ gpm _____ hrs.

Drawdown: feet — Static level (*depth of water*): 20 feet

GROUTING INFORMATION

Material	Depth of grout From to	Method of installation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To	Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
Soil, dirt	0	7
Gravel	7	17
Hard Pan	17	40
Gravel	40	44
Hard Pan	44	53
Gravel	53	61
Clay	61	102
Fine Sand	102	113
Shale	113	115

(*Additional space for well log on reverse side*)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner or authorized representative: — Date:

FOR ADMINISTRATIVE USE ONLY
(well driller does not fill out)

01-01 180010

County	Township	Range		Section
Marion	~~Wayne~~ 15N	3E ~~15N~~	NE 1/4 NW 1/4 NE	6

Topo map	1950 Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	100 Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS (type of material)	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks)

N

W

E

113

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

completely

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion	Wayne	15N	3E	6

Driving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a map on reverse side.

325 Feet South of Test #16

OWNER - CONTRACTOR

Name of well owner: Allison Engineering Company Plant #3 — Telephone number:

Address (*number and street, city, state, ZIP code*):

Name of building contractor — Telephone number:

Address (*number and street, city, state, ZIP code*):

Name of drilling contractor: Layne Northern — Telephone number:

Address (*number and street, city, state, ZIP code*):

Name of equipment operator: James Ness — License number: — Date of completion: May 27, 1940

CONSTRUCTION DETAILS

Use of well:
- [ ] Home
- [ ] Public supply
- [ ] Industry
- [ ] Stock
- [x] Test
- [ ] Other (*specify*):
- [ ] Irrigation

Method of drilling:
- [ ] Rotary
- [ ] Cable tool
- [ ] Jet
- [ ] Rev. rotary
- [ ] Bucket rig
- [ ] Other

Casing length	Material	Diameter
feet		inches
Screen length	**Material**	**Diameter**
feet		inches

Screen slot size: — Total depth of well:

Depth of pump setting: — Water quality (*clear, cloudy, odor, etc.*):

Type of pump:
- [ ] Submersible
- [ ] Shallow-well jet
- [ ] Deep-well jet
- [ ] Other (*specify*):

WELL CAPACITY TEST

Check one:
- [ ] Bailing
- [ ] Air
- [ ] Pumping

Test rate: _____ gpm _____ hrs.

Drawdown: feet

Static level (*depth of water*): 17 feet

GROUTING INFORMATION

Material	Depth of grout From to	Sealing material	Depth filled From To
Method of installation	Number of bags used	Method of installation	Number of bags used

WELL ABANDONMENT

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
Soil, Dirt	0	6
Gravel	6	13
Hard Pan	13	35
Gravel	35	39
Hard Pan	39	46
Gravel	46	59
Tough Clay	59	101
Fine Sand	101	105
Shale	105	107

(*Additional space for well log on reverse side*)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner or authorized representative: — Date:

FOR ADMINISTRATIVE USE ONLY (well driller does not fill out) 01-01 179995

County	Township	Range		Section
Marion	15N	3E	NE 1/4 NW 1/4 NE	6

Topo map	1950 Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	400 Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS (Type of material)	FROM Feet	TO Feet

SKETCH SHOWING LOCATION (Locate with reference to highways, intersection, county roads, and distinctive landmarks)

C. (Test well No. 17)

N

W

E

(114)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

ounty in which well was drilled: Marion Civil Township: Wayne

riving directions to the well location: Ind. Boiler Room of new factory

ame of property owner (if known): Allison Engineering Division

ddress of owner:

ame of building contractor (if known):

ame of Well Drilling Contractor: Layne Northern

ddress: Mishawaka, IN

ame of drilling equipment operator: James Young

INFORMATION ON THE WELL

epth of well: 60 Date well was completed: August 2, 1939

iameter of casing or drive pipe: Total length:

iameter of liner (if used): Total length:

iameter of Screen: Length: Slot size:

ype of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

se of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

ethod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tatic water level in completed well (Distance from ground to water level) 14 ft.

ailer Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

ing Test: Hours tested ____ Rate 260 g.p.m. Drawdown 39 ft.

Signature

Date

01-01 183305 FOR ADMINISTRATIVE ONLY
(Well driller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E NW ¼ NE ¼ NE ¼ SEC. 6

Topo Map: I W

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

700 Ft W of EL. Ground elevation 728 ft

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

680 Ft S of NL. Aquifer elevation _____

C. (addt'l info stapled to log)

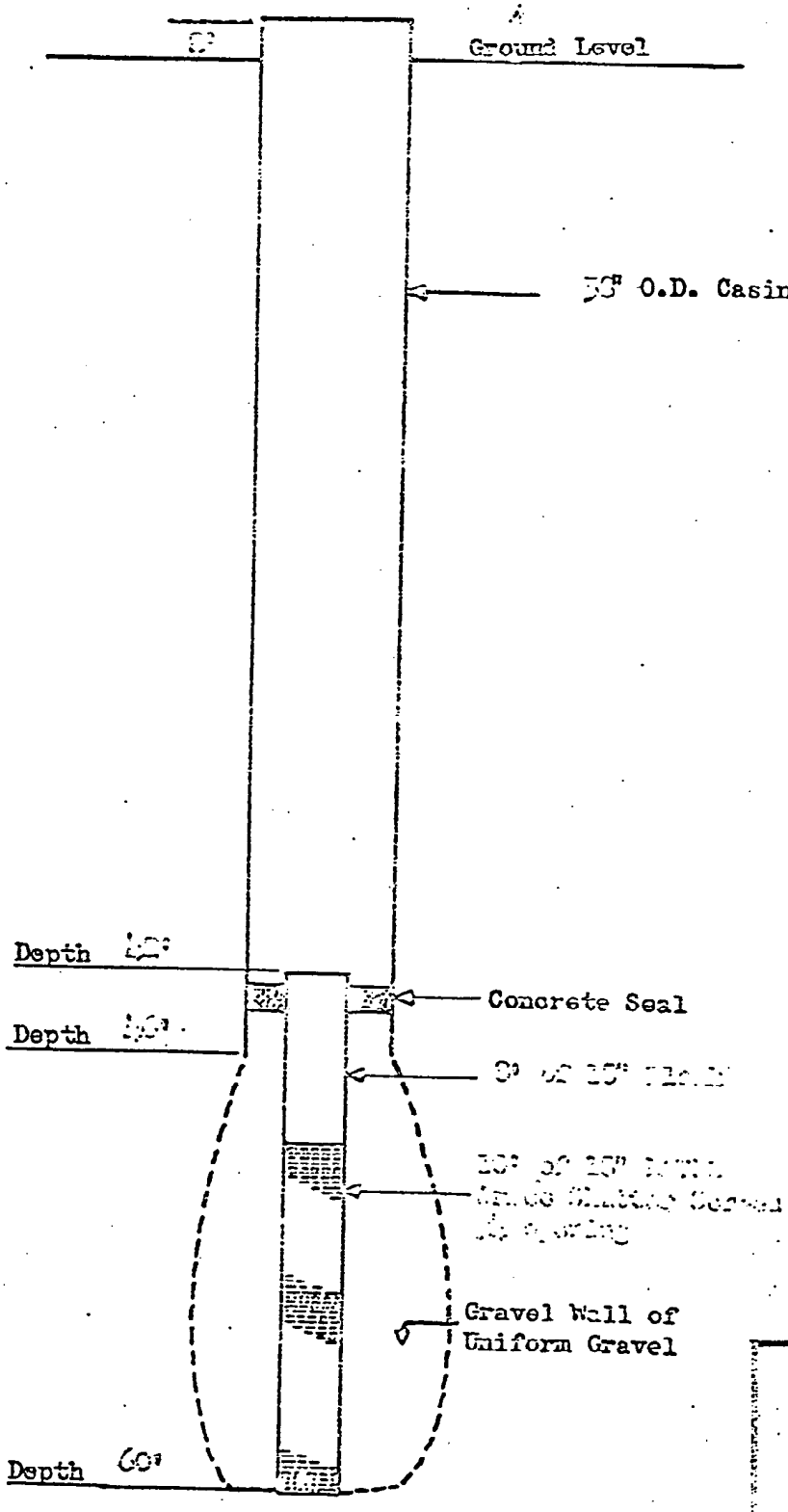
Subdivision Name: Allison GMC Plant #3

Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soil	0	5
Gravel	5	20
Clay	20	48
Gravel and Sand	48	60

KS:



Marion Co.
Wayne Twp.

Single Cased
LAYNE GRAVEL WALL WELL
for

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DRAWING NO.

Driller
Date Finished

Not drawn to Scale
All depths measured
from ground level

Static Level 14'
Pumped 260 GPM
at Pumping Level

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

115

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

115' S. of Fence, 115' W. of Cassell Road
S.W. of Plant #3, 15' S. of #12 Permanent Well

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel Allison Div. Address

Building Contractor Address

Name of Well Drilling Contractor: Layne-Northern Company

Address Mishawaka, Ind.

Name of Drilling Equipment Operator: C. Freeman

WELL INFORMATION

Depth of well: 118 Date well was completed: 5-20-75

Diameter of casing or drive pipe: Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 180434

ALLISON ~~TEST~~ ~~75H~~

COUNTY MARION TWP. 15N RGE. 3E ¼ ¼ NE SEC 6

~~LAYNE 5/20/75~~ Subdivision Name

Topo Map INDIANAPOLIS WEST ~~7½~~

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by BRUNS 3-18-76

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation 720

Depth to bedrock _____

Bedrock elevation _____

Aquifer elevation _____

Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Topsoil, clay & fill	0	8
Sand & gravel	8	12
Clay	12	18
Sand gravel & boulders	18	33
Grey clay	33	47
Gravel strips	47	48
Clay	48	54
Sand & gravel	54	64
Clay	64	100
Fine sand & clay	100	110
Sand & gravel	110	118
Shale	118	

(Test Well 75H)

(116)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

ELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Plant 3 10th & Main

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Div. G.M.C. Address

Building Contractor Address

ame of Well Drilling Contractor: Layne-Northern

ddress

ame of Drilling Equipment Operator:

ELL INFORMATION

pth of well: 59 Date well was completed: Oct. 1940

iameter of casing or drive pipe: ~~42~~ 18 Total Length:

iameter of liner (if used): Total Length:

iameter of Screen: Length: Slot Size:

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other

e of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

thod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tic water level in completed well (Distance from ground to water level) 18 feet

ler Test: Hours Tested Rate g.p.m. Drawdown ft.

g Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Source of Data: Owner's Files

~~Signature~~

~~Date~~ John G. Ferris, USGS 1-4-45

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soil & clay	0	4
Dirgravel & sand ~~Static~~	4	16
Gravel & sand ~~16~~	16	32
Gravel w/ boulders	32	40
Gravel w/ fine sand	40	42
Fine Sand	42	44
Clay	44	48
Sand w/ gravel	48	59
Clay	59	
static 13' on completion		
Screen 10' of 18' Layne #1 opening	29	39
10' " " Armco casing	39	49
10' " " Layne #1 opening	49	59

01-1 180000

COUNTY Madison

Topo Map

Field Located By

Courthouse Location By

Location accepted w/o verification by

Date

Date

TWP. 15N RGE. 3E ¼ ¼ NE SEC 6

FOR ADMINISTR /E USE ONLY
(Well driller does not fill out)

Ft W of EL.

Ft N of SL.

Ft E of WL.

Ft S of NL.

Ground Elevation

Depth to bedrock

Bedrock elevation

Aquifer elevation

Subdivision Name

Lot Number

(117)

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W. Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

completely

WELL LOCATION

unty where drilled	Civil township	Township	Range	Section
Marion	Wayne			

iving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a ap on reverse side.

2000 feet East and 5129 feet North of SW Corner of section
0 feet West of N.W. corner of Allison #5 Well House
340 feet East of Cossell Road. 70 feet South of 10th Street

OWNER - CONTRACTOR

me of well owner: Allison Divison General Motors Corp. Plant #3 — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of building contractor: — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of drilling contractor: Layne Northern — Telephone number:

dress (*number and street, city, state, ZIP code*): Mishawaka, IN

me of equipment operator: len Matlock — License number: — Date of completion: November 15.

CONSTRUCTION DETAILS

of well:
Home ☐ Industry ☑ Test ☐ Irrigation
Public supply ☐ Stock ☐ Other (*specify*):

thod of drilling
Rotary ☐ Jet ☐ Bucket rig
Cable tool ☐ Rev. rotary ☐ Other

sing length	Material	Diameter
feet		4 inches
een length	Material	Diameter
feet		inches

een slot size: — Total depth of well:

th of pump setting: — Water quality (*clear, cloudy, odor, etc.*):

e of pump
Submersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (*specify*):

WELL CAPACITY TEST

ck one
Bailing ☐ Air ☐ Pumping

Test rate: _____ gpm _____ hrs.

vdown: feet — Static level: (*depth of water*) feet

GROUTING INFORMATION

al	Depth of grout From to	Sealing material	Depth filled From To
od of installation	Number of bags used	Method of installation	Number of bags used

WELL ABANDONMENT

WELL LOG

FORMATIONS: Type of material	From (feet)	To (feet)
Top Gravel	0	14
Blue Clay	14	35
Blue Clay and Sand	35	46
Gravel	46	55
Blue Clay and Sand	55	57
Gravel	57	62
Clay and Sand (Blue)	62	80
Gravel	80	87
Clay and Sand	87	94.5
Sand	94.5	96.5
Soft Blue Clay	96.5	107.5
Fine Gravel - (water bearing)	107.5	122

(*Additional space for well log on reverse side*)

eby swear or affirm, under the penalties perjury that the information submitted with is to the best of my knowledge and f. true, accurate and complete.

Signature of owner or authorized representative: — Date:

01-01 183300

FOR ADMINISTRATIVE USE ONLY (Well driller does not fill out)

County	Township	Range	1/4	1/4	Section
Marion	15N	3E			6

Topo map	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG

FORMATIONS: type of material	FROM Feet	TO Feet
Hard Pack Sandy Clay	122	127
Bed Rock	127	

SKETCH SHOWING LOCATION (Locate with reference to highways, intersecting county roads and distinctive landmarks)

C. (Well log No. 66A)

N

W

E

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

118

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Plant #3 - 125 feet West of East Shoulder of Cossell Road 100 feet South of fence. 15 feet North of Test well no. 751t

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel/Allison Division of GMC Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern

Address

Name of Drilling Equipment Operator: Robert Collins

WELL INFORMATION

Depth of well: 119 Date well was completed: 8/31/75

Diameter of casing or drive pipe: 16 Total Length: 111

Diameter of liner (if used): Total Length:

Diameter of Screen: 16 Length: 8 Slot Size: #6

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) 50 feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 8 Rate 300 g.p.m. Drawdown 34 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

CASING EXTENDS 3 FEET ABOVE GROUND LEVEL

JOB NO. 23551

DISTRICT Indianapolis

LOCATION: 125' West of Cossell Rd. 100' S. of fence, North side of Eagle Creek

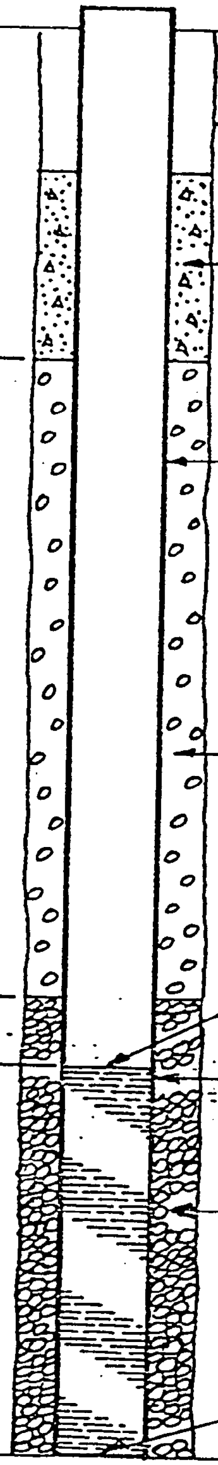
COUNTY Marion

TOWNSHIP Wayne

SECTION 6 T 15N R 3E

STATE Indiana

GROUND LEVEL



24 "DIA. HOLE

20 ' CONCRETE SEAL

DEPTH 30

16 " O.D. STEEL WELL CASING. 3/8 " WALL THICKNESS.

GRAVEL FILL

welded CONNECTION SCREEN

DEPTH 100

DEPTH 111

8 FT. OF 16 IN. DIA. Layne Shutter S.S. SCREEN OPENING #6

SILICA GRAVEL WALL 4 YDS. SIZE # 48

1/4" S.S. PLATE

DEPTH 119 BOTTOM

CASING TALLY

	FT.	WELDED THREADED IN.
BOTTOM		
TOP		
TOTAL		

FILL USED FROM BOTTOM UP

SILICA GRAVEL PACK	119 TO 100	FT.
GRAVEL FILL	100 TO 20	FT.
CONCRETE	30 TO 10	FT.

STATIC LEVEL 50'

PUMPED 305 G.P.M. AT 96 FEET PUMPING LEVEL AFTER 24 HOURS

TYPE OF RIG R.C. DRILLER R. Collins DATE COMPLETED 8/31/75

NOTE: ALL DEPTHS MEASURED FROM GROUND LEVEL. NOT TO SCALE.

GRAVEL WALL WELL NO. 12 TYPE SC-1

FOR: DETROIT DIESEL/ALLISON DIVISION OF GENERAL MOTORS - Plant #3, South Well

SINGER - LAYNE-NORTHERN DIV.

INDIANAPOLIS, IND. • MISHAWAKA, IND. • LANSING, MICH.

DRAWING NUMBER SC-1

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Brown Clay	0	15
Fill cement, trash	15	33
Hard Gritty Clay	33	48
Medium to coarse gravel	48	51
Hard Gritty clay	51	54
Coarse Gravel, medium Sand	54	63
Hard Gritty Clay	63	98
Strips of soft sand, stone, wood	98	99
Brown Clay	99	101
Soft Gritty clay, gray	101	108
Black Shale	108	109
Coarse Gravel, medium sand, gray	109	114
Coarse Gravel, gray	114	119
Black Shale Bottom	119	

C. (Casing extends 3 feet above ground)

C. (Well log No. 12) C. (addt'l info stapled log)

COUNTY MARION TWP. 15N RGE. 3E ¼ ¼ NE SEC 6 Subdivision Name

Topo Map INDIANAPOLIS WEST 7½

Field Located By _____ Date _____ Ft W of EL. _____ Ground Elevation _____

Courthouse Location By _____ Date _____ Ft N of SL. _____ Depth to bedrock _____

Location accepted w/o verification by BRUNS 3-18-76 Ft E of WL. _____ Bedrock elevation _____

Ft S of NL. _____ Aquifer elevation _____ Lot Number _____

F 01-01 3335 SE ONLY (all out)

~~DETROIT DESIGN~~ ~~ALLEN~~ ~~#72~~

~~LAYNE~~ 8/31/75

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

119

WATER WELL RECORD

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

ounty in which well was drilled: Marion Civil Township: Wayne

riving directions to the well location: Plant #3 12" and 8" Rock Well

me of property owner (if known): Allison Engineering Company

dress of owner:

me of building contractor (if known):

Well Drilling Contractor: Layne Northern

ress:

me of drilling equipment operator: William Wagner and C.E. Poole

INFORMATION ON THE WELL

pth of well: 362 Date well was completed: January 12, 1941

ameter of casing or drive pipe: 12 Total length:

ameter of liner (if used): Total length:

ameter of Screen: 8 Length: Slot size:

e of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

tic water level in completed well (Distance from ground to water level) 69 ft.

ler Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

Test: Hours tested ____ Rate 30 g.p.m. Drawdown ~~24~~ 30 ft.

Signature

Date

01-0 180020

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY: MARION TWP. 15N RGE. 3E ___ ¼ ___ ¼ NE ¼ SEC. 6

Topo Map: I W

Field Located By ___ Date ___

Courthouse Location By ___ Date ___

Location accepted w/o verification by ___

___ Ft W of EL. Ground elevation ___

___ Ft N of SL. Depth to bedrock ___

___ Ft E of WL. Bedrock elevation ___

___ Ft S of NL. Aquifer elevation ___

C (addt'l info stapled to log)

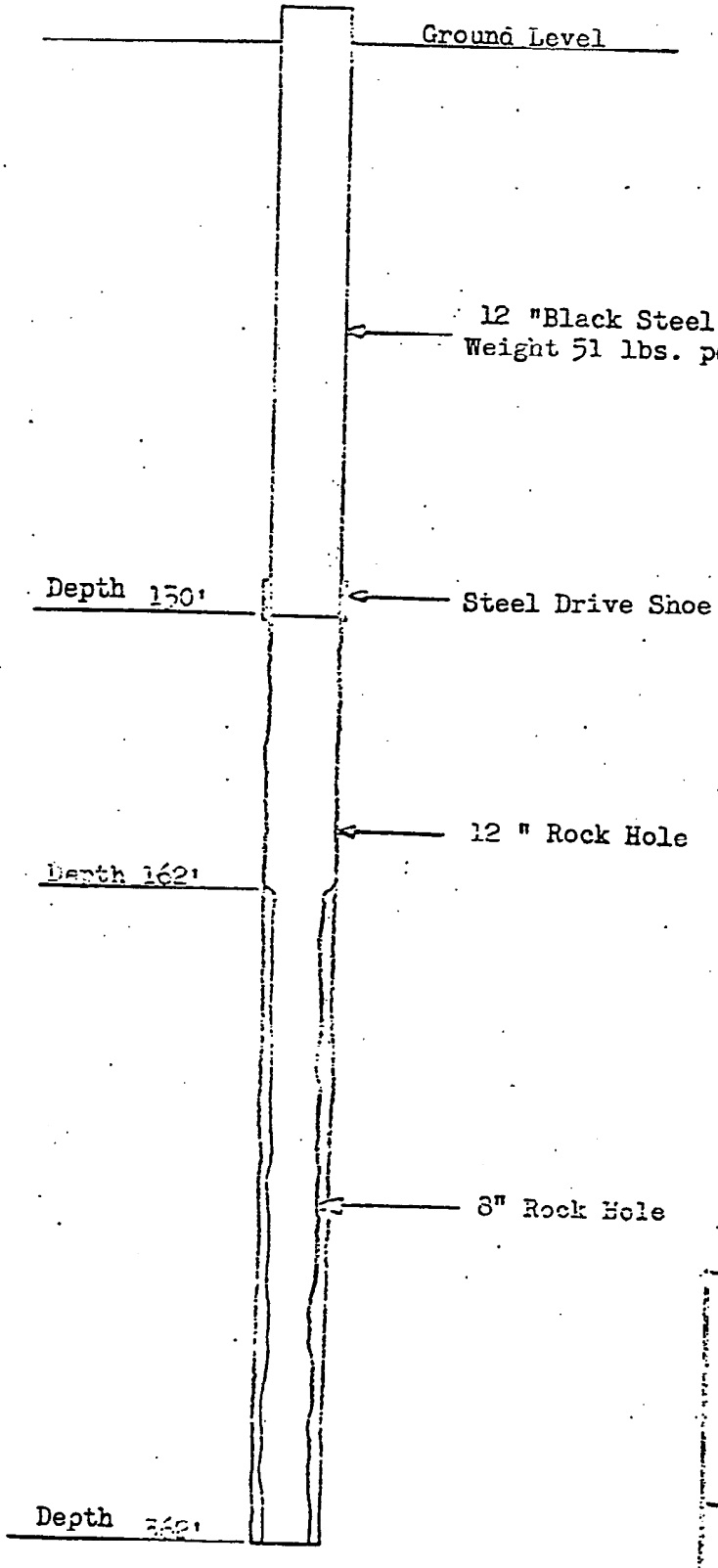
Subdivision Name ~~Allison Gas~~ ~~Plant #3~~

Lot Number ___

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil and Clay	0	5
Gravel and Sand	5	18
Hard Gravelly Clay	18	52
Stg	52	58
Hard Gravelly Clay	58	86
Medium Clay	86	107
Soft Shale	107	109
Medium Clay	109	120
Hard Gravelly Clay	120	124
Sticky Shale	124	129
Hard Shale	129	159
Limestone	159	362

REMARKS:



Marion Co.
Wayne Twp

Static Level 69'
Pumped 30 GPM
at 99' pumping Level

Driller W. WAGNER & C. E. POOLE
Date Finished 1-12-41

#10 ROCK WELL
For
ALLISON ENGINEERING COMPANY
Division General Motors Corp.
Speedway, Indiana
Plant No. 3

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE 2-13-41

DRAWING No.
121

Not drawn to scale
All depths measured from Ground Level

120

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

100' S of N. Fence, 100 E of W Fence
75' S of #11 Permanent Well

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel/Allison Div. Address Plant #3

Building Contractor _____ Address _____

Name of Well Drilling Contractor: Layne-Northern Co.

Address Michawaka, IN

Name of Drilling Equipment Operator: E. Allen

WELL INFORMATION

Depth of well: 124 Date well was completed: 5-20-75

Diameter of casing or drive pipe: _____ Total Length: _____

Diameter of liner (if used): _____ Total Length: _____

Diameter of Screen: _____ Length: _____ Slot Size: _____

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) _____ feet

Bailer Test: Hours Tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Pumping Test: Hours Tested _____ Rate _____ g.p.m. Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature _____

Date _____

FOR ADMINIS[illegible]TIVE USE ONLY
(Well driller [illegible]oes not fill out)

01-01 180429

ALLISO TEST 75
LAYNE 5/20/75

COUNTY MARION TWP. 15N RGE. 3E ¼ ¼ NE SEC 6

Subdivision Name

Topo Map INDIANAPOLIS WEST ~~76~~

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL.
_____ Ft N of SL.
_____ Ft E of WL.
_____ Ft S of NL.

Ground Elevation _____
Depth to bedrock _____
Bedrock elevation _____
Aquifer elevation _____
Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Brown Clay	0	4
Coarse Med. & Fine Gravel	4	25
Med. hard grey clay	27 ~~25~~	34 ~~27~~
Coarse sand & fine gravel	34 ~~27~~	38 ~~34~~
Med. hard grey clay	38 ~~34~~	43
Med to fine gravel	25	27
Soft Sandy grey clay	43	47
Fine gravel w/coarse sand	47	58
Med. hard grey clay	58	106
Med. & fine gravel w/coarse sand	106	124
Dark brown shale	124	

C. (Test Well 75I)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

121

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township Wayne

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

25 feet South of Fence, 100 feet East of West fence. 30 feet South of East 10th street, 75 feet North of 75I test Well

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Detroit Diesel/Allison Division Address

Building Contractor Address

Name of Well Drilling Contractor: Layne Northern

Address

Name of Drilling Equipment Operator: Robert Collins

WELL INFORMATION

Depth of well: 121

Diameter of casing or drive pipe: 16 Date well was completed: 7/17/75

Diameter of liner (if used): Total Length: 106

Diameter of Screen: 16 Length: 15 Total Length:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Slot Size: #6

Use of Well: For Home ☐ For Industry ☑ Other

Method of Drilling: ☑ Reverse Circular Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ For Public Supply ☐ Stock ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 24 Rate 316 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE

(Well driller does not fill out)

01-01 165290

COUNTY MARION TWP. 15N RGE. 3E ___ ¼ ___ ¼ NE SEC 6 Subdivision Name

Topo Map INDIANAPOLIS WEST

Field Located By ___ Date ___

Courthouse Location By ___ Date ___

Location accepted w/o verification by [illegible] 3-18-76

___ Ft W of EL. Ground Elevation ___

___ Ft N of SL. Depth to bedrock ___

___ Ft E of WL. Bedrock elevation ___

___ Ft S of NL. Aquifer elevation ___ Lot Number ___

C. (Casing extends 3.5 feet above ground)

C. (addt'l info Stapled to log)

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Brown Clay	0	4
Fill, Boulders, Coarse yellow gravel	4	16
Coarse Gravel and Medium Sand Gray	16	23
Medium Gravel, fine Sand - Grey	23	24
Medium Gravel, Medium Sand clay strips-yellow	24	27
Coarse Gravel, med. sand gray clay strips	27	28
Coarse Yellow Gravel, boulders	28	30
Med. Gravel, boulders, fine Sand	30	38
Hard Gray Clay, gritty	38	44
Sand Stone	44	45
Med. gravel, med. Sand - gray	45	53
Coarse Gravel, med. sand, boulders	53	57
Hard Gritty Clay Gray boulders	57	76
Med. Gravel, med. Sand - gray	76	79
Soft Gritty clay - gray	79	99
Coarse gravel/coarse sand - gray	99	103
Coarse Gravel, coarse sand, pcs. of wood	103	105
Coarse Gravel, med. sand - gray	105	121

CASING EXTENDS 3'-6" FEET ABOVE GROUND LEVEL

JOB NO. 23551

DISTRICT Indianapolis

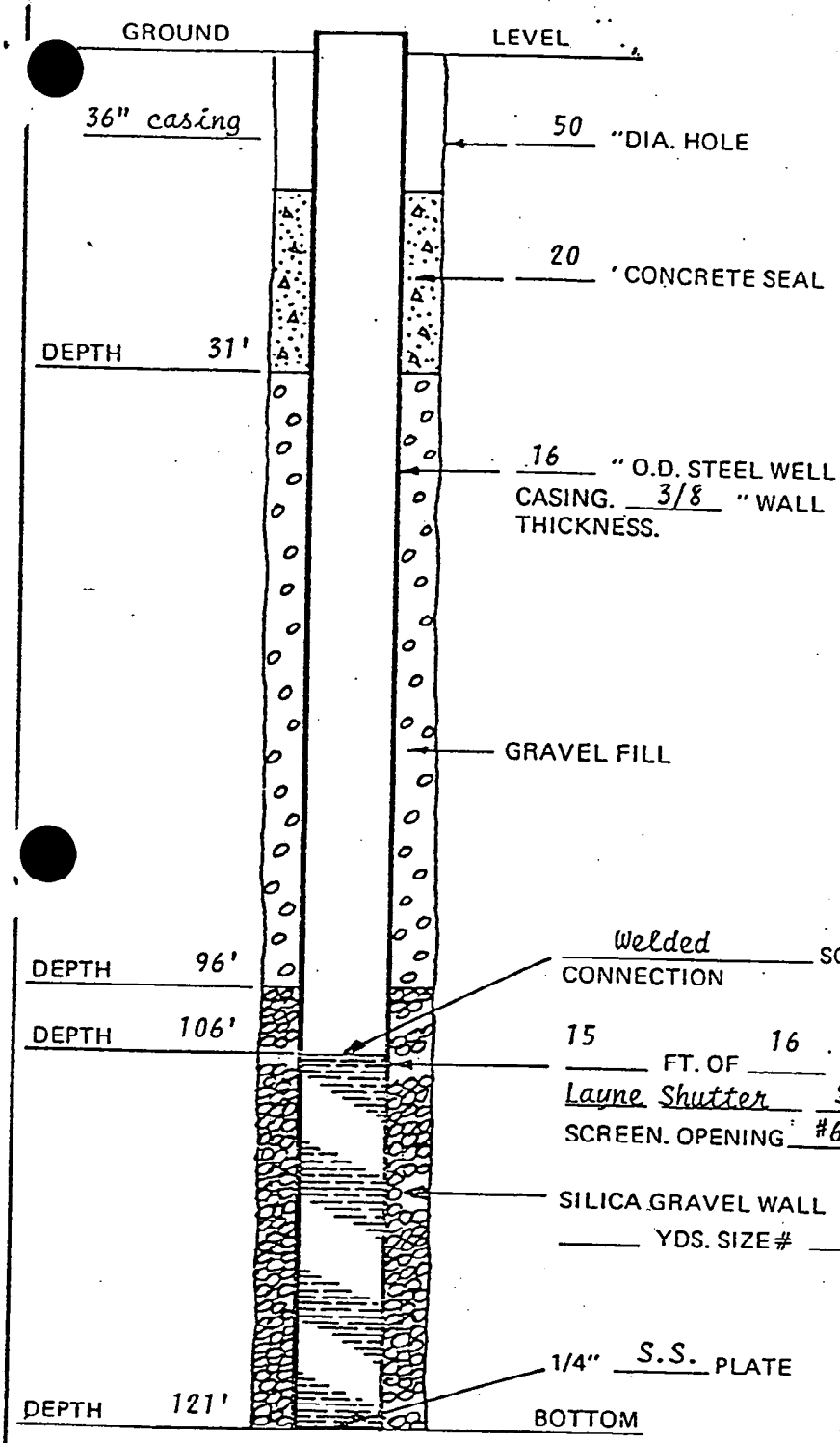
LOCATION: 30' S. of East 10th St.
25' S. of Fence
100' E. of West Fence

COUNTY Marion

TOWNSHIP Wayne

SECTION 6 T 15N R 3E

STATE Indiana



CASING TALLY

	FT.	IN.
BOTTOM		
	Screen	15'
	18'	9 1/2"
	21'	3 1/2"
	18'	11"
	20'	7"
	16'	3"
	13'	8"
TOP		
TOTAL		

WELDED THREADED

FILL USED FROM BOTTOM UP

SILICA GRAVEL PACK 121 TO 96 FT.
GRAVEL FILL 96 TO 31 FT.
CONCRETE 31 TO 11 FT.

STATIC LEVEL 46'

PUMPED 316 G.P.M. AT 74 FEET PUMPING LEVEL AFTER 24 HOURS

TYPE OF RIG R.C. DRILLER R. Collins DATE COMPLETED 7/17/75

NOTE: ALL DEPTHS MEASURED FROM GROUND LEVEL. NOT TO SCALE.

GRAVEL WALL WELL NO. 11 TYPE SC-1

FOR: DETROIT DIESEL/ALLISON DIVISION OF GENERAL MOTORS - Plant #3 - North Well

– LAYNE-NORTHERN DIV.

INDIANAPOLIS, IND. • MISHAWAKA, IND. • LANSING, MICH.

DRAWING NUMBER SC-1

5/73

(122)

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

.n completely

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion	~~15N~~ Wayne	~~3E~~ 15N	3E	6

Driving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a map on reverse side.

OWNER - CONTRACTOR

lame of well owner: Allison Engineering Division	Telephone number
ddress (*number and street, city, state, ZIP code*)	
ame of building contractor	Telephone number
ddress (*number and street, city, state, ZIP code*)	
ame of drilling contractor: Layne-Northern Company	Telephone number
ddress (*number and street, city, state, ZIP code*): Mishawaka INDIANA	
a: equipment operator: Poole & C. Kimble	License number / Date of completion: 3-20-39

CONSTRUCTION DETAILS

of well:
- ☐ Home
- ☐ Public supply
- ☐ Industry
- ☐ Stock
- ☒ Test
- ☐ Other (*specify*):
- ☐ Irrigation

ethod of drilling
- ☐ Rotary
- ☐ Cable tool
- ☐ Jet
- ☐ Rev. rotary
- ☐ Bucket rig
- ☐ Other

asing length feet	Material	Diameter inches
creen length feet	Material	Diameter inches
creen slot size	Total depth of well	
epth of pump setting	Water quality (*clear, cloudy, odor, etc.*)	

pe of pump
- ☐ Submersible
- ☐ Shallow-well jet
- ☐ Deep-well jet
- ☐ Other (*specify*):

WELL CAPACITY TEST

eck one
- ☐ Bailing
- ☐ Air
- ☐ Pumping

Test rate _____ gpm _____ hrs.

awdown feet

Static level (*depth of water*) 15 feet

OUTING INFORMATION

ou ial	Depth of grout From to	
od of installation	Number of bags used	

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
Top Soil	0	4
Sand + gravel	4	31 ~~27~~
blue Clay	31 ~~27~~	39
gravel	39	40
blue clay	40	54
sand + gravel	54	60
blue clay	60	108
Shale	108	111

(*Additional space for well log on reverse side*)

reby swear or affirm, under the penalties perjury that the information submitted ewith is to the best of my knowledge and el true, accurate and complete.

Signature of owner or authorized representative

Date

FOR ADMINISTRATIVE USE ONLY (Well driller does not fill out) 01-01 180425

County	Township	Range		Section
Marion	15N	3E	SW 1/4 NE 1/4 NE	6

Topo map	1250 Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	1400 Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION (Locate with reference to highways, intersecting county roads and distinctive landmarks)

N

W

E

C. Test # 2 (one of several test wells)

Telephone 633-5267 Area Code 317

WATER WELL RECORD

(23)

INFORMATION ON WELL LOCATION

(Fill in completely as possible - Refer to intruction sheet)

unty in which well was drilled: Marion Civil Township: Wayne

iving directions to the well location: 300 feet South of East Gate, 10 feet from fence Plant #3.

ne of property owner (if known): Allison Engineering Company

lress of owner:

ne of building contractor (if known):

ne of Well Drilling Contractor: Layne Northern

lress: Mishawaka, IN

ne of drilling equipment operator: James Young

INFORMATION ON THE WELL

th of well: 72 Date well was completed: July 11, 1939

meter of casing or drive pipe: Total length:

meter of liner (if used): Total length:

meter of Screen: Length: Slot size:

e of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

ic water level in completed well (Distance from ground to water level) 10 ft.

er Test: Hours tested ____ Rate ____ g.p.m. Drawdown ____ ft. (Difference between static level and water level at end of test)

ing Test: Hours tested ____ Rate 950 g.p.m. Drawdown 32 ft.

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

01-01 183295

NTY: MARION TWP. 15N RGE. 3E NE ¼ NE ¼ NE ¼ SEC. 6

Allison GMC

Plant #3

o Map: INDIANAPOLIS WEST

ld Located By _____ Date _____

rthouse Location By _____ Date _____

ation accepted w/o verification by _____

50 Ft W of EL. Ground elevation 720

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

950 Ft S of NL. Aquifer elevation _____

Lot Number _____

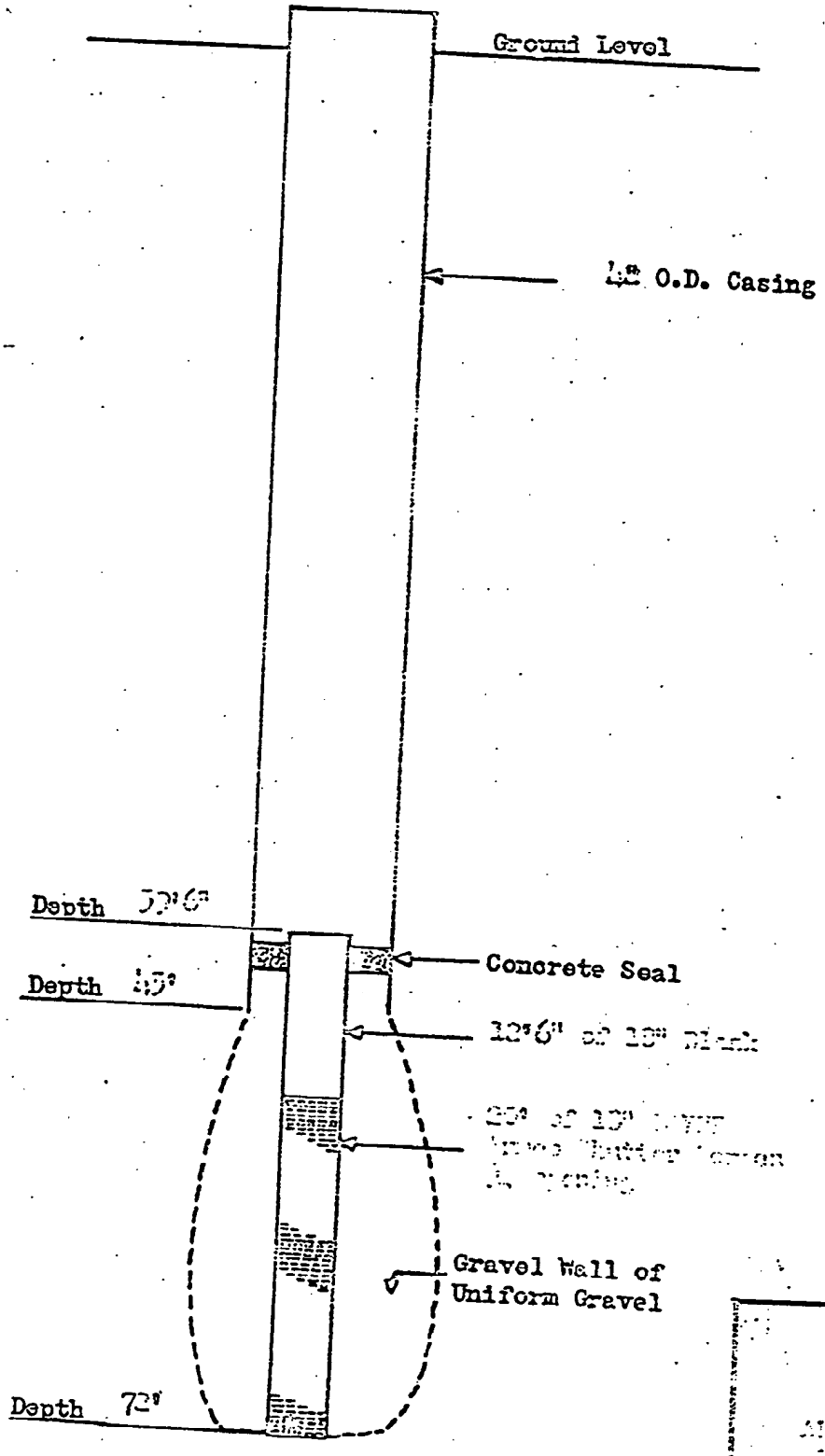
Top Soil	0	2
Gravel	2	12
Clay	12	44
Gravel	44	72

C. (addt'l info stapled to log)

MARKS:

THIS SHEET

(at end of test)



Marion Co.
Wayne Twp.

Single Cased
LAYNE GRAVEL WALL WELL
for

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

LL LOCATION

(Fill in completely - Refer to instruction sheet)

nty in which well was drilled Marion Civil Township

ing directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Plan 23 - Well No. 3 Log Test #9

IE OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Engr. Co. Address Speedway City

Building Contractor Address

e of Well Drilling Contractor: Layne-Northern

e of Drilling Equipment Operator:

LL INFORMATION

h of well: Date well was completed: 9-12-39

eter of casing or drive pipe: ~~42~~-18 Total Length:

eter of liner (if used): Total Length:

eter of Screen: 18" Length: 15' ~~(42-57)~~ Slot Size:

of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

f Well: For Home [ ] For Industry [ ] For Public Supply [ ] Stock [ ]

od of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

: water level in completed well (Distance from ground to water level) 12 feet

Test: Hours Tested Rate g.p.m. Drawdown ft.

Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: C.R. Merrick

Date C.L. McGuinness, USGS 10-14-40

Copied from Card log 7-19-82 DSH

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Test well No. 9		
Soil	0	4
"Dry" gravel + boulders SL 10'	4	12
Gravel	12	35
Clay	35	43
Gravel + Sand	43	56
Clay	56+	

FOR 01-01 100005 ONLY
(Numbers fill out)

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NE SEC 6

Topo Map

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

Ft W of EL. Ft N of SL. Ft E of WL. Ft S of NL.

Ground Elevation

Depth to bedrock

Bedrock elevation

Aquifer elevation

Subdivision Name

Lot Number

125

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Engr. Co. Address Speedway City

Building Contractor Address

Name of Well Drilling Contractor: Layne-Northern

Name of Drilling Equipment Operator:

WELL INFORMATION

Depth of well 57.5 Date well was completed: 1940

Diameter of casing or drive pipe: 4 1/2-18 Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: 18" Length: 10' Slot Size: #4 Layne

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [ ] For Industry [X] For Public Supply [ ] Stock [ ]

Method of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 19 feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Air Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: C.R. Merrick

~~Date~~ C.L. Mc Guinness, USGS

Copied from card log 7-19-02 NSH

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
~~Test #7 0-336~~		
Soil	0	5
Sand & Gravel	5	32
Blue Clay	32	35
Gravel	35	37
Blue clay	37	46
Fine Gravel	46	48
Sand & Gravel	48	60
Tough blue clay	60	85

COUNTY Marion TWP. 15N RGE. 3E ¼ ¼ NE SEC 6

FOR 01-01 183400 ONLY (Well ... out)

Topo Map

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

Ft W of EL. Ft N of SL. Ft E of WL. Ft S of NL.

Ground Elevation

Depth to bedrock

Bedrock elevation

Aquifer elevation

Subdivision Name

Lot Number

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ity in which well was drilled: _____ Civil Township: _____

ressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

ribe in your own words the well location with respect to nearby towns, roads, streets

listinctive landmarks: _____

e of owner: _____ Address: _____

e of Well Drilling Contractor: _____

ress: _____

e of Drilling Equipment Operator: _____

INFORMATION ON THE WELL

pleted depth of well: 76 ft. Date well was completed: _____

meter of outside casing or drive pipe: 4.25 Length: _____

meter of inside casing or liner: _____ Length: _____

meter of Screen: 4.25 Length: 3 Slot size: _____

e of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) _____ ft.

ler Test: Hours tested 1 Rate 10 g.p.m. Drawdown 27 ft. (Difference between static level and water level at end of test)

ping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

126

01-01 172486

FOR ADMINISTRATIVE USE ONLY
(Well Driller does not fill out)

COUNTY: Marion TWP. 13 N RGE. 3 E NE ¼ NW ¼ NW ¼ SEC. 8

Topo. Map: Indy West 7½

El. of grnd. surface at well: _____ Loc. accepted w/o verification Yes ✓ No ____

Depth to bedrock: _____ Courthouse Loc. By _____ Date _____

Well Log processed by: [illegible] 1/26/62 Field Located By _____ Date _____

Placed [illegible]

oncerning a
formation as
es.
log.

submitted
ces, Indiana

127

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Hamilton Bros. Address 4023 Rockville Rd.

Building Contractor Address

ame of Well Drilling Contractor: Hamilton Bros.

ame of Drilling Equipment Operator:

ELL INFORMATION

epth of well: 45' Date well was completed: 2-4-55

ameter of casing or drive pipe: 4" Total Length:

ameter of liner (if used): Total Length:

ameter of Screen: Shop Length: ~~5', 6"~~ 5.5 Slot Size: ~~Shop~~

pe of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

e of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

thod of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

tic water level in completed well (Distance from ground to water level) feet

ler Test: Hours Tested Rate g.p.m. Drawdown ft.

ping Test: Hours Tested Rate ~~600~~ 10 gpm g.p.m. Drawdown 25 ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Driller

~~Date~~ TMK, Ind. Dept. of Conserv.

Copied from Card log 7-20-82

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
clay	0	18
dry gravel	18	23
sandy clay	23	34
Sand & gravel	34	45

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ NW SEC 8

Topo Map

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

Ft W of EL. Ground Elevation

Ft N of SL. Depth to bedrock

Ft E of WL. Bedrock elevation

Ft S of NL. Aquifer elevation

Subdivision Name

Lot Number

01-01 172568

(128)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204

State Form 35680

Telephone 317-232-4160

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Richard Hamilton Address 4025 Rockville Rd.

Building Contractor Address

ame of Well Drilling Contractor: Hamilton Bros.

ame of Drilling Equipment Operator:

ELL INFORMATION

epth of well: 77' Date well was completed: 2-3-55

ameter of casing or drive pipe: 4" Total Length:

ameter of liner (if used): Total Length:

ameter of Screen: Shop Length: ~~5', 6'~~ 5.5 Slot Size: Shop

pe of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

e of Well: For Home [X] For Industry [ ] For Public Supply [ ] Stock [ ]

thod of Drilling: Cable Tools [ ] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

tic water level in completed well (Distance from ground to water level) feet

ler Test: Hours Tested Rate 10 g.p.m. Drawdown ft.

nping Test: Hours Tested Rate ~~600~~ 10 gpm g.p.m. Drawdown 62 ft.

(Drawdown is the difference between static level and water level at end of test)

~~Signature~~ Source of Data: Driller

~~Date~~ TMK, Ind. Dept. of Conserv.

Copied from card log 7-20-82 DSH

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
sandy clay	0	70
Sand - gravel	70	77

FOR ADMINISTRATIVE USE ONLY (Well driller does not fill out) 01-01 172563

COUNTY Marion TWP. 15N RGE. 3E ¼ NW ¼ NW SEC. 8

Topo Map _____ Ft W of EL. _____ Ground Elevation _____ Subdivision Name _____

Field Located By _____ Date _____ Ft N of SL. _____ Depth to bedrock _____

Courthouse Location By _____ Date _____ Ft E of WL. _____ Bedrock elevation _____

Location accepted w/o verification by _____ Ft S of NL. _____ Aquifer elevation _____ Lot Number _____

Reference 22 Page 286

565630E

FOR ADMIN... (Well d... 01-01 54076 Y

~~LIESKE'S HARDWARE~~

189

COUNTY MARION TWP. 15 N RGE. 3E NW ¼ NW ¼ NW SEC 8 Subdivision Name

Topo Map INDPLS. WEST

Field Located By MCBN Date 1992

Courthouse Location By ____ Date ____

Location accepted w/o verification by BRUNS 12-21-82

____ Ft W of EL. Ground Elevation 710

____ Ft N of SL. Depth to bedrock ____

____ Ft E of WL. Bedrock elevation ____

____ Ft S of NL. Aquifer elevation 662 Lot Number ____

WATER WELL RECORD

PERMIT NO.

COUNTY: MARION

CIVIL TOWNSHIP

DRIVING DIRECTIONS: 4200 ROCKVILLE RD.

VIRGINIA LIESKE
WELL OWNER

LIESKE'S HARDWARE
BUILDING CONTRACTOR

DESTER HARNESS
DRILLING EQUIPMENT OPERATOR

WELL INFORMATION

WELL DEPTH	CASING DIAMETER	MATERIAL	CASING LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SCREEN SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
48	4"	PVC	45			4	3	60	DRILLED	COMMERCIAL	ROTARY	8/18/82

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
25				1	10	10 ~~35 P/L~~

FORMATIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
TOPSOIL & CLAY	0	40
SAND & GRAVEL	40	48

UTM NORTH 4401615

UTM EAST 565630

**COMMENTS MC

HAMILTON BROS. INC.
~~P.O. BOX 2418~~
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

C. (MC662)

130

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled MARION Civil Township WAYNE

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

N. W. CORNER PLANT #2

PERMANENT #2

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner ALLISON ENGINEERING Address

Building Contractor Address

Name of Well Drilling Contractor: LAYNE NORTHERN

Address

Name of Drilling Equipment Operator: WAGNER AND POOLE

WELL INFORMATION

Depth of well: 121 Date well was completed: 2-12-41

Diameter of casing or drive pipe: 40 Total Length: 108

Diameter of liner (if used): Total Length:

Diameter of Screen: 8 Length: 15 Slot Size: #4

Type of Well: Drilled ☐ Gravel Pack ☒ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☒ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) 32 feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Top Soil	0	2
GRAVEL	2	10
Clay	10	14
GRAVEL	14	31
Clay	31	43
HARD PAN	43	52
SAND + GRAVEL	52	61
Tough clay	61	108
SAND + clay balls	108	113
COARSE SAND + gravel	113	122

C. (WELL Diagram in original)

FOR ADMINIS
(Well driller
01-01 173716

COUNTY MARION TWP. 16N RGE. 3E ¼ ¼ SE SEC 31

Topo Map Indep West

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

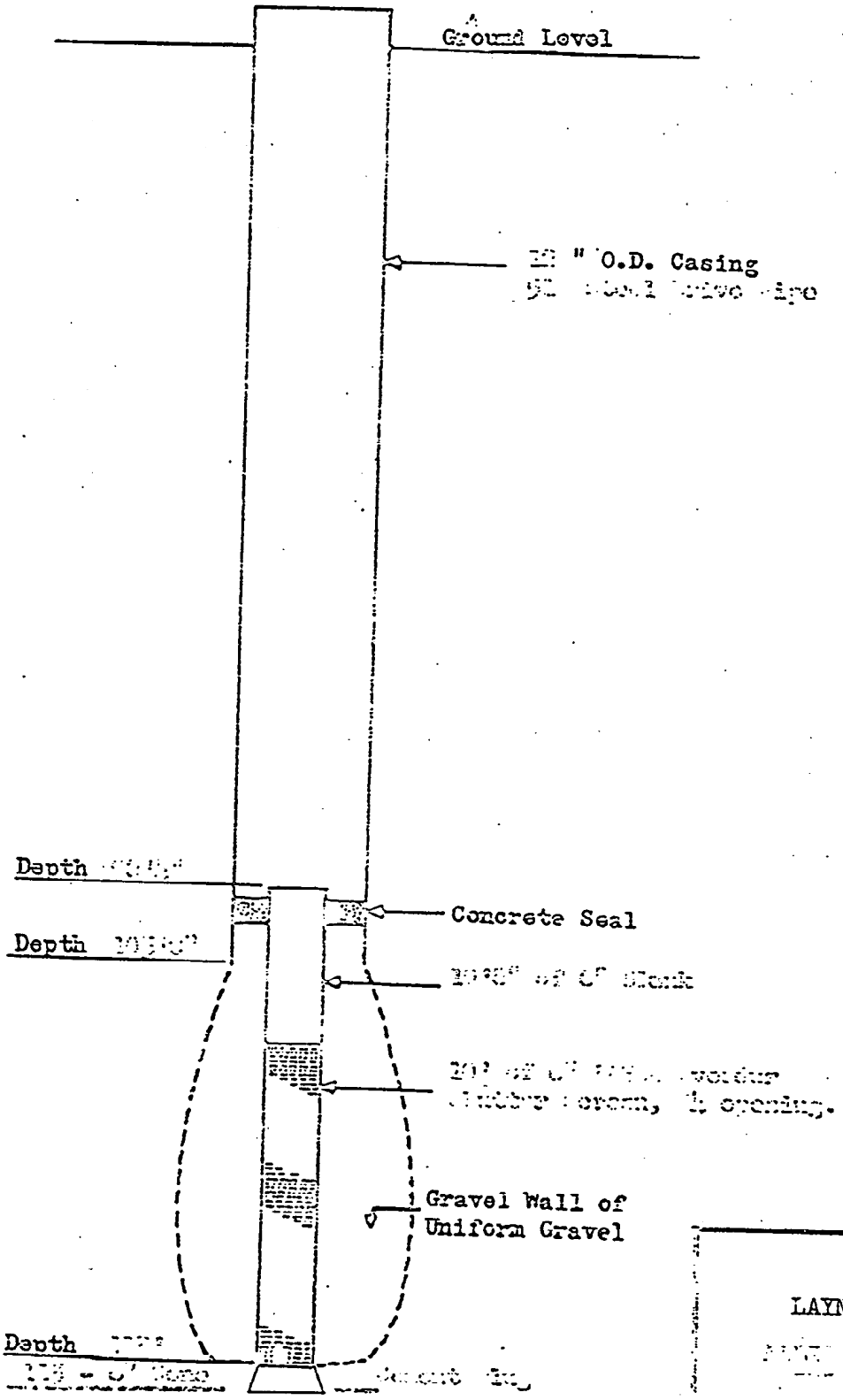
_____ Ft W of EL. Ground Elevation _____ Subdivision Name Allison Grove

_____ Ft N of SL. Depth to bedrock _____ Plant #2

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

Allison



Marion G.
Wagner Drop.

Single Cased
LAYNE GRAVEL WALL WELL 2
for

Driller
Date Finished

Not drawn to Scale
All depths measured
from ground level

270/3

Static Level 28'
Pumped GPM
at Pumping Level

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY

DRAWING No.

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

131

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled MARION Civil Township WAYNE

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

AT #2 TEST SITE SE CORNER PERMANENT #2

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner ALLISON ENGINEERING Address

Building Contractor Address

Name of Well Drilling Contractor: LAYNE NORTHERN

Address

of Drilling Equipment Operator: William WAGNER

WELL INFORMATION

Depth of well: 114 Date well was completed:

Diameter of casing or drive pipe: 12 Total Length: 105

Diameter of liner (if used): Total Length:

Diameter of Screen: 6 Length: 10 Slot Size: #4

Type of Well: Drilled ☐ Gravel Pack ☒ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☒ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) 28 feet

Bailer Test: Hours Tested Rate 270 g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADMINIST[illegible] 01-01 173711
(Well driller[illegible])

COUNTY MARION TWP. 16N RGE. 3E ¼ ¼ SE SEC 31 Subdivision Name

Topo Map Indpls West

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

Ft W of EL. Ground Elevation ~~Allison GMC~~

Ft N of SL. Depth to bedrock ~~Plant #2~~

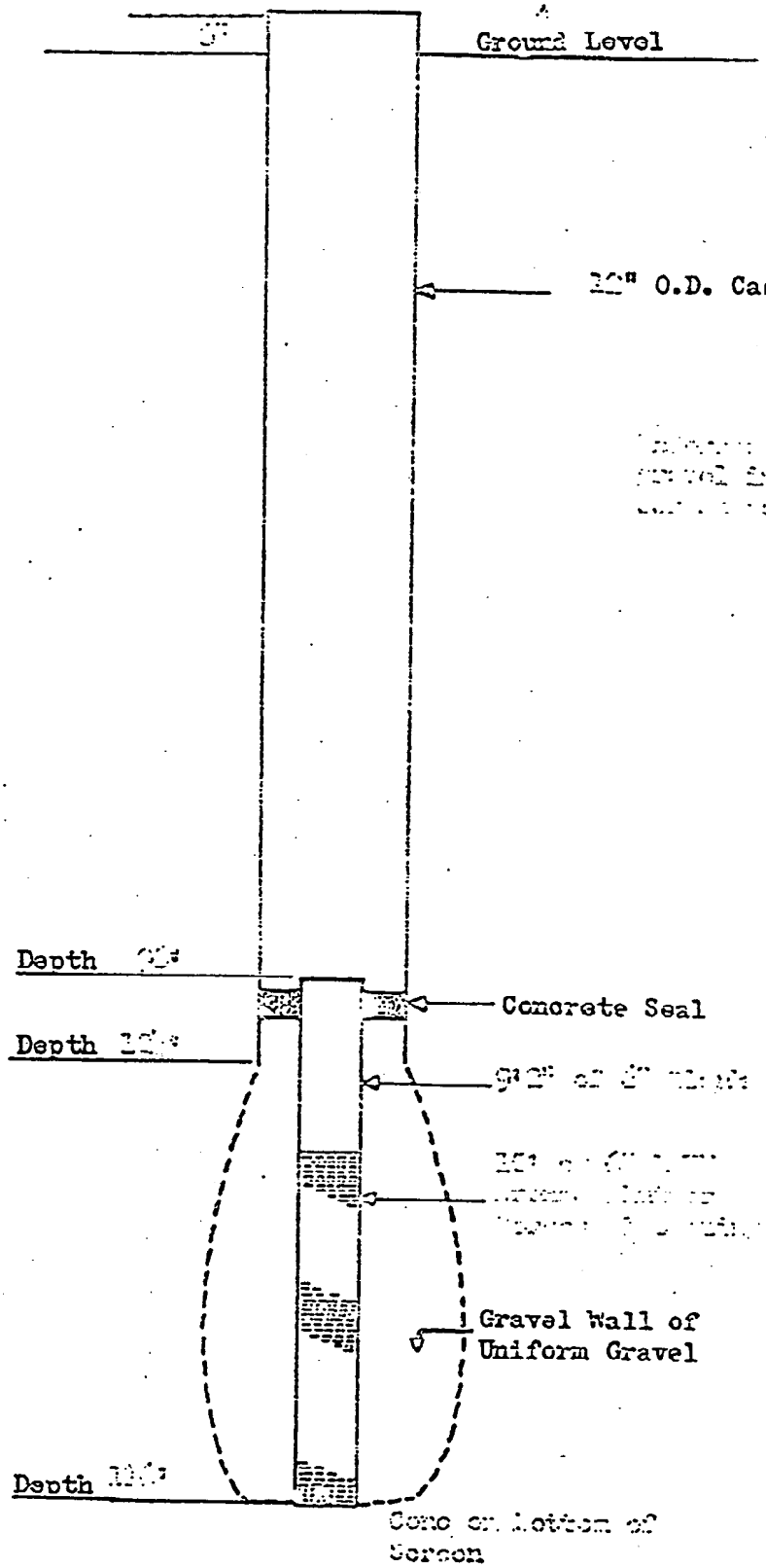
Ft E of WL. Bedrock elevation

Ft S of NL. Aquifer elevation Lot Number

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
FILL	0	8
GRAVEL	8	14
HARDPAN	14	18
GRAVEL	18	30
BOULDERS	30	34
HARD clay	34	52
Clay + GRAVEL	52	59
Tough clay	59	77
HARD clay	77	99
Tough clay	99	105
MEDIUM SAND	105	108
FINE GRAVEL	108	114
SHALE		

C. (WELL DIAGRAM AVIALABLE)



Marion Co.
Wayne Twp.

Single Cased
LAYNE GRAVEL WALL WELL
for

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY

DRAWING No.

Driller C. E. POOLE
Date Finished

Not drawn to Scale
All depths measured
from ground level

Static Level
Pumped GPM
at Pumping Level

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

132

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled MARION Civil Township WAYNE

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

PLANT #2 NE CORNER WELL # 1

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner ALLISON ENGINEERING Address

Building Contractor Address

Name of Well Drilling Contractor: LAYNE NORTHERN

Address

Name of Drilling Equipment Operator: JAMES NESS

WELL INFORMATION

Depth of well: 114 Date well was completed: 11-7-40

Diameter of casing or drive pipe: 12 Total Length: 104

Diameter of liner (if used): Total Length:

Diameter of Screen: 6 Length: 10 Slot Size:

Type of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☐ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) 26 feet

Bailer Test: Hours Tested Rate 400 g.p.m. 43 Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADM (Well 01-01 173701

COUNTY MARION TWP. 16N RGE. 3E ¼ ¼ SE SEC 31 Subdivision Name

Topo Map Indpls West

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

Ft W of EL.

Ft N of SL.

Ft E of WL.

Ft S of NL.

Ground Elevation Allison GMC

Depth to bedrock Plant #2

Bedrock elevation

Aquifer elevation Lot Number

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
TILL	0	8
GRAVEL	8	14
HARD PAN	14	18
GRAVEL	18	30
BOULDERS	30	34
Clay	34	105
COARSE SAND	105	108
FINE GRAVEL	108	114

C. (WELL DIAGRAM AVAILABLE)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

133

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Plant #2 Test #1

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Eng. Co Address Speedway City

Building Contractor Address

ame of Well Drilling Contractor: Layne Northern Co

ddress

a of Drilling Equipment Operator:

ELL INFORMATION

epth of well: 117 Date well was completed: ~~10~~ 9-20 - ~~[illegible]~~ - 40 (? date rec)

iameter of casing or drive pipe: — Total Length: —

iameter of liner (if used): Total Length:

iameter of Screen: Length: Slot Size:

ype of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

se of Well: For Home [ ] ~~For Industry~~ [X] Test #1 For Public Supply [ ] Stock [ ]

ethod of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

atic water level in completed well (Distance from ground to water level) ~~See log - over~~ feet

iler Test: Hours Tested Rate g.p.m. Drawdown ft.

mping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Old Card Citing C-R Merrick by McGuinness

Date 4595

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET 4-9-73

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Fill	0	8
Gravel	8	30
Boulders	30	35
Gravel ~~S.L. 18'~~	35	40
Clay	40	52
Gravel ~~S.L. 18'~~	52	56
Clay	56	106
Gravel - Medium - ~~S.L. 27'~~	106	108
Fine Gravel	108	114
Black Shale	114	117

FOR A 01-0 67037 NLY
(W)

COUNTY Marion TWP. 16 N RGE. 3 E ¼ ¼ SE SEC 31 Subdivision Name

Topo Map Indpls West ½

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

11-9-73

_____ Ft W of EL. Ground Elevation 725 C (Test #1)

_____ Ft N of SL. Depth to bedrock 114 ~~10 14 40~~ ?

_____ Ft E of WL. Bedrock elevation 611

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

Altisons Plant 2

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

134

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Plant #2 Test 4
On Main St. 10' East of Fence; 10' North from pavement: In S.W. Corner of parking lot.

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Eng Co Address Speedway

Building Contractor Address

ame of Well Drilling Contractor: Layne Northern Co

ddress

ame of Drilling Equipment Operator:

ELL INFORMATION

epth of well: 123 Date well was completed: 1940

ameter of casing or drive pipe: — Total Length:

ameter of liner (if used): Total Length:

ameter of Screen: Length: Slot Size:

pe of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

e of Well: For Home [ ] ~~For Industry~~ [X] Test 4 For Public Supply [ ] Stock [ ]

thod of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

atic water level in completed well (Distance from ground to water level) ~~See log - over~~ 27 feet

iler Test: Hours Tested Rate g.p.m. Drawdown ft.

mping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Old log Card Citing C. R. Merrick

Date by McGuinness - USGS 10-14-40

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET 2-9-73

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)		From	To
Fill - Gravel & Clay	(20)	0	20
Medium Gravel	(15)	20	35
Tough Clay	(19)	35	54
Gravel	(5)	54	59
Tough Clay	(44)	59	103
Fine Sand	(10)	103	113
Muddy Sand & Gravel	S.L. 27 (9)	113	122
Black Shale	(1)	122	123

FOR AD 01-(67036 LY
(Well ...

8

Attic
Plant 2

GOUNTY Marion TWP. 16 N RGE. 3 E ¼ ¼ SE SEC 31 Subdivision Name

Topo Map Indpls West Fr

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

4-9-73

_____ Ft W of EL. Ground Elevation 715 C. (Test 4)

_____ Ft N of SL. Depth to bedrock 122 Lyn 40

_____ Ft E of WL. Bedrock elevation 593

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

135

WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled _____ Civil Township _____

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Plant 2 Test # 2
Northeast Corner of Grounds.

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allison Eng Co Address Speedway City

Building Contractor _____ Address _____

ame of Well Drilling Contractor: Layne Northern Co

ddress _____

f Drilling Equipment Operator: _____

ELL INFORMATION

epth of well: 115 Date well was completed: 8-28 1940

ameter of casing or drive pipe: — Total Length: —

ameter of liner (if used): _____ Total Length: _____

ameter of Screen: _____ Length: _____ Slot Size: _____

pe of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other _____

e of Well: For Home [ ] For Industry [X] Test 2 For Public Supply [ ] Stock [ ]

thod of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

atic water level in completed well (Distance from ground to water level) ~~See log - est~~ 25.5 feet

iler Test: Hours Tested _____ Rate _____ g.p.m. _____ Drawdown _____ ft.

mping Test: Hours Tested _____ Rate _____ g.p.m. _____ Drawdown _____ ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Old log Card Citing C.R. Merrick

Date by McGuinness, USGS 10-14-40

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET 4-9-73

FO: 01-01 (7035 E ONLY
... out)

B

~~Allison~~
~~Plant 2~~

COUNTY Marion TWP. 16 N RGE. 3 E ¼ ¼ SE SEC 31 Subdivision Name

Topo Map Indpls West ~~7~~

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL.

_____ Ft N of SL.

_____ Ft E of WL.

_____ Ft S of NL.

Ground Elevation 715 Co (Test 2)

Depth to bedrock 114 ~~8 21/28 40~~

Bedrock elevation 601

Aquifer elevation _____ Lot Number _____

U-9-73

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Fill and Clay	0	8
Gravel	8	14
Hardpan	14	18
Gravel - S.L. 18'	18	30
Boulders	30	34
Hard Clay	34	52
Clay and Gravel Mixed	52	59
Tough Clay	59	77
Hard Clay	77	99
Tough Clay	99	105
Medium Sand	105	108
Fine Gravel ~~S.L. 1/2~~	108	114
Black Shale	114	115

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

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WATER WELL RECORD

VELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled Marion Civil Township

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Plant 2 Test 3

Northwest Corner of property - Main St and Fillman

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Allisons Eng Co. Address Speedway

Building Contractor Address

ame of Well Drilling Contractor: Joyce Northern Co

ddress

ame of Drilling Equipment Operator:

ELL INFORMATION

pth of well: 123 Date well was completed: ~~8-1940~~ 9-9-1940

iameter of casing or drive pipe: – Total Length: –

iameter of liner (if used): Total Length:

iameter of Screen: Length: Slot Size:

pe of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

e of Well: For Home [ ] For Industry [X] Test #3 For Public Supply [ ] Stock [ ]

thod of Drilling: Cable Tools [ ]? Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

atic water level in completed well (Distance from ground to water level) ~~See log~~ 33 feet

ter Test: Hours Tested Rate g.p.m. Drawdown ft.

mping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Old Log Cont Citing C.R. Merrick

Date by C.L. McGuinness - USGS 10-14-40

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET 4-9-73

FOR ADMI[illegible] ONLY
(Well d[illegible] 67034

B

Allisons
Plant 2

COUNTY Marion TWP. 16 N RGE. 3 E ¼ ¼ SE SEC. 31 Subdivision Name

Topo Map Indpls West 7½

Field Located By Date

Courthouse Location By Date

Location accepted w/o verification by

Ft W of EL.

Ft N of SL.

Ft E of WL.

Ft S of NL.

Ground Elevation 715 Ca (Test 3)

Depth to bedrock 122 Layne 1940

Bedrock elevation 593

Aquifer elevation Lot Number

2-9-73

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Fill and Clay	0	6
Gravel	6	10
Hardpan	10	14
Gravel S.L. 18'	14	31
Clay	31	43
Gravel	43	45
Tough Clay	45	52
Fine Gravel - S.L. 25½	52	61
Tough Clay	61	105
Sand	105	109
Coarse Sand & Gravel S.L. 33'	109	122
Blue Shale	122	123

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RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

(...completely)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion				

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.

1500 Polco Street

OWNER - CONTRACTOR

Name of well owner: Union Carbide Coating Service Corp.
Telephone Number: ( )
Address (Street and number, city, state): 1500 Polco Street Indpls, In.
ZIP code: 46224
Name of building contractor:
Telephone number: ( )
Address (Street and number, city, state):
ZIP code:
Name of drilling contractor: Hamilton Bros, Inc.
Telephone number: ( ) 241-2571
Address (Street and number, city, state): 4025 Rockville Road Indpls, In.
ZIP code: 46222
Name of equipment operator: David R. Harness
License number: #35
Date of completion: 7/13/90

CONSTRUCTION DETAILS

Use of well:
☐ Home ☒ Industry ☐ Test ☐ Irrigation
☐ Public supply ☐ Stock ☐ Other (specify):
Method of drilling: ☒ Rotary ☐ Rev. rotary
☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other

Casing length	Material	Diameter
107 feet	P.V.C.	8 inches

Screen length	Material	Diameter
10' feet	~~Stainless Steel~~ (SS)	8 inches

Screen slot size: .060
Total depth of well: 117'
Depth of pump setting: 80'
Water quality (Clear, cloudy, odor, etc.): Clear
Type of pump: ☐ Shallow-well jet ☒ Submersible ☐ Deep-well jet ☐ Other (specify):

WELL CAPACITY TEST

Check one: ☐ Air ☒ Bailing ☐ Pumping
Test rate: 80 gpm 1 hrs.
Drawdown: 35 feet
Static level (depth to water): 45' feet

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
Topsoil + Clay	0	110
Gravel	110	117

(Additional space for well log on reverse side)

ROUTING INFORMATION

Material	Depth of grout	Sealing material	Depth filled
Quiriplug	From 0 To 110		From To

Method of installation	Number of bags used	Method of installation	Number of bags used
Hemmie	9		

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative:
Date:

FOR ADM
(well c 01-01 173681

County	Township	Range		Section
Marion	11 N	3E	¼ NE ¼ SE	31

Topo map: Indpls. West	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG	FROM	TO
Formations: type of material	Feet	Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

S

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

138

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: _____

ongressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets

r distinctive landmarks: Holiday Motel across from Speedway

ame of owner: Baker and McHenry Address: 421 W. Eleventh

ame of Well Drilling Contractor: Hamilton Bros

dress: _____

Drilling Equipment Operator: Bob Edwards

INFORMATION ON THE WELL

mpleted depth of well: 127 ft. Date well was completed: Sept 25 1959

ameter of outside casing or drive pipe: 8" Length: _____

ameter of inside casing or liner: _____ Length: _____

ameter of Screen: 8" Length: 15' Slot size: Cook #60

pe of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other Metal Well

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) _____ ft.

ler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ping Test: Hours tested 8 Rate 300 g.p.m. Drawdown _____ ft.

~~Pumping level 65'~~

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay	0	12
S + G	12	24
Clay	24	34
S. Clay	34	40
Clay	40	49
Sand	49	50
Clay	50	112
Gravel ~~#~~ ~~#5~~	112	127

REMARKS:
gasoline log

FOR ADMINISTRATIVE ONLY
(Well Driller does not fill out)

COUNTY: Marion TWP. North RGE. 3E NE ¼ NE ¼ SE ¼ SEC. 31

Topo. Map: Indianapolis West Loc. accepted w/o verification Yes ___ No ___

El. of grnd. surface at well: 727 Courthouse Loc. ✓ By ___ Date ___

Depth to bedrock: ___ Field Located By Hale Date 1960

Well Log processed by: Hale 11/59 Placed in Master Well Log File Date ___

01-01 1 91

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a ter well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ease include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted hin thirty days after the completion of a well to the Division of Water Resources, Indiana artment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

(139)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS 9, INDIANA

WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: Marion Civil Township: _____

Congressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

Describe in your own words the well location with respect to nearby towns, roads, streets or distinctive landmarks: End of Gilman St off Speedway Main

1300 N =

35816

Name of owner: CENTRAL LIME CORP. Address: 4700 W. [illegible]

Name of Well Drilling Contractor: HAMILTON BROS

Address: _____

Name of Drilling Equipment Operator: WHEELER

INFORMATION ON THE WELL

Completed depth of well: 116 ft. Date well was completed: 2-27-64

Diameter of outside casing or drive pipe: 4.25 Length: 117

Diameter of inside casing or liner: _____ Length: _____

Diameter of Screen: 4 Length: 2 Slot size: 50

Type of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

Use of Well: For home ☐ For industry ☒ For public supply ☐ Stock ☐

Method of Drilling: Cable Tools ☐ Rotary ☒ Rev. Rotary ☐ Jet ☐ Driven ☐

Static water level in completed well (Distance from ground to water level) 35 ft.

Bailer Test: Hours tested 1 Rate 20 g.p.m. Drawdown 45 ft. (Difference between static level and water level at end of test)

Pumping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
CLAY	0	10
GRAVEL + SAND *~~23'~~	10	33
CLAY	33	49
SAND MED. - COARSE *~~15'~~	49	56
CLAY	56	111
SAND FINE to COARSE *~~5'~~	111	116

?

REMARKS: graphic log

FOR ADMINISTRATIVE USE ONLY
(Well driller does not fill out)

COUNTY: Marion TWP. 16N RGE. 3E NE ¼ SE ¼ SE ¼ SEC. 31

Topo Map: T. West 7½ INDIANAPOLIS

Well log classified By ___ Date 5-64
Courthouse located By ___ Date ___
Field located By ___ Date ___
Acc. w/o verification By ___ Date 5-64

500 Ft W of EL. Ground elevation 728±
1100 Ft N of SL. Depth to bedrock ___
___ Ft E of WL. Bedrock elevation ___
___ Ft S of NL. Aquifer elevation 612-

01-01 173706

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a ter well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ease include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted thin thirty days after the completion of a well to the Division of Water Resources, Indiana partment of Conservation.

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

140

3750 W

WATER WELL RECORD

RECEIVED
Division of Water

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

me of owner: Harding Address: 1039 [illegible]

me of Well Drilling Contractor: [illegible]

dress: [illegible]

Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

npleted depth of well: 58 ft. Date well was completed: [illegible]

ameter of outside casing or drive pipe: 4 Length: [illegible]

ameter of inside casing or liner: MATERIAL PVC Length: _____

ameter of Screen: 3 Length: [illegible] Slot size: _____

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

e of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) 7 ft.

iler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ f . (Difference between static level and water level at end of test)

mping Test: Hours tested _____ Rate 10 g.p.m. Drawdown 1 ft.

Signature [illegible]

Date [illegible]

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

ORMATIONS (Color, type of material, hardness, etc.)	From	To
[illegible]	0	10
[illegible]	10	55

ARKS: graphic log

COUNTY: _____ TWP. 16N RGE. 3E ¼ ¼ ¼ SEC. 32

Topo Map: [illegible]

Well log classified By _____ Date _____
Courthouse located By _____ Date _____
Field located By _____ Date _____
Acc. w/o verification By _____ Date _____

FOR ADMINIS' 01-01
(Well driller does not [illegible])

Ft W of EL. _____ Ground elevation _____
Ft N of SL. _____ Depth to bedrock _____
Ft E of WL. _____ Bedrock elevation _____
Ft S of NL. _____ Aquifer elevation _____

/9

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

(144)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

ely

WELL LOCATION

nty where drilled	Civil township	Township	Range	Section
MARION		16N	3E	32

ring directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a on reverse side.

1801 N LUETT ST

OWNER - CONTRACTOR

e of well owner: SHOCKENCY	Telephone number
ess (*number and street, city, state, ZIP code*)	
e of building contractor: --	Telephone number
ess (*number and street, city, state, ZIP code*)	
e of drilling contractor: HAMILTON BROS.	Telephone number
ess (*number and street, city, state, ZIP code*)	
e of equipment operator	License number / Date of completion: 1954

CONSTRUCTION DETAILS

me ☐ Industry ☐ Test ☐ Irrigation
Public supply ☐ Stock ☐ Other (*specify*):

od of drilling
Rotary ☐ Jet ☐ Bucket rig
Cable tool ☐ Rev. rotary ☐ Other

ng length	Material	Diameter
feet		4 inches
en length 5.5 feet	Material	Diameter inches

en slot size | Total depth of well: 47

th of pump setting | Water quality (*clear, cloudy, odor, etc.*)

of pump ☐ Shallow-well jet ☐ Other (*specify*):
Submersible ☐ Deep-well jet

WELL CAPACITY TEST

k one ☐ Air
Bailing ☐ Pumping

Test rate _____ gpm _____ hrs.

down feet | Static level (*depth of water*) feet

GROUTING INFORMATION

ial	Depth of grout From to
of installation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
SANDY clay	0	10
DRY GRAVEL	10	22
Clay	22	42
SAND + GRAVEL	42	47

(*Additional space for well log on reverse side*)

eby swear or affirm, under the penalties erjury that the information submitted with is to the best of my knowledge and f. true, accurate and complete.

Signature of owner or authorized representative | Date

FOR ADMINISTI 01-01 173766
(well driller c

County	Township	Range	1/4	1/4	Section
MARION	16N	3E			32

Topo map: INDIANAPOLIS WEST	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS; type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

(142)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

WATER WELL RECORD

OCT 1 ... RECEIVED Dept. of Nat. Res. Division of Water

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: _____

me of owner: William Nardisty Address: 1811 Suett

me of Well Drilling Contractor: _____

dress: _____

of Drilling Equipment Operator: Jack

INFORMATION ON THE WELL

npleted depth of well: 68 ft. Date well was completed: 7-13-66

ameter of outside casing or drive pipe: 4 ~~3~~ Length: 65

ameter of inside casing or liner: _____ Length: _____

ameter of Screen: _____ Length: ~~4'~~ 4.6 Slot size: _____

pe of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other ~~35-12-6-0~~

e of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) _____ ft.

iler Test: Hours tested ~~15~~ Rate ~~10~~ g.p.m. Drawdown _____ f . (Difference between static level and water level at end of test).

aping Test: Hours tested 0.5 ~~15~~ Rate 10 g.p.m. Drawdown _____ ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

ORMATIONS (Color, type of material, hardness, etc.)	From	To
Top-soil + Clay	0	22
dry Sand	22	29
Clay	29	45
Sand	45	68
~~Not Thru formation~~		

MARKS:

COUNTY: _____ FOR ADMINI 01-01 6 6
(Well driller [illegible])

Topo Map: _____ TWP. 16 N RGE. 3 E ___ ¼ ___ ¼ ___ ¼ SEC. 32

Well log classified By _____ Date _____
Courthouse located By _____ Date _____
Field located By _____ Date _____
Acc. w/o verification By _____ Date _____

_____ Ft W of EL. Ground elevation _____
_____ Ft N of SL. Depth to bedrock _____
_____ Ft E of WL. Bedrock elevation _____
_____ Ft S of NL. Aquifer elevation _____

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted hin thirty days after the completion of a well to the Division of Water

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

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WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: _____

(375° W)

me of owner: Bob Address: 1903 N. Lutz

me of Well Drilling Contractor: _____

dress: _____

Drilling Equipment Operator: Rick

INFORMATION ON THE WELL

npleted depth of well: 63 ft. Date well was completed: 8-13-68

ameter of outside casing or drive pipe: 4 3/4 Length: 63

ameter of inside casing or liner: _____ Length: _____

ameter of Screen: _____ Length: 5' Slot size: _____

pe of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other ~~[illegible]~~

e of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) _____ ft.

ler Test: Hours tested 0.5 Rate 11 g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

ORMATIONS (Color, type of material, hardness, etc.)	From	To
Top soil + Clay	0	16
Sand	16	30
Clay	30	45
Sand	45	69

ARKS: graphic log

FOR ADMINIS
(Well driller 01-01 637

COUNTY: Madison TWP. 16N RGE. 3E SW ¼ NW ¼ NE ¼ SEC. 32

Topo Map: Indianapolis West

Well log classified By ____ Date ____
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By WH Date 1-69

____ Ft W of EL. Ground elevation 731
____ Ft N of SL. Depth to bedrock ____
____ Ft E of WL. Bedrock elevation ____
____ Ft S of NL. Aquifer elevation ____

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted n thirty days after the completion of a well to the Division of Water

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

144

OCT 1959

WATER WELL RECORD

INFORMATION ON WELL LOCATION

ounty in which well was drilled: Marion Civil Township: Wayne

ongressional township: 14 Range: _____ Number of section: _____
(Fill in as completely as possible)

escribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: ~~Leone Lemasters~~
Rambow Ridge Lot 482

(36)

ame of owner: Leone Lemasters Address: 1807 N. Rochester St.

ame of Well Drilling Contractor: Moll & Tabb

ddress: R R #2 Greenwood Ind

ar of Drilling Equipment Operator: Lowell Tabb

INFORMATION ON THE WELL

ompleted depth of well: 60 Ft. Date well was completed: 9-4-59

ameter of outside casing or drive pipe: ~~4½~~" 4.5 Length: 10½"

ameter of inside casing or liner: 4" Length: _____

ameter of Screen: 3" Length: 3" Slot size: #6

pe of Well: Drilled ☒ Gravel Pack ☐ Driven ☐ Other _____

e of Well: For home ☒ For industry ☐ For public supply ☐ Stock ☐

thod of Drilling: Cable Tools ☒ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

atic water level in completed well (Distance from ground to water level) 21 Ft.

iler Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ Ft. (Difference between static level and water level at end of test)

mping Test: Hours tested 2 Rate 10 ~~100~~ g.p.m. Drawdown 36 Ft.

Signature Lowell Tabb

Date 9-4-59

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADM
(Well Dri 01-01 63775 ILY
out)

COUNTY: Marion TWP. 16N RGE. 3E ¼ ¼ NW¼ SEC. 32

Topo. Map: Indianapolis W. 7½ Loc. accepted w/o verification Yes ✓ No ✗

El. of grnd. surface at well: Courthouse Loc. By Date

Depth to bedrock: Field Located By Date

Well log processed by: Dean N Placed in Master Well Log File Date 10/13/69

3680 W 4 [illegible] 8 Tibbs

Lot 482 Rainbow Ridge Subdivision

FORMATIONS (Color, type of material, hardness, etc.)	From	To
~~Clay 3 feet hard pan 25 feet then heavy sand rock 20 feet then into water sand 12 feet~~		
clay	0	3
hardpan	3	27
hard sand	27	48
water sand	48	60

MARKS:

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana tment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

145

SEP 1963
RECEIVED
Dept. of Conservation
Division of
Water Resources

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Co. Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: 1823 Rochester [illegible]
[illegible] Rochester St. [illegible]

ne of owner: [illegible] Address: [illegible]

ne of Well Drilling Contractor: [illegible]

dress: [illegible]

Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

npleted depth of well: _____ ft. Date well was completed: [illegible]

ameter of outside casing or drive pipe: 4.5 [illegible] Length: [illegible]

ameter of inside casing or liner: _____ Length: _____

meter of Screen: _____ Length: 2.5 [illegible] Slot size: _____

e of Well: Drilled ☐ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) [illegible] ft.

ler Test: Hours tested _____ Rate [illegible] g.p.m. Drawdown 20 ft. (Difference between static level and water level at end of test)

ping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

Signature [illegible]

Date [illegible]

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Clay yellow	1	15
Sand Brown	5	34
Clay [illegible]	34	55
Sand Brown	55	60

ARKS:

FOR ADMIN: 01-01 63
(Well Drille ... out)

COUNTY: Monroe TWP. 16 RGE. 3E ¼ ¼ SE ¼ SEC. 32

Topo. Map: Indianapolis West Rt

El. of grnd. surface at well: _____ Loc. accepted w/o verification Yes ✓ No ___

Depth to bedrock: _____ Courthouse Loc. By _____ Date _____

Well Log processed by: [illegible] Field Located By _____ Date _____

Placed in Master Well Log File Date _____

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a r well. We request that you be as accurate as possible in recording this information as ay be of great assistance in the planning and development of new water supplies.

An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana rtment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

(146)

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

ely

WELL LOCATION

inty where drilled	Civil township	Township	Range	Section
MARION		16N	3E	32

ving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a p on reverse side.

1829 N ROCHESTER

OWNER - CONTRACTOR

ne of well owner: HART — Telephone number:

ress (*number and street, city, state, ZIP code*):

ne of building contractor: — Telephone number:

ress (*number and street, city, state, ZIP code*):

e of drilling contractor: HAMILTON BROS. — Telephone number:

ress (*number and street, city, state, ZIP code*):

ne of equipment operator: — License number: — Date of completion: 11-22-54

CONSTRUCTION DETAILS

ome ☐ Industry ☐ Test ☐ Irrigation
Public supply ☐ Stock ☐ Other (*specify*):

hod of drilling
Rotary ☐ Jet ☐ Bucket rig
Cable tool ☐ Rev. rotary ☐ Other

ing length	Material	Diameter
40 feet		4 inches
een length	Material	Diameter
4.5 feet		inches

een slot size: — Total depth of well: 43

th of pump setting: — Water quality (*clear, cloudy, odor, etc.*):

e of pump ☐ Shallow-well jet ☐ Other (*specify*):
Submersible ☐ Deep-well jet

WELL CAPACITY TEST

ck one
Bailing ☐ Air ☐ Pumping

Test rate: ~~450~~ 7.3 gpm _____ hrs.

wdown: feet — Static level: (*depth of water*) feet

GROUTING INFORMATION

it material	Depth of grout From to
stallation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
TOP SOIL + clay	0	11
DRY SAND	11	33
clay	33	38
SAND	38	43

(*Additional space for well log on reverse side*)

eby swear or affirm, under the penalties perjury that the information submitted with is to the best of my knowledge and f, true, accurate and complete.

Signature of owner or authorized representative: — Date:

FOR ADM 01-01 173761
(well d

County	Township	Range	1/4	1/4	Section
MARION	16N	3E			32

Topo map: INDIANAPOLIS WEST	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

147

(Fill in completely) Job 88-214

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion				23

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting road and trip origination there is space for a map on reverse side.

OWNER - CONTRACTOR

Name of well owner: Floyd Mi adams	Telephone Number: ( )
Address (Street and number, city, state): 1027 N Olin Ave OLIN Indpls, In	ZIP code: 46222
Name of building contractor:	Telephone number: ( )
Address (Street and number, city, state):	ZIP code:
Name of drilling contractor: Matlock Well Drilling	Telephone number: (241 8239
Address (Street and number, city, state): 1701 N. Morris Indpls. In	ZIP code: 46241
Name of equipment operator: Tom Davis	License number: 66 / Date of completion: 9/25/88

CONSTRUCTION DETAILS

Use: ☐ Home ☐ Industry ☐ Test ☐ Irrigation

Public supply ☐ Stock ☐ Other (specify):

Method of drilling: ☐ Rotary ☐ Rev. rotary

Cable tool ☐ Jet ☐ Bucket rig ☐ Other

Casing length	Material	Diameter
92 feet	~~Plastic~~ PVC	4 inches

Screen length	Material	Diameter
5 feet	~~Plastic~~ PVC	4 inches

Screen slot size: #60

Total depth of well: 92'

Depth of pump setting:

Water quality (Clear, cloudy, odor, etc.): Clear

Type of pump: ☐ Shallow-well jet ☐ Submersible ☐ Deep-well jet ☐ Other (specify):

WELL CAPACITY TEST

Check one: ☐ Air ☐ Bailing ☐ Pumping

Test rate: 20 gpm hrs.

Drawdown: feet

Static level (depth to water): 25' feet

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
Topsoil	0	3
Overburden	3	15
Gravel	15	37
Clay	37	64
Gravel	64	92

(Additional space for well log on reverse side)

GROUTING INFORMATION

Grout material	Depth of grout (From To)	Sealing material	Depth filled (From To)
Method of installation	Number of bags used	Method of installation	Number of bags used

WELL ABANDONMENT

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative: Allen Matlock

Date: 9/30/88

01-01 173731 ONLY
(out)

County	Township	Range		Section
Marion	16N	3E	SW ¼ SW ¼ SE	32

Topo map: INDPLS WEST	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG	FROM	TO
Formations: type of material	Feet	Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

(148)

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

WATER WELL RECORD

Permit # 2623

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Hancock Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner [illegible] Address [illegible]

Building Contractor Address

Name of Well Drilling Contractor: Hamilton [illegible]

Address

Name of Drilling Equipment Operator: [illegible]

WELL INFORMATION

Depth of well: 71 Date well was completed: 6/21/73

Diameter of casing or drive pipe: 4" Total Length: 65'

Diameter of liner (if used): Total Length:

Diameter of Screen: 3" Length: 5' Slot Size: #40

Type of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other

Use of Well: For Home ☑ For Industry ☐ For Public Supply ☐ Stock ☐

Method of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

Static water level in completed well (Distance from ground to water level) feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested 2 Rate 10 g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature [illegible]

Date 6/21/73

FOR WELL LOG SPACE USE REVERSE SIDE OF

FOR ADMI[illegible] 63781
(Well d[illegible] does no[illegible]

COUNTY MARION TWP. 16N RGE. SE NE ¼ SE ¼ SW SEC 32 Subdivision Name

Topo Map INDIANAPOLIS

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

2700 Ft W of EL.
900 Ft N of SL.
_____ Ft E of WL.
_____ Ft S of NL.

Ground Elevation 728
Depth to bedrock _____
Bedrock elevation _____
Aquifer elevation 663
Lot Number _____

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
[illegible]	0	[illegible]
[illegible]	2[illegible]	3[illegible]
[illegible]	3[illegible]	65
[illegible]	65	71
(Fine Sand)		
w/L 707		

Section # 11 - Lower Unit (A)

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

149

'l in completely) Job 88-236

WELL LOCATION

e drilled	Civil township	Township	Range	Section
Marion				

lving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there space for a map on reverse side.

OWNER - CONTRACTOR

ne of well owner: Ray Medsker	Telephone Number: ( ) 637-0851
ress (Street and number, city, state): 1111 N Olin Ave Indpls. In	ZIP code: 46222
ne of building contractor: 1 N 2800 W.	Telephone number: ( )
ress (Street and number, city, state):	ZIP code:
ne of drilling contractor: Matlock Well Drilling	Telephone number: ( ) 241-8239
ress (Street and number, city, state): 4701 W. Morris Indpls. In	ZIP code: 46241
ne of equipment operator:	License number: / Date of completion:

CONSTRUCTION DETAILS

.ome ☐ Industry ☐ Test ☐ Irrigation

Public supply ☐ Stock ☐ Other (specify): _____

iod of drilling: ☑ Rotary ☐ Rev. rotary

Cable tool ☐ Jet ☐ Bucket rig ☐ Other

ng length	Material	Diameter
133 feet	~~Plastic~~ PVC	4 inches
en length feet		inches

en slot size: Total depth of well: 133'

h of pump setting: Water quality (Clear, cloudy, odor, etc.): Clear

of pump ☐ Shallow-well jet

Submersible ☐ Deep-well jet ☐ Other (specify): _____

WELL CAPACITY TEST

k one ☐ Air ☐ Pumping

Bailing: Test rate 10 gpm _____ hrs.

down feet: Static level (depth to water) 40' feet

GROUTING INFORMATION

material	Depth of grout From To
allation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
Top Soil	0	3
Gravel	3	37
Clay	37	65
Gravel	65	67
Clay	67	96
Gravel	96	98
Clay	98	130
Gravel	130	133

(Additional space for well log on reverse side)

eby swear or affirm, under the penalties for perjury that information submitted herewith is to the best of my vledge and belief, true, accurate and complete.

Signature of owner or authorized representative: Allen Matlock

Date: 10/21/88

Reference 22 Page 328

01-01 173736 RATIVE USE ONLY
oes not fill out)

County	Township	Range		Section
Marion	16N	3E	SW SE	32

Topo map: Indianapolis West	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG	FROM	TO
Formations: type of material	Feet	Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W E

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

150

(Completely)

WELL LOCATION

County where drilled	Civil township	Township	Range	Section
Marion		~~Wayne~~ 16N	3E	32

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.

1113 Olin ave INDpls. (NE, SE, SW)

OWNER - CONTRACTOR

Name of well owner	Telephone Number ( )
Address (Street and number, city, state)	ZIP code
Name of building contractor: Marathon oil company (Bill Day)	Telephone number ( ) 249-0677 Ext 262
Address (Street and number, city, state): 1304 Olin ave INDpls. IN	ZIP code 46241
Name of drilling contractor: Hamilton Bros. INC.	Telephone number ( ) 241-2571
Address (Street and number, city, state): 4025 Rockville Rd. INDpls IN	ZIP code 46222
Name of equipment operator: Bob Schellenberg	License number #36
Date of completion: 12-18-91	

CONSTRUCTION DETAILS

Use of well:
- [X] Home
- [ ] Industry
- [ ] Test
- [ ] Irrigation
- [ ] Public supply
- [ ] Stock
- [ ] Other (specify):

Method of drilling:
- [X] Rotary
- [ ] Rev. rotary
- [ ] Cable tool
- [ ] Jet
- [ ] Bucket rig
- [ ] Other

Casing length: 86 feet	Material: P.V.C.	Diameter: 4 inches
Screen length: 4 feet	Material: P.V.C.	Diameter: 4 inches
Screen slot size: 060	Total depth of well: 90	
Depth of pump setting: 60	Water quality (Clear, cloudy, odor, etc.): Clear	
Type of pump: [X] Submersible	[ ] Shallow-well jet [ ] Deep-well jet [ ] Other (specify):	

WELL CAPACITY TEST

Check one: [X] Bailing	[ ] Air [ ] Pumping
Test rate: 10 gpm 1 hrs.	
Static level (depth to water): 20 feet	
Drawdown: 40 feet	

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
Topsoil & clay	0	5
Gravel	5	35
clay	35	80
Gravel	80	90

(Additional space for well log on reverse side)

GROUTING INFORMATION

Material	Depth of grout	Sealing material	Depth filled
[illegible]	From 80 To 90		From To
[illegible]	Number of bags used	Method of installation	Number of bags used

Information affirm, under the penalties for perjury that [illegible] submitted herewith is to the best of my [illegible] relief, true, accurate and complete.

Signature of owner of authorized representative

Date

FOR ADMINIS[illegible]VE USE ONL[illegible] 01-01 173800
(well driller does not fill out)

County	Township	Range	1/4	1/4	Section
MARION	16N	3E			32

Topo map	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

RECORD OF WATER WELL

State Form 35680 (R3 / 11-87)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

151

Fill in completely)

WELL LOCATION

Where drilled	Civil township	Township	Range	Section
Perron				

Driving directions to the well location (include county road names, number, subdivisions lot number with consideration to intersecting, road and trip origination there is space for a map on reverse side.

1115 Olin Street

OWNER - CONTRACTOR

Name of well owner: Russell Dill	Telephone Number: (244-9796
Address (Street and number, city, state): 7136 Buick Dr. Indpls, In.	ZIP code: 46214
Name of building contractor:	Telephone number: ( )
Address (Street and number, city, state):	ZIP code:
Name of drilling contractor: Hamilton Bros., Inc.	Telephone number: (244-2571
Address (Street and number) city, state): 4025 Forkville Rd Indpls, In.	ZIP code: 46222
Name of equipment operator: Robert D. Schellenberg	License number: #36 / Date of completion: 4/5/90

CONSTRUCTION DETAILS

Well:

☑ Home ☐ Industry ☐ Test ☐ Irrigation

☐ Public supply ☐ Stock ☐ Other (specify): _____

Method of drilling: ☑ Rotary ☐ Rev. rotary

☐ Cable tool ☐ Jet ☐ Bucket rig ☐ Other

Casing length	Material	Diameter
83 feet	P.V.C.	4" inches

Screen length	Material	Diameter
4 feet	P.V.C.	4" inches

Screen slot size: .060

Total depth of well: 87'

Depth of pump setting: 50'

Water quality (Clear, cloudy, odor, etc.): Clear

Type of pump: ☐ Shallow-well jet

☐ Submersible ☐ Deep-well jet ☐ Other (specify): _____

WELL CAPACITY TEST

Check one: ☐ Air ☐ Bailing ☐ Pumping

Test rate: 10 gpm 1 hrs.

Drawdown: 20 feet

Static level (depth to water): 30 feet

GROUTING INFORMATION

Grout material	Depth of grout	Method of installation	Number of bags used
Bentonite	From 0 To 81		7

WELL ABANDONMENT

Sealing material	Depth filled	Method of Installation	Number of bags used
	From To		

WELL LOG

Formations: type of material	From (Feet)	To (Feet)
Topsoil + Clay	0	5
Gravel	5	37
Clay	37	81
Gravel	81	87

(Additional space for well log on reverse side)

I hereby swear or affirm, under the penalties for perjury that the information submitted herewith is to the best of my knowledge and belief, true, accurate and complete.

Signature of owner of authorized representative

Date

FOR ADMINISTRATIV 01-01 173741
(well driller does n

County	Township	Range		Section
Marion	16N	3E	¼ SE ¼ SW	32

Topo map [illegible] West	Ft. W of EL	Ground elevation	Subdivision name
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w/o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG Formations: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W E

(152)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

MAR 1965 RECEIVED Dept. of Conservation, Division of Water Resources

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: Marion Civil Township: _____

ngressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: _____

me of owner: [illegible] Address: 1117 N. Olive

me of Well Drilling Contractor: _____

dress: _____

f Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

mpleted depth of well: 40 ft. Date well was completed: [illegible]

ameter of outside casing or drive pipe: _____ Length: _____

ameter of inside casing or liner: _____ Length: _____

ameter of Screen: [illegible] (PVC) MATERIAL Length: _____ Slot size: _____

rpe of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

se of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

ethod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tatic water level in completed well (Distance from ground to water level) _____ ft.

ailer Test: Hours tested _____ Rate [illegible] g.p.m. Drawdown [illegible] ft. (Difference between static level and water level at end of test)

umping Test: Hours tested _____ Rate 10 g.p.m. Drawdown [illegible] ft.

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR ADMINISTI 01-01 17 6
(Well driller d

COUNTY: Marion TWP. 16N RGE. 3E NW ¼ SW ¼ SE ¼ SEC. 32

Topo Map: INDIANAPOLIS I. West 7½

Well log classified By U Date 5-65
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By U Date 5-65

____ Ft W of EL. Ground elevation ____
____ Ft N of SL. Depth to bedrock ____
____ Ft E of WL. Bedrock elevation ____
____ Ft S of NL. Aquifer elevation ____

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Gravel	0	40

MARKS: Geophysical log

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a
er well. We request that you be as accurate as possible in recording this information as
may be of great assistance in the planning and development of new water supplies.
An accurate location of the well is equally as important as an accurate well log.
ase include all information possible in the space provided for well location.
As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted
in thirty days after the completion of a well to the Division of Water Resources, Indiana
rtment of Conservation.

COUNTY MARION TWP. 16N RGE. 3E ¼ NE ¼ SW SEC 32 Subdivision Name

Topo Map INDIANAPOLIS WEST

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by AM 5/11/81

_____ Ft W of EL. Ground Elevation _____

_____ Ft N of SL. Depth to bedrock _____

_____ Ft E of WL. Bedrock elevation _____

_____ Ft S of NL. Aquifer elevation _____ Lot Number _____

WATER WELL RECORD

PERMIT NO.

ITY MARION

CIVIL TOWNSHIP

NG DIRECTIONS 1304 OLIN AVE.

OWNER MARATHON OIL

BUILDING CONTRACTOR MARATHON OIL CO.

DRILLING EQUIPMENT OPERATOR DESTER HARNESS

WELL INFORMATION

CASING DIAMETER	MATERIAL LENGTH	LINER DIAM.	LINER LENGTH	SCREEN DIAM.	SCREEN LENGTH	SLOT	TYPE OF WELL	USE OF WELL	METHOD OF DRILLING	DATE WELL COMPLETED
4" PVC	107			4	3	60	GRAVEL PACK	INDUSTRY	ROTARY	2/11/81

STATIC WATER LEVEL	BAILER TEST HOURS TEST	BAILER TEST RATE G.P.M.	BAILER TEST DRAWDOWN	PUMP TEST HOURS TEST	PUMP TEST RATE G.P.M.	PUMP TEST DRAWDOWN
20				1	10	20 ~~40 P/L~~

TIONS (COLOR, TYPE OF MATERIAL, HARDNESS, ETC.)	FROM	TO
SOIL & CLAY	0	10
/EL	10	40
/	40	90
/EL	90	96
/	96	110

HAMILTON BROS. INC.
P.O. BOX 24181
4025 ROCKVILLE ROAD
INDIANAPOLIS, IND. 46224

STATE COPY

(154)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

JUN 1960
RECEIVED
Dept. of Conservation
Division of
Water Resources

WATER WELL RECORD

INFORMATION ON WELL LOCATION

nty in which well was drilled: Marion Civil Township: _____

gressional township: _____ Range: _____ Number of section: _____
(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets

distinctive landmarks: 1801 North Exeter North of 16th St.
dianapolis Ind.

e of owner: M. C. Calment Address: _____

e of Well Drilling Contractor: Willard English & Son

ress: Clayton Indiana [illegible]

Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

pleted depth of well: 108 ft. Date well was completed: 8/24/59

meter of outside casing or drive pipe: ~~[illegible]~~ 4.5" Length: [illegible]

meter of inside casing or liner: 4" Length: _____

meter of Screen: 4" Length: 2.5 ~~[illegible]~~ ft. Slot size: [illegible]

of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☐ Rotary ☑ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) 40 ft.

er Test: Hours tested ___ Rate ___ g.p.m. Drawdown ___ ft. (Difference between static level and water level at end of test)

ing Test: Hours tested ___ Rate ___ g.p.m. Drawdown ___ ft.

Signature Leon English

Date Aug. 24 1959

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Topsoil	0	1
Clay - yellow - gray	1	101
Sands	101	108

MARKS:

FOR ADM
(Well Dr. 01-01 637 LY
1 out)

COUNTY: MARION TWP. 16N RGE. SE SW ¼ SE ¼ NE ¼ SEC. 32

Topo. Map: Indianapolis W Loc. accepted w/o verification Yes ✓ No ___

El. of grnd. surface at well: 730 Courthouse Loc. By ___ Date ___

Depth to bedrock: ___ Field Located By ___ Date ___

Well Log processed by: [illegible] Placed in Master Well Log File Date 4-3-62

INSTRUCTIONS

This Water Well Record form is designed to record the most essential data concerning a er well. We request that you be as accurate as possible in recording this information as may be of great assistance in the planning and development of new water supplies. An accurate location of the well is equally as important as an accurate well log. ase include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana artment of Conservation, 311 West Washington Street, Indianapolis, Indiana.

(155)

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
311 WEST WASHINGTON STREET
INDIANAPOLIS, INDIANA

DEC 1980

WATER WELL RECORD

INFORMATION ON WELL LOCATION

unty in which well was drilled: MARION Civil Township: WAYNE

ngressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

scribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: 1826 N EXTER AVE

me of owner: McADAMS Address: 1826 N EXTER AVE

me of Well Drilling Contractor: HARLAN MILLER Well & Pump Company

iress: _____

Drilling Equipment Operator: R. WAGONER

INFORMATION ON THE WELL

ıpleted depth of well: 125 ft. Date well was completed: 11/26/60

ımeter of outside casing or drive pipe: 4" Length: 122

ımeter of inside casing or liner: _____ Length: _____

ıneter of Screen: 3" Length: 5' Slot size: 6

e of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☑ For industry ☐ For public supply ☐ Stock ☐

hod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

tic water level in completed well (Distance from ground to water level) 30 ft.

ler Test: Hours tested 1 Rate 10 g.p.m. Drawdown 2 ft. (Difference between static level and water level at end of test)

ping Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft.

HARLAN MILLER
Well & Pump Company

Signature _____

Date 12/15/60

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

WATER WELL LOG

FOR ADMINIS 01-01 780
(Well Driller [illegible])

COUNTY: MARION

Topo. Map: INDIANAPOLIS NW TWP. 16 N RGE. 3 E NW ¼ SE ¼ NE ¼ SEC. 3

El. of grnd. surface at well: 730 Loc. accepted w/o verification Yes ✓ No ___

Depth to bedrock: ___ Courthouse Loc. By ___ Date ___

Well Log processed by: DTB Field Located By ___ Date ___

Placed in Master Well Log File Date 4-3-61

ORMATIONS (Color, type of material, hardness, etc.)	From	To
DRY GRAVEL	0	65
CLAY	65	120
GRAVEL	120	125

ARKS:

INSTRUCTIONS

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RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

156

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

[redacted]etely

WELL LOCATION

unty where drilled	Civil township	Township	Range	Section
MARION		16N	3E	32

ving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a ap on reverse side.

3451 W 16th

OWNER - CONTRACTOR

me of well owner: B+B TAVERN — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of building contractor: — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of drilling contractor: HAMILTON BROS. — Telephone number:

dress (*number and street, city, state, ZIP code*):

me of equipment operator: — License number: — Date of completion: 1955

CONSTRUCTION DETAILS

.ome ☐ Industry ☐ Test ☐ Irrigation
Public supply ☐ Stock ☐ Other (*specify*):

thod of drilling
Rotary ☐ Jet ☐ Bucket rig
Cable tool ☐ Rev. rotary ☐ Other

ing length	Material	Diameter
feet		8 inches
een length 6 feet	Material	Diameter inches

een slot size: #40 — Total depth of well: 85

th of pump setting: — Water quality (*clear, cloudy, odor, etc.*):

e of pump ☐ Shallow-well jet ☐ Other (*specify*):
Submersible ☐ Deep-well jet

WELL CAPACITY TEST

ck one ☐ Air
Bailing ☐ Pumping

Test rate: 100 gpm _____ hrs.

vdown: feet — Static level: (*depth of water*) feet

GROUTING INFORMATION

it material	Depth of grout From to
[redacted]stallation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
SANDY clay	0	15
DRY GRAVEL	15	20
SANDY clay	20	77
SAND + GRAVEL	77	85

(*Additional space for well log on reverse side*)

eby swear or affirm, under the penalties perjury that the information submitted with is to the best of my knowledge and f, true, accurate and complete.

Signature of owner or authorized representative: — Date:

FOR ADMINISTRATIVE USE ONLY
(well driller does not fill out)

County	Township	Range	1/4 1/4	Section
MARION	16N	3E		32

Topo map: INDIANAPOLIS WEST	Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS: type of material	FROM Feet	TO Feet

SKETCH SHOWING LOCATION
(Locate with reference to highways, intersecting county roads and distinctive landmarks.)

N

W

E

32

157

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS 9, INDIANA

WATER WELL RECORD

INFORMATION ON WELL LOCATION

nty in which well was drilled: [illegible] Civil Township: _____

gressional township: _____ Range: _____ Number of section: _____

(Fill in as completely as possible)

cribe in your own words the well location with respect to nearby towns, roads, streets distinctive landmarks: _____

[illegible]

241-2392

e of owner: [illegible] Address: 4400 [illegible] St.

e of Well Drilling Contractor: [illegible]

[illegible]

e of Drilling Equipment Operator: [illegible]

INFORMATION ON THE WELL

pleted depth of well: 1 1 ft. Date well was completed: [illegible]

meter of outside casing or drive pipe: _____ Length: _____

meter of inside casing or liner: [illegible] Length: _____

meter of Screen: 5" Length: [illegible] Slot size: 60

of Well: Drilled ☑ Gravel Pack ☐ Driven ☐ Other _____

of Well: For home ☐ For industry ☐ For public supply ☐ Stock ☐

od of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐

ic water level in completed well (Distance from ground to water level) 55 ft.

er Test: Hours tested _____ Rate _____ g.p.m. Drawdown _____ ft. (Difference between static level and water level at end of test)

ing Test: Hours tested 8 Rate 352 g.p.m. Drawdown _____ ft.

~~Also tested at 1000 gpm~~ ~~Seemingly little drawdown~~

Signature _____

Date _____

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

NL

WATER WELL LOG

RMATIONS (Color, type of material, hardness, etc.)	From	To
Gravel	0	28
Clay	28	63
Small Gravel	63	81
Clay	81	107
Gravel	107	117
Gravel	117	131

ARKS: graphic log

FOR ADMI 01-01 63 Y
(Well drille... ut)

COUNTY: Marion TWP. 16N RGE. 3E NW ¼ NW ¼ SW ¼ SEC. 32

Topo Map: Indpls. Bdrdr

Well log classified By [illegible] Date 2/22/[illegible]
Courthouse located By ____ Date ____
Field located By ____ Date ____
Acc. w/o verification By [illegible] Date 2/22/[illegible]

Ft W of EL. Ground elevation ____
Ft N of SL. Depth to bedrock ____
Ft E of WL. Bedrock elevation ____
Ft S of NL. Aquifer elevation ____

INSTRUCTIONS

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An accurate location of the well is equally as important as an accurate well log. se include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted in thirty days after the completion of a well to the Division of Water Resources, Indiana rtment of Conservation.

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

5 300

158

WATER WELL RECORD

WELL LOCATION

(Fill in completely - Refer to instruction sheet)

County in which well was drilled Marion Civil Township

Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

Test # 7

200 West of Olin Ave. 200 N.E. side of Pa-Erie RR tracks

NAME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner Speedway Water Address Speedway City

Building Contractor City of Speedway Address Speedway City

Name of Well Drilling Contractor: Layne Northern Co

Address

Name of Drilling Equipment Operator: Ness, James E.

WELL INFORMATION

Depth of well: 130 Date well was completed: 4-2-1941

Diameter of casing or drive pipe: Total Length:

Diameter of liner (if used): Total Length:

Diameter of Screen: Length: Slot Size:

Type of Well: Drilled [X] Gravel Pack [ ] Driven [ ] Other

Use of Well: For Home [ ] For Industry [ ] For Public Supply [X] Stock [ ]

Method of Drilling: Cable Tools [X] Rotary [ ] Rev. Rotary [ ] Jet [ ] Bucket Rig [ ]

Static water level in completed well (Distance from ground to water level) 23 feet

Bailer Test: Hours Tested Rate g.p.m. Drawdown ft.

Pumping Test: Hours Tested Rate g.p.m. Drawdown ft.

(Drawdown is the difference between static level and water level at end of test)

Signature Old log card. no citations

Date or dates

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET 11-9-73

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To
Soil & Clay	0	5
Medium Sand & Gravel	5	18
Medium Sand & Gravel	18	36
Gritty Clay	36	69
Muddy Sand	69	75
Muddy Gravel - (Water)	75	79
Gritty Clay	79	85
Medium Gravel - (Water)	85	86
Hard Gritty Clay	86	106
Soft Gritty Clay	106	118
Tough Clay	118	126
Soft Clay	126	129
Shale	129	130
~~Plotted on Marion Co. Bedrock Map by ?~~		

26-9-73

COUNTY Marion TWP. 16N RGE. 3E ¼ ¼ SEC 32 Subdivision Name

Topo Map Indpls West

Field Located By _____ Date _____ Ft W of EL. Ground Elevation 720 E Test 7

Courthouse Location By _____ Date _____ Ft N of SL. Depth to bedrock 129 Layout

Location accepted w/o verification by _____ Ft E of WL. Bedrock elevation 591 4-2-41

Ft S of NL. Aquifer elevation _____ Lot Number _____

FOR ADMIN 0 1 173751
(Well dr. ... in out)

B

~~Operator~~

DIVISION OF WATER
DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA
STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46204
Telephone 633-5267 Area Code 317

159

WATER WELL RECORD

/ELL LOCATION

(Fill in completely - Refer to instruction sheet)

ounty in which well was drilled MARION Civil Township WAYNE

riving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinctive landmarks, etc.

PERMANENT #5 AT site of #27 TEST WELL
750' S. of c/L of 16th STREET

AME OF WELL OWNER and/or BUILDING CONTRACTOR

Well Owner SPEEDWAY WATER Address

Building Contractor Address

ıme of Well Drilling Contractor: LAYNE NORTHERN

ldress

Drilling Equipment Operator: John MILLER

ELL INFORMATION

pth of well: 119.5 Date well was completed: 10-28-1944

ımeter of casing or drive pipe: 50 Total Length: 50

ımeter of liner (if used): Total Length:

.meter of Screen: 18 Length: 25 Slot Size: #6

ɔe of Well: Drilled ☐ Gravel Pack ☒ Driven ☐ Other

: of Well: For Home ☐ For Industry ☐ For Public Supply ☒ Stock ☐

:hod of Drilling: Cable Tools ☐ Rotary ☐ Rev. Rotary ☐ Jet ☐ Bucket Rig ☐

:ic water level in completed well (Distance from ground to water level) 14 feet

er Test: Hours Tested Rate g.p.m. Drawdown ft.

ıping Test: Hours Tested Rate 600 g.p.m. Drawdown 31 ft.

(Drawdown is the difference between static level and water level at end of test)

Signature

Date

FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

FOR ADM 01-0 173756 Y
(Well ...)

Speedway City

COUNTY MARION TWP. 16N RGE. 3E SW ¼ NE ¼ SW SEC 32 Subdivision Name

Topo Map INDIANAPOLIS WEST

Field Located By _____ Date _____

Courthouse Location By _____ Date _____

Location accepted w/o verification by _____

_____ Ft W of EL.
_____ Ft N of SL.
_____ Ft E of WL.
_____ Ft S of NL.

Ground Elevation _____
Depth to bedrock _____
Bedrock elevation _____
Aquifer elevation _____ Lot Number _____

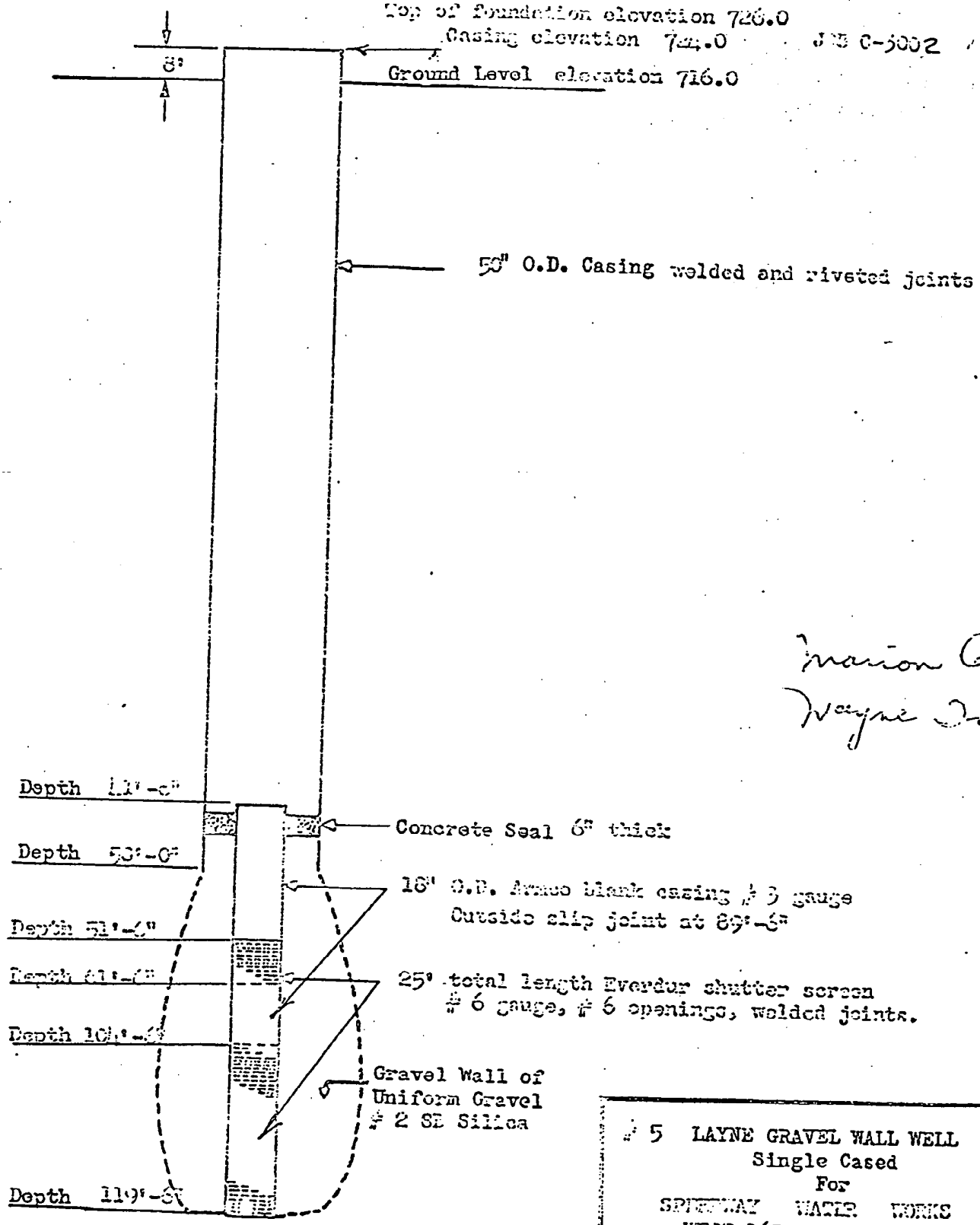
APPROX. LOCATION

C. (WELL DIAGRAM AVIALABLE)

WATER WELL LOG

FORMATIONS (Color, type of material, hardness, etc.)	From	To

T16N, R3E, Sec 32' SE/NE, SW?



Marion Co.
Wayne Twp.

5 LAYNE GRAVEL WALL WELL
Single Cased
For
SPEEDWAY WATER WORKS
WEST 16TH STREET
INDIANAPOLIS INDIANA

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY
APPROVED BY
DATE

DRAWING No.
759

Driller John Miller
Date Finished 10/20/44

Not drawn to Scale
All depths measured
from ground level

Static Level 14'
Pumped 600 GPM
at 45 Pumping Level

160

RECORD OF WATER WELL

State Form 35680 (R4 / 4-92)

Mail complete record within 30 days to:
INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
402 W.Washington St., Rm. W264
Indianapolis, IN 46204
(317) 232-4160

...mpletely

WELL LOCATION

...unty where drilled	Civil township	Township	Range	Section
Marion	Wayne			

...iving directions to the well location (*include county road names, number, subdivision lot number with consideration to intersecting road and trip origination*). There is space for a ...ap on reverse side.

250 feet South of #6 well, 5 feet West of water line

OWNER-CONTRACTOR

...me of well owner: Allison Engineering Company

Telephone number:

...dress (*number and street, city, state, ZIP code*):

...me of building contractor:

Telephone number:

...dress (*number and street, city, state, ZIP code*):

...me of drilling contractor: ...ayne Northern

Telephone number:

...dress (*number and street, city, state, ZIP code*):

...me of equipment operator: ...liam Wagner and Charles Poole

License number:

Date of completion: October 24, 1940

CONSTRUCTION DETAILS

...of well:
Home ☐ Industry ☐ Test ☐ Irrigation
Public supply ☐ Stock ☐ Other (*specify*):

...hod of drilling
Rotary ☐ Jet ☐ Bucket rig
Cable tool ☐ Rev. rotary ☐ Other

...ing length	Material	Diameter
feet		inches
...en length	Material	Diameter
feet		inches

...en slot size:

Total depth of well:

...th of pump setting:

Water quality (*clear, cloudy, odor, etc.*):

... of pump
Submersible ☐ Shallow-well jet ☐ Deep-well jet ☐ Other (*specify*):

WELL CAPACITY TEST

...k one
Bailing ☐ Air ☐ Pumping

Test rate: _____ gpm _____ hrs.

...down: feet

Static level (*depth of water*): 22 feet

GROUTING INFORMATION

...	Depth of grout From to
...d of installation	Number of bags used

WELL ABANDONMENT

Sealing material	Depth filled From To
Method of installation	Number of bags used

WELL LOG

FORMATIONS: Type of material	From (*feet*)	To (*feet*)
Top Soil	0	1
Clay	1	4
S + G	4	34
Gritty Clay	34	37
S + G - some clay	37	42
Gritty Clay	42	52
S + G	52	60
Hard Gritty Clay	60	100
Medium + Fine Sand Mixed	100	107
Fine Sand and Gravel	107	117

(*Additional space for well log on reverse side*)

...by swear or affirm, under the penalties ...erjury that the information submitted ...ith is to the best of my knowledge and ... true, accurate and complete.

Signature of owner or authorized representative:

Date:

FOR ADMINISTRATIVE USE ONLY (well driller does not fill out) 01-01 179990

County	Township	Range		Section
Marion	~~Wayne~~ 15N	3E	NW 1/4 NW 1/4 NE	6

Topo map	2650 Ft. W of EL	Ground elevation	Name of subdivision
Field located By Date	Ft. N of SL	Depth to bedrock	Lot number
Courthouse location By Date	Ft. E of WL	Bedrock elevation	U.T.M.
Location accepted w / o verification by	300 Ft. S of NL	Aquifer elevation	

(continued from front side)

WELL LOG FORMATIONS (type of material)	FROM Feet	TO Feet

SKETCH SHOWING LOCATION (Locate with reference to highways, intersecting county roads and distinctive landmarks)

C. (~~#2~~ Well Log No. 24)

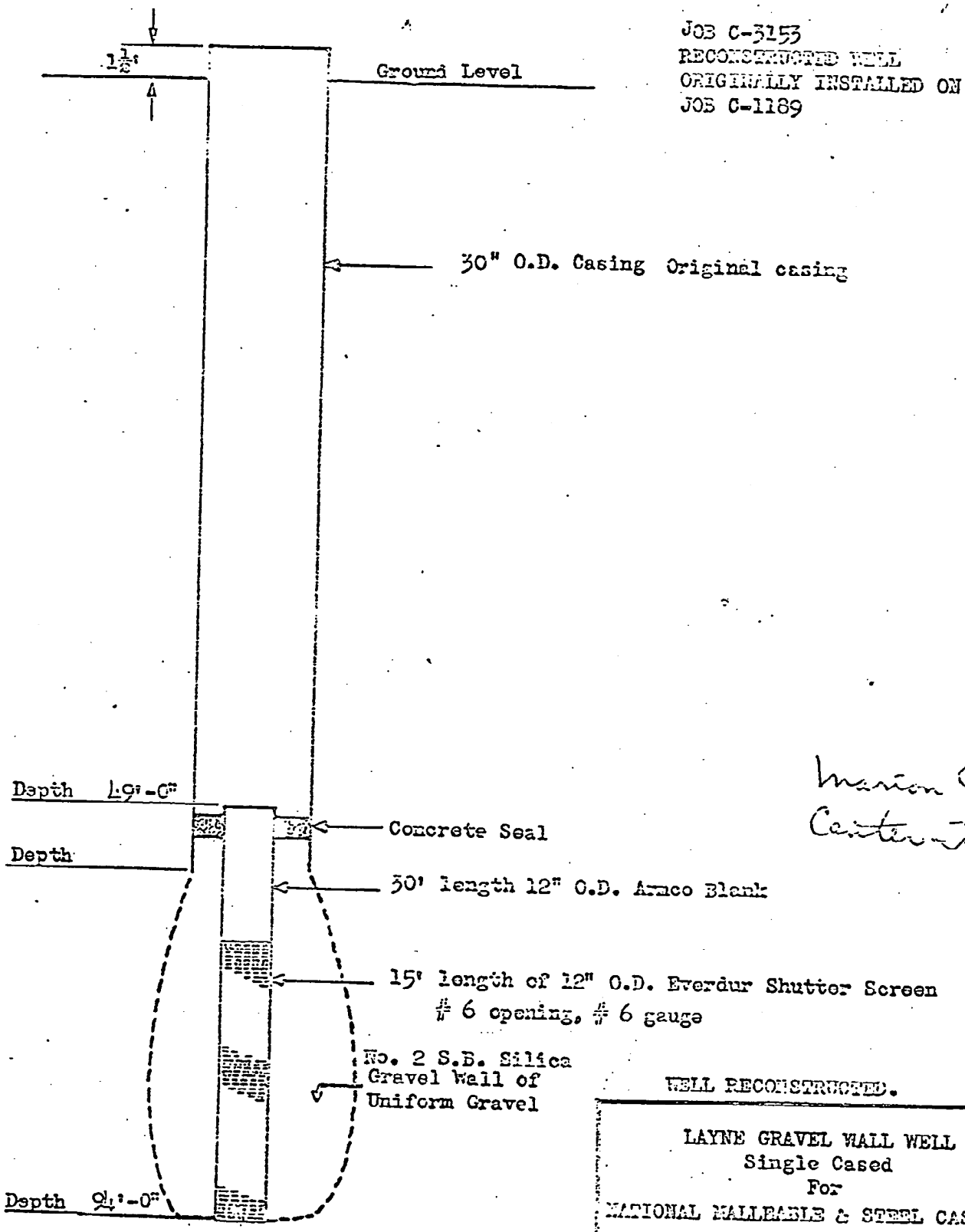
N

W

E

T15N, R3E, Sec 4 NW, SW, NE

JOB C-3153
RECONSTRUCTED WELL
ORIGINALLY INSTALLED ON
JOB C-1189



Marion Co.
Center Twp.

WELL RECONSTRUCTED.

LAYNE GRAVEL WALL WELL
Single Cased
For
NATIONAL MALLEABLE & STEEL CASTINGS
COMPANY
546 NORTH HOLMES AVE.
INDIANAPOLIS INDIANA

Driller John Miller
Date Finished 11/24/44

Not drawn to Scale
All depths measured
from ground level

Static Level 22
Pumped 600 GPM

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY | DRAWING No.

POTABLE WATER
CHEMICAL SAMPLE

Date Rec'd 98 JUN 25 PM 3:22

Lab Sample No.: 1533

Date Completed 98 JUL -1 AM 9:55

SAMPLE #: JR062598-2
ESTABLISHMENT: RESIDENCE
ADDRESS: 709 N. GUN AVE.
OWNER: GERODINE GILL 632-3712
OWNER ADDRESS: Above
WHERE SAMPLE TAKEN: KITCHEN
DEPTH OF WELL: _____ DIAMETER: _____
TYPE OF WELL: DRILLED: _____
DRIVEN: _____
DUG: _____

MARION COUNTY HEALTH DEPARTMENT
making a difference

DATE: 6/25/98
E.H.S.: REED TIME: 2:40
CHEMISTS: [illegible]
RESAMPLE: _____
POSSIBLE ENVIRONMENTAL HAZARDS:
On Site: _____
Off Site: ALLISON ENGINE

HOW LONG WATER RUN: 5 MIN

ODOR: _____ KIND OF ODOR: _____

pH N/T
CONDUCTIVITY N/T

X GC - M. S. ANALYSIS OF VOLATILES. EPA 524.2

	Scan	Identity	Purity	Fit	Conc. in ug/L
X ANIONS Conc. in mg/L: EPA 300.0		Nothing detected			
NITRATE AS N (.08) 4.1					
NITRITE AS N (.04) <DL					
CHLORIDE (0.5) 41.3					
SULFATE (0.8) 51.0					
FLOURIDE (.02) 0.13					
X METALS Conc. in ug/L: EPA 200.8					
ARSENIC (1) <DL					
BARIUM (2) 103.9					
CADMIUM (3) <DL	CARBAMATES (circle if required): EPA 531.1				
CHROMIUM (3) 13.2					
MERCURY (0.3) <DL					
LEAD (3) <DL					

RECEIVED
MAR 01 2002
KERAMIDA

(Detection Limits)

GROUNDWATER

Date Rec'd

98 MAR -9 PM 1:03

POTABLE WATER
CHEMICAL SAMPLE

Lab Sample No. : 520

Date Completed

SAMPLE #: JR030998-2
ESTABLISHMENT: RESIDENCE
ADDRESS: 709 N. OLIN AVE.
OWNER: GERODINE GILL
OWNER ADDRESS: Above
WHERE SAMPLE TAKEN: KITCHEN
DEPTH OF WELL: _____ DIAMETER: _____
TYPE OF WELL: DRILLED: _____
DRIVEN: _____
DUG: _____

HOW LONG WATER RUN: 5 MIN

ODOR: _____ KIND OF ODOR: _____

MARION COUNTY HEALTH DEPARTMENT
making a difference

DATE: 3/9/98
E.H.S.: REED TIME: 11:30
CHEMISTS: [illegible] BJ
RESAMPLE: _____
POSSIBLE ENVIRONMENTAL HAZARDS:
On Site: _____
Off Site: ALLISON

pH 7.45
CONDUCTIVITY 940

X GC - M. S. ANALYSIS OF VOLATILES.

Scan	Identity	Purity	Fit	Conc. in ug/L
1016	octamethylcyclotetrasiloxane	642	642	~4.0

ANIONS Conc. in mg/L:	
NITRATE AS N (.08)	7.78
NITRITE AS N (.04)	<DL
CHLORIDE (0.5)	54.7
SULFATE (0.8)	75.0
FLOURIDE (.02)	0.13

X

METALS Conc. in ug/L:	
ARSENIC (1)	<DL
BARIUM (2)	120.0
CADMIUM (3)	<DL
CHROMIUM (3)	<DL
MERCURY (0.3)	<DL
LEAD (3)	<DL

(Detection Limits)

CARBAMATES (circle if required):

GROUNDWATER

cc'd

99 FEB 25 PM 3:32

POTABLE WATER
CHEMICAL SAMPLE

Lab Sample No.: 325

Date Completed

SAMPLE #: KR022599-2
ESTABLISHMENT: Residence
ADDRESS: 709 N. Olin Ave.
OWNER: Mrs. Gerodine Gill
OWNER ADDRESS: Above
WHERE SAMPLE TAKEN: Kitchen sink
DEPTH OF WELL: _____ DIAMETER: _____
TYPE OF WELL: DRILLED: _____
DRIVEN: _____
DUG: _____

HOW LONG WATER RUN: _____

ODOR: 5 KIND OF ODOR: min

MARION COUNTY HEALTH DEPARTMENT
making a difference

DATE: 2/25/99
E.H.S.: Rockhill TIME: 10:43
CHEMISTS: BG MO
RESAMPLE: _____
POSSIBLE ENVIRONMENTAL HAZARDS:
On Site: _____
Off Site: _____

pH
CONDUCTIVITY

X GC - M. S. ANALYSIS OF VOLATILES. EPA 524.2

	Scan	Identity	Purity	Fit	Conc. in ug/L
ANIONS Conc. in mg/L:EPA 300.0		Nothing Detected			
NITRATE AS N (.08) 3.28					
(0.06)					
NITRITE AS N ~~(.04)~~ <DL					
(1.0)					
CHLORIDE ~~(0.5)~~ 43.91					
(1.0)					
SULFATE ~~(0.8)~~ 57.93					
(0.03)					
FLOURIDE ~~(.02)~~ 0.11					
X METALS Conc. in ug/L:EPA 200.8					
ARSENIC (1) <DL					
BARIUM (2) 96.8					
CADMIUM (3) <DL					
CHROMIUM (3) <DL					
MERCURY (0.3) <DL					
LEAD (3) <DL					

CARBAMATES (circle if required): EPA 531.1

(Detection Limits)

POTABLE WATER
CHEMICAL SAMPLE

Rec'd

99 JUN 15 2:31

Lab Sample No.: 1379

Date Completed

SAMPLE #: KR061499-2
ESTABLISHMENT: Residence
ADDRESS: 709 N. Olin Ave
OWNER: Geroline Gill
OWNER ADDRESS: Above
WHERE SAMPLE TAKEN: Kitchen sink
DEPTH OF WELL: DIAMETER:
TYPE OF WELL: DRILLED:
DRIVEN:
DUG: X
HOW LONG WATER RUN: 5 min
ODOR: NO KIND OF ODOR:

DATE: 6/15/99
E.H.S.: Rockhill TIME: 1:35
CHEMISTS: YJS
RESAMPLE:
POSSIBLE ENVIRONMENTAL HAZARDS:
On Site:
Off Site:

pH
CONDUCTIVITY

GC - M. S. ANALYSIS OF VOLATILES. EPA 524.2

Scan	Identity	Purity	Fit	Conc. in ug/L
	Nothing Detected			

ANIONS Conc. in mg/L: EPA 300.0	
NITRATE AS N (.08)	5.5
NITRITE AS N (.06)	<DL
CHLORIDE (1.0)	42.6
SULFATE (1.0)	63.8
FLOURIDE (.03)	0.14

METALS Conc. in ug/L: EPA 200.8	
ARSENIC (2)	<DL
BARIUM (1)	104.4
CADMIUM (1)	<DL
CHROMIUM (2)	<DL
MERCURY (0.4)	<DL
LEAD (2)	<DL

CARBAMATES (circle if required): EPA 531.1

(Detection Limits)

Date Rec'd 1 SEP 29 AM 11:30

POTABLE WATER
CHEMICAL SAMPLE

Date Completed

Lab Sample No. : 2548

SAMPLE #: AH092999-2

ESTABLISHMENT: residence

ADDRESS: 709 N. Clin Av

OWNER: Gerodine Gill

OWNER ADDRESS: above

WHERE SAMPLE TAKEN: kitchen

DEPTH OF WELL: _____ DIAMETER: _____

TYPE OF WELL: DRILLED: _____
DRIVEN: _____
DUG: _____

HOW LONG WATER RUN: 10

ODOR: _____ KIND OF ODOR: _____

MARION COUNTY HEALTH DEPARTMENT
making a difference

DATE: 9/29/99

E.H.S.: Heller TIME: 10:35

CHEMISTS: MSJ PL

RESAMPLE: 10-5-99

POSSIBLE ENVIRONMENTAL HAZARDS:

On Site: _____

Off Site: _____

GROUND WATER

pH

CONDUCTIVITY

GC - M. S. ANALYSIS OF VOLATILES. EPA 524.2

	Scan	Identity	Purity	Fit	Conc. in ug/L
ANIONS Conc. in mg/L:EPA 300.0		NOTHING DETECTED			
NITRATE AS N (.08) 3.6					
NITRITE AS N (.06) <DL					
CHLORIDE (1.0) 32.4					
SULFATE (1.0) 64.4					
FLOURIDE (.03) 0.12					
METALS Conc. in ug/L:EPA 200.8					
ARSENIC (2) <DL					
BARIUM (1) 97.1					
CADMIUM (1) <DL					
CHROMIUM (2) <DL					
MERCURY (0.4) <DL					
LEAD (2) <DL					

CARBAMATES (circle if required): EPA 531.1

(Detection Limits)

Date Rec'd

POTABLE WATER
CHEMICAL SAMPLE

Date Completed

97 JUL 14 PM 2:14

Lab Sample No.: 1227

97 JUL 23 AM 9:19

SAMPLE #: JG071497-1
ESTABLISHMENT: RESIDENCE
ADDRESS: 709 OLIN AVE.
OWNER: GERODINE GILL
OWNER ADDRESS: 709 OLIN AVE.
WHERE SAMPLE TAKEN: KITCHEN
DEPTH OF WELL: _____ DIAMETER: _____
TYPE OF WELL: DRILLED: _____
DRIVEN: _____
DUG: _____
HOW LONG WATER RUN: 5 MIN.
ODOR: NO KIND OF ODOR: _____

MARION COUNTY HEALTH DEPARTMENT
making a difference

DATE: 7/14/97
E.H.S.: GOFF ([redacted]) TIME: 12:40
CHEMISTS: BG WBZ
RESAMPLE: _____
POSSIBLE ENVIRONMENTAL HAZARDS:
On Site: _____
Off Site: HISTORICAL TCE, etc.

pH 6.81
CONDUCTIVITY 971

X GC - M. S. ANALYSIS OF VOLATILES.

	Scan	Identity	Purity	Fit	Conc. in ug/L
X ANIONS Conc. in mg/L:		None Detected.			
NITRATE AS N (.08)					
<5.90					
NITRITE AS N (.04)					
<DL					
CHLORIDE (0.5)					
68.1					
SULFATE (0.8)					
84.7					
FLOURIDE (.02)					
0.14					
X METALS Conc. in ug/L:					
ARSENIC (1) <DL					
BARIUM (2) 95.9					
CADMIUM (3) <DL		CARBAMATES (circle if required):			
CHROMIUM (3) 3.25					
MERCURY (0.3) <DL					
LEAD (3) <DL					

(Detection Limits)

GROUNDWATER

WELL CHEMICAL SAMPLE

Date Rec'd

Lab Sample No.: 002

Date Completed

SAMPLE #: G-010297-1

DATE: 01-02-97

ESTABLISHMENT: RESIDENTIAL

SANITARIAN: SPENCE

ADDRESS: 709 OLIN AV.

CHEMISTS:

OWNER: Geraldine Gill 632-3712.

RESAMPLE:

OWNER ADDRESS: 709 OLIN AV.

POSSIBLE ENVIRONMENTAL HAZARDS:

WHERE SAMPLE TAKEN: KITCHEN SINK

On Site:

DEPTH OF WELL: DIAMETER:

TYPE OF WELL: DRILLED:
DRIVEN:
DUG:

Off Site: Allison's Plant #10

HOW LONG WATER RUN: 05 MIN

KIND OF ODOR:

pH 7.37

CONDUCTIVITY 916

Conc. in mg/L:

NITRATE as N 3.22

CHLORIDE 56.9

FLUORIDE 0.12

Conc. in ug/L:

ARSENIC (80) <DL

BARIUM (0.3) 72.2

CADMIUM (5) <DL

CHROMIUM (2) 2.99

MERCURY (20) 1.62

(10) <DL

(Detection Limits)

Sulfate 74 mg/L

Carbonates

GC - M. S. ANALYSIS OF VOLATILES:

Scan	Identity	Purity	Fit	Approx Quan. (ug/L)
	Nothing Detected			
0.072				
0.003				
0.0016				
	Nothing Detected			

GROUNDWATER

POTABLE WATER
CHEMICAL SAMPLE

Date Rec'd 97 JUL 14 PM 2:14

Lab Sample No.: 1227

Date Completed 97 JUL 23 AM 9:19

SAMPLE #: J6071497-1
ESTABLISHMENT: RESIDENCE
ADDRESS: 709 OLIN AVE.
OWNER: GERODINE GILL
OWNER ADDRESS: 709 OLIN AVE.
WHERE SAMPLE TAKEN: KITCHEN
DEPTH OF WELL: _____ DIAMETER: _____
TYPE OF WELL: DRILLED: _____
DRIVEN: _____
DUG: _____
HOW LONG WATER RUN: 5 MIN.
ODOR: NO KIND OF ODOR: _____

MARION COUNTY HEALTH DEPARTMENT

DATE: 7/14/97
E.H.S.: GOFF ([illegible]) TIME: 12:40
CHEMISTS: BG WBB
RESAMPLE: _____
POSSIBLE ENVIRONMENTAL HAZARDS:
On Site: _____
Off Site: HISTORICAL TCE, etc.

pH 6.81
CONDUCTIVITY 971

X GC - M. S. ANALYSIS OF VOLATILES.

	Scan	Identity	Purity	Fit	Conc. in ug/L
X ANIONS Conc. in mg/L:		None Detected.			
NITRATE AS N (.08) 5.90					
NITRITE AS N (.04) <DL					
CHLORIDE (0.5) 68.1					
SULFATE (0.8) 84.7					
FLOURIDE (.02) 0.14					
X METALS Conc. in ug/L:					
ARSENIC (1) <DL					
BARIUM (2) 95.9					
CADMIUM (3) <DL	CARBAMATES (circle if required):				
CHROMIUM (3) 3.25					
MERCURY (0.3) <DL					
LEAD (3) <DL					

(Detection Limits)

GROUNDWATER

Sample ID #:11032 Lab ID: 1342 Fed ID:

Address: 709 N OLIN AV
INDIANAPOLIS IN
Census Tract:

Sample Type: PW
Sample Location: KS
Collected By: WQ
Comment:

Sample Date: 07/14/1997 Sample Time:
Reason: OT
Date Received: 07/14/1997 Date Reported: 07/15/1997

Results

Param	Result	SUI	Units	Limits	Method	Anal.	Anal. Date	Remark
TC1	A	S	P/A	18HR	MMO-MUG			

Sample ID #:11033 Lab ID: 2245 Fed ID:

Address: 709 N OLIN AV
INDIANAPOLIS IN
Census Tract:

Sample Type: PW
Sample Location: KS
Collected By: WQ
Comment:

Sample Date: 10/07/1997 Sample Time:
Reason: RO
Date Received: 10/07/1997 Date Reported: 10/08/1997

Results

Param	Result	SUI	Units	Limits	Method	Anal.	Anal. Date	Remark
TC1	A	S	P/A	18HR	MMO-MUG			

Sample ID #:11034 Lab ID: 661 Fed ID:

Address: 709 N OLIN AV
INDIANAPOLIS IN
Census Tract:

Sample Type: PW
Sample Location: KS
Collected By: WQ
Comment:

Sample Date: 03/09/1998 Sample Time:
Reason: RO
Date Received: 03/09/1998 Date Reported: 03/10/1998

Results

Param	Result	SUI	Units	Limits	Method	Anal.	Anal. Date	Remark
TC1	A	S	P/A	18HR	MMO-MUG			

Sample ID #:11035 Lab ID: 448 Fed ID:

Address: 709 N OLIN AV
INDIANAPOLIS IN
Census Tract:

Sample Type: PW
Sample Location:
Collected By: WQ
Comment:

Sample Date: 02/25/1999 Sample Time:
Reason: OT
Date Received: 02/25/1999 Date Reported: 02/26/1999

Results

Param	Result	SUI	Units	Limits	Method	Anal.	Anal. Date	Remark
TC1	A	S	P/A	18HR	MMO-MUG			

Sample ID #:11036 Lab ID: 1430 Fed ID:

Address: 709 N OLIN AV
INDIANAPOLIS IN
Census Tract:

Sample Type: PW
Sample Location: KS
Collected By: WQ
Comment:

Sample Date: 06/15/1999 Sample Time:
Reason: OT
Date Received: 06/15/1999 Date Reported: 06/16/1999

Results

Param	Result	SUI	Units	Limits	Method	Anal.	Anal. Date	Remark
TC1	P	U	P/A	18HR	MMO-MUG			
EC1	A	U	P/A	18HR	MMO-MUG			

Sample ID #:AH092999-2 Lab ID: W2603 Fed ID:

Address: 709 N OLIN AV
INDIANAPOLIS IN
Census Tract:

Sample Type: PW Sample Date: 09/29/1999 Sample Time: 10:35
Sample Location: KS Reason: RO
Collected By: WQ Date Received: 09/29/1999 Date Reported: 09/30/1999
Comment:

Results

Param	Result	SUI	Units	Limits	Method	Anal.	Anal. Date	Remark
TC1	A	S	P/A	18HR	MMO-MUG	B/C	09/30/1999	
EC1			P/A	18HR	MMO-MUG			
TC2			MPN	18HR	MMO-MUG			
EC2			MPN	18HR	MMO-MUG			
TC3			P/A	24HR	MMO-MUG			
EC3			P/A	24HR	MMO-MUG			
TC4			MPN	24HR	MMO-MUG			
EC4			MPN	24HR	MMO-MUG			

ample ID #:CMC073101-4 Lab ID: W1164 Fed ID:

ddress: 709 OLIN AV
INDIANAPOLIS IN 46222
Census Tract: 41700

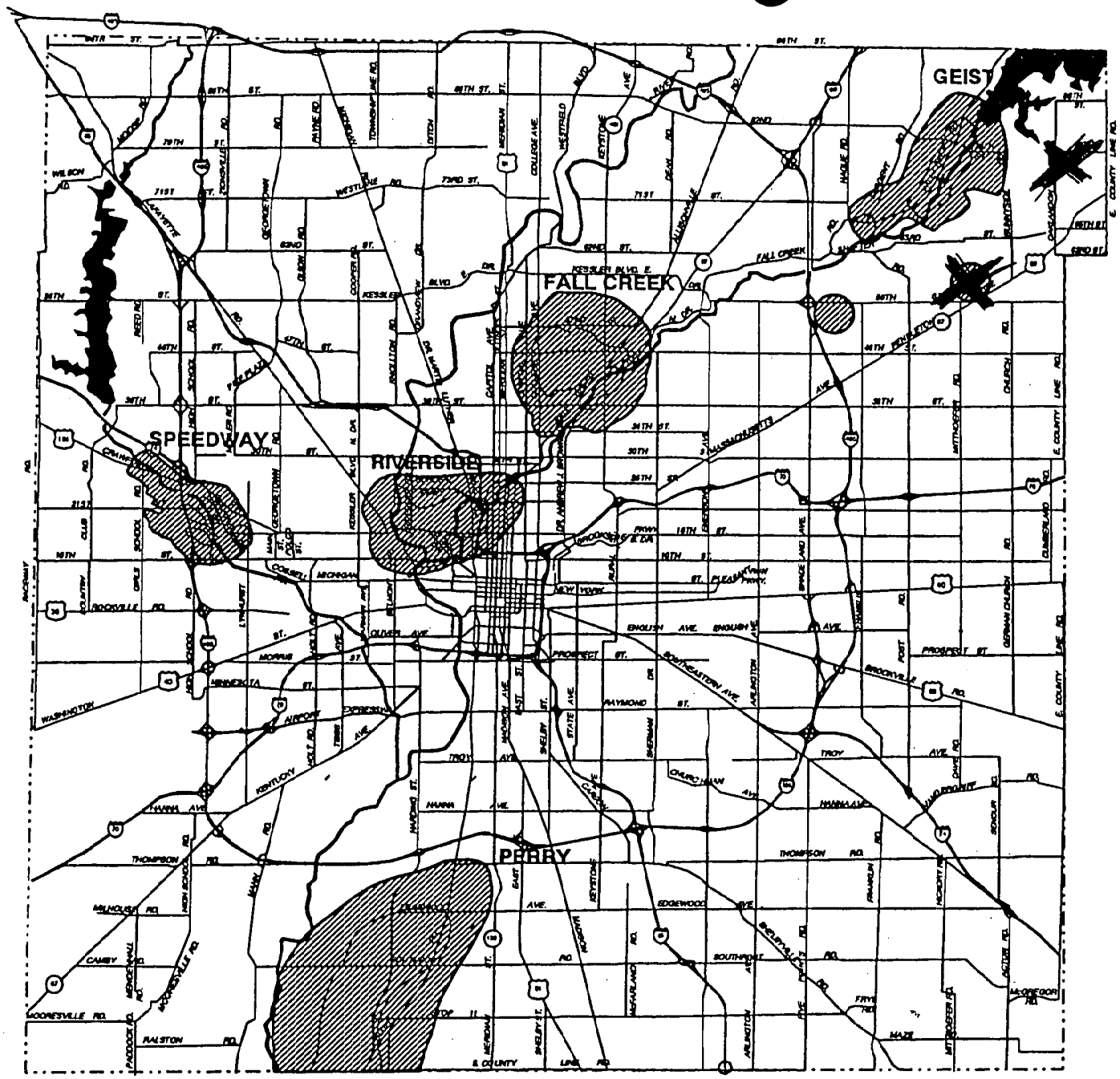
ample Type: PW
ample Location: KS
ollected By: WS
omment:

Sample Date: 07/31/2001 Sample Time: 04:45
Reason: RQ
Date Received: 08/01/2001 Date Reported: 08/02/2001

Results

aram	Result	SUI	Units	Limits	Method	Anal.	Anal. Date	Remark
C1	A	S	P/A	18HR	MMO-MUG	SB	08/02/2001	
C1			P/A	18HR	MMO-MUG			
C2			MPN	18HR	MMO-MUG			
C2			MPN	18HR	MMO-MUG			
C3			P/A	24HR	MMO-MUG			
C3			P/A	24HR	MMO-MUG			
C4			MPN	24HR	MMO-MUG			
C4			MPN	24HR	MMO-MUG			

WELLFIELD PROTECTION DISTRICTS



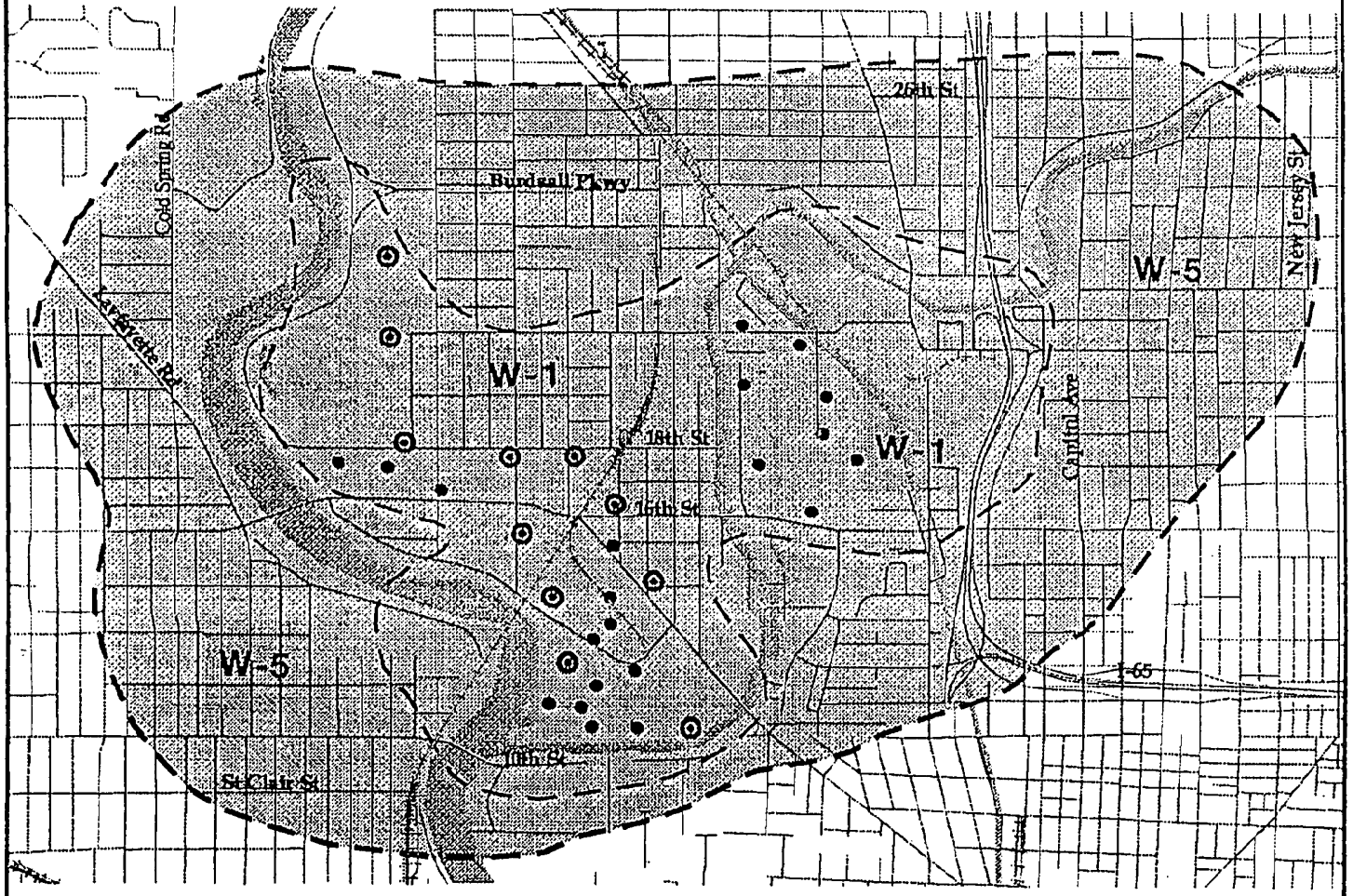
DATA SOURCES FOR MAPS:

MARION COUNTY HEALTH DEPARTMENT
IMAGIS, GEOGRAPHIC INFORMATION SYSTEM, COMPUTER DATA
INFORMATION SHOWN ON THIS MAP IS NOT WARRANTED FOR ACCURACY OR MERCHANTABILITY.

5,000 0 5,000 10,000 FEET

CITY OF INDIANAPOLIS
DEPARTMENT OF METROPOLITAN DEVELOPMENT
PREPARED BY THE PLANNING DIVISION

imagis



Riverside

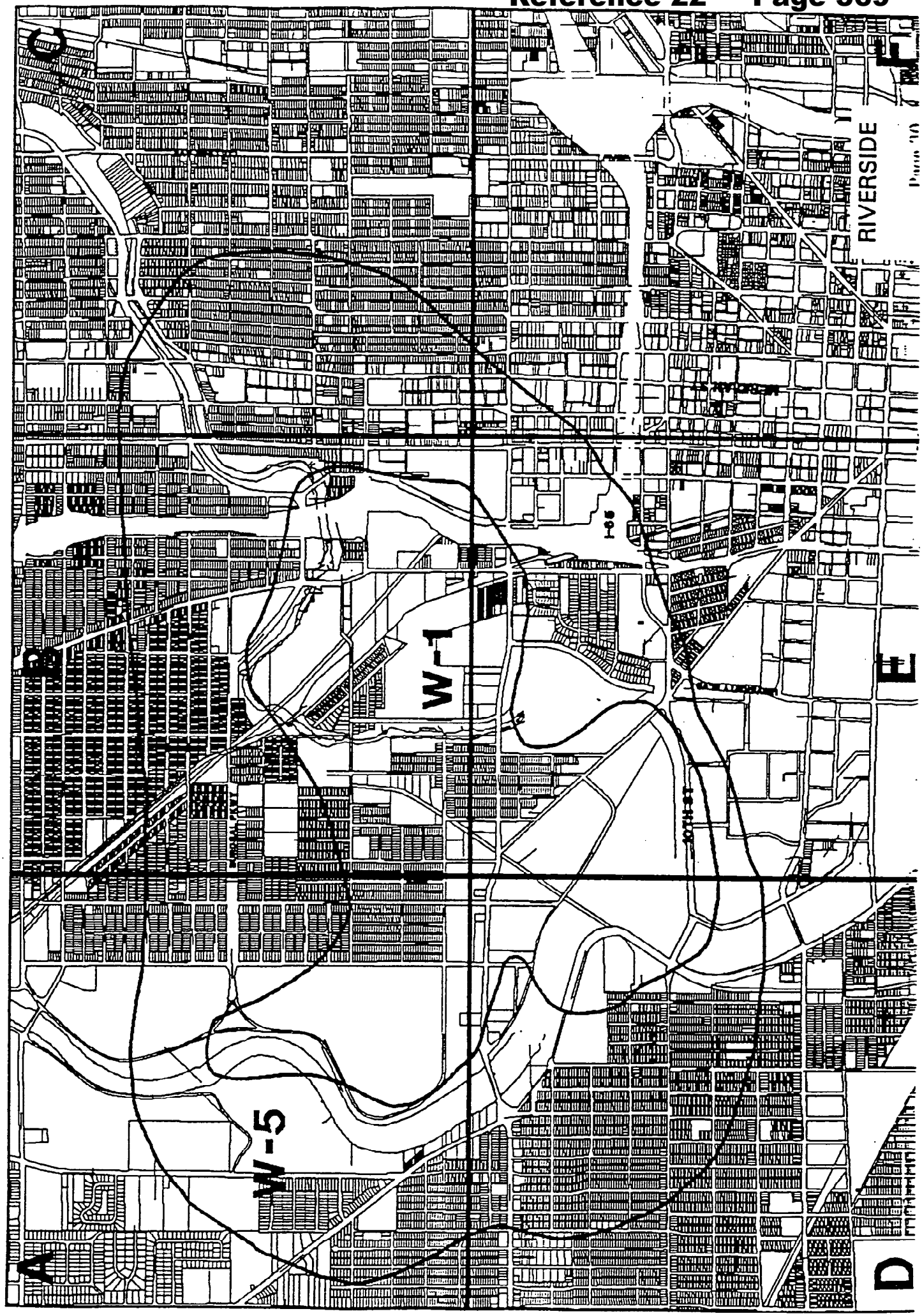
Wellhead Protection Area

- Wellhead Protection Area
- Roads
- Railroads
- One Year Time of Travel
- Five Year Time of Travel
- Lawrence Wells
- Indianapolis Water Company Wells
- Ft. Harrison Wells
- Speedway Wells
- Proposed Wells

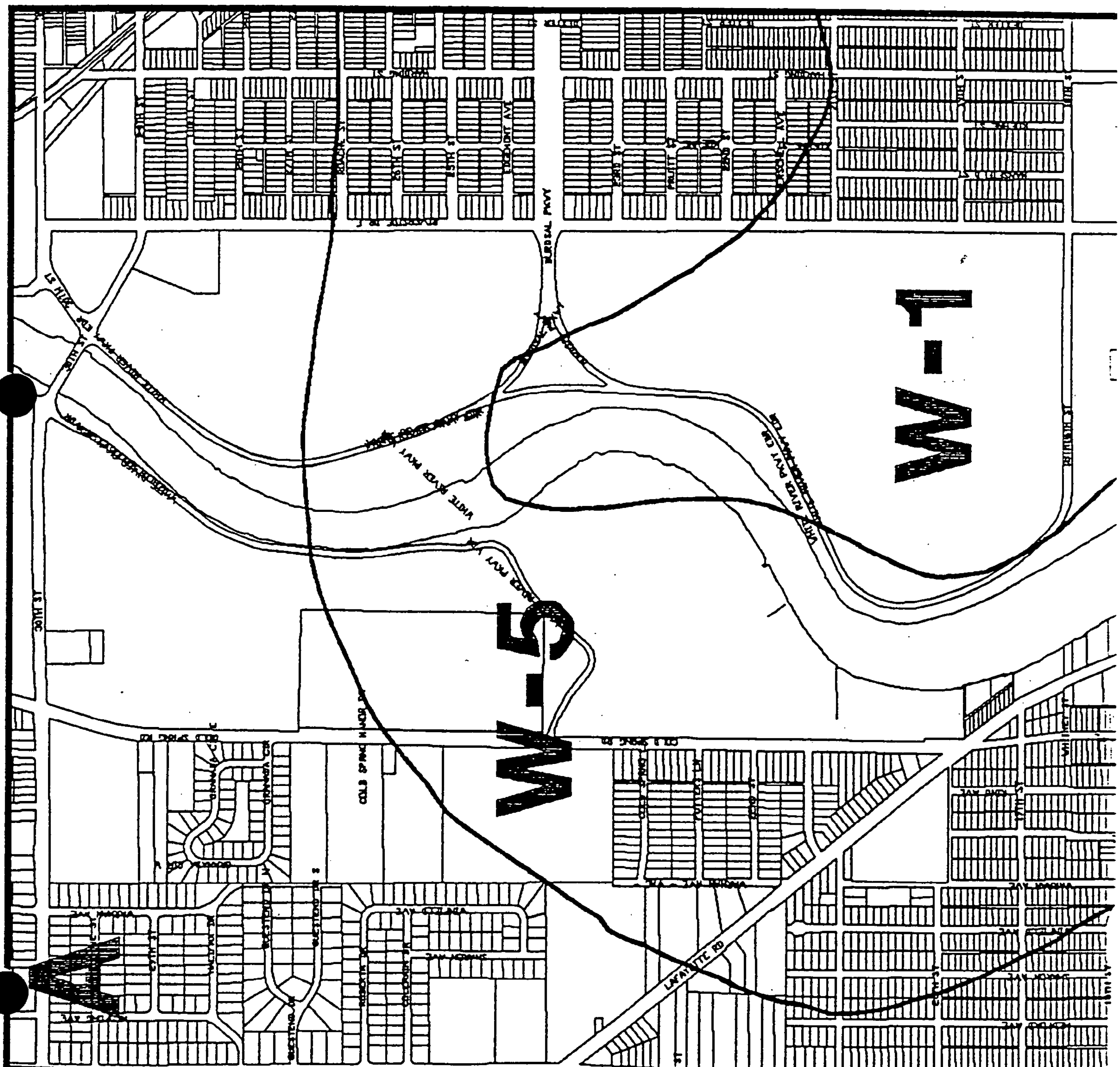
MAP 4

Marion County Health Department

The Health and Hospital Corporation of Marion County
Bureau of Environmental Health - GIS Department

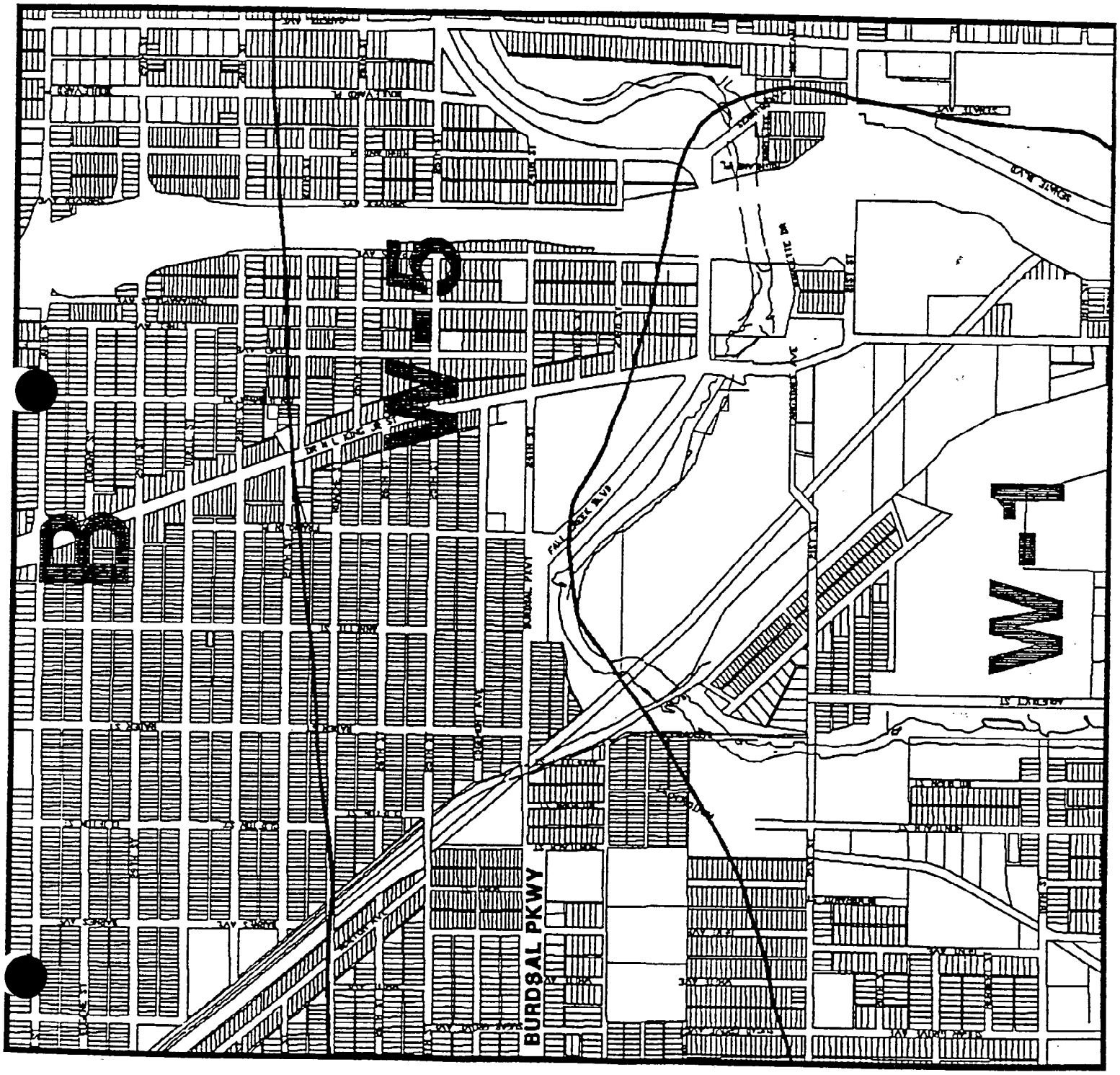

A
B
C
D
E
F
W-1
W-5
RIVERSIDE

RIVERSIDE



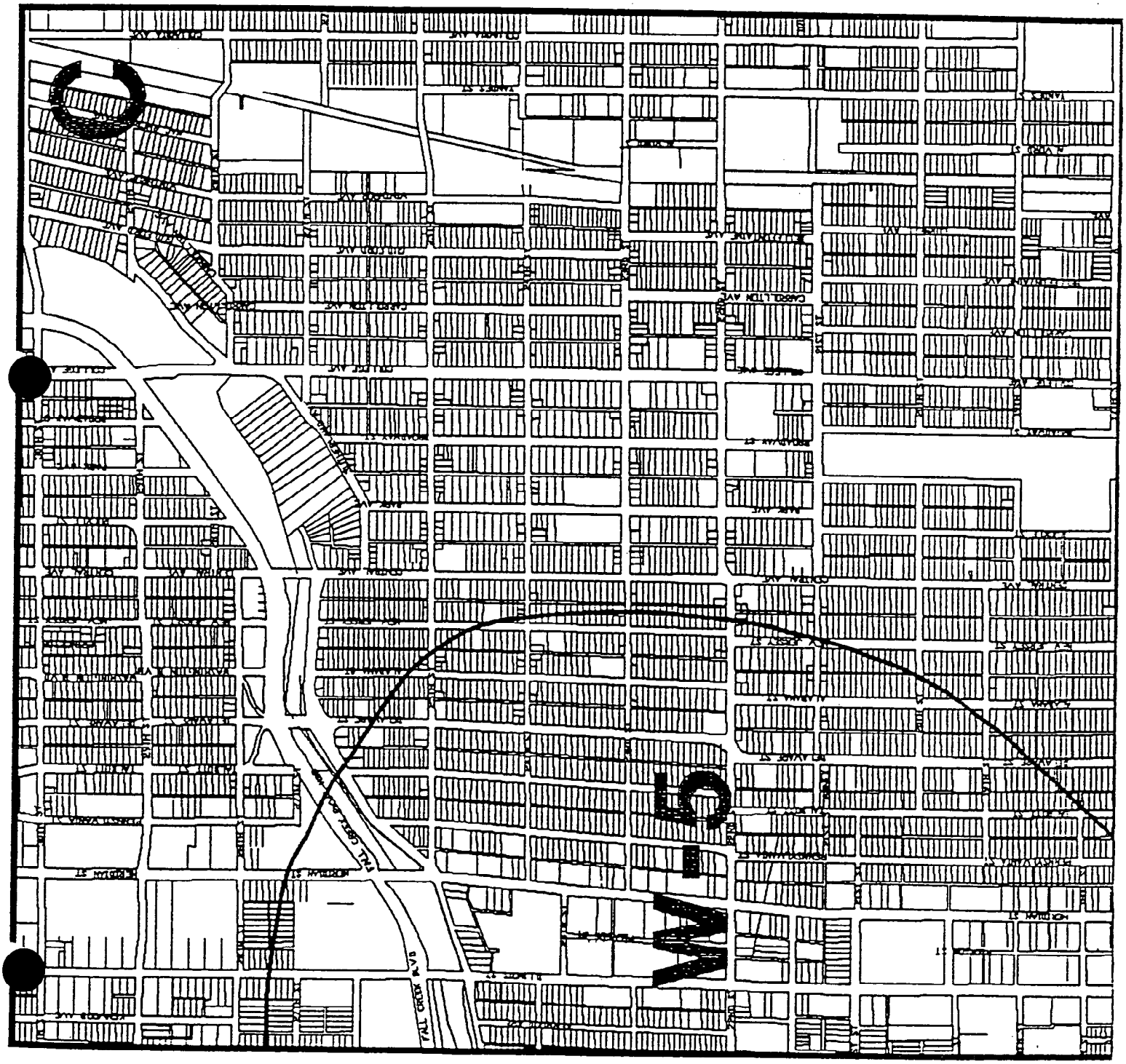
RIVERSIDE

Page 32



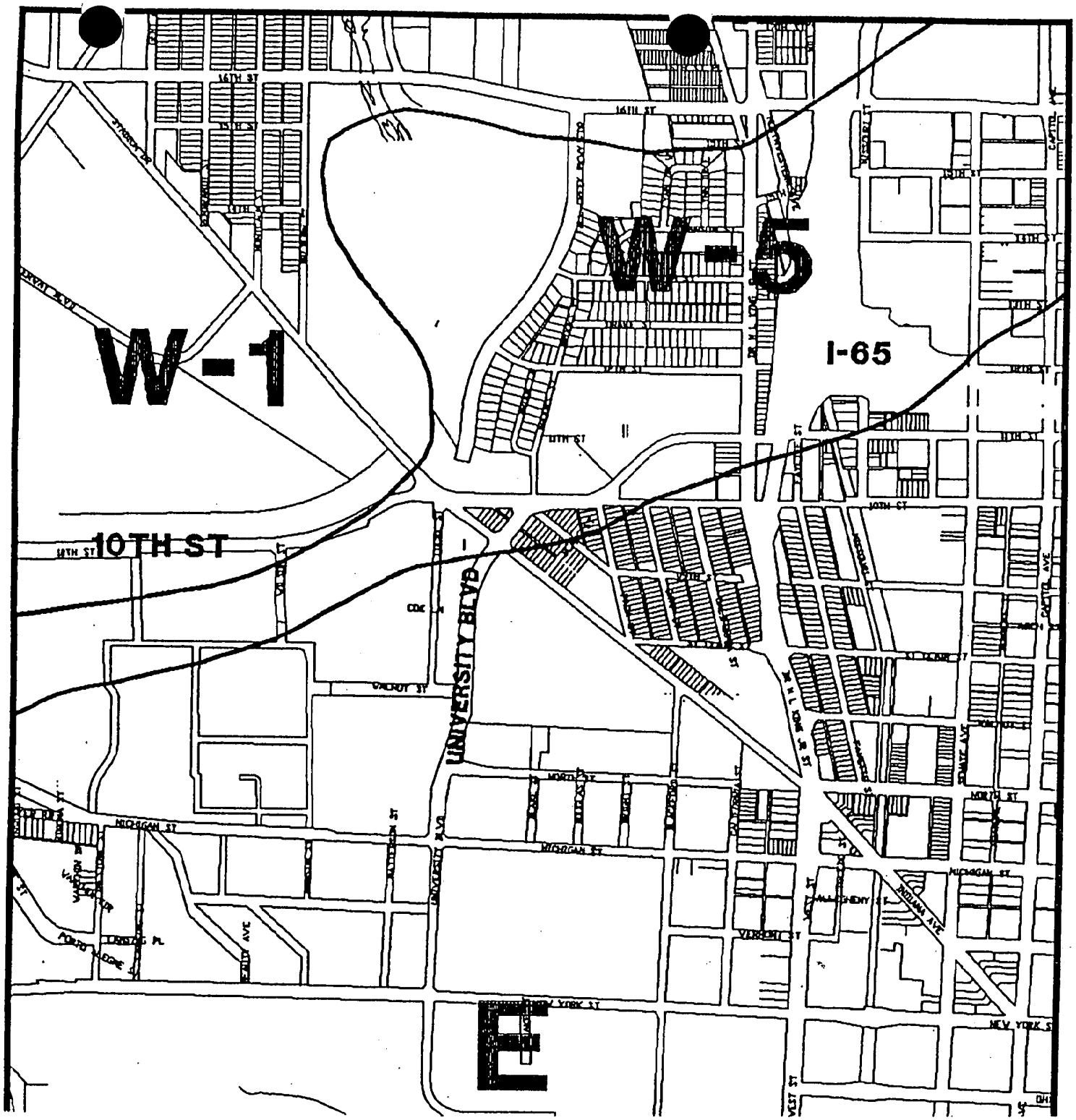
RIVERSIDE

Page 33



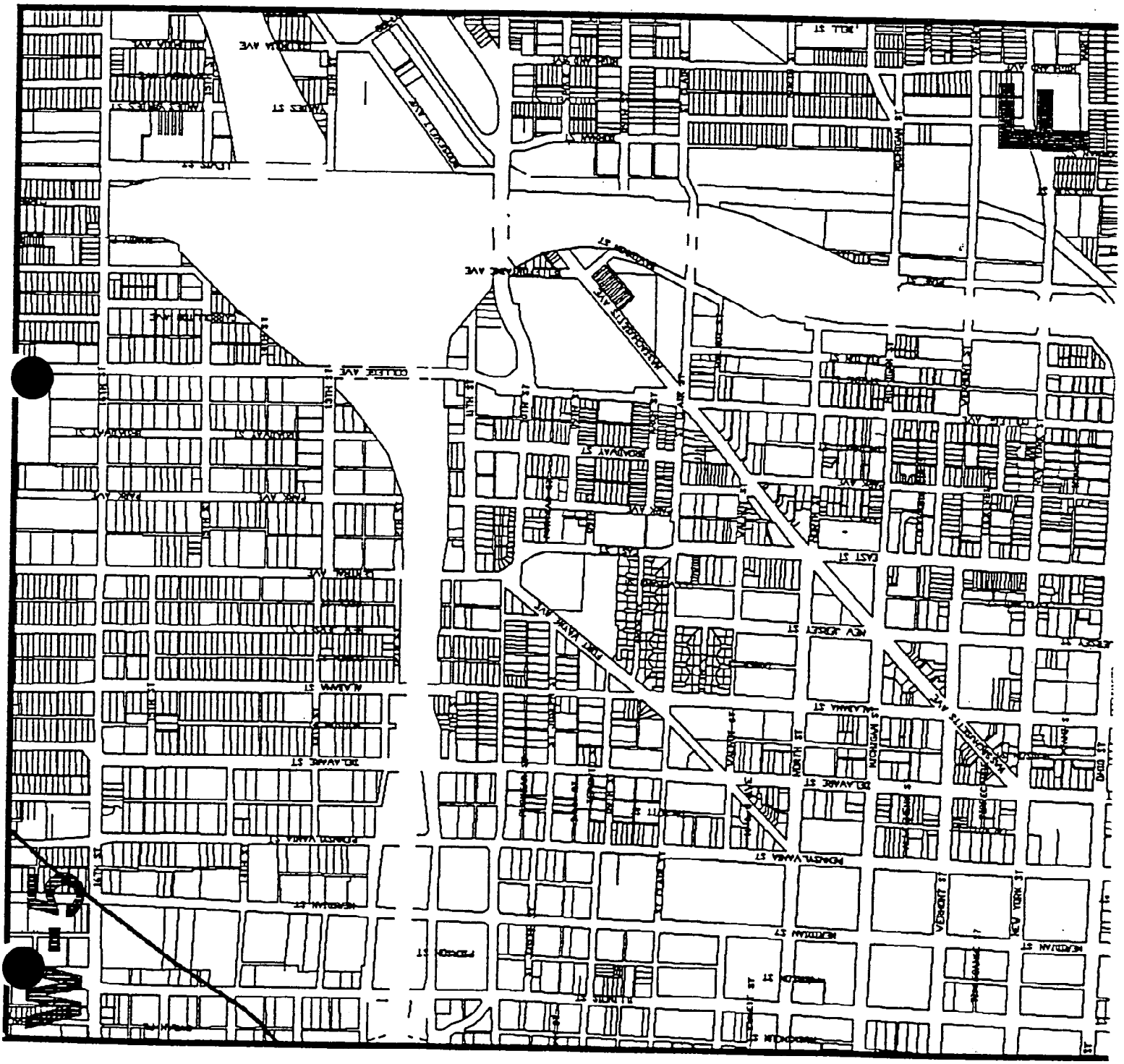
RIVERSIDE

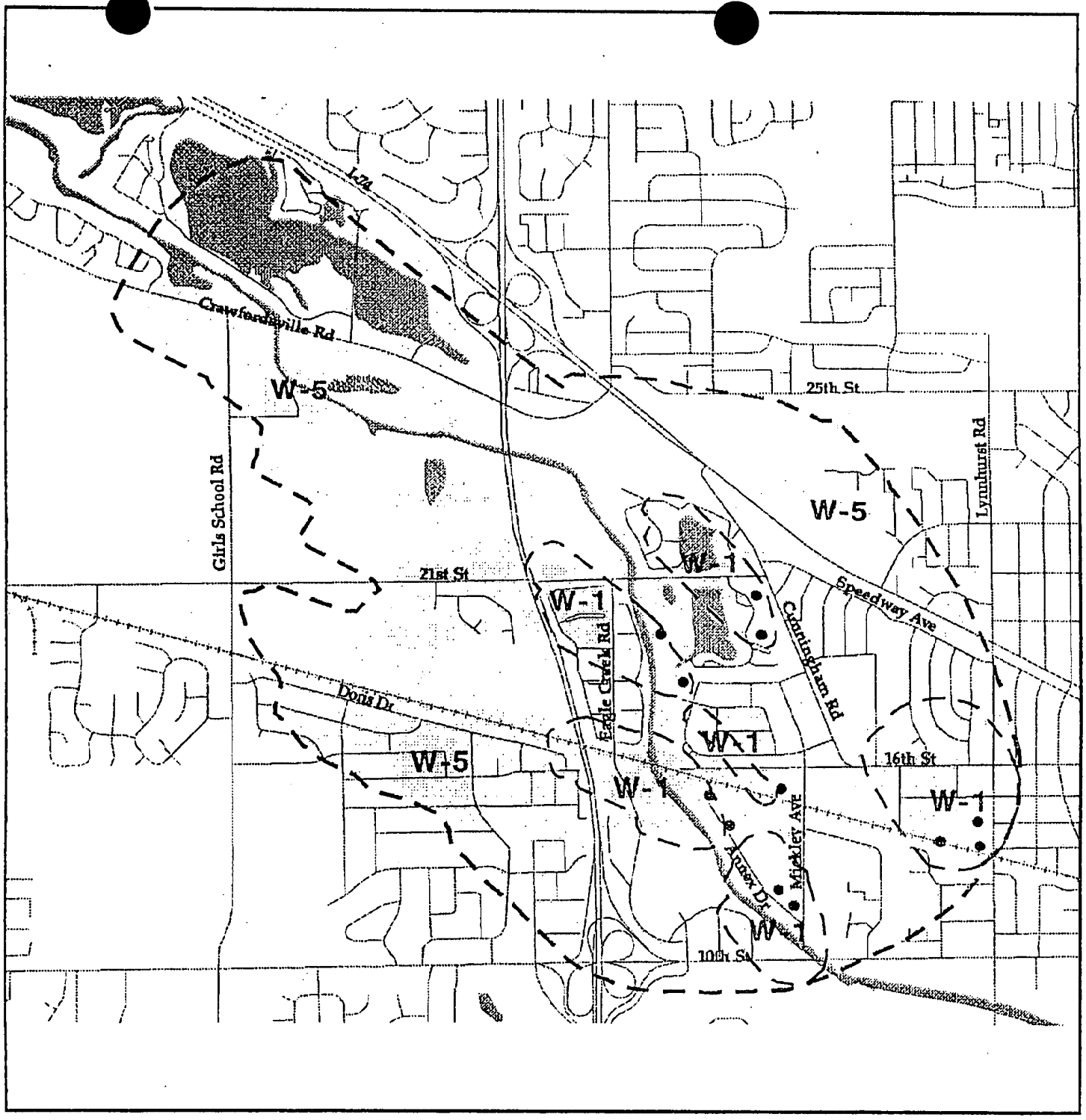
Page 34


W-1
W-5
I-65
10TH ST
UNIVERSITY BLVD
16TH ST
15TH ST
14TH ST
13TH ST
12TH ST
11TH ST
10TH ST
WALNUT ST
NORTH ST
MICHIGAN ST
VERMONT ST
NEW YORK ST
INDIANA AVE
CAPITOL AVE
E

RIVERSIDE

RIVERSIDE


COLLEGE AVE
BROADWAY ST
PARK AVE
EAST ST
NEW JERSEY ST
ALABAMA ST
DELAWARE ST
PENNSYLVANIA ST
MERIDIAN ST
VERMONT ST
NEW YORK ST
MICHIGAN ST
NORTH ST
OHIO ST
MASSACHUSETTS AVE
FORT WAYNE AVE
BELL ST
PROSPECT ST



Speedway

Wellhead Protection Area

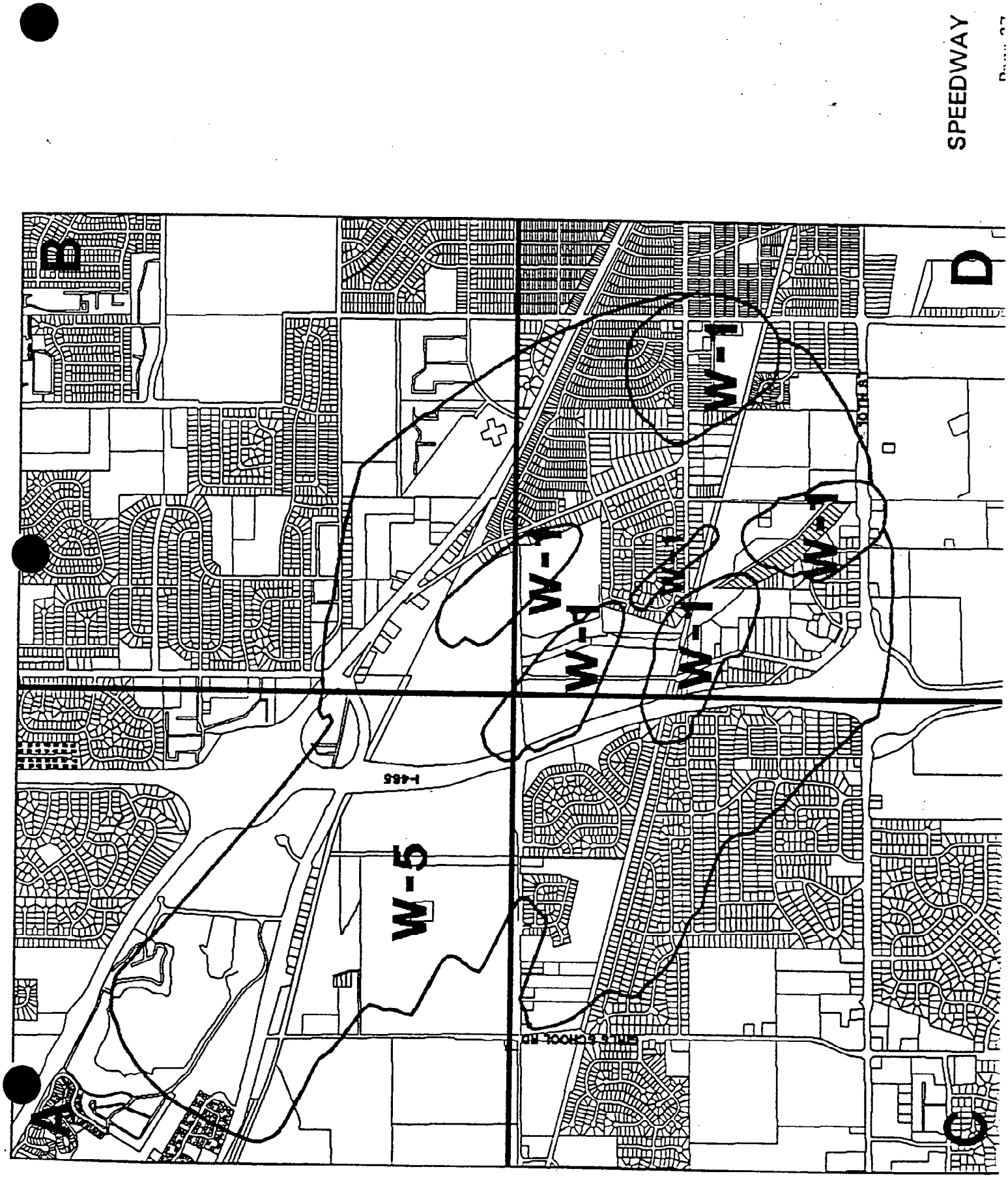
Wellhead Protection Area

- Roads
- Railroads
- One Year Time of Travel
- Five Year Time of Travel
- Lawrence Wells
- Indianapolis Water Company Wells
- Ft. Harrison Wells
- Speedway Wells
- Proposed Wells

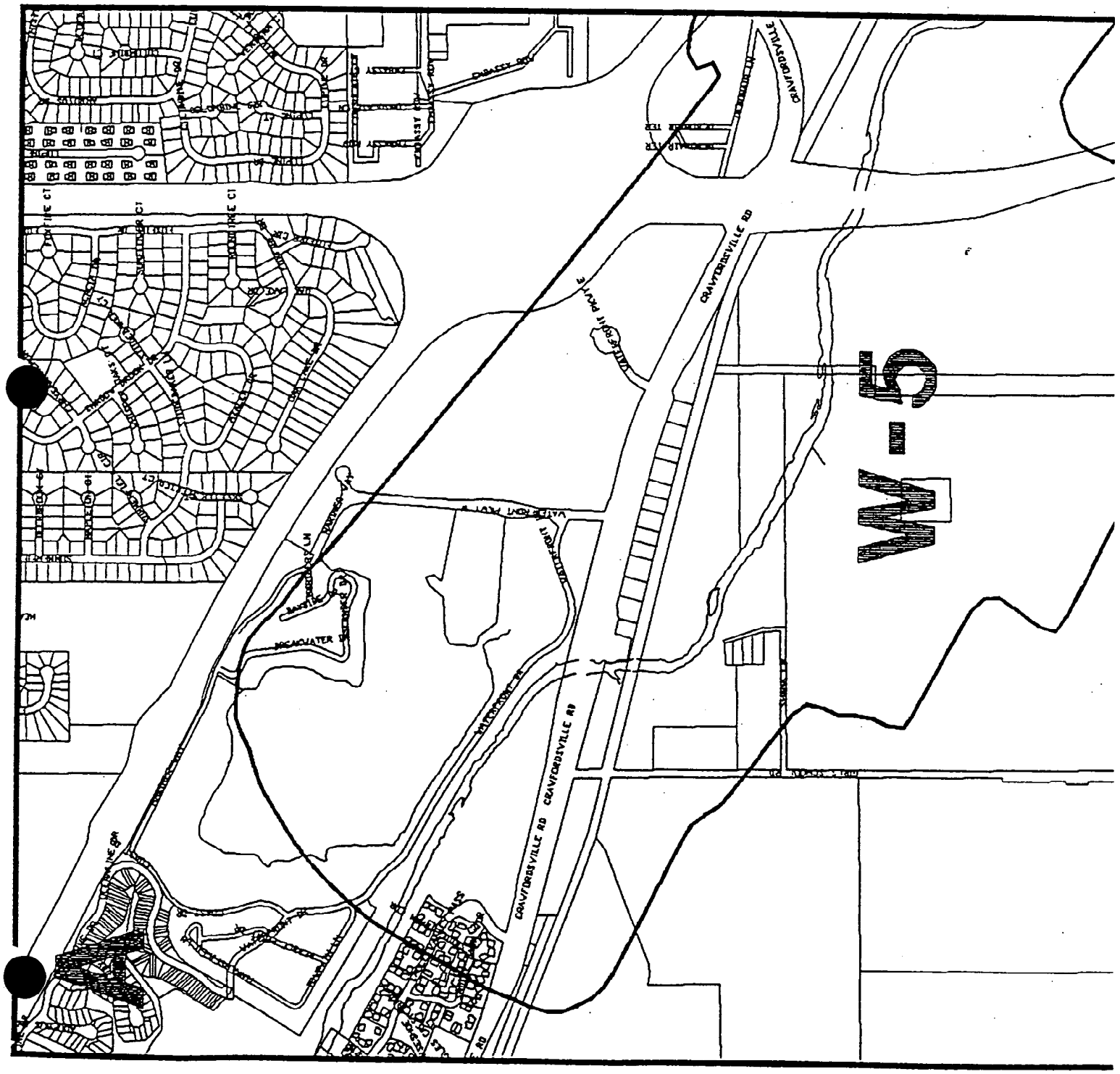
MAP 5

Marion County Health Department

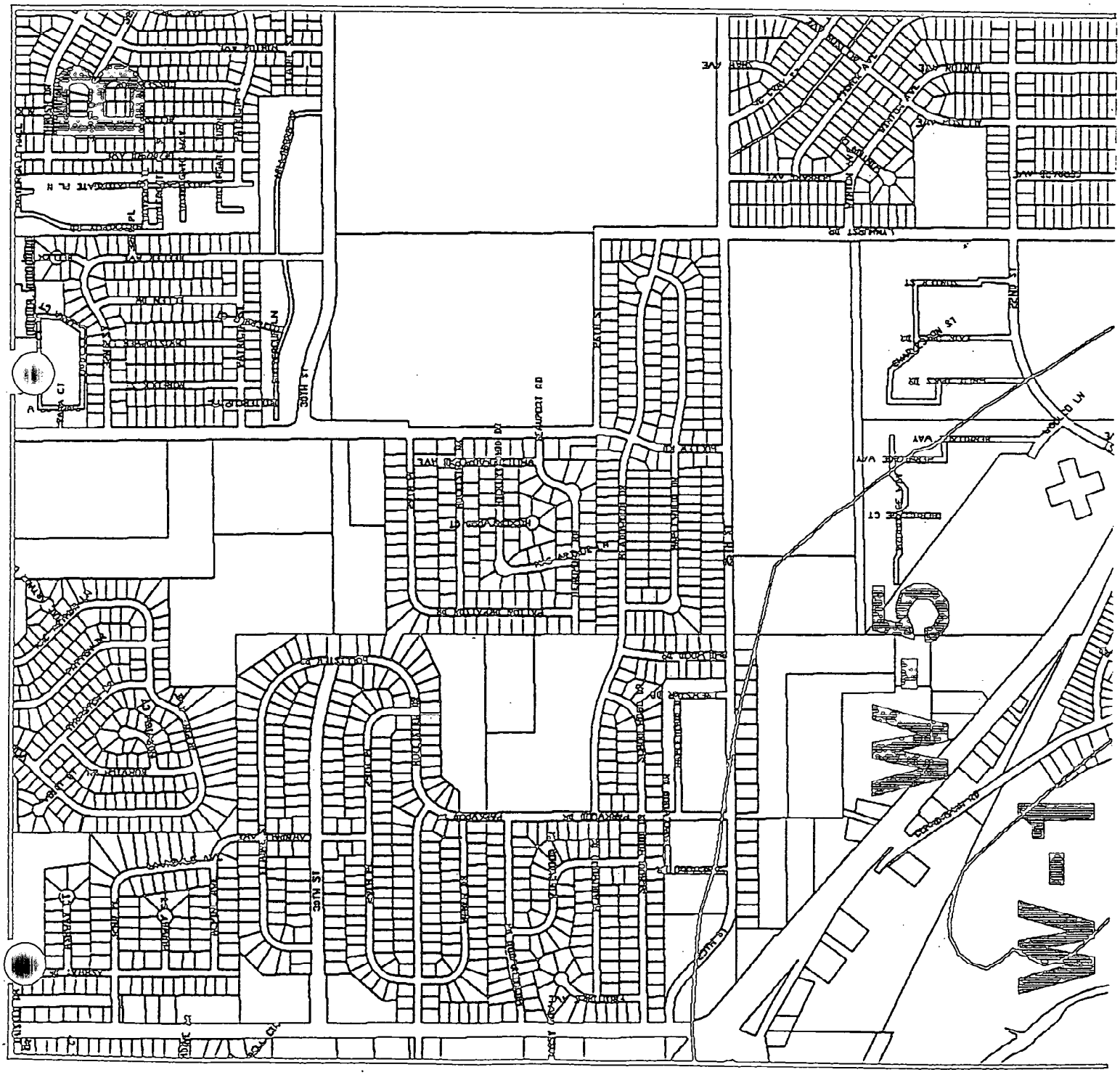
The Health and Hospital Corporation of Marion County
Bureau of Environmental Health - GIS Department

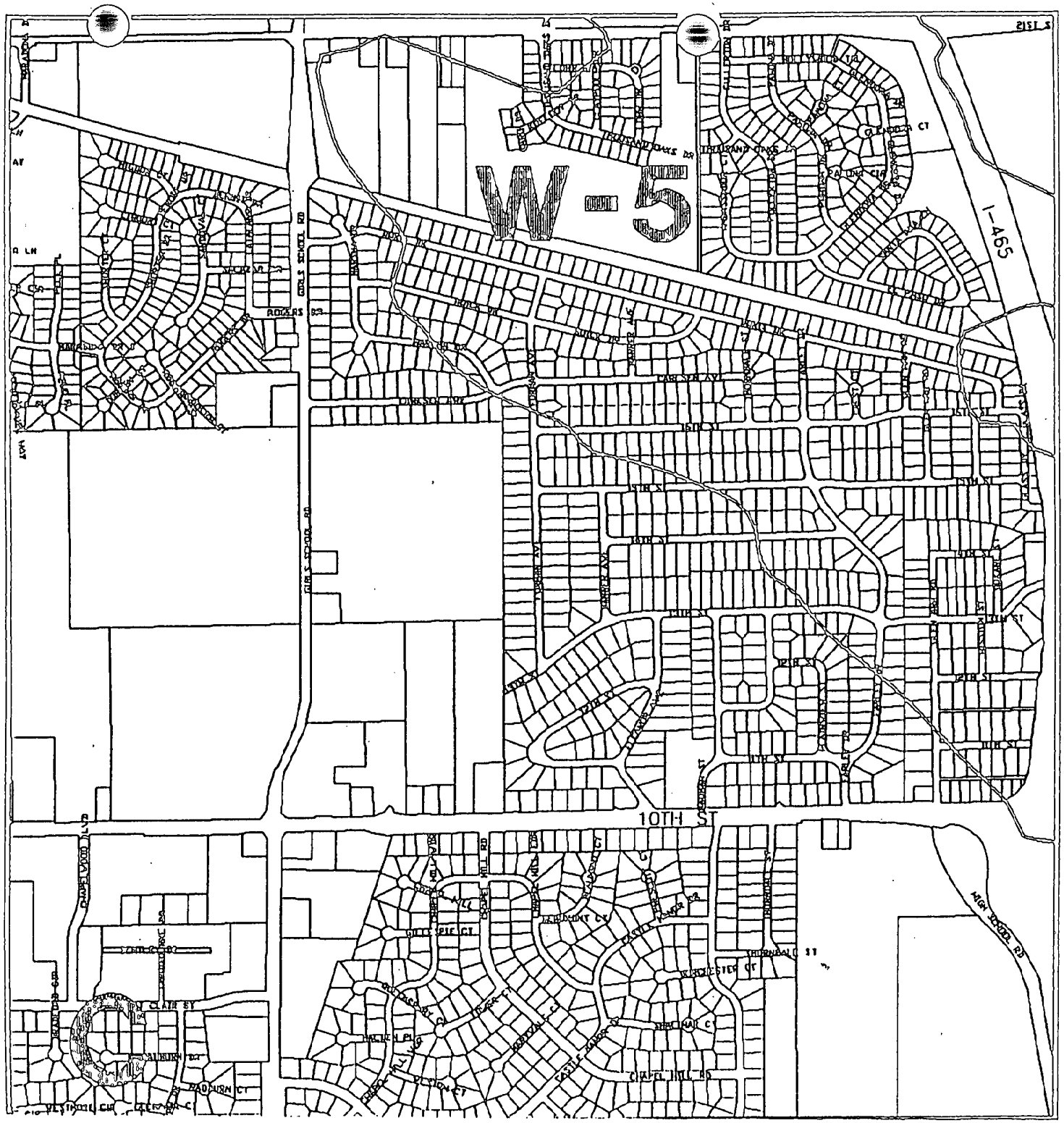

SPEEDWAY
B
D
A
C
W-1
W-1
W-1
W-1
W-1
W-1
W-5
I-465
10TH ST
GIRLS SCHOOL RD

SPEEDWAY


W-5
CRAWFORDSVILLE RD
CRAWFORDSVILLE
WATERFRONT PKWY E
BREAKWATER DR
EMBASSY RD

SPEEDWAY



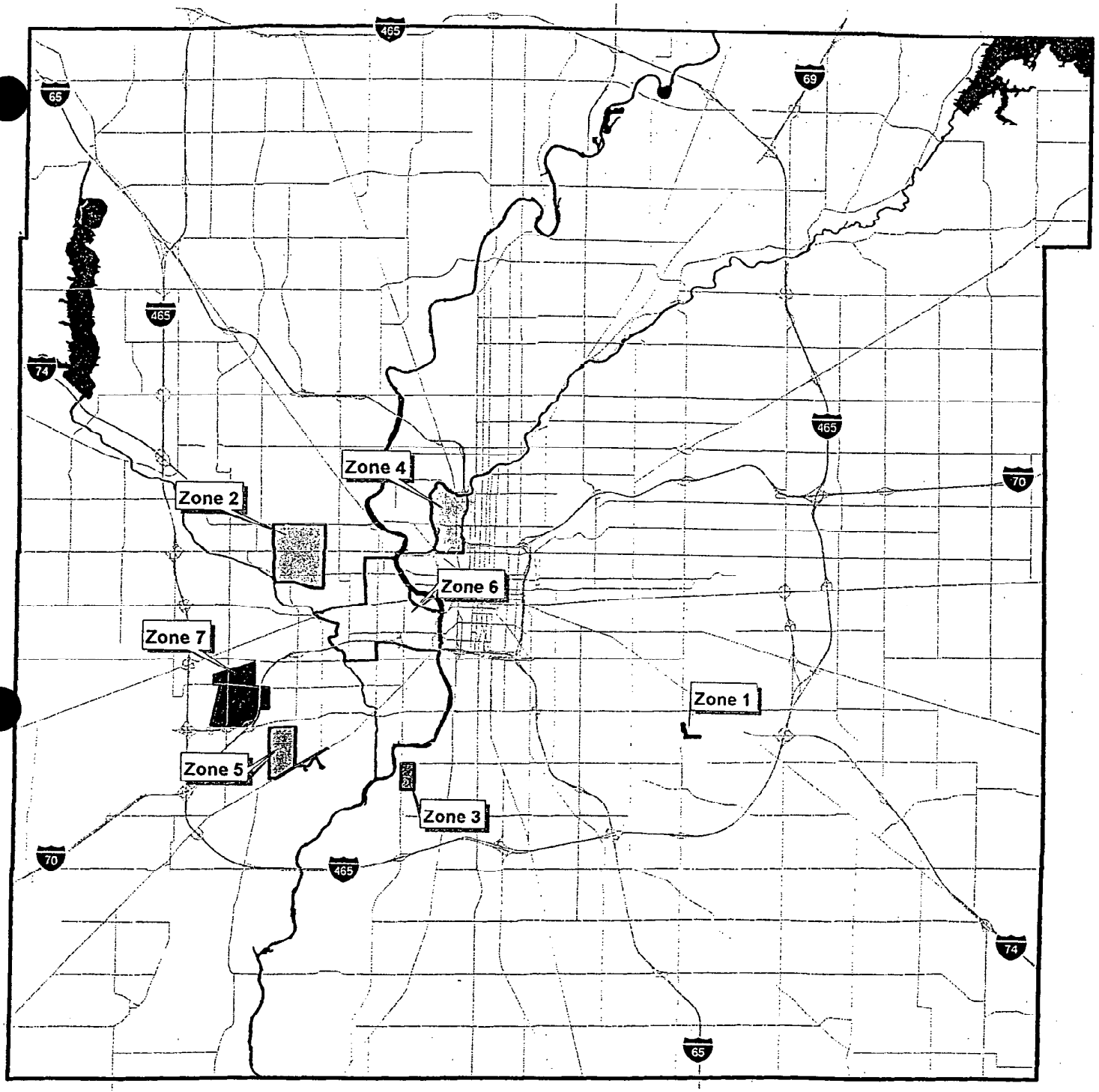

W-5
I-465
10TH ST
GIRLS SCHOOL RD
ROGERS RD
HIGH SCHOOL RD
CLARE ST
AUBURN RD
AUBURN CT
CHAPEL HILL RD
THORNBALL ST
WORCESTER CT
BRIDGEPORT CT
CASTLE PARK DR
CASTLE PARK CT
DUNCAN CT
DUNCAN DR
DUNCAN PL
DUNCAN LN
DUNCAN WAY
DUNCAN CIR
DUNCAN CTR
DUNCAN PKWY
DUNCAN BLVD
DUNCAN TRL
DUNCAN TER
DUNCAN PATH
DUNCAN ALLEY
DUNCAN ROAD
DUNCAN STREET
DUNCAN AVENUE
DUNCAN HILL
DUNCAN VALLEY
DUNCAN MEADOW
DUNCAN GARDEN
DUNCAN GROVE
DUNCAN PARK
DUNCAN LAKE
DUNCAN POND
DUNCAN FALLS
DUNCAN CREEK
DUNCAN RIVER
DUNCAN MILL
DUNCAN BRIDGE
DUNCAN TOWER
DUNCAN CASTLE
DUNCAN FORTRESS
DUNCAN MANOR
DUNCAN HOUSE
DUNCAN HOME
DUNCAN FARM
DUNCAN RANCH
DUNCAN CABIN
DUNCAN LODGE
DUNCAN INN
DUNCAN HOTEL
DUNCAN MOTEL
DUNCAN CAMP
DUNCAN TENT
DUNCAN CAMPER
DUNCAN TRAILER
DUNCAN CAR
DUNCAN BUS
DUNCAN TRUCK
DUNCAN BOAT
DUNCAN SHIP
DUNCAN PLANE
DUNCAN TRAIN
DUNCAN SUBWAY
DUNCAN TUNNEL
DUNCAN BRIDGE
DUNCAN ROAD
DUNCAN STREET
DUNCAN AVENUE
DUNCAN HILL
DUNCAN VALLEY
DUNCAN MEADOW
DUNCAN GARDEN
DUNCAN GROVE
DUNCAN PARK
DUNCAN LAKE
DUNCAN POND
DUNCAN FALLS
DUNCAN CREEK
DUNCAN RIVER
DUNCAN MILL
DUNCAN BRIDGE
DUNCAN TOWER
DUNCAN CASTLE
DUNCAN FORTRESS
DUNCAN MANOR
DUNCAN HOUSE
DUNCAN HOME
DUNCAN FARM
DUNCAN RANCH
DUNCAN CABIN
DUNCAN LODGE
DUNCAN INN
DUNCAN HOTEL
DUNCAN MOTEL
DUNCAN CAMP
DUNCAN TENT
DUNCAN CAMPER
DUNCAN TRAILER
DUNCAN CAR
DUNCAN BUS
DUNCAN TRUCK
DUNCAN BOAT
DUNCAN SHIP
DUNCAN PLANE
DUNCAN TRAIN
DUNCAN SUBWAY
DUNCAN TUNNEL

SPEEDWAY

SPEEDWAY

Page 41

No Well Zone Areas



Marion County, Indiana

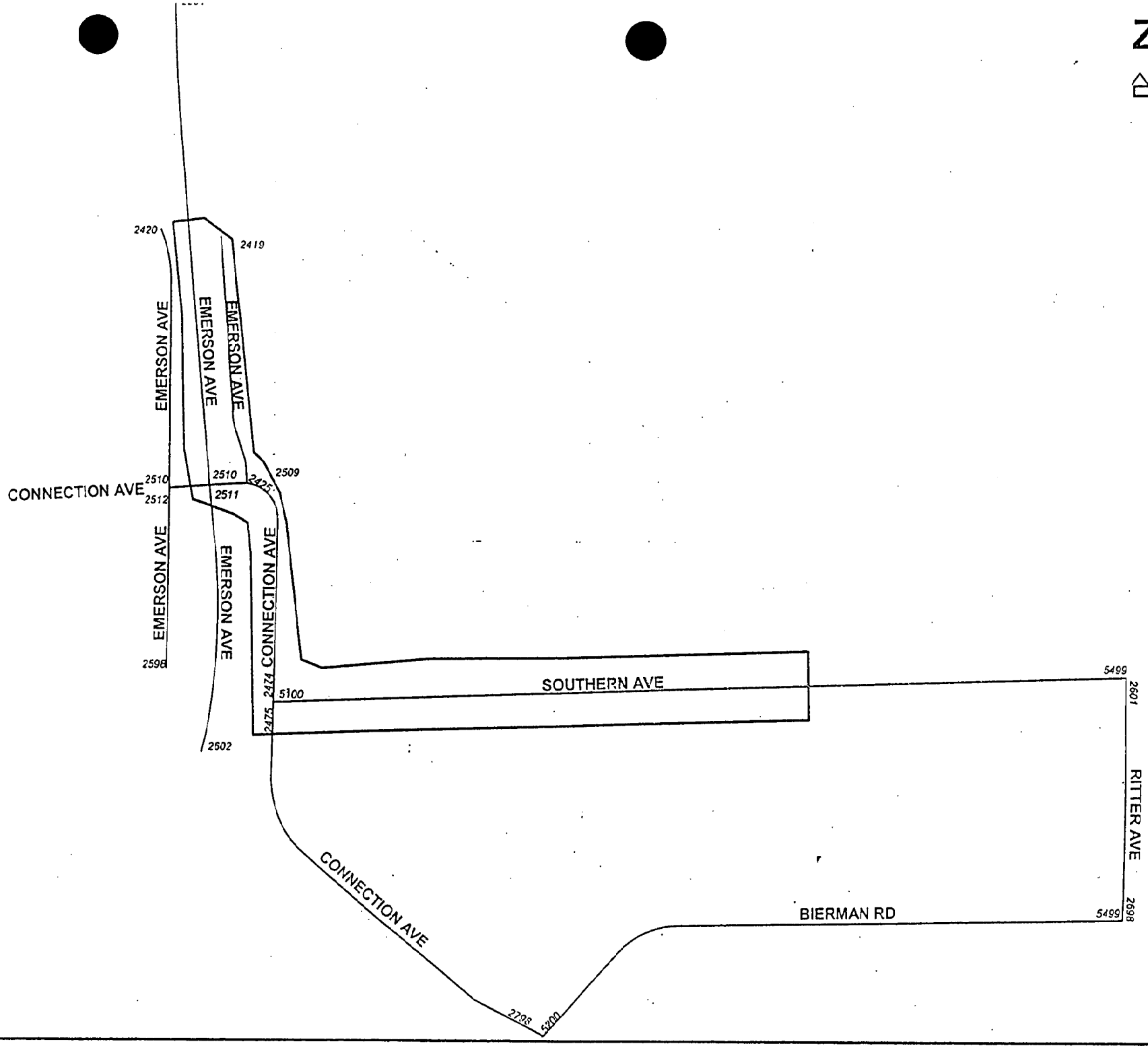
- No Well Zone Area 1
- No Well Zone Area 2
- No Well Zone Area 3
- No Well Zone Area 4
- No Well Zone Area 5
- No Well Zone Area 6
- No Well Zone Area 7

N

0 1 2 3 4 Miles

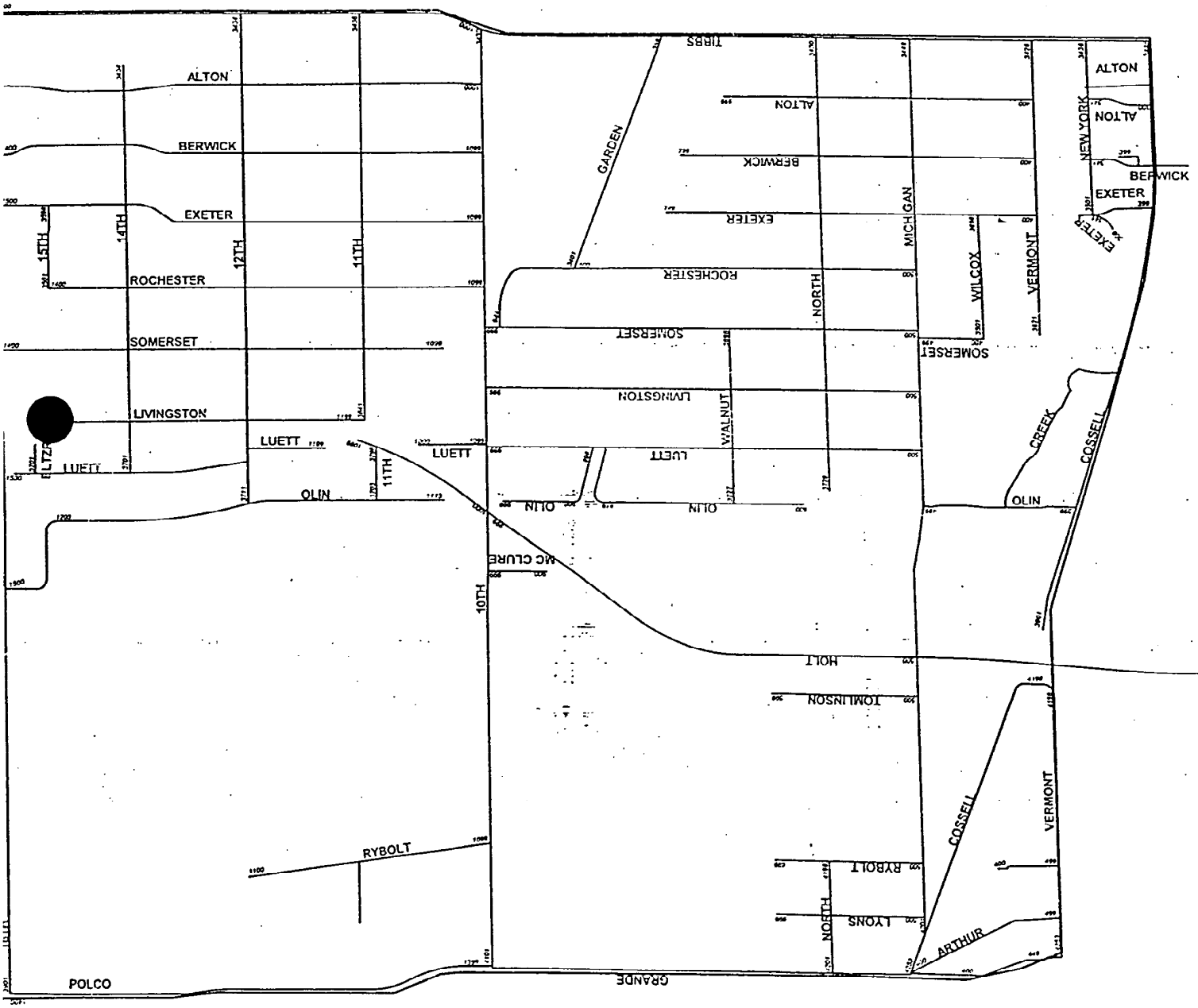
Zone 1

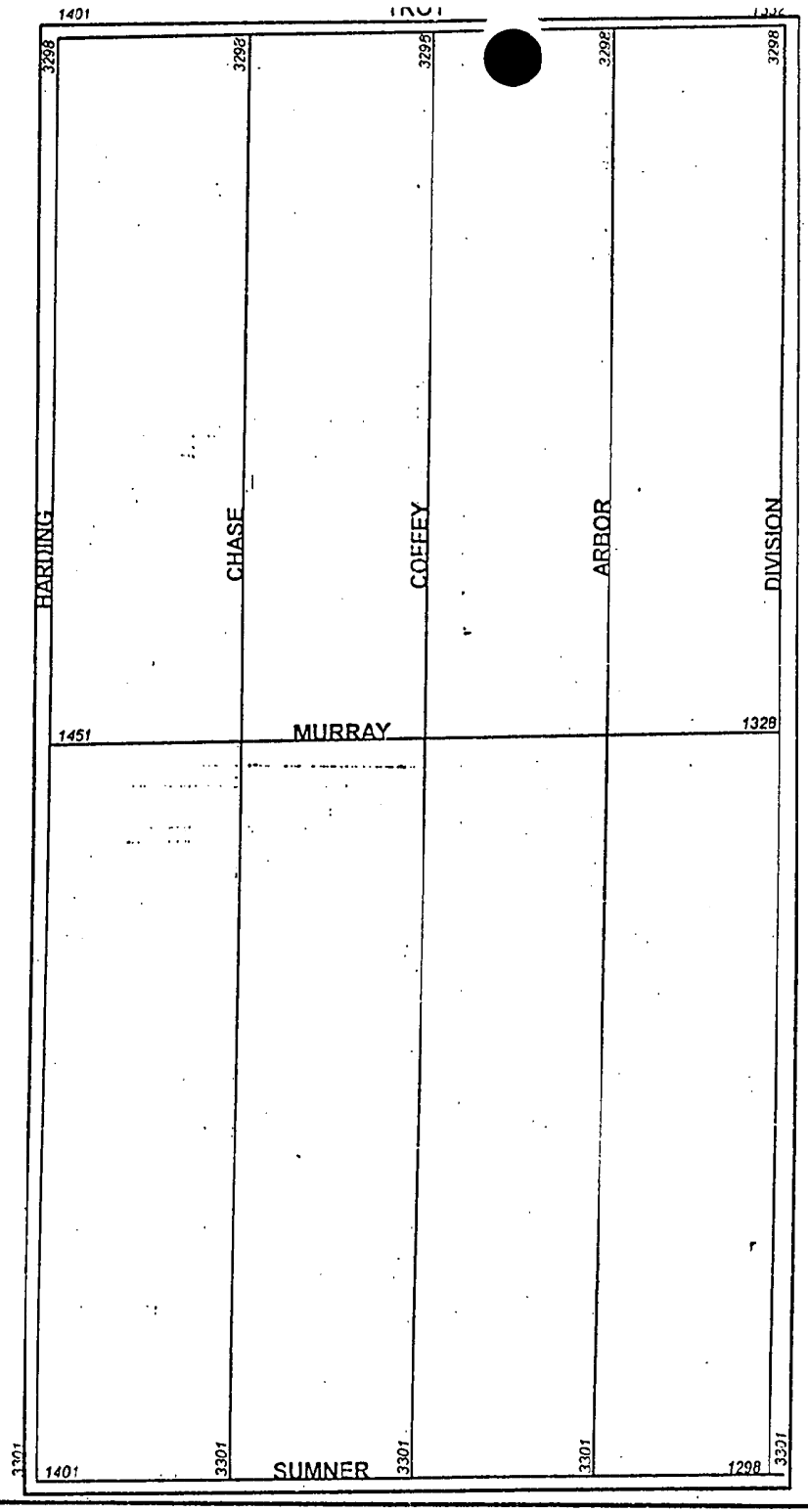
Zone 1
No Well Zone Area 1



Zone 2

Zone 2
No Well Zone Area 2





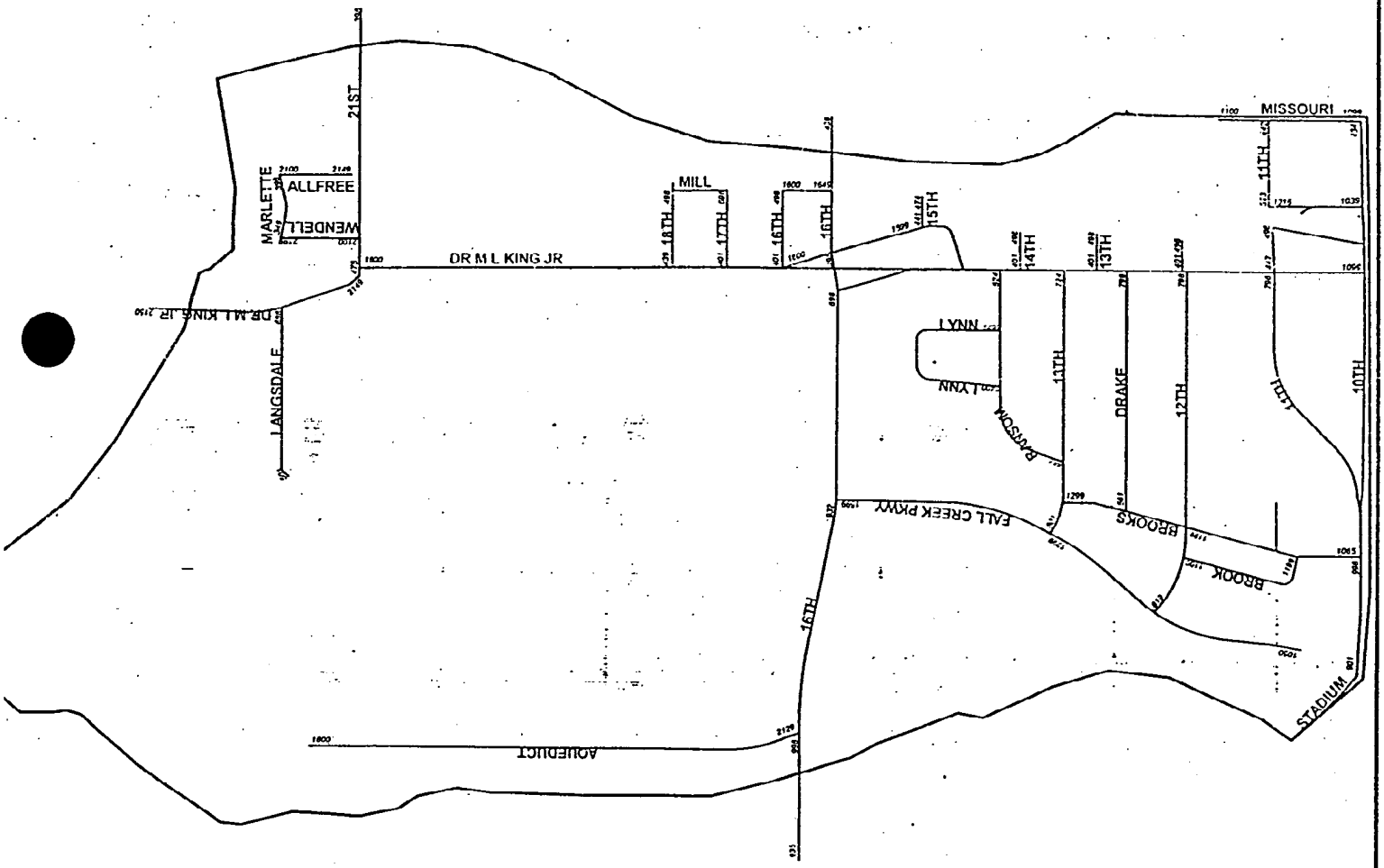
Zone 3

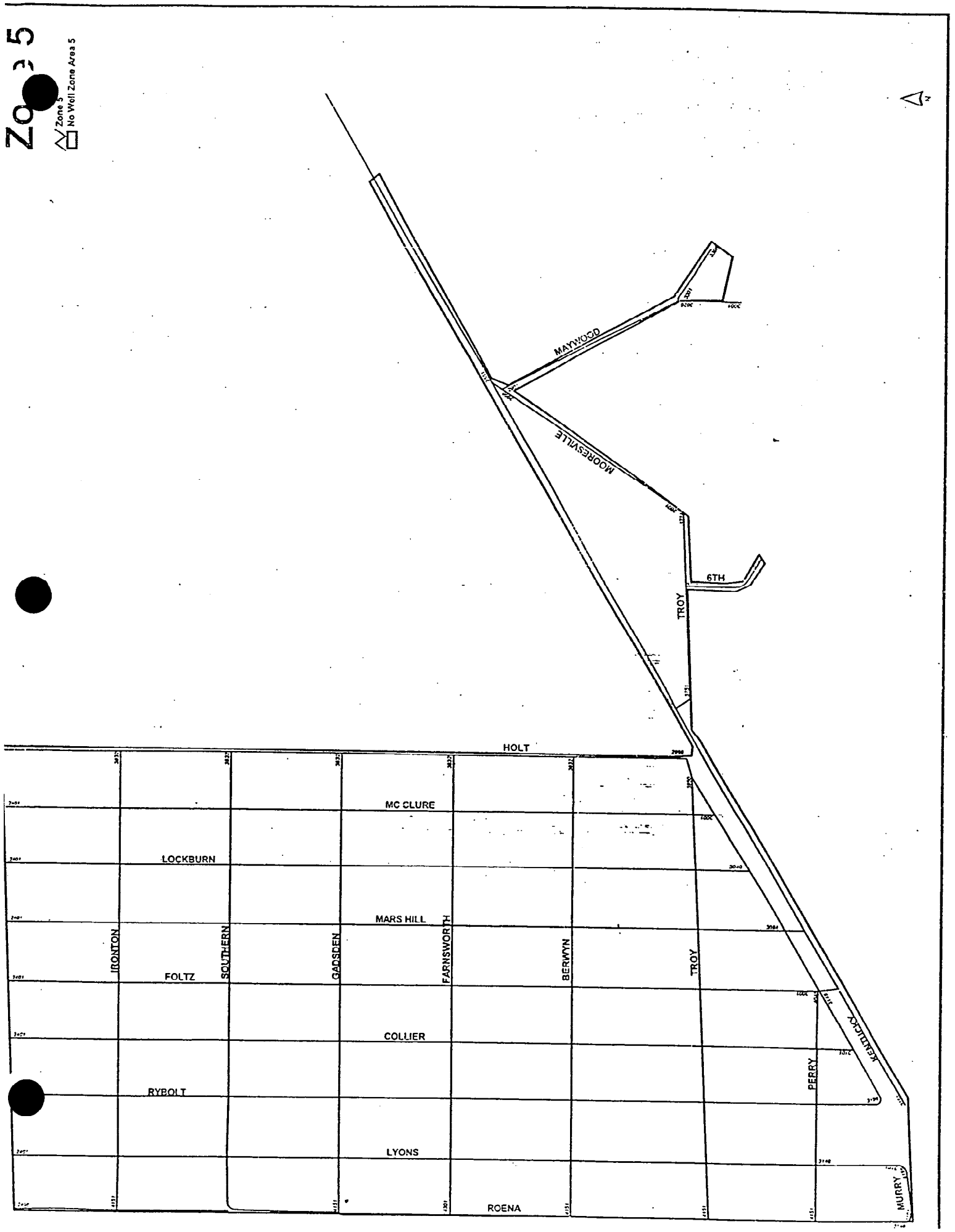
Zone 3
No Well Zone Area 3

N

Zone 4

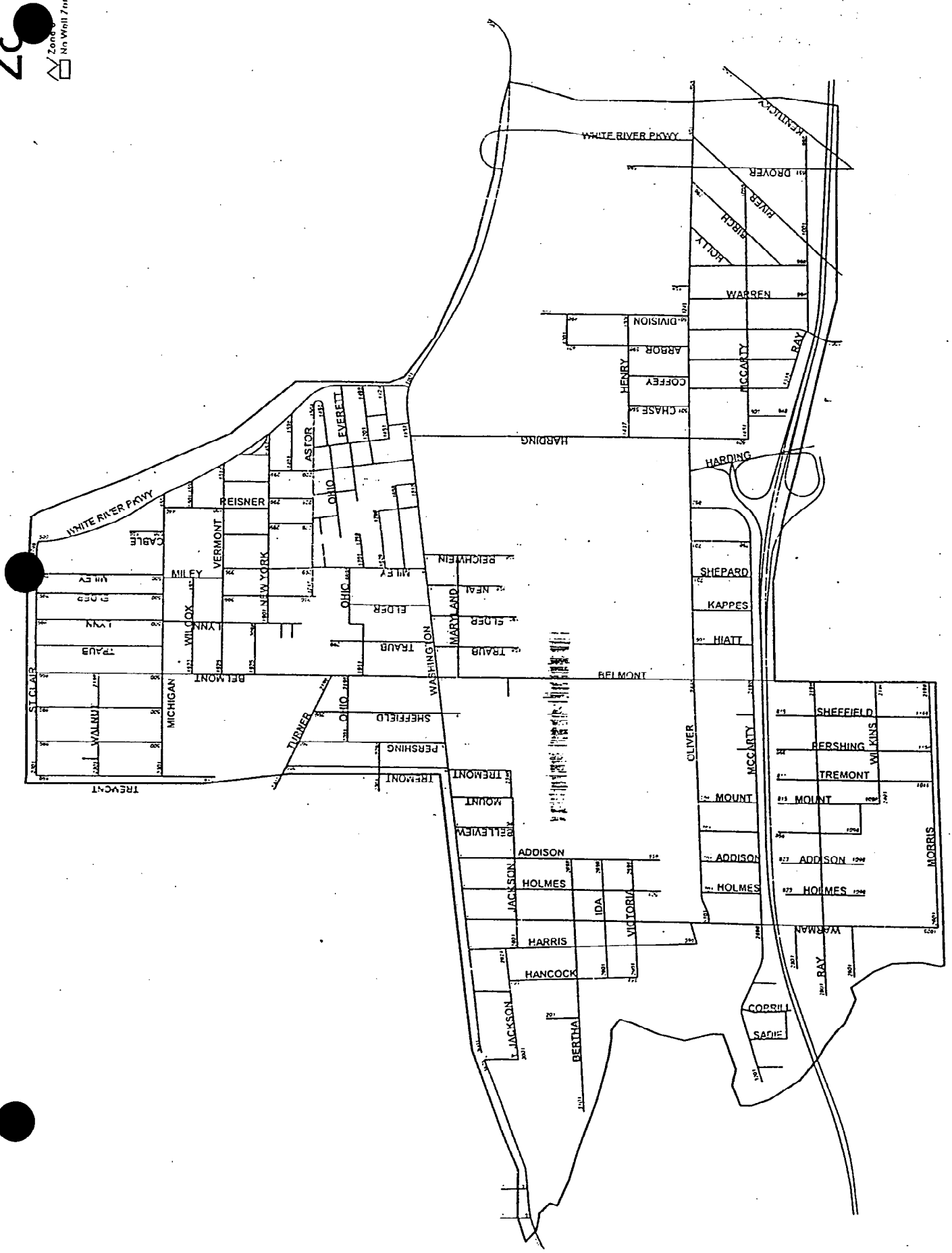
Zone 4
No Well Zone Area 4

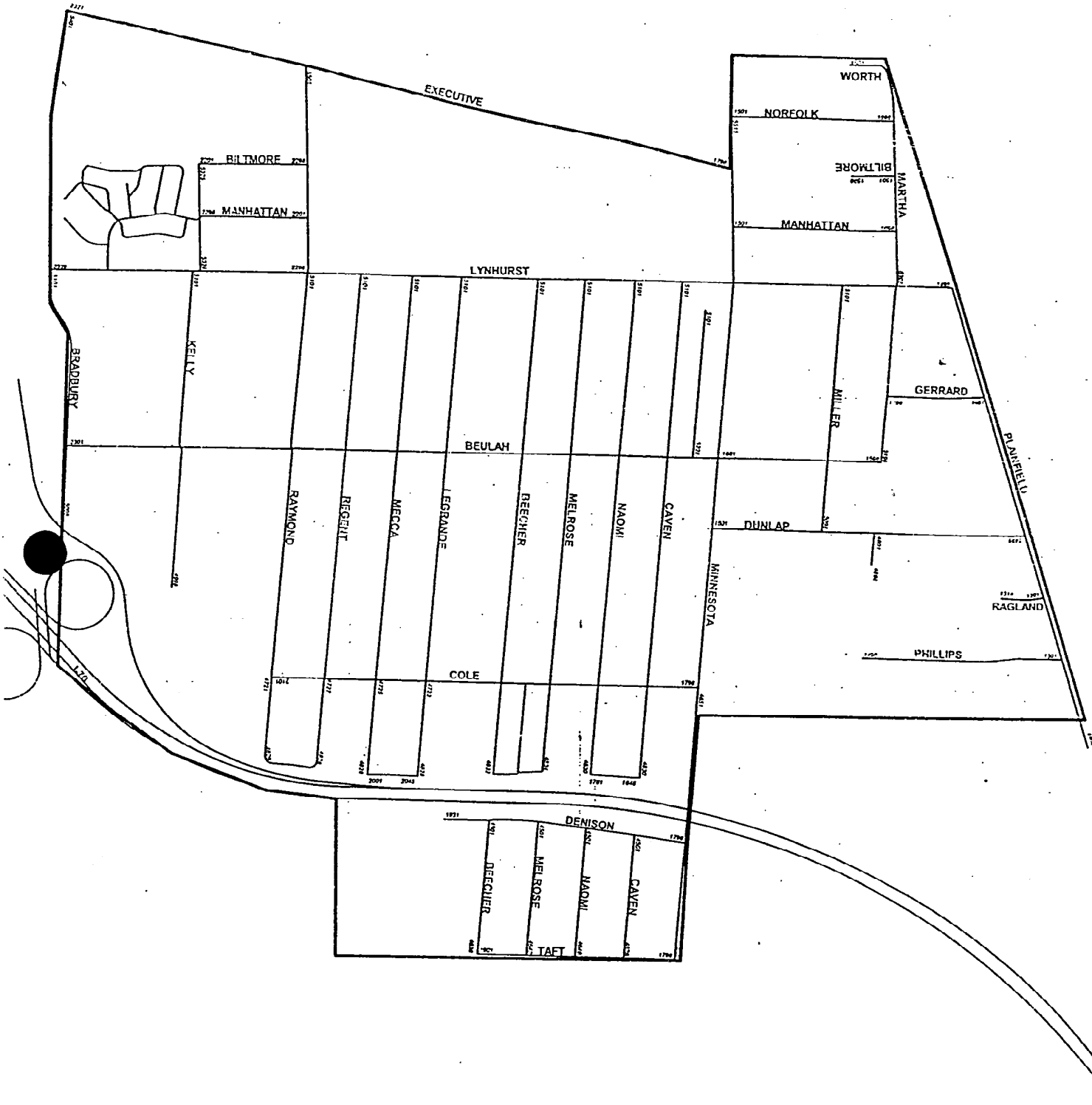



Zone 5
Zone 5
No Well Zone Area 5
MAYWOOD
MOORESVILLE
6TH
TROY
HOLT
MC CLURE
LOCKBURN
MARS HILL
IRONTON
FOLTZ
SOUTHERN
GADSDEN
FARNSWORTH
BERWYN
TROY
KENTUCKY
COLLIER
PERRY
RYBOLT
LYONS
ROENA
MURRY

Zone 6

Zone 6
No Wall Zoning Area





Zone 7

Zone 7
No Wall Zone Area 7

Street Zone Table

11/02/2001

FROM	TO	DIRECTION	STREET NAME	ZONE
3000	3099	S	06TH AVE E	5
400	999	W	10TH ST	4
3400	4199	W	10TH ST	2
3400	3799	W	11TH ST	2
322	797	W	11TH ST	4
3400	3799	W	12TH ST	2
400	899	W	12TH ST	4
400	823	W	13TH ST	4
3400	3799	W	14TH ST	2
400	499	W	14TH ST	4
3500	3599	W	15TH ST	2
440	549	W	15TH ST	4
400	699	W	16TH PL	4
3400	4699	W	16TH ST	2
400	999	W	16TH ST	4
400	603	W	17TH ST	4
430	499	W	18TH ST	4
326	949	W	21ST ST	4
2	1099	S	ADDISON ST	6
2101	2148		ALLFREE ST	4
1	98	N	ALTON AVE	6
301	1598	N	ALTON AVE	2
301	398		ALTON DR	2
1601	2128		AQUEDUCT ST	4
400	923		ARBOR AVE	6
3000	3499		ARBOR ST	3
401	498		ARTHUR AVE	2
1400	1899		ASTOR ST	6
4600	5100	W	BEECHER ST	7
2	1099	S	BELLEVIEW PL	6
1	898	N	BELMONT AVE	6
2	845	S	BELMONT AVE	6
2600	3299		BERTHA ST	6
1	98	N	BERWICK AVE	6
275	1598	N	BERWICK AVE	2
301	398		BERWICK PL	2
3800	4199	W	BERWYN ST	5
1600	2300	S	BEULAH AVE	7
1500	2300	S	BILTMORE AVE	7
500	899		BIRCH AVE	6
5100	5400	W	BRADBURY AVE	7
1501	1724		BRIGHTON BLVD	4
1101	1198		BROOK LN	4
1001	1298		BROOKS ST	4
301	598		CABLE ST	6
4500	5100	W	CAVEN ST	7
500	949		CHASE ST	6

Street Zone Table

11/02/2001

FROM	TO	DIRECTION	STREET NAME	ZONE
3000	3499		CHASE ST	3
500	949		COFFEY ST	6
3000	3499		COFFEY ST	3
1800	4700	S	COLE ST	7
2400	3109		COLLIER ST	5
2426	2600		CONNECTION AVE	1
200	873		CORRILL ST	6
3400	4299		COSSELL RD	2
1200	1799	W	COURT ST	6
1700	1900	S	DENISON ST	7
300	1035		DIVISION ST	6
3000	3499		DIVISION ST	3
1001	2198		DR M L KING JR ST	4
500	799		DRAKE ST	4
500	599		DROVER ST	6
1400	1600	S	DUNLAP AVE	7
1	898	N	ELDER AVE	6
2	199	S	ELDER AVE	6
3700	3799		ELTZROTH ST	2
2200	2603	S	EMERSON AVE	1
1300	1699		EVERETT ST	6
1700	2300	S	EXECUTIVE DR	7
309	1598	N	EXETER AVE	2
301	398		EXETER DR	2
1051	1598	N	FALL CREEK PKWY E D	4
3800	4399		FARNSWORTH ST	5
1001	1098		FAYETTE ST	4
2400	3111		FOLTZ ST	5
3800	4199		GADSDEN ST	5
3400	3599		GARDEN AVE	2
1400	1500	S	GERRARD ST	7
1300	1333		GILLETTE ST	6
401	998		GRANDE AVE	2
2	899		HANCOCK ST	6
1	398	N	HARDING ST	6
2	999	S	HARDING ST	6
3000	3499	S	HARDING ST	3
2	599		HARRIS AVE	6
1300	1499	W	HENRY ST	6
600	799		HIATT ST	6
500	699		HOLLY AVE	6
2	1099	S	HOLMES AVE	6
1	1098	N	HOLT RD	2
2400	2999	S	HOLT RD	5
2600	2999		IDA ST	6
3800	4199		IRONTON ST	5
2100	3199		JACKSON ST	6

Street Zone Table

11/02/2001

FROM	TO	DIRECTION	STREET NAME	ZONE
600	799		KAPPES ST	6
4900	5300	W	KELLY ST	7
800	1099		KENTUCKY AVE	6
2675	3173		KENTUCKY AVE	5
1	398		KOEHNE ST	6
500	849	W	LANGSDALE AVE	4
4800	5100	W	LEGRANDE AVE	7
501	1598	N	LIVINGSTON AVE	2
2400	3039	S	LOCKBURN ST	5
501	1598	N	LUETT AVE	2
1400	2300	S	LYNHURST DR	7
1401	1498		LYNN DR E	4
1401	1498		LYNN DR W	4
225	898		LYNN ST	6
501	698	N	LYONS AVE	2
2400	3149	S	LYONS AVE	5
1500	2300	S	MANHATTAN AVE	7
600	999		MARION AVE	6
1200	1799	W	MARKET ST	6
348	399		MARLETTE DR	4
2400	3089		MARS HILL ST	5
4800	5600	W	MARTHA ST	7
1700	2099	W	MARYLAND ST	6
2900	2999		MAYWOOD RD	5
901	998	N	MC CLURE ST	2
2400	3023	S	MC CLURE ST	5
1000	3299	W	MCCARTY ST	6
1700	1799		MCCORMICK ST	6
4800	5100	S	MECCA ST	7
4500	5100	S	MELROSE AVE	7
1600	1799	W	MIAMI ST	6
3400	4223	W	MICHIGAN ST	2
1550	2399	W	MICHIGAN ST	6
1	898		MILEY AVE	6
1601	1798		MILL ST	4
5000	5100	W	MILLER ST	7
4600	5600	W	MINNESOTA ST	7
1001	1198	N	MISSOURI ST	4
1900	1999		MOOREFIELD AVE	6
2800	2999	S	MOORESVILLE RD	5
2100	2799	W	MORRIS ST	6
2	1099	S	MOUNT ST	6
1300	1499	W	MURRAY ST	3
4100	4199	W	MURRY ST	5
4600	5100	W	NAOMI ST	7
2	199		NEAL AVE	6
3400	3535	W	NEW YORK ST	2

Street Zone Table

11/02/2001

FROM	TO	DIRECTION	STREET NAME	ZONE
1450	2099	W	NEW YORK ST	6
1600	1700	S	NORFOLK ST	7
3400	4299	W	NORTH ST	2
1401	1624		NORTHWESTERN AVE	4
1400	2399	W	OHIO ST	6
0	1598		OLIN AVE	2
800	2799		OLIVER AVE	6
4000	4199	W	PERRY ST	5
700	1199	S	PERSHING AVE	6
1	898	N	PERSHING AVE	6
1300	1500	S	PHILLPS DR	7
4700	5600		PLAINFIELD AVE	7
1001	1598		POLCO ST	2
1300	1400	S	RAGLAND ST	7
500	599		RANSOM ST	4
800	2899	W	RAY ST	6
4800	5100	W	RAYMOND ST	7
4800	5100	W	REGENT ST	7
2	199		REICHWEIN ST	6
1	498	N	REISNER ST	6
700	799	S	REISNER ST	6
1	298	N	RICHLAND ST	6
700	799	S	RICHLAND ST	6
600	1053		RIVER AVE	6
501	1574	N	ROCHESTER AVE	2
2400	3199		ROENA ST	5
2400	3199	S	RYBOLT AVE	5
401	1198	N	RYBOLT AVE	2
800	899		SADIE ST	6
2	99		SANATORIUM AVE	6
1400	1599		SAULCY ST	6
2	1199	S	SHEFFIELD AVE	6
1	898	N	SHEFFIELD AVE	6
700	799		SHEPARD ST	6
401	1598	N	SOMERSET AVE	2
3800	4199	W	SOUTHERN AVE	5
5101	5344	E	SOUTHERN AVE	1
1700	2399	W	ST CLAIR ST	6
0	1001		STADIUM DR	4
2800	2899		STANDARD AVE	6
1234	1499	W	SUMNER AVE	3
1700	1900	S	TAFT AVE	7
301	1598	N	TIBBS AVE	2
2900	3041	S	TIBBS AVE	5
800	899		TIP ST	6
501	598		TOMLINSON DR	2
2	199	S	TRAUB AVE	6

Street Zone Table

11/02/2001

FROM	TO	DIRECTION	STREET NAME	ZONE
1	898	N	TRAUB AVE	6
2	1199	S	TREMONT ST	6
1	898	N	TREMONT ST	6
1200	1499	W	TROY AVE	3
3300	4199	W	TROY AVE	5
2100	2399		TURNER AVE	6
2800	2899		VANDALIA AVE	6
3400	4261	W	VERMONT ST	2
1500	2099	W	VERMONT ST	6
2600	2999		VICTORIA ST	6
2100	2399	W	WALNUT ST	6
3640	3799	W	WALNUT ST	2
2	1199	S	WARMAN AVE	6
500	999		WARREN AVE	6
900	3499	W	WASHINGTON ST	6
2101	2198		WENDELL AVE	4
1	898	N	WHITE RIVER PKWY W	6
2	1099	S	WHITE RIVER PKWY W	6
3500	3699		WILCOX ST	2
1500	2099		WILCOX ST	6
2100	2499	W	WILKINS ST	6
1500	1600	S	WORTH ST	7
2800	3099	W	WYOMING ST	6

PRIVILEGED AND CONFIDENTIAL - PREPARED AT GMC COUNSEL'S REQUEST

PHASE I INFORMATION REVIEW REPORT FOR GENERAL MOTORS CORPORATION ALLISON GAS TURBINE DIVISION

PLANT 10

Prepared For

General Motors Corporation
3044 W. Grand Boulevard
Detroit, Michigan 48202

April 21, 1993

Prepared By

Engineering-Science, Inc.
1000 Jorie Boulevard, Suite 250
Oak Brook, Illinois 60526

CH151.01/730332.01

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APPENDIX A PLANT 10 SPILL INCIDENT REPORTS

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SECTION 1
INTRODUCTION

1.1 PURPOSE

General Motors Corporation (GMC) retained Engineering-Science, Inc. (ES) to perform an environmental assessment of the GMC Allison Gas Turbine facility near Indianapolis, Indiana. The overall objective of the project is to identify areas in the plants where there may have been releases of concern to the public health or the environment. A phased approach was used for the project to allow subsequent efforts to be developed based on current findings. The purpose of the initial Phase I effort, the subject of this report, was to conduct an information review to develop a comprehensive inventory of potential sources of environmental concern at the site and to identify potential sources that warrant additional investigation in subsequent phases of the project.

Following this introduction is a description of the current site setting. The Phase I effort is described in Section 2. Findings of the records review, and recommendations for the Phase II investigation, are presented in Section 3.

1.2 SITE BACKGROUND

The GMC Allison Gas Turbine Division - Maywood Operations includes Plant 10, a remote warehouse facility that is located near the town of Speedway (Figure 1.1). Plant 10 was purchased by GMC in 1973 to be used as a warehouse for obsolete machines, tooling, and fixtures. Prior to the purchase, the building had been operated by the former owners, BHT Corporation, as a carburetor remanufacturing and brake overhaul facility. Plant 10 was operated as a part of the GMC Speedway Division (Plant 3) until approximately 1984 when it was made a part of the Allison Gas Turbine Division. GMC deeded the property north of the warehouse to the city, and the land is presently used as a park. The metal building on the west side of the property was enclosed in 1990. Prior to that time, the area was a storage pad covered with a metal roof.

532956

FIGURE 1.1

VICINITY MAP

GENERAL MOTORS
ALLISON GAS TURBINE DIVISION
PLANT NUMBER 10
INDIANAPOLIS, INDIANA

ES ENGINEERING—SCIENCE

SECTION 2
PHASE I EFFORTS

Engineering-Science reviewed available information on the GMC Allison facility including personnel interviews, aerial photographs, GMC files, environmental permits, local and state regulatory agency files. Following is a description of these efforts.

2.1 PERSONNEL INTERVIEWS AND FACILITY INSPECTION

In July 1992, ES interviewed facility personnel with knowledge of the plants' operating history and past practices of handling hazardous materials as well as the current operating practices. ES also inspected the facility and the surrounding property.

2.2 AERIAL PHOTOGRAPHS

Historical information was obtained through review of aerial photographs. The earliest available photographs of the site are from 1936. ES also obtained and reviewed photographs from 1941, 1950, 1956, 1971, and 1974. The photographs were used to identify past solid waste disposal activities, i.e., landfills, former manufacturing operations, or other potential sources of public health or environmental concern.

2.3 RECORDS REVIEW

Engineering-Science obtained and reviewed records from the GMC files and local and state regulatory agencies. Specific documents available during this effort were:

1. Available Spill Incident (SPI) reports dating from 1974 to 1991 that contain information on the amount and type of product spilled, any remedial actions taken, and any soil sampling or excavation performed (Appendix A).

A discussion of the findings of the records review is provided in Section 3.1

SECTION 3
PHASE I FINDINGS AND RECOMMENDED FIELD INVESTIGATIONS

Engineering-Science reviewed the information described in Section 2 to identify areas in the plant where there may have been releases of concern to the public health or the environment. The findings were used to identify potential areas of concern that would be sampled in Phase II to confirm or deny the existence of a release of concern. ES then developed a recommended Phase II field investigation for these areas.

The recommended Phase II site investigation is described in the remainder of this section.

3.1 PLANT 10 AREAS OF CONCERN

A review of the available spill records showed two reported releases at Plant 10. One hundred gallons of quench oil were released onto the ground and the pavement in the southwest corner of the property when a furnace was laid on its side causing the oil to be spilled out. Absorbent material was used and no further action was taken. An unknown amount of hydraulic oil was released onto the paved area in the southwest courtyard as machinery was being moved. An oil dam was installed in front of the drain to the creek and absorbent material was used to collect the oil.

3.2 INSPECTION FINDINGS

Plant 10 was inspected by ES employees on July 30, 1992. The tooling and records are stored on shelves in the front of the warehouse, and the machines are kept on the floor in the back. Two floor drains were observed in the warehouse. One of the floor drains located in the front of the storage area had been previously plugged. The floor drain located on the southern side of the warehouse in the rear of the building appeared to still be connected to the sewer system. The warehouse floor was latticed with several cracks where heavy machinery had stressed the concrete. The floor was stained with oils from past and present use. The present practice is to collect any oil spilled with absorbent material. There was evidence in several places where walls had been removed. A rectangular patch

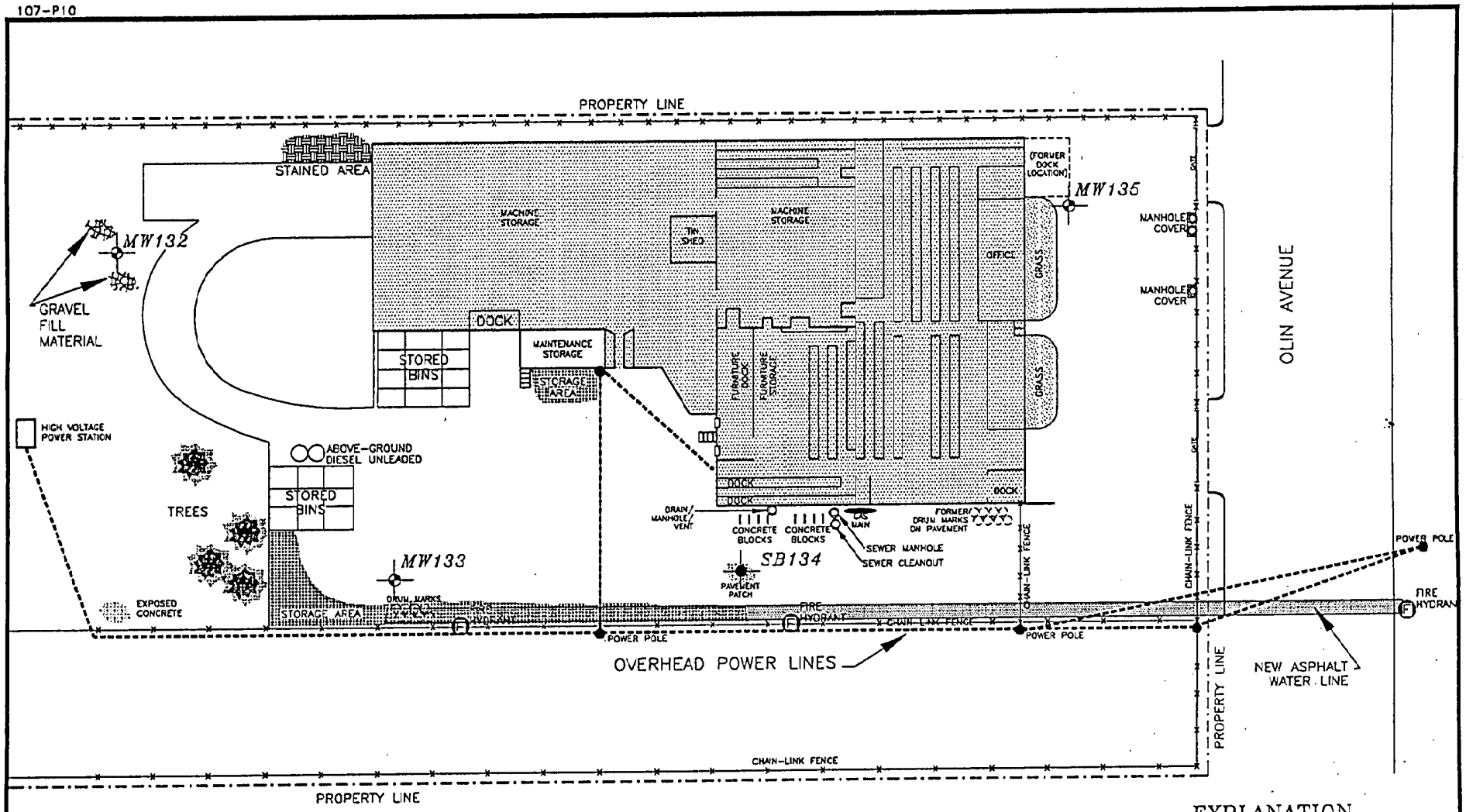
of concrete was noted in the furniture storage area where a former heating unit may have been located.

The outside courtyard was paved with asphalt that was cracked and showed evidence that 55-gallon drums had been stored along the building at one time. Two sewer manholes were located on the south side of the building. On the west end of the property near the edge of the asphalt drive it was observed that the area may have been used to bury waste at one time. The information reviewed indicated that brake lines may have been uncovered at the back of the property and a fuel oil tank had been removed from the property. There was an area of patched asphalt near the southwest corner of the warehouse that was approximately the size of a 500-gallon tank. There were no piles of dust or overspray observed on the roof. The two current aboveground storage tanks are in good condition. The tanks are each kept within metal dikes for leak protection.

3.3 PLANNED PHASE II ACTIVITIES

These observations indicate that a release of concern to the public health or the environment may have occurred at this area. Three soil borings/monitoring wells and one soil boring are recommended at the Plant 10 property as shown on Figure 3.1. One well (MW132) will be located near the northwest corner of the plant in the area of suspected dumping. One well (MW133) will be located near the 55-gallon drum marks on the asphalt pavement to investigate the possible leakage of material from the drum into the ground. One soil boring (SB134) will be located at the pavement patch to investigate whether or not this area had at one time an underground storage tank and it had leaked into the subsurface. The third well (MW135) will be installed on the eastside of the warehouse to help determine the local groundwater gradient and provide general coverage of the site. Soil samples will be collected at 5-foot intervals and screened using a photoionization detector (PID). The soil sample from each boring showing the highest PID reading will be submitted for laboratory analysis. Samples from Plant 10 will be analyzed for volatile organic compounds (VOCs) and total petroleum hydrocarbon (TPH) with the exception of

107-P10



EXPLANATION

PLANNED MONITORING WELL

PLANNED SOIL BORING

NOT TO SCALE

PLANNED SAMPLE LOCATIONS
PLANT 10

DATE: 9-29-92	UPDATE #: 4/CK	PROJECT NO. CH107	DATE
CHANGE REQUESTED BY: LAB		ORIGINAL DESIGN BY:	
		ORIGINAL DWG. BY: C. KURT	8/92
		CHECKED BY	
		ENGINEER	
		REGISTRATION NO. DATE	

GM GENERAL MOTORS
ALLISON GAS TURBINE DIVISION
INDIANAPOLIS, INDIANA

ENGINEERING-SCIENCE
DESIGN • RESEARCH • PLANNING
1000 JORIE BLVD. • SUITE 250 • OAKBROOK, ILLINOIS 60521 • 708/990-7200
OFFICES IN PRINCIPAL CITIES

ES

FIGURE 3.1

the soil sample collected in the area of suspected dumping, which will also be analyzed for polychlorinated biphenyls and asbestos. Groundwater samples from the three wells will be analyzed for TPH and VOCs.

3.4 SUMMARY OF FINDINGS

Engineering-Science completed the information review and site inspection of the Plant 10 property, at the GMC Allison Turbine Division facility. The Phase I site assessment effort identified areas at the facilities where there may have been releases of concern to the public health or the environment. The sampling locations selected for the Phase II investigation are within areas where a need was identified to confirm or deny the existence of a release. The implementation of the recommended field investigations will be in subsequent phases of the GMC project.

APPENDIX A
PLANT 10 SPILL INCIDENT REPORTS

F-8635(F)

SPI REPORT

SPI 841219

INSTRUCTIONS: COMPLETE ALL LINES WITH SOLID DOT (•); SHEET 1 OF 3
OTHER LINES AS APPLICABLE. USE ADDITIONAL SHEET(S) IF NEEDED.

• WHERE PLANT 10

•LOCATION (BAY, T.C., E.P., AREA) S.W. OF PLANT 10, ON PROPERTY

•EXTENT OF SPILL SEE PLOT PLAN

•SPILL WAS: ☐INSIDE ☒OUTSIDE ☐BOTH

•SPILL WENT ON/INTO: ☒PAVED AREA ☒GROUND ☐SEWER

• WHEN DATE, TIME, DURATION OF SPILL 19DEC84 1230

•DATE/TIME SPI REPORTED TO ENVIR. SCI. & TECH. 1300 19DEC84

WEATHER (IF ANY PART OF SPILL WAS OUTSIDE)

WIND: ☐CALM ☑ 8MPH NW TEMPERATURE +1 °C (34 °F)

• PRODUCT SPILLED QUENCH OIL

•HOW WAS PRODUCT IDENTIFIED? ☒KNOWN LINE OR CONTAINER

☐GC ☐IR ☐OTHER

•PRODUCT IS: ☒OIL ☐HAZARDOUS MATERIAL PER 40CFR116

☐NPDES-LIMITED EFFLUENT CHARACTERISTIC.

☐NONE OF THE ABOVE -- SPI REPORT NOT REQUIRED

•ESTIMATED QUANTITY OF PRODUCT SPILLED DETERMINED BY:

☒ESTIMATE OF EXPERIENCED PERSONNEL

☐CALCULATIONS BELOW

•ESTIMATED QUANTITY: 380 LITRES (100 GALS.)

•PRODUCT UNIT COST WASTE OIL COST OF PRODUCT LOST NO VALUE

SPILL EVENT OR OUT-OF-LIMIT CONDITION

•DID SPILL REACH: ☐STREAM ☐MUNICIPAL SEWER ☒NEITHER OF THESE

LOCATION OF ENTRY INTO STREAM/MUNICIPAL SEWER

NPDES LIMIT ON PRODUCT SPILLED: ☐NONE ☐

SPILL CONCENTRATION IN STREAM/MUNICIPAL SEWER

•A SPILL EVENT IS VISIBLE OIL OR A HARMFUL QUANTITY OF A HAZARDOUS MATERIAL REACHING THE STREAM.

WAS THIS A SPILL EVENT? ☐YES ☒NO

IF YES, COMPLETE "SPILL EVENT REPORT" FORM.

ATTACHMENTS/DISTRIBUTION

•PLOT PLAN ATTACHED ☒YES ☐NO PHOTOS TAKEN ☐YES ☒NO

•PLANT SECURITY REPORT RECEIVED ☐YES ☒NO

DISTRIBUTION ☐FILE ONLY L.E. BRYANT, R.G. BARNES, R.W. SEWALL, J. McCRAY, M.W. GRAY, P.P. COOK, P.A. EDDY

CONTINUE TO SHEET 2, (REVERSE SIDE)

F-8635(B)

SPI REPORT

SPI 041219

SHEET 2 OF 3

① EVENTS CAUSING SPILL (DESCRIBE SYSTEM, IF NECESSARY, TO EXPLAIN CAUSE OF SPILL):
DUE TO RELATIVELY HIGH BED ON TRUCK PICKING UP A LINDBERG FURNACE, DRIVER ASKED THAT FURNACE BE PLACED ON ITS SIDE, WHEN THIS WAS DONE QUENCH OIL SPILLED. PERSONNEL STATED THEY COULD NOT SEE INTO FURNACE AND DID NOT KNOW IT CONTAINED OIL.

② ACTION TAKEN TO CLEAN UP SPILL, INCLUDING PREVENTION OF FURTHER SPREADING OF FLOW.
SPEDI-DRI AND ROLL SORBENT LAID. SPEDI-DRI PICKED UP BY MAINTENANCE.

③ ACTION TAKEN TO LOCATE AND SHUT OFF SPILL SOURCE. NONE. FURNACE CONTAINED FINITE AMOUNT OF OIL.

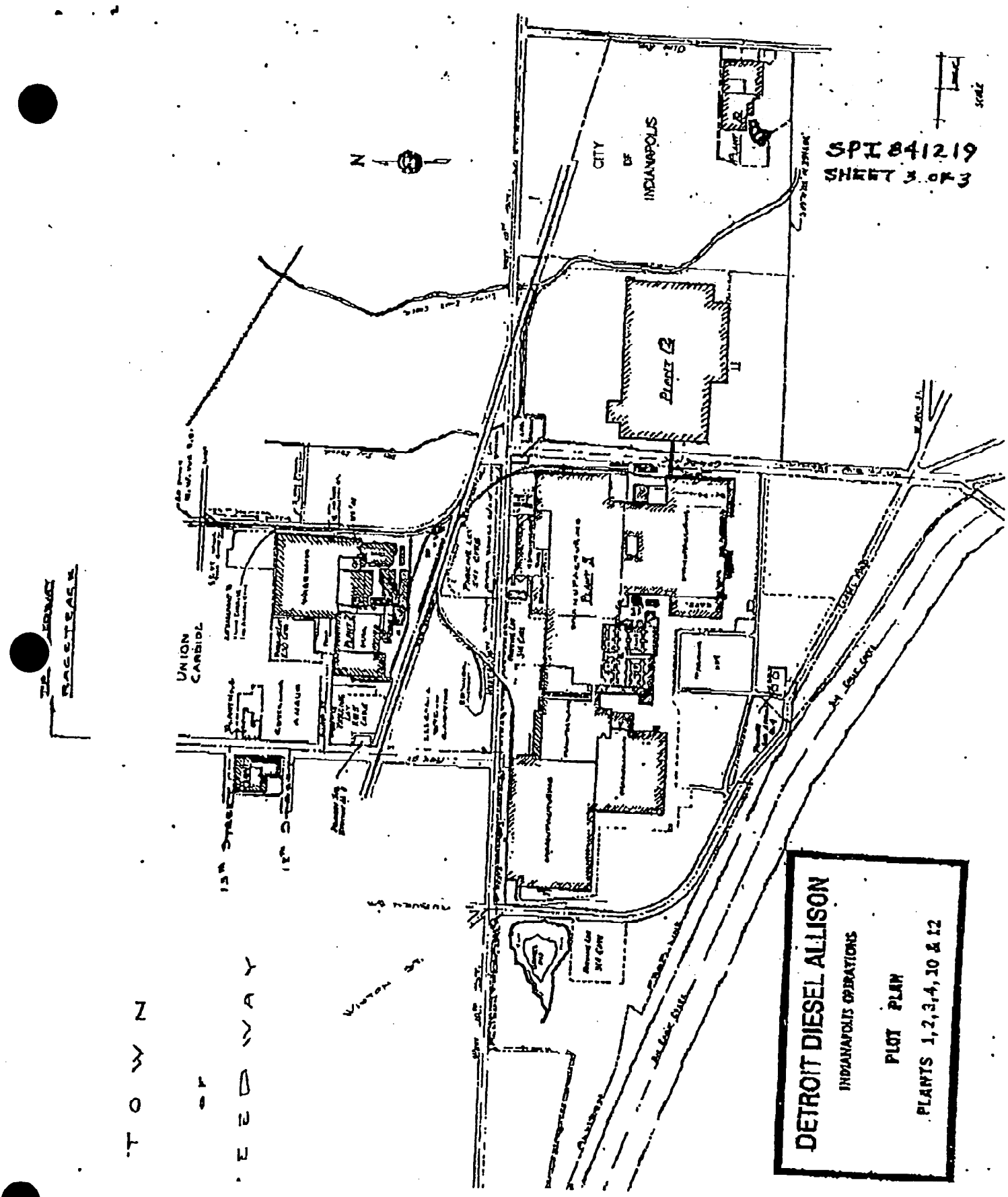
④ DISPOSITION OF SPILLED MATERIAL. SPEDI-DRI TO RICHARDS GONDOLA.

⑤ ACTIONS/RECOMMENDATIONS TO PREVENT RECURRENCE. ALL DEPTS. SENDING MACHINES TO PLANT 10 SHOULD FIRST REMOVE ALL LIQUIDS FROM THE MACHINES. THIS ALSO APPLIES TO PLANT 15.

⑥ ESTIMATED MANHOURS INVOLVED IN THIS INCIDENT. 20

⑦ COMMENTS.
- THIS IS A REPEAT OF WHAT HAS HAPPENED AT PLANT 15.
- FEDERAL, STATE AND GM REPORTS MADE. MEMOS WRITTEN.

NAME OF PERSON PREPARING SPI REPORT W. W. McPherson


SPI 841219
SHEET 3 OF 3
CITY OF INDIANAPOLIS
UNION CARBIDE
PLANT 12
DETROIT DIESEL ALLISON
INDIANAPOLIS OPERATIONS
PLOT PLAN
PLANTS 1,2,3,4,10 & 12

Allison

To: P. P. Cook

From: W. W. McMillan

Date: December 20, 1984

Subject: SPI 841219 Report to GM EAS

At 15:40, December 19, 1984 I reported to Mitch Zdyb, GM EAS concerning the events causing the spill of quench oil. I told him an estimated 100 gallons had been spilled on the ground and that it did not reach the creek. Clean up is in process. I told him that I had reported to NRC and will report to the State today (19 Dec 84).

W. W. McMillan
W. W. McMillan
Environmental Sciences

WWM/gl
Ref: 122084b
cc: R. G. Barnes
P. A. Eddy

Allison

To: P. P. Cook

From: W. W. McMillan

Date: December 20, 1984

Subject: SPI 841219 Report to State

At 15:55 this date (19 Dec 84) I reported to Mike Sorg, Office of Emergency Response, State Board of Health on SPI 841219. He asked me the following questions:

1. Was it contained: Yes
2. Amount: Estimated 100 gallons
3. Name: Smiley McMillan
4. Title: Senior Staff Engineer
5. Company: Allison Gas Turbine Div., GMC, Indianapolis
6. Phone: (317) 242-5455
7. Mailing Address: P.O. Box 894, Indianapolis, IN 46206
8. Time of spill: 12:30, December 19, 1984
9. Size of Area: Estimated 40 feet by 80 feet

I explained the quench oil to Mike. He was interested that it contained nothing more hazardous than motor oil and that it didn't pick up any metal from heat treat.

10. Did it reach any surface water or sewer: No
11. Were there any personnel injuries: No
12. Was the company the only outfit on the scene: Yes

No further information was requested, but he did want a responsible party to send a written report to the State.

W. W. McMillan
W. W. McMillan
Environmental Sciences

WWM/gl
Ref: 122084c
cc: R. G. Barnes
P. A. Eddy

Allison

To: Mike Sorg

From: Pete Cook

Date: January 14, 1985

Subject: Oil Spill Outside DDA Plant #10 on the 19th of December, 1984

SPI841219

As per your request, the attached documentation is being sent to cover our 100 gallon quench oil spill. This spill resulted from the loading of a heat treat furnace onto the bed of a truck. As the loading progressed, approximately 100 gallons of oil spilled from the furnace onto the ground. It was cleaned up by the use of Speedy-Dry plus a roll-type absorbent. All concerned agencies were notified within the required time frame and no further action is contemplated at this time.

Any questions should be directed to me on 242-4388. Thank you for your cooperation in this matter.

P. P. Cook, Superintendent
Environmental Sciences

PPC/gl
Ref: 11185b
Attachment

Allison Gas Turbine Operations General Motors Corporation P.O. Box 420 Indianapolis, Indiana 46206-0420

Allison

To: P. P. Cook

From: W. W. McMillan

Date: December 20, 1984

Subject: SPI 841219 Report to National Response Center

The following questions and replies took place between the writer and LT (jg) Nance, USCG at 15:20 this date: (19 Dec 84)

1. What was spilled: Quench oil
2. State: Indiana
3. Name: Smiley McMillan
4. Company: Allison Gas Turbine Div., GMC,
5. Address: P.O. Box 894, Indianapolis, IN 46206
6. Phone: (317) 242-5455
7. Location: Outside Plant 10, Indianapolis
8. Time: 12:30, 19th of December, 1984
9. Did it reach a body of water: No
10. Where was the spill: On the ground
11. Cause: Because of the relatively high bed of a truck, the driver asked that the Lindberg furnace be laid on its side. When this was done the spill occurred. (The Lieutenant said "Oh, this is residual quench oil," and I said "Yes.")
12. Is is being cleaned up: Yes
13. What is used: Spedi-Dri plus roll-type sorbent
14. Have other agencies been notified: Not yet

No additional information was requested.

W. W. McMillan
Environmental Sciences

WWM/gl
Ref: 122084a
cc: R. G. Barnes
P. A. Eddy

F-8635(F)

SPI REPORT

SPI 860310

INSTRUCTIONS: COMPLETE ALL LINES WITH SOLID DOT (•); SHEET 1 OF ___
OTHER LINES AS APPLICABLE. USE ADDITIONAL SHEET(S) IF NEEDED.

• WHERE

PLANT 10

• LOCATION (BAY, T.C., F.P., AREA) South west side - Courtyard area
• EXTENT OF SPILL Contained on low areas of pavement
• SPILL WAS: ☐ INSIDE ☒ OUTSIDE ☐ BOTH
• SPILL WENT ON/INTO: ☒ PAVED AREA ☐ GROUND ☐ SEWER

• WHEN DATE, TIME, DURATION OF SPILL ___

• DATE/TIME SPI REPORTED TO ENVIR. SCI. & TECH. 11:45
WEATHER (IF ANY PART OF SPILL WAS OUTSIDE) warm but heavy intermittant rain
WIND: ☐ CALM ☐ ___ TEMPERATURE ___ °C (___ °F)

• PRODUCT SPILLED Hydraulic oil from stored equipment
• HOW WAS PRODUCT IDENTIFIED? ☒ KNOWN LINE OR CONTAINER
☐ GC ☐ IR ☐ OTHER ___
• PRODUCT IS: ☒ OIL ☐ HAZARDOUS MATERIAL PER 40CFR116
☐ NPDES-LIMITED EFFLUENT CHARACTERISTIC.
☐ NONE OF THE ABOVE -- SPI REPORT NOT REQUIRED
• ESTIMATED QUANTITY OF PRODUCT SPILLED DETERMINED BY:
☐ ESTIMATE OF EXPERIENCED PERSONNEL
☐ CALCULATIONS BELOW unknown

• ESTIMATED QUANTITY: ___ LITRES (___ GALS.)
• PRODUCT UNIT COST ___ COST OF PRODUCT LOST ___

SPILL EVENT OR OUT-OF-LIMIT CONDITION

• DID SPILL REACH: ☐ STREAM ☐ MUNICIPAL SEWER ☒ NEITHER OF THESE
LOCATION OF ENTRY INTO STREAM/MUNICIPAL SEWER ___

NPDES LIMIT ON PRODUCT SPILLED: ☐ NONE ☒ ___
SPILL CONCENTRATION IN STREAM/MUNICIPAL SEWER ___
• A SPILL EVENT IS VISIBLE OIL OR A HARMFUL QUANTITY OF A HAZARDOUS MATERIAL REACHING THE STREAM.
WAS THIS A SPILL EVENT? ☐ YES ☒ NO
IF YES, COMPLETE "SPILL EVENT REPORT" FORM.

ATTACHMENTS/DISTRIBUTION

• PLOT PLAN ATTACHED ☐ YES ☒ NO PHOTOS TAKEN ☐ YES ☒ NO
• PLANT SECURITY REPORT RECEIVED ☐ YES ☒ NO
DISTRIBUTION ☒ FILE ONLY ___

CONTINUE TO SHEET 2. (REVERSE SIDE)

F-8635(B)

SPI REPORT

SPI _____

SHEET 2 OF _____

5535 X4664 LARRY BEARY

① EVENTS CAUSING SPILL (DESCRIBE SYSTEM, IF NECESSARY, TO EXPLAIN CAUSE OF SPILL).
Moving machinery in potable gondolla, oil spilled into bottom & run out bottom to pavement outside

② ACTION TAKEN TO CLEAN UP SPILL, INCLUDING PREVENTION OF FURTHER SPREADING OF FLOW.
Oil dam installed in front of drain to creek, oil sorbent pad used on puddles, waste hauling truck [illegible] to pump up surface water. 30 bag speedy dry applied to court yard area

③ ACTION TAKEN TO LOCATE AND SHUT OFF SPILL SOURCE.

④ DISPOSITION OF SPILLED MATERIAL.

⑤ ACTIONS/RECOMMENDATIONS TO PREVENT RECURRENCE. By product sales & maintainence need to be sure stored or scrapped equipment is empty of oil & fluids before they leave the plant for shipping anywhere. It is possible this equipment has been stored for many years and/or come from DDA facilities

⑥ ESTIMATED MANHOURS INVOLVED IN THIS INCIDENT. Alot!
3 + 6 + 9 = 18 hr

⑦ COMMENTS. Rain made containment difficult

NAME OF PERSON PREPARING SPI REPORT _____

Allison

Allison Engine Company P.O. Box 420 Indianapolis, Indiana 46206-0420

General Counsel
Office: (317) 230-4694
Fax: (317) 230-3706
Speed Code U6A
WEP:G97-37P

November 12, 1997

Genuine Parts Company
2999 Circle 75 Parkway
Atlanta, Georgia 30339

Attention: Mr. Brainard T. Webb, Jr.
Vice President & Corporate Counsel

Re: 700 N. Olin Avenue

Dear Mr. Webb:

Your letter to Allison's Mr. Gregory Dunn, dated October 31, 1997, just came to my attention and I wanted to take this opportunity to respond to you directly. Earliest this year, Genuine Parts Company presented Allison an offer, through your Mr. Karl Koenig, to purchase the subject property, known to us as Plant 10. To better understand the reasonableness of that offer, we had a real estate evaluation performed. Subsequently, I made a presentation to Allison senior management and offered several options for them to explore, regarding pursuit of your offer.

Allison's management proceeded to discuss the issue for a time, but did not come to a final decision. I apologize that I did not follow up and the matter was apparently tabled. I ask your indulgence now, so that I may re-energize this issue and have Allison's managers determine how they wish to proceed regarding your offer.

Please contact me at (317) 230-4694 should you have any further questions.

Sincerely,

W. Eric Pedersen
General Counsel

/kd

Property Appraisal Dated March 25, 1997 by Philip W. Dils, MAI
700 N. Olin Avenue; Indianapolis, Indiana

* The original 52,000-s.f. structure was built in 1956, and the 31,000-s.f. addition was built in 1970. (p. 1)

* The property is located in a low-income neighborhood; crime is a problem in the area. (p. 4)

* The entire site is in a floodway; the southern portion of the site is in a floodplain. The site would probably have to be filled before constructing any new improvements. (p. 6)

* Trucks must travel narrow residential streets to reach the site. (p. 7)

* There may be asbestos-containing materials in the building. (p. 7-8)

* The roof leaks in the older and newer sections of the building; it is probably at the end of its life, and may have to be completely replaced soon. (p. 8, 10) The estimated cost to replace the roof is $150,000. (p. 18)

* The HVAC units may also have to be replaced. (p. 11)

* The building has lower ceiling heights--16' in the older section, 10' to 13' in the newer section. Newer industrial buildings typically have 22' to 28' interior clear height. (p. 8)

* The offices require updating/renovation. (p. 8)

* This property does not have investment grade characteristics. (p. 27)

* Value by Sales Comparison (p. 18)
  = ($12.50/sf x 82,500 sf) - $150,000 (for a new roof)
  = $880,000

* Value by Income Approach (p. 27)
  = ($130,047/12.75%) - $150,000 (for a new roof)
  = $870,000

* Value Conclusion = $875,000 (p. 28)

* CB Commercial estimated the building should sell for $640,000 ($8/sf) to $800,000 ($10/sf).

* Older industrial warehouses usually sell in the $9 to $14/sf range. (p. 28)

PRIVILEGED AND CONFIDENTIAL - PREPARED AT GMC COUNSEL'S REQUEST

PHASE II INFORMATION REVIEW REPORT FOR GENERAL MOTORS CORPORATION ALLISON GAS TURBINE DIVISION

PLANT 10

Prepared For

General Motors Corporation
3044 W. Grand Boulevard
Detroit, Michigan 48202

November 19, 1993

Prepared By

Engineering-Science, Inc.
1000 Jorie Boulevard, Suite 250
Oak Brook, Illinois 60526

CH151.01/730332.01

PRIVILEGED AND CONFIDENTIAL - PREPARED AT GMC COUNSEL'S REQUEST

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SECTION 1
INTRODUCTION

1.1 PURPOSE

At the request of General Motors Corporation (GMC) Counsel, Engineering-Science, Inc. (ES) was retained to perform a Phase II environmental assessment site investigation of the GMC Allison Gas Turbine Division Plant 10 facility near Indianapolis, Indiana. The overall objective of the Phase I and Phase II environmental assessments is to identify areas where there may have been a release into the environment at a level of concern to the public health and/or the environment.

A Phase I site assessment began in August 1992. The objectives of the Phase I assessment are: 1) to ascertain the general conditions of the facility by non-intrusive activities, e.g., records review, interviews, existing data review, visual inspection; and 2) identify potential areas of environmental concern (PAOC) where there may have been a release of chemicals into the environment at levels that could adversely impact public health or the environment. The findings from the Phase I review are summarized in an April 21, 1993, report titled *Phase I Records Review Report*.

The Phase II environmental assessment site investigation, involving intrusive sampling, began in the fall of 1992. The objective of the Phase II environmental assessment is to collect environmental samples to confirm or deny a Phase I PAOC release into the environment at levels that could adversely impact public health or the environment. Any confirmed PAOCs in Phase II should be fully delineated in Phase III, if necessary. The areas investigated during the Phase II sampling were those identified from the initial Phase I information review and subsequent investigative efforts. The following report summarizes the results and findings from the complete Phase II Site Assessment conducted August through September 1992, and May through June 1993 at Allison Gas Turbine (AGT) Plant 10.

1.2 SITE BACKGROUND

Plant 10 was purchased by GMC in 1973 from the previous owner, BHT Corporation, to be used as a warehouse for obsolete machines, tooling, and fixtures. The original building was constructed in 1956, followed by a renovation in 1970 which doubled the floor space. Plant 10 was operated as a part of GMC Allison Transmission Division (Plant 3) as a warehouse until the mid-1980s when it was made a part of the AGT Division and continued to be managed as a warehouse facility. The Plant 10 vicinity map is shown in Figure 1.1 and the facility layout is presented on Figure 1.2.

The Plant 10 potable water supply is purchased from the city of Indianapolis. There are no process wastewaters generated at Plant 10. Sanitary wastewater is discharged to the City of Indianapolis Sanitary Sewer System.

532956

FIGURE 1.1

VICINITY MAP

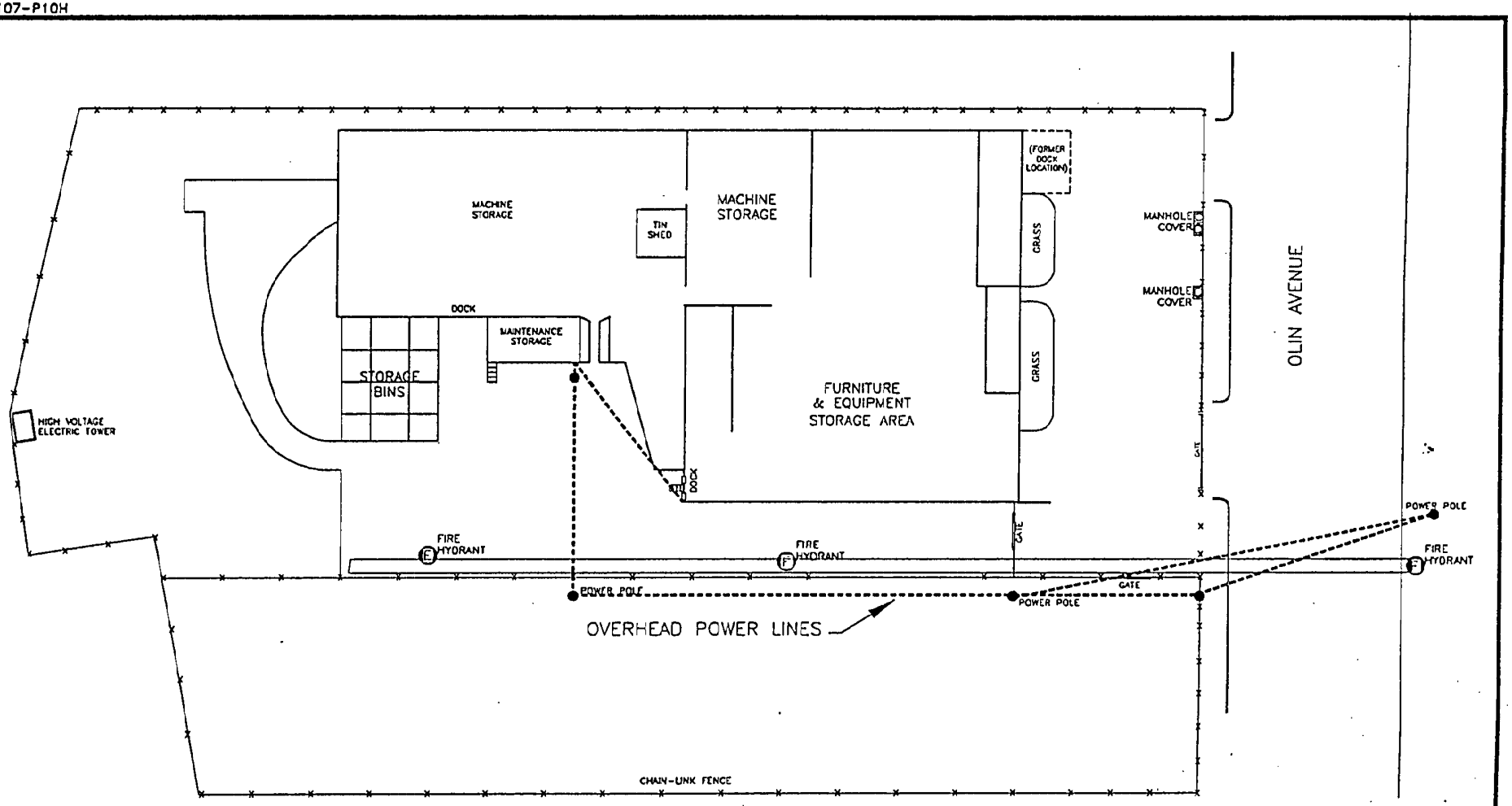
GENERAL MOTORS
ALLISON GAS TURBINE DIVISION
PLANT NUMBER 10
INDIANAPOLIS, INDIANA

N

SCALE 1" = 2000'

ES ENGINEERING—SCIENCE

107-P10H



EXPLANATION

PLANT 10
GENERAL LAYOUT

N

SCALE 1" = 100'

DATE: 10-14-93	UPDATE #: 0/CK	PROJECT NO. CH151	DATE
		DRAWN BY C. KURT	12/92
CHANGE REQUESTED BY: RY		CHECKED BY RLY	10/93
		ENGINEER	
		REGISTRATION NO.	DATE

GM

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INDIANAPOLIS, INDIANA

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FIGURE 1.2

PRIVILEGED AND CONFIDENTIAL - PREPARED AT GMC COUNSEL'S REQUEST

SECTION 2
SCOPE OF WORK

2.1 INTRODUCTION

Plant 10 was identified as a PAOC during the Phase I inspection. Four soil borings (SB132 through SB135) were advanced at Plant 10 during the initial Phase II sampling effort. Three of the soil borings were completed as monitoring wells (MW132, MW133, and MW135) as shown on Figure 2.1 to define the hydrogeology at the site and to confirm or deny whether the plant as a whole is a PAOC. The locations of two of the monitoring wells (MW132 and MW133) were selected based on visual inspection. The third monitoring well (MW135) was constructed for triangulate definition of groundwater flow at the site.

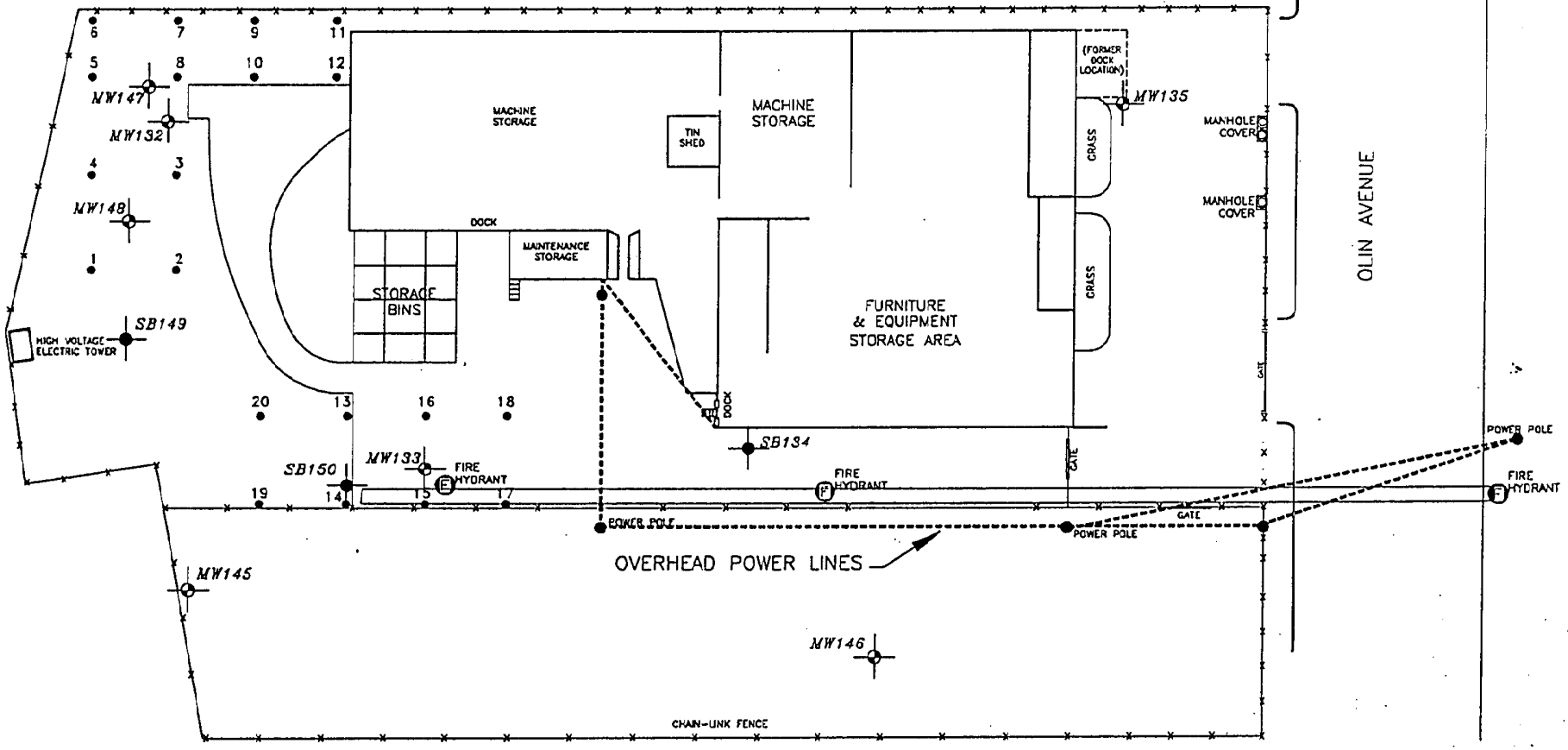
One soil sample collected from each boring, selected based on the results of field screening, was submitted to the laboratory to be analyzed for TPH and VOCs. The monitoring wells were surged and developed before a groundwater sample was collected from each well and submitted to the laboratory for VOC analysis.

The soil and groundwater samples collected at Plant 10 during the first Phase II effort had concentrations of trichloroethene (TCE) and its decomposition products. Additional sampling was completed at Plant 10 during the second Phase II effort to confirm and/or further define the site as a PAOC.

2.2 PLANT 10 SOIL GAS SURVEY

A soil gas survey was completed on the west side of the facility to further define the extent of contaminated soils. The soil gas survey was set up using a 50-foot grid and marking 20 sampling points as shown on Figure 2.1. Approximate locations for soil borings and monitoring wells were selected prior to the survey based upon the previous record review and the initial Phase II sampling effort. The results from the soil gas survey were then used to determine the exact monitoring well and soil boring locations.

107-P10G



EXPLANATION

MONITORING WELL

SOIL BORING

SOIL GAS SURVEY SAMPLE POINTS

N

SCALE 1" = 100'

SAMPLE LOCATIONS
PLANT 10

DATE: 6-29-93	UPDATE #: 1/CK	PROJECT NO. CH107	DATE
CHANGE REQUESTED BY: LAB		DRAWN BY C. KURT	12/92
		CHECKED BY	
		ENGINEER	
		REGISTRATION NO.	DATE

GM

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FIGURE 2.1

2.3 MONITORING WELL AND SOIL BORING INSTALLATION

Six soil borings (SB145 through SB150) were drilled at Plant 10 during the second Phase II sampling effort. Four of the soil borings were advanced to the first clay aquitard at the bottom of the shallow aquifer (approximately 30 feet below grade) and were completed as monitoring wells (MW145 through MW148) as shown on Figure 2.1. The well screens were placed to monitor the conditions at the bottom of the aquifer as the contaminants of concern, chlorinated hydrocarbons, are denser than water.

Two soil samples were collected from each of the four soil borings that were completed as monitoring wells, and submitted to the laboratory for VOC analysis. The soil samples from these borings were collected from the groundwater interface and from the bottom of the boring.

Soil borings SB149 and SB150, not completed as monitoring wells, were drilled to a depth of 15 feet below the ground surface. One soil sample from each boring, selected based on field screening was submitted to the laboratory for VOC analysis.

Monitoring wells MW145 through MW148 were surged and developed prior to sampling. The three monitoring wells (MW132, MW133, and MW135), installed during initial Phase II work, were purged and resampled. All of the groundwater samples collected were submitted to the laboratory and analyzed for VOCs.

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SECTION 3
PHYSICAL CHARACTERISTICS

3.1 GEOLOGY

3.1.1 Regional Geology

The site is located along the flank of the Cincinnati Arch, which is overlain by up to 105 feet of glacial sediments. The first bedrock unit encountered is the New Albany Shale. Glacial sediments beneath the sites consist mainly of sand and gravel deposits. However, a discontinuous lens of silty clay, approximately 16- to 18- feet thick, was encountered at depths varying between 50 and 55 feet below the surface during a previous investigation (by others).

3.1.2 Plant 10 Geology

The geology at Plant 10 is predominantly sands and gravel. A surface seam of topsoil/silty clay was underlain by sand and gravel to approximately 24.5 feet below the surface, the maximum drilling depth. A thin clayey silt seam was encountered at 23 to 30 feet below the surface in three of the six borings. The soil boring logs for the additional Phase II drilling are included in Appendix A.

3.2 HYDROGEOLOGY

3.2.1 Regional Hydrogeology

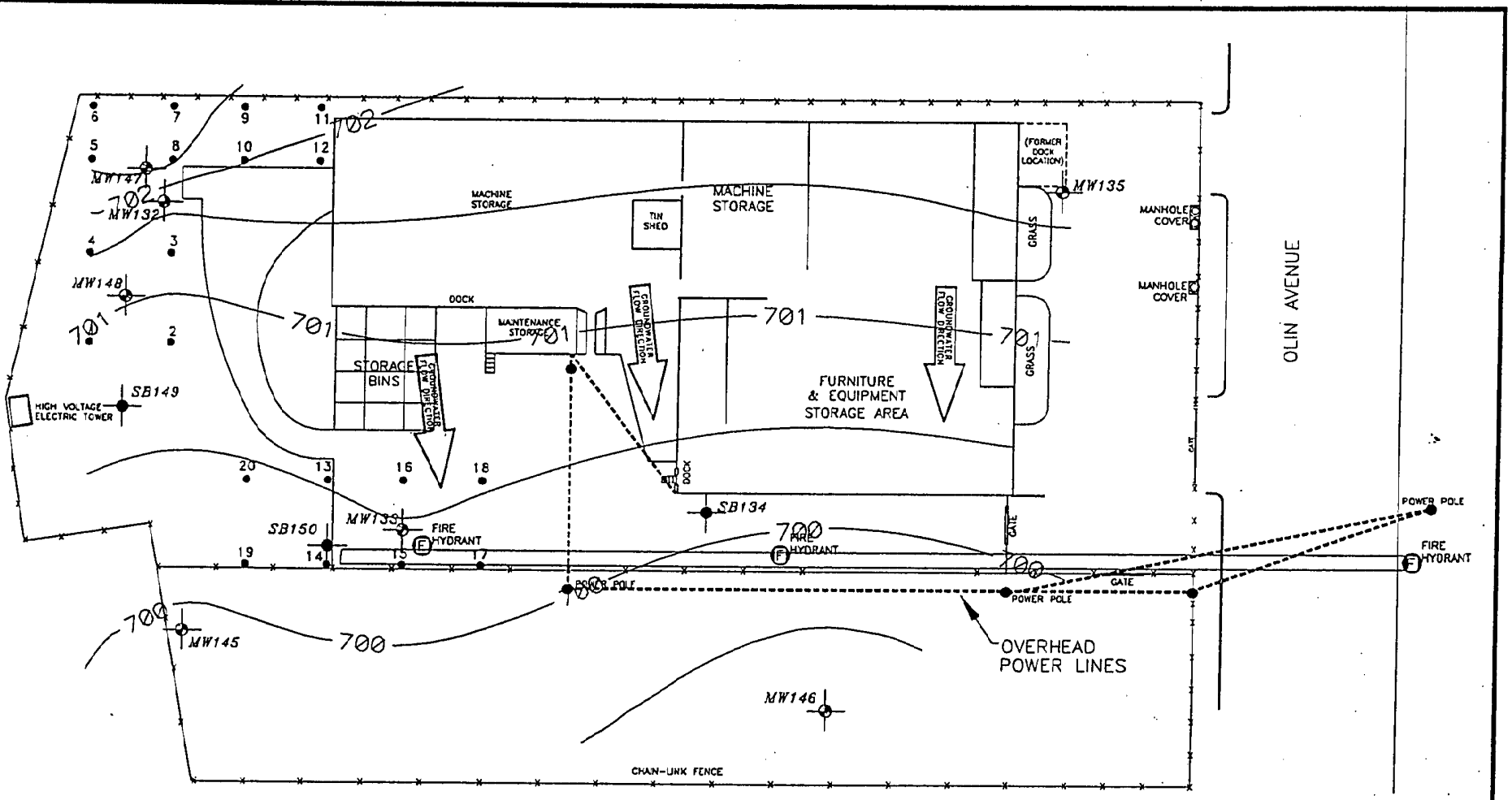
The facility is located in the north-central drift Paleozoic Province. Most water supplies in this province are derived from the glacial drift. Although the water generally is hard, it is still used as a potable water supply.

3.2.2 Plant 10 Hydrogeology

During the initial Phase II sampling effort at Plant 10, the groundwater elevation data indicated an east/southeast groundwater flow in the shallow aquifer. During the second Phase II sampling effort, the static water level measurements taken from all of the monitoring wells at Plant 10 indicated the groundwater in the shallow aquifer was flowing in a southerly direction. The change in groundwater flow direction from east/southeasterly

to southerly results from the number and locations of the monitoring wells used in determining the flow direction. The static water levels at 7 points provides a higher level of certainty for the groundwater flow direction. The potentiometric surface for Plant 10 based upon the May 1993 data is shown on Figure 3.1. The groundwater elevations measured in September 1992 are presented in Table 3.1 and the groundwater elevations measured in May 1993 are presented in Table 3.2.

151GW10



EXPLANATION

- MONITORING WELL
- SOIL BORING
- SOIL GAS SURVEY SAMPLE POINTS

N

SCALE 1" = 100'

PLANT 10 GROUNDWATER CONTOUR MAP

DATE: 9-17-93	UPDATE #: 2/CK	PROJECT NO. CH107	DATE
CHANGE REQUESTED BY: LAB		ORIGINAL DESIGN BY: C. KURT	12/92
		CHECKED BY	
		ENGINEER	
		REGISTRATION NO.	DATE

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ALLISON GAS TURBINE DIVISION
INDIANAPOLIS, INDIANA

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FIGURE 3.1

TABLE 3.1
GROUNDWATER ELEVATION DATA - SEPTEMBER 1992

GENERAL MOTORS ALLISON GAS TURBINE DIVISION
PHASE II SITE ASSESSMENT

Well	Survey Coordinates[1]		Elevation (MSL)[2]		Depth to Water[3]	Potentiometric
Number	N	E	Casing	Riser	(Feet)	Surface
MW132	2,876	4,282.9	712.59	712.17	11.31	700.86
MW133	2,675.9	4,450.8	709.14	708.79	8.7	700.09
MW135	2,892.9	4,654.6	714.07	713.69	13.04	700.65

(1) Referenced to Plant Grid System.
(2) Elevation in feet above mean sea level (MSL).
(3) Measured September 1992.

TABLE 3.2
GROUNDWATER ELEVATION DATA - MAY 1993

GENERAL MOTORS ALLISON GAS TURBINE DIVISION
PHASE II SITE ASSESSMENT

Well	Survey Coordinates[1]		Elevation (MSL)[2]		Depth to Water[3]	Potentiometric
Number	N	E	Casing	Riser	(Feet)	Surface
MW132	2,876.0	4,282.9	712.59	712.17	10.68	701.49
MW133	2,675.9	4,450.8	709.14	708.79	8.29	700.50
MW135	2,892.9	4,654.6	714.07	713.69	12.02	701.67
MW145	4,539.2	7,079.2	708.84	707.90	8.00	699.90
MW146	4,505.1	7,401.8	708.95	708.67	9.60	699.07
MW147	4,829.2	6,958.9	712.40	711.88	9.00	702.88
MW148	4,743.4	6,945.1	711.96	711.00	10.00	701.00

(1) Referenced to Plant Grid System.
(2) Elevation in feet above mean sea level (MSL).
(3) Measured in May 1993.

SECTION 4
RESULTS AND CONCLUSIONS

4.1 ESTABLISHED SCREENING CRITERIA

4.1.1 Risk-Based Criteria

The Environmental Matters section of the AGT Sales Agreement (Agreement) establishes a set of risk-based factors that are to be utilized in the determination of cleanup goals and action levels. GMC believes that the Michigan Department of Natural Resources (MDNR) industrial cleanup criteria levels should be used as a conservative risk-based screen criteria, until such a site-specific set of chemical action levels are developed in Phase III.

The MDNR has established cleanup criteria specifically for use with industrial sites such as the AGT facility. These cleanup standards are based upon a human health evaluation using standard risk assessment assumptions relevant to the typical industrial site usage. The MDNR standards, Act 307 Type C Generic Industrial Cleanup Criteria, which became effective in July 1993, can be found in Appendix D. These screening standards have been summarized in Table 4.1.

4.1.2 Background Metal Review

Background metal concentrations for surface soil were obtained from an IDEM remedial investigation report prepared for Reilly Industries, which is adjacent (west) to AGT Plant 8 and currently is undergoing a Superfund cleanup. The background samples in the Reilly report were collected specifically for background concentrations determination and were calculated using the upper 95th percent confidence interval of the arithmetic mean for 10 discrete soil samples. The Reilly report did not include background metal concentrations for selenium or silver. A background value for silver and selenium in soil was taken from: "The Fate of Hazardous Materials in Soils." Dragun, James. Pages 31-78: Hazardous Materials Control. Vol 1, No 2 1988. The established background metal concentrations are presented in Table 4.2. The risk-based screening criteria are compared

TABLE 4.1
MICHIGAN TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

GENERAL MOTORS ALLISON GAS TURBINE DIVISION
PHASE II SITE ASSESSMENT

	SUBSURFACE SOIL (mg/kg)	GROUNDWATER (mg/L)
Total Petroleum Hydrocarbons		
Gasoline	NA	NA
Diesel	NA	NA
Total Organic Halogen		
Total Organic Halogen	NA	NA
Volatile Organic Compounds		
Trichloroethene	150	0.022
Tetrachloroethene	49	0.0068
1,1-Dichloroethane	18,000	2.5
1,2-Dichloroethane	27	0.0038
1,2-Dichloroethene (cis)	1,600	0.29
1,1,1-Trichloroethane	4,200	0.58
Vinyl chloride	1.1	0.00016
Acetone	15,000	2.1
Benzene	85	0.012
Toluene	33,000	4.6
Ethylbenzene	14,000	2
Xylenes (total)	270,000	38
Methylene chloride	NA	NA
BTEX		
Benzene	85	0.012
Ethylbenzene	14,000	2
Toluene	33,000	4.6
Xylenes	270,000	38
Metals and Cyanide		
Arsenic	8.6	0.002
Barium	63,000	7.3
Cadmium	450	0.01
Chromium	NA	NA
Chromium, hexavalent	4,300	0.35
Lead	400	0.004
Mercury	270	0.0063
Nickel	68,000	1.6
Selenium	4,500	0.1
Silver	4,200	0.098
Cyanide	20,000	0.46

PRIVILEDGED AND CONFIDENTIAL-PREPARED AT GMC COUNSEL'S REQUEST

TABLE 4.2
DOCUMENTED BACKGROUND METALS CONCENTRATIONS

GENERAL MOTORS ALLISON GAS TURBINE DIVISION
PHASE II SITE ASSESSMENT

Parameter	Upper 95th CI For Arith. Mean (mg/kg) (1)	Documented Soil Concentrations (ppm) (2)
Arsenic	9.8	
Barium		100-3500
Cadmium	3.6	
Chromium	22	
Lead	337	
Mercury	0.1	
Nickel	21	
Selenium		0.1-2
Silver		0.1-5.0

(1) Values taken from the Indiana Department of Environmental Management from the remedial investigation report for the Reilly Industries Superfund Site.

(2) Values for silver and selenium taken from "The Fate of Hazardous Materials in Soils," Dragun, James, 1988, pages 31 through 78, Hazardous Materials Control, Volume 1, Number 2.

to the concentrations reported in the soil samples collected during the Phase II site assessment to determine if a release of concern to the public health and/or the environment has occurred.

4.2 ANALYTICAL RESULTS

The analytical results from the soil gas, soil and groundwater samples that were collected during the Phase II investigation are presented in the following subsections. The environmental samples collected during the initial Phase II sampling effort were submitted to the Engineering-Science, Inc. Laboratory in Berkeley, California, for analysis. National Environmental Testing Laboratory in Indianapolis, Indiana, performed the analysis of the samples collected during the second sampling effort. Both laboratories analyzed the samples according the U.S. Environmental Protection Agency (USEPA) SW-846 standard methodologies. The laboratory reports are presented in Appendix B.

The summary of the soil and groundwater analytical results are presented in Table 4.3 and Table 4.4, respectively. The summary table reflects the parameters detected in the environmental samples. A parameter is not included on the table if it was not detected in any of the environmental samples during the Phase II investigation. The established screening criteria used for this project are also reported on this table. As noted, determination of whether a release of concern to human health or the environment has occurred, was made based on comparison to the noted regulatory criteria. The results of the comparison, i.e., reported values that exceed the screening criteria, are discussed in the following subsections.

Groundwater samples collected from four of the monitoring wells reported concentrations of chlorinated hydrocarbons above the respective cleanup standards. The contaminants of concern in the groundwater include trichlorethene, vinyl chloride, and 1.2-dichloroethene. Plant 10 has been confirmed as a PAOC and the source of contamination is unknown.

TABLE 4.3
PLANT 10 SOIL RESULTS

GENERAL MOTORS ALLISON GAS TURBINE DIVISION
PHASE II SITE ASSESSMENT

Parameter	CLEANUP OBJECTIVES Michigan DNR Type C Cleanup Criteria	PLANT 10 SB 132 * 8'-10'	SB 133 * 3'-5'	SB 134 * 8'-10'	SB 135 * 8'-10'	SB 135 * Duplicate	SB145 ** 13'-15'	SB145 ** duplicate	SB145 ** 23'-30'	SB146 * 13'-15'
Total Petroleum Hydrocarbons (mg/kg)										
Gasoline	NA	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR	NR	NR	NR
Diesel	NA	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	NR	NR	NR	NR
Total Organic Halogen (mg/kg)										
Total Organic Halogen	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR
Volatile Organic Compounds (mg/kg)										
Trichloroethene	150	120	14	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	0.093
Tetrachloroethene	49	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	< 0.005
1,1-Dichloroethane	18,000	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	< 0.005
1,2-Dichloroethane	27	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	< 0.005
1,2-Dichloroethene (total)	1,600	12	< 0.63	< 0.005	< 0.005	< 0.005	1.2	< 0.6	< 0.005	< 0.005
1,1,1-Trichloroethane	4,200	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	< 0.005
Vinyl chloride	1.1	< 6.3	< 1.3	< 0.01	< 0.01	< 0.01	< 0.5	< 0.5	< 0.01	< 0.01
Acetone	15,000	< 6.3	< 1.3	< 0.01	< 0.01	< 0.01	< 2	< 2	< 0.02	< 0.02
Benzene	85	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	< 0.005
Toluene	33,000	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.01	< 0.007	< 0.005
Ethylbenzene	14,000	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	< 0.005
Xylenes (total)	270,000	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 0.1	< 0.1	< 0.005	< 0.005
Methylene chloride	NA	< 3.1	< 0.63	< 0.005	< 0.005	< 0.005	< 1	< 1	0.018	0.012
BTEX (mg/kg)										
Benzene	85	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	14,000	NR	NR	NR	NR	NR	NR	NR	NR	NR
Toluene	33,000	NR	NR	NR	NR	NR	NR	NR	NR	NR
Xylenes	270,000	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals and Cyanide (mg/kg)										
Arsenic	8.6	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	63,000	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	450	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium, hexavalent	4,300	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	400	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	270	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nickel	68,000	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	4,500	NR	NR	NR	NR	NR	NR	NR	NR	NR
Silver	4,200	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cyanide	20,000	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR Not Requested
* Samples collected September 1992
** Samples collected May 1993
*** Only cleanup value for cis-1,2-dichloroethene available

TABLE 4.3 (cont.)
PLANT 10 SOIL RESULTS

GENERAL MOTORS ALLISON GAS TURBINE DIVISION
PHASE II SITE ASSESSMENT

Parameter	CLEANUP OBJECTIVES Michigan DNR Type C Cleanup Criteria	PLANT 10 SB146 ** 23'-25'	SB147 ** 8'-10'	SB147 ** 28'-30'	SB148 ** 8'-10'	SB148 ** 23'-25'	SB149 ** 8'-10'	SB150 ** 3'-5'	SB150 ** 8'-10'
Total Petroleum Hydrocarbons (mg/kg)									
Gasoline	NA	NR	NR	NR	NR	NR	NR	NR	NR
Diesel	NA	NR	NR	NR	NR	NR	NR	NR	NR
Total Organic Halogen (mg/kg)									
Total Organic Halogen	NA	NR	NR	NR	NR	NR	NR	NR	NR
Volatile Organic Compounds (mg/kg)									
Trichloroethene	150	< 0.005	23	< 0.005	14	0.014	0.2	4.2	0.3
Tetrachloroethene	49	0.013	< 0.1	< 0.005	< 0.1	< 0.005	< 0.1	0.7	< 0.1
1,1-Dichloroethane	18,000	< 0.005	< 0.1	< 0.005	< 0.1	< 0.005	< 0.1	< 0.1	< 0.1
1,2-Dichloroethane	27	< 0.005	< 0.1	< 0.005	< 0.1	< 0.005	< 0.1	< 0.1	< 0.1
1,2-Dichloroethene (total)	1,600	< 0.005	1	< 0.005	0.9	0.015	1.4	< 0.1	1.8
1,1,1-Trichloroethane	4,200	< 0.005	< 0.1	< 0.005	< 0.1	< 0.005	< 0.1	< 0.1	< 0.1
Vinyl chloride	1.1	< 0.01	< 0.5	< 0.01	< 0.5	< 0.01	< 0.5	0.5	< 0.5
Acetone	15,000	< 0.02	< 2	< 0.02	< 2	< 0.02	< 2	< 2	< 2
Benzene	85	< 0.005	< 0.1	< 0.005	< 0.1	< 0.005	< 0.1	< 0.1	< 0.1
Toluene	33,000	0.008	< 0.1	< 0.024	< 0.1	0.012	< 0.1	< 0.1	< 0.1
Ethylbenzene	14,000	< 0.005	< 0.1	< 0.005	< 0.1	< 0.005	< 0.1	< 0.1	< 0.1
Xylenes (total)	270,000	< 0.005	< 0.1	< 0.005	< 0.1	< 0.005	< 0.1	< 0.4	< 0.1
Methylene chloride	NA	0.015	< 1	< 0.021	< 1	< 0.01	< 1	< 1	< 1
BTEX (mg/kg)									
Benzene	85	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	14,000	NR	NR	NR	NR	NR	NR	NR	NR
Toluene	33,000	NR	NR	NR	NR	NR	NR	NR	NR
Xylenes	270,000	NR	NR	NR	NR	NR	NR	NR	NR
Metals and Cyanide (mg/kg)									
Arsenic	8.6	NR	NR	NR	NR	NR	NR	NR	NR
Barium	63,000	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	450	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	NA	NR	NR	NR	NR	NR	NR	NR	NR
Chromium, hexavalent	4,300	NR	NR	NR	NR	NR	NR	NR	NR
Lead	400	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	270	NR	NR	NR	NR	NR	NR	NR	NR
Nickel	68,000	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	4,500	NR	NR	NR	NR	NR	NR	NR	NR
Silver	4,200	NR	NR	NR	NR	NR	NR	NR	NR
Cyanide	20,000	NR	NR	NR	NR	NR	NR	NR	NR

NR Not Requested
* Samples collected September 1992
** Samples collected May 1993
*** Only cleanup value for cis-1,2-dichloroethene available

TABLE 4.4
PLANT 10 GROUNDWATER RESULTS

GENERAL MOTORS ALLISON GAS TURBINE DIVISION
PHASE II SITE ASSESSMENT

	CLEANUP OBJECTIVES	Shallow Screen							Deep Screen			
	Michigan DNR Type C Cleanup Criteria	MW 132 *	MW132 ** Resample	MW 133 *	MW133 ** Resample	MW 135 *	MW135 ** Resample	MW135 duplicate	MW145 **	MW146 **	MW147 **	MW148 **
Total Petroleum Hydrocarbons (mg/l)												
Gasoline	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Diesel	NA	< 0.05	NR	< 0.05	NR	< 0.05	NR	NR	NR	NR	NR	NR
Total Organic Halogen (mg/l)												
Total Organic Halogen	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Volatile Organic Compounds (mg/l)												
Trichloroethene	0.022	0.280	1.9	0.047	0.024	< 0.005	< 0.001	< 0.001	0.0098	0.083	0.039	4.9
Tetrachloroethene	0.0068	< 0.050	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
1,1-Dichloroethane	2.5	< 0.05	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
1,2-Dichloroethane	0.0038	< 0.05	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
1,2-Dichloroethene (total)	0.29	1.5	2.4	0.081	0.056	< 0.005	< 0.001	< 0.001	0.44	< 0.001	< 0.14	19
1,1,1-Trichloroethane	0.58	< 0.05	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
Vinyl chloride	0.0002	1.2	< 0.1	< 0.01	0.0053	< 0.01	< 0.005	< 0.005	< 0.02	< 0.005	0.042	0.49
Acetone	2.1	< 0.1	< 0.4	< 0.01	< 0.02	< 0.01	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	< 1.6
Benzene	0.012	< 0.05	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
Toluene	4.6	< 0.05	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
Ethylbenzene	2	< 0.05	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
Xylenes (total)	38	< 0.05	< 0.02	< 0.005	< 0.001	< 0.005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001	< 0.08
Methylene chloride	NA	< 0.05	< 0.2	< 0.005	< 0.01	< 0.005	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.8
BTEX (mg/l)												
Benzene	0.012	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Toluene	4.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Xylenes	38	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals and Cyanide (mg/l)												
Arsenic	0.002	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Barium	7.3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cadmium	0.01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chromium, hexavalent	0.35	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Lead	0.004	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury	0.0063	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nickel	1.6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Selenium	0.1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Silver	0.098	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Cyanide	0.46	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR Not Requested
* Samples collected September 1992.
** Samples collected May 1993
*** Only cleanup value for cis-1,2-dichloroethene available

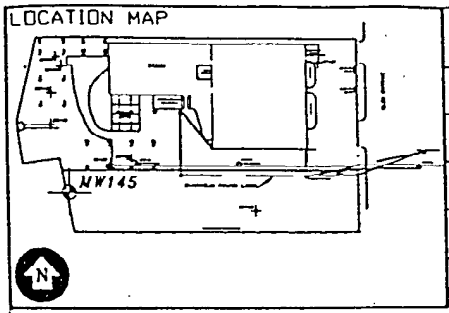
4.3 CONCLUSIONS

The results of this initial Phase II site investigation confirm that a release of concern to the public health and/or the environment has occurred near the Plant 10 PAOCs. Source identification and plume delineation of chlorinated hydrocarbons is required on the west side of the property. This area has been confirmed based upon the Phase II investigation should be fully delineated in Phase III.

App. A

151WL10A

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

PAGE 1 OF 2

WELL NUMBER	SB145 / MW145	LOCATION	GM ALLISON GAS TURBINE PLANT 10
DATE	6/2/93	WEATHER	RAIN 55 °F
LOGGED BY	D.A. GROUTAGE	DRILLED BY	EARTH EXPLORATION
DRILLING METHOD	4.25' I.D. HOLLOW-STEM AUGERS	SAMPLING METHOD	STAINLESS STEEL SPLIT-SPOON
GRAVEL PACK	COARSE GRAINED SILICA SAND	SEAL	BENTONITE CHIPS

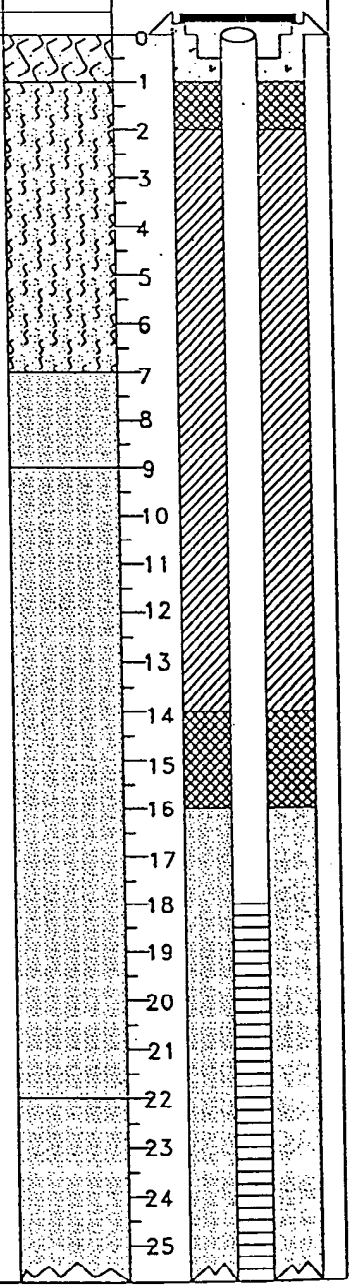
CASING TYPE SCHEDULE 5, 316 STAINLESS STEEL DIAMETER 2-INCH LENGTH 17.5 FEET HOLE DIA. 8-INCH

SCREEN TYPE 316 STAINLESS STEELSLOT 0.010-INCH DIAMETER 2-INCH LENGTH 10 FEET TOTAL DEPTH 28.0 FEET

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING, MOISTURE, PLASTICITY)
		0–1			0-1.0' SANDY SILT, brown topsoil. 1.0'-7.0' SILTY SAND, poorly sorted, with 20% small gravel, brown dry to damp.
		3		4, 2	
	0.5	4		10, 6	4.2'-4.3' Reddish brown stained interval. Damp to moist.
		7–8		20, 36	7.0'-9.0' SAND poorly sorted with silt and clay < 10% small gravel.
	6.3	9–10	20%	31, 41	9.0'-22.0' SAND, poorly sorted, small gravel a few large cobbles, gray, wet.
		13	GROUND-WATER	9, 12	
S01	11.8	14	70%	11, 14	
		18–19		13, 22	
	13.6	19–20	50%	10, 23	
		22–23		35	22.0'-26.5' SAND, medium grained moderately sorted, gray, saturated.
	12.3	24	60%	44, 73, 58	

LITHO. PROFILE

WELL COMPLETION

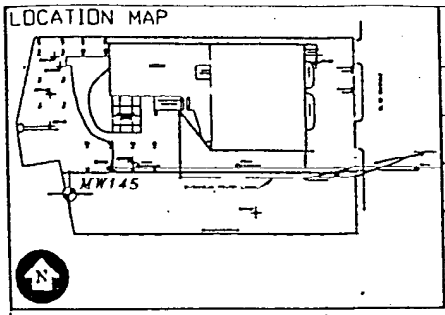


JOB#	DATE:	DRAWN BY:
CH151.02	7-8-93	MJK
UPDATE # 3/MJK		

SANDY SILT · SAND · BENTONITE CHIPS · SILTY SAND · CONCRETE · BENTONITE GROUT

151WL10B

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

WELL NUMBER	SB145 / MW145	LOCATION	GM ALLISON GAS TURBINE PLANT 10
DATE	6/2/93	WEATHER	RAIN 55 °F
LOGGED BY	D.A. GROUTAGE	DRILLED BY	EARTH EXPLORATION
DRILLING METHOD	4.25' I.D. HOLLOW-STEM AUGERS	SAMPLING METHOD	STAINLESS STEEL SPLIT-SPOON
GRAVEL PACK	COARSE GRAINED SILICA SAND	SEAL	BENTONITE CHIPS

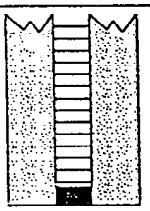
CASING TYPE SCHEDULE 5, 316 STAINLESS STEEL DIAMETER 2-INCH LENGTH 17.5 FEET HOLE DIA. 8-INCH

SCREEN TYPE 316 STAINLESS STEELSLOT 0.010-INCH DIAMETER 2-INCH LENGTH 10 FEET TOTAL DEPTH 28.0 FEET

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING, MOISTURE, PLASTICITY)
		25			
		26			26.5'-30' CLAYEY SILT with coarse grained sand and small gravel 10% damp, gray.
		27			
		28			TD = 28'
		29		9	
S02	0.7		100%	16	
				21	
		30		15	
		31			
		32			
		33			
		34			
		35			
		36			
		37			
		38			
		39			
		40			
		41			
		42			
		43			
		44			WELL CONSTRUCTION:
		45			SCREENED: 17.5' to 27.5'
		46			SAND: 16' to 28'
		47			BENTONITE CHIPS: 14' to 16'
		48			BENTONITE GROUT: 2' to 14'
		49			BENTONITE CHIPS: 1' to 2'
		50			FINISHED WITH FLUSH MOUNT PROTECTIVE WELL BOX IN CONCRETE.

LITHO. PROFILE

WELL COMPLETION



JOB# CH151.02 DATE: 6-29-93 DRAWN BY: MJK

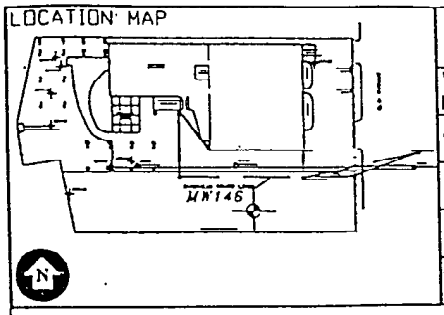
UPDATE # 1/MJK

SAND

CLAYEY SILT

151WL11

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

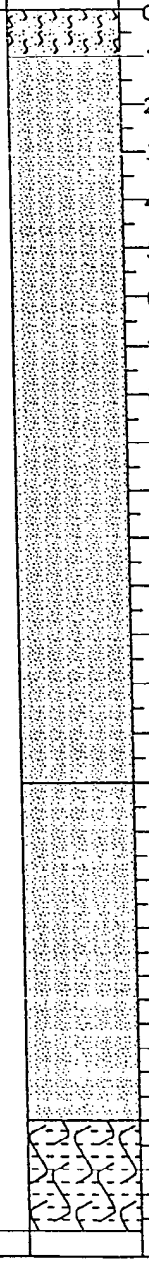
WELL NUMBER	SB146 / MW146	LOCATION	GM ALLISON GAS TURBINE PLANT 10
DATE	6/2,3/93	WEATHER	CLOUDY, RAIN 55-60 °F
LOGGED BY	D.A. GROUTAGE	DRILLED BY	EARTH EXPLORATION
DRILLING METHOD	4.25' I.D. HOLLOW-STEM AUGERS	SAMPLING METHOD	STAINLESS STEEL SPLIT-SPOON
GRAVEL PACK	COARSE GRAINED SILICA SAND	SEAL	BENTONITE CHIPS

CASING TYPE SCHEDULE 5, 316 STAINLESS STEEL DIAMETER 2-INCH LENGTH 15.0 FEET HOLE DIA. 8-INCH

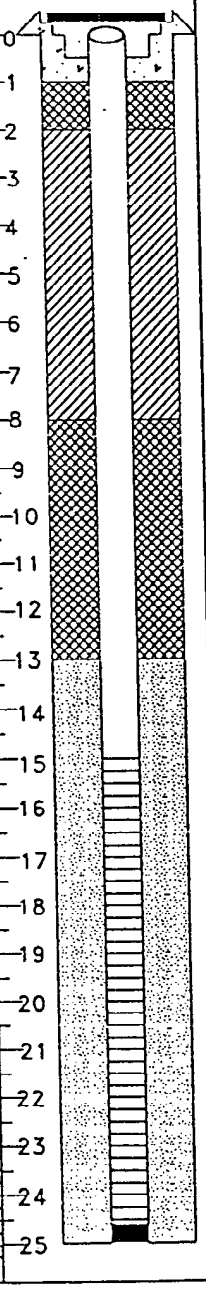
SCREEN TYPE 316 STAINLESS STEELSLOT 0.010-INCH DIAMETER 2-INCH LENGTH 10.0 FEET TOTAL DEPTH 25.3 FEET

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING, MOISTURE, PLASTICITY)
		0–1			0-1.0' SILTY SAND, moderately sorted, brown. 1.0'-16.0' SAND, medium grained, moderately sorted with small gravel < 10%, light brown to yellow, damp to dry.
	3.3	3–4	80%	3, 4, 6, 7	
		8–9	0%	8, 10, 14, 12	
		13	GROUND-WATER		WELL CONSTRUCTION: SCREENED: 15' to 25'; SAND: 13' to 25.3'; BENTONITE CHIPS: 8' to 13'; BENTONITE GROUT: 2' to 8'; BENTONITE CHIPS: 1' to 2'; FINISHED WITH FLUSH MOUNT PROTECTIVE WELL BOX IN CONCRETE.
S01	3.5	14	100%	5, 9, 13, 18	
		16–23			16.0'-23.0' SAND, poorly sorted with gravel, due to sand coming into augers sample not collected at 18-20 feet depth. Attempted to seat augers in clay prior to sampling.
S02	0.0	24–25	80%	10, 20, 33, 31	23.0'-24.5' CLAYEY SILT, sand and gravel laminae 1-2' thick interspersed, gray, becomes damp to dry with depth. TD = 25.3'

LITHO. PROFILE



WELL COMPLETION



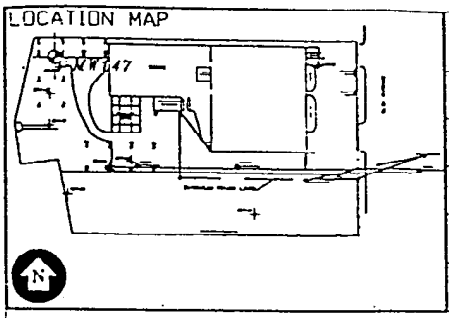
JOB# CH151.02 DATE: 6-29-93 DRAWN BY: MJK

UPDATE # 1/MJK

SILTY SAND | CLAYEY SAND | BENTONITE CHIPS | SAND | CONCRETE | BENTONITE GROUT

151WL12A

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

PAGE 1 OF 2

WELL NUMBER	SB147 / MW147	LOCATION	GM ALLISON GAS TURBINE PLANT 10
DATE	6/3/93	WEATHER	CLOUDY 55 °F
LOGGED BY	D.A. GROUTAGE	DRILLED BY	EARTH EXPLORATION
DRILLING METHOD	4.25' I.D. HOLLOW-STEM AUGERS	SAMPLING METHOD	STAINLESS STEEL SPLIT-SPOON
GRAVEL PACK	COARSE GRAINED SILICA SAND	SEAL	BENTONITE CHIPS

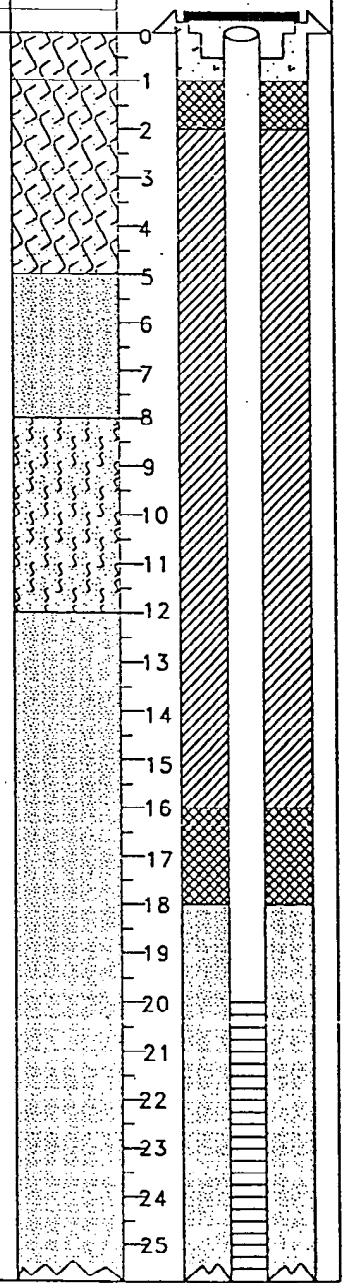
CASING TYPE SCHEDULE 5, 316 STAINLESS STEEL DIAMETER 2-INCH LENGTH 20.0 FEET HOLE DIA. 8-INCH

SCREEN TYPE 316 STAINLESS STEELSLOT 0.010-INCH DIAMETER 2-INCH LENGTH 10 FEET TOTAL DEPTH 30.5 FEET

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING, MOISTURE, PLASTICITY)
		0–1			0-1.0' SILTY, dark brown organic topsoil. 1.0'-4.9' SANDY SILT, brown with small gravel, damp to moist.
		3		1, 2	
	54.4	4	30%	2, 2	4.9'-8.1' SAND, poorly sorted, damp.
		8		1, 2	8.1'-12.0' Wet SILTY SAND, with small gravel saturated at 9.0'
S01	580	9	GROUND-WATER 100%	2, 3	
		12			12.0'-29.2' SAND, poorly sorted with small gravel.
		13		7, 12	
	4.8	14	100%	13, 15	
		18		3, 8	
	6.7	19	100%	14, 18	
		23		9, 17	
	1.3	24	60%	22, 26	

LITHO. PROFILE

WELL COMPLETION

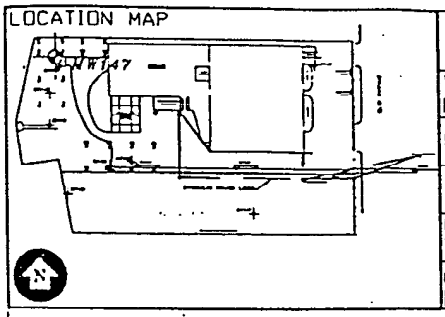


JOB#	DATE:	DRAWN BY:
CH151.02	6-29-93	MJK
UPDATE # 1/MJK		

SILT, SAND, CONCRETE, BENTONITE CHIPS, SANDY SILT, SILTY SAND, BENTONITE GROUT

151WL12B

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

WELL NUMBER	SB147 / MW147	LOCATION	GM ALLISON GAS TURBINE PLANT 10
DATE	6/3/93	WEATHER	CLOUDY 55 °F
LOGGED BY	D.A. GROUTAGE	DRILLED BY	EARTH EXPLORATION
DRILLING METHOD	4.25' I.D. HOLLOW-STEM AUGERS	SAMPLING METHOD	STAINLESS STEEL SPLIT-SPOON
GRAVEL PACK	COARSE GRAINED SILICA SAND	SEAL	BENTONITE CHIPS

CASING TYPE SCHEDULE 5, 316 STAINLESS STEEL DIAMETER 2-INCH LENGTH 20.0 FEET HOLE DIA. 8-INCH

SCREEN TYPE 316 STAINLESS STEELSLOT 0.010-INCH DIAMETER 2-INCH LENGTH 10 FEET TOTAL DEPTH 30.5 FEET

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING, MOISTURE, PLASTICITY)
		25			12.0'-29.2' SAND, poorly sorted with small gravel.
		26			
		27			
		28		10	
		29		17	
S02	0.9		100%	17	29.2'-30.5' SILT with sand and small gravel, hard, gray, damp. TD = 30.5'
		30		30	
		31			
		32			
		33			
		34			
		35			
		36			
		37			
		38			
		39			
		40			
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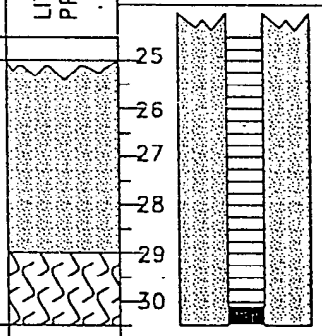
		50			

LITHO. PROFILE

WELL COMPLETION



WELL CONSTRUCTION:
- SCREENED: 20' to 30'
- SAND: 18' to 30.5'
- BENTONITE CHIPS: 16' to 18'
- BENTONITE GROUT: 2' to 16'
- BENTONITE CHIPS: 1' to 2'
- FINISHED WITH FLUSH MOUNT PROTECTIVE WELL BOX IN CONCRETE.

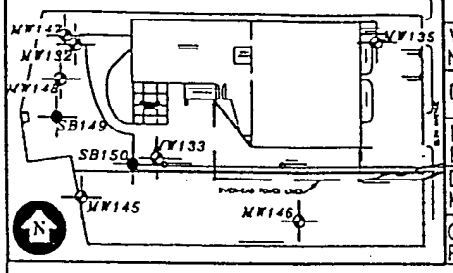
JOB#	DATE:	DRAWN BY:
CH151.02	6-29-93	MJK
UPDATE # 1/MJK		

SAND

SILT

151WL13

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

WELL NUMBER	SB148/MW148	LOCATION	GM-AGT, PLANT 10
DATE	6-3-93	WEATHER	CLOUDY, 65 °F
LOGGED BY	D. GROUTAGE	DRILLED BY	EARTH EXPLORATION, INC.
DRILLING METHOD	4.25"ID HOLLOW-STEM AUGER	SAMPLING METHOD	SPLIT-SPOON
GRAVEL PACK	SILICA SAND	SEAL	BENTONITE CHIPS

CASING TYPE	SCH 5, 316 S.S.		DIAMETER	2"	LENGTH	15'	HOLE DIA. 8"
SCREEN TYPE	SCH 5, 316 S.S.	SLOT 0.010"	DIAMETER	2"	LENGTH	10'	TOTAL DEPTH 25.5'

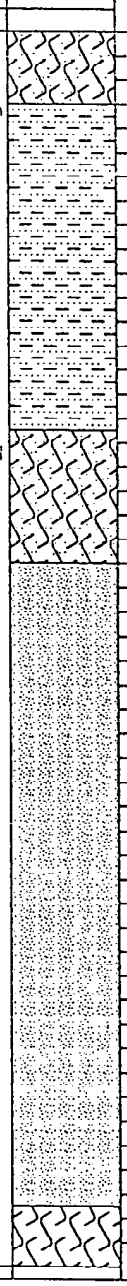
SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING, MOISTURE, PLASTICITY)
		0			0-1.5' SANDY SILT; topsoil brown to dark brown; moist.
		1			1.5'-8.3' SANDY CLAY; brown to orange brown with some silt, moderately plastic, moist.
		2			
		3		3	
	0.0	4	80%	2	
				2	
		5		4	
		6			
		7			
		8		2	8.3'-11' SANDY SILT with clay; becoming more sandy with depth. Gray, wet. Becoming saturated at approx. 9.5'.
S01	334	9	100%	2	
				4	
		10		3	
		11			11'-24.2' SAND. Poorly sorted with gravel, some sand, fine to medium grained laminae 2-3" thick at various intervals; gray.
		12			
		13		8	
	525	14	50%	12	
				13	
		15		14	
		16			
		17			
		18		7	
		19		11	
	193		60%	24	
		20		21	
		21			
		22			
		23		8	
	5.2	24	80%	14	
				16	24.2'-25.5' SILT with small gravel; gray, damp to dry; hard.
		25		17	TD = 25.5'

WELL CONSTRUCTION:

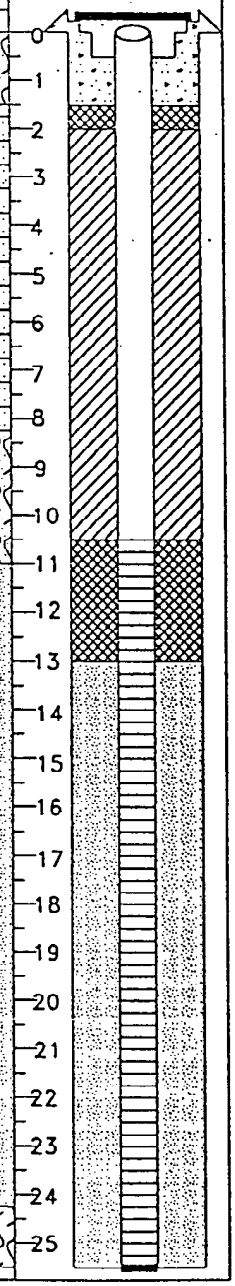
SCREENED:	25.5'-10.5'
SAND PACK:	25.5'-13'
BENTONITE CHIPS:	13'-10.5'
BENTONITE SLURRY:	10.5'-2'
BENTONITE CHIPS:	2'-1'

Finished with flush mount protective well box in CONCRETE.

LITHO. PROFILE



WELL COMPLETION

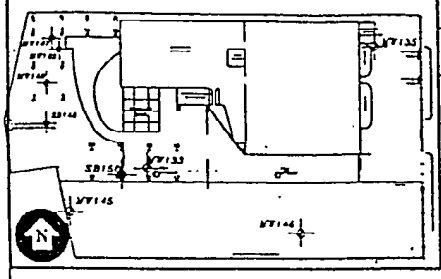


JOB #	DATE:	DRAWN BY:
CH151	6-14-93	CK
UPDATE # 0		

CONCRETE | SAND | BENTONITE CHIPS | BENTONITE SLURRY | SANDY SILT | SANDY CLAY | SILT

151WL14

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

PAGE 1 OF 1

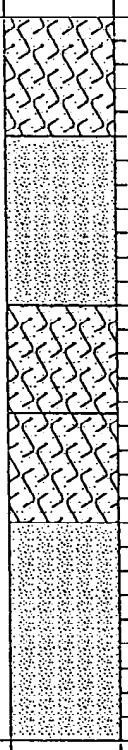
WELL NUMBER	SB149	LOCATION	GM-AGT, PLANT 10
DATE	6-4-93	WEATHER	RAIN, T-STORMS, 60 °F
LOGGED BY	D. GROUTAGE	DRILLED BY	EARTH EXPLORATION, INC.
DRILLING METHOD	3.25"ID HOLLOW-STEM AUGER	SAMPLING METHOD	SPLIT-SPOON
GRAVEL PACK	NA	SEAL	BENTONITE CHIPS

CASING TYPE NA DIAMETER LENGTH HOLE DIA. 6"

SCREEN TYPE NA SLOT DIAMETER LENGTH TOTAL DEPTH 15'

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING; MOISTURE, PLASTICITY)
		0–2			0-2.5' SANDY SILT; topsoil brown.
		2–3			2.5'-6' SAND; poorly sorted, damp, brown.
	4.0	3–5	60%	3, 5, 7, 8	
		6–8			6'-8.2' SANDY SILT; brown to light brown; wet.
SD1	48.4	8–10	80% (GROUNDWATER)	9, 7, 6, 3	8.2'-10.5' SANDY SILT; gray, wet.
		10–15			10.5'-15' SAND; poorly sorted with gravel, multiple 2-4" sand laminae, medium to fine grained.
	24.5	13–15	90%	9, 14, 15, 16	TD = 15'
		15–25			Boring sealed with bentonite chips.

LITHO. PROFILE



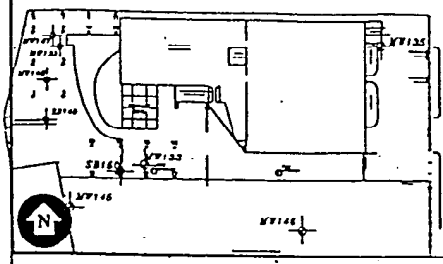
WELL COMPLETION

JOB# CH151	DATE: 6-29-93	DRAWN BY: CK	SANDY SILT / SAND
UPDATE # 1.ck			

CSWELLOG1

151WL15

LOCATION MAP



ENGINEERING-SCIENCE, INC. WELL LOG

PAGE 1 OF 1

WELL NUMBER	SB150	LOCATION	GM-AGT, PLANT 10
DATE	6-4-93	WEATHER	CLOUDY, 70 °F
LOGGED BY	D. GROUTAGE	DRILLED BY	EARTH EXPLORATION, INC.
DRILLING METHOD	3.25"ID HOLLOW-STEM AUGER	SAMPLING METHOD	SPLIT-SPOON
GRAVEL PACK	NA	SEAL	BENTONITE CHIPS

CASING TYPE NA DIAMETER LENGTH HOLE DIA. 6"

SCREEN TYPE NA SLOT DIAMETER LENGTH TOTAL DEPTH 15'

SAMPLE NO.	ORGANIC VAPORS (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS (COLOR, SOIL, TYPE, SORTING, MOISTURE, PLASTICITY)
		0			0-2.5' CLAYEY SILT with sand and gravel; moist.
		1			
		2			2.5'-4.8' SANDY SILT; brown, damp.
		3		3	
S01	684	4	30%	4	
				10	4.8'-7' SANDY SILT; gray, damp to wet.
		5		13	
		6			
		7			7'-7.5' SAND; poorly sorted, gray and wet.
		8			7.5'-15' SAND; poorly sorted, gray, saturated.
				8	
S02	38.4	9	80%	8	
			GROUND-WATER	11	
		10		11	
		11			
		12			
		13		4	
	24.6	14	80%	9	
				15	
		15		16	TD = 15'
		16			Boring sealed with bentonite chips.
		17			
		18			
		19			
		20			
		21			
		22			
		23			
		24			
		25			

LITHO. PROFILE

WELL COMPLETION

JOB# CH151 DATE: 6-29-93 DRAWN BY: CK

UPDATE # 1.ck

SANDY SILT SAND CLAYEY SILT

ESVELOG1

App. B

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

NET Job Number: 93.01581

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: CH151; GM INDY

Sample Number	Sample Description	Date Taken	Date Received
69676	CH151 - TB002 - 5/27/93	05/27/1993	05/28/1993
69677	CH151 - RB002 - 5/27/93	05/27/1993	05/28/1993
69678	CH151 - MW235 - 5/27/93	05/27/1993	05/28/1993
69679	CH151 - MW135 - 5/27/93	05/27/1993	05/28/1993
69680	CH151 - MW133 - 5/27/93	05/27/1993	05/28/1993
69681	CH151 - MW132 - 5/27/93	05/27/1993	05/28/1993
69682	CH151 - MW136 - 5/27/93	05/27/1993	05/28/1993
69683	CH151 - MW137 - 5/27/93	05/27/1993	05/28/1993
~~69684~~	~~CH151 - SB141 - 18.5-20~~	~~05/27/1993~~	~~05/28/1993~~

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

Approved By:

Steve Johnson
Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69676
Job No.: 93.01581
P.O. NO.:

Page 1

Sample Description: CH151 - TB002 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/L	rla / 06/02/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
Chloroform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

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Indianapolis Division
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ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69676
Job No.: 93.01581
P.O. NO.:

Page 2

Sample Description: CH151 - TB002 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrahydrofuran	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 06/02/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/02/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	102.	76-114	rla / 06/02/1993	S - 8240	1
Toluene-d8	97.	88-110	rla / 06/02/1993	S - 8240	1
4-Bromofluorobenzene	97.	86-115	rla / 06/02/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69677
Job No.: 93.01581
P.O. NO.:

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Sample Description: CH151 - RB002 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/L	rla / 06/02/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
Chloroform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69677
Job No.: 93.01581
P.O. NO.:

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Sample Description: CH151 - RB002 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrahydrofuran	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 06/02/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/02/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	100.	76-114	rla / 06/02/1993	S - 8240	1
Toluene-d8	95.	88-110	rla / 06/02/1993	S - 8240	1
4-Bromofluorobenzene	98.	86-115	rla / 06/02/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69678
Job No.: 93.01581
P.O. NO.:

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Sample Description: CH151 - MW235 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/L	rla / 06/02/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
Chloroform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69678
Job No.: 93.01581
P.O. NO.:

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Sample Description: CH151 - MW235 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrahydrofuran	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 06/02/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/02/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	104.	76-114	rla / 06/02/1993	S - 8240	1
Toluene-d8	97.	88-110	rla / 06/02/1993	S - 8240	1
4-Bromofluorobenzene	99.	86-115	rla / 06/02/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69679
Job No.: 93.01581
P.O. NO.:

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Sample Description: CH151 - MW135 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/L	rla / 06/02/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
Chloroform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69679
Job No.: 93.01581
P.O. NO.:

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Sample Description: CH151 - MW135 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrahydrofuran	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 06/02/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/02/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	104.	76-114	rla / 06/02/1993	S - 8240	1
Toluene-d8	99.	88-110	rla / 06/02/1993	S - 8240	1
4-Bromofluorobenzene	99.	86-115	rla / 06/02/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69680
Job No.: 93.01581
P.O. NO.:

Page 9

Sample Description: CH151 - MW133 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/L	rla / 06/02/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 06/02/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<5.0	ug/L	rla / 06/02/1993	S - 8240	<5.0
Chloroform	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	1.4	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	56.	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69680
Job No.: 93.01581
P.O. NO.:

Page 10

Sample Description: CH151 - MW133 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Tetrahydrofuran	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichloroethene	24.	ug/L	rla / 06/02/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 06/02/1993	S - 8240	<10.
Vinyl chloride	5.3	ug/L	rla / 06/02/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 06/02/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/02/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	107.	76-114	rla / 06/02/1993	S - 8240	1
Toluene-d8	96.	88-110	rla / 06/02/1993	S - 8240	1
4-Bromofluorobenzene	99.	86-115	rla / 06/02/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69681
Job No.: 93.01581
P.O. NO.:

Page 11

Sample Description: CH151 - MW132 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<400.	ug/L	rla / 06/04/1993	S - 8240	<20.
Acrolein	<1,000.	ug/L	rla / 06/04/1993	S - 8240	<50.
Acrylonitrile	<1,000.	ug/L	rla / 06/04/1993	S - 8240	<50.
Benzene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Bromodichloromethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Bromoform	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Bromomethane	<100.	ug/L	rla / 06/04/1993	S - 8240	<5.0
2-Butanone (MEK)	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Carbon disulfide	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Carbon tetrachloride	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Chlorobenzene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Chloroethane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<100.	ug/L	rla / 06/04/1993	S - 8240	<5.0
Chloroform	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Chloromethane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Dibromomethane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Dibromochloromethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Dichlorodifluoromethane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
1,1-Dichloroethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,2-Dichloroethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,1-Dichloroethene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	2400.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,2-Dichloropropane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Ethyl Acetate	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Ethylbenzene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Ethyl methacrylate	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/10/1993

Sample No.: 69681
Job No.: 93.01581
P.O. NO.:

Page 12

Sample Description: CH151 - MW132 - 5/27/93
Job Description: CH151; GM INDY

Date Taken: 05/27/1993 Date Received: 05/28/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Iodomethane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Methylene chloride	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Paraldehyde	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Styrene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Tetrachloroethene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Tetrahydrofuran	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Toluene	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
1,2,3-Trichloropropane	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
1,1,1-Trichloroethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Trichloroethene	1900.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Trichlorofluoromethane	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
Vinyl acetate	<200.	ug/L	rla / 06/04/1993	S - 8240	<10.
Vinyl chloride	<100.	ug/L	rla / 06/04/1993	S - 8240	<5.
Xylenes	<20.	ug/L	rla / 06/04/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/04/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	105.	76-114	rla / 06/04/1993	S - 8240	1
Toluene-d8	99.	88-110	rla / 06/04/1993	S - 8240	1
4-Bromofluorobenzene	101.	86-115	rla / 06/04/1993	S - 8240	1

ENGINEERING SCIENCE, INC.

1000 Jorie Boulevard - Suite 250, Oak Brook, Illinois 60521
(708) 990-7200 • Fax (708) 990-7218

Nº A _ _ _ _

Chain-of-Custody Record

PROJECT NUMBER	PROJECT NAME / LOCATION
CH151	GM INDY

SAMPLER(S) NAME (Please Print): MICHAEL KUZEL
(Signature)
LINDA BERAN
(Signature)

Project Manager: RONDA YODER

Site Code:

PRESERVATIVES: HCL, N/A

ANALYSES REQUESTED: VOC 8240, TKN's

Site Number	Date MM/DD/YY	Military Time	Comp.	Grab	Sample Identification	Matrix	Container	VOC 8240	TKN's	REMARKS
TB002	5-27-92	—		X	CH151-TB002-5-27-92	H2O	3-40 ml	X		
RB002	5-27-92	6:50		X	CH151-RB002-5-27-92		3-40 ml.	X		
MW235	5-27-92	9:30		X	CH151-MW235-5-27-92			X		
MW135	5-27-92	9:45		X	CH151-MW135-5-27-92			X		
MW133	5-27-92	10:20		X	CH151-MW133-5-27-92			X		
MW132	5-27-92	11:20		X	CH151-MW132-5-27-92			X		
MW136	5-27-92	14:30		X	CH151-MW136-5-27-92			X		
MW137	5-27-92	16:30		X	CH151-MW137-5-27-92			X		
SB141	5-27-92	13:50		X	CH151-SB141-12.5-26.5	Soil	2-40ml		X	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
	5-27-92 7:30		
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
		Linda Jacobs	5/28/93 8:45

AIRBILL#: NOT USED
COOLER#: 1
LABORATORY: NET INDY
ATTN. DENT
PLEASE SEND REPORT TO: R. YODER
T.A.T. EXPECTED NORMAL

DISTRIBUTION: Pink Sampling Coordinator • White and Yellow Accompanies Shipment • White Returned with Report

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

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ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

NET Job Number: 93.01621

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: CH151 - GMC ALLISON GAS TURBINE

Sample Number	Sample Description	Date Taken	Date Received
~~69797~~	~~CH151 - HA005~~	~~06/02/1993~~	~~06/03/1993~~
~~69798~~	~~CH151 - HA006~~	~~06/02/1993~~	~~06/03/1993~~
~~69799~~	~~CH151 - HA003~~	~~06/02/1993~~	~~06/03/1993~~
~~69800~~	~~CH151 - HA004~~	~~06/02/1993~~	~~06/03/1993~~
~~69801~~	~~CH151 - HA008~~	~~06/02/1993~~	~~06/03/1993~~
~~69802~~	~~CH151 - HA007~~	~~06/02/1993~~	~~06/03/1993~~
69803	CH151 - SB145 - 13-15	06/02/1993	06/03/1993
69804	CH151 - SB195 - 13-15 — 145 Dup	06/02/1993	06/03/1993
69805	CH151 - SB145 - 23-30	06/02/1993	06/03/1993
69806	CH151 - SB146 - 13-15	06/02/1993	06/03/1993
69807	CH151 - SB146 - 23-25	06/02/1993	06/03/1993

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

Approved By:

JD Shafer

Joseph D. Shafer
Division Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69803
Job No.: 93.01621
P.O. NO.:

Page 7

Sample Description: CH151 - SB145 - 13-15
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
Acetone	<2.	mg/kg	rla / 06/04/1993	S-8240	<2.
Acrolein	<5.	mg/kg	rla / 06/04/1993	S-8240	<5.
Acrylonitrile	<5.	mg/kg	rla / 06/04/1993	S-8240	<5.
Benzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Bromodichloromethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Bromoform	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Bromomethane	<0.5	mg/kg	rla / 06/04/1993	S-8240	<0.5
2-Butanone (MEK)	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Carbon disulfide	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Carbon tetrachloride	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Chlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Chloroethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
2-Chloroethyl vinyl ether	<0.5	mg/kg	rla / 06/04/1993	S-8240	<0.5
Chloroform	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dibromoethane (EDB)	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Chloromethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Dibromomethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Dibromochloromethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dibromo-3-chloropropane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Dichlorodifluoromethane	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
1,2-Dichlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,3-Dichlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,4-Dichlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1-Dichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1-Dichloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
trans-1,2-Dichloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
cis-1,2-Dichloroethene	1.2	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dichloropropane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
cis-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
trans-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Ethyl Acetate	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Ethylbenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Ethyl methacrylate	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69803
Job No.: 93.01621
P.O. NO.:

Page 8

Sample Description: CH151 - SB145 - 13-15
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
2-Hexanone	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Iodomethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Methylene chloride	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Paraldehyde	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
4-Methyl-2-pentanone (MIBK)	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Styrene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1,2,2-Tetrachloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Tetrachloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Tetrahydrofuran	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Toluene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1,2-Trichlorotrifluoroethan	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
1,2,3-Trichloropropane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
1,1,1-Trichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1,2-Trichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Trichloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Trichlorofluoromethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Vinyl acetate	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Vinyl chloride	<0.5	mg/kg	rla / 06/04/1993	S-8240	<0.5
Xylenes (Total)	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/04/1993	S-8240	% RECOVERY
1,2-Dichloroethane-d4	94.	70-121	rla / 06/04/1993	S-8240	1
Toluene-d8	95.	81-117	rla / 06/04/1993	S-8240	1
4-Bromofluorobenzene	96.	74-121	rla / 06/04/1993	S-8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69804
Job No.: 93.01621
P.O. NO.:

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Sample Description: CH151 - SB195 - 13-15
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
Acetone	<2.	mg/kg	rla / 06/04/1993	S-8240	<2.
Acrolein	<5.	mg/kg	rla / 06/04/1993	S-8240	<5.
Acrylonitrile	<5.	mg/kg	rla / 06/04/1993	S-8240	<5.
Benzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Bromodichloromethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Bromoform	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Bromomethane	<0.5	mg/kg	rla / 06/04/1993	S-8240	<0.5
2-Butanone (MEK)	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Carbon disulfide	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Carbon tetrachloride	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Chlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Chloroethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
2-Chloroethyl vinyl ether	<0.5	mg/kg	rla / 06/04/1993	S-8240	<0.5
Chloroform	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dibromoethane (EDB)	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Chloromethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Dibromomethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Dibromochloromethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dibromo-3-chloropropane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Dichlorodifluoromethane	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
1,2-Dichlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,3-Dichlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,4-Dichlorobenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1-Dichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1-Dichloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
trans-1,2-Dichloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
cis-1,2-Dichloroethene	0.6	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,2-Dichloropropane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
cis-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
trans-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Ethyl Acetate	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Ethylbenzene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Ethyl methacrylate	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69804
Job No.: 93.01621
P.O. NO.:

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Sample Description: CH151 - SB195 - 13-15
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
2-Hexanone	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Iodomethane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Methylene chloride	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Paraldehyde	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
4-Methyl-2-pentanone (MIBK)	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Styrene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1,2,2-Tetrachloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Tetrachloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Tetrahydrofuran	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
Toluene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1,2-Trichlorotrifluoroethan	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
1,2,3-Trichloropropane	<1.0	mg/kg	rla / 06/04/1993	S-8240	<1.0
1,1,1-Trichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
1,1,2-Trichloroethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Trichloroethene	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Trichlorofluoromethane	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
Vinyl acetate	<1.	mg/kg	rla / 06/04/1993	S-8240	<1.
Vinyl chloride	<0.5	mg/kg	rla / 06/04/1993	S-8240	<0.5
Xylenes (Total)	<0.1	mg/kg	rla / 06/04/1993	S-8240	<0.1
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/04/1993	S-8240	% RECOVERY
1,2-Dichloroethane-d4	94.	70-121	rla / 06/04/1993	S-8240	1
Toluene-d8	98.	81-117	rla / 06/04/1993	S-8240	1
4-Bromofluorobenzene	97.	74-121	rla / 06/04/1993	S-8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69805
Job No.: 93.01621
P.O. NO.:

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Sample Description: CH151 - SB145 - 23-30
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/kg	rla / 06/10/1993	S - 8240	<20.
Acrolein	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Acrylonitrile	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Benzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromodichloromethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromoform	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
2-Butanone (MEK)	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Carbon disulfide	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Carbon tetrachloride	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chloroethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Chloroform	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chloromethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Dibromomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Dibromochloromethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dibromo-3-chloropropane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<5.	ug/kg	rla / 06/10/1993	S - 8240	<5.
1,2-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,3-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,4-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Dichlorodifluoromethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
1,1-Dichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
trans-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
cis-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dichloropropane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
cis-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
trans-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Ethyl acetate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Ethylbenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Ethyl methacrylate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69805
Job No.: 93.01621
P.O. NO.:

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Sample Description: CH151 - SB145 - 23-30
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Iodomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Methylene chloride	18.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Paraldehyde	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Styrene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,2,2-Tetrachloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Tetrachloroethene	<5.	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Tetrahydrofuran	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Toluene	6.8	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,1-Trichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,2-Trichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2,3-Trichloropropane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Trichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Trichlorofluoromethane	<5.	ug/kg	rla / 06/10/1993	S - 8240	<5.
1,1,2-Trichlorotrifluoroethan	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Vinyl acetate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Vinyl chloride	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Xylenes (Total)	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/10/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	96.	70-121	rla / 06/10/1993	S - 8240	1
Toluene-d8	107.	81-117	rla / 06/10/1993	S - 8240	1
4-Bromofluorobenzene	80.	74-121	rla / 06/10/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69806
Job No.: 93.01621
P.O. NO.:

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Sample Description: CH151 - SB146 - 13-15
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/kg	rla / 06/10/1993	S - 8240	<20.
Acrolein	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Acrylonitrile	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Benzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromodichloromethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromoform	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
2-Butanone (MEK)	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Carbon disulfide	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Carbon tetrachloride	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chloroethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Chloroform	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chloromethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Dibromomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Dibromochloromethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dibromo-3-chloropropane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<5.	ug/kg	rla / 06/10/1993	S - 8240	<5.
1,2-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,3-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,4-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Dichlorodifluoromethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
1,1-Dichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
trans-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
cis-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dichloropropane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
cis-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
trans-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Ethyl acetate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Ethylbenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Ethyl methacrylate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69806
Job No.: 93.01621
P.O. NO.:

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Sample Description: CH151 - SB146 - 13-15
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Iodomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Methylene chloride	12.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Paraldehyde	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Styrene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,2,2-Tetrachloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Tetrachloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Tetrahydrofuran	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Toluene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,1-Trichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,2-Trichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2,3-Trichloropropane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Trichloroethene	93.	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Trichlorofluoromethane	<5.	ug/kg	rla / 06/10/1993	S - 8240	<5.
1,1,2-Trichlorotrifluoroethan	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Vinyl acetate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Vinyl chloride	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Xylenes (Total)	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/10/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	99.	70-121	rla / 06/10/1993	S - 8240	1
Toluene-d8	110.	81-117	rla / 06/10/1993	S - 8240	1
4-Bromofluorobenzene	75.	74-121	rla / 06/10/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69807
Job No.: 93.01621
P.O. NO.:

Page 15

Sample Description: CH151 - SB146 - 23-25
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/kg	rla / 06/10/1993	S - 8240	<20.
Acrolein	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Acrylonitrile	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Benzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromodichloromethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromoform	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Bromomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
2-Butanone (MEK)	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Carbon disulfide	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Carbon tetrachloride	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chloroethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Chloroform	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Chloromethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Dibromomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Dibromochloromethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dibromo-3-chloropropane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<5.	ug/kg	rla / 06/10/1993	S - 8240	<5.
1,2-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,3-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,4-Dichlorobenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Dichlorodifluoromethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
1,1-Dichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
trans-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
cis-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2-Dichloropropane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
cis-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
trans-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Ethyl acetate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Ethylbenzene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Ethyl methacrylate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69807
Job No.: 93.01621
P.O. NO.:

Page 16

Sample Description: CH151 - SB146 - 23-25
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/02/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Iodomethane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Methylene chloride	15.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Paraldehyde	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Styrene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,2,2-Tetrachloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Tetrachloroethene	13.	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Tetrahydrofuran	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Toluene	7.5	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,1-Trichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,1,2-Trichloroethane	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
1,2,3-Trichloropropane	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Trichloroethene	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
Trichlorofluoromethane	<5.	ug/kg	rla / 06/10/1993	S - 8240	<5.
1,1,2-Trichlorotrifluoroethan	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Vinyl acetate	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Vinyl chloride	<10.	ug/kg	rla / 06/10/1993	S - 8240	<10.
Xylenes (Total)	<5.0	ug/kg	rla / 06/10/1993	S - 8240	<5.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/10/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	103.	70-121	rla / 06/10/1993	S - 8240	1
Toluene-d8	106.	81-117	rla / 06/10/1993	S - 8240	1
4-Bromofluorobenzene	81.	74-121	rla / 06/10/1993	S - 8240	1

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NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

KEY TO FLAG ABBREVIATIONS

FLAG	DESCRIPTION
<	Less Than
a	Quantitated as Diesel Fuel
b	Analyte Found in Blank
d	Sample was Diluted for Analysis
e	Estimated Concentration
f	Quantitated as Fuel Oil
g	Quantitated as Gasoline
h	Sample Analyzed Past Holding Time
j	Reported Below Reporting Limit
k	Quantitated as Kerosene
m	Quantitated as Mineral Spirits
o	Quantitated as Motor Oil
r	Sample Received Past Holding Time
s	Quantitated as Stoddard Solvent
u	Sample Received Improperly Preserved

ENGINEERING SCIENCE, INC.

1000 Jorie Boulevard - Suite 250, Oak Brook, Illinois 60521
(708) 990-7200 • Fax (708) 990-7218

Nº A 6393

Chain-of-Custody Record

PROJECT NUMBER	PROJECT NAME / LOCATION
CH151	GMC Allison Gas Turbine

SAMPLER(S) NAME (Please Print): Dave Coratage, Mike Kuzel, Rhonda Yoder

(Signature)

Project Manager: Rhonda Yoder

Site Code:

PRESERVATIVES

ANALYSES REQUESTED

Site Number	Date MM/DD/YY	Military Time	Comp.	Grab	Sample Identification	Matrix	Container	BTEX ( )	PNA ( )	Voa (8240)	BNA	PCBs	Open Cup Flash Point	Paint Filter	TCLP RCRA Metals	Total Cyanide	(10PPM MDL) Reactive Sulfide	Phenolics	PH (10% Solution)	Total Solids	Metals, Heavy	REMARKS
Plating	6/2/93	0915		\	CH151-HA005	Soil	1														X	
		0945		\	CH151-HA006		1														X	
		1030		\	CH151-HA003		1														X	
		1230		\	CH151-HA004		1														X	
		1320		\	CH151-HA008		1														X	
Plating	6/2/93	1500		\	CH151-HA007	Soil	1														X	
Pl 10	6/2/93	0730			CH151-SB145-13-15	Soil	1			X												
		0800			CH151-SB195-13-15		1			X												
		0900			CH151-SB145-28-30		1			X												
		1205			CH151-SB146-13-15		1			X												
Pl 10	6/2/93	1355			CH151-SB146-23-25	Soil	1			X												

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Rhonda Yoder	6/3/93 0700		
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
		Mindy Jacobs	6/3/93 8:55

AIRBILL#: pick up

COOLER#: —

LABORATORY: NET Indianapolis

ATTN. Melissa Count

PLEASE SEND REPORT TO: R Yoder

T.A.T. EXPECTED 2-3 weeks

DISTRIBUTION: Pink Sampling Coordinator • White and Yellow Accompanies Shipment • White Returned with Report

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

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ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

NET Job Number: 93.01649

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: CH151 - GMC ALLISON GAS TURBINE

Sample Number	Sample Description	Date Taken	Date Received
~~69868~~	~~CH151 - MW144 - SO1~~	~~06/03/1993~~	~~06/03/1993~~
~~69869~~	~~CH151 - HA001~~	~~06/03/1993~~	~~06/03/1993~~
~~69870~~	~~CH151 - HA001 DUP.~~	~~06/03/1993~~	~~06/03/1993~~
~~69871~~	~~CH151 - HA002~~	~~06/03/1993~~	~~06/03/1993~~
~~69872~~	~~CH151 - HA009~~	~~06/03/1993~~	~~06/03/1993~~
69873	CH151 - SB147 - 8-10	06/03/1993	06/03/1993
69874	CH151 - SB147 - 28-30	06/03/1993	06/03/1993
69875	CH151 - SB148 - 8-10	06/03/1993	06/03/1993
69876	CH151 - SB148 - 23-25	06/03/1993	06/03/1993

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

Approved By:

Joseph D. Shafer
Division Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69873
Job No.: 93.01649
P.O. NO.:

Page 7

Sample Description: CH151 - SB147 - 8-10
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
Acetone	<2.	mg/kg	rla / 06/11/1993	S-8240	<2.
Acrolein	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Acrylonitrile	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Benzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromodichloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromoform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromomethane	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
2-Butanone (MEK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Carbon disulfide	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Carbon tetrachloride	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloroethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
2-Chloroethyl vinyl ether	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Chloroform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromoethane (EDB)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloromethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromochloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromo-3-chloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dichlorodifluoromethane	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
1,2-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,3-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,4-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,2-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,2-Dichloroethene	1.0	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloropropane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl Acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Ethylbenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl methacrylate	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69873
Job No.: 93.01649
P.O. NO.:

Page 8

Sample Description: CH151 - SB147 - 8-10
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
2-Hexanone	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Iodomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Methylene chloride	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Paraldehyde	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
4-Methyl-2-pentanone (MIBK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Styrene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2,2-Tetrachloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrachloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrahydrofuran	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Toluene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichlorotrifluoroethan	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,2,3-Trichloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,1,1-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichloroethene	23.	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichlorofluoromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Vinyl acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Vinyl chloride	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Xylenes (Total)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S-8240	% RECOVERY
1,2-Dichloroethane-d4	78.	70-121	rla / 06/11/1993	S-8240	1
Toluene-d8	96.	81-117	rla / 06/11/1993	S-8240	1
4-Bromofluorobenzene	99.	74-121	rla / 06/11/1993	S-8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69874
Job No.: 93.01649
P.O. NO.:

Page 9

Sample Description: CH151 - SB147 - 28-30
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/kg	rla / 06/15/1993	S - 8240	<20.
Acrolein	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Acrylonitrile	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Benzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Bromodichloromethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Bromoform	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Bromomethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
2-Butanone (MEK)	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Carbon disulfide	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Carbon tetrachloride	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Chlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Chloroethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Chloroform	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Chloromethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Dibromomethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Dibromochloromethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2-Dibromo-3-chloropropane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<5.	ug/kg	rla / 06/15/1993	S - 8240	<5.
1,2-Dichlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,3-Dichlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,4-Dichlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Dichlorodifluoromethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
1,1-Dichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2-Dichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1-Dichloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
trans-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
cis-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2-Dichloropropane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
cis-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
trans-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Ethyl acetate	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Ethylbenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Ethyl methacrylate	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69874
Job No.: 93.01649
P.O. NO.:

Page 10

Sample Description: CH151 - SB147 - 28-30
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Iodomethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Methylene chloride	21.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Paraldehyde	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Styrene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1,2,2-Tetrachloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Tetrachloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Tetrahydrofuran	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Toluene	24.	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1,1-Trichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1,2-Trichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2,3-Trichloropropane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Trichloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Trichlorofluoromethane	<5.	ug/kg	rla / 06/15/1993	S - 8240	<5.
1,1,2-Trichlorotrifluoroethan	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Vinyl acetate	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Vinyl chloride	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Xylenes (Total)	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/15/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	87.	70-121	rla / 06/15/1993	S - 8240	1
Toluene-d8	109.	81-117	rla / 06/15/1993	S - 8240	1
4-Bromofluorobenzene	80.	74-121	rla / 06/15/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69875
Job No.: 93.01649
P.O. NO.:

Page 11

Sample Description: CH151 - SB148 - 8-10
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
Acetone	<2.	mg/kg	rla / 06/11/1993	S-8240	<2.
Acrolein	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Acrylonitrile	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Benzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromodichloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromoform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromomethane	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
2-Butanone (MEK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Carbon disulfide	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Carbon tetrachloride	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloroethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
2-Chloroethyl vinyl ether	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Chloroform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromoethane (EDB)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloromethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromochloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromo-3-chloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dichlorodifluoromethane	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
1,2-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,3-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,4-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,2-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,2-Dichloroethene	0.9	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloropropane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl Acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Ethylbenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl methacrylate	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69875
Job No.: 93.01649
P.O. NO.:

Page 12

Sample Description: CH151 - SB148 - 8-10
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
2-Hexanone	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Iodomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Methylene chloride	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Paraldehyde	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
4-Methyl-2-pentanone (MIBK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Styrene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2,2-Tetrachloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrachloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrahydrofuran	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Toluene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichlorotrifluoroethan	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,2,3-Trichloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,1,1-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichloroethene	14.	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichlorofluoromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Vinyl acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Vinyl chloride	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Xylenes (Total)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S-8240	% RECOVERY
1,2-Dichloroethane-d4	76.	70-121	rla / 06/11/1993	S-8240	1
Toluene-d8	96.	81-117	rla / 06/11/1993	S-8240	1
4-Bromofluorobenzene	101.	74-121	rla / 06/11/1993	S-8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69876
Job No.: 93.01649
P.O. NO.:

Sample Description: CH151 - SB148 - 23-25
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/kg	rla / 06/15/1993	S - 8240	<20.
Acrolein	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Acrylonitrile	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Benzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Bromodichloromethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Bromoform	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Bromomethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
2-Butanone (MEK)	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Carbon disulfide	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Carbon tetrachloride	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Chlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Chloroethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Chloroform	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Chloromethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Dibromomethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Dibromochloromethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2-Dibromo-3-chloropropane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<5.	ug/kg	rla / 06/15/1993	S - 8240	<5.
1,2-Dichlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,3-Dichlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,4-Dichlorobenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Dichlorodifluoromethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
1,1-Dichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2-Dichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1-Dichloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
trans-1,2-Dichloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
cis-1,2-Dichloroethene	15.	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2-Dichloropropane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
cis-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
trans-1,3-Dichloropropene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Ethyl acetate	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Ethylbenzene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Ethyl methacrylate	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/23/1993

Sample No.: 69876
Job No.: 93.01649
P.O. NO.:

Page 14

Sample Description: CH151 - SB148 - 23-25
Job Description: CH151 - GMC ALLISON GAS TURBINE

Date Taken: 06/03/1993 Date Received: 06/03/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Iodomethane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Methylene chloride	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Paraldehyde	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Styrene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1,2,2-Tetrachloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Tetrachloroethene	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Tetrahydrofuran	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Toluene	12.	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1,1-Trichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,1,2-Trichloroethane	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
1,2,3-Trichloropropane	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Trichloroethene	14.	ug/kg	rla / 06/15/1993	S - 8240	<5.0
Trichlorofluoromethane	<5.	ug/kg	rla / 06/15/1993	S - 8240	<5.
1,1,2-Trichlorotrifluoroethan	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Vinyl acetate	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Vinyl chloride	<10.	ug/kg	rla / 06/15/1993	S - 8240	<10.
Xylenes (Total)	<5.0	ug/kg	rla / 06/15/1993	S - 8240	<5.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/15/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	90.	70-121	rla / 06/15/1993	S - 8240	1
Toluene-d8	107.	81-117	rla / 06/15/1993	S - 8240	1
4-Bromofluorobenzene	81.	74-121	rla / 06/15/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

KEY TO FLAG ABBREVIATIONS

FLAG	DESCRIPTION
<	Less Than
a	Quantitated as Diesel Fuel
b	Analyte Found in Blank
d	Sample was Diluted for Analysis
e	Estimated Concentration
f	Quantitated as Fuel Oil
g	Quantitated as Gasoline
h	Sample Analyzed Past Holding Time
j	Reported Below Reporting Limit
k	Quantitated as Kerosene
m	Quantitated as Mineral Spirits
o	Quantitated as Motor Oil
r	Sample Received Past Holding Time
s	Quantitated as Stoddard Solvent
u	Sample Received Improperly Preserved

ENGINEERING SCIENCE, INC.

1000 Jorie Boulevard - Suite 250, Oak Brook, Illinois 60521
(708) 990-7200 • Fax (708) 990-7218

Chain-of-Custody Record

№ A 6393.

PROJECT NUMBER	PROJECT NAME / LOCATION
CH151	GMC Allison Gas Turbine

SAMPLER(S) NAME (Please Print): Rhonda Yoder, Mike Kurol, Dave Cornstage

(Signature) [signature]

Project Manager: Rhonda Yoder

Site Code:

PRESERVATIVES

ANALYSES REQUESTED

Site Number	Date MM/DD/YY	Military Time	Comp.	Grab	Sample Identification	Matrix	Container	BTEX ( )	PNA ( )	Voa	BNA	PCBs	Open Cup Flash Point	Paint Filter	TCLP RCRA Metals	Total Cyanide	(10PPM MDL) Reactive Sulfide	Phenolics	PH (10% Solution)	Total Solids	Metals	REMARKS
Aq Inc	6/3/93	1230		X	CH151-MW144-SO1	Water	2									X						
Plat		930		X	CH151-HA001	Soil	1														X	Please Run this sample in duplicate
		830		X	CH151-HA002	Soil	1														X	
Heathrow	6/3/93	1030		X	CH151-HA009	Soil	1			X												
RR 10	6/3/93	0741		X	CH151-SB147-8-10	Soil	2			X												
		0840		X	CH151-SB147-28-30	Soil	2			X												
		1135		X	CH151-SB148-8-10	Soil	2			X												
PR 10	6/3/93	1158		X	CH151-SB148-23-25	Soil	2			X												

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[signature]		[signature]	6/3/93 5:11
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time

AIRBILL#: drop off

COOLER#: —

LABORATORY: NET Indianapolis

ATTN. Melissa Coent

PLEASE SEND REPORT TO: R Yoder

T.A.T. EXPECTED 2-3 Week

DISTRIBUTION: Pink Sampling Coordinator • White and Yellow Accompanies Shipment • White Returned with Report

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

NET Job Number: 93.01665

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: CH151 - GMC - ALLISON GAS TURBINE

Sample Number	Sample Description	Date Taken	Date Received
69941	CH151 - MW145 - SO1	06/04/1993	06/04/1993
69942	CH151 - MW146 - SO1	06/04/1993	06/04/1993
69943	CH151 - MW147 - SO1	06/04/1993	06/04/1993
69944	CH151 - MW148 - SO1	06/04/1993	06/04/1993
69945	CH151 - SB149 - 8-10	06/04/1993	06/04/1993
69946	CH151 - SB150 - 3-5	06/04/1993	06/04/1993
69947	CH151 - SB150 - 8-10	06/04/1993	06/04/1993

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

Approved By:

Joseph D. Shafer
Division Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69941
Job No.: 93.01665
P.O. NO.:

Page 1

Sample Description: CH151 - MW145 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<100	ug/L	rla / 06/11/1993	S - 8240	<20.
Acrolein	<200	ug/L	rla / 06/11/1993	S - 8240	<50.
Acrylonitrile	<200	ug/L	rla / 06/11/1993	S - 8240	<50.
Benzene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromodichloromethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromoform	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromomethane	<20	ug/L	rla / 06/11/1993	S - 8240	<5.0
2-Butanone (MEK)	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Carbon disulfide	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Carbon tetrachloride	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Chlorobenzene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Chloroethane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<20	ug/L	rla / 06/11/1993	S - 8240	<5.0
Chloroform	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Chloromethane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Dibromomethane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Dibromochloromethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Dichlorodifluoromethane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
1,1-Dichloroethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichloroethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1-Dichloroethene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	440.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichloropropane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Ethyl Acetate	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Ethylbenzene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Ethyl methacrylate	<50	ug/L	rla / 06/11/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69941
Job No.: 93.01665
P.O. NO.:

Page 2

Sample Description: CH151 - MW145 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Iodomethane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Methylene chloride	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Paraldehyde	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Styrene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Tetrachloroethene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Tetrahydrofuran	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Toluene	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
1,2,3-Trichloropropane	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
1,1,1-Trichloroethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichloroethene	9.8	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichlorofluoromethane	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Vinyl acetate	<50	ug/L	rla / 06/11/1993	S - 8240	<10.
Vinyl chloride	<20	ug/L	rla / 06/11/1993	S - 8240	<5.
Xylenes	<5.	ug/L	rla / 06/11/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	85.	76-114	rla / 06/11/1993	S - 8240	1
Toluene-d8	100.	88-110	rla / 06/11/1993	S - 8240	1
4-Bromofluorobenzene	103.	86-115	rla / 06/11/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69942
Job No.: 93.01665
P.O. NO.:

Page 3

Sample Description: CH151 - MW146 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/L	rla / 06/11/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 06/11/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 06/11/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromodichloromethane	1.4	ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 06/11/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<5.0	ug/L	rla / 06/11/1993	S - 8240	<5.0
Chloroform	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69942
Job No.: 93.01665
P.O. NO.:

Page 4

Sample Description: CH151 - MW146 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Tetrahydrofuran	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichloroethene	83.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 06/11/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 06/11/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 06/11/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	87.	76-114	rla / 06/11/1993	S - 8240	1
Toluene-d8	98.	88-110	rla / 06/11/1993	S - 8240	1
4-Bromofluorobenzene	99.	86-115	rla / 06/11/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69943
Job No.: 93.01665
P.O. NO.:

Page 5

Sample Description: CH151 - MW147 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
Acetone	<20.	ug/L	rla / 06/10/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 06/10/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 06/10/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 06/10/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<5.0	ug/L	rla / 06/10/1993	S - 8240	<5.0
Chloroform	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	140.	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69943
Job No.: 93.01665
P.O. NO.:

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Sample Description: CH151 - MW147 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Tetrahydrofuran	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Trichloroethene	39.	ug/L	rla / 06/10/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 06/10/1993	S - 8240	<10.
Vinyl chloride	42.	ug/L	rla / 06/10/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 06/10/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/10/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	102.	76-114	rla / 06/10/1993	S - 8240	1
Toluene-d8	103.	88-110	rla / 06/10/1993	S - 8240	1
4-Bromofluorobenzene	102.	86-115	rla / 06/10/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69944
Job No.: 93.01665
P.O. NO.:

Page 7

Sample Description: CH151 - MW148 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS						
Acetone	<1,600		ug/L	rla / 06/11/1993	S - 8240	<20.
Acrolein	<4,000		ug/L	rla / 06/11/1993	S - 8240	<50.
Acrylonitrile	<4,000		ug/L	rla / 06/11/1993	S - 8240	<50.
Benzene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromodichloromethane	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromoform	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Bromomethane	<400		ug/L	rla / 06/11/1993	S - 8240	<5.0
2-Butanone (MEK)	<800		ug/L	rla / 06/11/1993	S - 8240	<10.
Carbon disulfide	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Carbon tetrachloride	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Chlorobenzene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Chloroethane	<800		ug/L	rla / 06/11/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	<400		ug/L	rla / 06/11/1993	S - 8240	<5.0
Chloroform	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Chloromethane	<800		ug/L	rla / 06/11/1993	S - 8240	<10.
Dibromomethane	<800		ug/L	rla / 06/11/1993	S - 8240	<10.
Dibromochloromethane	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<800		ug/L	rla / 06/11/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Dichlorodifluoromethane	<800		ug/L	rla / 06/11/1993	S - 8240	<10.
1,1-Dichloroethane	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichloroethane	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1-Dichloroethene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	19000.	e	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,2-Dichloropropane	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Ethyl Acetate	<800		ug/L	rla / 06/11/1993	S - 8240	<10.
Ethylbenzene	<80.		ug/L	rla / 06/11/1993	S - 8240	<1.0
Ethyl methacrylate	<800		ug/L	rla / 06/11/1993	S - 8240	<10.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69944
Job No.: 93.01665
P.O. NO.:

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Sample Description: CH151 - MW148 - S01
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILE ANALYSIS					
2-Hexanone	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
Iodomethane	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
Methylene chloride	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
Paraldehyde	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
Styrene	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Tetrachloroethene	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Tetrahydrofuran	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
Toluene	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
1,2,3-Trichloropropane	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
1,1,1-Trichloroethane	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichloroethene	4900.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Trichlorofluoromethane	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
Vinyl acetate	<800	ug/L	rla / 06/11/1993	S - 8240	<10.
Vinyl chloride	490.	ug/L	rla / 06/11/1993	S - 8240	<5.
Xylenes	<80.	ug/L	rla / 06/11/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	85.	76-114	rla / 06/11/1993	S - 8240	1
Toluene-d8	99.	88-110	rla / 06/11/1993	S - 8240	1
4-Bromofluorobenzene	100.	86-115	rla / 06/11/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69945
Job No.: 93.01665
P.O. NO.:

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Sample Description: CH151 - SB149 - 8-10
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
Acetone	<2.	mg/kg	rla / 06/11/1993	S-8240	<2.
Acrolein	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Acrylonitrile	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Benzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromodichloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromoform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromomethane	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
2-Butanone (MEK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Carbon disulfide	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Carbon tetrachloride	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloroethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
2-Chloroethyl vinyl ether	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Chloroform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromoethane (EDB)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloromethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromochloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromo-3-chloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dichlorodifluoromethane	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
1,2-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,3-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,4-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,2-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,2-Dichloroethene	1.4	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloropropane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl Acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Ethylbenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl methacrylate	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69945
Job No.: 93.01665
P.O. NO.:

Page 10

Sample Description: CH151 - SB149 - 8-10
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
2-Hexanone	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Iodomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Methylene chloride	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Paraldehyde	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
4-Methyl-2-pentanone (MIBK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Styrene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2,2-Tetrachloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrachloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrahydrofuran	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Toluene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichlorotrifluoroethan	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,2,3-Trichloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,1,1-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichloroethene	0.2	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichlorofluoromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Vinyl acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Vinyl chloride	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Xylenes (Total)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S-8240	% RECOVERY
1,2-Dichloroethane-d4	79.	70-121	rla / 06/11/1993	S-8240	1
Toluene-d8	100.	81-117	rla / 06/11/1993	S-8240	1
4-Bromofluorobenzene	105.	74-121	rla / 06/11/1993	S-8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69946
Job No.: 93.01665
P.O. NO.:

Page 11

Sample Description: CH151 - SB150 - 3-5
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
Acetone	<2.	mg/kg	rla / 06/11/1993	S-8240	<2.
Acrolein	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Acrylonitrile	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Benzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromodichloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromoform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromomethane	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
2-Butanone (MEK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Carbon disulfide	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Carbon tetrachloride	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloroethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
2-Chloroethyl vinyl ether	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Chloroform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromoethane (EDB)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloromethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromochloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromo-3-chloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dichlorodifluoromethane	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
1,2-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,3-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,4-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,2-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,2-Dichloroethene	1.8	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloropropane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl Acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Ethylbenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl methacrylate	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69946
Job No.: 93.01665
P.O. NO.:

Page 12

Sample Description: CH151 - SB150 - 3-5
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
2-Hexanone	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Iodomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Methylene chloride	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Paraldehyde	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
4-Methyl-2-pentanone (MIBK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Styrene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2,2-Tetrachloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrachloroethene	0.7	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrahydrofuran	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Toluene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichlorotrifluoroethan	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,2,3-Trichloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,1,1-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichloroethene	4.2	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichlorofluoromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Vinyl acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Vinyl chloride	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Xylenes (Total)	0.4	mg/kg	rla / 06/11/1993	S-8240	<0.1
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S-8240	% RECOVERY
1,2-Dichloroethane-d4	76.	70-121	rla / 06/11/1993	S-8240	1
Toluene-d8	100.	81-117	rla / 06/11/1993	S-8240	1
4-Bromofluorobenzene	100.	74-121	rla / 06/11/1993	S-8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69947
Job No.: 93.01665
P.O. NO.:

Page 13

Sample Description: CH151 - SB150 - 8-10
Job Description: CH151 - GMC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
Acetone	<2.	mg/kg	rla / 06/11/1993	S-8240	<2.
Acrolein	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Acrylonitrile	<5.	mg/kg	rla / 06/11/1993	S-8240	<5.
Benzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromodichloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromoform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Bromomethane	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
2-Butanone (MEK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Carbon disulfide	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Carbon tetrachloride	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloroethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
2-Chloroethyl vinyl ether	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Chloroform	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromoethane (EDB)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Chloromethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dibromochloromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dibromo-3-chloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Dichlorodifluoromethane	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
1,2-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,3-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,4-Dichlorobenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,2-Dichloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,2-Dichloroethene	1.8	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,2-Dichloropropane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
cis-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
trans-1,3-Dichloropropene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl Acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Ethylbenzene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Ethyl methacrylate	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Ms. Rhonda Yoder
ENGINEERING - SCIENCE
1000 Jorie Blvd.
Suite 250
Oak Brook, IL 60521

06/17/1993

Sample No.: 69947
Job No.: 93.01665
P.O. NO.:

Page 14

Sample Description: CH151 - SB150 - 8-10
Job Description: CH151 - GHC - ALLISON GAS TURBINE

Date Taken: 06/04/1993 Date Received: 06/04/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Reporting Limit
VOLATILES ANALYSIS					
2-Hexanone	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Iodomethane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Methylene chloride	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Paraldehyde	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
4-Methyl-2-pentanone (MIBK)	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Styrene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2,2-Tetrachloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrachloroethene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Tetrahydrofuran	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
Toluene	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichlorotrifluoroethan	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,2,3-Trichloropropane	<1.0	mg/kg	rla / 06/11/1993	S-8240	<1.0
1,1,1-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
1,1,2-Trichloroethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichloroethene	0.3	mg/kg	rla / 06/11/1993	S-8240	<0.1
Trichlorofluoromethane	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
Vinyl acetate	<1.	mg/kg	rla / 06/11/1993	S-8240	<1.
Vinyl chloride	<0.5	mg/kg	rla / 06/11/1993	S-8240	<0.5
Xylenes (Total)	<0.1	mg/kg	rla / 06/11/1993	S-8240	<0.1
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 06/11/1993	S-8240	% RECOVERY
1,2-Dichloroethane-d4	77.	70-121	rla / 06/11/1993	S-8240	1
Toluene-d8	98.	81-117	rla / 06/11/1993	S-8240	1
4-Bromofluorobenzene	104.	74-121	rla / 06/11/1993	S-8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

PROJECT NARRATIVE

JOB NUMBER: 93.01665

Two of the water samples had to be diluted to successfully analyze the samples. In both of these cases other contaminates were found in elevated amounts. The reporting limits of other analytes were elevated in proportion to the dilutions.

The samples diluted for VOA's are:

69941	1:5
69944	1:80

ENGINEERING SCIENCE, INC.

1000 Jorie Boulevard - Suite 250, Oak Brook, Illinois 60521
(708) 990-7200 • Fax (708) 990-7218

Chain-of-Custody Record

№ A _ _ _ _

PROJECT NUMBER	PROJECT NAME / LOCATION
CH151	GMC - Allison Gas Turbine

SAMPLER(S) NAME (Please Print): Rhonda Yoder, Dave Corontage (Signature)

Project Manager: Rhonda Yoder

Site Code:

PRESERVATIVES

ANALYSES REQUESTED: VOCs

Site Number	Date MM/DD/YY	Military Time	Comp.	Grab	Sample Identification	Matrix	Container	VOCs	REMARKS
PL 10	6/4/93	1000		✓	CH151-ML0145-S01	water	3	X	
		1110		✓	CH151-ML0146-S01		3	X	
		1100		✓	CH151-ML0147-S01		3	X	
		0850		✓	CH151-ML0148-S01	water	3	X	
		645		✓	CH151-SB149-8.0	soil	2	X	
		1120		✓	CH151-SB150-3.5		1	X	
PL 10	6/4/93	1130		✓	CH151-SB150-8.0	soil	2	X	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[signature]	6/4/93 14:15		
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
		[signature]	6/4/93

AIRBILL#: pick up
COOLER#: —
LABORATORY: WET Indianapolis
ATTN. Melissa Coart
PLEASE SEND REPORT TO: R Yoder
T.A.T. EXPECTED 2-3 weeks

DISTRIBUTION: Pink Sampling Coordinator • White and Yellow Accompanies Shipment • White Returned with Report

App. C

SOIL GAS DATA

AGT SITE
700 NORTH OLIN AVENUE
INDIANAPOLIS, INDIANA

PREPARED FOR

ENGINEERING SCIENCE, INC.
1000 JORIE BOULEVARD, SUITE 250
OAKBROOK, ILLINOIS 60521

PREPARED BY

TARGET ENVIRONMENTAL SERVICES, INC.
9180 RUMSEY ROAD
COLUMBIA, MARYLAND 21045
(410) 992-6622

JUNE 1993

SAMPLE COLLECTION AND ANALYSIS

On May 27, 1993, TARGET Environmental Services, Inc. (TARGET) conducted a soil gas survey at the AGT Site, located at 700 North Olin Avenue in Indianapolis, Indiana. A total of 20 soil gas samples were collected from depths of 6 to 10 feet. The variation in sampling depth was due to fluctuations in the depth to ground water. Ground water in the northern portion of the site occurred at approximately 12 feet, while in the southern portion, ground water was encountered at approximately 8 feet below grade. Sampling locations are shown in Figure 1.

Prior to the collection of each sample, the entire sampling system (including down-hole probe, tubing, syringe, and all associated plumbing) was purged with ambient air drawn through an organic vapor filter cartridge. To collect the samples, a van-mounted hydraulic probe was used to advance connected 3 foot sections of 1 inch diameter threaded steel casing down to the sampling depth. Once at depth, the casing was hydraulically raised several inches in order to release a disposable drive point and open the bottom of the casing. A teflon line with a perforated hollow stainless steel probe end was inserted into the casing to the bottom of the hole, and the bottom-hole line perforations were isolated from the up-hole annulus by an inflatable packer. A sample of in-situ soil gas was then withdrawn through the probe and used to purge atmospheric air from the sampling system. A second sample of soil gas was withdrawn through the probe and encapsulated in a pre-evacuated glass vial at two atmospheres of pressure (15 psig). The self-sealing vial was detached from the sampling system, packaged, labeled, and stored for laboratory analysis. All sampling holes were backfilled with bentonite and the surface repaired with like material upon completion of the sampling.

Prior to the day's field activities all sampling equipment and probes were decontaminated by washing with soapy water and rinsing thoroughly. Internal surfaces were flushed dry using

pre-purified nitrogen or filtered ambient air, and external surfaces were wiped clean using clean paper towels.

All of the samples collected during the field phase of the survey were analyzed according to EPA Method 8010 on a gas chromatograph equipped with an electron capture detector (ECD), and using direct injection. Specific analytes standardized for the ECD analysis were:

1,1-dichloroethene (11DCE)
methylene chloride (CH_2Cl_2)
trans-1,2-dichloroethene (t12DCE)
chloroform ($CHCl_3$)
1,1-dichloroethane (11DCA)
carbon tetrachloride (CCl_4)
cis-1,2-dichloroethene (c12DCE)
1,1,1-trichloroethane (111TCA)
trichloroethene (TCE)
1,1,2-trichloroethane (112TCA)
tetrachloroethene (PCE)

The chlorinated hydrocarbons in this suite were chosen because of their common usage in industrial solvents, and/or their degradational relationship to commonly used compounds. The analytical equipment was calibrated using a 3-point instrument-response curve and injection of known concentrations of the target analytes. Retention times of the standards were used to identify the peaks in the chromatograms of the field samples, and their response factors were used to calculate the analyte concentrations.

The tabulated results of the laboratory analysis of the soil gas samples are reported in micrograms per liter (μg/l) in Table 1. Although "micrograms per liter" is equivalent to "parts per billion (v/v)" in water analyses, they are not equivalent in gas analyses, due to the difference in the mass of equal volumes of water and gas matrices.

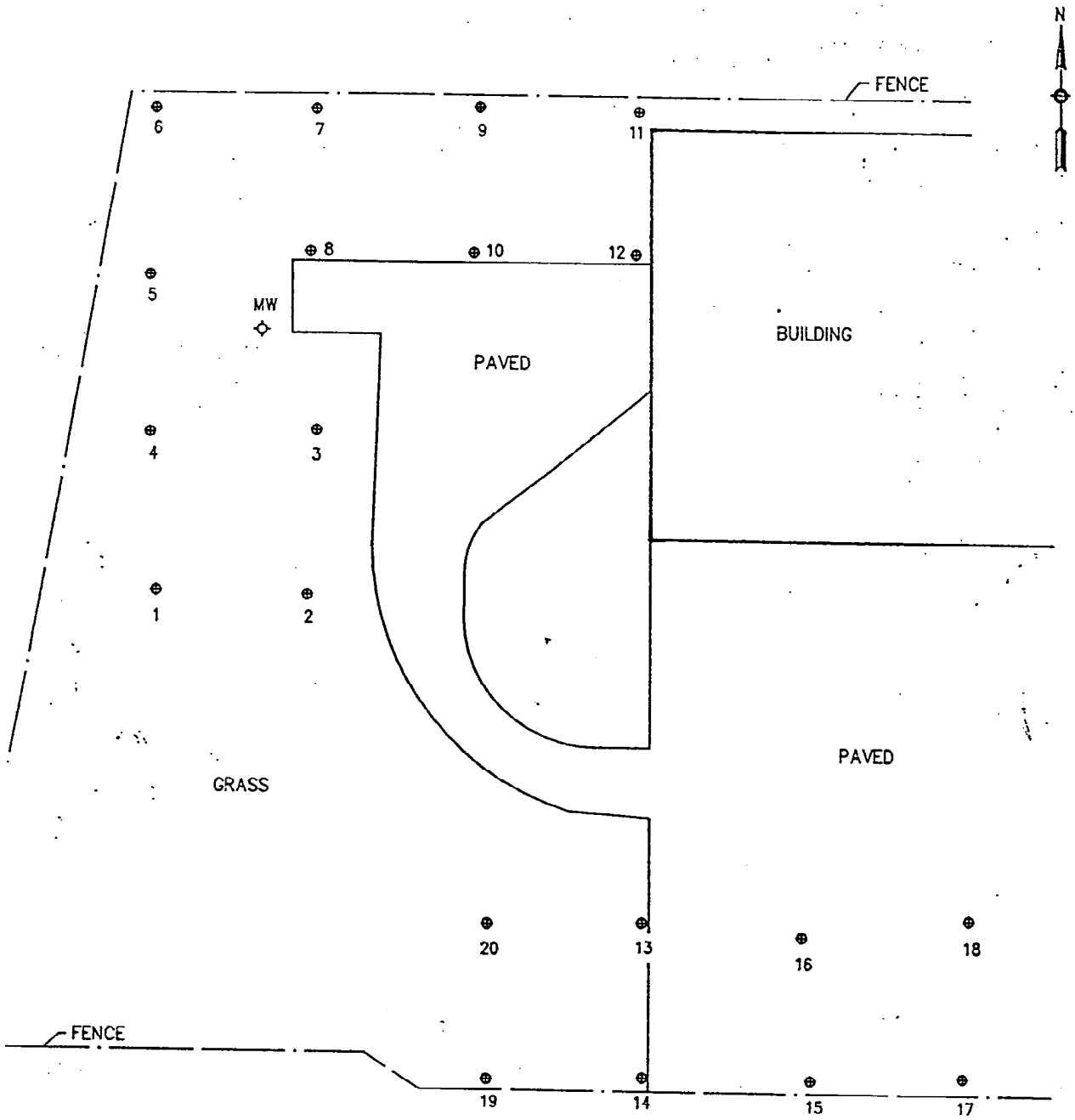
Quality Assurance/Quality Control (QA/QC) Evaluation

Field QA/QC Samples

Field control samples were collected at the beginning and end of the day's field activities. These QA/QC samples were obtained by filtering ambient air through a dust and organic vapor filter cartridge and encapsulating as described above. The laboratory results of the analysis of these samples are reported in Table 1. Concentrations of all analytes were below the reporting limit in all field control samples.

Laboratory QA/QC Samples

A duplicate analysis was performed on every tenth field sample. Laboratory blanks of nitrogen gas were also analyzed after every tenth field sample. The results of these analyses are reported in Table 1. All duplicate analyses were within acceptable limits. Concentrations of all analytes were below the reporting limit in all laboratory blanks.



0 25 50
FEET

⊕ SOIL GAS SAMPLE LOCATION
MONITORING WELL

FIGURE 1. Sample Locations

TARGET ENVIRONMENTAL SERVICES, INC.

AGT SITE
INDIANAPOLIS, INDIANA

This map is integral to a written report and should be viewed in that context.

TARGET Project SESA

TABLE 1

ANALYTE CONCENTRATIONS VIA GC/ECD (µg/l)

SAMPLE	11DCE	CH2CL2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CCL4	TCE	112TCA	PCE
REPORTING LIMIT	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1	44	<1.0	10	<1.0	2,346	<1.0	<1.0	<1.0	7.6	<1.0	<1.0
2	2.6	<1.0	4.5	<1.0	238	<1.0	<1.0	<1.0	44	<1.0	<1.0
3	2.0	<1.0	2.6	<1.0	230	<1.0	<1.0	<1.0	939	<1.0	1.8
4	114	<1.0	73	1.9	11,644	<1.0	<1.0	<1.0	2,224	<1.0	180
5	5.0	<1.0	14	<1.0	1,844	<1.0	<1.0	<1.0	104	<1.0	<1.0
6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
8	<1.0	<1.0	<1.0	<1.0	38	<1.0	<1.0	<1.0	172	<1.0	<1.0
9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	1.3	<1.0	<1.0
11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
12	<1.0	<1.0	1.0	<1.0	16	<1.0	<1.0	<1.0	15	<1.0	<1.0
13	<1.0	<1.0	<1.0	<1.0	27	<1.0	<1.0	<1.0	73	<1.0	<1.0
[illegible]	<1.0	<1.0	<1.0	<1.0	8.9	<1.0	<1.0	<1.0	19	<1.0	<1.0
15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
16	6.7	<1.0	5.2	<1.0	119	<1.0	<1.0	<1.0	351	<1.0	<1.0
17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6	<1.0	<1.0
18	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
19	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6	<1.0	<1.0
20	<1.0	<1.0	<1.0	<1.0	2.2	<1.0	<1.0	<1.0	1.7	<1.0	<1.0
FIELD CONTROL SAMPLES											
25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
26	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
LABORATORY DUPLICATE ANALYSIS											
10	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	1.3	<1.0	<1.0
10R	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	1.3	<1.0	<1.0
20	<1.0	<1.0	<1.0	<1.0	2.2	<1.0	<1.0	<1.0	1.7	<1.0	<1.0
20R	<1.0	<1.0	<1.0	<1.0	2.4	<1.0	<1.0	<1.0	1.9	<1.0	<1.0

11DCE = 1,1-dichloroethene
11DCA = 1,1-dichloroethane
111TCA = 1,1,1-trichloroethane
112TCA = 1,1,2-trichloroethane
CH2CL2 = methylene chloride
c12DCE = cis-1,2-dichloroethene
CCl4 = carbon tetrachloride
PCE = tetrachloroethene
t12DCE = trans-1,2-dichloroethene
CHCl3 = chloroform
TCE = trichloroethene

TARGET Project SESA

TABLE 1 (CONT.)

ANALYTE CONCENTRATIONS VIA GC/ECD (µg/l)

SAMPLE	11DCE	CH2CL2	t12DCE	11DCA	c12DCE	CHCl3	111TCA	CCL4	TCE	112TCA	PCE
REPORTING LIMIT	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
LABORATORY BLANKS											
10B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
20B	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

11DCE = 1,1-dichloroethene
1DCA = 1,1-dichloroethane
111TCA = 1,1,1-trichloroethane
112TCA = 1,1,2-trichloroethane
CH2CL2 = methylene chloride
c12DCE = cis-1,2-dichloroethene
CCl4 = carbon tetrachloride
PCE = tetrachloroethene
t12DCE = trans-1,2-dichloroethene
CHCl3 = chlororform
TCE = trichloroethene

Sep-93

App D

ACT 307
TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA FOR GROUNDWATER AND SOIL

These criteria were calculated using the most current available toxicological data. Criteria may change as new toxicity data become available. They are not necessarily final cleanup standards. PLEASE READ THE ATTACHED OPERATIONAL MEMORANDUM FOR DETAILS. Carcinogenic chemicals are shown in italics. Values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. Scientific notation is represented by E+ or E- a value. For example, 2 x 10^6 is reported as 2E+6. Please refer to Operational Memorandum #6 and #8 for information concerning method detection limits and Type B cleanup criteria, respectively.

	GROUNDWATER (ug/l)				SOIL (ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value (A) [R 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
Acenaphthene	3,700	NA	{F}	5			1.6E+08	330
Acenaphthylene	75	NA	{F}	5			3.2E+06	330
Acetone	2,100	NA	500	50			1.5E+07	100
Acetonitrile	400	NA	810	10			2.8E+06	100
Acrolein	330	NA	2.5	5			2.4E+06	10
Acrylamide	0.077	NA	9.1	0.5			3,300	5
Acrylic acid	1,700	NA	{F}	NA			1.2E+07	NA
Acrylonitrile	0.64	NA	2.2	1			4,600	10
Alachlor	4.3	NA	{F}	1			1.9E+05	20
Aldrin	0.02	NA	0.0014	0.01	{I}	{I}	880	1.7
Aluminum	ID	50 {J}	{F}	20			ID	500
Aniline	61	NA	4	20			4.3E+05	1,700
Anthracene	21,000	NA	1.1E+5	5			9.0E+08	330
Antimony	7.3 {E}	NA	4,300	5			3.1E+05	500
Arsenic	0.2 {E}	NA	1.4 {G}	1			8,600	100
Atrazine	1.6	NA	{F}	1			68,000	50

TYPE C GENERIC INDUSTRIAL CLEANUP CRITER A

Chemical	GROUNDWATER (ug/l) Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} R 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit In Water {C}	SOIL (ug/kg) Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit In Soil {C}
Azobenzene	3.2	NA	{F}	NA			1.4E+05	NA
Barium	7,300 {E}	NA	{F}	200			6.3E+07	1,000
Benzene	12	NA	60	1			85,000	10
Benzidine	0.0015	NA	0.0054	50			65	5,000
Benzo(a)anthracene	0.048	NA	0.31	5	{I}	{I}	2,100	330
Benzo(b)fluoranthene	0.048	NA	0.31	5	{I}	{I}	2,100	330
Benzo(k)fluoranthene	0.048	NA	0.31	5	{I}	{I}	2,100	330
Benzo(g,h,i)perylene	75	NA	{F}	5	{I}	{I}	3.2E+06	330
Benzo(a)pyrene	0.048	NA	0.31	5	{I}	{I}	2,100	330
Benzoic acid	92,000	NA	{F}	50			6.5E+08	3,300
Benzyl alcohol	29,000	NA	22	50			2.1E+08	1,300
Benzyl Chloride	2	NA	{F}	0.5			15,000	200
bis(2-chloroethoxy)ethane	ID	NA	{F}	5			ID	330
bis(2-Chloroethyl)ether	0.32	NA	4.2	5			2,300	330
bis(2-Ethylhexyl)phthalate	25	NA	59	5	{I}	{I}	1.1E+06	330
Boron	1,300 {E}	NA	{F}	10			5.4E+07	2,000
Bromobenzene	ID	NA	{F}	1			ID	10
Bromodichloromethane	5.6	NA	24	1			40,000	10
Bromoform	44	NA	65	1			3.1E+05	10
Bromomethane	29	NA	11	1			2.1E+05	10

TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l) Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit In Water {C}	SOIL (ug/kg) Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
2-Butanone	960	NA	4,[illegible]10	50			6.8E+06	100
2-Butoxyethanol	ID	NA	{F}	NA			ID	NA
t-Butyl alcohol	1,600	NA	{F}	NA			1.2E+07	NA
Butyl benzyl phthalate	3,300	NA	{F}	5			1.4E+08	330
Cadmium	10 {E}	NA	0.5- {E,G}	0.2			4.5E+05	50
Camphene	ID	NA	{F}	NA			ID	NA
Caprolactam	17,000	NA	{F}	NA			7.2E+08	NA
Carbon disulfide	2,300	NA	{F}	50			1.6E+07	100
Carbon tetrachloride	2.7	NA	21	1			19 000	10
Chlordane	0.27	NA	0.0[illegible]053	0.02	{I}	{I}	12 000	3.3
Chloride	ID	250,000	{F}	NA	{K}		ID	NA
Chlorobenzene	400	NA	71	1			2.8E+06	10
Chloroethane	91	NA	{F}	1			6.5E+05	10
2-Chloroethyl vinyl ether	ID	NA	{F}	10			ID	100
Chloroform	57	NA	8[illegible]	1			4.1E+05	10
Chloromethane	27	NA	{F}	1			1.9E+05	10
2-Chlorophenol	130	NA	9.3	5			9.2E+05	330
Chlorpyrifos	63	NA	{F}	NA			2.7E+06	NA
Chromium III {K}	1.1E+5 {E}	NA	7[illegible] {E,G}-	50			1.0E+9 {Q}	2,500
Chromium VI	350 {E}	NA	7.3-{E}	1			4.3E+06	200

TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l) Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R 709(2)(c)(d)]	GSI Value {B} [R 7 3]	Target Method Detection Limit in Water {C}	SOIL (ug/kg) Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
Chrysene	0.048	NA	0.31	5	{I}	{I}	2,100	330
Copper	ID	1,000	18 {E}	25			ID	1,000
Cyanazine	29	NA	{F}	10			1.3E+06	500
Cyanide (Free)	460	NA	5.5	5			2.0E+07	200
Dacthal	16,000	NA	{F}	NA			6.8E+08	NA
DDD	1.4	NA	0.0034	0.02	{I}	{I}	62,000	3.3
DDE	1	NA	0.0059	0.02	{I}	{I}	44,000	3.3
DDT	1	NA	0.00023	0.02	{I}	{I}	44,000	3.3
Di-n-butyl phthalate	2,500	NA	{F}	5			1.1E+08	330
Di-n-octyl phthalate	380	NA	{F}	5			1.6E+07	330
Diacetone alcohol	ID	NA	{F}	NA			ID	NA
Diazinon	1.9	NA	{F}	NA			81,000	NA
Dibenzo[a,h]anthracene	0.06	NA	0.31	5	{I}	{I}	2,600	330
Dibenzofuran	ID	NA	{F}	5			ID	330
Dibromochloromethane	4.1	NA	29	1			29,000	10
Dibromomethane	230	NA	{F}	5			1.6E+06	10
1,2-Dichlorobenzene	1,800	NA	7	1			1.3E+07	10
1,3-Dichlorobenzene	1,800	NA	180	1			1.3E+07	10
1,4-Dichlorobenzene	14	NA	15	1			1.0E+05	10
3,3'-Dichlorobenzidine	0.77	NA	0.063	20			33,000	2,000

TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
Dichlorodifluoromethane	4,800	NA	{F}	1			3.4E+07	10
1,1-Dichloroethane	2,500	NA	{F}	1			1.8E+07	10
1,2-Dichloroethane	3.8	NA	550	1			27,000	10
1,1-Dichloroethylene	21	NA	32	1			1.5E+05	10
cis-1,2-Dichloroethylene	280	NA	{F}	1			1.6E+06	10
trans-1,2-Dichloroethylene	350	NA	300	1			2.5E+06	10
2,4-Dichlorophenol	63	NA	34	5			2.7E+06	330
2,4-Dichlorophenoxyacetic acid	210	NA	47	10			9.0E+06	200
1,2-Dichloropropane	5.1	NA	64	1			36,000	10
1,3-Dichloropropene {L}	1.9	NA	3	1			14,000	10
Dichlorovos	1.2	NA	{F}	0.1			52,000	50
Dicyclohexyl phthalate	ID	NA	{F}	5			ID	330
Dieldrin	0.022	NA	3.2E-5	0.02	{I}	{I}	937	3.3
Diethyl ether	10,000	NA	{F}	1			7.4E+07	10
Diethyl phthalate	16,000	NA	{F}	5			6.7E+08	330
Diethylene glycol monobutyl ether	250	NA	{F}	NA			1.1E+07	NA
Dimethyl phthalate	2.1E+05	NA	{F}	5			1.0E+9 {Q}	330
N,N-Dimethylaniline	46	NA	{F}	NA			3.3E+05	NA
2,4-Dimethylphenol	1,000	NA	31	5			4.5E+07	330
2,6-Dimethylphenol	13	NA	{F}	5			5.4E+05	330

TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
3,4-Dimethylphenol	29	NA	{F}	5			1.3E+06	330
2,4-Dinitrotoluene	0.51	NA	{F}	5			22,000	330
Dinoseb	21	NA	0.5 {H}	1			9.0E+05	20
1,4-Dioxane	32	NA	2,000	1			2.3E+05	10
Endosulfan {M}	4.8	NA	0.056	0.01	{I}	{I}	2.1E+05	3.3
Endrin	3.5	NA	0.0023	0.02	{I}	{I}	1.5E+05	3.3
Epichlorohydrin	35	NA	{F}	5			2.5E+05	10
Ethyl acetate	19,000	NA	1,000	NA			1.3E+08	NA
Ethylbenzene	2,000	74	31	1			1.4E+07	10
Ethylene dibromide	0.0041	NA	1.1	1			29	10
Ethylene glycol	42,000	NA	68,000	5,000			1.0E+9 {Q}	5,000
Ethylene glycol acetate	ID	NA	{F}	NA			ID	NA
1-Ethyl-2-methylbenzene	ID	NA	{F}	NA			ID	NA
Fluoranthene	2,500	NA	370	5			1.1E+08	330
Fluorene	2,500	NA	14,000	5			1.1E+08	330
Fluorine	6,300	2,100	1,900	NA			5.4E+07	NA
Formaldehyde	3,800	NA	170	100			2.7E+07	500
Gentian violet	3.5	NA	{F}	NA			1.5E+05	NA
Heptachlor	0.077	NA	0.0016	0.01	{I}	{I}	3,300	1.7
Heptachlor epoxide	0.038	NA	{F}	0.01	{I}	{I}	1,700	1.7

YPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R 709(2)(c)(d)	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
n-Heptane	92,000	NA	{F}	NA			6.5E+08	NA
Hexabromobenzene	58	NA	{F}	0.1			2.5E+06	50
Hexachlorobenzene (C-66)	0.22	NA	0.0018	0.01			9,400	50
Hexachlorobutadiene (C-46)	4.5	NA	{F}	0.01			1.9E+05	50
alpha-Hexachlorocyclohexane	0.055	NA	{F}	0.01			2,400	1.7
beta-Hexachlorocyclohexane	0.19	NA	{F}	0.01			8,300	1.7
Hexachlorocyclopentadiene (C-56)	150	NA	0.54	0.01			6.4E+06	50
Hexachloroethane	25	NA	13	5			1.8E+05	330
n-Hexane	8,600	NA	{F}	NA			6.1E+07	NA
2-Hexanone	2,900	NA	{F}	50			2.1E+07	100
Indeno(1,2,3-cd)pyrene	0.048	NA	0.31	5	{I}	{I}	2,100	330
Iron	ID	300 {E}	{F}	100			ID	2,000
Isobutyl alcohol	6,700	NA	{F}	1,000			4.8E+07	1,000
Isophorone	370	NA	850	5			2.6E+06	330
Isopropyl alcohol	1,300	NA	21,000	400			9.5E+06	400
Lead	4 {E,R}	NA	8 {E,G}	3			4.0E+5 {S}	1,000
Lindane	0.27	NA	0.08	0.01			12,000	1.7
Manganese	500 {E}	50 {E}	{F}	20			4.3E+06	2,000
Mercury (Inorganic)	6.3 {E}	NA	0.0013	0.2			2.7E+05	100
Methanol	10,000	NA	41,000	800			7.4E+07	800

YPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l) Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	SOIL (ug/kg) Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
Methoxychlor	100	NA	{F}	0.5			4.5E+06	50
2-Methoxyethanol	83	NA	{F}	NA			5.9E+05	NA
2-Methyl-4-chlorophenoxyacetic acid	21	NA	{F}	0.5			9.0E+05	20
2-Methyl-4,6-dinitrophenol	7.3	NA	0.59	20			3.1E+05	1,700
4-Methyl-2-pentanone	1,000	NA	{F}	50			7.4E+06	100
Methyl-tert-butyl ether (MTBE)	690	NA	380	50			4.9E+06	100
Methylcyclopentane	ID	NA	{F}	NA			ID	NA
4,4'-Methylene-bis-2-chloroaniline {N}	0.36	NA	{F}	1	{I}	{I}	15,000	50
Methylene chloride	46	NA	59	1			3.3E+05	10
2-Methylnaphthalene	33	NA	{F}	5			1.4E+06	330
2-Methylphenol	1,000	NA	38	5			7.4E+06	330
3-Methylphenol	1,000	NA	{F}	5			4.5E+07	330
4-Methylphenol	100	NA	24	5			4.5E+06	330
Metolachlor	4,800	NA	{F}	0.1			2.1E+08	20
Naphthalene	750	NA	29	5			3.2E+07	330
Nickel	1,600 {E}	NA	57 {E,G}	50			6.8E+07	1,000
Nitrate	33,000	NA	{F}	NA			1.0E+9 {Q}	NA
Nitrite	1,500	NA	{F}	NA			9.0E+07	NA
Nitrobenzene	10	NA	1,900	5			68,000	330
n-Nitroso-di-n-Propylamine	0.05	NA	{F}	5			350	330

TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l) Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	SOIL (ug/kg) Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
N-Nitrosodiphenylamine	71	NA	160	5			5.1E+05	330
Pendimethalin	2,500	NA	{F}	0.1			1.1E+08	20
Pentachlorobenzene	17	NA	{F}	0.5			7.5E+05	50
Pentachlorophenol	2.9	NA	0.8 {H}	1			1.2E+05	1,700
2-Pentene	ID	NA	{F}	NA			ID	NA
Phenanthrene	75	NA	{F}	5			3.2E+06	330
Phenol	13,000	NA	1,100	5			8.9E+07	330
Polybrominated biphenyls	0.039	NA	{F}	0.01			1,700	50
Polychlorinated biphenyls {O}	0.17	NA	2E-5	0.2	{I}	{I}	7,500	330
Prometon	460	NA	{F}	0.1			2.0E+07	20
Propachlor	270	NA	{F}	0.5			1.2E+07	20
Propazine	560	NA	{F}	0.1			2.4E+07	20
Propyl alcohol	4,000	NA	8.2E+5	NA			2.8E+07	NA
Propylene glycol	4.2E+05	NA	1.9E+5	5,000			1.0E+9 {Q}	5,000
Pyrene	1,600	NA	11,000	5			6.7E+07	330
Pyridine	21	NA	20	10			1.5E+05	330
Selenium	100 {E}	NA	22 {E}	5			4.5E+06	500
Silver	98 {E}	100	0.1 {E}	0.5			4.2E+06	500
Sodium	4.5E+05	NA	{F}	NA			1.0E+9 {Q}	NA
Styrene	12	NA	19	1			83,000	10

TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
Sulfate	ID	2.5E+5	{F}	NA			ID	NA
Tebuthiuron	1,500	NA	{F}	NA			6.3E+07	NA
1,2,4,5-Tetrachlorobenzene	7,100	NA	0.4	0.1			3.1E+08	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin	4.6E-06	NA	1.4E-8	1E-5	{I}	{I}	0.2	0.001
1,1,1,2-Tetrachloroethane	13	NA	{F}	1			95,000	10
1,1,2,2-Tetrachloroethane	1.7	NA	32	1			12,000	10
Tetrachloroethylene	6.8	NA	22	1			49,000	10
Tetrahydrofuran	690	NA	3,300	NA			4.9E+06	NA
Thallium	1.7 {E}	NA	6.3 {E}	2			75,000	500
Toluene	4,600	790	110	1			3.3E+07	10
p-Toluidine	1.6	NA	{F}	NA			79,000	NA
Toxaphene	0.32	NA	0.00024	1			2,300	170
Triallate	270	NA	{F}	1			1.2E+07	20
1,2,4-Trichlorobenzene	310	NA	22	1			2.2E+06	10
1,1,1-Trichloroethane	580	NA	120	1			4.2E+06	10
1,1,2-Trichloroethane	6.1	NA	65	1			43,000	10
Trichloroethylene	22	NA	94	1			1.5E+05	10
Trichlorofluoromethane	7,300	NA	{F}	1			5.2E+07	10
2,4,5-Trichlorophenol	2,100	NA	{F}	50			9.0E+07	1,700
2,4,6-Trichlorophenol	32	NA	1.5	5			1.4E+06	330

TYPE C GENERIC INDUSTRIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ug/l)				SOIL (ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value {A} [R 709(2)(c)(d)]	GSI Value {B} [R 713]	Target Method Detection Limit in Water {C}	Groundwater Protection Value {D}	Surface Water Protection Value {D}	Direct Contact Value	Target Method Detection Limit in Soil {C}
2(2,4,5-Trichlorophenoxy)propionic acid {P}	160	NA	21	1			6.7E+06	50
1,2,3-Trichloropropane	120	NA	{F}	1			8.5E+05	10
1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+05	NA	{F}	NA			1.0E+9 {Q}	NA
Trifluralin	45	NA	{F}	NA			1.9E+06	NA
2,2,4-Trimethyl-2-pentene	ID	NA	{F}	NA			ID	NA
1,3,5-Trimethylbenzene	ID	NA	{F}	1			ID	10
tris(2,3-Dibromopropyl)phosphate	0.19	NA	{F}	NA			8,300	NA
Vanadium	180 {E}	NA	8 {E}	20			7.8E+06	1,000
Vinyl chloride	0.16	NA	3.1	1			1,100	10
Xylenes	38,000	280	59	3			2.7E+08	30
Zinc	6,900 {E}	5,000 {E}	81 {E,G}	20			3.0E+08	1,000

›tnotes

Criteria apply only if groundwater is used as a drinking water source, currently or in the future.

Groundwater surface water interface (GSI) values are based on Rule 57 of Act 245. The GSI values are presented only to establish groundwater criteria which are protective of surface water, and the criteria apply at the GSI.

Method detection limits for groundwater and soil samples, the latter expressed in ug/kg dry weight.

See Operational Memorandum #14 for discussion of this criterion.

Background, as defined in Rule 701(c), may be substituted as the cleanup criteria if higher than the listed criterion, or a site-specific Type C value may be determined.

Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. MDNR should be contacted to determine whether a chemical is being evaluated or has been evaluated since this list was prepared. If no value exists, the responsible party (RP) may develop a proposed GSI value for MDNR review and approval. Guidance can be obtained from MDNR. If a GSI value cannot be developed from data in the scientific literature, the RP can either perform a Type A cleanup or generate the minimum toxicity data required to develop the GSI value.

; GSI value is dependant on water hardness. Value presented was calculated assuming a hardness of 178 mg/l of $CaCO_3$. If site-specific water hardness is expected to be significantly different, contact an ERD toxicologist.

} GSI value is pH dependant. Value presented was calculated assuming a pH of 7.7. If site-specific pH is expected to be significantly different, contact an ERD toxicologist.

Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions. Therefore, the direct contact soil criterion is considered to be protective of groundwater. However, the presence of organic solvents in the soil may increase the solubility of these chemicals, thereby increasing their potential to leach from soil to groundwater. Under these conditions site-specific leachate testing may be required.

; Professional judgement used to determine that 50 ppb of aluminum in drinking water is protective of human health.

} Chromium III (Cr+3) criteria can be used only in those situations where chromium VI (Cr +6) is known/demonstrated not to exist at the site and use of the groundwater as a public water supply is prevented.

} Criteria for 1,3-dichloropropene can be applied to the cis- and trans-1,3-dichloropropene isomers. The toxicity data used for criteria development was generated using a mixture of both isomers (Telone II).

{} Criteria for endosulfan can be applied to endosulfan I (alpha-endosulfan) and endosulfan II (beta-endosulfan).

:} Also known as MBOCA.

›} Criteria apply to each Aroclor separately (Aroclor 1016, 1221, 1232, 1242, 1248, 1254 and 1260).

} Also known as Silvex.

}} Direct contact criterion is at saturation in soil. Criterion is actually greater than 100% in soil, hence it is reduced to 100%.

;} Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.

;} Type B criteria used as the default because no risk assessment tools are currently available to evaluate the health risks from exposure to lead for adults.

· = Inadequate data to develop criterion.

Footnotes

NA = Not available.

FLUOR DANIEL GTI

DRAFT

FEASIBILITY STUDY REPORT

General Motors-Allison Gas Turbine Plant 10
700 North Olin Avenue
Indianapolis, Indiana

June 3, 1997

Prepared For
General Motors Corporation
485 West Milwaukee Avenue
Detroit, Michigan 48202

Prepared By:
Fluor Daniel GTI, Inc.

Tom Sichz
Engineer

Bernard A. Lauctes, PE
Lead Engineer

Gianni Chieruzzi, PE, PG
Senior Hydrogeologist

Reviewed/Approved By:
Fluor Daniel GTI, Inc.

Andrew A. Gremos, CPG, CHMM
Operations Manager

David E. Arnold, CPG
Senior Project Director

PRIVILEGED & CONFIDENTIAL
PREPARED AT GMC COUNSEL'S REQUEST

6330 East 75th Street, Suite 174 / Indianapolis, IN 46250 USA (317) 595-6400 FAX (317) 595-6420

EXECUTIVE SUMMARY

Fluor Daniel GTI has prepared a Feasibility Study report for the former Allison Plant 10 located at 700 North Olin Avenue in Indianapolis, Indiana. This scope of work has been completed, when considered as a whole, to be consistent with the National Contingency Plan as referenced in 40 CFR 300.700 (Subpart H-Participation by Other Persons). The purpose of the study was to evaluate remediation cleanup goals for groundwater and soil, develop and screen possible remediation technologies, present results of treatability investigations, and provide a detailed analysis of selected remediation technologies.

Site-specific human health risks were calculated for the site using IDEM and Environmental Protection Agency (EPA) risk assessment methodology. No soil carcinogenic risks for non-residential exposures to soils exceeded the $1x\ 10^{-5}$ target risk level. On-site soil contaminants of interest (COI) concentrations found do not appear to pose a significant human health threat. No off-site soil COI were identified that required assessment.

Based on the noted exceedances of the Tier II Residential Cleanup Goals at property boundaries and/or at off-site locations, it is apparent that potentially unacceptable risks are posed by potential direct contact (i.e., ingestion) groundwater exposures to off-site residents in the immediate vicinity of the subject site. However, an evaluation of volatilized vapor from groundwater to indoor air using data from an off-site well posed no significant human health threat for offsite residents. No on-site groundwater COI were identified that required assessment.

The surface water non-carcinogenic risks were below the EPA's target hazard index of 1.0. Cis-1,2-dichloroethene, the only surface water COI, does not have carcinogenic toxicity constants. Therefore, no surface water carcinogenic risk levels were estimated. Off-site surface water COI concentrations found do not appear to pose a significant human health threat.

There are two major sources of organic constituents at the Plant 10 site: the principal source area is located near the northwestern corner of the property , and a secondary source area is located near the southeastern corner of the property . The direction of groundwater flow is generally toward the southeast in the western portion, and toward the south in the southeast portion of the site. As a result, the point of regulatory compliance is the southern and southeastern boundaries of the site. These property boundaries abut the City of Indianapolis Property and residential areas, respectively.

Remediation cleanup goals were determined for groundwater and soil in two phases. The objective of the first phase was to determine the maximum concentration of contaminants of interest (COI) that could be left in groundwater and not exceed Federal maximum contaminant levels (MCLs) for drinking water at the compliance point. The second phase determined the maximum concentration of COIs that could be left in the soil and, due to leaching, not exceed the groundwater cleanup goals established in the first phase.

The groundwater cleanup goals for the southeastern area were set at MCLs since little attenuation is expected to occur in the aquifer between the source area and the compliance point. The groundwater

cleanup goals are 5 ug/L for trichloroethylene (TCE), 70 ug/L for cis-1,2-dichloroethene (cis-1,2-DCE), and 2 ug/L for vinyl chloride (VC). In the western area, some attenuation between the source and the compliance point will occur. As a result, groundwater cleanup goals are based on the results of analytical modeling with 15 ug/L for TCE, 170 ug/L for cis-1,2-DCE, and 5 ug/L for VC.

Soil cleanup goals were determined using the SESOIL analytical model. Based on the calculated groundwater cleanup goals, the model was used to determine applicable soil cleanup goals. Based on the results of the modeling and consideration of direct-contact exposures, the soil cleanup goals in the southeastern area are 24,182 ug/kg TCE, 181,425 ug/kg cis-1,2-DCE, and 300 ug/kg VC. In the western area, the goals are 43,528 ug/kg TCE, 259,605 ug/kg cis-1,2-DCE, and 300 ug/kg VC.

Remediation alternatives considered for this site fall under two areas of classification. The first is non-treatment of impacted soil and groundwater and the second is combined soil and groundwater treatment. Based on time to cleanup and potential institutional controls, the non-treatment options were not considered applicable. In addition, a monitor-only approach would not reduce the mobility, destroy, or reduce the volume of contaminants.

Of all the alternatives for remediation, the two which are most technically feasible are air sparge and soil venting (AS/SV) and soil venting with groundwater extraction .

Based on preliminary engineering calculations, the cost for capital purchases, installation, and operation and maintenance (O&M) for one year of the AS/SV system could range from $410,000 to $460,000. Annual O&M of the system could range from $65,000 to $95,000. These estimates do not account for the possibility of off-gas treatment of vapors. The cost for capital purchases, installation, and operation and maintenance (O&M) for one year of the groundwater extraction/SV system could range from $400,000 to $510,000. Annual O&M of the system could range from $90,000 to $110,000.

A SV/AS pilot test was conducted at the site on February 24, 1997. The test results suggest that this technology is feasible given the site conditions.

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1. Site Location Map
2. Site Map
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4. Soil Venting Pilot Test Results
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1.0 INTRODUCTION

Fluor Daniel GTI, Inc.(Fluor Daniel GTI) has completed the following Feasibility Study (FS) for the Allison Engine Company, Plant 10 in Indianapolis, Indiana. A site location map is shown on **Figure 1**. This scope of work has been completed, when considered as a whole, to be consistant with the National Contingency Plan as referenced in 40 CFR 300.700 (Subpart H-Participation by Other Persons). The primary objective of the FS was to develop and evaluate appropriate remedial alternatives for contaminants of interest (COI) identified in the Remedial Investigation.

1.1 Background Information

1.1.1 Site Description

The subject property is the site of the former General Motors Corporation Allison Gas Turbine Division (AGT) Plant 10. This plant was purchased by General Motors from BHT Corporation (BHT) for use as a warehouse for obsolete machines, tooling, and fixtures in 1973. Prior to 1973, the facility was operated as a carburetor remanufacturing and brake overhaul facility by BHT. The original building was constructed in 1956 and renovated in 1970, doubling the floor space. The facility was used as a warehouse by General Motors until the mid 1980s at which time it became part of the AGT Division and continued to be managed as a warehouse. The property was then sold to The Allison Engine Company in December 1993 as part of the sale of AGT.

The site is occupied by a single warehouse. The area surrounding the warehouse is covered by asphalt and concrete. The western and southern sections of the property are grass with wooded areas. A site map showing salient site features is presented as **Figure 2**.

The property is zoned industrial and is currently occupied by Genuine Parts Company for use as a warehouse and distribution center. Land use in the surrounding area of the site is mixed use with zoning predominantly residential, general business, and industrial. The property is bordered by a wooded area, Little Eagle Creek, and Michigan Meadows Apartments to the south, a residential neighborhood to the east, a city park (Olin Park) to the north, and Holt Road and an Allison Transmission Plant to the west. Features of the surrounding area are presented on the Vicinity Map **(Figure 3)**.

The site is located on the southwest side of Indianapolis, Indiana on the Tipton Till Plain. The surface topography over most of the site is relatively flat. The southern third of the site slopes moderately to the south, towards Little Eagle Creek. Surface elevations at the site range from approximately 715 feet to 705 feet near Little Eagle Creek to the south. The subsurface of the site area is characterized by two thick layers of sand separated by a layer of silty clay. Another discontinuous layer of silty clay is found at the surface. The lower sand unit was not encountered at the maximum depth of penetration (65 feet) in the western area. Based on a comparison to published data, the two sand units are assumed to be the middle and lower confined aquifers of Meyer et al.,1975. The intermediary silty clay unit ranges in thickness from

approximately 8 feet to greater than 33 feet. According to Meyer et al. (1975), this clay layer acts as a semipervious confining bed (aquitard).

Based on data collected during three gauging events in 1995 and 1997, groundwater occurs at elevations ranging from 698.92 to 703.75 feet in the shallow water bearing unit, 698.83 to 701.00 feet in the lower sand unit, and 689.10 to 700.68 feet in the intermediary clay unit. Groundwater elevation data indicates groundwater flows generally towards the south (Little Eagle Creek). A comparison of groundwater elevations in the three well clusters (MW-153, MW-202, and MW-302; MW-150 and MW-200; and MW-151, MW-201, and MW-301) indicated a downward vertical hydraulic gradient in the western portion of the site and east of the plant. An upward hydraulic gradient was observed offsite to the southeast. Rising head permeability tests indicated average hydraulic conductivities of 137 feet per day in the shallow sand unit, 8.7 feet per day in the lower sand unit, and 0.012 feet per day in the intermediary clay. Based on the low hydraulic conductivity of the intermediary unit, it appears to act as an aquitard between the aquifers.

Fluor Daniel GTI obtained all available drilling logs of domestic water wells on record at the Indiana Department of Natural Resources, Division of Water. A total of 160 domestic wells were identified as being located within a one-mile radius of the subject site, the nearest of which lies approximately 1,000 feet north (upgradient) of the property. The wells are completed within limestone bedrock, clay, or sand and gravel units at depths ranging from 30 to 270 feet below grade (bg). Records indicate the Allison Transmission Plant across Holt Road to the west has two water supply wells, the nearest of which lies approximately 1,600 feet northwest of the site (cross-gradient). The majority of the water supply wells identified are located to the north, west, and south of the site. A total of 47 municipal or high capacity wells were identified as being located within a two mile radius of the subject site, with 17 of those located within a one mile radius. The nearest of these wells lies approximately 1,400 feet northwest of the site along Little Eagle Creek (cross-gradient). A house-to-house survey of local residences along the east side of Olin and the west side of Luett Avenues was conducted by the Marion County Health Department (MCHD) in December, 1996. A single domestic well was located at 709 North Olin Avenue. The construction of the well is unknown. This well was not identified during the well search conducted at the Department of Natural Resources. Only well logs completed by the drillers and submitted to IDNR are found in the IDNR's files. The approximate location of this domestic well is provided on **Figure 3**. The well was sampled by MCHD on January 2, 1997. The analytical results indicate that volatile organics are not present in this water supply.

Potable water is supplied to the area by the Indianapolis Water Company (IWC). The water supply is drawn from numerous wells in the area, the majority of which are located along Eagle Creek approximately 1.5 miles west (upstream) of the subject site. A discussion with the Supervisor of Customer Contact at IWC indicated that residences across Olin Avenue to the east and the Michigan Meadows Apartment complex across Little Eagle Creek to the south are supplied by IWC.

The nearest body of surface water is Little Eagle Creek located adjacent to the southern property boundary. This creek flows towards the east-southeast and eventually joins to Eagle Creek approximately one mile to the south of the site.

Indianapolis has a temperate climate with warm summers and no dry season. Precipitation is distributed fairly evenly through out the year. The average precipitation is 39.99 inches per year and the average annual temperature is 52.5° Fahrenheit (F). (NOAA, 1989). Over a 29 year period from 1960 to 1989 the average monthly rainfall ranged from a low of 2.69 inches in October to a high of 4.03 inches in June. Average temperature for the same period ranged from a low of 28.0° F in January to a high of 75.8 ° F in July. Spring and early summer rains usually exceed winter precipitation. (Sturm and Gilbert, 1978).

1.1.2 Site History

Two environmental investigations were completed at this property by Engineering Science, Inc. (ESI) in 1992. The initial investigation, entitled *Phase I Information Review Report for General Motors Corporation Allison Gas Turbine Division*, was completed by ESI in July of 1992. This assessment involved no intrusive exploration of environmental conditions. The Phase I assessment identified the following potential areas of environmental concern:

- two reported releases (100 gallons of quench oil in the southwest corner of the property and an unknown amount of hydraulic fluid in the southwest courtyard);
- possible waste burial area at western end of property; and
- possible area of dumping near the northwest corner of the plant.

The above ground storage tanks were reported to be in good condition. The Phase I identified the Plant 10 site as a potential area of concern (PAOC). The report included a recommendation to install three monitoring wells and one soil boring.

An intrusive follow-up assessment of the areas of environmental concern identified during the Phase I assessment was completed by ESI in November of 1993. Methods and results of this additional investigation were reported in a document titled *Phase II Site Assessment Final Report for General Motors Corporation Allison Gas Turbine Division* dated November 19, 1993. During the initial phase of work, three monitoring wells (MW-132, MW-133, and MW-135) were installed and one soil boring (SB-134) was advanced at the site. A soil gas survey was completed on the west side of the property during this investigation. During the second phase of this investigation four monitoring wells (MW-145 through MW-148) were installed and two soil borings (SB-149 and SB-150) were advanced on-site.

Results of this investigation identified trichloroethene (TCE), vinyl chloride (VC), 1,2-dichloroethene (1,2-DCE), tetrachloroethene (PCE), toluene, and methylene chloride in the soil on-site. Compounds most

frequently detected included TCE, 1,2-DCE, and VC. The west side of the site was confirmed as a PAOC during the Phase II investigation, however the source was unknown.

O'Brien and Gere Engineers, Inc. (OGE) conducted a Buyer Environmental Assessment for Plant 10 in May, 1994. They advanced six soil borings (SB-10-1 through SB-10-5 and OBG-10-1) and installed one monitoring well MW-10-1 in soil boring OBG-10-1. Surface samples collected included two surface soil samples near an area containing brake pad pieces, two brake pad samples for asbestos testing, two sludge samples from the sumps located south of the building. These sumps have since been removed. A total of six subsurface soil samples and three groundwater samples were also collected.

Fluor Daniel GTI conducted a Remedial Investigation at this site during the period of July 1995 to February 1997. Activities completed during the investigation included the advancement of fourteen soil borings, one Hydropunch, and six Geoprobe borings; collection of soil samples for laboratory analysis; the installation of nine shallow and five deep monitoring wells in the fourteen borings; surveying of all new wells; groundwater elevation monitoring and sampling of all wells on-site; stream survey and sampling of Little Eagle Creek; and rising head permeability tests from the newly installed wells. Results of the investigation were used to better characterize the geology and hydrogeology of the site, to further delineate VOCs and metals occurrence, and to assess the potential risk of VOCs and metals occurrence to human health and the environment.

1.1.3 Nature, Extent and Magnitude of Contamination

Analytical results for soil samples collected from the vadose zone during the above mentioned site investigations indicated the presence of VOCs in 17 of the 23 samples collected. TCE and 1,2-DCE were the most frequently detected compounds. Concentrations of TCE ranged from 29 micrograms per kilogram (ug/kg) to 120,000 ug/kg. 1,2-DCE concentrations ranged from 4 ug/kg to 12,000 ug/kg. Levels of adsorbed VC ranged from 12 ug/kg to 500 ug/kg. TCE was detected on site at one location (MW-132) above the Indiana Department of Environmental Management (IDEM) Tier II Non-Residential Cleanup Goal of 25,730 ug/kg. VC was detected at one location above its Tier II Non-Residential Cleanup Goal of 130 ug/kg. Using the Tier II Non-Residential Cleanup Goals as delineation, VOC occurrence in soil has been defined.

Using TCE as an indicator, multiple source areas (i.e., areas of elevated VOC concentrations) appear to be present in the western portion of the site (e.g., MW-132, GP-2, and MW-133). A soil sample collected from the air-water interface southeast of the plant building (MW10-1) contained 3,800 ug/kg TCE. This value was within the same order of magnitude as two groundwater samples collected from this location, therefore, it is not clear whether a source is present in this area. Levels of TCE an order of magnitude lower were measured in samples collected from the vadose zone on the southeast side of the plant building (MW-152) and further to the south (GP-5). These may represent other small source areas.

One sample collected southeast of the property contained a TCE concentration above the Tier II Residential Cleanup Goal. The sample, collected from a depth of 18-20 feet contained 170 ug/kg TCE which is above the Tier II Residential Cleanup Goal of 80 ug/kg. This sample was however, collected from below the water table. The groundwater sample collected from this location contained 280 ug/l TCE and therefore the soil results may reflect the presence of TCE in the groundwater.

A total of 28 of the 41 groundwater samples collected from monitoring wells during the period of July 1995 to February 1997 contained detectable concentrations of VOCs. Samples from seven of the wells were below detection limits for all analyzed constituents. As was the case with soil, the most frequently detected compounds were TCE and 1,2-DCE. Analytical data indicate detectable TCE concentrations ranged from 5.4 ug/L to 13,000 ug/L, cis-1,2-DCE concentrations ranged from 5.3 ug/L to 65,000 ug/L, trans-1,2-DCE concentrations ranged from 5.9 ug/L to 1,400 ug/L, and detectable VC concentrations ranged from 12 ug/L to 3,400 ug/L. Wells located west, southwest, and southeast of the building and/or property contained TCE, 1,2-DCE, and/or VC concentrations above the Tier II Non-Residential Cleanup goals. Based on this data, VOCs occurrence in groundwater has not been delineated horizontally south and east of MW-157. However, two additional wells are planned for this area. VOCs occurrence in groundwater south of HP-1 near Little Eagle Creek also has not been delineated. Shallow groundwater likely discharges into Little Eagle Creek, and therefore, it is unlikely that dissolved VOCs occurrence extends south of the creek.

Based on isoconcentration maps constructed for TCE, 1,2-DCE, and VC in groundwater, at least two potential source areas of elevated concentrations were identified. These areas are west of the building in the vicinity of MW-132 and southeast of the building in the vicinity of MW10-1. Based on a higher concentration of TCE degradation products (1,2-DCE and VC), it would appear that the potential source area due west of the building is older than the other area. Non-determined aliphatic hydrocarbons were detected in samples collected from MW-157 offsite to the southeast. The occurrence of these compounds appears to be localized in the vicinity of the well.

Groundwater data collected during previous investigations were compared to recent data (July 1995 to February 1997) to evaluate trends in dissolved VOCs concentrations. In general, most of the wells did not exhibit major changes in dissolved VOCs concentrations with time. Dissolved VOCs concentrations did increase in wells MW-132 and MW155. Detected concentrations decreased in wells MW-148, MW-153, and MW-156. Wells MW-132 and MW155 are located in the western potential source area. Well MW-148 is located downgradient of MW-132. MW-153 is located in the well cluster located southwest of the building and MW-156 is located offsite to the southeast.

The discharge (stream flow volume) of Little Eagle Creek was measured on October 4, 1996 and February 10, 1997. Maximum stream flows of 8 cubic feet per second (cfs) and 23.77 cfs were measured for these dates, respectively. Data collected from a gauging station 1.2 miles upstream indicated historical average flows of 11.1 cfs and 30.54 cfs, respectively, for the same two months. This suggests that the gauging station data could be used to describe relative stream flow trends.

Loading of VOCs to Little Eagle Creek was estimated using concentrations in groundwater at HP-1 and the above stream flow data. A concentration of 25 ug/L 1,2-DCE was predicted to be detected in Little Eagle Creek using the October, 1996 flow data. The actual concentration measured in Little Eagle Creek near HP-1 in October, 1996 was 17 ug/L. The predictive model and laboratory analytical results both indicated that detectable TCE and VC concentrations were not present in Little Eagle Creek in October 1996 and February 1997. Both also indicated that detected 1,2-DCE concentrations were not present in February 1997.

1.1.4 Baseline Risk Assessment

Site-specific human health risks were calculated for the site using IDEM and Environmental Protection Agency (EPA) risk assessment methodology. No soil carcinogenic risks for non-residential exposures to soils exceeded the $1x\ 10^{-5}$ target risk level. Assessed non-residential scenarios included the on-site worker and on-site construction worker exposure to surface and subsurface soil. The only on-site soil contaminant of interest (COI), vinyl chloride, does not have non-carcinogenic toxicity constants. Therefore, no soil non-carcinogenic hazard indices for non-residential exposures were estimated. On-site soil COI concentrations found do not appear to pose a significant human health threat. No off-site soil COI were identified that required assessment.

Based on the noted exceedances of the Tier II Residential Cleanup Goals at property boundaries and/or at off-site locations, it is apparent that potentially unacceptable risks are posed by potential direct contact (i.e., ingestion) groundwater exposures to off-site residents in the immediate vicinity of the subject site. However, an evaluation of volatilized vapor from groundwater to indoor air using data from an off-site well (MW-157) posed no significant human health threat for offsite residents. No on-site groundwater COI were identified that required assessment.

The surface water non-carcinogenic risks were below the EPA's target hazard index of 1.0. Cis-1,2-dichloroethene, the only surface water COI, does not have carcinogenic toxicity constants. Therefore, no surface water carcinogenic risk levels were estimated. Off-site surface water COI concentrations found do not appear to pose a significant human health threat.

1.1.5 Preliminary Identification of ARARs

For each hazardous waste site governed by CERCLA and SARA, congress has directed EPA to consider the degree of public health or environmental protection afforded by each remedial alternative considered. Section 121(d) of SARA requires that remedial actions be consistent with and in accordance with other environmental laws. These laws may include: the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the Clean Air Act (CAA), the Toxic Substances Control Act (TSCA), and the Safe Drinking Water Act (SDWA), among other federal laws, and any state law that has stricter requirements than the corresponding federal law.

These regulations and standards preliminarily identified for the **GM-Allison Plant 10** site have been categorized as "applicable or relevant and appropriate requirements" (ARARs), or as "to be considered" (TBCs). ARARs are legally binding. While TBCs are not legally binding, they will be considered along with ARARs as part of the site endangerment assessment and may be used in determining the necessary level of cleanup for protection of health or the environment.

ARARs may be further categorized as: chemical-specific requirements that may define acceptable exposure levels and therefore be used in establishing preliminary remediation goals; location-specific requirements that may set restrictions on activities within specific locations such as floodplains or wetlands; or action-specific requirements that may set controls or restrictions for particular treatment and disposal activities related to the management of hazardous wastes.

Based on these definitions, lists of ARARs and TBCs potentially applicable to the **GM Allison Plant 10** site have been identified and are shown in **Table 1** . This preliminary identification of ARARs and TBCs was used in identifying potential remedial alternatives to be developed and evaluated in the FS. Because the FS is iterative in nature, both state and federal ARAR identification may continue throughout the FS process as additional information concerning remedial action alternatives is acquired. This alternatives array document is intended to solicit any additional ARARs from appropriate state and federal agencies.

2.0 Remediation Cleanup Goals

There are two assumed source areas of COIs at the site; the principal area is located in the western portion of the property and a secondary source area is located in the southeastern corner of the property. Since groundwater flows toward the southeast and the south in the western and southeastern portions of the site, respectively, the most conservative point of regulatory compliance is the southern boundary of the site. The site abuts with the City of Indianapolis property along this southern boundary.

Remediation cleanup goals were determined for groundwater and soil in two phases. The objective of the first phase was to determine the maximum concentration of COIs that could be left in groundwater and not exceed MCLs at the compliance point. The objective of the second phase of modeling was to determine the maximum concentration of COIs that could be left in the soil and, due to leaching, not exceed the groundwater cleanup goals established in the first phase.

2.1 Groundwater Cleanup Goals

2.1.1 Southeastern Area

The southeastern source area, in the vicinity of MW10-1, is located less than 50 feet upgradient of the selected compliance point (the southern property border at the fence line). Little attenuation is expected between the source and the compliance point; therefore, the cleanup goals in this area are set at MCLs. Consequently, groundwater remediation cleanup goals for the southeast source area are 5 ug/L for TCE, 70 ug/L for cis-1,2-DCE, and 2 ug/L for VC.

2.1.2 Western Area

The source area in the western portion of the site is assumed to be represented by MW-132. The nearest compliance point can be conservatively set at the property line located about 180 feet directly south of MW-132, near MW-153. Although not directly downgradient, this location represents the most conservative compliance point for the western area of the site. An alternate compliance point may be set at the creek centerline located about 490 feet directly downgradient of MW-132. The following analysis determined groundwater cleanup goals for each COI at each compliance point using the following methods: (1) a simplified two dimensional (2-D) analytical equation and (2) a three dimensional (3-D) analytical model (AT123D).

The 2-D method used the 1995 chemical data from MW-132 and MW-153. Since this method is sensitive to large variations in concentrations the more rigorous AT123D modeling was completed to better deal with the observed variability in chemical data (as suggested by the most recent 1997 results). As shown in the next two sections, both methods do yield similar results when considering chemical data through 1995. However, if the latest 1997 data is used, the simplified 2-D analytical equation would yield a different cleanup goal. Consequently, the results of the 3-D analysis are used to calculate site cleanup goals.

2.1.2.1 Simplified 2-D Analytical Equation

If volatilization to the vadose zone and biodegradation are neglected, the principal mechanism for the attenuation of COI concentrations in groundwater is hydrodynamic dispersion. The equation describing COI dispersion from a point source located at the origin in a two-dimensional aquifer subject to uniform flow is (Bear 1979, eq. 7-156):

$$dC(x,y,t) = \frac{dM}{2\pi[2D_L^{'}t]^{1/2}[2D_T^{'}t]^{1/2}} exp\left[-\frac{(x - v't)^2}{4D_L^{'}t} - \frac{y^2}{4D_T^{'}t} \right] \quad (1)$$

Where

dM	=	C_o Q dt (mass of instantaneous slug of tracer)
v'	=	v/R
D_L'	=	D_L/R
D_T'	=	D_T/R
Co	=	input COI concentration
C	=	downgradient COI concentration
D_L	=	coefficient of longitudinal dispersivity
D_T	=	coefficient of transverse dispersivity
M	=	COI mass
Q	=	input COI flow
R	=	retardation coefficient
t	=	time
v	=	velocity of groundwater flow
x	=	longitudinal (i.e., along the direction of flow) coordinate
y	=	transverse coordinate

Convolution and integration of this equation can be used to obtain analytical expressions for the downgradient COI concentration that spreads from a given source area and input concentrations. Analytical codes such as AT123D (Yeh, 1981), provide solutions for the dispersion/retardation problem. It is important to note that the general dispersion equation, and particular solutions such as above, are linear with respect to the associated COI concentrations. Therefore, if the input concentration is halved and all other input parameters are fixed, all the calculated downgradient concentrations also will be halved.

In addition to the theoretical framework presented above, steady-state COI distributions were hypothesized in the development of the cleanup objectives for the groundwater at the site. The facility has apparently been operated only as a warehouse since 1973. Therefore, it can be assumed that on-site operations involving the use of chlorinated solvents have ceased for 20 or more years. A rough calculation of COI migration in the western area based on the approximate distance from well MW-132 to the point of compliance (set at MW-153) indicates the three COIs have most likely reached a steady-state condition at MW-153 in a time frame of less than 20 years. Additionally, comparisons of groundwater data collected from 1992 to 1995 reveal generally consistent concentrations of the groundwater COI. These two lines of

evidence support the hypothesis that the COI plumes have likely reached steady-state conditions from well MW-132 to MW-153.

Given that the downgradient analytical data for well MW-153 is available and that the concentration distributions have likely reached steady-state conditions, the cleanup criteria using the linear relationship between source area COI concentrations and point-of-compliance COI concentrations can be expressed as:

$$C_{goal} = (C_{point\ of\ compliance})\ (C_{MW132}/C_{MW153}) \qquad (2)$$

where:

$C_{point\ of\ compliance}$ is represented by the MCL for each COI.

Using equation (2) and the analytical results from 1995, the calculated concentration cleanup goals for the western area are:

C = 5(1,700/570) = 15 ug/L for TCE,
C = 70(5,115/980) = 365 ug/L for 1,2-DCE, and
C = 2(600/22) = 55 ug/L for VC.

Note that 1,2-DCE and VC are degradation products of TCE and more volatile than TCE. TCE has a half-life of one year in soil and 4.5 years in groundwater, however half-life in groundwater may be reduced to one year in the presence of aerobic bacteria (Howard, et al., 1991). Therefore, the treatment of TCE to a cleanup goal of 15 ug/L will result in depletion of the biodegradation parent product (TCE) and in the enhanced volatilization of 1,2-DCE and VC. Because of these two factors and because the cleanup goal for TCE is more stringent than that for 1,2-DCE or VC, the actual final concentrations of 1,2-DCE and VC are expected to be significantly lower than the cleanup goals presented above, when the cleanup goal for TCE is achieved.

2.1.2.2 3-D Analytical Model (AT123D)

The analytical groundwater flow and solute transport model AT123D was used as a second, more rigorous, method to determine groundwater cleanup goals in the western area. The simplifying assumptions associated with this groundwater flow model requires the aquifer to be treated as homogenous and isotropic with infinite or user-defined limits on areal extent. Groundwater flow is assumed to be uniform and at steady-state conditions. These assumptions were reasonably satisfied by available site hydrogeologic information. The following model input parameters, taken from qualified field data wherever possible, were used for the base-case model.

AT123D Model Input Values			
Aquifer Properties			
	Value	Units	Reference
thickness	18	feet	well logs
soil bulk density	1.76	g/cm^3	lab results
effective porosity	25	percent	assumed, Dominico and Schwartz, 1990.
hydraulic conductivity	137	ft/d	slug tests
hydraulic gradient	0.0045	ft/ft	water level data
plume travel distance	460	ft	chemical data
longitudinal dispersivity	46	ft	10% of travel distance (Gelhar et al., 1992)
transverse dispersivity	4.6	ft	1% of travel distance (Gelhar et al., 1992)
vertical dispersivity	0.16	ft	0.035% of travel distance (Gelhar et al., 1992)
total organic carbon	0.0012	mg/kg	lab results

Chemical Properties					
	TCE	cis-1,2-DCE	VC	Units	Reference
distribution coefficient	1.5E-4	5.9E-5	5.9E-5	m^3/kg	USEPA, 1990
biodegradation half-life	4.5	7.9	7.9	years	Howard et al., 1991
source loading rate	1E-4	1E-4	1E-4	kg/hr	estimated using site data

The calibration of the model presented a number of challenges. First, the data used to calibrate the model was obtained from wells completed either in the upper or lower portion of a relatively thin aquifer. However, data from these wells indicate a vertical concentration gradient exists. Second, for calibration, the available chemical record is limited as it contains wells that were sampled only two to four times in the period from 1992 to 1997. Finally, the recent variability in concentrations is relatively large in MW-132 and MW-153. Based on these observations, model calibration targets were established as follows: (1) the chemical record from 1992 to 1995 was used, (2) wells were designated "shallow" or "deep" if completed in the upper or lower half of the aquifer, respectively, and (3) modeled concentrations should be within the observed variability of data from 1992 to 1995 or within the same order-of-magnitude.

TCE was used to calibrate the model using the above base case values. This provided a starting point from which source area loading and dispersivity values were adjusted until a reasonable match between predicted and observed TCE groundwater concentrations was achieved. The time of release is not known but was assumed to be 1973 and, therefore, the calibration period is from 1973 to 1993.

To achieve an acceptable match between predicted and observed TCE concentrations, the source loading was increased from the initial estimate of 1.4E-4 kg/hr to 2.5E-4 kg/hr and the values for transverse and vertical dispersivity were subsequently reduced from 4.6 to 3.3 feet and from 0.16 to 0.033 feet, respectively. The following is a summary of the calibration results for TCE in ug/L using the chemical data record from 1992 to 1995.

Location	TCE Concentrations (ug/L)					Comments
	Observed				Predicted	
	1992	1993	1995	1997	1993	
MW-132	280	1900	1700	15000	790	Source Area - Shallow
MW-147	-	39	<5	51	5	Source Area - Deep
MW-133	47	24	23	53	93	Shallow
MW-145	-	9	5.6	43	20	Deep
MW-153	-	-	570	5.4	150	Shallow

To check the calibration, the calibrated model was used to simulate cis-1,2-DCE from 1973 to 1993. The only parameter that can be adjusted is the source area loading rate, once chemical-specific properties are changed. The results are shown in the table below.

Location	cis-1,2-DCE Concentrations (ug/L)					Comments
	Observed				Predicted	
	1992	1993	1995	1997	1993	
MW-132	1500	2400	5100	65000	5200	Source Area - Shallow
MW-147	-	<140	<5	95	61	Source Area - Deep
MW-133	81	56	70	100	862	Shallow
MW-145	-	440	530	<5	135	Deep
MW-153	-	-	980	<5	1220	Shallow

Based on the calibration results, the model is deemed capable of being used as a tool to determine groundwater cleanup goals for TCE, cis-1,2-DCE, and VC. Using the calibrated model, source loading rates were adjusted for each chemical until concentrations at the compliance points were at or below their respective MCL. The on-site cleanup levels for the conservative compliance point at the property line are 9 ug/L for TCE, 100 ug/L for cis-1,2-DCE, and 3 ug/L for VC. For the other possible compliance point at the stream, the cleanup goals are 15 ug/L for TCE, 170 ug/L for cis-1,2-DCE, and 5 ug/L for VC.

2.2 Soil Cleanup Goals

The objective of the second phase of modeling was to determine the maximum concentration of COIs that could be left in the soil without leaching to groundwater and exceeding the groundwater cleanup goals established in the phase one analysis. The 1-D analytical vadose zone model SESOIL (GSC, 1996) was used with a climatic database for Indianapolis to predict groundwater concentrations due to leaching of COIs from the vadose zone. Infiltration is the driving force for downward migration of COIs from the vadose zone.

The simplifying assumptions associated with SESOIL requires the soil to be treated as homogenous and isotropic with user-defined limits on source areal extent. These assumptions were reasonably satisfied by available site hydrogeologic information. The following model input parameters, taken from qualified field data wherever possible, were used in the model.

SESOIL Model Input Values					
Soil Properties					
	Value	Units	Source		
thickness	10	feet	well logs		
soil bulk density	1.76	g/cm^3	lab results		
effective porosity	25	percent	assumed, Dominico and Schwartz, 1990.		
total organic carbon	0.0012	mg/kg	lab results		
intrinsic permeability	1.0E-8	cm^2	assumed, GSC, 1996		
Chemical Properties					
	TCE	cis-1,2-DCE	VC	Units	Reference
molecular weight	131.50	96.94	62.5	g/mol	GSC, 1996
solubility	1100	3500	2670	mg/L	GSC, 1996
Henry's Constant	0.0103	0.00674	0.00674	m^3-atm/mol	GSC, 1996
K_{oc}	126	49	57	-	GSC, 1996
diffusion coefficient in air	0.083	0.091	0.091	cm^2	GSC, 1996 GSC, 1996

In the model, the source was assumed to occupy the upper five feet of the vadose zone. The initial soil concentration for each COI was loaded into this zone during the first model time step. As a staring point, the IDEM Tier II Non-residential Cleanup Goals were used. The simulation period was ten years with the greatest leachate concentration, typically occurring within the first five years, applied to the groundwater. The Summer's Method (GSC, 1996) was used to estimate the groundwater concentration due to leaching

from the vadose zone. The leachate was assumed to enter at the water table over a 30-square foot area and mix completely with clean groundwater in the upper half (9 feet) of the aquifer.

The resulting groundwater concentration due to leaching was compared to the groundwater cleanup goals determined using the AT123D model. The maximum soil concentration for each COI that leached to produce a groundwater concentration equal to the groundwater cleanup goal was determined. The modeling results are presented below.

Site Specific Soil Cleanup Goals (ug/Kg)			
Southeastern Area			
	TCE	cis-1,2-DCE	VC
	24,182	181,425	4,417
Western Area			
	TCE	cis-1,2-DCE	VC
Property Line Compliance Point	43,528	259,179	6,625
Little Eagle Creek Compliance Point	75,547	440,605	10,042

IDEM Tier II Nonresidential cleanup goals for subsurface soil are based on (1) direct-contact exposure scenarios using standard human health risk assessment calculations and (2) protection of groundwater (IDEM, 1996). The site specific subsurface soil cleanup goals presented in the above table were based on protection of groundwater. These cleanup goals were compared to the Tier II goals for direct-contact. The calculated site specific closure goals are below the Tier II goals for direct-contact exposure scenarios for TCE and cis-1,2-DCE. However, the site specific goal for VC is above the Tier II value; therefore, to be protective of human health, the Tier II value of 300 ug/kg for VC in subsurface soils (IDEM, 1996) is used.

3.0 DEVELOPMENT AND SCREENING OF TECHNOLOGIES

3.1 Introduction

The objective of the development and screening of technologies is to identify, screen, and develop alternatives for removal, containment, treatment and/or other remediation of impacted areas at the site. The initial development and screening of alternatives is based on information provided in the Remedial Investigation Report.

COIs, impacted media, extent and magnitude of occurrence, and cleanup goals are discussed in Section 1.0. In summary, the COIs are TCE, 1,2 DCE, and VC. Two general areas of concern requiring remedial evaluation were identified, one southeast of the warehouse building near MW10-1 and a second comprising the western portion of the site south of MW-132. Remedial alternatives need to be considered for COI occurrence in groundwater in the shallow unconfined aquifer in both areas of concern. Alternatives for the remediation of COI in soil only need to be considered for the western area of concern. Initial screening for remedial technologies was accomplished by using matrices for evaluating remediation strategies **(Tables 2 and 3)**. These matrices are based on applicability (technical feasibility), protection of public health and the environment, cost and treatment time, and administrative considerations. The development and screening criteria are discussed in more detail below.

3.1.1 Overview of Development and Screening Process and Criteria

In order to screen remediation technologies and identify potential corrective measure alternatives, the following site specific information is considered:

- chemical type and characteristics;
- site medium;
- chemical concentrations distribution throughout medium;
- cleanup goals;
- technical feasibility of attaining cleanup goals;
- time frame for remediation and;
- costs to accomplish the remedial objective.

3.1.1.1 Applicability

The applicability of a technology to remediate impacted areas at any specific site is evaluated with regard to the specific advantages and disadvantages listed below.

<u>Advantages</u>

- Mobility reduction: when the technology significantly reduces the potential for migration.

- Destruction: when the technology destroys, degrades or otherwise transforms the chemical to a non-toxic form.
- Volume reduction: when the technology significantly reduces the amount of contamination in the impacted areas.
- Performance and reliability: whether the technology has a proven track record for treating the chemicals in a similar site setting.
- Implement ability: when the logistics of designing, procurement, installing, and operating the technology at the given site appear to be direct.

Disadvantages

- Emerging technology: when a technology is not fully developed and may not be reliable.
- Inappropriate technology: when site conditions are not technically suitable for the application of the technology.
- Not permittable: if permitting of the technology at the site is very difficult or impossible to obtain.
- Additional treatment required: if the technology requires additional equipment or processes to handle secondary controls (e.g., off-gas treatment)
- Operating area: application of the technology would require a large area of the site surface.
- Inappropriate soil material: if the soil structure is incompatible with the treatment process.
- Depth to water: whether depth to groundwater is inappropriate for the treatment alternative.
- Potential additional liability: whether the treatment technology may add additional liability.

The advantages and disadvantages are used to give each alternative a numeric applicability rating. This rating gives a numerical value to the relative applicability of the technology to the specific site with regard to technical merits and the ability to permit the process. This is a subjective rating based upon the listed advantages and disadvantages of the technology applicability as well as any additional professional judgements. The rating scale is from zero to five, with zero equal to "not applicable, available, or implementable" to five for "widely used, proven and applicable."

3.1.1.2 Protection of Public Health and the Environment

Any remediation technology under consideration should maintain exposure to site workers, visitors, and surrounding population to a minimum. The treatment technology is considered an advantage when the technology reduces human exposure to the chemicals or minimizes the exposure through the process of remediation. This is a numerical score ranging from zero to three based on the use of the technology. Community impact is also important and the technology is considered a disadvantage if the application of the technology could be perceived as negatively impacting the local community or environment.

3.1.1.3 Costs and Treatment Time

This rating gives a numerical value to the relative capital and operating costs incurred in implementing the technology.

- Capital Costs: relative cost of obtaining and installing the technology.
- Operating Costs: relative costs of operating and maintaining the treatment system.

The treatment time rating gives a numerical value to the potential of the treatment technology to perform the desired site remediation within an acceptable time.

3.1.1.4 Administrative Considerations

These considerations include the time necessary for administrative project oversight and control from initial conception through cleanup. This rating gives a numerical value to the relative administrative oversight required by the technology. Ratings are from one to three with three requiring the least amount of administrative oversight. This includes required engineering design work and oversite.

3.1.1.5 Rating Score

The rating score is defined as the arithmetic scoring of each of these criteria based on the following calculation:

$$\text{Rating Summation} = AP \times HE \times AC \times (C + T)$$

Where	AP	=	Applicability
	HE	=	Health and the Environment
	AC	=	Administrative Considerations
	C	=	Costs
	T	=	Treatment Time

For each technology, these criteria are given a score that ranges from one up to three or five, depending on the criteria. Table 2 provides a detailed summary of the scoring used within each criteria.

3.2 Development of Alternatives

Remediation alternatives considered for this site fall under two areas of classification. The first is non-treatment of impacted soil and groundwater and the second is active soil and groundwater treatment. Each of these categories is broken into subsections with alternative technologies relevant to that process. The alternatives are presented in matrix form with scoring as presented on **Tables 2 and 3**. The alternatives initially scored and presented are under general consideration and may be applicable to this site. The alternatives are broken down as follows:

3.2.1 Non-Treatment of Impacted Soil and Groundwater

Listed below are options that provide a baseline by which to compare other alternatives. Alternatives are as follows:

NO ACTION
- Leave existing levels in place with long term monitoring

CONTAINMENT
- Groundwater Extraction and Treatment
- Air Sparge Curtain

3.2.2 Active Soil and Groundwater Treatment

Provided below are active remediation alternatives to address either the soil or groundwater. Alternatives are as follows:

VOLATILIZATION
- Soil venting only
- Soil venting with groundwater extraction
- Soil venting with air sparging

EXCAVATION
- Soil removal and disposal

EXTRACTION
- Groundwater pumping

DEGRADATION
- Ozone injection

3.3 Screening of Alternatives

3.3.1 Non-Treatment of Impacted Soil and Groundwater

3.3.1.1 Description

The no action alternative will require long-term groundwater gauging and/or sampling on a periodic basis (possibly quarterly) to track the movement of the COIs. Deed restrictions will be required for the site that prohibit the installation of an on-site water supply well and excavation activities in the western portion of the site. The site will also have to remain zoned for commercial/industrial use. Institutional controls restricting the installation of water supply wells off-site to the southeast and south would also be required. Use of this alternative also assumes the COIs will naturally attenuate through biodegradation and dispersion.

Containment technologies, such as groundwater interceptor wells or an air sparge curtain, also may place a restriction on the land. The purpose of the containment technologies is to intercept the COIs before they migrate off-site in the groundwater. Typically, a line of extraction wells or air sparge wells is placed along the downgradient property line. Groundwater is either pumped from the aquifer and treated (extraction) or stripped of the COI in place (air sparge). On-site deed and zoning restrictions would be similar to the no action approach. The sale of the land may be restricted after a containment technology is implemented stating the technology may not be removed and must continue to be maintained.

3.3.1.2 Screening

3.3.1.2.1 Applicability

The no action and containment treatment options were considered not applicable (AP 0-2). These alternatives do not reduce the mobility, destroy, or reduce the volume of contaminants. It is unlikely that the City of Indianapolis (property to south) or residents to the southeast would be willing to deed-restrict their properties.

3.3.1.2.2 Protection of Public Health and the Environment

These alternatives are not in the best interest of the public health or the environment in this situation (HE 1-2). The assessment to determine the horizontal and vertical extent of impact indicated possible impact to the Little Eagle Creek, although risk assessment determined no unacceptable risks.. Additionally, monitoring wells located off-site to the southeast of the property indicated levels above federal MCLs. Due to the possibility that a water supply well could be installed off-site, this course of action is not recommended.

Discussions with Marion County Health Department personnel indicated that there are no ordinances prohibiting the installation of a water supply well on private property in Indianapolis. However, Section 18-803 of the County Health Code states that the Health Department can prohibit the installation of water supply wells in areas where groundwater has been determined to be contaminated by chemical, biological, or radiological contaminants. Sherry Winters, Field Supervisor, indicated, however, that if "chemical contamination" were detected in a newly installed well, they could ask the owner to connect to public water supply if it were available (within 100 feet). However, since the water supplier is a private company they could not automatically make someone use the water supply.

3.3.1.2.3 Cost

The costs for continued monitoring are minimal on an annual basis, but can be substantial in the long term due to perpetual monitoring requirements.

Containment controls would cover the horizontal extent both on the southern and eastern property lines. Capital, installation, and one year of operation and maintenance costs could range from $200,000 to $400,000 for groundwater extraction and treatment and $100,000 to $300,000 for an air sparge curtain. The concentrations of chlorinated solvents in the groundwater may also require the use of an air stripper before carbon polishing in the groundwater extraction and treatment option.

3.3.1.2.4 Administrative considerations

These technologies were considered to require normal or no administrative oversight (AC 2-3). The following administrative controls were identified:

Continued monitoring:

- quarterly or periodic reporting (to client and regulatory agency)
- sampling/purge water drum disposal or permit to discharge

Institutional actions:

- possible public hearings
- continued communication with regulatory agency providing necessary documentation for re-zoning or deed restriction as required by agency

Containment:

- water discharge permitting either storm or local sanitary sewer
- quarterly or periodic reporting (to client and regulatory agency)
- site safety plan
- engineering wells, equipment, and piping design
- engineering operation and maintenance manual

3.3.1.2.5 Treatment Time

The technologies were considered to have treatment times either longer than desired or acceptable (AC 1-2), for no action and containment, respectively.

3.3.2 Active Soil and Groundwater Treatment

Active soil and groundwater treatment can be accomplished by several methods including soil venting, soil venting combined with air sparging, soil venting combined with groundwater extraction, soil excavation and disposal, groundwater pumping alone, and contaminant degradation. These options are discussed in the following sections.

3.3.2.1 Description

Volatilization is the process of removing the contamination from the saturated or unsaturated zone via the vapor phase. Volatilization of adsorbed phase contaminants in the unsaturated zone typically involves soil ventilation. Soil venting (soil vapor extraction) removes VOCs from vadose zone soils by inducing air flow through the impacted areas. Venting is typically performed by applying a vacuum to vertical vapor extraction wells screened through the level of soil contamination using a vacuum blower. The resulting pressure gradient causes the soil gas to migrate through the soil pores toward the vapor extraction wells. VOCs are volatilized out of the subsurface and converged to the surface by the migrating soil gas.

A process that volatilizes both adsorbed phase contaminants in the saturated and unsaturated zones and dissolved phase contaminants in the saturated zone is air sparging with soil venting. Air is forced under low pressure through a 1 to 2 foot section of well screen into the saturated zone generally at a point 5 to 20 feet below the vertical extent of impact. Sparging creates air-filled porosity in the saturated zone which facilitates direct volatilization of contaminants from saturated soil and removes VOCs from groundwater. The turbulence created by sparging improves mixing in the saturated zone which increases the transport of contaminants from saturated soils to groundwater.

A less-often used technology is vertical circulation wells that extract groundwater at the well bottom, air-strip within the well to remove VOCs, and finally discharge the treated groundwater through the top of the well at the water table. This is also known as "in-well sparging" technology. Several methods can be used to induce vertical flow within the well and thereby create the circulation cell within the aquifer in the vicinity of the well. Vapors generated within the well are removed, treated, and discharged.

Vertical circulation wells are not appropriate because, as an emerging technology, it is not widely used and does not have a proven track record. Furthermore, this technology is essentially a groundwater pump, treat, and reinject system without the use of submersible pumps or air stripper. As with conventional pump-and-treat systems, groundwater cleanup times and their effectiveness are diffusion-limited resulting in ineffective and long clean-up times.

Excavation involves removing soil from the impacted area using heavy machinery. The horizontal and vertical extent of impact is first identified. Heavy machinery is then used to remove the impacted soil while pumps extract the exposed groundwater. The soil is typically placed directly in the back of a staged truck while the groundwater is treated via activated carbon and discharged. The excavated soil is taken to off-site facilities and treated. The excavated soil is replaced with clean backfill. The on-site remediation of the soil requires equipment capable of processing several thousand cubic yards of soil and is not feasible for this site.

Extraction of groundwater is historically the most common remedial technology addressing dissolved phase contaminants. This technology employs either surface mounted or downwell pumps. Recovery wells are placed either within the impacted groundwater or perpendicular to the groundwater gradient at the leading edge of impacted groundwater. Downwell pumps extract the groundwater and convey it to an on-site treatment facility. This technology addresses only groundwater contamination. Vadose zone soils are not remediated.

Advanced oxidation processes degrade aqueous contaminants by reaction with hydroxyl radicals. The hydroxyl radicals are typically produced using ozone and/or hydrogen peroxide. Ozone is a highly reactive form of oxygen which reacts preferentially with organic compounds containing a double bond structure (unsaturated). Compounds with this double bond structure include chlorinated solvents. Ozone is injected into the aquifer at or below the vertical extent of contamination using an ozone generator.

3.3.2.2 Screening

3.3.2.2.1 Applicability

Of the alternatives evaluated, the only two that are the most applicable are soil venting with groundwater extraction and soil venting with air sparging (AP 5, see Table 2)). Excavation is not considered feasible (AP 2) due to the value of soil requiring removal, treatment, and disposal near MW-132 and SB-150 (approximately 250 cubic yards). Also, the more favorable technologies are able to remediate the soil as part of their overall operation. Groundwater pumping alone is also feasible (AP 3) and could place control on the movement of groundwater, but it will not address the impacted soil which would continue to contribute to the groundwater contamination. Like groundwater extraction, soil venting only (AP 2) will address only one phase of the contamination; the adsorbed phase chemicals in the unsaturated zones.

3.3.2.2.2 Protection of public health and the environment

The in-situ treatment technologies that are most feasible in this situation are inherently more protective of human health (HE 3) than ex-situ technologies such as excavation (HE 2). Excavation would require the use of heavy machinery and often leads to the uncontrolled release of dust and vapors from the excavations. The water and air discharge from an in-situ technology are regulated by state agencies to protect the public health and the surrounding environment.

3.3.2.2.3 Cost

A volatilization technology requires the installation of wells, trenching, and an operating system after completing a full design. Capital, installation, and one year of operation and maintenance costs for a volatilization system range from $100,000 to $300,000 with soil venting only as the least expensive. Soil venting with groundwater removal or air sparging are more expensive technologies.

A groundwater-only pumping system is less expensive than volatilization with a range of $100,000 to $300,000 for capital, installation, and one year of operation and maintenance. However, these systems often require significantly longer periods of operation than more aggressive treatments such as soil venting and air sparging and have higher overall annual operation and maintenance costs.

Excavation and disposal of impacted soils above cleanup goals cost ranges from $100,000.00 to $300,000.00. However, soil excavation alone does not address current groundwater impacts.

The costs for installing and operating an ozone injection system is expected to be greater than $500,000 for capital, installation, and one year of operation and maintenance.

Any system removing groundwater will most likely require the use of either an aqueous phase granular activated carbon (GAC) treatment or other technology prior to discharge to meet effluent standards. An alternative to GAC for groundwater treatment is an air stripper, however, these units require significant additional maintenance and there is a potential for more frequent discharge excursions. Groundwater removal may also require the use of an air stripper prior to carbon polishing based on some of the concentrations of chlorinated compounds in the groundwater.

3.3.2.2.4 Administrative considerations

Each alternative scored the same regarding administrative considerations (AC 2). Any system requiring the removal of soil vapors or groundwater will require discharge permitting, mass removal tracking, monthly or quarterly reports, engineering design and equipment sizing. Excavation will require classification permitting and disposal permitting along with typical excavation reports. Ozone injection may require special permitting but it is highly reactive and has a limited life in the usable form. Extra site safety controls would be necessary, however, for on-site personnel performing operation and maintenance tasks within the remediation treatment facility

4.0 TREATABILITY INVESTIGATIONS

4.1 Introduction

Treatability investigations are used to determine the feasibility of a proposed remedy and to provide data for remedial design purposes. A review of historical site data indicates no treatability investigations have been conducted at this site.

4.2 Pilot Scale Test

Based on the screening of technologies and the potential applicability of air sparging with soil venting , Fluor Daniel GTI conducted a pilot scale test using this technology. On February 24, 1997, a soil venting (SV), air sparge (AS), and combined AS/SV pilot test was conducted in the southeastern portion of the site. The objectives of the pilot testing were as follows.

- evaluate the technical feasibility of using the AS/SV technology at the site
- determine the radius of influence for single-well SV test
- determine the radius of influence for single-well AS test
- estimate flow rates and VOC emission rate during a combined AS/SV test

The nested well SP1 was used for the pilot tests. The well is constructed of a 1-inch diameter PVC sparge point screened from 23 to 25 feet below ground (bg) and a 4-inch diameter PVC vent well screened from 5 to 15 feet bg. The three 2-inch diameter PVC observation wells OB-1, OB-2, and MW-10 were used, they are located 5, 10 and 20 feet from SP1, respectively. OB-1 is screened from 5 to 15 feet bg, OB-2 from 5 to 15 feet bg, and MW-10 from 7 to 17 feet bg.

4.2.1 Soil Vent Pilot Test Methods and Results

The first test conducted was a step-vacuum soil vent test using a 1.0 Hp Rotron regenerative blower to apply a vacuum to SP1 at settings of 7, 14, and 21 inches of water. The steps were conducted for 30, 15, and 15 minutes, respectively. Corresponding air flow rates, measured at the wellhead using a differential flow sensor, were 63, 88 and 137 scfm, respectively. Vapor concentrations in the effluent were 1.2 ppmv and 4.0 ppmv for the first step and third step, respectively.

The pretest depth to water was 13.50 feet below the top of casing. The well is screened from 7 to 17 feet below grade and has about a 3-foot stickup yielding an available screen interval of 3.5 feet. Observation well vacuum is summarized in **Table 4**. **Figure 4** shows a plot of vacuum versus distance for each vacuum setting with linear and logarithmic scales presented in the upper and lower plots, respectively.

The vacuum radius of influence (ROI) is defined as the distance at which subsurface vacuum equals 0.1 inches of water. The ROI is calculated at 25, 28, and 29 feet for vacuum settings of 7, 14, and 21 inches of water, respectively. A design flow rate of 88 scfm per extraction well (25 scfm per foot of screen) at a vacuum of 14 inches of water will produce an ROI of 28 feet.

Short-term SV tests were conducted in wells MW-132, MW-153, and MW-154. Only about one foot of screen was exposed at MW-132 which was insufficient to conduct a test due to upwelling of the water table. At 45 inches of water, a flow rate of 88 scfm was recorded at MW-153. The available screen interval was about 3.5 feet which yields 25 scfm per foot of well screen. An air sample collected after ten minutes was non-detect for VOCs. At 65 inches of water, no measurable flow was observed in MW-154. The available screen was 8 feet. These results suggest that adequate air flow rates can be achieved at most locations across the site except in the extreme northwest portion due to greater amounts of clay and silt in the vadose zone.

4.2.2 Air Sparge Pilot Test Method and Results

The second test was an air sparge test conducted on the SP1 sparge point. Using a portable compressor, an air flow of 9.5 standard cubic feet per minute (scfm) at a pressure of 4.8 pounds per square inch (psi) was applied to SP1. During the sparge test, depth to water, dissolved oxygen, and pressure measurements were recorded at OB-1, OB-2, and MW-10. The test data is summarized in **Table 5**. The results for dissolved oxygen, pressure, and upwelling (change in depth to water from static) are illustrated in **Figure 5** for each parameter versus time and distance.

Dissolved oxygen concentrations increased within 10 minutes in OB-1 and OB-2. There was a delay of about 40 minutes before an increase was observed in MW-10. Dissolved oxygen concentrations stabilized in all observation wells within 60 minutes. Dissolved oxygen increased above pretest levels by 2.5 mg/L in OB-1, 3 mg/L in OB-2, and 2 mg/L in MW-10.

Air pressure in the unsaturated zone increased throughout the test in OB-1 and OB-2, observed pressures in MW-10 initially increased but appeared stable throughout the test. At 52 minutes, pressures were 0.22 inches of water in OB-1, 0.09 inches of water in OB-2, and 0.075 inches of water in MW-10.

Depth to water was measured to record any increase in the water table elevation. During the early stages of injecting air below the water table, the water table rises (upwells) in the vicinity of the sparge well. As preferential air channels develop, the upwelled area collapses and begins to return to static or near-static levels. Maximum upwelling was recorded at 37 minutes with 0.75 feet in OB-1, 0.97 feet in OB-2, and 0.44 feet in MW-10. Within 65 minutes, the upwelled area collapsed to 0.3 feet in OB-1, 0.42 feet in OB-2, and 0.21 feet in MW-10. Upwelling was greater at a radial distance of 10 feet from SP1 in OB-2 than at OB-1 which is located at 5 feet. This may indicate preferential flow in the direction of OB-2 due to heterogeneities in aquifer materials.

Dissolved oxygen is the primary indicator of sparging ROI with pressure and upwelling providing qualitative indications of ROI. Analysis of these parameters indicates an ROI of 20 feet is possible at an air flow rate of 9.5 scfm at 4.5 psi.

4.2.3 Combined AS/SV Test

After about 60 minutes of continuous air sparging, the vapor extraction blower was activated to conduct the combined AS/SV test. Concentrations in vapors from SP-1 after approximately 30 minutes of the combined test were 10 ppmv based on FID readings. An air sample was also collected in a Tedlar bag and sent for analysis of VOCs using EPA Method TO-14. VOC emission rates could not be evaluated because analytical results were non-detect for all analytes. Possible reasons for not detecting VOC vapors in the effluent include: (1) VOC concentrations in soil in the southeastern area are relatively low, (2) a longer test may have been needed, or (3) leakage around the test well may diluted the effluent air stream. Regardless, the primary goal of the test was to investigate the applicability of AS/SV at the site. The pilot test results demonstrate that this is a viable technology given the site hydrogeologic conditions.

5.0 DETAILED ANALYSIS OF ALTERNATIVES

5.1 Introduction

The previous section identified and screened potential technological alternatives and provided two viable options for site remediation. The objective of the following detailed analysis of alternatives is to describe in detail and rank, the two options.

5.1.1 Overview of Detailed Analysis and Criteria

The two corrective measure alternatives identified in the previous section are evaluated and ranked for their suitability in remediating soil and groundwater at the site. The basic mechanism for the screening process is a subjective rating system where each feasible technology is compared on a relative basis with regard to the site conditions and the following considerations:

- Applicability;
- Protection of public health and the environment;
- Cost; and
- Administrative considerations.

5.2 Individual Analysis of Alternatives

5.2.1 Soil Venting with Groundwater Extraction

5.2.1.1 Description

Soil venting with groundwater extraction simultaneously removes fluids and vapors from either a single extraction well or separate venting and groundwater pumping wells thereby addressing both the saturated and unsaturated zones. The SVE removes VOCs from the unsaturated zone by inducing air flow through contaminated areas. Soil vapor extraction is typically performed by applying a vacuum to vapor extraction wells screened through the level of adsorbed phase contamination. The resulting vacuum gradient causes the soil gas to migrate through the soil toward the vapor extraction wells. VOCs are volatilized by the passing air and conveyed to the subsurface by the migrating soil gas.

Groundwater extraction is accomplished by use of either a single submersible electric pump or pneumatic suction pump at the surface, using a variety of equipment. Soil vapors can be recovered from the pumping wells. However, based on known site conditions, separate groundwater pumping and vapor extraction wells are needed. This is because a greater number of VES wells are required compared to groundwater wells. Recovered groundwater is treated via air stripping or liquid phase granular activated carbon (GAC). Air stripping involves the physical removal of a VOC from the water stream. This is accomplished by cascading the water stream over a counter-current stream of air. Packing material in the stripper provides additional

surface area to improve the removal process. Air stripping is a preferred technology when the groundwater pumping rate and dissolved VOC concentrations are relatively high and dissolved metals concentrations are relatively low. Iron fouling due to oxidation can become a maintenance issue.

Liquid-phase GAC adsorption is the accumulation of a chemical from a liquid phase onto the surface of the carbon. The adsorptive properties of GAC are due mainly to its highly porous structure and resulting large surface area. Contaminated water is generally treated by passing it through two vessels containing GAC arranged in series. The first vessel acts as the primary treatment unit and the second acts as a polishing treatment unit. When the primary vessel becomes saturated, it is removed and is replaced with the secondary vessel. A fresh carbon drum is placed in the secondary position. This process is repeated when the primary vessel reaches saturation. Liquid phase carbon adsorption is the preferred water treatment technology when dissolved VOC concentrations and groundwater pumping rate are relatively low.

5.2.1.2 Soil Venting with Groundwater Extraction Criteria

5.2.1.2.1 Applicability

Groundwater extraction with soil venting could be implemented in both areas of concern. Groundwater extraction would be used to treat dissolved VOCs in both areas. Soil venting would be used to treat VOCs in soil in the western area only. Groundwater extraction and treatment is a widely used technology for the treatment of VOCs in groundwater in hydrogeologic settings similar to the site. Groundwater pumped form the subsurface is treated and discharged to a publicly owned treatment works (POTW) or to the surface with appropriate permitting. The water stream is typically treated using air stripping or liquid phase GAC. Based on assumed pumping rates and potential VOC concentrations, the air stripping technology would likely be employed. Soil venting is a widely used technology to address VOC occurrence in soil. Based on the VOC recovery rates, off-gas treatment of the emissions may or may not be required.

5.2.1.2.2 Protection of Public Health and the Environment

Since this technology extracts volatilized vapors, it may require an off-gas treatment technology such as vapor phase carbon adsorption to prevent migration of the vapor plume into the residential areas. Since this technology also extracts groundwater, treatment prior to discharge will be required.

5.2.1.2.3 Cost

The number of extraction wells depends on the groundwater capture radius for each well. The analytical solution for a single pumping well in a uniform flow field as calculated in the computer program DREAM (Round and Bonn, 1994) was used to estimate capture radius. Program input included site-specific hydrogeologic parameters as used in the AT123D model (refer to Section 2.1.2.2) for hydraulic conductivity, aquifer thickness, and hydraulic gradient. For the selected pumping rate of 20 gallons per minute, the

resulting well drawdown was about 3 feet with a capture radius of 40 feet (which is a well spacing of 80 feet).

Based on the groundwater capture radius of 40 feet, approximately 16 pumping wells would be required for the two areas. Five soil venting wells should cover the area of soil treatment in the western portion of the site. Separate equipment compounds would be installed in each area. The estimated cost for the capital purchase, installation and operation of a groundwater extraction with soil venting system could range from $400,000 to $510,000. Annual operation and maintenance of the system could range from $90,000 to $110,000. Routine maintenance is required for air strippers (acid wash or replacement), downhole pumps (maintenance/replacement), and liquid phase GAC replacements. This estimate does not consider off-gas treatment of emitted vapors.

5.2.1.2.4 Administrative Considerations

Soil venting w/ groundwater extraction requires the following Administrative Considerations:

- air discharge permitting
- air discharge sampling
- groundwater sampling
- groundwater discharge permitting (storm or sanitary sewer)
- Monthly or quarterly reporting (to client and regulatory agency)
- site safety plan
- engineering / piping, wells, blower, pump design
- engineering operation and maintenance manual
- mass removal tracking

5.2.2 Soil Venting with Air Sparging

5.2.2.1 Description

Air sparging enhances desorption of both adsorbed phase and dissolved phase contaminants in saturated soils and groundwater through volatilization. Sparging involves the forcing of air under pressure through a well screened below the vertical extent of contamination. Dissolved contaminants with high Henry's Law coefficients are volatilized and stripped by the passing air stream and carried into the vadose zone. To be physically removable by sparging, contaminants should have a dimensionless Henry's Law constant >0.01 and a vapor pressure >1 mm Hg. Compounds amenable to air sparging include the chlorinated compounds present at this site including TCE, cis-1,2-DCE.

In order for sparged air to penetrate the soil matrix, hydraulic conductivity should be $>10^{-5}$ cm/sec. In addition, sparging is most efficient when there are no continuous lenses with significantly different permeability in the saturated zone and when permeability in the saturated zone does not increase with depth. Air sparging is often coupled with an SVE technology to control the release of liberated vapors.

This technology is best suited to homogeneous saturated zones, volatile contaminants, saturated thicknesses greater than five feet, and a subsurface geology conducive to capture and control of the liberated vapors. The requirements are reasonably met by site conditions.

5.2.2.2 Soil Venting and Air Sparging Criteria

5.2.2.2.1 Applicability

Air sparging combined with soil venting could be implemented in both areas of concern. Soil venting would be used to control liberated vapors in both areas. It would also be used to address VOCs occurrence in soil in the western area.

The impacted saturated zone at the site mainly consists of homogenous sands with an upper layer of discontinuous silts and clays. The high permeability of the sands is conducive to air sparging. The clay and silt strands may produce channeling through or around these areas. Cyclical sparging should be used at this site to maintain sparging efficiency by limiting the channeling of air. The chemicals of concern are spargeable and the saturated thickness of ten feet or more provides the necessary area for effective air sparing with soil vapor extraction control. The pilot test conducted at the site indicated a sparging radius of influence of 20 feet and a soil venting radius of influence of 28 feet.

No additional water treatment process equipment is required because the combination of air sparging with soil venting does not extract groundwater. This technology may require a barrier groundwater well for additional hydraulic control due to several factors. One factor is possible groundwater mounding and subsequent contaminant migration caused by air sparging. Groundwater mounding is a local increase in the groundwater level caused by the upward pressure of the injection of air into the groundwater. This changes the local direction of flow of groundwater. However, under cyclic operation and low injection pressures, this effect is found to be localized and temporary. Additional factors are the proximity of the creek and the residential neighborhood to the area being treated.

5.2.2.2.2 Protection of Public Health and the Environment

Because of the presence of the clay and silt stringers, additional soil vapor extraction wells [beyond what would be required in a homogenous sand lithology] may be necessary to control liberated vapors along the residential neighborhood perimeter. Sparging causes the vertical movement of contaminants as bubbles move from the saturated zone upward into the unsaturated zone where they are captured as soil gas by the soil venting system. However, when there is a confining layer, such as silt or clay through which the bubbles can not travel, the contaminant bubbles may migrate laterally underneath the confining layer until they can again move upwards to the unsaturated zone. It should be noted that the soil venting radius of influence measured at the site is greater than the sparge radius and conventional system designs extract about three to five times the volume of air that is injected. This practice minimizes or eliminates the possibility of fugitive soil gases migrating into residential areas.

5.2.2.2.3 Cost

Based on an air sparge radius of influence of 20 feet, approximately 30 nested AS/SV wells would be required in the western area and 22 nested wells would be required in the southeastern area. Separate equipment compounds would be installed in each area. The preliminary engineering estimated cost for the capital purchase, installation, and operation of an AS/SV system for one year could range from $410,000 to $460,000. Annual operation and maintenance of the system could range from $65,000 to $95,000. This estimate does not consider off-gas treatment of emitted vapors.

5.2.2.2.4 Administrative Considerations

The following Administrative considerations were identified for soil venting w/air sparging:

- air discharge permitting
- air discharge sampling
- Monthly or quarterly reporting (to client and regulatory agency)
- site safety plan
- engineering / piping, wells, blower, compressor design
- engineering operation and maintenance manual
- mass removal tracking

5.3 Comparative Analysis of Alternatives

There are two major areas of concern at the site. COI are present in the groundwater at both areas above cleanup goals. COI are present above cleanup goals in the soil only in one area. A potential remediation technology must be able to address all phases of interest and be able to bring the dissolved COI concentrations at the property boundary to within levels in a cost-effective manner. The two technologies which have the most potential are soil ventilation with air sparging and soil ventilation with groundwater extraction.

Based on the findings of the technology screening, the two technologies appear to cost approximately the same to design and install. However, permitting, operation, and treatment costs would be higher for the soil vapor and groundwater extraction approach. In addition, the expected life cycle (cleanup time) of the soil vapor and groundwater extraction system would be longer (estimated at least 10 years) than the soil venting and air sparging system (estimated at 3 to 5 years), thereby yielding a much larger total cost. Soil venting with air sparging will not require water management while soil venting with groundwater extraction will. Several options exist with this technology. Both technologies may require vapor treatment prior to discharge. Results of the air sparging with soil venting pilot test indicate this is a feasible technology for the site.

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TABLE 1
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

1. Chemical Specific

- Safe Drinking Water Act (SDWA) (42 U.S.C. 300(f))
  - •National Primary Drinking Water Standards (40 CFR Par 141)
  - •Maximum Contaminant Levels, (chemicals, turbidity, and microbiological contamination) (for drinking water or human consumption) (40 CFR 141.11-141.16)
  - •Maximum Contaminant Level Goals (40 CFR 141.50-141.51, 50 FR 46936)
- Indiana Drinking Water Quality Standards (327 IAC 8)
- Clean Air Act (CAA) (42 U.S.C. 7401)
  - •National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR Part 61)
- Indiana Regulations for Establishing Emission Levels for Volatile Organic Compounds (VOCs) (326 IAC 2 and 8)
- Clean Water Act (CWA) (33 U.S.C. 1251)
  - •Federal Water Quality Criteria (Section 304)
- Indiana Department of Environmental Management (IDEM) Voluntary Remediation Program (VRP) (Indiana Code 13-25-5)

2. Action Specific

- CWA (33 U.S.C. 1251)
  - •National Pollutant Discharge Elimination System (NPDES) Permit Regulations (Section 402 and 40 CFR Parts 122 and 125)
  - •State Enforcement Jurisdiction (40 CFR Part 131)
  - •Sample Preservation Procedures (40 CFR Part 136)
- CAA Standards of performance for new stationary sources (42 U.S.C. 7411)
- Resource Conservation and Recovery Act (RCRA) of 1976 (42 U.S.C. 6926(b), Section 3006(b))
  - •Definition and Identification of Hazardous Waste (40 CFR Part 261)
  - •Standards for Generators of Hazardous Waste (40 CFR Part 262)
  - •Standards for Transporters of Hazardous Waste (40 CFR Part 263)
  - •Land Disposal Restrictions (LDRs) (40 CFR Part 268)
  - •Approved State Hazardous Waste Management Programs (Indiana) (40 CFR Part 272.750-272.751, Subpart P)
- Department of Transportation Rules for the Transportation of Hazardous Materials (49 CFR Parts 107, 171.1-172.558)
- Occupational Safety and Health Act (OSHA) Regulations for Workers Involved in Hazardous Waste Operations (29 CFR Part 1910)
- Endangered Species Act of 1973 (16 U.S.C. 1531, generally 50 CFR Parts 81, 225, 402)
- Fish and Wildlife Coordination Act (16 U.S.C. 661)

- Fish and Wildlife Improvement Act of 1978, and Fish and Wildlife Act of 1956 (16 U.S.C. 742a)
- Fish and Wildlife Conservation Act of 1970 (16 U.S.C. 2901, generally 50 CFR Part 83)
- Farmland Protection Policy Act (7 U.S.C. 4201, generally 7 CFR Part 658)
- Indiana Regulations for Spills of Oil and Other Objectionable Substances: Reporting, Containment and Cleanup (327 IAC 2-6)
- Indiana Regulations for the Treatment and Disposal of Hazardous Waste (329 IAC 3.1)
- Indiana Regulations for the Permitting of Air Strippers (326 IAC 2 and 8)
- Indiana Regulations for Construction Permits for Water Treatment Facilities (327 IAC 3)
- Indiana NPDES Permit Regulations (327 IAC 2 and 5)
- Indiana Regulations for the Registration of Groundwater Extractions Wells Which have a combined capability of pumping greater than 70 gallons per minute (Indiana Code 13-2-6.1)
- Indiana Fugitive Dust Rules (326 IAC 6)
- Indiana Incinerator Rules (326 IAC 4)
- Indiana Final Rules Concerning the Regulation of Water Well Drilling (310 IAC 16)
  - Rules Regarding Permanent Abandonment of Wells (310 IAC 16-10-2)

3. Location Specific

- Construction Within 100-year Floodplain (40 CFR Part 264)
- U.S. EPA's Statement of Procedures on Floodplain Management and Wetland Protection (40 CFR Part 6, Appendix A)[1]
- Indiana Regulations Governing Construction in a Floodway (Indiana Code 13-2-22)
- Marion County Regulations Governing Construction in a Floodway (Indiana Code 13-2-22)

4. To Be Considered (TBC) Criteria

a. U.S. EPA RCRA Guidance Documents
   - RCRA Design Guidelines
   - Permitting Guidance Manuals
   - Technical Resource Documents (TRDs)
   - Test Methods for Evaluating Solid Waste

b. U.S. EPA Office of Water Guidance Documents
   - Pretreatment Guidance Documents
   - Water Quality Guidance Documents
   - NPDES Guidance Documents
   - Groundwater Guidance Documents
   - Groundwater Protection Strategy (August 1984)
   - Clean Water Act Guidance Documents

b. U.S. EPA Miscellaneous

- SW-846 Methods - laboratory analytical methods (November 1986)
- Lab protocols developed pursuant to Clean Water Act Section 304(h)
- OSWER Directive 9355.0-28 - Control of Air Emissions from **Superfund Air Strippers**

[1] - 40 CFR Part 6 Subpart A sets forth EPA policy for carrying out the provisions of Executive Orders 11988(Floodplains Management) and 11990 (Protection of Wetlands)

TABLE 2
TECHNOLOGY SCREENING MATRIX

NON-TREATMENT SOIL AND GROUNDWATER REMEDIATION ALTERNATIVES

TREATMENT OPTIONS	APPLICABILITY 0 - 5 AP	PUBLIC HEALTH and ENVIRONMENT 1 - 3 HE	ADMINISTRATIVE CONSIDERATIONS (high) 1 - 3 (low) AC	TREATMENT TIME 1 - 3 T	COST 1 - 5 C	RATING SCORE 0 - 360 AP * HE * AC * (C + T)	RETAIN? (Yes / No)
1.0 NO ACTION							
1.1 Leave existing levels in place w/	0	1	3	1	.5	0	NO
long term monitoring							
2.0 CONTAINMENT							
2.1 Groundwater Extraction & Treatment	2	2	2	2	2	32	NO
2.2 Air Sparge Curtain	2	2	2	2	3	40	NO

LEGEND

A:\disk30-2\gmmtx2

APPLICABILITY

0 = Not applicable, available, or implementable
1 = Not widely used and probably not applicable
2 = Widely used but probably not applicable, or not widely used and may not be applicable
3 = Widely used but may not be applicable, or not widely used but probably applicable
4 = Widely used and probably applicable, or not widely used but proven and applicable
5 = Widely used, proven and applicable

HEALTH AND ENVIRONMENT
1 = No control heavy impact and exposure
2 = Extensive impact or exposure with controls
3 = Limited impact or exposure with controls

TREATMENT TIME
1 = Treatment time longer than desired
2 = Acceptable treatment time
3 = Rapid treatment

COST (Capital / Installation / 1 yr O&M)
1 = >$500,000
2 = $300,000 - $500,000
3 = $100,000 - $300,000
4 = $30,000 - $100,000
5 = $0 - $30,000

ADMINISTRATIVE CONSIDERATIONS
1 = Extensive administrative oversight
2 = Normal administrative oversight
3 = Little to no administrative oversight

FLUOR DANIEL GTI

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PREPARED AT GMC COUNSEL'S REQUEST

TABLE 3
TECHNOLOGY SCREENING MATRIX

SOIL and GROUNDWATER TREATMENT--ORGANIC CONTAMINATION

TREATMENT OPTIONS	APPLICABILITY 0 - 5 AP	PUBLIC HEALTH AND ENVIRONMENT 1 - 3 HE	ADMINISTRATIVE CONSIDERATIONS (high) 1 - 3 (low) AC	TREATMENT TIME 1 - 3 T	COST 0 - 5 C	RATING SCORE 0 - 360 AP * HE * AC * (C+T)	RETAIN? (Yes / No)
1.0 VOLATILIZATION							
1.1 Soil ventilation only	2	3	2	1	4	60	NO
1.2 Soil venting with groundwater extraction	5	3	2	2	2	120	YES
1.3 Soil venting w/ air sparging	5	3	2	3	2	150	YES
2.0 EXCAVATION							
2.1 Soil removal and disposal	2	2	3	1	3	32	NO
3.0 EXTRACTION							
3.1 Groundwater pumping only	3	3	2	1	3	72	NO
4.0 DEGRADATION							
4.1 Ozone injection	3	3	2	3	1	72	NO

LEGEND

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APPLICABILITY

0 = Not applicable, available, or implementable
1 = Not widely used and probably not applicable
2 = Widely used but probably not applicable, or not widely used and may not be applicable
3 = Widely used but may not be applicable, or not widely used but probably applicable
4 = Widely used and probably applicable, or not widely used but proven and applicable
5 = Widely used, proven and applicable

HEALTH AND ENVIRONMENT

1 = No control heavy impact and exposure
2 = Extensive impact or exposure with controls
3 = Limited impact or exposure with controls

TREATMENT TIME

1 = Treatment time longer than desired
2 = Acceptable treatment time
3 = Rapid treatment

COST (Capital / Installation / 1 yr O&M)

1 = >$500,000
2 = $300,000 - $500,000
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5 = $0 - $30,000

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2 = Normal administrative oversight
3 = Little to no administrative oversight

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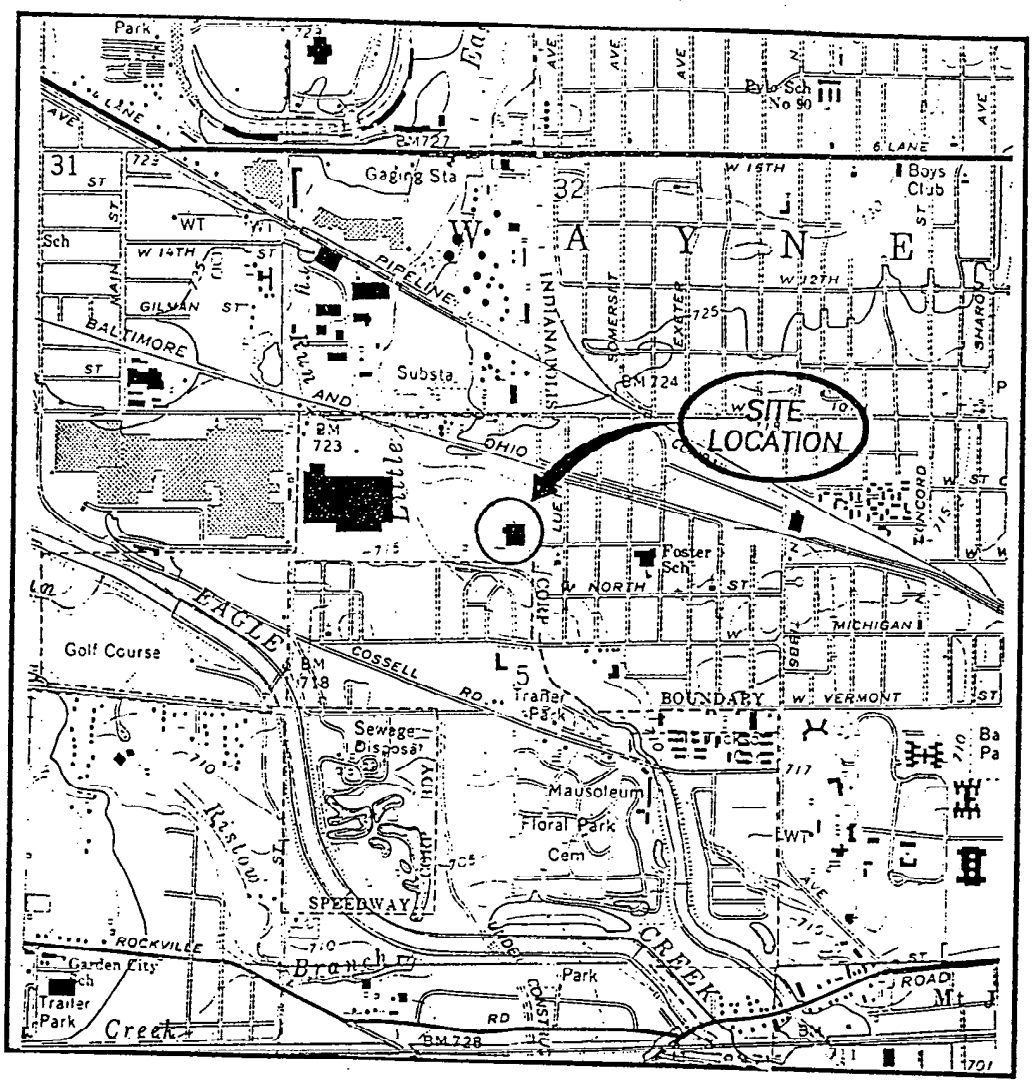
FIGURES



SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE
INDIANAPOLIS WEST, INDIANA (1980)

SCALE 1:24,000

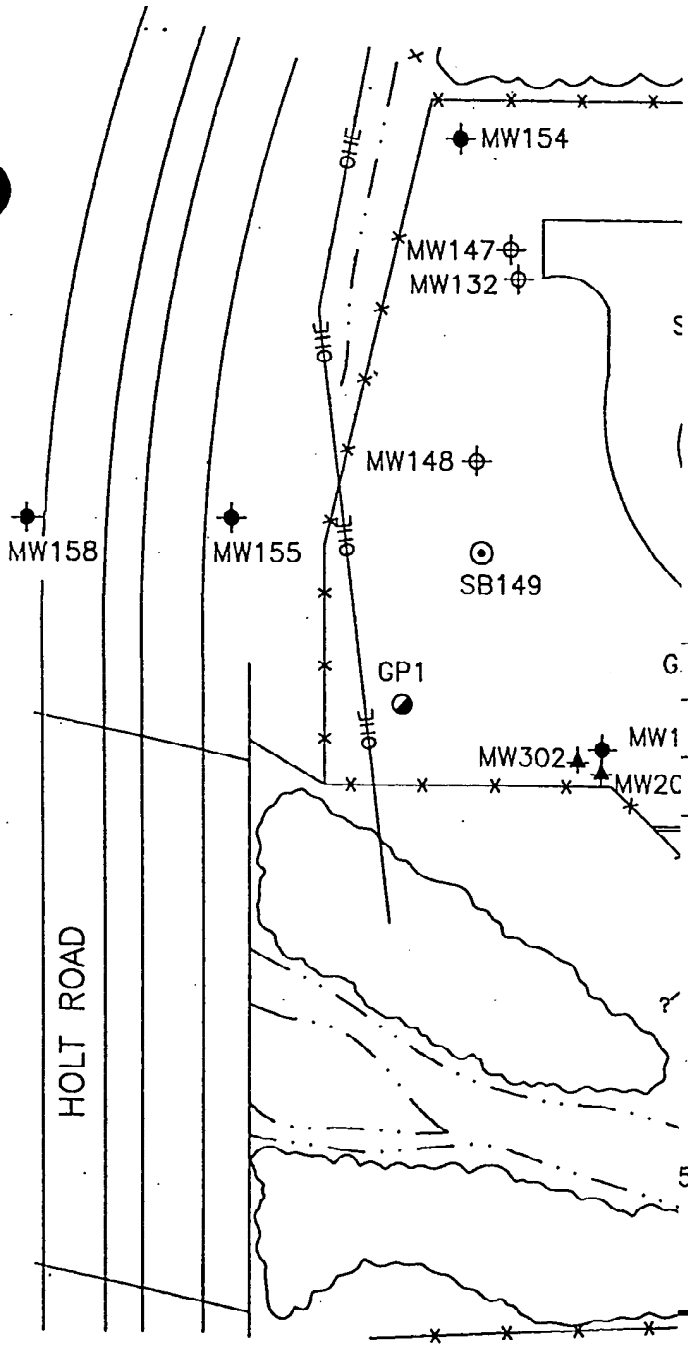
0 1/2 1 MILE

0 2,000 4,000

SCALE FEET

N

FLUOR DANIEL GTI 6330 E. 75TH ST., STE 176 INDIANAPOLIS, IN 46250 (317) 595-6400	DESIGNED: KG DETAILED: KG CHECKED:	**SITE LOCATION MAP** CLIENT: GENERAL MOTORS CORPORATION ALLISON ENGINE COMPANY PLANT #10 LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA
		DRAWING DATE: 6/1/95 FIGURE: 1



LEGEND

- NEW SHALLOW 2" MONITORING WELL
- NEW DEEP 2" MONITORING WELL
- NEW AIR SPARGE/ VENT TEST WELL
- NEW 2" OBSERVATION WELL
- NEW HYDROPUNCH POINT
- NEW GEOPROBE POINT
- EXISTING SOIL BORING
- EXISTING MONITORING WELL
- OHE — OVERHEAD ELECTRICAL LINE
- E — ELECTRICL LINE
- G — GAS LINE
- W — WATER LINE

DANIEL QTI

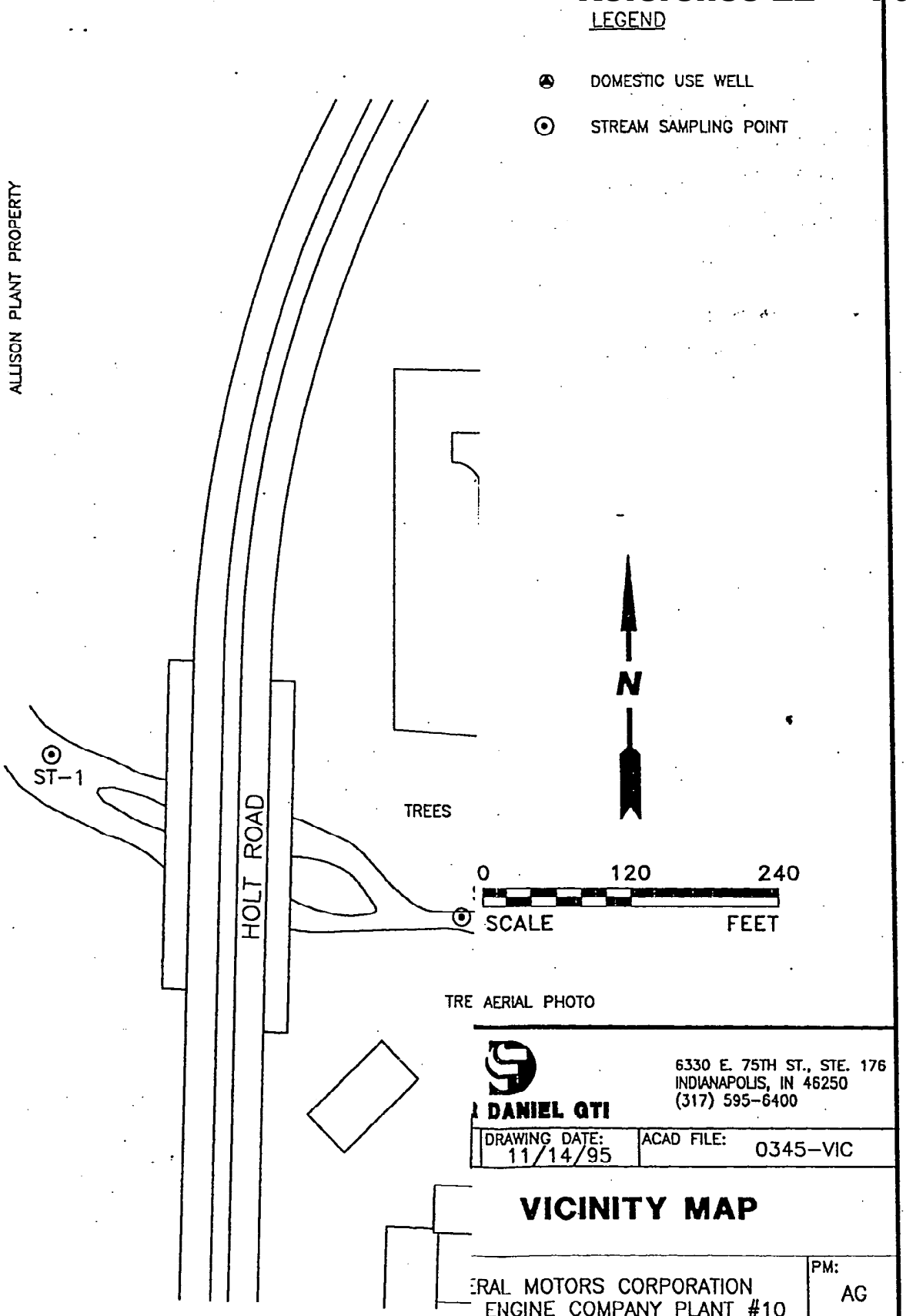
6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400

DRAWING DATE: 2/26/97	ACAD FILE: 0262UTIL

SITE MAP

ERAL MOTORS CORPORATION N ENGINE COMPANY PLANT #10	PM: AG
700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA	PE/RG:

DETAILED:	PROJECT NO.:	FIGURE:
PJC	040020262	2



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DANIEL GTI
6330 E. 75TH ST., STE. 176
INDIANAPOLIS, IN 46250
(317) 595-6400

DRAWING DATE: 11/14/95	ACAD FILE: 0345-VIC

VICINITY MAP

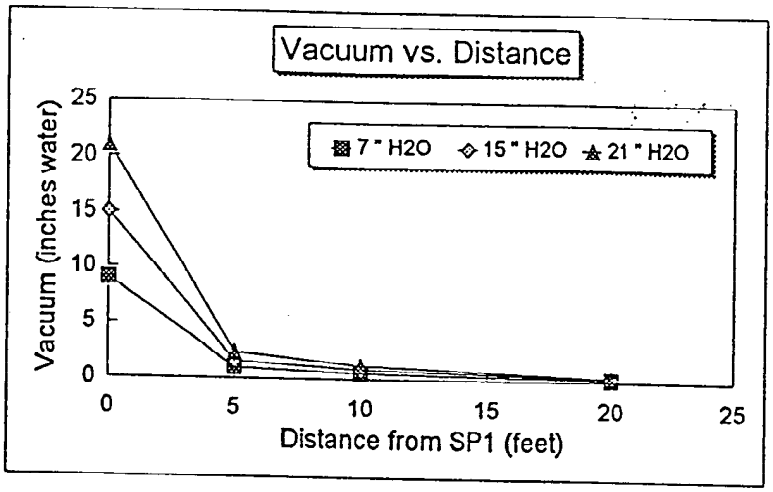
ERAL MOTORS CORPORATION ENGINE COMPANY PLANT #10	PM: AG
00 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA	PE/RG:

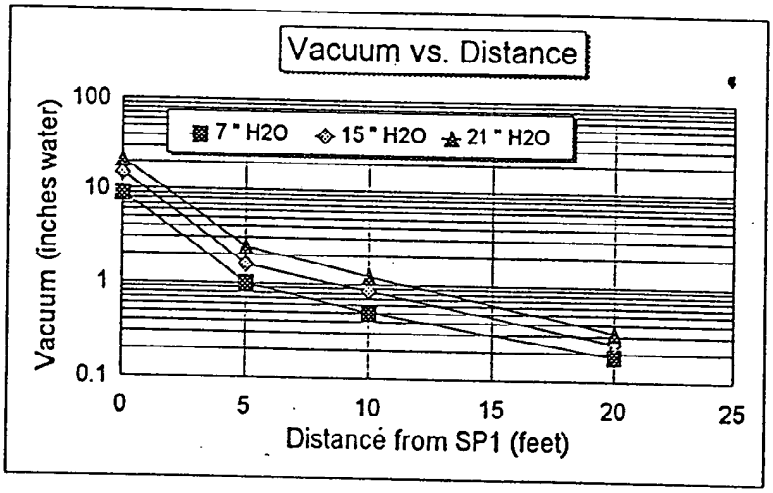
DETAILED:	PROJECT NO.:	FIGURE:
PJC	040020345	3

Figure 4

GM Allison Plant 10

Soil Venting Pilot Test Results





Radius of Influence

Average ROI = 28 feet

Vacuum	ROI (feet)	Correlation Coefficient
7	25.6	0.99
15	27.9	0.99
21	29.4	0.99

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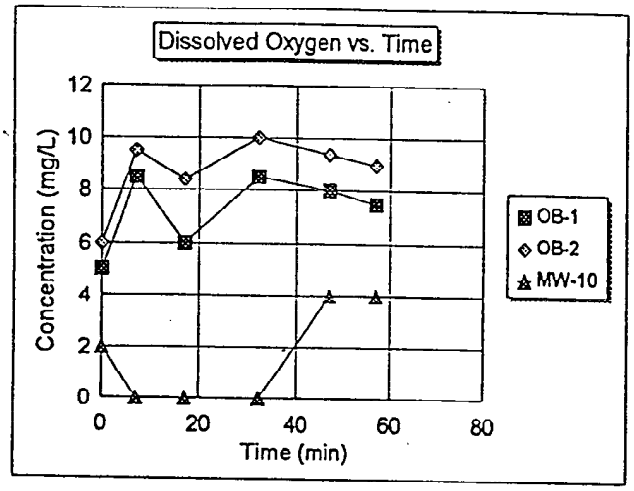
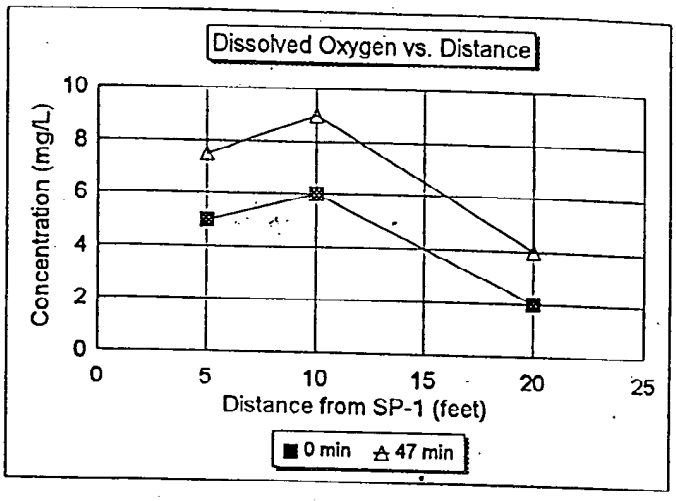
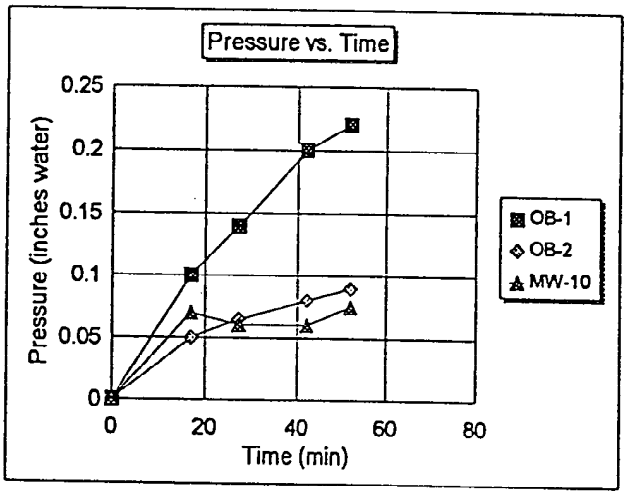
Figure 5

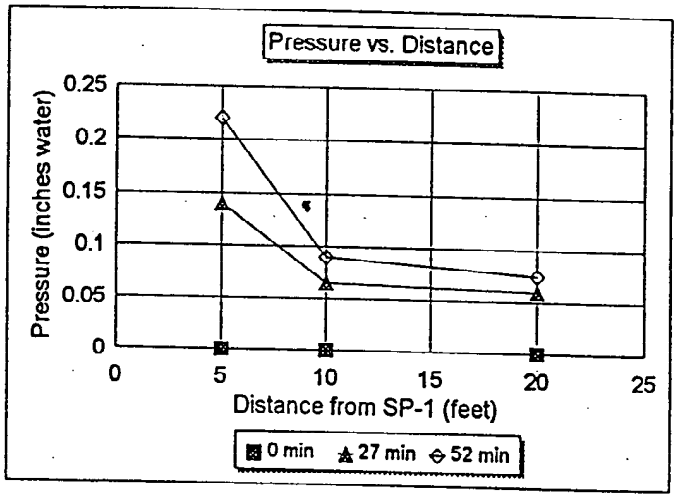
General Motors Corporation - Allison Engine Company Plant 10

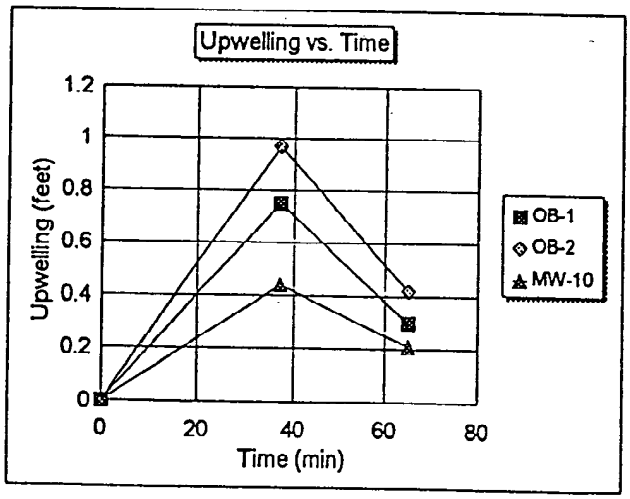
Air Sparge Test Results

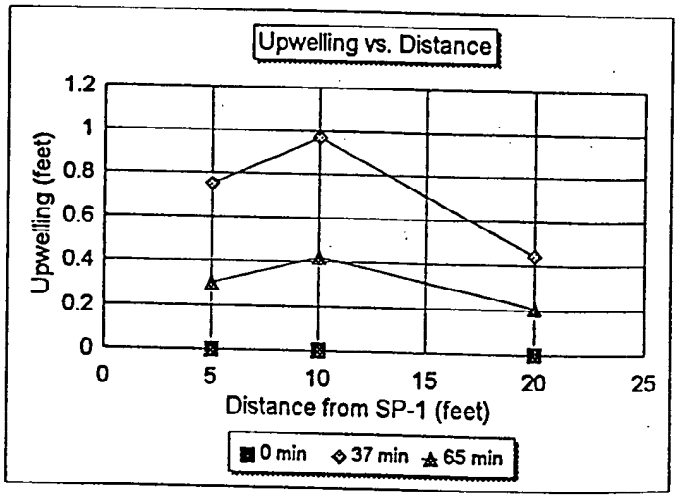












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FLUOR DANIEL GTI

REMEDIAL INVESTIGATION REPORT

General Motors - Allison Plant 10
700 North Olin Avenue
Indianapolis, Indiana

DRAFT

September 19, 1997

Prepared For
General Motors Corporation
485 West Milwaukee Avenue
Detroit, Michigan 48202

Prepared By:
Fluor Daniel GTI, Inc.

D. Krista Gremos, CHMM
Hydrogeologist

Keith Stang
Staff Risk Analyst

Reviewed/Approved By:
Fluor Daniel GTI, Inc.

Andrew A. Gremos, CPG, CHMM
Project Manager

David E. Arnold, CPG
Senior Project Director

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116 Venture Court, Suite 5 / Lexington, KY 40511 USA (606) 254-8223 FAX (606) 254-8226

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1.0 INTRODUCTION

Fluor Daniel GTI, Inc. has prepared this Remedial Investigation Report for The Allison Engine Company Plant 10 located at 700 North Olin Avenue in Indianapolis, Indiana. The location of the property is depicted on Figure 1. The scope of work has been completed, and when considered as a whole, is consistent with the National Contingency Plan as referenced in 40 CFR 300.700 (Subpart H-Participation by Other Persons). The purpose of the investigation was to better define the magnitude and extent of volatile organic compounds (VOC) in the soil and groundwater and to assess potential environmental risks to their occurrence. Metals in surface soil were also investigated. Objectives of the investigation were to:

1) determine the vertical and horizontal extent and magnitude of VOC occurrence in soil and groundwater at the site.
2) determine the horizontal extent and magnitude of VOC occurrence in soil and groundwater off-site to the east, west, and south.
3) delineate the vertical extent of VOC occurrence in soil and groundwater off-site to the southeast.
4) investigate the presence of VOC in Little Eagle Creek.
5) investigate metals in surface soil on site.
5) assess the potential threat of VOC and metals occurrence to human health and the environment.

Activities completed during the investigation included the advancement of fourteen soil borings, one Hydropunch, and six Geoprobe borings; collection of soil samples for laboratory analysis; the installation of nine shallow and five deep groundwater monitoring wells in the fourteen borings; surveying of all new wells; groundwater elevation monitoring and sampling of all wells on-site; stream survey and sampling of Little Eagle Creek; and rising head permeability tests from the newly installed wells. Results of the investigation were used to more fully characterize the geology and hydrogeology of the site, to further delineate VOC and metals occurrence, and to assess the potential risk of VOC and metals occurrence to human health and the environment.

1.1 Site Description

The subject property is the site of the former General Motors Corporation Allison Gas Turbine Division (AGT) Plant 10. This plant was purchased by General Motors from BHT Corporation (BHT) for use as a warehouse for obsolete machines, tooling, and fixtures in 1973. Prior to 1973, the facility was operated as a carburetor remanufacturing and brake overhaul facility by BHT. The original building was constructed in 1956 and renovated in 1970, doubling the floor space. The facility was used as a warehouse by General Motors until the mid 1980s at which time it became part of the AGT Division and continued to be managed as a warehouse. The property was then sold to the Allison Engine Company in December 1993 as part of the sale of AGT.

1.2 Site Physical Features

The site is located on the southwest side of Indianapolis, Indiana in Marion County on the Tipton Till Plain. The surface topography over most of the site is relatively flat. The southern third of the site slopes moderately to the south, towards Little Eagle Creek. Site elevations range from approximately 715 feet above mean sea level (MSL) at the north end of the property to 705 feet above MSL near Little Eagle Creek.

The site is occupied by a single warehouse. The area surrounding the warehouse is covered by asphalt and concrete. The western and southern sections of the property are grass with wooded areas. A site map showing salient site features is presented as Figure 2.

1.3 Land Use and Population

The property is zoned industrial and is currently leased from Allison Engine Company by a subsidiary of Genuine Parts Company, for use as a warehouse and distribution center. Land use in the surrounding area of the site is mixed use with zoning predominantly residential, general business, and industrial. The property is bordered by a wooded area, Little Eagle Creek, and Michigan Meadows Apartments to the south, a residential neighborhood to the east, a city park (Olin Park) to the north, and Holt Road and an Allison Transmission Plant to the west. Features of the surrounding area are presented on the Vicinity Map (Figure 3).

1.4 Water Resources and Climate

Fluor Daniel GTI obtained all available drilling logs of domestic water wells on record at the Indiana Department of Natural Resources, Division of Water. A total of 160 domestic wells were identified as being located within a one mile radius of the subject site, the nearest of which lies approximately 1,000 feet north (upgradient) of the property. The wells are completed within limestone bedrock, clay, or sand and gravel units at depths ranging from 30 to 270 feet below grade (bg). Records indicate the Allison Transmission Plant across Holt Road to the west has two water supply wells, the nearest of which lies approximately 1,600 feet northwest of the site (cross-gradient). The majority of the water supply wells identified are located to the north, west, and south of the site. A total of 47 municipal or high capacity wells were identified as being located within a two mile radius of the subject site, with 17 of those located within a one mile radius. The nearest of these wells lies approximately 1,400 feet northwest of the site

along Little Eagle Creek (cross-gradient). Refer to Figure 4 for approximate locations of the domestic and municipal wells. The completion logs for the domestic wells are presented in Appendix A.

Potable water is supplied to the area by the Indianapolis Water Company (IWC). The water supply is drawn from numerous wells in the area, the majority of which are located along Eagle Creek approximately 1.5 miles west (upstream) of the subject site. A discussion with the Supervisor of Customer Contact at IWC indicated that residences across Olin Avenue to the east and the Michigan Meadows Apartment complex across Little Eagle Creek to the south are supplied by IWC. A house to house survey of local residences along the east side of Olin and the west side of Luett Avenues was conducted by the Marion County Health Department (MCHD) in December, 1996. A single domestic well was located at 709 North Olin Avenue. The construction of the well is unknown. This well was not identified during the well search conducted at the Department of Natural Resources. Only well logs completed by the drillers and submitted to IDNR are found in the IDNR's files. The approximate location of this domestic well is provided on Figure 3. The well was sampled by MCHD on January 2, 1997. The analytical results indicate that volatile organics are not present in this water supply. These results are included in Appendix B.

The nearest body of surface water is Little Eagle Creek located adjacent to the southern property boundary. This creek flows towards the east-southeast and eventually joins with Eagle Creek approximately one mile to the south of the site.

Indianapolis has a temperate climate with warm summers and no dry season. Precipitation is distributed fairly evenly through out the year. The average precipitation is 39.99 inches per year and the average annual temperature is 52.5° F. (NOAA, 1989). Over a 29 year period from 1960 to 1989 the average monthly rainfall ranged from a low of 2.69 inches in October to a high of 4.03 inches in June. Average temperature for the same period ranged from a low of 28.0° F in January to a high of 75.8 ° F in July. Spring and early summer rains usually exceed winter precipitation. (Sturm and Gilbert, 1978).

1.5 Ecological Survey

A desktop ecological survey was completed by Fluor Daniel GTI personnel. The nearest body of surface water is Little Eagle Creek which flows across the southern boundary of the property. The National Wetlands Inventory Map was obtained for the Indianapolis West Quadrangle (USDI, 1990). These maps are compiled using high altitude aerial photographs and therefore, have a margin of error. The wetlands map identifies Little Eagle Creek as riverain, lower perennial, unconsolidated bottom, and permanently flooded. This area had not been field examined at the time the map was printed.

A letter regarding the site from Mr. David Hudak of the United States Fish and Wildlife Service stated that the area is located within the range of the Federally endangered Indiana bat and peregrine falcon, and Federally threatened bald eagle.

"The Indiana bat uses woodlands during the summer when maternity colonies utilize trees with loose bark for nesting. These bats forage primarily over wooded stream corridors, although they have been collected in grazed woodlots, mature deciduous forests, and pastures with trees. A survey done in 1993 by our office found Indiana bats in the northeast section of Marion County."

"Peregrin falcon habitat is usually described as open country along large rivers, lakes, and coastlines. High cliffs or bluffs are often used as nest sites, however, breeding is also presently occurring on high buildings, bridges, and other man-made structures in cities". None of these features appear to be present in the study area.

"Eagles nest in close proximity to lakes, rivers, and reservoirs. They construct their nests near habitat ecotones, such as lakeshores, rivers, and timber management areas." The site does not appear to be in close proximity to this habitat.

1.6 Site History and Previous Investigations

Two environmental investigations were completed at this property by Engineering Science, Inc. (ESI) in 1992. The initial investigation, entitled *Phase I Information Review Report for General Motors Corporation Allison Gas Turbine Division*, was completed by ESI in July of 1992. This assessment involved no intrusive exploration of environmental conditions. The Phase I assessment identified the following potential areas of environmental concern:

- two reported releases (100 gallons of quench oil in the southwest corner of the property and an unknown amount of hydraulic fluid in the southwest courtyard);
- possible waste burial area at western end of property; and
- possible area of dumping near the northwest corner of the plant.

The above ground storage tanks were reported to be in good condition. The Phase I identified the Plant 10 site as a potential area of concern (PAOC). The report included a recommendation to install three monitoring wells and one soil boring.

An intrusive follow-up assessment of the areas of environmental concern identified during the Phase I assessment was completed by ESI in November of 1993. Methods and results of this additional investigation were reported in a document titled *Phase II Site Assessment Final Report for General Motors Corporation Allison Gas Turbine Division* dated November 19, 1993. During the initial phase of work, three monitoring wells (MW-132, MW-133, and MW-135) were installed and one soil boring (SB-134) was advanced at the site. A soil gas survey was completed on the west side of the property during this investigation. During the second phase of this investigation four monitoring wells (MW-145 through MW-148) were installed and two soil borings (SB-149 and SB-150) were advanced on-site.

Results of this investigation identified trichloroethene (TCE), vinyl chloride (VC), 1,2-dichloroethene (1,2-DCE), tetrachloroethene (PCE), toluene, and methylene chloride in the soil on-site. Compounds most frequently detected included TCE, 1,2-DCE, and VC. Analytical results for the soil sampling are presented in Table 1. The west side of the site was confirmed as a PAOC during the Phase II investigation, however the source was unknown.

O'Brien and Gere Engineers, Inc. (OBG) conducted a Buyer Environmental Assessment for Plant 10 in May, 1994. They advanced six soil borings (SB-10-1 through SB-10-5 and OBG-10-1) and installed one monitoring well MW-10-1 in soil boring OBG-10-1. Surface samples collected included two surface soil samples near an area containing brake pad pieces, two brake pad samples for asbestos testing, and two sludge samples from the sumps located south of the building. These sumps have since been removed. A total of six subsurface soil samples and three groundwater samples were also collected. VOC and metals analytical results for the subsurface soil sampling are presented in Tables 1 and 1B, respectively.

2.0 PHASE III FIELD INVESTIGATION PROCEDURES

Fluor Daniel GTI conducted an expanded subsurface investigation at this site in July 1995, September 1995, and February 1997. The purpose of the investigation was to further characterize the site hydrogeology, to delineate the extent and magnitude of the VOC occurrence in soil and groundwater, and to investigate metals occurrence in surface soil.

2.1 Health and Safety Plan

Before implementation of field work, a site specific Health and Safety Plan was prepared by Fluor Daniel GTI to comply with the OSHA Standard, "Hazardous Waste Operations and Emergency Response," (29 CFR 1910.120) and state and local procedures. Fluor Daniel GTI personnel who performed site work are certified as completing a 40 hour OSHA training course for hazardous waste activities. Additionally, employees have completed an annual eight hour refresher course. Copies of all certifications are kept on

file with the Fluor Daniel GTI, Inc. corporate office of Health and Safety and with the employee's Fluor Daniel GTI branch office.

2.2 Monitoring Well Installation

Fourteen monitoring wells were installed on and off-site as part of this investigation. Well locations are provided on Figure 2. Monitoring wells MW-150 through MW-154 and MW-200 through MW-202 were installed during the time period of June 27 through July 11, 1995 by subcontractors Haskett Drilling and Earth Exploration, Inc. with Fluor Daniel GTI providing technical environmental assistance. Additional subsurface investigations included the installation of monitoring wells MW-155, MW-156 on September 5 and 6, 1995; and the installation of monitoring wells MW-157, MW-158, MW-301, and MW-302 on January 22 through January 31, 1997. The wells were installed with completion depths ranging from 19 to 55 feet below grade (bg) utilizing truck and all terrain vehicle (ATV) mounted hollow-stem auger drill rigs. Wells MW-150 through MW-158 were installed to further delineate (laterally) VOCs in the groundwater both on and off-site. Double cased wells MW-200, MW-202, and MW-302 were installed to vertically delineate VOCs in the groundwater to the southwest and southeast of the facility. MW-201 and MW-301were installed off-site to the southeast to vertically delineate VOC occurrence in that direction. Well locations are shown on Figure 2.

Soil samples were collected at five foot intervals (from 3 feet below surface to boring terminus) for MW-152, MW-154 through MW-158, MW-200 through MW-202, and MW-301 and MW-302. Wells MW-150, MW-151, and MW-153 were installed as part of well clusters where soil samples were collected during the installation of the other wells of the cluster. During advancement of the borings, soil samples were collected by advancing hollow-stem augers and driving a 1.25-inch diameter, 2 foot long split-spoon sampler through the sampling interval. The split spoon sampler was driven into the soil using a 140 pound hammer with a free-fall of approximately 30 inches in accordance with ASTM standards. The number of blows required to advance the split spoon in 6-inch increments were recorded on the boring log (Appendix C). Soils encountered during drilling were logged by a geologist with respect to grain size, moisture content, density, and color using the Unified Soil Classification System (USCS).

Each soil sample was separated into two representative portions and placed in plastic zippered bags. Any organic vapors present in the sample were allowed to equilibrate in one of the tightly sealed bags for approximately 10-15 minutes. The organic vapor concentration in the headspace of the container was then measured using a photo-ionization detector (PID) with a 10.2 eV lamp or a flame ionization detector (FID). The second bag was kept on ice pending packing in glass jars for laboratory analysis. Soil samples from the location of highest PID/FID response and from the bottom of each boring or from the zone above the water table were submitted to GTEL Environmental Laboratories, Inc (GTEL) of Wichita, Kansas for VOC analysis using EPA Method 8240.

All sampling equipment was decontaminated after each boring by washing with a laboratory grade detergent solution and rinsing with water. Augers were cleaned with pressurized steam after each use. All decontamination fluids were collected, placed in drums, labeled and stored on the site for disposal by the owner.

The monitoring wells MW-150 through MW-158 were completed to depths ranging from 19 feet to 29 feet bg and were constructed of two-inch diameter, schedule 40 PVC flush-threaded casing, with 0.020-inch machine slotted schedule 40 PVC screen. The annular space around each well was backfilled with clean silica sand to approximately 1 foot above the top of the screen above which was placed a bentonite seal. The wells were completed with a concrete cap to surface grade and either a flush mounted well box or a stand pipe protective cover. A locking cap was placed on each wellhead. Well construction details are included with the drilling logs in Appendix C.

The deep wells (MW-200 through MW-202) were completed to depths ranging from 35 feet to 50 feet bg. These monitoring wells were installed in accordance with Section 3.3.5 of the Fluor Daniel GTI work plan dated June 20, 1995. Since the clay unit was less than 10 feet thick at MW-200, the well was set at 50 feet bg. Since the clay was greater than 10 feet at the other two locations, MW-201 and MW-202 were set within the clay unit itself. Wells MW-301 and MW-302 were later installed near MW-201 and MW-202, respectively, to intercept the lower sand unit. Well MW-301 was set within the lower sand unit, however, this unit was not present in the vicinity of MW-302. The well screen of MW-302 was set approximately 10 to 20 feet below MW-202 and its screen intercepts an approximately 0.5 feet sand layer. The wells were constructed of two-inch diameter, schedule 40 PVC flush-threaded casing, with 0.020-inch machine slotted schedule 40 PVC screen. These wells were double cased to 25 feet with ten-inch diameter, schedule 40 PVC flush-threaded casing. The outer casing was set with a half foot of bentonite seal at the bottom and a bentonite/portland grout to approximately 6 feet bg. This was allowed to set up for approximately 48 hours. The annular space around each inner well was backfilled with clean silica sand to approximately 1 foot above the top of the screen above which was placed a two foot bentonite seal. The wells were completed with bentonite/portland grout and a concrete cap to surface grade and either a flush mounted well box (MW-200, MW-201, and MW-301) or a stand pipe protective cover (MW-202 and MW-302).

2.3 Hydropunch and Geoprobe Sampling

One Hydropunch boring (HP-1) was advanced on September 6, 1995 and six Geoprobe borings (GP-1 through GP-6) were advanced on December 19, 1996 by Earth Exploration, Inc. with Fluor Daniel GTI providing technical environmental assistance. The Hydropunch was advanced to a total depth of approximately 7 feet, and a water sample was collected before the boring was backfilled. Geoprobe borings were advanced to a total depth of 12 feet bg utilizing a truck mounted Geoprobe rig. The Geoprobe borings were backfilled with bentonite after sample collection. Geoprobes GP-1 through GP-6, and Hydropunch HP-1 were installed to further delineate (laterally) VOCs in the groundwater both on and off-site. Surface soil samples were also collected from the Geoprobe borings for metals analysis. Geoprobe and Hydropunch locations are shown on Figure 2.

Soil samples were collected at five foot intervals (from 3 feet below surface to boring terminus) for HP-1 and GP-1 through GP-6. HP-1 was sampled in the same manner as the monitoring wells. Soil samples from the Geoprobe borings were collected by hydraulically driving a 1.25-inch diameter, piston-type sampler to the desired sampling interval. The piston within the sampler was released and the plastic-lined sampler was advanced through the sampling interval.

Samples were collected and screened in the field using the same methods utilized for the monitoring well samples. In addition to EPA Method 8240, samples from the Geoprobe borings were also analyzed for priority pollutant metals by appropriate EPA 6000/7000 series method.

2.4 Stream Gauge Installation/Measurements

On February 24, 1997, two stream gauges were attached to concrete bridge supports along Little Eagle Creek in order to correlate the creek level with the depth to water in the monitoring wells. One gauge (SG-1) was attached to a bridge support beneath Holt Road, west (upstream) of the site. The second gauge (SG-2) was attached to an abandoned support near the end of Olin Avenue, east (downstream) of the site. SG-1 was attached with an adhesive and SG-2 was attached with screws. Fluor Daniel GTI personnel surveyed the elevation of the tops of the gauges relative to nearby monitoring wells. The stream levels were read off of the stream gauges on February 26, 1997. At this time a partial gauging was done on the wells on site in order to correlate the water levels in the wells with the stream level.

2.5 Well and Stream Gauge Survey

On July 14-17, 1995, monitoring wells MW-150 through MW-154 and MW-200 through MW-202 were surveyed for top of casing (TOC) elevation by Fluor Daniel GTI personnel. TOC elevations of wells MW-155 and MW-156 were surveyed on September 11, 1995, and those of wells MW-157, MW-158, MW-301,

and MW-302 were surveyed on February 4, 1997. The stream gauges were surveyed in on February 26, 1997 by surveying the point on the top of the bridge/support directly above the gauge and measuring the distance to the top of the gauge. Well and stream gauge elevations were measured relative to pre-existing monitoring wells with known elevations using an engineers level. Well TOC elevations are presented in Table 2.

2.6 Rising Head Permeability Tests

Rising-head permeability tests were performed in nine monitoring wells to evaluate the hydraulic characteristics of the shallow and deep aquifers and the inter-lying clay. The rising-head permeability tests involved the rapid removal of a volume of water to lower the level of the water below that measured at static conditions. The rate at which the water level returned to static conditions was then observed by periodically measuring the water level in the test well and recording the elapsed time since the removal of the slug. The tests in the wells screened in the sand aquifers were conducted utilizing a Hermit 2000 data logger with a pressure transducer to measure the rising head. The wells screened within the clay unit were tested by removing a slug of water with a bailer and measuring the rising head utilizing an interface probe (IP). This method was used in the clay unit based on the slow rate of water recovery in the wells.

The rising-head permeability tests were conducted in wells MW-150, MW-151, MW-153, MW-154, MW-200 through MW-202, MW-301, and MW-302 on February 24, 1997. The static water level in each of the selected test wells was measured and recorded prior to initiation of the tests. A 1.25 inch by 5.5 foot long sand-filled PVC slug was submerged below the static water level (SWL) in the sand aquifer wells to displace a volume of water. The water level was then allowed to return to static conditions. Once the water level returned to the original depth, the slug was quickly removed. Following removal of the slug, the water level in the test well was periodically measured utilizing the Hermit 2000 data logger until it had recovered to at least 90% of the static level or until a one-hour monitoring interval had elapsed. The wells screened within the clay unit were tested by removing a slug of water from the well using a bailer and periodically measuring the depth to water using an IP for about 4 to 6 hours.

2.7 Groundwater Monitoring and Sampling

On July 14-17, 1995, September 11, 1995, and February 5-6, 1997, and February 26, 1997 groundwater levels in the monitoring wells were gauged using an electronic interface probe. This probe is capable of measuring the depth to water to within 0.01 feet. The depths to groundwater were used in conjunction with the TOC elevations to calculate the groundwater elevation at each location. The interface probe was thoroughly cleaned with a laboratory grade detergent and water solution, and rinsed with distilled water between each use. Monitoring well MW-133 was not gauged during the July 1995 visit since the broken well box made it appear the well was destroyed. Further investigation showed the integrity of the well had

not been breached and it was gauged during the September 1995 monitoring event. Monitoring well MW-150 was not gauged since it had been developed shortly prior to the sampling event and the water level in the well had not reached equilibrium with the formation. Well MW-200 was not gauged during the September visit due to excess bentonite in the well box. The bentonite was removed from the well box prior to the February 1997 event.

Groundwater samples were collected from all existing monitoring wells except MW-133 on July 14 and 17, 1995 for laboratory chemical analysis of VOCs by GTEL using EPA Method 8240. Groundwater samples were collected from the two new wells (MW-155 and MW-156) and MW-133 on September 11, 1995 for laboratory chemical analysis of VOCs by GTEL using EPA Method 8240. Groundwater samples were collected from all existing monitoring wells on February 5 and 6, 1997 for laboratory chemical analysis of VOCs by GTEL using EPA Method 8240. A second groundwater sample was collected from well MW-157 on February 26, 1997 to confirm the presence of TCE and to investigate tentatively identified compounds (TIC) reported during the previous sampling. Before sampling, a minimum of three well volumes of water were purged from each well using a clean disposable PVC bailer or a decontaminated purge pump. A water sample was then retrieved using a clean disposable bailer and carefully transferred from the bailer into 40 milliliter glass vials with zero headspace and preserved with HCL. The vials were then capped and stored on ice. Promptly after collection, all samples were sent by overnight express to GTEL for analysis under proper chain-of-custody procedures. Appropriate trip blanks, equipment blanks, and duplicate samples were also collected for analysis during the July 1995 and initial February 1997 sampling events. The disposable bailers were discarded after use on one well and the purge pump was thoroughly cleaned between sampling events using a laboratory grade detergent and distilled water rinse.

2.8 Stream Flow Measurements/Water Sampling

Stream flow measurements were obtained from three points in Little Eagle Creek on October 4, 1996 and February 10, 1997 utilizing an open channel water flow meter. The points are located upstream (ST-1), downstream (ST-3), and even (ST-2) with the site (Figure 3). Stream flow measurements were obtained by stretching a measuring tape across the creek channel from one bank to the other. Right and left bank measurements were measured using the tape. Water flow and depth were measured at evenly spaced intervals between the banks utilizing an open channel flow meter and a folding ruler or the measuring pole included with the flow meter. Stream water samples were collected from the three points (ST-1 through ST-3), near the mid-point of the channel, at the time of the measurements and sent by overnight courier to GTEL for analysis by EPA Method 8240. A trip blank, equipment blank, and duplicate sample were also collected and sent with the samples for analysis. Sampling equipment was thoroughly cleaned with alconox and a clean water rinse between sampling points.

3.0 PHYSICAL CHARACTERISTICS OF THE SITE

3.1 Geology

The site area is underlain by the Wisconsin Age Undifferentiated Outwash Deposits and Holocene Age alluvium of Little Eagle Creek (Gray, 1989). Subjacent to this unit is the Devonian Age New Albany Shale which in turn is underlain by the Devonian limestones and dolomites of the Muscatatuck Group (Gray, et al, 1987).

Boring logs compiled during the current investigation indicate that the site area is underlain by unconsolidated materials to a depth of at least 65 feet bg. Three geologic cross sections were constructed to illustrate the site subsurface geology. Locations of the cross sections, A-A', B-B', and C-C' are depicted on Figure 5. The cross sections are presented on Figures 5A and 5B. Boring logs and well construction records for the recently installed wells, Geoprobes, and Hydropunch are provided in Appendix C. The logs indicate that the most surficial unit is a discontinuous silt and/or clay layer extending downward to an approximate elevation of 704 feet (10 feet below grade surface(bgs)). This surficial clay/silt layer is underlain by a sand layer with the bottom extent ranging from approximately 681 to 691 feet in elevation (24 to 34 feet bgs). A discontinuous clay/silt layer occurs within this sand layer in the western portion of the site with upper and lower extents at approximately 707 and 698 feet bgs in elevation, respectively. This sand layer is underlain by a silt/clay layer with the upper extent at approximately 691 to 681 feet,in elevation. At it's thinnest known point this clay layer extends from approximately 690 to 682 feet in elevation (8 feet thick) at it's thickest known point this clay extends from 688 to 655 feet in elevation (33 feet thick). Another sand layer (discontinuous) is found beneath this lower clay layer with an upper boundary at approximately 682 feet in elevation and extending to at least approximately 663 feet in elevation (bottom extent of deepest boring). This sand layer was seen only in borings MW-200 and MW-301. A very thin (< 1 foot) sand seam was noted in MW-302 at an approximate elevation of 662 feet bgs.

3.2 Hydrogeology

According to Meyer, et al, (1975) the aquifer system in Marion County consists of an underlying limestone aquifer, an unconfined glacial outwash aquifer, and a system of three discontinuous, confined sand and gravel aquifers (upper, middle, and lower). The upper confined aquifer does not exist west of the White

River (ie: the site location). These aquifers range in thickness from 0 to 40 feet and lie one above the other. They are generally separated from each other by varying thicknesses of silt and clay. The silt and clay layers act as semipervious confining beds (aquitards). Based on maps constructed by Meyer, et al, (1975), the middle and lower confined aquifers appear to exist beneath the Plant 10 site. In this area, the top of the middle confined aquifer (i.e. sand and gravel unit) ranges in elevation from approximately 680 to 700 feet (measured thickness of 7-12 feet) while the top of the lower confined aquifer (i.e. lower sand and gravel unit) ranges in elevation from 660 to approximately 680 feet (measured thickness 17-26 feet).

Monitoring wells MW10-1, MW-132, MW-133, MW-135, MW-145 through MW-148, and MW-150 through MW-158 are assumed to be completed in the middle confined aquifer described by Meyer (1975). Monitoring wells MW-201, MW-202, and MW-302 are assumed to be completed in the clay unit between the middle and lower confined aquifers, while MW-200 and MW-301 are assumed to be completed in the lower confined aquifer. The intermediary clay layer thickens towards the south-southwest (near MW-302) from approximately 8 feet thick to greater than 33 feet thick.

Groundwater occurs locally in the middle confined aquifer at elevations ranging from 698.92 to 703.75 feet based on the three gauging events in 1995 and 1997. Based on the absence of a confining layer, this unit is assumed to be under water table conditions locally. In the intermediary clay layer, groundwater occurs at elevations ranging from 689.10 to 700.68 feet. The groundwater elevation for MW-202 was originally 689.10 feet (July 14, 1995), however, the well had recently been developed and the water level in the well may not have reached equilibrium with the water level in the formation. In the lower confined aquifer, groundwater occurs at elevations ranging from 698.83 to 701.00 feet. Well gauging data are provided in Table 2.

Groundwater elevation data for wells completed in the middle confined aquifer indicate flow across the property generally towards Big Eagle Creek to the south. Figures 6A, 6B, and 6C are potentiometric surface maps for the July 14-17, 1995, September 11, 1995, and February 5-6, 1997 gauging events (respectively). Comparison of these three maps shows a similarity in flow pattern across the site. Insufficient well coverage is available to determine groundwater flow direction in the lower confined aquifer. Based on the relative location of (big) Eagle Creek groundwater flow in this unit is likely to the south.

A comparison of well and creek gauging data from February 26, 1997 indicated that groundwater flow was directed toward the creek (as above) and based on relative water elevations shallow groundwater was discharging into the creek.

Three well clusters are present in the study area. One cluster (A), composed of MW-153, MW-202, and MW-302, is located in the western portion of the site. A second cluster (B), composed of MW-150 and

MW-200, is located east of the plant building. A third cluster (C), composed of wells MW-151, MW-201, and MW-301, is located off-site to the southeast. Clusters A and C have wells completed in all three of the previously discussed units. Cluster B has wells in the middle confined and lower confined aquifers. A comparison of groundwater elevations in the three well clusters indicated a downward gradient in the western portion of the site and east of the plant. An upward gradient was observed offsite to the southeast.

Rising head permeability tests were conducted on wells completed in the middle confined (water table) aquifer, intermediary clay layer, and lower confined aquifer. To evaluate the hydraulic conductivity of the materials tested, the analytical method presented in Bouwer and Rice (1976) for unconfined aquifers was used. In this method, time versus water level data are plotted as semilog (time on linear x-axis and water level on log y-axis). A straight line is fit to the linear portion of the curve. Typically, the late-time data is nonlinear and is not used. Appendix D contains the Bouwer and Rice analytical solution, table of analysis parameters, method plots with best-fit lines, and the raw field data.

Table 3 summarizes the results of the slug test analysis used to estimate hydraulic conductivity of the shallow sandy aquifer, the intermediate silty-clay aquitard, and the lower sandy aquifer. Good repeatability was found for repeat tests within a single well as shown for MW-151, MW-154, MW-200, and MW-301.

Core samples were collected during installation of MW-151 and MW-301. A falling head permeability test was conducted on the (repacked) core samples to estimate the material hydraulic conductivity. This test measures the vertical hydraulic conductivity of the sample. The most reliable results are obtained from intact core samples. Less reliable results are obtained when the samples are a repacked. Cohesive soils (high clay content) generally remain intact while noncohesive soils (low clay content) typically do not remain intact and require repacking prior to testing. These test results are not used in calculating the average horizontal K value for each unit.

Vertical to horizontal K ratios generally range from 1:2 to 1:100 (Walton, 1988). The ratios 1:2, 1:10, 1:100 are considered representative of low, medium, and high degrees of anisotropy, respectively (Walton, 1988). Based on MW-151 testing, the ratio for the shallow materials is about 1:30 which is considered a medium degree of anisotropy. The ratio from MW-301 tests suggest no difference between vertical and horizontal K of the lower sand.

As shown in Table 4, average K values are found to be 137 feet/day for the upper water table aquifer, 0.012 feet/day for the middle silt-clay aquitard, and 9.1 feet/day for the lower confined/semiconfined aquifer. The lower aquifer at the site most likely is under confined to semi-confined conditions. Slug test results for MW-302 were not used to calculate the average aquitard

K because the well is completed across a thin sand seam that may not be representative of the aquitard as viewed on an average or site-wide scale.

4.0 RESULTS

4.1 Soil Analytical Results

4.1.1 Surface Soils (0-2 feet)

Detectable results of field screening of soils with a PID/FID ranged from 1.3 parts per million by volume (ppmv) in GP-4 to 4.6 ppmv in GP-1 and GP-2. Soil vapor headspace readings are summarized in Table 5.

Surface soils were collected during the advancement of Geoprobe borings GP-1 through GP-6 for analysis of priority pollutant metals. Chromium, copper, lead, nickel, and zinc were found in all six samples. Chromium concentrations ranged from 5.5 milligrams per kilograms (mg/kg) in GP-1 to 1,600 mg/kg in GP-2. Copper concentrations ranged from 7.4 mg/kg in GP-5 to 510 mg/kg in GP-2. Lead concentrations ranged from 8.6 mg/kg in GP-6 to 940 mg/kg in GP-2. Nickel concentrations ranged from 7.7 mg/kg in GP-1 to 28 mg/kg in GP-2. Zinc concentrations ranged from 36 mg/kg in GP-5 to 880 mg/kg in GP-2. Beryllium was found only in GP-3 at a concentration of 0.61 mg/kg and Cadmium was found only in GP-2 at a concentration of 4.1 mg/kg.

4.1.2 Vadose Zone (2-10 feet)

Detectable results of field screening of soils with a PID/FID ranged from 0.4 ppmv in MW-156 (3-5 feet) to greater than 1000 ppmv in MW-158 (8-10 feet). Soil vapor headspace readings are summarized in Table 5.

Laboratory analytical results for soil samples collected during this investigation indicated the presence of VOCs in 8 of the 11 vadose samples collected. A total of five VOCs were detected in the samples and included trichloroethene (TCE), vinyl chloride (VC), {cis-} and {trans} 1,2-dichloroethene ({cis} and {trans} 1,2-DCE), and tetrachloroethene (PCE). None of the samples contained all five compounds. The most frequently detected compounds were TCE (5 out of 11 samples) and {cis} 1,2-DCE (3 out of 11 samples). 1,2-DCE is a degradation product of TCE and its occurrence may be attributable to the decomposition of TCE over time.

Detectable TCE concentrations ranged from 41.0 micrograms per kilogram(ug/kg) in GP-6 (5-7 feet) to 12,000 ug/kg in GP-1 (5-7 feet). TCE concentrations were below detection limits in MW-154 (8-10 feet),

MW-157 (3-5 feet), MW-158 (8-10 feet), GP-2 (5-7 feet), GP-3 (5-7 feet), and HP-1 (3-5 feet). Detectable concentrations of cis-1,2-DCE ranged from 40 ug/kg in HP-1 (3-5 feet) to 2,700 ug/kg in GP-1 (5-7 feet). Cis-1,2-DCE was below detection limits in MW-152 (8-10 feet), MW-154 (8-10 feet), MW-157 (3-5 feet), MW-158 (8-10 feet), and GP-3 through GP-6 (5-7 feet). VC, another degradation product of TCE, was detected only in GP-1 (5-7 feet) and GP-3 (5-7 feet) at concentrations of 40 ug/kg and 12 ug/kg, respectively. {trans} 1,2 DCE was detected only in GP-1 (5-7 feet) at a concentration of 25 ug/kg, while PCE was detected only in HP-1 (3-5 feet) at a concentration of 17 ug/kg. Soil analytical results for compounds detected in wells and borings installed by Fluor Daniel GTI are summarized in Table 6. Laboratory analytical reports are provided in Appendix E. Analytical results for TCE, 1,2-DCE, and VC in the soil vadose zone for these borings and those advanced by previous consultants are provided on Figure 7.

4.1.3 Saturated Zone (>10 feet)

Detectable results of field screening of soils with a PID/FID ranged from 0.2 parts per million by volume (ppmv) in MW-200 (38-40 feet) and MW-202 (23-25 feet) to 540 ppmv in MW-302 (48-50 feet). Soil vapor headspace readings are summarized in Table 5.

Laboratory analytical results for soil samples collected during this investigation indicated the presence of VOCs in 6 of the 13 saturated zone samples collected. The five VOCs detected in the vadose samples were also detected in the saturated zone samples. Again, none of the samples contained all five compounds. The most frequently detected compounds were TCE (5 out of 13 samples) and {cis} 1,2-DCE (4 out of 13 samples).

Detectable TCE concentrations ranged from 6.8 ug/kg in MW-202 (33-35 feet) to 8,300 ug/kg in MW-202 (13-15 feet). TCE concentrations were below detection limits in MW-152 (18-20 feet), MW-154 (18-20 feet), MW-155 (28-30 feet), MW-200 (48-50 feet), MW-201 (both samples), and MW-302 (both samples). Detectable concentrations of cis-1,2-DCE ranged from 33 ug/kg in MW-200 (13-15 feet) to 3,500 ug/kg in MW-155 (13-15 feet). Cis-1,2-DCE was below detection limits in MW-152 (18-20 feet), MW-154 (18-20 feet), MW-155 (28-30 feet), MW-156 (18-20), MW-200 (48-50 feet), MW-201 (38-40 feet), MW-202 (33-35 feet), and MW-302 (both samples). VC, another degradation product of TCE, was detected only in MW-155 (13-15 feet) and MW-202 (13-15 feet) at concentrations of 60 ug/kg and 24 ug/kg, respectively. {trans} 1,2 DCE was detected only in MW-201 (18-20 feet) at a concentration of 11 ug/kg. PCE was detected in MW-156 (18-20 feet) and MW-200 (13-15 feet) at concentrations of 14 ug/kg and 18 ug/kg, respectively. Soil analytical results for compounds detected in wells and borings installed by Fluor Daniel GTI are summarized in Table 6. Laboratory analytical reports are provided in Appendix E. Available data indicates that concentrations of 1,2-DCE, TCE, PCE, and VC all decrease with depth.

4.2 Groundwater Analytical Results

4.2.1 Monitoring Wells and Hydropunch

Laboratory analytical results for groundwater samples collected from monitoring wells and the Hydropunch during the current investigation indicated the presence of VOCs in 28 of the 41 samples collected. A total of six VOCs were detected in the groundwater samples and included TCE, {cis} and {trans} 1,2-DCE, VC, acetone, and 1,1-dichloroethane. Acetone was detected in one sample only at a concentration near the detection limit. Since acetone is a common laboratory contaminant and was detected in one sample only at a low concentration, it was not considered to be present in groundwater. None of the samples contained all of the detected VOCs compounds. As was the case in soil, the most frequently detected compounds were TCE (22 out of 41 samples) and {cis} 1,2-DCE (21 out of 41 samples). VC was detected in 7 of the 41 samples and only in MW-155 (3,400 ug/L) during the February 5-6, 1997 sampling event. The compounds 1,1-dichloroethane and {trans} 1,2-DCE were not detected in any samples during the February, 1997 sampling event.

No VOCs were detected above the detection limit in MW-135, MW-154, MW-158, MW-200 through MW-202, MW-301, the trip blank, and the equipment blank. Groundwater samples collected from the remainder of the wells all contained detectable VOC levels. Detectable TCE concentrations ranged from 5.4 ug/L in groundwater collected from well MW-153 to 15,000 ug/L in well MW-132. Detectable {cis} 1,2-DCE concentrations ranged from 5.3 ug/L in groundwater collected from MW-152 to 65,000 ug/L in MW-132. Concentrations of {trans} 1,2 DCE ranged from 5.9 ug/L in MW10-1 to 1,400 ug/L in MW-148. Detectable VC concentrations ranged from 12 ug/L in MW-145 to 3,400 ug/L in MW-155

Data collected from the well clusters indicate that VOCs concentrations in groundwater decrease with depth. Only MW-302 contained a detectable VOCs concentration. MW-302 contained cis-1,2-DCE at a concentration of 8.2 ug/L. Groundwater analytical results for compounds detected during the current investigation are summarized in Table 7. Analytical results for TCE, 1,2-DCE, and VC in groundwater for the monitoring wells are provided on Figures 8A and 8B. Laboratory groundwater analytical reports are presented in Appendix F.

Isoconcentration maps were constructed for TCE, 1,2-DCE, and VC concentrations in groundwater using the February, 1997 data (Figures 9, 10, and 11). These figures show two areas of elevated VOCs at Plant 10. The two areas are: 1) west of the building in the vicinity of MW-132 and; 2) southeast of the building in the vicinity of MW10-1.

Two groundwater samples were collected from MW-157 in February 1997. Both contained a detectable concentration of TCE. Levels of 60 ug/L and 100 ug/L were detected in the well on February 6 and

February 26, respectively. Both samples contained a detectable concentration of undetermined aliphatic petroleum hydrocarbons. The type and quantity of the hydrocarbons could not be determined. The source appears to be localized to the vicinity of the well and not the site.

Groundwater data collected during previous investigations were compared to recent data to evaluate trends in dissolved VOCs concentrations. Historical dissolved VOCs data are provided in Table 7. In general, most of the wells did not exhibit major changes in dissolved VOCs concentrations with time. Dissolved VOCs concentrations did increase in wells MW-132 and MW155. Detected concentrations decreased in wells MW-148, MW-153, and MW-156. Wells MW-132 and MW155 are located in the western potential source area. Well MW-148 is located downgradient of MW-132. MW-153 is located in the well cluster located southwest of the building and MW-156 is located offsite to the southeast.

4.2.2 Little Eagle Creek Surface Water Sampling

Surface water samples were collected from Little Eagle Creek at ST-1, ST-2, and ST-3 on October 4, 1996 and February 10, 1997 for analysis of VOCs by EPA Method 8240. Two of the samples collected in October 1996 (midstream and downstream) contained a detectable VOC concentration. The midstream sample (ST-2) contained 17 ug/L cis-1,2-DCE and the downstream sample (ST-3) contained 14 ug/L cis-1,2-DCE. Both values are below the Federal M.C.L. for drinking water of 70 ug/L. None of the samples collected in February 1997 contained a detectable VOC concentration. A trip blank analyzed for the October 1996 sampling event contained 5 ug/L methylene chloride. The method blank for the sampling event contained 5.9 ug/L methylene chloride. A concentration of 8.3 ug/L methylene chloride was detected in an equipment blank for the February 1997 sampling event. The laboratory report indicated that methylene chloride is a common laboratory contaminant. Analytical results for TCE, 1,2-DCE, and VC in the surface water from the creek are provided on Figure 12. Laboratory analytical reports for Little Eagle Creek are presented on Table 7B and in Appendix B.

4.3 Aquifer-Stream Interaction

4.3.1 Stream Flow

To estimate stream flow in Little Eagle Creek in the vicinity of the site, stream velocity and flow depth were measured on October 4, 1996 and February 10, 1997. An upstream (ST-1), midstream (ST-2), and downstream (ST-3) location were selected as shown on Figure 3. At each location, stream depth and velocity were recorded every 2 feet in a direction perpendicular to flow, from the north bank to the south bank. The raw field data are summarized in Appendix G. Total stream flow at each location was calculated using a midpoint method. Discharge in cubic feet per second (cfs) for each 2-foot section of the stream is summed up to provide the total stream flow. These calculations are shown in Appendix G.

Calculated stream flow is summarized in Table 8. Stream flow on October 4, 1996 was too low and the flow area too wide, so flow velocity could not be accurately measured at the upstream and downstream locations. As a result, these data were not used in any calculations. At midstream, flow depth was adequate and stream flow was calculated as 7.98 or 8 cfs. Steam flow on February 10, 1997 was sufficient to measure velocity at all locations. Stream flow was calculated as 20.88 cfs, 23.77 cfs, and 23.58 cfs for upstream, midstream, and downstream locations, respectively. This indicates the stream is gaining volume as it flows past the site.

The nearest gauging station is located about 1.2 miles upstream of the site at the West 16th Street bridge. Flow data at this location from 1965 to 1995 (Stewart, 1983) are summarized for October and February on Table 8. The data suggest that, on average, the stream flow is lower (11.1 cfs) in October compared to February (30.4 cfs). Site specific stream flow data supports this observation. This suggests that the gaging station can be used to describe general stream flow trends at the site but more site-specific data would be needed before actual gauging station discharge values could be used quantitatively.

4.3.2 Chemical Mass Loading to Little Eagle Creek

In the western portion of the site, groundwater from the shallow water table aquifer discharges to Little Eagle Creek. The groundwater concentration just before entering the stream is based on a temporary well point (HP-1) that was installed near the streambank (see Figure 2). Groundwater from HP-1, as sampled and analyzed on October 4, 1996, was found to contain 3,900 ug/L of cis-1,2-DCE, 430 ug/L of TCE, and 500 ug/L of VC.

Stream samples were collected on October 4, 1996 and February 10, 1997 (Figure 12) at locations upstream, midstream, and downstream of the site. Two of the samples collected in October 1996 (midstream and downstream) contained a detectable VOCs concentration. The midstream sample (ST-2) contained 17 ug/L cis-1,2-DCE and the downstream sample (ST-3) contained 14 ug /L cis-1,2-DCE. Both values are below the Federal MCL for drinking water of 70 ug/L. None of the samples collected in February 1997 contained a detectable VOCs concentration. A trip blank analyzed for the October 1996 sampling event contained 5 ug/L methylene chloride. The method blank for the sampling event contained 5.9 ug/L methylene chloride. A concentration of 8.3 ug/L methylene chloride was detected in an equipment blank for the February 1997 sampling event. The laboratory report indicated that methylene chloride is a common laboratory contaminant.

Site-specific hydrogeologic and chemical data are used to develop a conceptual model of aquifer-stream interaction so that chemical mass loading to the stream can be estimated. The conceptual model consists of a shallow sandy water table aquifer in good communication with Little Eagle Creek, a gaining stream at the site. Since the aquifer is relatively thin (about 18 feet), all of the

shallow groundwater is assumed to discharge to the stream as illustrated in Figure 13. The creek is a local discharge area in contrast with Eagle Creek, located further to the southwest, which is the likely discharge area for the deeper aquifers at the site.

The water table contour maps shown in Figures 6A, 6B, and 6C suggest a gaining stream at the site with the shallow aquifer contributing to stream baseflow. Baseflow is the relatively constant (long-term) contribution of groundwater to streamflow. Storm runoff accounts for the large fluctuations (short-term) in streamflow that occur above the baseflow. Average aquifer thickness, based on well logs, is about 18 feet. With such a limited thickness, it is not unreasonable to assume that all of the shallow aquifer discharges to the stream.

Assumptions must be developed for the groundwater chemical concentration as it enters the stream and the dimensions of the chemical loading area (thickness and width). HP-1 was screened in the upper few feet of the aquifer and is conservatively assumed to represent the concentration of groundwater entering the stream. In reality, the concentrations along the chemical loading width would be expected to diminish in directions away from HP-1. If the chemical plume maps and groundwater contour maps are superimposed, flowlines can be drawn to show the width of streambank where chemical loading occurs is about 360 feet, as shown in Figure 14. The chemical loading width is taken as the average aquifer thickness of about 18 feet. Given the relatively thin aquifer thickness and that sources are located up to 300 feet or more upgradient, concentrations are assumed to be distributed throughout the aquifer thickness.

The final assumption concerns mixing in the stream. It is assumed that complete mixing occurs as the aquifer discharges to the stream. Given the small width (about 35 feet) of the stream and limited depth (<0.50 feet on October 4, 1996), this assumption is reasonable.

The following form of Darcy's law (Todd, 1980) is used to calculate the discharge from the shallow water table aquifer into the stream through the chemical discharge area.

$$Q = K I A$$

where Q = volumetric flux (ft^3/d)
K = hydraulic conductivity (ft/d)
I = hydraulic gradient (ft/ft)
$A = W \times D$ = chemical loading area (ft^2/d)

where W = chemical loading area width (ft)
D = chemical loading area thickness (ft)

The following values were selected:

K = 137 ft/d	Average K from slug test analysis for the shallow aquifer
I = 0.005	Calculated directly from site water level data
W = 360 ft	Based on plume and groundwater contour maps
D = 18 ft	Based on average aquifer thickness from well logs

Groundwater discharge to the stream is calculated as 1.4×10^{-4} cfs per foot of streambank or 0.05 cfs along the chemical loading area. Assuming that the discharging groundwater contains the chemical concentrations observed in HP-1, the resulting stream concentration can be estimated as follows (modified from Todd, 1989):

$$Qt\ Ct = Qs\ Cs + Qa\ Ca$$

where Qt = combined flow (cfs)
Ct = combined concentration (ug/L)
Qs = stream flow (cfs)
Cs = stream concentration (ug/L)
Qa = aquifer flow (cfs)
Ca = aquifer concentration (ug/L)

Solving for the combined concentration Ct yields:

$$Ct = (Qs\ Cs + Qa\ Ca) / Qt$$

Input data to this equation are as follows:

Qs = 8 cfs (observed)
Cs = 0.0 ug/L (observed)
Qa = 0.050 cfs (calculated)
Ca = 3,900 ug/L cis-1,2-DCE, 500 ug/L VC, and 430 ug/L TCE (observed)
Qt = Qa + Qs (calculated)

Assuming only the western plume is loading to the stream, conservative estimates of stream concentrations at low flow conditions are 25 ug/L, 3.2 ug/L, and 2.7 ug/L for cis-1,2-DCE, TCE, and VC, respectively. All values are below the MCLs for drinking water supplies. Estimated stream concentrations during higher flow (February) are significantly below the detection limit of 5 ug/L for cis-1,2-DCE, TCE, and VC.

aquifer-stream interaction modeling were considered for evaluations of the surface waters. The two surface water sampling events were both recent and only three months apart to represent low and high flow stream conditions. For the purposes of the risk assessment for the site, it is assumed that the site will remain intact as it currently is (surface cover and on-site building structures), be used as an industrial property in the future, and will continue to use only the municipal water supply for all water uses on site. Deed restrictions may be necessary to ensure future site uses under this assumption. Several other general assumptions were made during this risk assessment. They are as follows:

- Since little on-site and no off-site surface soil data were collected as part of the current or historic data collection efforts and based on the nature of the site-related constituents of interest (COI) being mobile, susceptible to leaching and volatilization, the subsurface soil data were assumed to conservatively represent both surface (0-2 feet) and subsurface (below 2 feet) soil conditions. Soil vapor headspace readings, summarized in Table 5, support the assumption that the upper soil layers did not have the most significant readings. The highest soil vapor readings typically occurred in the interval 13 to 20 feet below surface, which is within the saturated soil zone. Two surface soil samples were collected by a previous consultant (O'Brien & Gere Engineers, 1994) and reported as having extremely low level concentrations of one site-related COI in one surface soil sample. It should be noted that although the analytical results of these two samples support the assumption that the subsurface soils represent worst-case surface soil conditions, they were collected in a relatively unimpacted area in the western half of the northern side of the plant property.

- COI intake pathways for each examined receptor follow the same pathways as used by IDEM in calculating the Tier II Cleanup Goals (IDEM, 1996). IDEM regulations (1996) require comparison of soil concentrations to the Maximum Upper Limit values for chemical classes to be "protective of other potential exposure pathways not evaluated in the calculation of health-based criteria". For VOCs, the total VOCs concentration in soil cannot exceed 1,000 mg/Kg. None of the soil samples collected had total VOCs concentrations exceeding 1,000 mg/Kg. For this risk assessment, other soil potential pathways, such as for dermal contact have been assumed to be subsumed by the soil incidental ingestion pathway risk estimates.

- As described in section 5.3, Domestic and Municipal Well Locations, downgradient wells due south of the facility are not likely to be impacted from the plume identified on site in the upper aquifer in the western portion of the property due to the fact that all indications are that the groundwater in this aquifer discharges to the Little Eagle Creek. Additionally, the nearest downgradient well to the south appears to be approximately one-quarter of a mile downgradient, based on the current well survey. Obviously with mixing and other attenuation factors, not only would the groundwater be unlikely to migrate to this receptor but the concentrations at

downgradient wells south of the site would be much lower than the concentrations immediately off site (which typically do not significantly exceed IDEM residential health-based criteria for groundwater). It is assumed for this assessment that the only receptor to the western plume in the upper aquifer is the Little Eagle Creek.

- Sample HP-1, which is a shallow Hydropunch groundwater sample collected in the previous sampling event a few feet from the Little Eagle Creek shoreline, is assumed to be an anomalous groundwater sample. Comparison of the HP-1 COI concentrations to groundwater sample concentrations from wells immediately upgradient show much lower upgradient concentrations. However, the COI concentrations in HP-1 were used as worst-case conditions for the aquifer-stream interaction modeling to determine whether COI in the upper aquifer are deleteriously impacting Little Eagle Creek. The aquifer-stream interaction discussions are presented in __.

- The soils collected within or under the water table (approximately 10-12 feet bgs) will not be considered as part of the subsurface soil data set for direct contact soil exposures since given the relatively stable depth to groundwater in the area of this site, no realistic scenarios (including commercial or residential construction activities) would normally involve human contact with soils at or below this depth. The soils at or below the water table are considered to be impacted as the result of the impacted groundwater plumes in the same areas, particularly for off-site impacts detected. As evidence of this assumption, in most locations where soil samples were collected just within the water table, the groundwater concentrations are significantly higher than the correlating soil concentrations of the COIs.

- An unregistered private residential well was identified due east of the facility on North Olin Avenue in a door-to-door survey performed by the Marion County Health Department. The residential well was sampled by the county and site-related COI were all nondetect. The groundwater flow from the relatively well-defined plume identified on the southeast portion of the site appears to be directed towards the south-southeast. Therefore, this residential well is assumed not to be a potential receptor for direct contact of this groundwater plume.

- The most current toxicity values for cancer slope factors (CSFs) and reference doses (RfDs) used in the human health risk evaluations were obtained from US EPA sources including references from the Integrated Risk Information System (IRIS) on-line database.

Other assumptions that are specific yet minor in consequence will be presented as they become necessary and applicable.

As stated in Section 5.0, the typical first step in data evaluation under the IDEM three tiered approach is to compare chemicals detected in impacted environmental media to Tier I background levels. However, this comparison was not completed for VOCs because these compounds do not naturally occur in the environment and because there is no evidence that the soil, groundwater, or surface water impact are related to upgradient sources. For the metals results in surface and subsurface soils, a background comparison was possible. The surface and subsurface soil metals results are presented in Tables 6B and 1B, respectively. Since IDEM does not provide background levels for the Tier I evaluations, literature values for the State of Indiana (when available) were utilized from *Elements in North American Soils* (Dragun, 1991). A summary of literature background ranges utilized for Tier I comparisons are presented in Table 9. Comparison of metals concentrations to the Tier I background ranges reveal arsenic, barium, chromium, mercury, and silver subsurface soil results are within expected background. Similarly, beryllium and zinc in surface soil results are within expected background. Therefore, these potential COIs can be removed from further consideration in this risk assessment.

Chemical concentrations reported for subsurface soil and groundwater were compared to IDEM Tier II generic health-based cleanup goals in Sections 5.3.2 and 5.4.2. Tier II health-based cleanup goals are calculated based on human health risks using standard risk assessment exposure assumptions generally following EPA's procedures for calculating preliminary remediation goals (EPA, 1991a). The results of the Tier II Cleanup Goal comparisons were used to focus discussions of the analytical results. These same comparative results will be used below to help screen COIs for the risk assessment. IDEM does not provide health-based cleanup goals for all chemicals for ecological or human exposures for impacted surface waters. In particular, the state's surface water quality criteria (1993) does not have a criterion for the COI cis-1,2-dichloroethene. Therefore, literature or federal screening values were used, as appropriate, for ecological receptors. Standard risk calculations were performed to evaluate whether potential risks exist for residential exposures to impacted surface waters.

5.1.1 Data Gaps

As described in Section 5.1, only limited surface soil data were obtained as part of the historical data collection efforts (O'Brien & Gere, 1994). As stated above, only two surface soil samples were collected in an area found to be relatively unimpacted in subsequent investigations. For this assessment, the subsurface soil conditions have been assumed to be the worst-case surface soil conditions. This is a potential data gap because the true surface soil conditions are uncertain. However, based on the current inactivity of the site, knowledge of the upper soil physical conditions and the soil vapor headspace readings, the assumption that the subsurface soils data represent the worst case of the surface soils appears to be conservative and valid.

Another potential data gap relates to the uncertainty of the removal action of soils impacted by asbestos. Soil particles containing asbestos if at the surface could become airborne as fugitive dust. The O'Brien & Gere report (1994) indicated that certain surface and subsurface soils in areas in the northwestern portion of the property where brake pads were discovered contained bulk asbestos up to 10% by volume. Insufficient documentation exists to determine whether the removal action completely eliminated this potential threat. A site walkover conducted by Fluor Daniel GTI and General Motors personnel on June 10, 1997 revealed the presence of a crushed drum near the surface containing what appeared to be pieces of brake pads. The drum was located near the western wall of the plant building north of the driveway. Further subsurface investigations (i.e. test pits) are planned for the area to determine the magnitude and extent of buried drum and asbestos occurrence in the northwestern portion of the site.

Other potential data gaps include: 1) the lack of sediment data from the Little Eagle Creek which is a possible impacted receptor considering its close proximity to the site and the presence of constituents in the Hydropunch groundwater sample collected near the shoreline and in two of the surface water samples during the low flow sampling event; 2) the lack of complete definition of the areal extent of COIs in groundwater off-site to the southeast (additional monitoring wells are planned to address this data gap); and 3) the lack of additional data collection to identify whether results obtained in HP-1 are anomalous, however, as stated previously, use of data from HP-1 is considered conservative.

Although the lack of sediment quality data have been identified as a potential data gap for this assessment, a qualitative statement regarding the potential hazards of impacted sediments to likely receptors can be made. Based on relatively high water solubilities and low octanol-water partitioning coefficients (K_{ow}), volatile organic chemicals tend to be very mobile in water and tend not to sorb to particulate matter. Based on the fact that the most significant point of exposure to environmental receptors (human and ecological) for potentially impacted sediments would be via the migration of the chemical to the surface water (Little Eagle Creek) and that two samplings of the surface waters have shown relatively minor impact, the sediments are not likely themselves to be of environmental concern. Comparison of the surface water sample data with surface water quality benchmarks for protection of human consumption (Title 327, Article 2, Water Quality Standards) and for ecological receptors (Suter, 1996) has clearly shown minimal potential for adverse effect of surface waters to these potential receptors. Therefore, the sediment quality data gap should not be construed as being of concern.

Additional wells are planned to be installed to address the lack of complete delineation of COI's in the groundwater off-site to the southeast of the site. The wells will be installed south and east of MW-157.

The lack of additional groundwater data from HP-1 is not a concern for the following reasons: data collected from HP-1 may not be representative of VOC concentrations in groundwater in the shallow sand unit at that location. If concentrations are vertically stratified (decline with depth), sample HP-1 would

overestimate the average value since it was collected from near the surface. A sample collected from a well point screened over the entire interval would provide a more representative vertically-averaged value of VOC concentrations. However, the data from HP-1 should represent the worst case and therefore appears to be conservative and valid.

5.1.2 Vadose Zone Soils

A total of 21 historic and current on-site subsurface soil samples from various depths and 3 historic and current off-site subsurface soil samples from various depths were collected at the site in the vadose zone and analyzed for VOCs. This data set serves as the basis for the soil potential exposures assessment in this report. All soil VOCs data for detected constituents are presented in Tables 1 and 6 for historical and current collection efforts, respectively. As described above in Section 5.1, only subsurface soils from above the water table were considered for direct contact exposures in this risk assessment. Historic subsurface soils were analyzed for a variety of chemical parameters including VOCs, semivolatile organics (SVOCs), polychlorinated biphenyls (PCBs), various TPHs, select metals, and asbestos. All of these parameter groups, except for VOCs and metals, were eliminated from current sampling programs due to a lack of positive detections. Current subsurface soil samples were analyzed for VOCs and recent surface geoprobe samples were analyzed for metals as described in Section 5.3. Current and historic soil metals results are presented in Tables 6B and 1B, respectively. In order to appropriately assess human health risks for VOCs and metals impact to site-related soils, COIs that realistically contribute to potential quantitative risks must be selected.

For this assessment, there are four criteria in selecting final COIs. As stated in Section 4.0, all environmental samples were analyzed for a target list of VOCs by Method 8240 and select samples were analyzed for various metals. The final COIs were selected from this list of chemicals. Note that the historic soil VOCs data had results for total-1,2-dichloroethene while the current sample analyses reported results separately for the cis- and trans-1,2-dichloroethene isomers. For consistency, the current analytical data results for cis-and trans-1,2-dichloroethene were summed to make a uniform data set in the risk-based summary tables. Since most of the total-1,2-dichloroethene concentration was contributed by the cis-1,2-dichloroethene isomer, (as can be seen from comparing the cis and trans 1,2-dichloroethene isomer concentrations shown in the original sample results in Tables 1 and 6) all physical and toxicity constants for the total-1,2-dichloroethene results were based on cis-1,2-dichloroethene. Also note that the historic subsurface soil samples that were selected for the metals analysis were analyzed for the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver and the current surface soil samples that were selected for metals analysis were analyzed for the metals beryllium, cadmium, chromium, copper, lead, nickel, and zinc. However, this is not of significant consequence since, as were evident below, all metals results were screened out from evaluation in the risk assessment.

Several of these metals results have already been eliminated from further evaluation since they were within expected background ranges from literature values.

The first criterion used for selecting final COIs was examining whether the compound was site-related. The VOCs methylene chloride was only detected in three on-site soil samples that were all collected and analyzed on the same day at low concentrations. Based on the fact that this VOCs is not related to historical site uses, is a common laboratory contaminant, and the similarly low detected results are indicative of typical GC/MS blank contamination, methylene chloride was removed as a COI.

The second criterion for selecting final COIs is its detection. If a target VOCs or metal is not detected, it should be removed from further consideration. Tables 1 and 6 edited the list of target VOCs to only those that were detected in at least one sample. Frequency and statistical summaries of the VOCs COIs retained thus far for on-site and off-site subsurface soils are presented in Tables 10 and 11, respectively. These summaries present the minimum and maximum detected concentrations, the location of the maximum detected concentration, the frequency of detection, the arithmetic mean, standard deviation, and the 95 percent upper confidence level (UCL) for each vadose zone soil VOCs COI retained for further evaluation. Note that the statistics presented for vinyl chloride in Table 10 do not include the unusually high detection limit value for soil sample SB-132. This value was removed from the soil data set in accordance with the EPA guidance document RAGS (1989a), Section 5.3.2. The original reported sample quantitation limit was 6,300 ug/kg when the maximum detected concentration in sample SB-150 was only 500 ug/kg and the next highest detected value was found in sample GP-1 at 40 ug/kg. Therefore, even the half-detection limit value was more than six times higher than the highest detected concentration. Based on that fact and that vinyl chloride was only detected in three of 21 vadose zone soil samples, this value was not utilized in calculating the arithmetic mean, standard deviation, or 95% UCL value presented in Table 10.

When re-organized into on-site and off-site vadose zone summary tables, the off-site list of COIs removed vinyl chloride, trichloroethene, toluene, and xylenes for lack of any off-site detections. Similarly, when considering only vadose zone on-site soils, the on-site COI toluene is removed for lack of detections. All metals above background were detected in at least one sample.

The third and fourth criteria for this assessment are based on prevalence and whether the compound was detected above the Tier II Cleanup Levels. Normal EPA convention uses a cutoff of five percent as a percentage of detection frequency for assessing whether to retain a COI based on prevalence. Tetrachloroethene and total xylenes were both detected in on-site vadose zone soil samples at a frequency of one in 21 (4.8%). Additionally, neither was detected above its respective Tier II Non-Residential Cleanup Levels. Total-1,2-dichloroethene concentrations in on-site soils were all below its associated Tier II Non-Residential Cleanup Levels and tetrachloroethene and total-1,2-dichloroethene

concentrations in off-site soils were all below its respective Tier II Cleanup Levels. Therefore, based on either or both of these criteria (low prevalences and detections are all below the Tier II Cleanup Levels), these VOCs were removed from the list of final COIs for on- and off-site soil exposures.

Trichloroethene was the most frequently detected VOCs on site (14 of 21 wells). However, even though one single trichloroethene detection in SB-132 exceeded the Tier II Non-Residential cleanup goal, the 95% UCL of the arithmetic mean concentration for trichloroethene in on-site vadose zone soils was below the Non-Residential Tier II subsurface soil cleanup goal of 25,730 ug/kg. Therefore, this COI was removed from the list of on-site soil COI.

Examination of all soil results for metals retained thus far reveal all on-site vadose zone soils are below their respective Non-Residential Tier II Cleanup Levels and all off-site vadose zone soils are below their respective Residential Tier II Cleanup Levels. Note that the metals copper and lead do not have IDEM Tier II screening concentrations. Copper is a ubiquitous metal with relatively low toxicity. The U.S. EPA Region V's *RCRA Permitting Branch Guidance: Data Quality Levels* (1994) provide a screening level of 2,900 mg/kg as a health-based criterion. All soil copper results are well below this screening criterion. Lead is also a ubiquitous metal. The EPA IRIS toxicity constants for lead exposures have been withdrawn. Currently, EPA does not have any recommended toxicity values with which to calculate health-based screening levels. The U.S. EPA Region V screening level (1994) is 500 mg/kg. Surface and subsurface soil statistics for lead are shown on Table 12. Even though one surface (current) and one subsurface (historic) soil sample have anomalously high concentrations of lead that exceed this screening level, there is not likely a significant health threat based on the facts that the average lead concentrations are well below this screening level and the arithmetic 95% UCL concentrations for lead in the surface and subsurface soils are within or approximate the 500 mg/kg screening level. Therefore, copper and lead, as well as the other metals can be removed from further consideration in this risk assessment.

Note that the surface and subsurface asbestos results reported by O'Brien & Gere (1994) are additionally represented in Table 12 along with the lead statistics for informational purposes since these data reflect a potential data gap on site. However, this assessment will not further examine the potential health threat associated with the unknown status of soils impacted with asbestos since this type of impact is not normally quantitatively evaluated in a human health threat risk assessment. Typically, when a potential health threat exists such as friable asbestos, it is usually removed and properly disposed. For this site, a removal action was taken to address asbestos impacted soils and waste brake pads found on site, but sufficient documentation does not exist to thoroughly determine whether the removal action removed all potential threat. A few brake pads were found in a crushed drum during the site walkover conducted by Fluor Daniel GTI and General Motors personnel on June 10, 1997.

After examining the data using the four screening criteria, the remaining COI for on-site subsurface soil exposure assessments is vinyl chloride. None of the off-site vadose zone soil potential COIs were retained for further evaluation. Therefore, no off-site direct contact soil exposures need to be assessed.

5.1.3 Groundwater

As stated above, the groundwater investigation at the site included laboratory analysis of groundwater samples to evaluate groundwater quality and to assess the extent and degree of potential groundwater impact potentially due to past site activities. Historical groundwater samples were collected and analyzed for the same variety of chemical groups including VOCs, SVOCs, PCBs, various TPHs, select metals, and asbestos. All chemical groups were nondetected other than VOCs. Subsequently, all current groundwater samples have been analyzed for VOCs only. A total of twenty-one groundwater samples were most recently collected and analyzed for VOCs in the first week of February 1997 as described in Section 4.4 . The current and historical groundwater analytical results for detected VOCs for all on- and off-site wells are summarized in Table 7. One hydropunch groundwater sample (HP-1) was collected in September 1995. No additional sampling was attempted at HP-1. Thus, the results for HP-1 were taken from the previous sampling event. Also note that a groundwater sample from the most downgradient off-site well to the southeast (MW-157) was recollected and reanalyzed in late February 1997 because the vinyl chloride detection limit in the sample collected previously had been reported by the laboratory with a high detection limit due to sample interferences. The latter sample results were utilized in this assessment since the vinyl chloride detection limit met the practical quantitation limit (PQL) for the method and the trichloroethene concentration in this sample was the highest measured off-site to the southeast. As with subsurface soils, the same four criteria were evaluated to select final COIs for groundwater.

The VOCs presented for groundwater in Table 7 are the list of detected target compounds which satisfies the first criterion for selecting final COIs. Acetone, a common laboratory blank contaminant, had been detected in one of 19 samples collected in the previous sampling event at a concentration well below its Tier II Cleanup Level for both residential and non-residential exposures. Therefore, based on the first, third, and fourth criteria defined above, acetone was removed as a COI. Acetone was not detected in any current groundwater samples.

A frequency summary of the COIs retained thus far for the combined on-site and off-site groundwater are presented in Table 13. This summary presents the minimum and maximum detected concentrations, the location of the maximum detected concentration, and the frequency of detections for each COI retained for further evaluation. Note that trans-1,2-dichloroethene was not included in this table since current groundwater results had no positive detections for trans-1,2-dichloroethene.

The target VOCs 1,1-dichloroethane was not detected in any of the twenty-three current groundwater samples. Thus, based on the second and third criteria used for selecting COIs of detection and prevalence, 1,1-dichloroethane was removed from further consideration. After examining the data using the four screening criteria, the remaining COIs for the on-site and off-site groundwater are vinyl chloride, total-1,2-dichloroethene, and trichloroethene.

5.1.4 Surface Water

Three surface water locations were sampled in October 1996 and February 1997 and were analyzed for VOCs as discussed in Section 4.2.2. Results of the three COIs retained for groundwater evaluations are presented in Figure 12. The October 1996 sampling event represented low flow conditions and the February 1997 sampling represented high flow conditions. The only COI detected in the two events was cis-1,2-dichloroethene. Cis-1,2-dichloroethene was not detected in the upgradient station ST-1. The two surface water stations adjacent to the two on-site plumes revealed positive detections of cis-1,2-dichloroethene in the low flow sampling event only with a maximum detected concentration of 17 ug/L. No other VOCs were detected in either sampling event.

The detections of cis-1,2-dichloroethene in these locations support the assumption that the groundwater in the upper aquifer is discharging to the Little Eagle Creek. In order to evaluate whether the detections of cis-1,2-dichloroethene would be the expected worst-case surface water conditions in the future, an aquifer-stream interaction modeling was performed. Results of this modeling are presented in Section __. Utilizing the anomalously high results in hydropunch sample HP-1 as a continuous source concentrations along the stream the model predicted that the detections found for cis-1,2-dichloroethene represent the worst-case conditions for current and future exposures. The model predicted at low flow that concentrations of vinyl chloride and trichloroethene would be below the reporting limits for the analytical method utilized. This conclusion is supported by the analytical results from two sampling events.

Literature screening values were obtained for evaluation of potential ecological receptors for cis-1,2-dichloroethene. The U.S. EPA's *Quality Criteria for Water 1986* (1987) lists an acute lowest observed effect level (LOEL) for dichloroethenes for freshwater organisms at 11,600 ug/L. The *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Freshwater Biota* (Suter, 1996) cites a Lowest Chronic Value extrapolated from an LC50 using regression at 14,680 ug/L and a Lowest Chronic Ambient Water quality criterion for fish at 9,538 ug/L. These references demonstrate that the low detections of cis-1,2-dichloroethene are almost three orders-of-magnitude less than the lowest of these literature screening values and thus, demonstrate the insignificant potential threat to ecological receptors of cis-1,2-dichloroethene in the surface waters at the site.

Since IDEM does not provide Tier II Cleanup Levels for human exposures to surface waters potentially impacted by cis-1,2-dichloroethene, a site -specific Tier III evaluation of risks associated with the most realistic exposure pathway for nearby off-site residents was performed to ascertain whether the cis-1,2-dichloroethene detections potentially posed a threat to human receptors. The only COI for surface water risk assessment evaluations is cis-1,2-dichloroethene.

5.1.5 Uncertainties Associated with Data Collection and Evaluation

Uncertainties associated with the data collection and evaluation activities include:

- the use of subsurface soil conditions to demonstrate the worst case surface soil conditions;
- the slight uncertainty associated with using soil data that were reported on a wet weight basis rather than dry weight corrected (concentration would go up by 10-20% in dry weight);
- the use of maximum groundwater results from an off-site location adjacent to the site to represent worst-case point exposure conditions for residential exposures when complete off-site delineation has not yet been completed; and
- the number of samples collected per medium and sampling locations selected to identify and define extent of impact.

Uncertainty associated with the data are also limited by the fact that the chemicals detected in soil and groundwater at the site focus on the most impacted areas. Therefore, these biased samples likely overestimate the potential risk at the GM Allison Plant No. 10 site.

5.2 Tier III Site-Specific Risk Assessment

The final COIs for soil, groundwater, and surface water that were retained will be carried through to the Tier III site-specific risk assessment. The purpose of this section is to identify realistic exposure scenarios for the site so that the Tier III site-specific human health risk assessment can be quantitatively evaluated. Both current and reasonably foreseeable future land uses of the site are considered in developing site-specific exposure scenarios. Per IDEM regulations, the risk assessment and subsequent cleanup goals, if necessary, are based on resource uses for the site and surrounding area. Tier III assessments also utilize the reasonable maximum exposures expected to occur under both current and potential future use conditions of areas impacted by a release or imminent threat of a release of hazardous substances (IDEM, 1996). These regulations and directives from IDEM substantially follow EPA guidance for performing risk assessments under the Risk Assessment Guidance for Superfund (RAGS) Parts A and B (1989a; 1991a; and 1991b).

IDEM and EPA have developed standardized methodology for quantitatively evaluating risk for soil, groundwater, and surface water exposures. This begins with the determination of probable land uses of the site and potential receptors that would be exposed to COIs in the on- and off-site soils and groundwater and the off-site surface water (IDEM, 1996).

5.2.1 Land Use

Basic physical site characteristics are discussed in Section 2.0 while basic site geology and hydrogeology characteristics are discussed in Section 5.0. The property is zoned industrial and is currently being used as a automotive parts warehouse. Land use in the surrounding area of the site is mixed use with zoning predominantly residential, general business and industrial. The properties immediately surrounding the site are:

- **North:** A city park
- **East:** Residential properties
- **South:** Wooded area and Little Eagle Creek
- **West:** Holt Road and Allison Transmission

A site vicinity map is presented in Figure 3.

As stated in Section 5.1, a basic assumption of this risk assessment is that the on-site property's reasonably foreseeable future land use is that it will continue the same as the current or historic use as a commercial/industrial property. Since the facility is supplied with a municipal water supply it has been assumed that no potential uses of on-site groundwater will occur in the future.

As discussed in Section 5.3, a domestic and municipal well location survey was completed by plotting all county registered wells that are within a one mile radius of the property. The domestic/municipal well location map is presented in Figure 4. The nearest downgradient well to the site is approximately one-quarter of a mile due south of the site. As noted above, a residential well has been identified due east of the facility but is cross gradient of the on-site plumes, is not currently impacted, and is not expected to be impacted in the future. Analytical results of water samples from on-site wells in the northeast corner of the site, which would be more upgradient of this off-site residential well do not indicate detectable VOC concentrations in any of the four groundwater sampling events to date. VOCs occurrence in shallow groundwater likely discharges into Little Eagle Creek. Therefore, it is unlikely that dissolved VOCs extend south of the stream to the south.

Since a public water supply is available to area residences, it is unlikely that wells to the southeast of the site are utilized for household use, including consumption. However, there are no ordinances in Indianapolis prohibiting the installation of a potable water supply well even where a municipal supply is available. It should be noted that MCHD personnel Paul Gilson indicated during a recent discussion with Fluor Daniel GTI that they plan to develop a program in the near future to deny well installation permits in areas where contamination is known and public water supply is available. He also stated that they were considering the use of the Allison Plant 10 site as a pilot case for this program. For conservatism, it is assumed that the groundwater immediately off-site may be used in the future as a potable water source and that the worst case intake by affected residential receptors would be the maximum off-site VOCs concentrations.

5.2.2 Potential Human Receptors

Potential human receptors who are likely to be present at the site or in the surrounding environment, and who, as a result could be exposed to COIs at the site, are identified based on the current and future land uses of the site (assumed to be industrial) and surrounding area (assumed to be mixed use including residential and industrial with the most sensitive receptors being residents). In addition, Fluor Daniel GTI assumed that the site surface will remain intact. Currently, it is covered by asphalt, concrete, and a relatively uninterrupted vegetative cover. Based on the assumed land uses specified in Section 5.4.1, the potential receptors are:

- on-site worker
- on-site construction worker
- off-site child resident
- off-site adolescent resident
- off-site adult resident

Groundwater scenarios for residents will not be separately evaluated for child and adult residents in accordance with scenarios evaluated by IDEM for calculation of Tier II Cleanup Goals (IDEM, 1996). The off-site adolescent resident receptor will only be specifically examined for the recreational use of the Little Eagle Creek. Additionally, residential receptors are the only receptors examined off-site for two reasons:

- Based on potential durations and frequencies of exposure, off-site residents who live nearby the property are the most sensitive of any reasonably expected future or current off-site receptor groups; and

- Because off-site data are limited to locations immediately adjacent to the facility property line, off-site extent of impact is uncertain and worst case exposures of COI concentrations from these adjacent sample locations are assumed.

On-site trespassers have not been included because the property is securely fenced and potential trespassers are extremely unlikely to regularly contact on-site surface soils based on the current and assumed future surface cover that is in place. Additionally, on-site trespassers would be even less likely to ever come into contact with on-site subsurface soils or groundwater. Therefore, the on-site trespasser receptor who may normally be evaluated for this type of risk assessment will not be examined.

5.2.3 Exposure Pathways

5.2.3.1 Soils

The following pathways are considered significant for surface and subsurface soils for on-site non-residential uses per IDEM guidance:

- incidental ingestion of soil
- inhalation of volatiles and soil particulates

Therefore, these exposure pathways for soils were considered the most significant when considering the site-specific receptors. As stated in Section 5.1, other exposure pathways, including the dermal route, are not evaluated, but are considered by applying IDEM's maximum upper limits (IDEM 1996) for each chemical class.

Receptors may contact site-related COIs in the following ways based on site conditions.

- An on-site worker at the site may come into contact with surface soil during daily work activities under current conditions because the site is not entirely paved. In the future, this exposure pathway is uncertain. The surface soil exposure routes would be incidental ingestion of soil and inhalation of volatile vapors and soil particulates. The potential also exists for an on-site worker to come into contact with subsurface soils under very limited conditions if the worker's responsibilities included facility maintenance. This type of exposure would be expected to be infrequent and last for a short time period. The exposure routes would also include incidental ingestion of soil and inhalation of volatile vapors and soil particulates.

- An on-site construction or utility worker at the site may come into contact with surface and subsurface soil during routine utility maintenance activities or future construction activities involving excavation. The exposure routes would be the same as for the on-site worker except

the construction or utility worker would be expected to be exposed for a much shorter duration to both surface and subsurface soil.

5.2.3.2 Groundwater

The following pathways are considered the most significant for off-site residential groundwater uses:

- ingestion of groundwater used as a potable water source
- inhalation of volatiles from the groundwater used as a potable water source
- dermal contact with groundwater used as a potable water source
- inhalation of volatilized vapors intruding into residences from impacted groundwater beneath the residence's foundation or basement

Therefore, these exposure pathways for groundwater were considered the most significant when evaluating the site-specific receptors. On-site non-residential groundwater exposure pathways will not be further evaluated in this risk assessment based on the following rationale:

- An on-site worker at the site is very unlikely to ingest groundwater during daily work activities since well water has not previously been used nor will likely be used as a potable water source on-site. The facility is connected to the local public water supply and it is unlikely that condition will change in the future use of the site. A deed restriction may be necessary to guarantee this assumption remains intact in the future. The groundwater exposure route of inhalation of volatile vapors from and dermal contact with on-site groundwater is unlikely for on-site workers because the typical pathway for this exposure route is via showering or bathing using well water. Inhalation of volatilized vapors intruding into the on-site building is unlikely since the plumes on site are not beneath the building, appear to be moving away from the building, the indoor air volume as a warehouse type of structure would allow significant dilution of potentially intruding vapors, and the indoor air exchange rate with large warehouse doors would tend to be quite high (which would allow for frequent fresh air replenishment).

- An on-site construction worker at the site is also unlikely to ingest groundwater during future construction activities since well water has not previously been used nor will likely be used as a potable water source on-site. It is unlikely that a future on-site construction worker would physically come into direct contact with groundwater on-site during excavation activities because the typical depth to groundwater is 11 to 13 feet below the surface. This is deeper than most depths required under normal construction activities. The on-site construction worker would also unlikely be exposed to routes other than ingestion for the same reason as for on-site workers.

5.2.3.3 Surface Water

The only single pathway that could potentially be considered significant for surface water exposures considering the stream size and nature would be for an off-site resident's use of the creek for recreational purposes. Normally, adolescent residents would be the most realistic receptor for this type of stream use. Young children and adults are unlikely to use the stream in this capacity. Other potential exposure pathways such as ingestion of wildlife that may exist in the stream is extremely unlikely because of the physical setting of the stream such as size, ability to support biota, and accessibility by potential receptors.

5.2.4 Quantify Exposure Pathways

For assessment of groundwater direct contact exposure risks (ingestion, inhalation, and dermal contact with groundwater used as a potable water source), the only receptor retained for evaluation was the off-site resident. Since the State of Indiana Tier II Residential Goals were developed with the specific intention to be protective of residential exposures to impacted groundwater, site specific direct contact groundwater exposure human health risks will not be quantitatively estimated herein. Instead, groundwater concentrations were evaluated by comparing each COI to its respective Tier II Residential Goal. Each groundwater COI for this baseline risk assessment has a Tier II Residential Goal. These values are typically their federal Maximum Contaminant Levels (MCLs). However, the indirect exposure route of inhalation of volatilized vapors from groundwater intruding into an off-site resident's basement were quantitatively evaluated to ascertain whether this exposure route is significant.

The majority of exposure input parameters for the soil, groundwater, and surface water exposure risk assessments for pathways not evaluated solely by direct comparison to Tier II cleanup goals were taken directly from IDEM's Intake Assumption tables for calculation of the Tier II Cleanup Goals, as applicable (IDEM 1996). Site specific exposure parameter values were substituted for IDEM's default values for a few intake parameters. In general, there are three categories of variables that are used in these equations:

- COI-related variables -- absorption factors, soil/air and groundwater/air volatilization factors, and particulate emission factors;
- variables that describe the exposed population -- intake rate and body weight; and
- assessment-determined variables -- exposure frequency and duration; and averaging times.

The variables and associated values used for soil, groundwater, and surface water exposure pathway-receptor combinations evaluated are presented on their respective quantitative risk assessment and

related calculation tables (Tables 14 through 20). The variables and values for the identified exposure pathways for each exposure scenario are described below.

5.2.4.1 COI-Related Variables.

Absorption Factors: An absorption factor (AB) defines the fraction of chemical which is expected to be absorbed through the body based on the route of exposure. This factor depends on the chemical and physical properties of the specific compound. Usually complete absorption (100%) is assumed for chemicals when exposure occurs via inhalation or ingestion (EPA, 1989a; 1989b). Assuming total absorption is the most health protective as there are few compound-specific studies in humans available in the literature that can be used to estimate absorption into the body. Therefore, for all identified receptors 100% absorption was assumed for the ingestion and inhalation exposure pathways. As such, this variable does not appear in any of the formulae for risk calculations as it would have no difference in impact to the result.

The dermal permeability constant (PC) defines the rate a chemical in water will absorb into the body based on dermal contact. This factor is also dependent on the chemical and physical properties of the specific compound. However, PC reference values for the COIs selected in this assessment could not be individually determined. EPA guidance (1989a) recommends using a default PC value for water as a substitute. This PC value is 8.4×10^{-4} cm/hour.

Volatilization Factor: The volatilization factor (VF_{soil}) relates the concentrations found in soils to the amount of volatile vapor that can be expected to be released into the ambient air through volatilization. One basic assumption for this model is that the formula is designed on the assumption that the source is homogenous, continuous, and constant without any impediments or retardation of the vapors volatilizing from the soil. The VF_{wesp} relates the concentrations found in groundwater beneath the surface through the soil and intruding into an enclosed space such as a basement through a foundation or floor crack. These factors are chemical-specific and relate to individual physical constants such as partitioning coefficients, Henry's Law constants, and chemical diffusivities. The formula for calculating site-specific VFs for soils for all COIs is found in IDEM Tier II Cleanup Goal guidance (IDEM 1996). The only values used in the formula for calculating soil VFs that were not IDEM default values or literature-based physical values were the length of the on-site area affected and the total surface area which were both estimated. The literature reference for all chemical-specific physical inputs, except for K_{oc}, was from the U.S. EPA's *Technical Background Document for Soil Screening Guidance* (1994). A K_{oc} value was estimated for vinyl chloride using Equation 4-5 from the *Handbook of Chemical Property Estimation Methods* (Lyman et al. 1993). Table 14 is a summary of all parameters and values used in calculating the site-specific VFs for the two remaining vadose zone soil COIs. The VF_{soil} value was 108 m^3/Kg for vinyl chloride.

The formula for calculating a site-specific VF_{wesp} for the only groundwater COI detected above its respective Residential Tier II Cleanup Level in an off-site well (trichloroethene) is from the Johnson and Ettinger model (1991) as represented in the American Society of Testing Materials (ASTM) *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (RBCA) (E1739-95) (1995). The only values used in the formula for calculating the VF_{wesp} that were site-specific were values related to the depth of water below the point of intrusion. The average depth to groundwater in the three off-site wells to the southeast was 11.4 feet. Assuming the affected residence has a basement with a typical construction would leave approximately six feet below the surface to the basement floor. Therefore, the approximate assumed depth below a basement to the groundwater in the upper aquifer off-site is five feet. Calculation of the site-specific VF_{wesp} is presented on Table 15 along with the formula and all parameters and values used. The calculated VF_{wesp} for trichloroethene was 6.31×10^{-3} mg/m^3/mg/L air-to-water.

Particulate Emission Factor: The particulate emission factor (PEF) relates the concentration of a COI in soil with the concentration of respirable particles (PM_{10}) in the air due to fugitive dust emissions from the site. This relationship is derived by Cowherd (1985) for a rapid assessment procedure applicable to a typical hazardous waste site where the surface contamination provides a relatively continuous and constant potential for emission. Particulates of fugitive dust emissions from sites are due to wind erosion and, therefore, depend on the erodibility of the surface material. EPA has suggested a default PEF of 4.63×10^9 m^3/kg (EPA, 1991a). A site-specific PEF was calculated using the formula presented in IDEM's Tier II Cleanup Goal guidance (IDEM 1996). Calculation of the site-specific PEF is also presented on Table 14 along with the formula and all parameters and values used. The only non-default or non-lookup parameter values were for vegetative cover and threshold wind speed which were both estimated. The site-specific PEF calculated was 1.7×10^{12} m^3/Kg.

5.2.4.2 Exposed Population Variables.

Exposure population variables are those assumptions associated with each identified receptor. These variables include body weight and intake rates for specific routes of exposure.

Body Weight: The body weight (BW) was assumed to be 70 kilograms (kg) for all adult receptors in accordance with EPA guidelines (EPA 1989b) and is the IDEM default value (1996). This value represents the average body weight for male and female adults. For an adolescent resident, the body weight used was the average weight for teenagers male and female for the age categories 12-15 and 15-18, as presented in the U.S. EPA's RAGS (1989b).

Soil Ingestion Rate: The ingestion rate (IR_{soil}) used is believed to represent an upper-bound value for soil ingestion. The IDEM default IR_{soil} values were used for soil exposure calculations. Thus, a value of 50 mg/day was used as the default IR_{soil} for adults in the "typical" workplace for the on-site worker. For the

on-site construction worker an IR_{soil} of 100 mg/day was used as construction activities involve a more significant disturbance of soil.

Inhalation Rate: Inhalation rates (IR_{air}) of 15.5 m^3/day and 24 m^3/day were calculated using EPA (1989b) data for a site-specific industrial soil exposure for an on-site worker and an on-site construction worker. These values were calculated by combining reasonable worst-case inhalation rates for indoor and outdoor activities estimated in the EPA's Exposure Factors Handbook (1989b). EPA guidance lists the reasonable worst-case outdoor inhalation rate as 3.0 m^3/hour and the reasonable worst-case indoor inhalation rate as 0.89 m^3/hour. To calculate site-specific inhalation rates for on-site workers and construction workers, it was assumed an on-site worker would have a maximum split of indoor / outdoor activities as 50 percent for each on a routine basis and a construction worker would have a maximum of 100 percent outdoors. Therefore, based on an 8 hour workday, an on-site worker's estimated total inhalation rate while on-site would be approximately 15.5 m^3/day and an on-site construction worker's estimated total inhalation rate while on-site would be approximately 24 m^3/day.

The inhalation rate for an off-site resident's indoor exposure to volatilized vapors is the EPA and IDEM default value for an adult receptor of 15 m^3/day.

Contact Rate: The EPA default (1989a) contact rate (ingestion) for water during swimming activities of 50 mL/hour was utilized for the surface water exposure.

5.2.4.3 Exposure Scenario Variables.

Exposure scenario variables are those assumptions that describe the duration and time of exposure for identified exposure pathways.

Exposure Frequency, Duration and Time: Exposure frequency (EF) is the number of times a receptor is expected to be exposed to a COI usually expressed as days/year. The exposure duration (ED) is the amount of time a receptor is assumed to be exposed. For the most part, IDEM and EPA recommend that upper-bound values be selected for these exposure variables as part of the reasonably maximum exposed receptor.

Exposure frequency and duration for an on-site worker recommended by EPA and IDEM were values of 250 days per year for 25 years. These time factors are based on an 8-hour workday (ET) and assume a work period of 5 days per week for 50 weeks based on a two-week vacation (EPA, 1991b). For surface and subsurface soil exposures, the 250 days per year EF value was adjusted since it could be assumed the majority of the work at the property would be inside and since the frequency does not account for inclement weather. The ground is estimated to be snow covered or frozen approximately five months of the year in Indiana. For the shorter term that an on-site worker could normally be exposed to surface and

subsurface soils considering weather conditions and the number of normal working days during fair weather conditions, an EF of 120 days/year was used for both surface and subsurface soil exposures. The ED remained 25 years for soil exposures for this receptor for surface exposures. Since the on-site worker would be expected not to be routinely exposed to subsurface soils except during construction or maintenance that disturb the surface cover, the ED for subsurface soil exposures for an on-site worker was estimated as a maximum of 2 years for multiple surface disturbances during an employees duration of employment.

The on-site construction worker was assumed to work 8-hour work shifts 5 days per week for a six-month time frame. This accounts for any type of construction activities being completed for the site under both current and future land use. This results in an EF of 120 days/year with an ED of 0.5 years for soil exposure pathways.

The off-site resident exposures are based on the upper bound maximum duration that a resident would be expected to live in one residence, which is 30 years. This is both the EPA and IDEM recommended value for a resident's ED. EPA and IDEM recommend using an EF of 350 days/year for all residential exposures. This value was used for the groundwater-to-indoor air residential exposure pathway examined.

The EF and ED for an adolescent resident's exposure to the Little Eagle Creek for recreational uses is based on the assumption of two events a week during an approximate 12 week summer during prime adolescent ages of 12 to 18 years old for an ED of approximately 25 events/year and an ED of 6 years. An estimated 2 hour ET duration per event was assumed.

Averaging Time: Averaging time (AT) is the total amount of time a receptor is exposed to a COI. For carcinogens the AT is 25,550 days. This is based on the assumption that an individual has an average lifetime of 70 years and is exposed 365 days/year. For noncarcinogenic endpoints, the AT is based on the specific ED in years for each pathway multiplied by 365 days/year.

5.2.5 Uncertainties Associated with Exposure Assessment

The most significant uncertainty associated with the exposure assessment that influences the calculation of site-specific human health risks is the accuracy in characterizing land uses. It is assumed that future land use of the site will remain industrial. Although the property could conceivably be redeveloped in the future for residential use, the assumptions regarding land and groundwater use at this site carry a high degree of confidence because they are based upon multiple factors that strongly support continued industrial use into the foreseeable future (e.g., zoning, historical use and current building trends). In

addition, as a requirement of the IDEM VCP, a deed restriction for this project site may need to be developed to limit future use of the property to industrial use and to restrict future on-site groundwater use.

Parameters such as inhalation and ingestion rates, assuming 100% absorption, exposure duration and frequency are high-end estimates to conservatively calculate health-based risks. Other exposure parameters such as body weight are average values following IDEM and EPA recommendations that a range of upper-bound and average values should be used to estimate exposure. Thus, although uncertainty is present in the exposure parameters, the parameters were selected such that resulting exposures are most likely overestimated to be protective of human health.

One additional uncertainty in the exposure assessment deals with the use of simple chemical transport/migration models. Typically, these models have basic assumptions that perfect physical conditions will be in effect, that the sources are continuous, constant, homogeneous, and nondegrading or retarding from the source to the final point of intake by the receptor. However, under realistic conditions, all of these assumptions being true is highly unlikely. These simple and rapid models tend to also overestimate transport mechanisms' efficiencies since it is unlikely that all of these conditions can be simultaneously true.

5.2.6 Toxicity Assessment

As part of performing the Tier III risk assessment, a toxicity assessment is required. The toxicity assessment involves evaluating the dose-response relationships for the COIs. This includes an assessment of the types of health effects associated with the exposure to site-related COIs and the relationship between the magnitude of the exposure and the adverse effects. The toxicity assessment determines the quantitative relationship between the dose of a COI and the incidence of adverse health effects. The end result of the toxicity assessment is the derivation of toxicity values which are used to calculate Tier III human health risks.

The EPA has developed two sets of toxicity values that provide quantitative estimates of the potency of chemicals and resultant toxic effects. These toxicity values are known as reference doses (RfDs) and cancer slope factors (CSFs). RfDs are used to evaluate the noncarcinogenic toxic effects while CSFs are used to evaluate the carcinogenic effects of COIs.

5.2.6.1 Toxicity Values for Noncarcinogenic Effects

Noncarcinogenic effects, such as organ damage or reproductive effects, are evaluated by reference doses (RfDs). The reference dose for an individual COI is expressed in units of milligrams per kilogram per day (mg/kg-day). The RfD is usually based on the relationship between the dose of a COI and the occurrence of systemic toxic effects in either experimental laboratory animals or humans. The methodology for

deriving a reference dose inherently assumes that there is a threshold intake rate below which no adverse effect will occur. Generally, a No Observed Adverse Effect Level (NOAEL) is divided by a safety factor to obtain a RfD that is intended to provide a benchmark for the daily dose to which humans, including sensitive populations such as children, may be subjected without an appreciable risk of deleterious effects during a lifetime (assumed to be 70 years).

Safety factors are factors of 10 that account for interspecies variation and sensitive human populations. These include variation in the general population (intended to protect sensitive subpopulations such as children and the elderly) and extrapolation from animal data to humans. Additional factors of 10 are included in the safety factor if the RfD is based on the lowest observed adverse effect level (LOAEL) instead of the NOAEL, or an experiment that includes a less-than-lifetime exposure.

5.2.6.2 Toxicity Values for Carcinogenic Effects

For carcinogens, the EPA has developed a classification system based on the weight of evidence that a compound is a human carcinogen. The classification system is defined as:

- Group A - Human Carcinogen
- Group B - Probable Human Carcinogen
  - B1 - limited human data are available
  - B2 - sufficient evidence in animals and inadequate or no evidence in humans
- Group C - Possible Human Carcinogen
- Group D - Not classifiable as to human carcinogenicity
- Group E - Evidence of non-carcinogenicity for humans

For COIs classified by EPA as potential human carcinogens, risk is evaluated differently, because noncarcinogenic and carcinogenic effects are believed to have different mechanisms of action. Typically animal carcinogenicity studies are conducted using relatively high doses. To evaluate the possibility of developing cancer at the low doses more frequently encountered in the environment, the linearized multistage model is used. This mathematical model expresses cancer risk as a function of exposure. The model is based on the assumption that even a single, low-dose exposure to a carcinogen may result in cancer. In other words, it is assumed that there is no threshold for any dose of a compound classified as a carcinogen.

The EPA's Carcinogen Assessment Group reviews human, animal and *in vitro* data regarding suspected chemical carcinogens and calculates cancer slope factors (CSFs) for those determined to be carcinogens. CSFs are upper-bound estimates of the excess cancer risk due to continuous exposure to a COI averaged throughout the course of a 70-year lifetime. A CSF has units of milligrams of chemical per kilogram of body weight per day [1/(mg chemical/kg body weight-day)] or 1/(mg/kg-day) and provides a

health-protective estimate of the probability of developing cancer from exposure over a lifetime. By definition, there is only a 5 percent chance that the probability of developing cancer is higher. The basis of a CSF is data from lifetime animal bioassays, although human data are used when available. The CSF represents the upper 95% confidence limit of the slope of the linear portion of the dose-response curve. The excess carcinogenic risk for the experimental animal is then extrapolated to the excess carcinogenic risk expected for humans. The resulting values from this model are more likely to overestimate than to underestimate the potential risk.

5.2.6.3 Toxicity Information for COI

Verified toxicity values were obtained from the current (May 1996) U.S. EPA Region III's Risk Based Concentration Table which utilizes the EPA's *Integrated Risk Information System* (IRIS) on-line computer database (EPA, 1995) as a primary source. These toxicity values and other chemical-specific information are included in IRIS after a comprehensive review of toxicity data by work groups of EPA health scientists. Verified toxicity values are the most reliable for estimating carcinogenic and noncarcinogenic risks due to COI exposure. Therefore, the toxicity values used for the COIs for this risk assessment are as follows:

Constituent	Inhalation / Oral	Cancer Slope Factor (CSF) (Kg-day/mg)	Reference Dose (RfD) (mg/Kg-day)
Vinyl Chloride	Inhalation	0.3	N/A
c-1,2-Dichloroethene	Inhalation	N/A	N/A
Trichloroethene	Inhalation	0.006	N/A
Vinyl Chloride	Oral	1.9	N/A
c-1,2-Dichloroethene	Oral	N/A	0.01

5.2.7 Uncertainties Associated with the Toxicity Assessment

Uncertainties associated with the toxicity assessment include:

- The quality of the studies used as the basis for the COI-specific toxicity values;

- Potential differences in toxicity and absorption efficiency between laboratory animals and humans;
- The applicability of studies conducted in experimental laboratory animals at high dose levels to human exposures at lower concentrations;
- The validity of the critical underlying assumption in the dose response model for carcinogens that there is no threshold for carcinogenesis (i.e., there is no dose of a carcinogen that is not associated with a risk of cancer);
- Calculation of lifetime excess cancer risk on the basis of less than a lifetime exposure;
- Potential synergistic or antagonistic interactions of chemicals to which the same individual may be exposed;
- Oral toxicity values used when no inhalation toxicity values were available; and
- Use of chronic toxicity values to evaluate short-term subchronic exposures when subchronic values are unavailable.

Because of these uncertainties, methods for developing toxicity values (RfDs and CSFs) are designed to be conservative. For example, cancer slope factors derived by the EPA are for the most part based on the upper 95th confidence limit. The use of uncertainty factors in the derivation of RfDs are devised to be health protective, accounting for limitations in available data and extrapolation from experimental conditions to exposure scenarios identified for site specific-conditions. As a result, calculation of risks using EPA-derived toxicity values should be conservatively protective of human health.

5.2.8 Calculation of Tier III Human Health Carcinogenic and Non-carcinogenic Risks

Once the exposure pathways, parameters, and toxicity values are identified, the Tier III human health risks can be calculated. There are two general equations used in calculating potential human health effects for carcinogens and non-carcinogens. Both of these equations are based on the estimated chronic daily intakes (CDI) calculated for each receptor and pathway retained for quantitative risk assessment. The equations for the CDIs are presented on the risk calculation summary tables (Tables 16 through 20). The formulae for the CDIs are taken directly from the EPA RAGS guidance document (EPA, 1989a). These same formulae are presented in terms of calculating remedial goals in the IDEM guidance document for Tier II Cleanup Goals (IDEM, 1996).

For carcinogenic effects, the excess cancer risk due to a lifetime exposure to the estimated chronic daily intake of each carcinogen is calculated using the following equation:

$$\text{CANCER RISK} = \text{CSF} \times \text{CDI}$$

where CSF is the cancer slope factor and CDI is the lifetime estimated chronic daily intake (CDI) or dose. Since the units of CSF are $(\text{mg/kg-day})^{-1}$ and the units of dose or intake are (mg/kg/day), the risk is unitless.

For compounds classified as carcinogens, the estimated risks appear in scientific notation. Thus a risk of 1×10^{-6} means that one additional person in an exposed population of one million (1,000,000) individuals may develop cancer during a lifetime of exposure to the compound. IDEM has adopted a cumulative incremental cancer risk (ICR) limit of 1×10^{-6} as the point of departure for sites with unrestricted future use (i.e., includes residential) and 1×10^{-5} as the target cancer risk level for current and future land use restricted to non-residential purposes. In this assessment, the site was assumed to remain non-residential, therefore, a risk limit of 1×10^{-5} was used to evaluate Tier III carcinogenic risks on site. A risk limit of 1×10^{-6} was used to evaluate Tier III carcinogenic risks off site.

Noncarcinogenic effects were quantified using the hazard index approach as recommended by IDEM. A hazard index (HI) is the ratio of the estimated chronic daily intake and a reference dose considered to be the level where adverse health effects would not be observed (these doses have also been called "safe" or "acceptable").

$$\text{HI} = \text{CDI}/\text{RfD}$$

CDI is the estimated chronic daily intake and the RfD is the reference dose. Since the units of CDI and reference dose (RfD) are both (mg/kg-day) the hazard index (HI) is unitless.

According to IDEM, a HI less than 1.0 suggests that no adverse health effects would result from exposure to compounds that do not bioaccumulate and 0.2 as a HI for compounds that bioaccumulate. Table 1 of the Water Quality Criteria for Specific Substances (Indiana Register, Volume 16, Number 7, April 1, 1993) was the basis for determining whether a compound bioaccumulates. None of the COIs evaluated in this assessment bioaccumulate.

These equations were then used to calculate direct contact health-based carcinogenic and non-carcinogenic risks for each COI for soil, groundwater, and surface water using IDEM's defined cancer risk limit and hazard indices for retained residential (off-site) and non-residential (on-site) scenarios. Note again that quantitative evaluations of off-site impacted groundwater residential use has not been performed since the Residential Tier II Cleanup Levels were specifically developed for protection of this scenario.

5.2.8.1 Tier III Non-Residential Risks

Tier III carcinogenic and non-carcinogenic human health risks for on-site workers' non-residential surface and subsurface soil exposures are summarized on Tables 16 and 17, respectively. Tier III carcinogenic and non-carcinogenic human health risks for on-site construction workers' non-residential surface and subsurface soil exposures are summarized on Table 18. Since subsurface soil data were used for actual subsurface soil conditions as well as worst case surface soil conditions and all exposure inputs for risk calculations are the same for both surface and subsurface exposures for an on-site construction worker, the resulting risks for either exposure are the same. Thus, they are both presented on one risk calculation summary table.

5.2.8.2 Tier III Residential Risks

As explained above, residential surface water exposures have been examined for an adolescent age category of 12 through 18 years old based on this being the most likely receptor for this type of exposure. Tier III non-carcinogenic human health risks for the off-site adolescent residential surface water exposures are summarized on Table 19. Tier III carcinogenic human health risks for the off-site residential indirect contact groundwater exposures are summarized on Table 20.

As stated above in Section 5.2.4, off-site residential groundwater exposures were assessed by comparing groundwater concentrations of each COI to its respective Tier II Residential Goal. Since residential groundwater exposures can only occur (even potentially) for groundwaters off of the Allison Plant No. 10 site, Tier II Residential goals need only be evaluated at the property boundary and/or monitoring well locations off-site. This exercise was performed in Section 5.5.2. All current groundwater results for positively detected VOC's were presented along with the Tier II Non-Residential and Tier II Residential Goals. Off-site groundwater locations discussed in Section 5.5.2 to the west or south of the facility were not evaluated as Little Eagle Creek was assumed to be the only realistic receptor of the plume in the western portion of the property moving towards the south-southeast. Of the five off-site groundwater sample locations to the southeast of the facility (MW-151, MW-156, MW-157, MW-201, and MW-301), the wells MW-201 and MW-301 monitor deeper aquifers that have shown no evidence of the same impact

found in the upper aquifer. Well MW-151 and MW-156 had positive detections of cis-1,2-dichloroethene in the current sampling but the concentrations were well below the Tier II Residential Cleanup Level of 70 ug/L. Wells MW-156 (52 ug/L) and MW-157 (100 ug/L) had trichloroethene results exceeding their respective Tier II Residential Goal of 5 ug/L. The concentration for trichloroethene in MW-157 was used as a worst-case representative concentration term for the off-site groundwater-to-indoor air exposure assessment.

On-site groundwater sample location MW 10-1, located a few feet west of the eastern property line along Olin Avenue, had trichloroethene (810 ug/L) and cis-1,2-dichloroethene (120 ug/L) concentrations above their respective Tier II Residential Goals of 5 ug/L and 70 ug/L, respectively.

5.3 Risk Assessment Conclusions

Site-specific human health risks were calculated for the Allison Plant No. 10 site located on Olin Avenue in Indianapolis, Indiana using IDEM and EPA risk assessment methodology. A summary of all carcinogenic risks calculated for all soil exposure pathways and all receptors described in Sections 5.2.8.1 and 5.2.8.2, are presented in Table 21. As can be seen from the summary of risks in Table 21, no soil carcinogenic risks for non-residential exposures to soils exceeded the 1×10^{-5} target risk level. The only on-site soil COI, vinyl chloride, does not have non-carcinogenic toxicity constants. Therefore, no soil non-carcinogenic hazard indices for non-residential exposures were estimated. On-site and off-site soil COI concentrations found do not appear to pose a significant human health threat.

The surface water non-carcinogenic risks, also presented in summary in Table 21, were below the EPA's target hazard index of 1.0. Cis-1,2-dichloroethene, the only surface water COI, does not have carcinogenic toxicity constants. Therefore, no surface water carcinogenic risk levels were estimated. Off-site surface water COI concentrations found do not appear to pose a significant human health threat.

Based on the noted exceedances of the Tier II Residential Goals at property boundaries and/or at off-site locations, it is apparent that potentially unacceptable risks are posed by potential direct contact (ie ingestion) groundwater exposures to off-site residents in the immediate vicinity of the subject site. However, an evaluation of volatilized vapor from groundwater to indoor air using data from well MW-157 posed no significant human health threat for offsite residents.

The methodology used throughout this report is in compliance with both State of Indiana and federal regulations and guidance for protection of the environment. The human health risk assessment performed is based on the assumption that the site will remain industrial, site surface conditions will remain fairly constant, and the future potable water source will remain as the public water supply. The purpose of

calculating human health risks is to provide information to General Motors that assists them in making informed decisions regarding whether remedial actions may be necessary for the site.

The individual risks were calculated using all available data provided to Fluor Daniel GTI, Inc. and by following IDEM (1994) and EPA guidance documents. In cases where the available data were limited, reasonable assumptions were used and are clearly documented. Additionally, uncertainties inherent in the process were summarized throughout this section. Generally, the uncertainties error on the side of conservatism. Therefore, overall the human health risks estimated are conservative and are not likely to underestimate potential risks to potentially exposed receptors.

6.0 SUMMARY & CONCLUSIONS

Fluor Daniel GTI, Inc. has completed a Remedial Investigation for the Allison Engine Company, Plant 10 in Indianapolis, Indiana. The scope of work has been completed, and when considered as a whole, to be consistent with the National Contingency Plan as referenced in 40 CFR 300.700 (Subpart H-Participation by Other Persons). The purpose of the investigation was to better define the magnitude and extent of volatile organic compounds (VOCs) in the soil and groundwater and to assess potential environmental risks to their occurrence. Metals in surface soil were also investigated.

Activities completed during the investigation included the advancement of fourteen soil borings, one Hydropunch, and six Geoprobe borings; collection of soil samples for laboratory analysis; the installation of nine shallow and five deep monitoring wells in the fourteen borings; surveying of all new wells; groundwater elevation monitoring and sampling of all wells on-site; stream survey and sampling of Little Eagle Creek; and rising head permeability tests from the newly installed wells. Results of the investigation were used to more fully characterize the geology and hydrogeology of the site, to further delineate VOCs and metals occurrence, and to assess the potential risk of VOCs and metals occurrence to human health and the environment.

- Surface elevations at the site range from approximately 715 feet to 705 feet near Little Eagle Creek to the south. The subsurface of the site area is characterized by two thick layers of sand separated by a layer of silty clay. Another discontinuous layer of silty clay is found at the surface. The lower sand unit was not encountered at the maximum depth of penetration (65 feet) in the western area. Based on a comparison to published data, the two sand units are assumed to be the middle and lower confined aquifers of Meyer et al (1975). The intermediary silty clay unit ranges in thickness from approximately 8 feet to >33 feet. According to Meyer, et al, (1975), this clay layer acts as a semipervious confining bed (aquitard).

- Based on data collected during three gauging events in 1995 and 1997, groundwater occurs at elevations ranging from 698.92 to 703.75 feet in the shallow water bearing unit, 698.83 to 701.00 feet in the lower sand unit, and 689.10 to 700.68 feet in the intermediary clay unit. Groundwater elevation data indicates groundwater flows generally towards the south (Little Eagle Creek). A comparison of groundwater elevations in the three well clusters indicated a downward gradient in the western portion of the site and east of the plant. An upward gradient was observed offsite to the southeast. Rising head permeability tests indicated average hydraulic conductivities of 137 feet per day in the shallow sand unit, 8.7 feet per day in the lower sand unit, and 0.012 feet per day in the intermediary clay. Based on the low hydraulic conductivity of the intermediary unit, it appears to act as an aquitard between the aquifers.

- Analytical results for soil samples collected from the vadose zone during the current and previous investigations indicated the presence of VOCs in 17 of the 23 samples collected. TCE and 1,2-DCE were the most frequently detected compounds. Concentrations of TCE ranged from 29 ug/kg to 120,000 ug/kg. 1,2-DCE concentrations ranged from 4 ug/kg to 12,000 ug/kg. Levels of adsorbed VC ranged from 12 ug/kg to 500 ug/kg. TCE was detected on site at one location above the Tier II Non-Residential Closure Goal of 25,730 ug/kg. VC was detected at one location above its Tier II Non-Residential Closure Goal of 130 ug/kg. Using the Tier II Non-Residential Closure Goals as delineation, VOCs occurrence in soil has been defined.

- Using TCE as an indicator, multiple source areas appear to be present in the western portion of the site (e.g.: MW-132, GP-2, and MW-133). A soil sample collected from the air/water interface southeast of the plant building (MW10-1) contained 3,800 ug/kg TCE. This value was within the same order of magnitude as two groundwater samples collected from this location, therefore, it is not clear whether a source is present in this area. Levels of TCE an order of magnitude lower were measured in samples collected from the vadose zone on the southeast side of the plant building (MW-152) and further to the south (GP-5). These may represent other small source areas.

- One sample collected southeast of the property contained a TCE concentration above the Tier II Residential Cleanup Goal. The sample, collected from a depth of 18-20 feet contained 170 ug/kg TCE which is above the Tier II Residential Cleanup Goal of 80 ug/kg. This sample was however, collected from below the water table. The groundwater sample collected from this location contained 280 ug/l TCE and therefore the soil results may reflect the presence of TCE in the groundwater.

- A total of 28 of the 41 groundwater samples collected from monitoring wells during the period of July 1995 to February 1997 contained detectable concentrations of VOCs. Samples from seven

of the wells were below detection limits for all analyzed constituents. As was the case with soil, the most frequently detected compounds were TCE and 1,2-DCE. Analytical data indicate detectable TCE concentrations ranged from 5.4 ug/L to 13,000 ug/L, {cis} 1,2-DCE concentrations ranged from 5.3 ug/L to 65,000 ug/L, {trans} 1,2-DCE concentrations ranged from 5.9 ug/L to 1,400 ug/L, and detectable VC concentrations ranged from 12 ug/L to 3,400 ug/L. Wells located west, southwest, and southeast of the building and/or property contained TCE, 1,2-DCE, and/or VC concentrations above the Tier II non-residential cleanup goals. Based on this data, VOCs occurrence in groundwater has not been delineated horizontally south and east of MW-157. However, two additional wells are planned for this area. VOCs occurrence in groundwater south of HP-1 near Little Eagle Creek also has not been delineated. Shallow groundwater likely discharges into Little Eagle Creek, and therefore, it is unlikely that dissolved VOCs occurrence extends south of the creek.

- Based on isoconcentration maps constructed for TCE, 1,2-DCE, and VC in groundwater, at least two potential source areas of elevated concentrations were identified. These areas are west of the building in the vicinity of MW-132 and southeast of the building in the vicinity of MW10-1. Non-determined aliphatic hydrocarbons were detected in samples collected from MW-157 offsite to the southeast. The occurrence of these compounds appears to be localized in the vicinity of the well and not the site.

- Groundwater data collected during previous investigations were compared to recent data to evaluate trends in dissolved VOCs concentrations. Historical dissolved VOCs data are provided in Table 7. In general, most of the wells did not exhibit major changes in dissolved VOCs concentrations with time. Dissolved VOCs concentrations did increase in wells MW-132 and MW155. Detected concentrations decreased in wells MW-148, MW-153, and MW-156. Wells MW-132 and MW155 are located in the western potential source area. Well MW-148 is located downgradient of MW-132. MW-153 is located in the well cluster located southwest of the building and MW-156 is located offsite to the southeast.

- The discharge (stream flow volume) of Little Eagle Creek was measured on October 4, 1996 and February 10, 1997. Maximum stream flows of 8 cfs and 23.77 cfs were measured for these dates, respectively. Data collected from a gauging station 1.2 miles upstream indicated historical average flows of 11.1 cfs and 30.54 cfs, respectively, for the two months. This suggests that the gauging station data could be used to describe general stream flow trends.

  Loading of VOCs to Little Eagle Creek were estimated using concentrations in groundwater at HP-1 and the above stream flow data. A concentration of 25 ug/L 1,2-DCE was predicted to be detected in Little Eagle Creek using the October, 1996 flow data. The actual concentration

measured in Little Eagle Creek near HP-1 in October, 1996 was 17 ug/L. The predictive model and laboratory analytical results both indicated that detectable TCE and VC concentrations were not present in Little Eagle Creek in October 1996 and February 1997. Both also indicated that detected 1,2-DCE concentrations were not present in February 1997.

- Site-specific human health risks were calculated for the site using IDEM and EPA risk assessment methodology. No soil carcinogenic risks for non-residential exposures to soils exceeded the 1x 10^{-5} target risk level. Assessed non-residential scenarios included the on-site worker and on-site construction worker exposure to surface and subsurface soil. The only on-site soil COI, vinyl chloride, does not have non-carcinogenic toxicity constants. Therefore, no soil non-carcinogenic hazard indices for non-residential exposures were estimated. On-site soil COI concentrations found do not appear to pose a significant human health threat. No off-site soil COI were identified that required assessment.

- Based on the noted exceedances of the Tier II Residential Goals at property boundaries and/or at off-site locations, it is apparent that potentially unacceptable risks are posed by potential direct contact (ie ingestion) groundwater exposures to off-site residents in the immediate vicinity south and east of the subject site. However, an evaluation of volatilized vapor from groundwater to indoor air using data from well MW-157 posed no significant human health threat for offsite residents. The only known water well in the site area was sampled by the MCHD on January 2, 1997 and the sample did not contain any detectable VOC concentrations. No on-site groundwater COI were identified that required assessment.

- The surface water non-carcinogenic risks were below the EPA's target hazard index of 1.0. Cis-1,2-dichloroethene, the only surface water COI, does not have carcinogenic toxicity constants. Therefore, no surface water carcinogenic risk levels were estimated. Off-site surface water COI concentrations found do not appear to pose a significant human health threat.

7.0 RECOMMENDATIONS

- TCE occurrence in groundwater has not been delineated southeast of the site. Additional wells should be and are planned to be installed south and east of MW-157.

- Based on the findings of the Remedial Investigation some potential unacceptable risks are posed by groundwater exposures to off-site residents in the immediate vicinity south and east of the subject site. Site specific cleanup goals need to be determined for VOCs occurrence in groundwater to mitigate the potential offsite risks. The cleanup goals will be used to determine the need for remediation (if warranted) and the type of technologies to be employed.

- Asbestos occurrence in the northwestern portion of the site has not been fully investigated. Additional investigation activities are planned in this area to identify the magnitude and extent of asbestos occurrence.

TABLE 1
SUMMARY OF DETECTED VOCs CONCENTRATIONS IN SOIL
HISTORICAL DATA
GENERAL MOTORS - ALLISON PLANT 10

BORING ID	SAMPLE DATE	SAMPLE DEPTH (feet)	SAMPLE ANALYTICAL RESULT						
			VINYL CHLORIDE	TETRA CHLORO-ETHENE	TOTAL 1,2-DICHLORO-ETHENE	TRICHLORO-ETHENE	METHYLENE CHLORIDE	TOLUENE	TOTAL XYLENES
SB-132[1]	9/92	8-10	<6300	<3100	12000	120000	<3100	<3100	<3100
SB-133[1]	9/92	3-5	<1300	<630	<630	14000	<630	<630	<630
SB-134[1]	9/92	8-10	<10	<5	<5	<5	<5	<5	<5
SB-135[1]	9/92	8-10	<10	<5	<5	<5	<5	<5	<5
		DUPL	<10	<5	<5	<5	<5	<5	<5
SB-145[1]	5/93	13-15	<500	<100	1200	<100	<1000	<100	<100
		DUPL	<500	<100	<600	<100	<1000	<100	<100
		28-30	<10	<5	<5	<5	18	<5	<5
SB-146[1]	5/93	13-15	<10	<5	<5	93	12	<5	<5
		23-25	<10	13	<5	<5	15	8	<5
SB-147[1]	5/93	8-10	<500	<100	1000	23000	<1000	<100	<100
		28-30	<10	<5	<5	<5	<21	<24	<5
SB-148[1]	5/93	8-10	<500	<100	900	14000	<1000	<100	<100
		23-25	<10	<5	15	14	<10	12	<5
SB-149[1]	5/93	8-10	<500	<100	1400	200	<1000	<100	<100
SB-150[1]	5/93	3-5	590	700	<100	4200	<1000	<100	<400
		8-10	<500	<100	1800	300	<100	<100	<100
SB10-1[2]	3/94	2-4	<1	<1	4	45	NA	<1	<3
SB10-2[2]	3/94	6-8	<5	<5	490	29	NA	<5	<16
SB10-3[2]	3/94	4-6	<1	<1	71	<1	NA	<1	<3
SB10-4[2]	3/94	6-8	<120	<120	<120	<120	NA	<120	1300
SB10-5[2]	3/94	14-16	<120	<120	<120	2500	NA	<120	<360
MW10-1[2]	3/94	10-12	<110	<110	<110	3800	NA	<110	<330
TIER II NON- RESIDENTIAL GOALS			130	8,010	102,490	25,730	not determined	1,000,000	1,000,000
TIER II RESIDENTIAL GOALS			130	230	17,140	80	not determined	202,160	1,000,000

NOTES: Analytical results are in ug/kg: parts per billion (ppb).
1) Samples collected by ESI.
2) Samples collected by OBG.
Bolded values are greater than Tier II non-residential goals.

95824kg

TABLE 1B
SUMMARY OF METAL CONCENTRATIONS IN SOIL
HISTORICAL DATA
GENERAL MOTORS - ALLISON PLANT 10

BORING ID	SAMPLE DEPTH (feet)	PRIORITY POLLUTANT METALS (mg/kg)							
		Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
SB10-1	2-4	8.4	290	8	39	1000	0.1	1.6	<1
SB10-2	6-8	4.6	19	<1	6	9.4	<1	2.1	<1
SB10-3	4-6	3.6	26	<1	9	5.4	0.1	2.3	<1
SB10-4	6-8	7.2	83	<1	22	13	<0.1	<0.6	<1
SB10-5	14-16	2.1	<11	<1	4	3.9	<0.1	3.3	<1
MW10-1	10-12	3.4	<11	<1	6	4.8	0.1	2.1	<1
TIER II NON-RESIDENTIAL GOALS		438	10000	730	10000/7300	NA	87.60	7300	7300
TIER II RESIDENTIAL GOALS		438	10000	730	10000/7300	NA	87.60	7300	7300

NOTES: Analytical results are in mg/kg: parts per million (ppm).
Samples collected by Fluor Daniel GTI, Inc.

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95824kg

TABLE 2
SUMMARY OF WELL AND CREEK GAUGING DATA
GENERAL MOTORS - ALLISON PLANT 10

WELL ID	TOC ELEV. (FEET)	SCREEN INTERVAL (FEET)	DATE GAUGED	DTW (FEET)	GROUNDWATER ELEV. (FEET)
MW-10-1	714.04	7-17	7/14/95	14.07	699.97
			9/11/95	14.25	699.79
			2/5/97	12.75	701.29
MW-132	712.17	10-20	7/14/95	11.39	700.78
			9/11/95	11.49	700.68
			2/5/97	10.25	701.92
			2/26/97	11.17	701.00
MW-133	708.79	8-18	9/11/95	8.84	699.95
			2/5/97	7.29	701.50
MW-135	713.69	10-20	7/14/95	13.26	700.43
			9/11/95	13.66	700.03
			2/5/97	11.96	701.73
			2/26/97	12.47	701.22
MW-145	707.90	18-28	7/14/95	8.85	699.05
			9/11/95	8.85	699.05
			2/5/97	7.43	700.47
MW-146	708.67	15-25	7/14/95	9.41	699.26
			9/11/95	9.44	699.23
			2/5/97	7.95	700.72
MW-147	711.88	20-30	7/14/95	11.09	700.79
			9/11/95	11.20	700.68
			2/5/97	9.91	701.97
MW-148	711.00	10.5-25.5	7/14/95	10.43	700.57
			9/11/95	10.50	700.50
			2/5/97	8.25	702.75
			2/26/97	10.15	700.85
MW-150	712.93	4-19	9/11/95	13.30	699.63
			2/5/97	11.75	701.18
MW-151	712.96	5-20	7/14/95	13.93	699.03
			9/11/95	14.04	698.92
			2/5/97	12.80	700.16
MW-152	713.06	5-20	7/14/95	13.45	699.61
			9/11/95	13.57	699.49
			2/5/97	12.21	700.85
			2/26/97	12.92	700.14

95824kg

TABLE 2
SUMMARY OF WELL AND CREEK GAUGING DATA
GENERAL MOTORS - ALLISON PLANT 10

WELL ID	TOC ELEV. (FEET)	SCREEN INTERVAL (FEET)	DATE GAUGED	DTW (FEET)	GROUNDWATER ELEV. (FEET)
MW-153	711.64	4.5-19.5	7/14/95	11.77	699.87
			9/11/95	11.76	699.88
			2/5/97	9.78	701.86
			2/26/97	11.14	700.50
MW-154	714.22	5-20	7/14/95	13.31	700.91
			9/11/95	13.42	700.80
			2/5/97	12.17	702.05
			2/26/97	13.07	701.15
MW-155	717.52	14-29	9/11/95	16.78	700.74
			2/5/97	15.71	701.81
			2/26/97	16.70	700.82
MW-156	711.69	5-20	9/11/95	12.21	699.48
			2/5/97	10.65	701.04
MW-157	711.30	5-20	2/5/97	10.71	700.59
			2/26/97	11.14	700.16
MW-158	720.05	14-29	2/5/97	17.95	702.10
			2/26/97	19.14	700.91
MW-200	713.03	45-50	7/14/95	14.20	698.83
			2/5/97	11.96	701.07
MW-201	712.29	36-38	7/14/95	13.15	699.14
			9/11/95	12.99	699.30
			2/5/97	11.65	700.64
			2/26/97	12.12	700.17
MW-202	711.88	33-35	7/14/95	22.78	689.10
			9/11/95	12.33	699.55
			2/5/97	11.20	700.68
			2/26/97	12.29	699.59
MW-301	712.75	45-50	2/5/97	11.75	701.00
MW-302	711.54	45-55	2/5/97	11.26	700.28
			2/26/97	12.33	699.21
Holt Gauge	702.57	N/A	2/26/97		
Olin Gauge	698.75	N/A	2/26/97		

NOTES: TOC ELEV. - Elevation at the top of the PVC well casing relative to the on-site datum.
DTW. - Depth to groundwater in feet.
GROUNDWATER ELEV. - Elevation of groundwater in the well using the depth to water.

95824kg

TABLE 5
SUMMARY OF SOIL VAPOR HEADSPACE READINGS
GENERAL MOTORS - ALLISON PLANT 10

SAMPLE DEPTH (FEET)	PID READING (PPMV)																	
	MW-152	MW-154	MW-155	MW-156	MW-157	MW-158	MW-200	MW-201	MW-202	MW-301	MW-302	GP-1	GP-2	GP-3	GP-4	GP-5	SP-1	HP-1
0-2	--	--	--	--	--	--	--	--	--	--	--	4.6	4.6	15	1.3	2.8	--	--
3-5	0.0	3.8	0.0	0.4	1.8*	250	0.0	0.0	0.0	--	--	--	--	--	--	--	0.0	0.0*
5-7	--	--	--	--	--	--	--	--	--	--	--	5.2	24	44	2.0	2.0	--	--
8-10	0.0*	3.9*	0.0	0.5	--	>1000*	--	0.0	0.0	--	--	--	--	--	--	--	2.2	--
9-11	--	--	--	--	1.6	--	--	--	--	--	--	--	--	--	--	--	--	--
10-12	--	--	--	--	--	--	--	--	--	--	--	52	17	2.5	3.0	6.4	--	--
13-15	0.0	2.2	200*	0.4	6.0	150	2.0*	0.0	14.8*	--	--	--	--	--	--	--	9.2	--
18-20	7.5*	3.2*	85	1.0*	6.9	102	0.0	8.4*	8.2	--	--	--	--	--	--	--	8.0	--
23-25	--	--	1.0	--	--	4.0	1.0	0.0	0.2	--	--	--	--	--	--	--	0.0	--
28-30	--	--	7.0*	--	--	3.5	0.0	5.8	0.0	--	--	--	--	--	--	--	--	--
33-35	--	--	--	--	--	--	1.4	0.0	0.0*	--	--	--	--	--	--	--	--	--
38-40	--	--	--	--	--	--	0.2	0.0*	--	--	28	--	--	--	--	--	--	--
43-45	--	--	--	--	--	--	0.7	--	--	9.0	160	--	--	--	--	--	--	--
45-47	--	--	--	--	--	--	--	--	--	6.4	--	--	--	--	--	--	--	--
47-49	--	--	--	--	--	--	--	--	--	12	--	--	--	--	--	--	--	--
48-50	--	--	--	--	--	--	0.0*	--	--	--	540*	--	--	--	--	--	--	--
49-51	--	--	--	--	--	--	--	--	--	9.2	--	--	--	--	--	--	--	--
53-55	--	--	--	--	--	--	--	--	--		180	--	--	--	--	--	--	--
58-60	--	--	--	--	--	--	--	--	--		300	--	--	--	--	--	--	--
63-65	--	--	--	--	--	--	--	--	--	--	200*						--	--

NOTES: PPMV - Parts per million by volume
-- - No sample at this depth.
* - Sample collected for laboratory analysis.

FLUOR DANIEL GTI

95624kg

TABLE 6
SUMMARY OF VOCs CONCENTRATIONS IN SOIL FOR WELLS AND BORINGS INSTALLED BY FLUOR DANIEL GTI
EPA METHOD 8240
GENERAL MOTORS - ALLISON PLANT 10

BORING ID	SAMPLE DEPTH (feet)	DATE SAMPLED	VINYL CHLORIDE	cis-1,2-DICHLORO-ETHENE	trans-1,2-DICHLORO-ETHENE	TRICHLORO-ETHENE	TETRACHLORO-ETHENE
MW-152	8-10	6/27/95	<10	<5	<5	300	<5
	18-20	6/28/95	<10	<5	<5	<5	<5
MW-154	8-10	6/29/95	<10	<5	<5	<5	<5
	18-20		<10	<5	<5	<5	<5
MW-155	13-15	9/5/95	60	3500	<5	390	<5
	28-30		<10	<5	<5	<5	<5
MW-156*	18-20	9/5/95	<10	<5	<5	170	14
MW-157	3-5	1/23/97	<10	<5	<5	<5	<5
MW-158	8-10	1/23/97	<10	<5	<5	<5	<5
MW-200	13-15	7/10/95	<10	33	<5	280	18
	48-50	7/14/95	<10	<5	<5	<5	<5
MW-201*	18-20	7/11/95	<10	90	11	<5	<5
	38-40	7/11/95	<10	<5	<5	<5	<5
MW-202	13-15	7/11/95	24	1100	<5	8300	<5
	33-35	7/11/95	<10	<5	<5	6.8	<5
MW-302	48-50	1/31/97	<10	<5	<5	<5	<5
	63-65		<10	<5	<5	<5	<5
GP-1	5-7	12/19/96	40	2700	25	12000	<5
GP-2	5-7	12/19/96	<10	130	<5	<5	<5
GP-3	5-7	12/19/96	12	<5	<5	<5	<5
GP-4	5-7	12/19/96	<10	<5	<5	77	<5
GP-5	5-7	12/19/96	<10	<5	<5	180	<5
GP-6	5-7	12/19/96	<10	<5	<5	41	<5
HP-1*	3-5	9/6/95	<10	40	<5	<5	17
TIER II NON-RESIDENTIAL GOALS			130	102,490	not determined	25,730	8,010
TIER II RESIDENTIAL GOALS			130	17,140	not determined	80	230

NOTES: Analytical results are in ug/kg: parts per billion (ppb).
Samples collected by Fluor Daniel GTI, Inc.
MW wells were analyzed using EPA Method 8240.
* - Located off-site to the south or southeast. Considered potential residential exposure.
Bolded value (MW156) indicates well of concern.

95824kg

TABLE 6B
SUMMARY OF DETECTED PRIORITY POLLUTANT METAL CONCENTRATIONS IN SOIL FOR GEOPROBE BORINGS INSTALLED BY FLUOR DANIEL GTI
DECEMBER 19, 1996
EPA METHOD 6010
GENERAL MOTORS - ALLISON PLANT 10

BORING ID	SAMPLE DEPTH (feet)	PRIORITY POLLUTANT METALS (mg/kg)						
		Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
GP-1	0-2	<0.5	<2	5.5	9.0	21	7.7	39
GP-2	0-2	<0.5	4.1	1600	510	940	28	880
GP-3	0-2	0.61	<2	16	21	9.0	21	60
GP-4	0-2	<0.5	<2	10	12	10	12	42
GP-5	0-2	<0.5	<2	9.7	7.4	13	8.5	36
GP-6	0-2	<0.5	<2	17	14	8.6	17	37
TIER II NON-RESIDENTIAL GOALS		13.49	1020	10000	not determined	NA	10000	10000
TIER II RESIDENTIAL GOALS		0.5	135	1350 or 10000	not determined	NA	5400	10000

NOTES: Analytical results are in mg/kg: parts per million (ppm)
Samples collected by Fluor Daniel GTI, Inc.

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TABLE 7
SUMMARY OF VOCs CONCENTRATIONS IN GROUNDWATER FOR MONITORING WELLS -HISTORICAL DATA EPA METHOD 8240 GENERAL MOTORS - ALLISON PLANT 10

SAMPLE ID	SAMPLE DATE	SAMPLE ANALYTICAL RESULT				
		VINYL CHLORIDE	11-DICHLORO-ETHANE	trans-1,2-DICHLORO-ETHENE	cis-1,2-DICHLORO-ETHENE	TRICHLORO-ETHENE
MW-10-1	3/28/94	<100	<100	160		880
	10/5/94	–	–			1600
	7/14/95	<10	<5	5.9	190	1800
	2/5/97	<10	<5	<5	120	810
MW-132	9/92	1200	<50	1600		280
	5/93	<100	<20	2400		1900
	7/14/95	600	<5	15	5100	1700
	2/5/97	<250	<120	<420	65000	15000
MW-133	9/92	<10	<5	81		47
	5/93	5.3	<1	56		24
	9/11/95	<10	<5	<5	70	23
	2/5/97	<10	<5	<5	100	53
MW-135	9/92	<10	<5	<5		<5
	5/93	<5	<1	<1		<1
	7/14/95	<10	<5	<5	<5	<5
	2/5/97	<10	<5	<5	<5	<5
MW-145	5/93	<20	<5	440		9
	7/14/95	12	<5	<5	530	5.6
	2/5/97	<10	<5	<5	<5	43
MW-146	5/93	<5	<1	<1		83
	7/14/95	<10	<5	<5	<5	52
	2/5/97	<10	<5	<5	<5	43
MW-147	5/93	42	<1	<140		39
	7/14/95	<10	<5	<5	<5	<5
	2/5/97	<10	<5	<5	95	51
MW-148	5/93	490	<80	19000		4900
	7/14/95	92	23	1400	12	410
	2/5/97	<10	<5	<5	73	<5
MW-150	7/17/95	<10	<5	<5	6.7	65
	2/5/97	<10	<5	<5	<5	86
MW-151*	7/14/95	<10	<5	7.4	74	<5
	2/6/97	<10	<5	<5	20	<5
MW-152	7/14/95	<10	<5	<5	5.3	150
	2/5/97	<10	<5	<5	<5	150

TABLE 7
SUMMARY OF VOCs CONCENTRATIONS IN GROUNDWATER FOR MONITORING WELLS -HISTORICAL DATA EPA METHOD 8240 GENERAL MOTORS - ALLISON PLANT 10

SAMPLE ID	SAMPLE DATE	SAMPLE ANALYTICAL RESULT				
		VINYL CHLORIDE	1,1-DICHLORO-ETHANE	trans-1,2-DICHLORO-ETHENE	cis-1,2-DICHLORO-ETHENE	TRICHLORO-ETHENE
MW-153	7/14/95	22	<5	<5	950	**570**
	2/6/97	<10	<5	<5	<5	5.4
MW-153 DUPL	2/6/97	<10	<5	<5	<5	<5
MW-154	7/14/95	<10	<5	<5	<5	<5
	2/5/97	<10	<5	<5	<5	<5
MW-155	9/11/95	240	<5	<5	180	<5
	2/6/97	**3400**	<500	<500	**17000**	<500
MW-156*	9/11/95	<10	<5	<5	30	**280**
	2/6/97	<10	<5	<5	7.5	**52**
MW-156* DUPL	2/6/97	<10	<5	<5	6.9	**50**
MW-157*	2/6/97	<100	<50	<50	<50	**60**
	2/26/97	<10	<5	<5	<5	**100**
MW-158	2/6/97	<10	<5	<5	<5	<5
MW-200	7/17/95	<10	<5	<5	<5	<5
	2/5/97	<10	<5	<5	<5	<5
MW-201*	7/14/95	<10	<5	<5	<5	<5
	2/6/97	<10	<5	<5	<5	<5
MW-202	7/14/95	<10	<5	<5	<5	<5
	2/6/97	<10	<5	<5	<5	<5
MW-301	2/6/97	<10	<5	<5	<5	<5
MW-302	2/6/97	<10	<5	<5	8.2	<5
HP-1*	9/6/95	**500**	<5	**12**	**3900**	**430**
TRIP BLANK	7/14/95	<10	<5	<5	<5	<5
	2/6/97	<10	<5	<5	<5	<5
EQUIPMENT BLANK	7/14/95	<10	<5	<5	<5	<5
	2/6/97	<10	<5	<5	<5	<5
TIER II NON-RESIDENTIAL GOALS		10	10,200	not determined	1,022	260
TIER II RESIDENTIAL GOALS		2	640	not determined	70	5

NOTES: Unit of data is ug/L.
9/92 & 5/93 Data collected by Engineering Science, Inc.
3/94 & 10/94 Data collected by O'Brien & Gere Engineers, Inc.
7/95, 9/95, & 2/97 Data collected by Fluor Daniel GTI, Inc.
Bolded values are greater than respective Tier II goals.
* - Located off-site to the south or southeast. Considered potential residential exposure.

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TABLE 7B
SUMMARY OF VOCs CONCENTRATIONS IN SURFACE WATER FROM LITTLE EAGLE CREEK
EPA METHOD 8240
GENERAL MOTORS - ALLISON PLANT 10

SAMPLE ID	SAMPLE DATE	SAMPLE ANALYTICAL RESULT			
		VINYL CHLORIDE	cis-1,2-DICHLORO-ETHENE	TRICHLORO-ETHENE	METHYLENE CHLORIDE
ST-1	10/4/96	<10	<5	<5	<5
	2/10/97	<10	<5	<5	<5
ST-2	10/4/96	<10	17	<5	<5
	2/10/97	<10	<5	<5	<5
ST-2 DUPL	2/10/97	<10	<5	<5	<5
ST-3	10/4/96	<10	14	<5	<5
	2/10/97	<10	<5	<5	<5
Equipment Blank	2/10/97	<10	<5	<5	8.3
Trip Blank	10/4/96	<10	<5	<5	5*
TIER II NON-RESIDENTIAL GOALS		10	1,022	260	
TIER II RESIDENTIAL GOALS		2	70	5	

NOTES: Unit of data is ug/L.
Data collected by Fluor Daniel GTI, Inc.
Tier II goals listed are for groundwater.
* Methylene Chloride was detected in the method blank at 5.9 ug/L.

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Table 8

General Motors - Allison Gas Plant 10
Little Eagle Creek Flow Summary

Summary of Little Eagle Creek Discharge Data

Location	Flow (cfs)	
	October 1996	February 1997
Upstream	4 *	20.88
Midpoint	8	23.77
Downstream	4 *	23.58

* indicates stream flow was too low to measure and was estimated

Little Eagle Creek at Speedway Gaging Station

	Flow (cfs)	
	October	February
Max	88.9	75.5
Min	0.81	3.82
Mean	11.1	30.4

Notes:
(1) Gaging period: 1965 - 1995
(2) Gaging station located approx. 1.2 miles upstream from site

TABLE 9
SUMMARY OF SOIL LITERATURE BACKGROUND RANGES FOR TIER I METALS EVALUATIONS GENERAL MOTORS - ALLISON PLANT 10

Analyte	Range of Background Results	Mean	Number of Samples In Background Range
Arsenic	3.6 - 15	7.5	11
Barium	300 - 700	500	11
Beryllium	ND - 2	0.36	11
Cadmium	N/A	1.15	60
Chromium	15 - 70	47	11
Copper	15 - 70	27	11
Lead	ND - 30	18	11
Mercury	0.04 - 0.26	0.109	11
Nickel	7 - 30	18	11
Selenium	ND - 0.5	0.35	11
Silver	ND - 5 *	–	1319
Zinc	32 - 113	56	11

Notes:

- All background concentrations are in units of mg/Kg.

- All literature values were taken from Elements in North American Soils (Dragun, 1991)

- Cadmium data were obtained from a source that did not provide a concentration range.

-'' Signifies a State of Indiana value was not available. Therefore, the background value for the conterminous USA was reported.*

- ND indicates the lower range of the background was nondetected concentrations.

TABLE 10
SOIL FREQUENCY AND STATISTICAL SUMMARY
ON-SITE VADOSE ZONE SUBSURFACE SOIL DATA
GENERAL MOTORS-ALLISON PLANT 10

ID		SB-132 (E)	SB-133 (E)	SB-134 (E)	SB-135 (E)	SB-147 (E)	SB-148 (E)
DEPTH		8-10	3-5	8-10	8-10	8-10	8-10
DATE		9/92	9/92	9/92	9/92	5/93	5/93
	UNIT						
Vinyl Chloride	ug/Kg	3150 U	650 U	5 U	5 U	250 U	250 U
Tetrachloroethene	ug/Kg	1550 U	315 U	2.5 U	2.5 U	50 U	50 U
Total-1,2-Dichloroethene	ug/Kg	12000	315 U	2.5 U	2.5 U	1000	900
Trichloroethene	ug/Kg	120000	14000	2.5 U	2.5 U	23000	14000
Toluene	ug/Kg	1550 U	315 U	2.5 U	2.5 U	50 U	50 U
Total Xylenes	ug/Kg	1550 U	315 U	2.5 U	2.5 U	50 U	50 U

ID		SB-149 (E)	SB-150 (E)	SB-150 (E)	SB10-1 (O)	SB10-2 (O)	SB10-3 (O)
DEPTH		8-10	3-5	8-10	2-4	6-8	4-6
DATE		5/93	5/93	5/93	3/94	3/94	3/94
	UNIT						
Vinyl Chloride	ug/Kg	250 U	500	250 U	0.5 U	2.5 U	0.5 U
Tetrachloroethene	ug/Kg	50 U	700	50 U	0.5 U	2.5 U	0.5 U
Total-1,2-Dichloroethene	ug/Kg	1400	50 U	1800	4	490	71
Trichloroethene	ug/Kg	200	4200	300	45	29	0.5 U
Toluene	ug/Kg	50 U	50 U	50 U	0.5 U	2.5 U	0.5 U
Total Xylenes	ug/Kg	50 U	200 U	50 U	1.5 U	8 U	1.5 U

TABLE 10
SOIL FREQUENCY AND STATISTICAL SUMMARY
ON-SITE VADOSE ZONE SUBSURFACE SOIL DATA
GENERAL MOTORS-ALLISON PLANT 10

ID		SB10-4 (O)	MW-152	MW-154	GP-1	GP-2	GP-3
DEPTH		6-8	8-10	8-10	5-7	5-7	5-7
DATE		3/94	6/27/95	6/29/95	12/19/96	12/19/96	12/19/96
	UNIT						
Vinyl Chloride	ug/Kg	60 U	5 U	5 U	40	5 U	12
Tetrachloroethene	ug/Kg	60 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Total-1,2-Dichloroethene	ug/Kg	60 U	2.5 U	2.5 U	2725	130	2.5 U
Trichloroethene	ug/Kg	60 U	300	2.5 U	12000	2.5 U	2.5 U
Toluene	ug/Kg	60 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Total Xylenes	ug/Kg	1300	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

ID		GP-4	GP-5	GP-6
DEPTH		5-7	5-7	5-7
DATE		12/19/96	12/19/96	12/19/96
	UNIT			
Vinyl Chloride	ug/Kg	5 U	5 U	5 U
Tetrachloroethene	ug/Kg	2.5 U	2.5 U	2.5 U
Total-1,2-Dichloroethene	ug/Kg	2.5 U	2.5 U	2.5 U
Trichloroethene	ug/Kg	77	180	41
Toluene	ug/Kg	2.5 U	2.5 U	2.5 U
Total Xylenes	ug/Kg	2.5 U	2.5 U	2.5 U

TABLE 10
SOIL FREQUENCY AND STATISTICAL SUMMARY
ON-SITE VADOSE ZONE SUBSURFACE SOIL DATA
GENERAL MOTORS-ALLISON PLANT 10

ID DEPTH DATE	UNIT	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION	ARITHMETIC MEAN *	STANDARD DEVIATION *	NORMAL UPPER 95% CONFIDENCE INTERVAL *
Vinyl Chloride	ug/Kg	12	500	SB-150 (E)	3/21	115.3	186.7	187.5
Tetrachloroethene	ug/Kg	700	700	SB-150 (E)	1/21	135.9	361.8	272.1
Total-1,2-Dichloroethene	ug/Kg	4	12000	SB-132 (E)	10/21	998.3	2625.6	1986.7
Trichloroethene	ug/Kg	29	120000	SB-132 (E)	14/21	8973.6	26260.1	18858.6
Toluene	ug/Kg	ND	ND		0/21	104.9	338.1	NA
Total Xylenes	ug/Kg	1300	1300	SB10-4 (O)	1/21	171.5	425.7	331.7

Note: (*) The statistics calculated for vinyl chloride are based on the entire data set excluding the significant elevated detection limit reported for soil sample SB-132 as even the half-detection limit value of 3100 ug/kg is more than six times greater than the maximum detected concentration of 500 ug/kg in soil sample SB-150 and is not representative of the remaining data set. The exclusion of this data point has been done in accordance with EPA guidance from Section 5.3.2 of RAGS, Part A, Interim Final (1989a).

ID DEPTH DATE	UNIT
Vinyl Chloride	ug/Kg
Tetrachloroethene	ug/Kg
Total-1,2-Dichloroethene	ug/Kg
Trichloroethene	ug/Kg
Toluene	ug/Kg
Total Xylenes	ug/Kg

TABLE 11
SOIL FREQUENCY AND STATISTICAL SUMMARY
OFF-SITE VADOSE ZONE SUBSURFACE SOIL DATA
GENERAL MOTORS-ALLISON PLANT 10

ID		MW-157	MW-158	HP-1
DEPTH		3-5	8-10	3-5
DATE		1/23/97	1/23/97	9/6/95
	UNITS			
Vinyl Chloride	ug/Kg	5 U	5 U	5 U
Tetrachloroethene	ug/Kg	2.5 U	2.5 U	17
Total-1,2-Dichloroethene	ug/Kg	2.5 U	2.5 U	40
Trichloroethene	ug/Kg	2.5 U	2.5 U	2.5 U
Toluene	ug/Kg	2.5 U	2.5 U	2.5 U
Total Xylenes	ug/Kg	2.5 U	2.5 U	2.5 U

		MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION	ARITHMETIC MEAN	STANDARD DEVIATION	NORMAL UPPER 95% CONFIDENCE INTERVAL
	UNITS							
Vinyl Chloride	ug/Kg	ND	ND	--	0/3	NA	NA	NA
Tetrachloroethene	ug/Kg	17	17	HP-1	1/3	7	8	13
Total-1,2-Dichloroethene	ug/Kg	40	40	HP-1	1/3	15	22	30
Trichloroethene	ug/Kg	ND	ND	--	0/3	NA	NA	NA
Toluene	ug/Kg	ND	ND	--	0/3	NA	NA	NA
Total Xylenes	ug/Kg	ND	ND	--	0/3	NA	NA	NA

TABLE 12
SURFACE AND SUBSURFACE SOIL LEAD & ASBESTOS STATISTICAL EVALUATIONS
GENERAL MOTORS - ALLISON PLANT 10

Surface Lead Results (mg/kg)

Location	Depth	Concentration
GP-1	0-2'	21
GP-2	0-2'	940
GP-3	0-2'	9
GP-4	0-2'	10
GP-5	0-2'	13
GP-6	0-2'	8.6

Average	167
Std Dev	379
95% UCL	479

Subsurface Lead Results (mg/kg)

Location	Depth	Concentration
SB10-1	2-4'	1000
SB10-2	6-8'	9.4
SB10-3	4-6'	5.4
SB10-4	6-8'	.13
SB10-5	14-16'	3.9
MW10-1	10-12'	4.8

Average	173
Std Dev	405
95% UCL	506

Surface Asbestos Results (%)

Location	Depth	Concentration
SS10-1	0-1'	10%
SS10-2	0-1'	10%

Subsurface Asbestos Results (%)

Location	Depth	Concentration
SB10-1	2-4'	8%
SB10-2	6-8'	<1%
SB10-3	4-6'	<1%
SB10-4	6-8'	<1%
SB10-5	14-16'	<1%
MW10-1	10-12'	<1%

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TABLE 13
GROUNDWATER FREQUENCY SUMMARY
ON-SITE AND OFF-SITE GROUNDWATER DATA
GENERAL MOTORS-ALLISON PLANT 10

ID		MW-10-1	MW-132	MW-133	MW-135	MW-145	MW-146
DATE		2/5/97	2/5/97	2/5/97	2/5/97	2/5/97	2/5/97
	UNIT						
Vinyl Chloride	ug/L	5 U	125 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	ug/L	2.5 U	60 U	2.5 U	2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	ug/L	120	65000	100	2.5 U	2.5 U	2.5 U
Trichloroethene	ug/L	810	15000	53	2.5 U	43	43

ID		MW-147	MW-148	MW-150	MW-151 *	MW-152	MW-153
DATE		2/5/97	2/5/97	2/5/97	2/6/97	2/5/97	2/6/97
	UNIT						
Vinyl Chloride	ug/L	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	ug/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	ug/L	95	73	2.5 U	20	2.5 U	2.5 U
Trichloroethene	ug/L	51	2.5 U	86	2.5 U	150	5.4

NOTE: '' Designates an off-site well southeast of the site where off-site potential exposures exist.*

TABLE 13
GROUNDWATER FREQUENCY SUMMARY
ON-SITE AND OFF-SITE GROUNDWATER DATA
GENERAL MOTORS-ALLISON PLANT 10

ID		MW-154	MW-155	MW-156 *	MW-157 *	MW-158	MW-200
DATE		2/5/97	2/6/97	2/6/97	2/26/97	2/6/97	2/5/97
	UNIT						
Vinyl Chloride	ug/L	5 U	3400	5 U	10 U	5 U	5 U
1,1-Dichloroethane	ug/L	2.5 U	250 U	2.5 U	5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	ug/L	2.5 U	17000	7.5	5 U	2.5 U	2.5 U
Trichloroethene	ug/L	2.5 U	250 U	52	100	2.5 U	2.5 U

ID		MW-201	MW-202	MW-301	MW-302	HP-1
DATE		2/6/97	2/6/97	2/6/97	2/6/97	9/6/95
	UNIT					
Vinyl Chloride	ug/L	5 U	5 U	5 U	5 U	500
1,1-Dichloroethane	ug/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	ug/L	2.5 U	2.5 U	2.5 U	8.2	3900
Trichloroethene	ug/L	2.5 U	2.5 U	2.5 U	2.5 U	430

NOTES: '' Designates an off-site well southeast of the site where off-site potential exposures exist. Sample MW-157 was resampled on 2/26/97 due to a high detection limit for vinyl chloride in the sample collected on 2/6/97. The TCE concentration in this well represents the worst-case off-site groundwater concentration for parameters exceeding the IDEM residential land use health-based criteria for groundwater.*

TABLE 13
GROUNDWATER FREQUENCY SUMMARY
ON-SITE AND OFF-SITE GROUNDWATER DATA
GENERAL MOTORS-ALLISON PLANT 10

ID DATE	UNIT	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
Vinyl Chloride	ug/L	500	3400	MW-155	2/23
1,1-Dichloroethane	ug/L	ND	ND		0/23
cis-1,2-Dichloroethene	ug/L	7.5	65000	MW-132	10/23
Trichloroethene	ug/L	5.4	15000	MW-132	12/23

ID DATE	UNIT
Vinyl Chloride	ug/L
1,1-Dichloroethane	ug/L
cis-1,2-Dichloroethene	ug/L
Trichloroethene	ug/L

TABLE 14

CALCULATION OF SOIL-TO-AIR VOLATILIZATION FACTOR AND PARTICULATE EMISSIONS FACTOR FOR USE IN DETERMINING INHALATION OF VOLATILES FROM SOILS EXPOSURES GENERAL MOTORS - ALLISON PLANT 10

Input Paramet	Abbrev.	Value	Units	Source
LENGTH OF AREA	LS	250	m	Estimated
WIND SPEED -MIX ZONE	V	2.25	m/sec	Default
DIFFUSION HEIGHT	DH	2	m	Default
AREA IMPACTED	A	150,000,000	cm^2	Estimated
SOIL POROSITY	E	0.35	unitless	Default
FRACTION OF VEGETATIVE COVER	G	0.95	unitless	Estimated
EFFECTIVE DIFFUSIVITY	Del	Di * E^0.33	cm^2/sec	Default
SOIL/AIR PARTITION	Kas	H/Kd * 41	g soil/cm^3 air	Default
PARTICULATE DENSITY	Ps	2.65	g/cm^3	Default
EXPOSURE INTERVAL	T	7.9E+08	sec	Default (25 yrs)
MOLECULAR DIFFUSIVITY	Dl	chem-spec	cm^2/sec	Lookup
HENRY'S LAW CONSTANT	H	chem-spec	atm-m^3/mol	Lookup
SOIL-WATER PARTITION	Kd	chem-spec	cm^3/g	Koc x OC
ORGANIC CARBON PARTITION	Koc	chem-spec	cm^3/g	Lookup
ORGANIC CARBON CONTENT	OC	0.02	unitless	Default
RESPIRABLE FRACTION	RF	0.036	g/m^2-hr	Default
MEAN ANNUAL WIND SPEED	Um	4.5	m/sec	Default
THRESHOLD WIND SPEED @ 10 M	Ut	18	m/sec	Estimated

Formulae ==> alpha (cm^2/sec) = (Del x E) / [E + (Ps) * (1-E) / Kas]
VF (m^3/Kg) = [(LS * V * DH) / A] * [(3.14 * alpha * T)^0.5 / (2 * Del * E * Kas *10^-3 kg/g)]
PEF (m^3/Kg) = [(LS * V *DH *3600) / A] * [(1000 g/Kg / (.036 * (1-G) * (Um/Ut)^3 * F(x))]

	VF Intermediate Calculated Inputs						Outputs		
Constituent	Del	Kas	Dl	H	Kd	Koc	alpha	VF	PEF
Vinyl Chloride	7.50E-02	3.08E+00	1.06E-01	8.42E-02	1.12E+00	56	2.89E-02	392	1.70E+12

Note: Most chemical-specific input values were taken from the Technical Background Document for Soil Screening Guidance, Review Draft. EPA/540/R-94/106. The Koc value was estimated using Equation 4-5 from the Handbook of Chemical Property Estimation Methods (Lyman et al. 1993).

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TABLE 15

CALCULATION OF GROUNDWATER-TO-INDOOR AIR VOLATILIZATION CONCENTRATIONS FOR USE IN DETERMINING INHALATION OF VOLATILES FROM OFF-SITE GROUNDWATER EXPOSURES

GENERAL MOTORS - ALLISON PLANT 10

Parameter	Definition	Units	Value	Basis
Site-Specific Parameters				
hcap	thickness of capillary fringe	cm	5	ASTM default
hv	thickness of vadose zone	cm	150	Site-specific
Vt	total soil porosity	cm^3/cm^3-soil	0.35	Default
p	soil particle density	g/cm^3	2.65	Default
pb	dry bulk density of soil	g/cm^3	1.45	Default
w	moisture content of soil	unitless	0.15	Estimated
Vacrack	volumetric air content in foundation walls/cracks	cm^3-air/cm^3 total volume	0.133	ASTM default
Vwcrack	volumetric water content in foundation walls/cracks	cm^3-water/cm^3 total volume	0.218	Vt-Vacrack
Vacap	volumetric air content in capillary fringe soils	cm^3-air/cm^3 soil	0.038	ASTM default
Vwcap	volumetric water content in capillary fringe soils	cm^3-water/cm^3 soil	0.312	Vt-Vacap
Vas	volumetric air content in vadose zone soils	cm^3-air/cm^3 soil	0.133	ASTM default
Vws	volumetric water content in vadose zone soils	cm^3-water/cm^3 soil	0.218	Vt-Vas
Lgw	depth to groundwater	cm	155	Site-specific
Lb	enclosed space volume/infiltration area ratio	cm	200	ASTM default
Lcrack	enclosed space foundation or wall thickness	cm	15	ASTM default
ER	enclosed space air exchange rate	L/sec	0.00014	ASTM default
n	areal fraction of cracks in foundation walls/cracks	cm^2-cracks/cm^2-total area	0.01	ASTM default
Chemical-Specific Parameters				
Dair	diffusion coefficient in air	cm^2/sec	chemical-specific	
Dwater	diffusion coefficient in water	cm^2/sec	chemical-specific	
H	Henry's Law Constant	cm^3-water/cm^3-air	chemical-specific	
Cwater	groundwater concentration	mg/L	chemical-specific	
Calculated Parameters				
Deffws	effective diffusion coefficient between groundwater and soil surface	cm^2/sec	chemical-specific	
Deffcap	effective diffusion coefficient through capillary fringe	cm^2/sec	chemical-specific	
Deffs	effective diffusion coefficient in soil based on vapor-phase concentration	cm^2/sec	chemical-specific	
Deffcrack	effective diffusion coefficient through foundation cracks	cm^2/sec	chemical-specific	
VFwesp	volatilization factor for groundwater to enclosed space vapors	(mg/m^3-air) / (mg/L-water)	chemical-specific	
Cair	air concentration	mg/m^3	chemical-specific	

Formulae

Deffws = (hcap + hv) / [hcap / Deffcap + hv / Deffs]

Deffcrack = Dair * Vacrack^3.33 / Vt^2 + (Dwater * Vwcrack^3.33) / (H * Vt^2)

Deffcap = Dair * Vacap^3.33 / Vt^2 + (Dwater * Vwcap^3.33) / (H * Vt^2)

Deffs = Dair * Vas^3.33 / Vt^2 + (Dwater * Vws^3.33) / (H * Vt^2)

VFwesp = H * [Deffws / (Lgw * ER * Lb)] * 10^3 L/m^3 / { 1 + [Deffws / (Lgw * ER * Lb)] + [(Deffws * Lcrack) / (Deffcrack * Lgw * n)] }

Cair = Cwater * VFwesp

Chemical	Dair	Dwater	H	Deffws	Deffcrack	Deffcap	Deffs	VFwesp	Cwater	Cair
Trichloroethene	0.079	9.10E-06	0.435	3.00E-04	7.71E-04	1.56E-05	7.71E-04	6.31E-03	0.10	6.31E-04

The Cair concentrations represent the estimated concentrations in air (from volatilized vapor) based on representative groundwater concentrations of the constituents of interest. The Cair values are then used to calculate an estimated risk from exposure to these estimated concentrations in air.

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08/21/97 ks\Indiana\95824T15.WK4

TABLE 17
SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC HUMAN HEALTH RISKS
INHALATION OF VOLATILES AND SOIL PARTICULATES AND INGESTION OF SITE SUBSURFACE SOILS
BASED ON RESULTS OF ON-SITE SUBSURFACE SOIL DATA
INDUSTRIAL NON-RESIDENTIAL EXPOSURES FOR ON-SITE WORKERS

CONSTITUENTS	PEF (m^3/Kg)	CF (10^-3 mg/ug)	VF (m^3/ Kg)	EF (d/yr)	ED (yrs)	IRair (m^3/ day)	BW (Kg)	AT Carc. (day)	AT Ncarc. (day)	INH Carc. CDI	INH Ncarc. CDI	CSF (Kg-d/ mg)	RfD (mg/ Kg-d)	INH ICR	INH HI
Vinyl Chloride	1.70E+12	1.00E-03	392	120	2	15	70	25550	730	9.65E-07	3.38E-05	0.3		2.90E-07	0.00E+00

INHALATION TOTAL ==> 2.90E-07 | 0.00E+00

CONSTITUENTS	IRsoil (mg/d)	EF (d/yr)	ED (yr)	BW (Kg)	AT Carc. (day)	AT Ncarc. (day)	CF 10^-9 Kg/ug	ING Carc. CDI	ING Ncarc. CDI	CSF (Kg-d/ mg)	RfD (mg/ Kg-d)	ING ICR	ING HI
Vinyl Chloride	100	120	2	70	25550	730	1.00E-09	2.52E-09	8.83E-08	1.9		4.79E-09	0.00E+00

INGESTION TOTAL = 4.79E-09 | 0.00E+00

TOTAL == 2.94E-07 | 0.00E+00

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TABLE 18

SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC HUMAN HEALTH RISKS
INHALATION OF VOLATILES AND SOIL PARTICULATES AND INGESTION OF SITE SOILS
BASED ON RESULTS OF ON-SITE SUBSURFACE SOIL DATA
INDUSTRIAL NON-RESIDENTIAL EXPOSURES FOR ON-SITE CONSTRUCTION WORKERS

CDI inh = [(CW)(EF)(ED)(IRair)(CF)(1/VF + 1/PEF)]/[(BW)(AT)]
CDI ing = [(CW)(IRsoil)(CF)(EF)(ED)]/[(BW)(AT)]

WHERE:
- CW = THE CHEMICAL CONCENTRATION (ug/Kg)
- VF = SOIL TO AIR VOLATILIZATION FACTOR (m^3/Kg)
- PEF = PARTICULATE EMISSION FACTOR (m^3/Kg)
- EF = THE EXPOSURE FREQUENCY (d/yr)
- ED = THE EXPOSURE DURATION (years)
- CF = CONVERSION FACTOR (10^-9 Kg/ug or 10^-3 mg/ug)
- BW = THE AVERAGE RECEPTOR BODY WEIGHT (Kg)
- AT = THE AVERAGING TIME (ED (yrs) x 365d/yr)
- IRair = THE AIR INGESTION RATE (m^3/d)
- IRsoil = THE SOIL INGESTION RATE (mg/d)

ICR = SUM(CDIi * CSFi) (inhalation or ingestion)

HAZARD INDEX = SUM(CDIi / RfDi) (inhalation or ingestion)

TOTAL ICR = ICR inh + ICR ing

TOTAL HI = HI inh + HI ing

- CDIi = CHRONIC DAILY INTAKE (per constituent)
- inh = VIA INHALATION EXPOSURE
- ing = VIA INGESTION EXPOSURE
- HI = HAZARD INDEX (non-carcinogenic risks)
- ICR = INCREMENTAL CANCER RISK (carcinogenic risks)
- CSFi = CANCER SLOPE FACTOR (per constituent)
- RfDi = REFERENCE DOSE (per constituent)

CONSTITUENTS	CW * (ug/Kg)	EPA WEIGHT OF EVIDENCE
Vinyl Chloride	188	A

* - The CW value for the on-site subsurface soils is the 95% UCL calculated for the 21 on-site vadose zone subsurface soil samples collected.

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08/21/97 ks\Indiana\95824T18.WK4

TABLE 18
SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC HUMAN HEALTH RISKS
INHALATION OF VOLATILES AND SOIL PARTICULATES AND INGESTION OF SITE SOILS
BASED ON RESULTS OF ON-SITE SUBSURFACE SOIL DATA
INDUSTRIAL NON-RESIDENTIAL EXPOSURES FOR ON-SITE CONSTRUCTION WORKERS

CONSTITUENTS	PEF (m^3/Kg)	CF (10^-3 mg/ug)	VF (m^3/ Kg)	EF (d/yr)	ED (yrs)	IRair (m^3/ day)	BW (Kg)	AT Carc. (day)	AT Ncarc. (day)	INH Carc. CDI	INH Ncarc. CDI	CSF (Kg-d/ mg)	RfD (mg/ Kg-d)	INH ICR	INH HI
Vinyl Chloride	1.70E+12	1.00E-03	392	120	0.5	24	70	25550	183	3.86E-07	5.41E-05	0.3		1.16E-07	0.00E+00

INHALATION TOTAL ==> 1.16E-07 | 0.00E+00

CONSTITUENTS	IRsoil (mg/d)	EF (d/yr)	ED (yr)	BW (Kg)	AT Carc. (day)	AT Ncarc. (day)	CF (10^-9 Kg/ug)	ING Carc. CDI	ING Ncarc. CDI	CSF (Kg-d/ mg)	RfD (mg/ Kg-d)	ING ICR	ING HI
Vinyl Chloride	100	120	0.5	70	25550	183	1.00E-09	6.31E-10	8.83E-08	1.9		1.20E-09	0.00E+00

INGESTION TOTAL == 1.20E-09 | 0.00E+00

TOTAL == 1.17E-07 | 0.00E+00

FLUOR DANIEL GTI

TABLE 19
SUMMARY OF NON-CARCINOGENIC HUMAN HEALTH RISKS
INCIDENTAL INGESTION OF AND DERMAL CONTACT WITH SURFACE WATER
BASED ON RESULTS OF MAXIMUM SAMPLE LOCATION (ST-2)
ADOLESCENT RESIDENTIAL EXPOSURE

CDI ing = [(CW)(IRgw)(CF)(EF)(ED)]/[(BW)(AT)]

WHERE:
CW = THE CHEMICAL CONCENTRATION (mg/L)
SA = THE SKIN SURFACE AREA AVAILABLE FOR CONTACT (cm^2)
PC = THE DERMAL PERMEABILITY CONSTANT (cm/hour)
CF = VOLUMETRIC CONVERSION FACTOR FOR WATER (L/1000 cm^3)
EF = THE EXPOSURE FREQUENCY (events/year)
ED = THE EXPOSURE DURATION (years)
ET = THE EXPOSURE TIME (hours/event or day)
BW = THE AVERAGE RECEPTOR BODY WEIGHT (Kg)
AT = THE AVERAGING TIME (ED (yrs) x 365d/yr)
CR = THE CONTACT RATE (L/hour)

ICR = SUM(CDII * CSFI) (ingestion or dermal)

HAZARD INDEX = SUM(CDII / RfDI) (ingestion or dermal)

TOTAL ICR = ICR ing + ICR dermal

TOTAL HI = HI ing + HI dermal

CDII = CHRONIC DAILY INTAKE (per constituent)
ing = VIA INGESTION EXPOSURE
dermal = VIA DERMAL EXPOSURE
HI = HAZARD INDEX (non-carcinogenic risks)
ICR = INCREMENTAL CANCER RISK (carcinogenic risks)
CSFi = CANCER SLOPE FACTOR (per constituent)
RfDI = REFERENCE DOSE (per constituent)

CONSTITUENTS	CW * (mg/L)	EPA WEIGHT OF EVIDENCE
cis-1,2-Dichloroethen	0.017	D

* - The CW values for the surface water exposure is the maximum detected result obtained from the first sampling event at station ST-2.

FLUOR DANIEL GTI

08/21/97 ks\indiana\95824T19.WK4

TABLE 19
SUMMARY OF NON-CARCINOGENIC HUMAN HEALTH RISKS
INCIDENTAL INGESTION OF AND DERMAL CONTACT WITH SURFACE WATER
BASED ON RESULTS OF MAXIMUM SAMPLE LOCATION (ST-2)
ADOLESCENT RESIDENTIAL EXPOSURE

CONSTITUENTS	CR (L/hour)	EF (e/yr)	ED (yr)	BW (Kg)	AT Carc. (day)	AT carc. (day)	ET (hrs/e)		ING Carc. CDI	ING Ncarc. CDI	CSF (Kg-d/ mg)	RfD (mg/ Kg-d)	ING ICR	ING HI	% carc. Risk
cis-1,2-Dichloroethene	0.05	25	6	55.9	25550	2190	2		1.79E-07	2.08E-06		1E-02	0.00E+00	2.08E-04	100.0
												INGESTION TOTAL =	0.00E+00	2.08E-04	100

CONSTITUENTS	PC (cm/hr)	CF (L/1000cc	SA (cm^2)	EF (d/yr)	ED (yrs)	ET (hr/d)	BW (Kg)	AT Carc. (day)	AT Ncarc (day)	DERMAL Carc. CDI	DERMAL Ncarc. CDI	CSF (Kg-d/mg	RfD (mg/Kg-d	DERMAL ICR	DERMAL HI	Perce Ncarc. Risk
cis-1,2-Dichloroethene	8.4E-04	1.00E-03	15800	25	6	2	55.9	25550	2190	4.74E-08	5.53E-07		1E-02	0.00E+00	5.53E-05	100.0
												DERMAL TOTAL ==>		0.00E+00	5.53E-05	100

TOTAL ==> 0 2.64E-04

FLUOR DANIEL GTI

08/21/97 ks\Indiana\95824T19.WK4

TABLE 20
SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC HUMAN HEALTH RISKS
INHALATION OF VOLATILES ENTRUDING TO RESIDENCES
FROM CONSTITUENTS DETECTED IN OFF-SITE GROUNDWATER
GENERAL MOTORS - ALLISON PLANT 10

Carcinogens
Intake(c) = (Cair * IRair * EF * ED) / (BW * ATc * 365 days/year)
Risk = Intake * CSFinh

Noncarcinogens
Intake(nc) = (Cair * IRair * EF * ED) / (BW * ATnc * 365 days/year)
Risk = Intake / RfDinh

Input Parameter		Units	Value
Intake(c)	daily intake (dose) of carcinogen	mg/kg/day	--
Intake(nc)	daily intake (dose) of noncarcinogen	mg/kg/day	--
IRair	inhalation rate	m^3/day	15
EF	exposure frequency	days/year	350
ED	exposure duration	years	30
BW	body weight	kg	70
ATc	averaging time (carcinogen)	years	70
ATnc	averaging time (noncarcinogen)	years	30
CSFinh	inhalation cancer slope factor	1/(mg/kg/day)	chemical specific
RfDinh	inhalation reference dose	mg/kg/day	chemical specific
HQ	hazard quotient	unitless	--
Risk	risk level	unitless	--

Chemical	Cair	RfDinh	CSFinh	Intake(nc)	HQ	Intake(c)	Risk
Trichloroethene	0.000631172	NA	0.006	1.30E-04	NA	0.0000555827	3.3E-07

Hazard Index 0.00E+00 Risk Level 3.3E-07

FLUOR DANIEL GTI

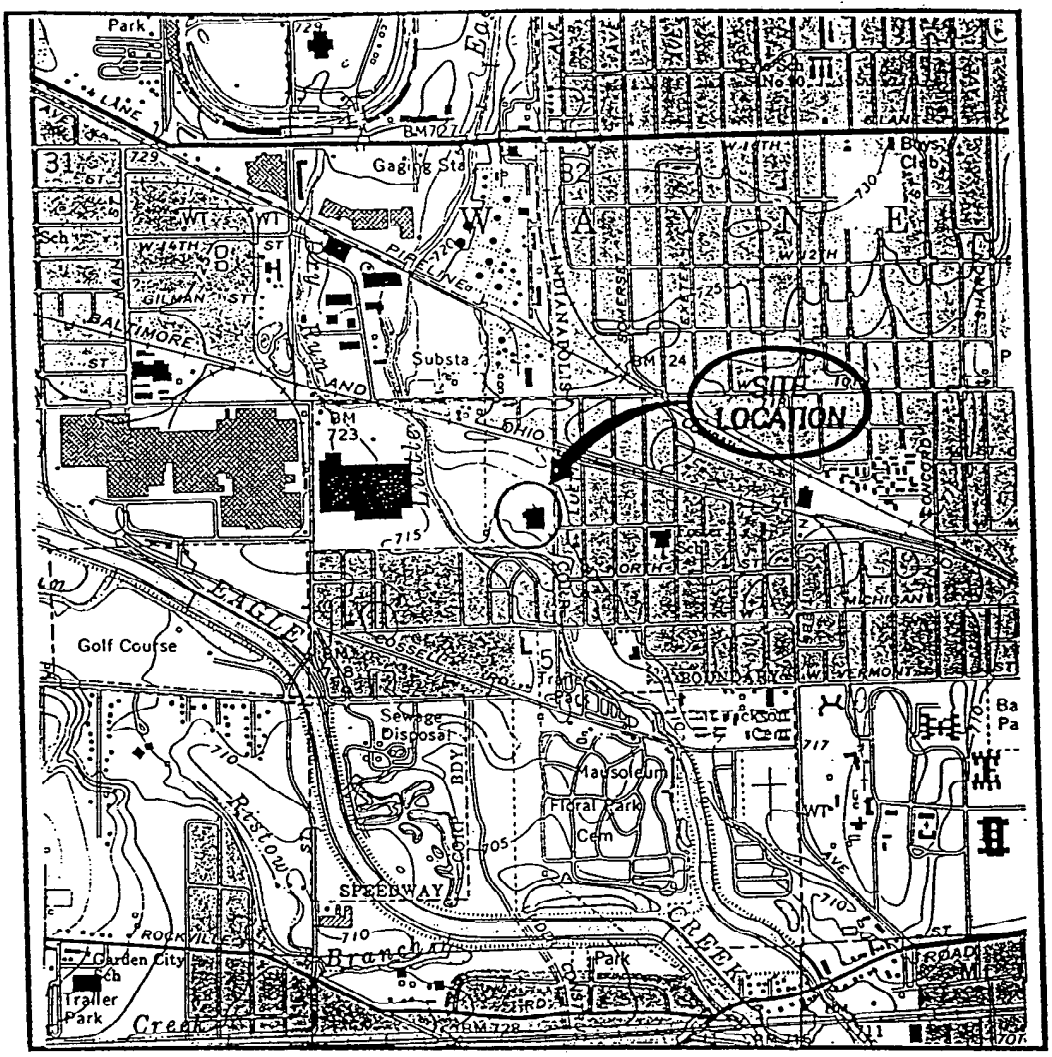
08/21/97 ks\Indiana\95824T20.WK4

TABLE 21
SUMMARY OF CARCINOGENIC AND NON-CARCINOGENIC HUMAN HEALTH RISKS FOR ALL EXPOSURE PATHWAYS AND RECEPTOR GROUPS ASSESSED
GENERAL MOTORS - ALLISON PLANT 10

		Ingestion Haz Index	Total Haz Index	Inhalation Canc Risk	Ingestion Canc Risk	Total Canc Risk
On-Site Worker	*Surface Soil*	0.00E+00	0.00E+00	3.62E-06	3.00E-08	3.65E-06
	Subsurface Soil	0.00E+00	0.00E+00	2.90E-07	4.79E-09	2.95E-07
On-Site Construction Worker	*Surface or Subsurface Soil*	0.00E+00	0.00E+00	1.16E-07	1.20E-09	1.17E-07
Adult Resident	*Groundwater-to-Indoor Air*	--	N/A	3.30E-07	N/A	3.30E-07

		Ingestion Haz Index	Dermal Haz Index	Total Haz Index
Adolescent Resident (12-18)	*Surface Water*	2.08E-04	5.53E-05	2.64E-04

FLUOR DANIEL GTI



SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE
INDIANAPOLIS WEST, INDIANA (1980)

SCALE 1:24,000

0 1/2 1 MILE

0 2,000 4,000

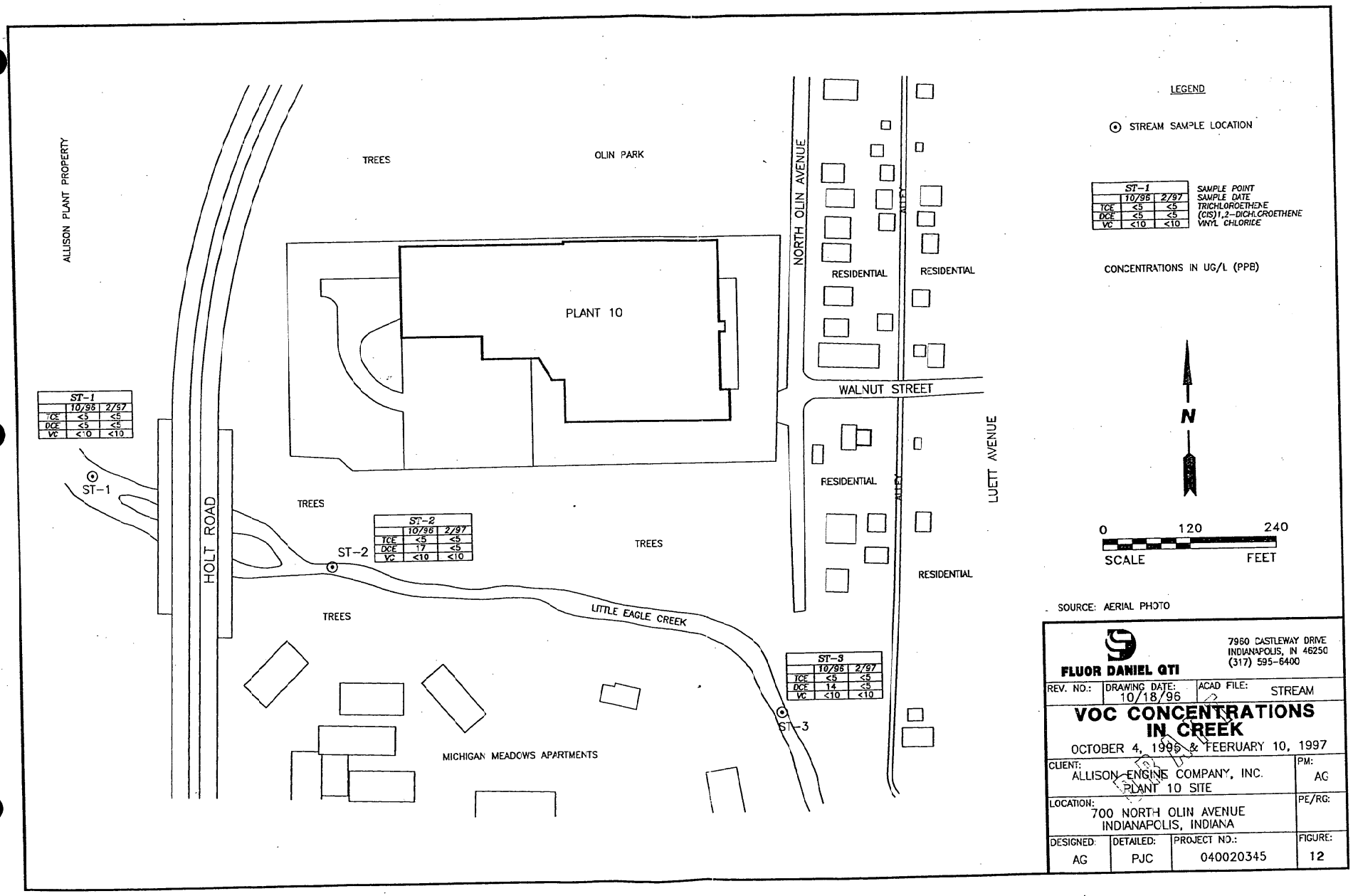
SCALE FEET

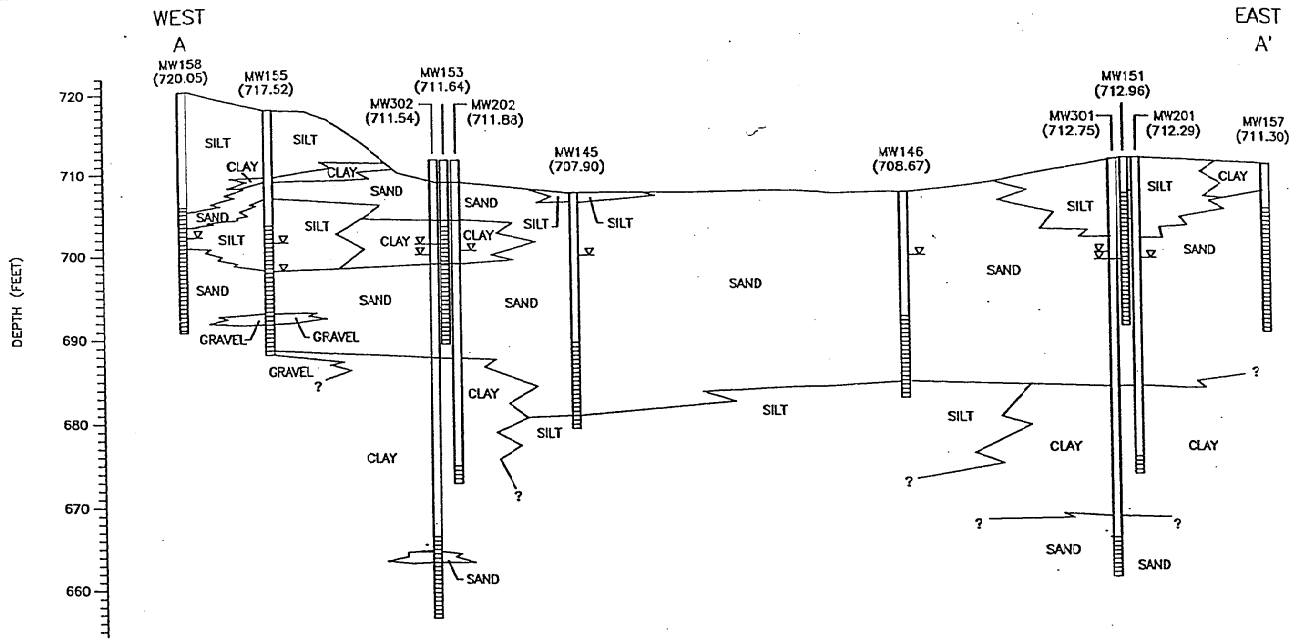
N

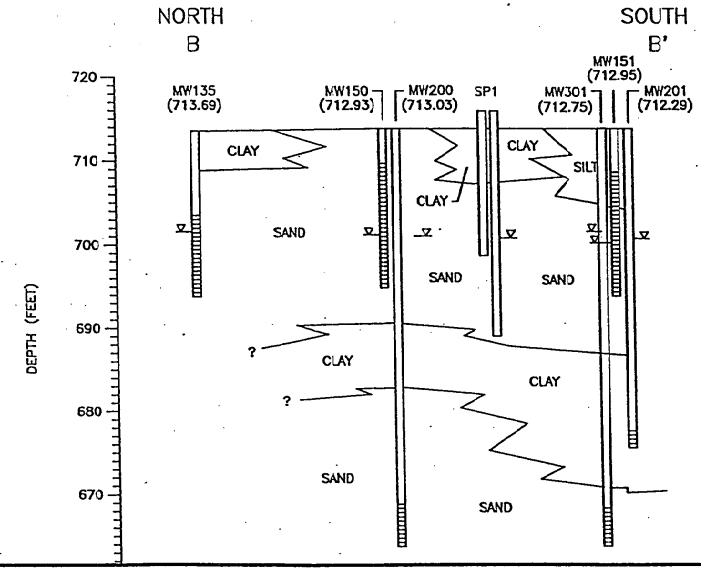
FLUOR DANIEL GTI

6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400

DESIGNED: KG	**SITE LOCATION MAP**	
DETAILED: KG	CLIENT: GENERAL MOTORS CORPORATION ALLISON ENGINE COMPANY PLANT #10	DRAWING DATE: 6/1/95
CHECKED:	LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA	FIGURE: 1


ALLISON PLANT PROPERTY
TREES
OLIN PARK
PLANT 10
NORTH OLIN AVENUE
RESIDENTIAL
RESIDENTIAL
ALLEY
WALNUT STREET
LUETT AVENUE
RESIDENTIAL
RESIDENTIAL
HOLT ROAD
TREES
TREES
TREES
LITTLE EAGLE CREEK
MICHIGAN MEADOWS APARTMENTS
ST-1
ST-2
ST-3
ST-1
10/96 2/97
TCE <5 <5
DCE <5 <5
VC <10 <10
ST-2
10/96 2/97
TCE <5 <5
DCE 17 <5
VC <10 <10
ST-3
10/96 2/97
TCE <5 <5
DCE 14 <5
VC <10 <10
LEGEND
STREAM SAMPLE LOCATION
ST-1
10/96 2/97
TCE <5 <5
DCE <5 <5
VC <10 <10
SAMPLE POINT
SAMPLE DATE
TRICHLOROETHENE
(CIS)1,2-DICHLOROETHENE
VINYL CHLORIDE
CONCENTRATIONS IN UG/L (PPB)
N
0 120 240
SCALE FEET
SOURCE: AERIAL PHOTO
FLUOR DANIEL GTI
7960 CASTLEWAY DRIVE
INDIANAPOLIS, IN 46250
(317) 595-6400
REV. NO.:
DRAWING DATE: 10/18/96
ACAD FILE: STREAM
VOC CONCENTRATIONS IN CREEK
OCTOBER 4, 1996 & FEBRUARY 10, 1997
CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE
PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA
PE/RG:
DESIGNED: AG
DETAILED: PJC
PROJECT NO.: 040020345
FIGURE: 12





LEGEND

WELL CASING

WELL SCREEN

STATIC WATER LEVEL (FEBRUARY 1997)

(720.05) SURVEYED ELEVATION TOP OF CASING

VERTICAL SCALE AS SHOWN

0 120 240

HORIZONTAL SCALE FEET

SOURCE: GEOLOGIST SKETCH

FLUOR DANIEL GTI

6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400

REV. DATE:	DRAWING DATE:	ACAD FILE:
3/5/97	11/14/95	0345XSEC

CROSS SECTIONS A-A' AND B-B'

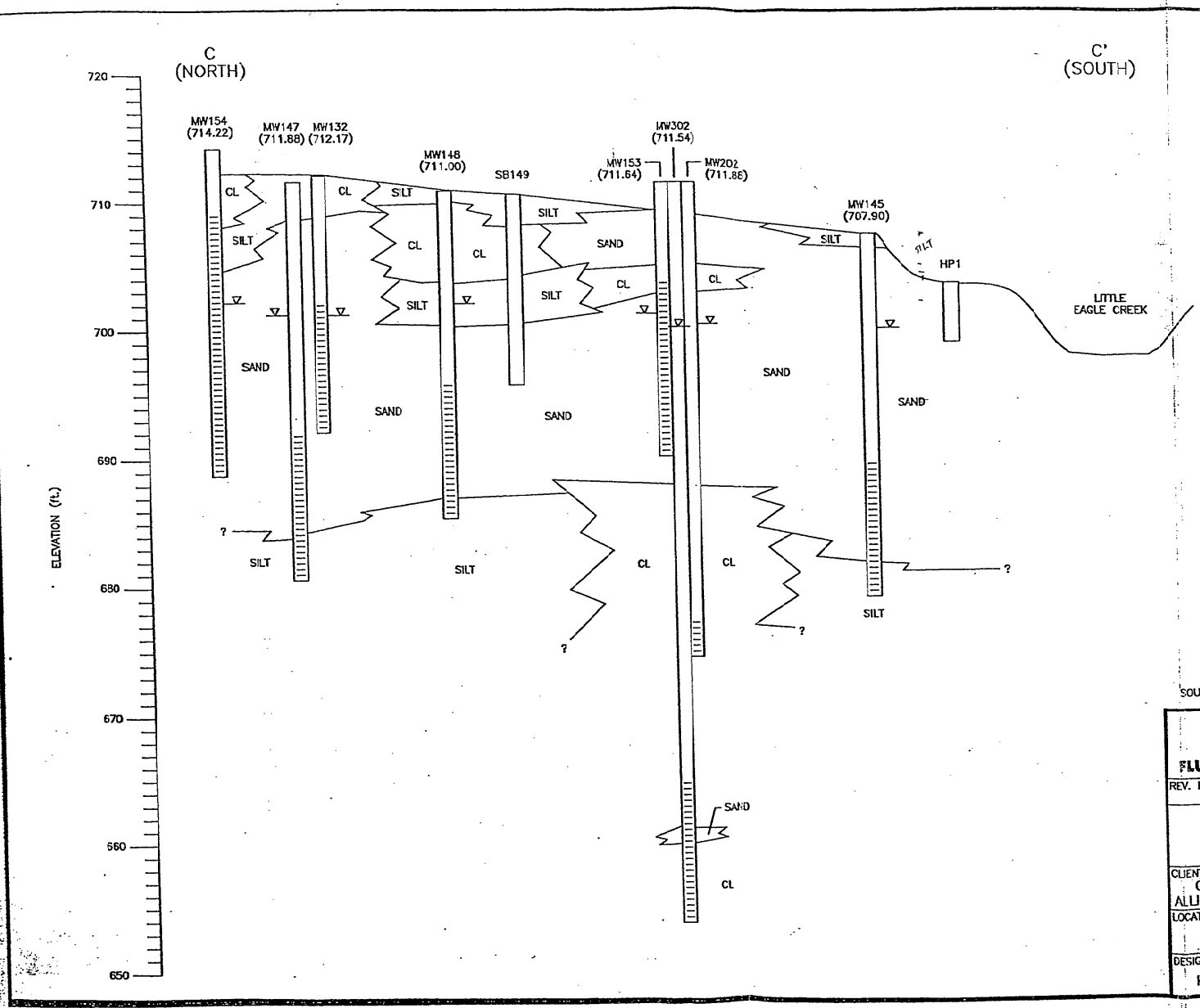
CLIENT: GENERAL MOTORS CORPORATION ALLISON ENGINE COMPANY PLANT #10

PM:

LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA

PE/RG:

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
KG	PJC	040020345	5A



LEGEND

WELL CASING

WELL SCREEN

STATIC WATER LEVEL (FEBRUARY 1997)

(714.22) SURVEYED ELEVATION TOP OF CASING

VERTICAL SCALE AS SHOWN

0 60 120

HORIZONTAL SCALE FEET

SOURCE: GEOLOGIST SKETCH

FLUOR DANIEL GTI

6330 EAST 75TH STREET
SUITE 174
INDIANAPOLIS, IN 46250
(317) 595-6400

REV. NO.:	DRAWING DATE: 3/4/97	ACAD FILE: 0262-XCC

CROSS SECTION C-C'

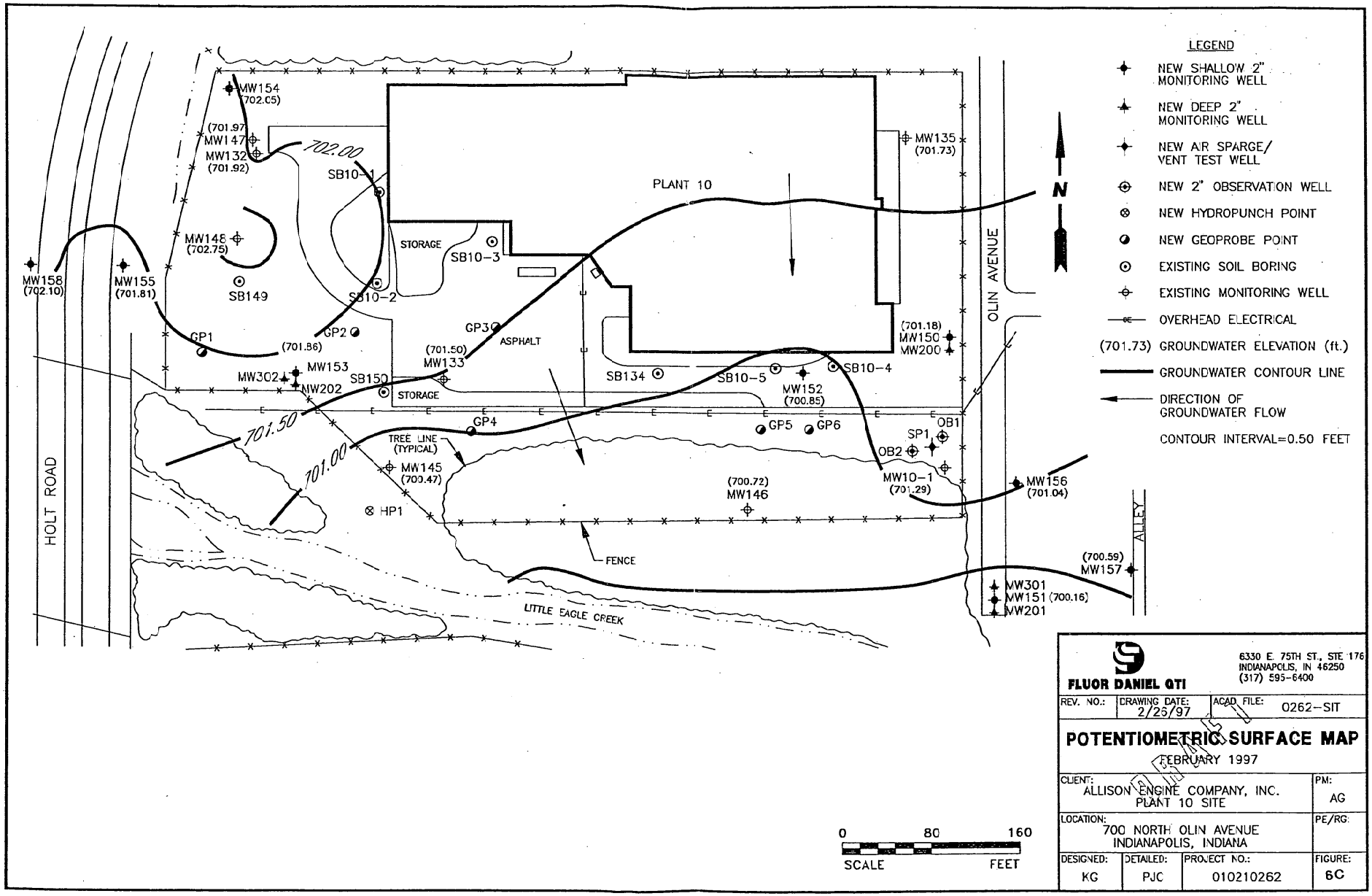
CLIENT: GENERAL MOTORS CORPORATION ALLISON ENGINE COMPANY PLANT #10

PM:

LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA

PE/RG:

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
KG	PJC	010210262	5B



FLUOR DANIEL GTI

6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400

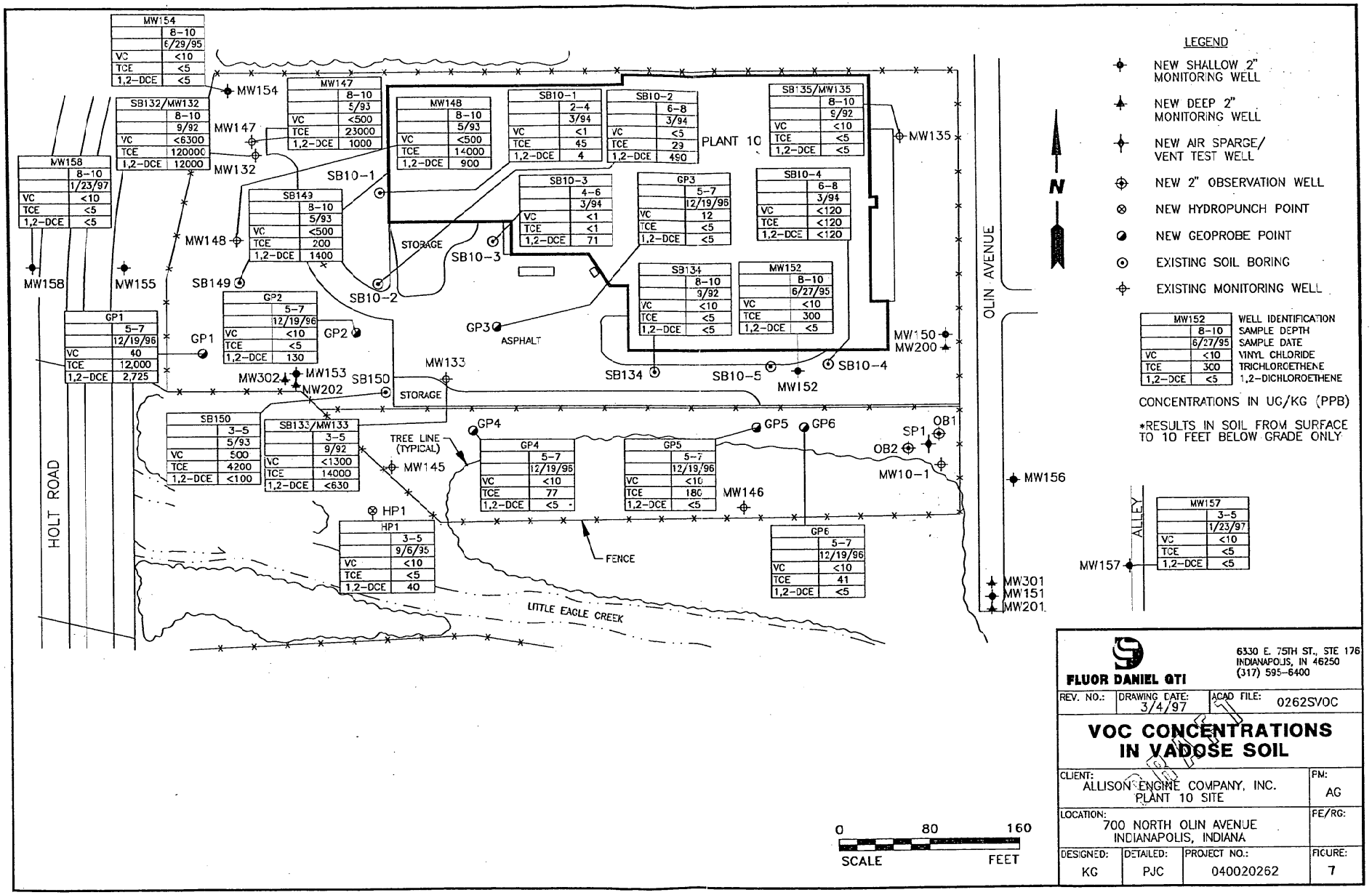
REV. NO.:	DRAWING DATE: 2/25/97	ACAD FILE: 0262-SIT

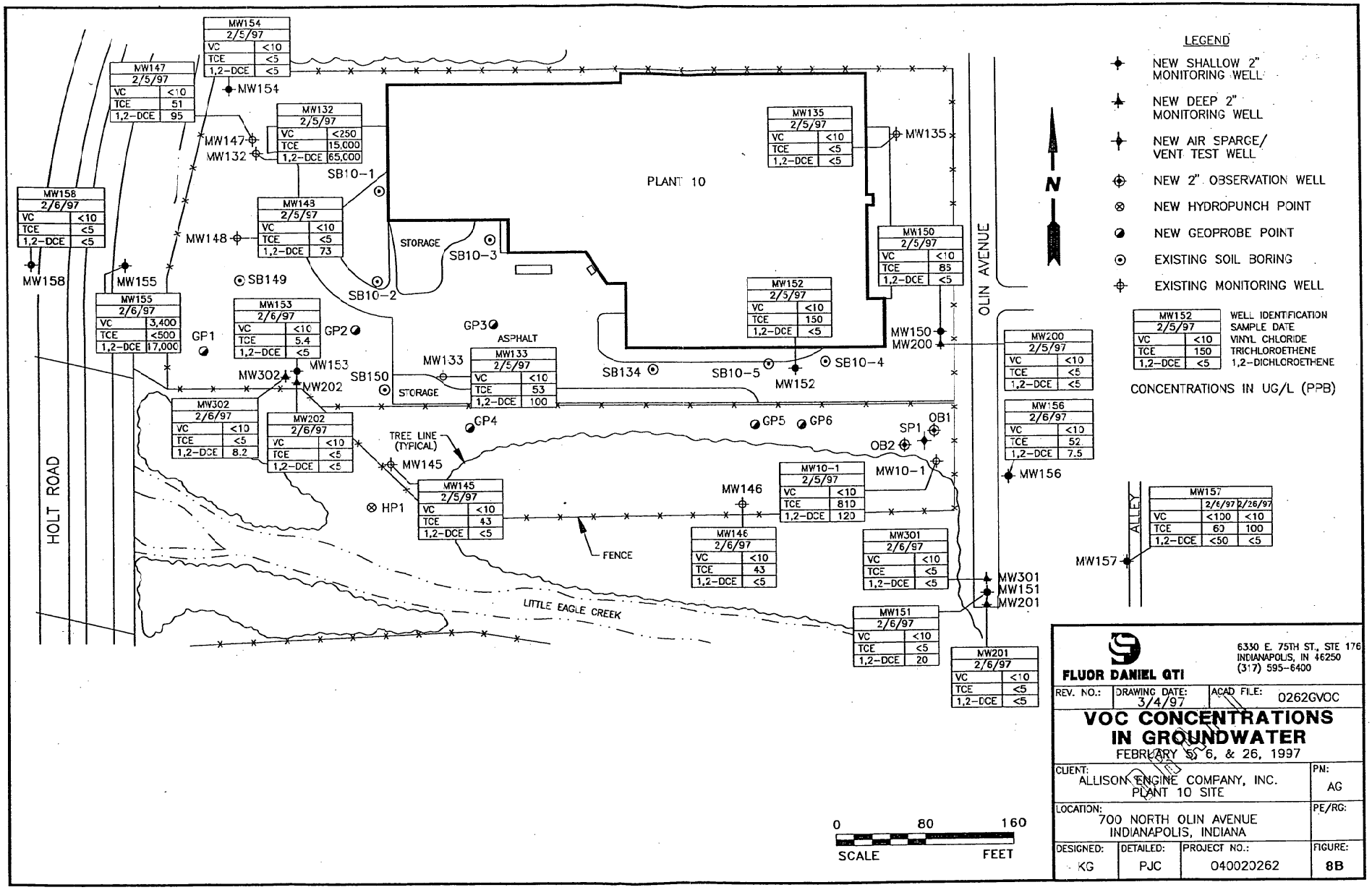
POTENTIOMETRIC SURFACE MAP

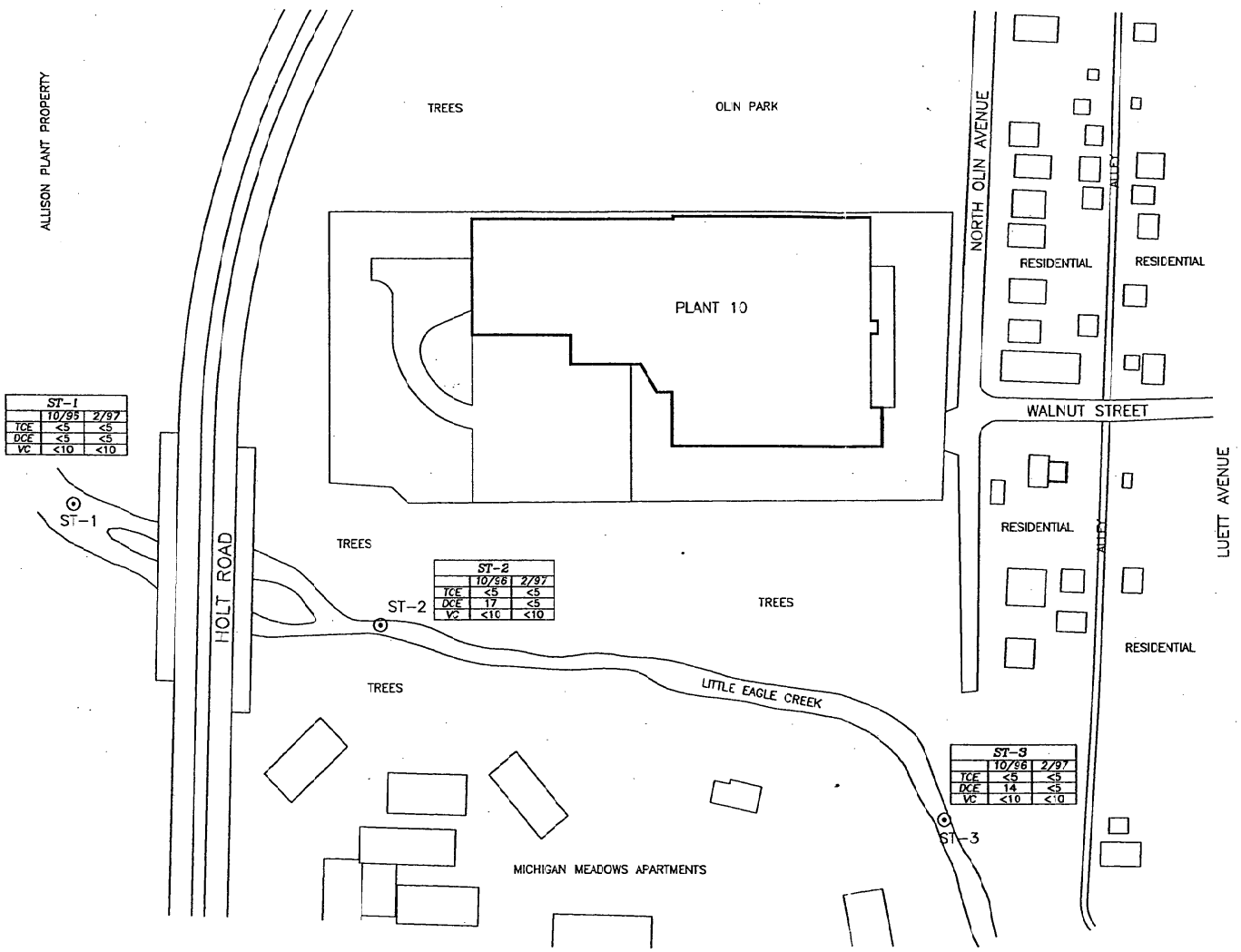
FEBRUARY 1997

CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE	PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA	PE/RG:

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
KG	PJC	010210262	6C


MW154
8-10
6/29/95
VC <10
TCE <5
1,2-DCE <5
MW154
MW147
8-10
5/93
VC <500
TCE 23000
1,2-DCE 1000
MW147
SB132/MW132
8-10
9/92
VC <6300
TCE 120000
1,2-DCE 12000
MW132
MW148
8-10
5/93
VC <500
TCE 14000
1,2-DCE 900
SB10-1
2-4
3/94
VC <1
TCE 45
1,2-DCE 4
SB10-2
6-8
3/94
VC <5
TCE 23
1,2-DCE 490
PLANT 10
SB135/MW135
8-10
9/92
VC <10
TCE <5
1,2-DCE <5
MW135
MW158
8-10
1/23/97
VC <10
TCE <5
1,2-DCE <5
MW158
MW155
SB149
8-10
5/93
VC <500
TCE 200
1,2-DCE 1400
MW148
STORAGE
SB10-3
4-6
3/94
VC <1
TCE <1
1,2-DCE 71
GP3
5-7
12/19/96
VC 12
TCE <5
1,2-DCE <5
SB10-4
6-8
3/94
VC <120
TCE <120
1,2-DCE <120
SB149
SB10-2
SB134
8-10
9/92
VC <10
TCE <5
1,2-DCE <5
MW152
8-10
6/27/95
VC <10
TCE 300
1,2-DCE <5
GP1
5-7
12/19/96
VC 40
TCE 12,000
1,2-DCE 2,725
GP1
GP2
5-7
12/19/96
VC <10
TCE <5
1,2-DCE 130
GP2
GP3
ASPHALT
MW150
MW200
OLIN AVENUE
N
MW302
MW153
MW202
SB150
MW133
STORAGE
SB134
SB10-5
MW152
SB10-4
SB150
3-5
5/93
VC 500
TCE 4200
1,2-DCE <100
SB133/MW133
3-5
9/92
VC <1300
TCE 14000
1,2-DCE <630
TREE LINE (TYPICAL)
MW145
GP4
GP4
5-7
12/19/96
VC <10
TCE 77
1,2-DCE <5
GP5
5-7
12/19/96
VC <10
TCE 180
1,2-DCE <5
GP5
GP6
OB1
SP1
OB2
MW10-1
MW156
MW146
HP1
HP1
3-5
9/6/95
VC <10
TCE <5
1,2-DCE 40
FENCE
GP6
5-7
12/19/96
VC <10
TCE 41
1,2-DCE <5
MW301
MW151
MW201
LITTLE EAGLE CREEK
HOLT ROAD
ALLEY
MW157
MW157
3-5
1/23/97
VC <10
TCE <5
1,2-DCE <5
LEGEND
NEW SHALLOW 2" MONITORING WELL
NEW DEEP 2" MONITORING WELL
NEW AIR SPARGE/ VENT TEST WELL
NEW 2" OBSERVATION WELL
NEW HYDROPUNCH POINT
NEW GEOPROBE POINT
EXISTING SOIL BORING
EXISTING MONITORING WELL
MW152 WELL IDENTIFICATION
8-10 SAMPLE DEPTH
6/27/95 SAMPLE DATE
VC <10 VINYL CHLORIDE
TCE 300 TRICHLOROETHENE
1,2-DCE <5 1,2-DICHLOROETHENE
CONCENTRATIONS IN UG/KG (PPB)
*RESULTS IN SOIL FROM SURFACE TO 10 FEET BELOW GRADE ONLY
0 80 160
SCALE FEET
FLUOR DANIEL GTI
6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400
REV. NO.:
DRAWING DATE: 3/4/97
ACAD FILE: 0262SVOC
VOC CONCENTRATIONS IN VADOSE SOIL
CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE
PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA
PE/RG:
DESIGNED: KG
DETAILED: PJC
PROJECT NO.: 040020262
FIGURE: 7


LEGEND
NEW SHALLOW 2" MONITORING WELL
NEW DEEP 2" MONITORING WELL
NEW AIR SPARGE/ VENT TEST WELL
NEW 2" OBSERVATION WELL
NEW HYDROPUNCH POINT
NEW GEOPROBE POINT
EXISTING SOIL BORING
EXISTING MONITORING WELL
MW152 2/5/97 VC <10 TCE 150 1,2-DCE <5
WELL IDENTIFICATION
SAMPLE DATE
VINYL CHLORIDE
TRICHLOROETHENE
1,2-DICHLOROETHENE
CONCENTRATIONS IN UG/L (PPB)
PLANT 10
OLIN AVENUE
HOLT ROAD
ALLEY
LITTLE EAGLE CREEK
STORAGE
ASPHALT
TREE LINE (TYPICAL)
FENCE
N
0 80 160
SCALE FEET
MW154 2/5/97 VC <10 TCE <5 1,2-DCE <5
MW147 2/5/97 VC <10 TCE 51 1,2-DCE 95
MW132 2/5/97 VC <250 TCE 15,000 1,2-DCE 65,000
MW135 2/5/97 VC <10 TCE <5 1,2-DCE <5
MW158 2/6/97 VC <10 TCE <5 1,2-DCE <5
MW143 2/5/97 VC <10 TCE <5 1,2-DCE 73
MW150 2/5/97 VC <10 TCE 85 1,2-DCE <5
MW155 2/6/97 VC 3,400 TCE <500 1,2-DCE 17,000
MW153 2/6/97 VC <10 TCE 5.4 1,2-DCE <5
MW152 2/5/97 VC <10 TCE 150 1,2-DCE <5
MW200 2/5/97 VC <10 TCE <5 1,2-DCE <5
MW133 2/5/97 VC <10 TCE 53 1,2-DCE 100
MW156 2/6/97 VC <10 TCE 52 1,2-DCE 7.5
MW302 2/6/97 VC <10 TCE <5 1,2-DCE 8.2
MW202 2/6/97 VC <10 TCE <5 1,2-DCE <5
MW145 2/5/97 VC <10 TCE 43 1,2-DCE <5
MW10-1 2/5/97 VC <10 TCE 810 1,2-DCE 120
MW146 2/6/97 VC <10 TCE 43 1,2-DCE <5
MW301 2/6/97 VC <10 TCE <5 1,2-DCE <5
MW151 2/6/97 VC <10 TCE <5 1,2-DCE 20
MW201 2/6/97 VC <10 TCE <5 1,2-DCE <5
MW157 2/6/97 2/26/97 VC <100 <10 TCE 60 100 1,2-DCE <50 <5
SB10-1
SB10-2
SB10-3
SB10-4
SB10-5
SB134
SB150
SB149
GP1
GP2
GP3
GP4
GP5
GP6
HP1
OB1
OB2
SP1
MW147
MW132
MW148
MW158
MW155
MW153
MW302
MW202
MW133
MW145
MW146
MW10-1
MW152
MW150
MW200
MW156
MW157
MW301
MW151
MW201
FLUOR DANIEL GTI
6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400
REV. NO.:
DRAWING DATE: 3/4/97
ACAD FILE: 0262GVOC
VOC CONCENTRATIONS IN GROUNDWATER
FEBRUARY 5, 6, & 26, 1997
CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE
PN: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA
PE/RG:
DESIGNED: KG
DETAILED: PJC
PROJECT NO.: 040020262
FIGURE: 8B



ST-1	10/96	2/97
TCE	<5	<5
DCE	<5	<5
VC	<10	<10

ST-2	10/96	2/97
TCE	<5	<5
DCE	17	<5
VC	<10	<10

ST-3	10/96	2/97
TCE	<5	<5
DCE	14	<5
VC	<10	<10

LEGEND

⊙ STREAM SAMPLE LOCATION

ST-1	10/96	2/97	
			SAMPLE POINT
			SAMPLE DATE
TCE	<5	<5	TRICHLOROETHENE
DCE	<5	<5	(CIS)1,2-DICHLOROETHENE
VC	<10	<10	VINYL CHLORIDE

CONCENTRATIONS IN UG/L (PPB)

N

0 120 240
SCALE FEET

SOURCE: AERIAL PHOTO

FLUOR DANIEL GTI
7960 CASTLEWAY DRIVE
INDIANAPOLIS, IN 46250
(317) 595-6400

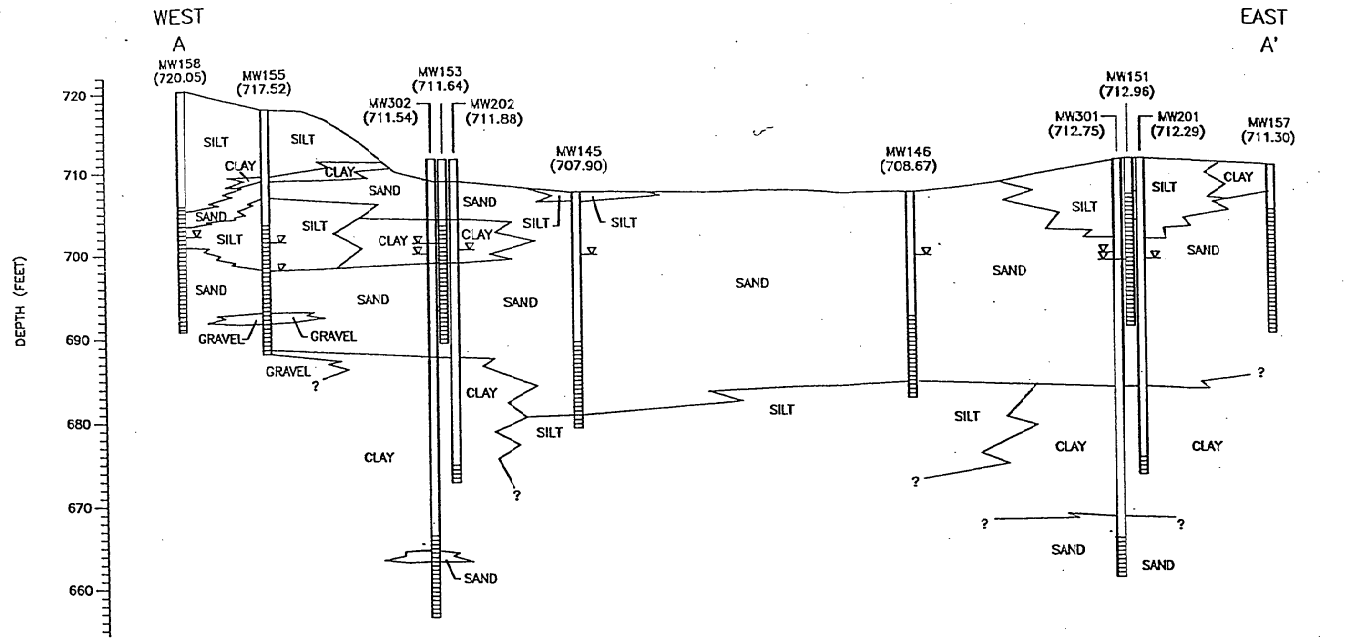
REV. NO.:	DRAWING DATE: 10/18/96	ACAD FILE: STREAM

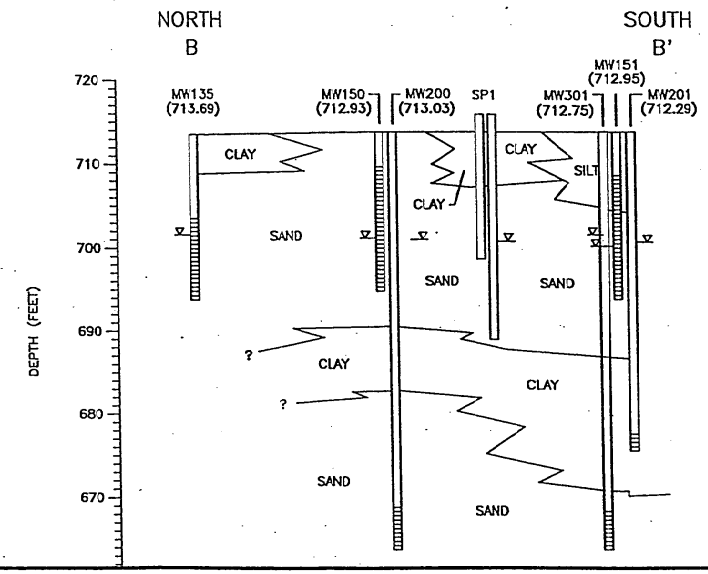
VOC CONCENTRATIONS IN CREEK

OCTOBER 4, 1996 & FEBRUARY 10, 1997

CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE	PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA	PE/RG:

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
AG	FJC	040020345	12





LEGEND

WELL CASING

WELL SCREEN

STATIC WATER LEVEL (FEBRUARY 1997)

(720.05) SURVEYED ELEVATION TOP OF CASING

VERTICAL SCALE AS SHOWN

0 120 240

HORIZONTAL SCALE FEET

SOURCE: GEOLOGIST SKETCH

FLUOR DANIEL GTI

6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400

REV. DATE:	DRAWING DATE:	ACAD FILE:
3/5/97	11/14/95	0345XSEC

CROSS SECTIONS A-A' AND B-B'

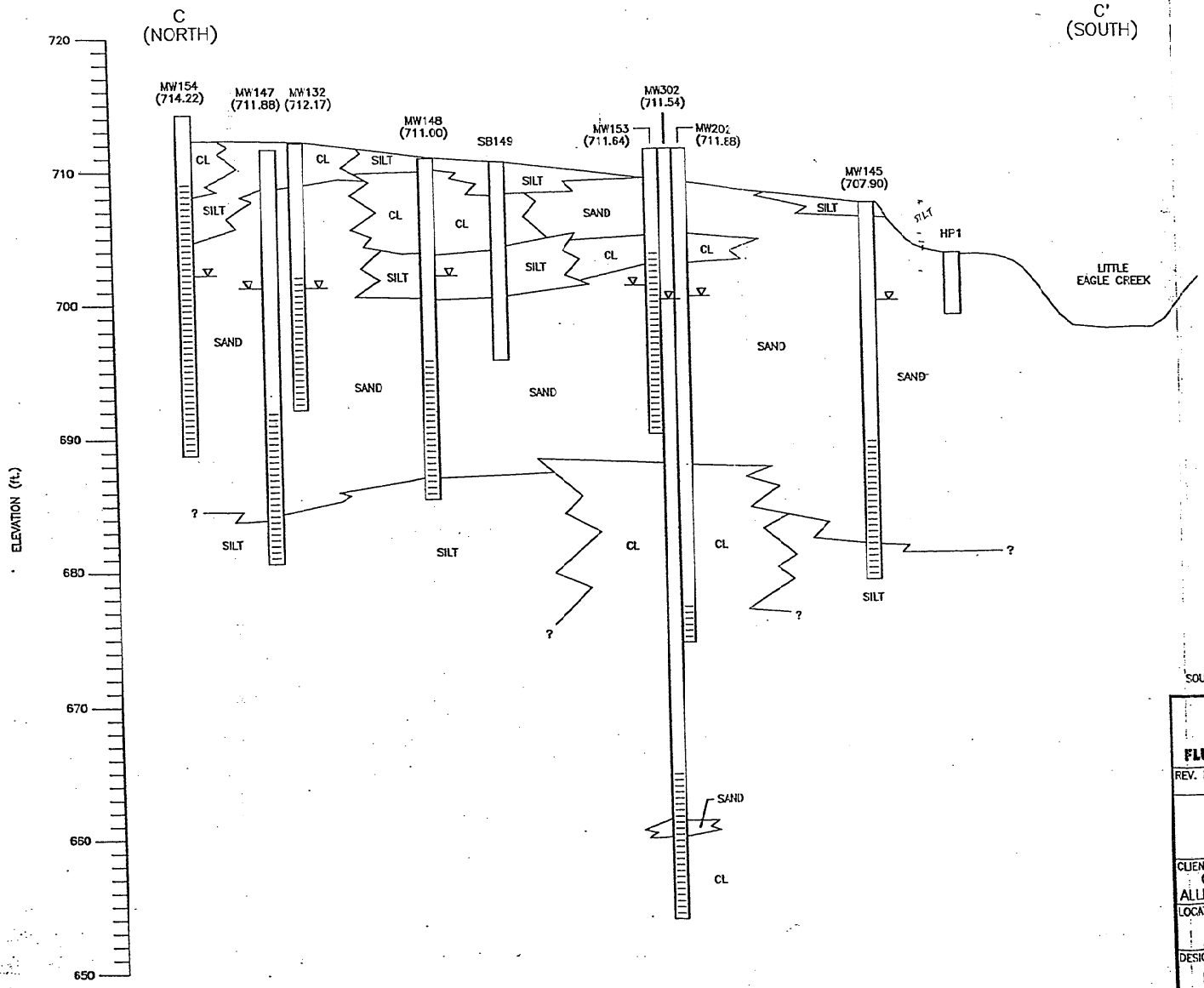
CLIENT: GENERAL MOTORS CORPORATION ALLISON ENGINE COMPANY PLANT #10

PM:

LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA

PE/RG:

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
KG	PJC	040020345	5A



LEGEND

WELL CASING

WELL SCREEN

STATIC WATER LEVEL (FEBRUARY 1997)

(714.22) SURVEYED ELEVATION TOP OF CASING

VERTICAL SCALE AS SHOWN

0 60 120

HORIZONTAL SCALE FEET

SOURCE: GEOLOGIST SKETCH

FLUOR DANIEL GTI

6330 EAST 75TH STREET
SUITE 174
INDIANAPOLIS, IN 46250
(317) 595-6400

REV. NO.:	DRAWING DATE: 3/4/97	ACAD FILE: 0262-XCC

CROSS SECTION C-C'

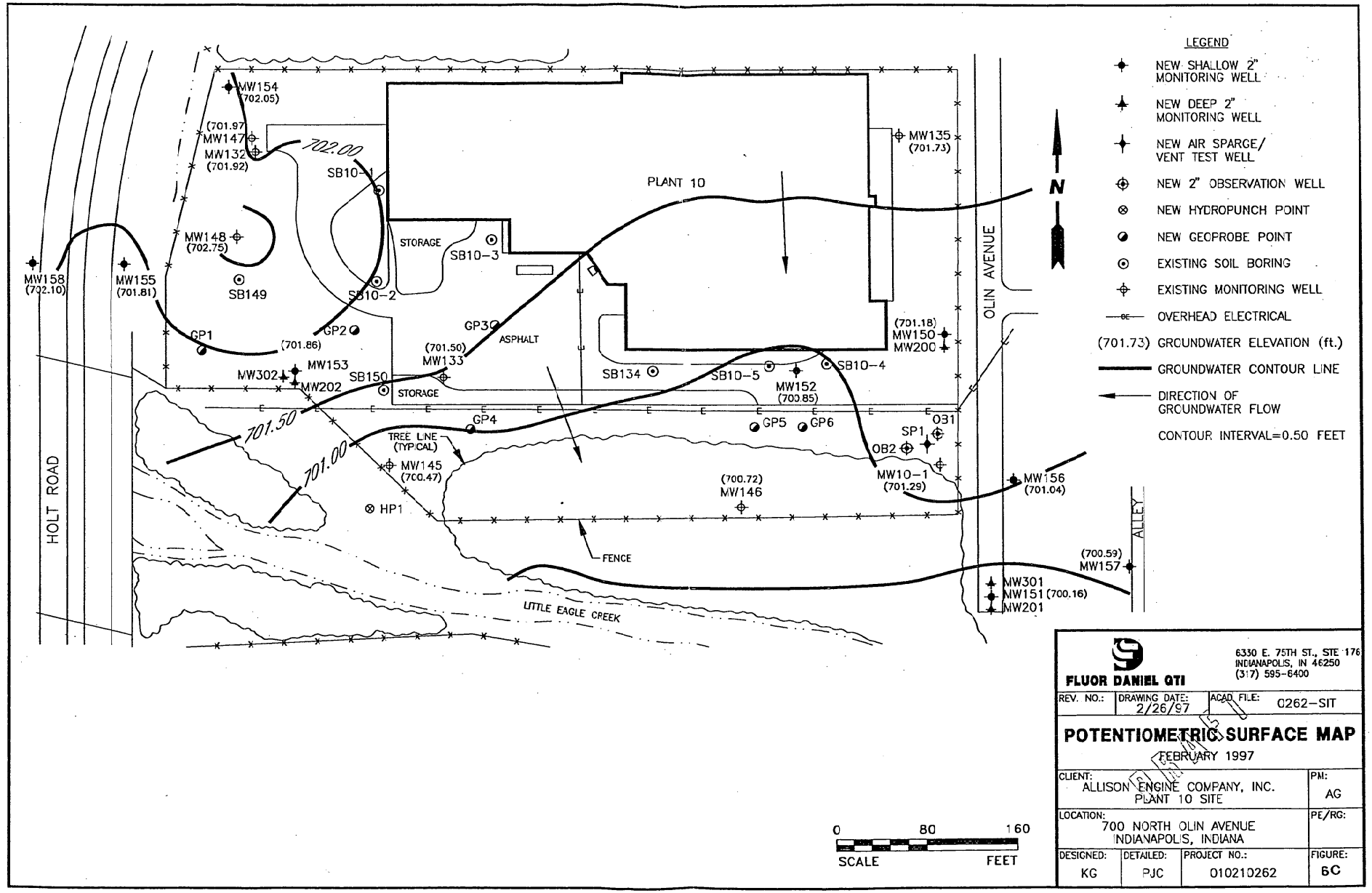
CLIENT: GENERAL MOTORS CORPORATION ALLISON ENGINE COMPANY PLANT #10

PM:

LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA

PE/RG:

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
KG	PJC	010210262	5B

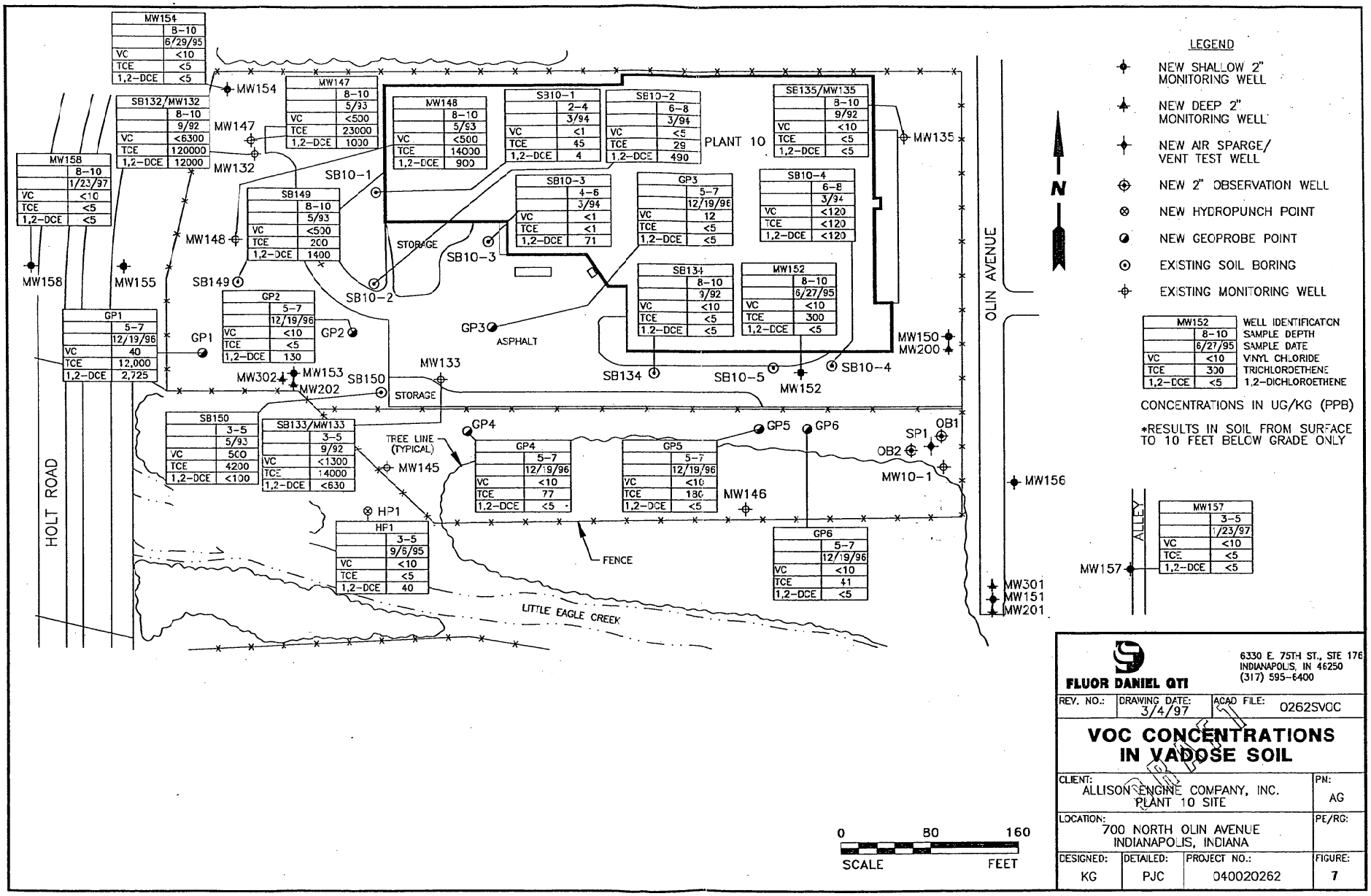


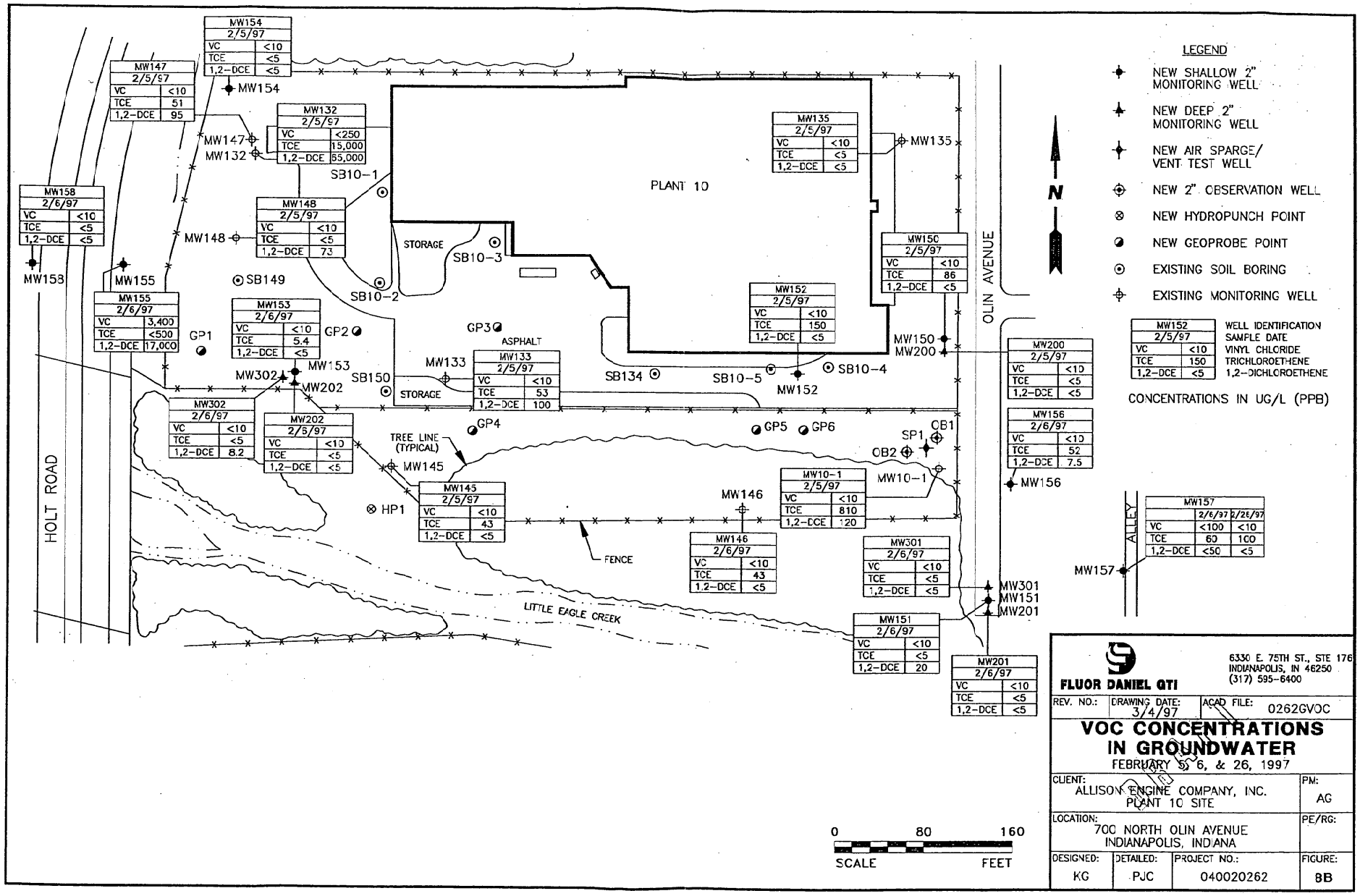
FLUOR DANIEL GTI
6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400

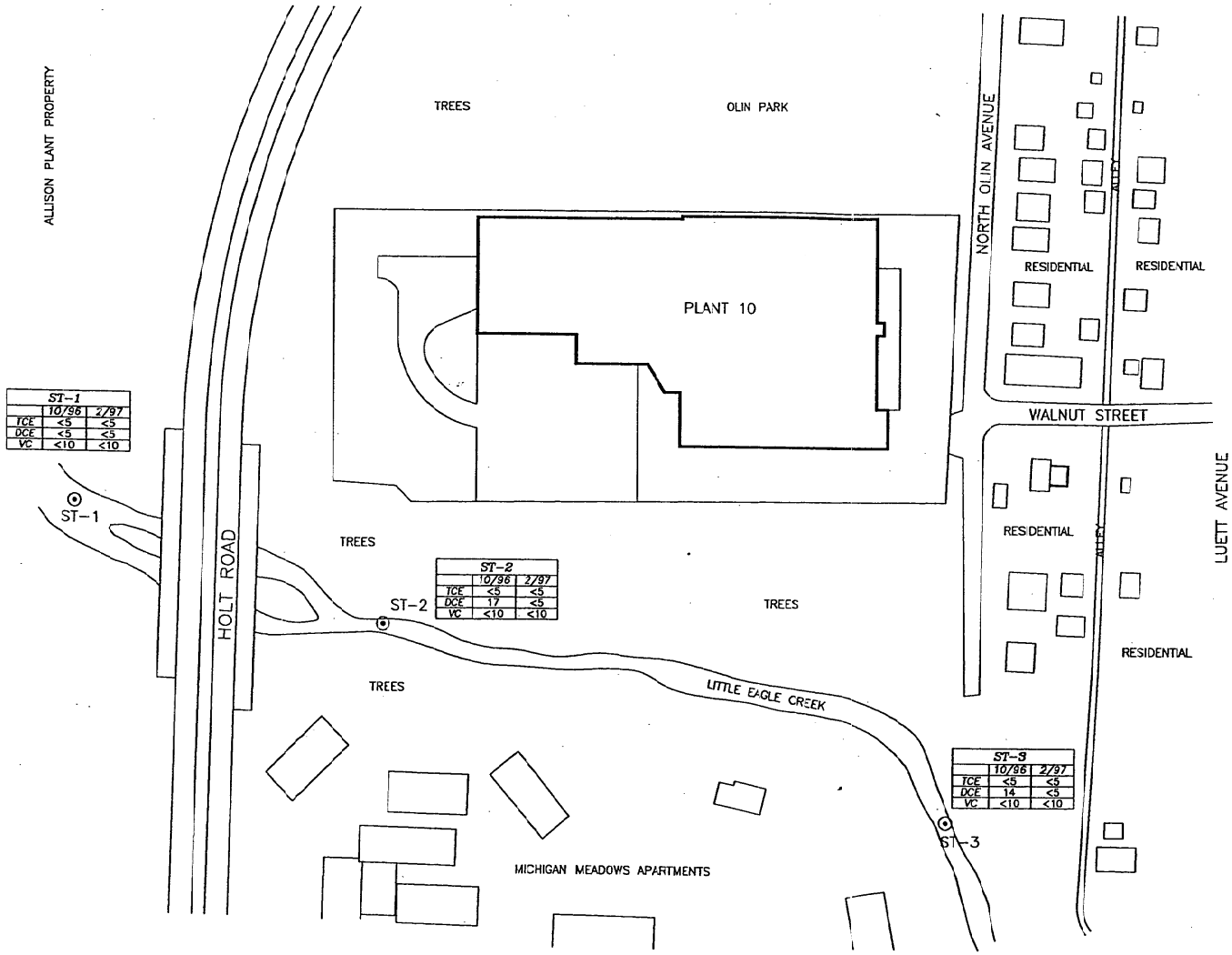
REV. NO.:	DRAWING DATE: 2/26/97	ACAD FILE: 0262-SIT

POTENTIOMETRIC SURFACE MAP
FEBRUARY 1997

CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE			PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA			PE/RG:
DESIGNED: KG	DETAILED: PJC	PROJECT NO.: 010210262	FIGURE: 6C


MW154
8-10
6/29/95
VC <10
TCE <5
1,2-DCE <5
MW154
SB132/MW132
8-10
9/92
VC <6300
TCE 120000
1,2-DCE 12000
MW147
MW147
8-10
5/93
VC <500
TCE 23000
1,2-DCE 1000
MW132
MW158
8-10
1/23/97
VC <10
TCE <5
1,2-DCE <5
MW158
MW155
MW148
MW148
8-10
5/93
VC <500
TCE 14000
1,2-DCE 900
SB149
8-10
5/93
VC <500
TCE 200
1,2-DCE 1400
SB149
SB10-1
SB310-1
2-4
3/94
VC <1
TCE 45
1,2-DCE 4
SB10-2
6-8
3/94
VC <5
TCE 29
1,2-DCE 490
PLANT 10
SB135/MW135
8-10
9/92
VC <10
TCE <5
1,2-DCE <5
MW135
SB10-3
4-6
3/94
VC <1
TCE <1
1,2-DCE 71
GP3
5-7
12/19/96
VC 12
TCE <5
1,2-DCE <5
SB10-4
6-8
3/94
VC <120
TCE <120
1,2-DCE <120
STORAGE
SB10-3
SB10-2
SB134
8-10
9/92
VC <10
TCE <5
1,2-DCE <5
MW152
8-10
6/27/95
VC <10
TCE 300
1,2-DCE <5
GP1
5-7
12/19/96
VC 40
TCE 12,000
1,2-DCE 2,725
GP1
GP2
5-7
12/19/96
VC <10
TCE <5
1,2-DCE 130
GP2
GP3
ASPHALT
MW150
MW200
MW302
MW153
MW202
SB150
MW133
SB134
SB10-5
MW152
SB10-4
STORAGE
SB150
3-5
5/93
VC 500
TCE 4200
1,2-DCE <100
SB133/MW133
3-5
9/92
VC <1300
TCE 14000
1,2-DCE <630
TREE LINE (TYPICAL)
MW145
GP4
GP4
5-7
12/19/96
VC <10
TCE 77
1,2-DCE <5
GP5
5-7
12/19/96
VC <10
TCE 180
1,2-DCE <5
GP5
GP6
SP1
OB1
OB2
MW10-1
MW146
HP1
HP1
3-5
9/6/95
VC <10
TCE <5
1,2-DCE 40
FENCE
GP6
5-7
12/19/96
VC <10
TCE 41
1,2-DCE <5
LITTLE EAGLE CREEK
HOLT ROAD
OLIN AVENUE
MW156
MW301
MW151
MW201
ALLEY
MW157
MW157
3-5
1/23/97
VC <10
TCE <5
1,2-DCE <5
N
LEGEND
NEW SHALLOW 2" MONITORING WELL
NEW DEEP 2" MONITORING WELL
NEW AIR SPARGE/ VENT TEST WELL
NEW 2" OBSERVATION WELL
NEW HYDROPUNCH POINT
NEW GEOPROBE POINT
EXISTING SOIL BORING
EXISTING MONITORING WELL
MW152 WELL IDENTIFICATON
8-10 SAMPLE DEPTH
6/27/95 SAMPLE DATE
VC <10 VINYL CHLORIDE
TCE 300 TRICHLOROETHENE
1,2-DCE <5 1,2-DICHLOROETHENE
CONCENTRATIONS IN UG/KG (PPB)
*RESULTS IN SOIL FROM SURFACE TO 10 FEET BELOW GRADE ONLY
0 80 160
SCALE FEET
FLUOR DANIEL GTI
6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400
REV. NO.:
DRAWING DATE: 3/4/97
ACAD FILE: 0262SVOC
VOC CONCENTRATIONS IN VADOSE SOIL
CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE
PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA
PE/RG:
DESIGNED: KG
DETAILED: PJC
PROJECT NO.: 040020262
FIGURE: 7


LEGEND
NEW SHALLOW 2" MONITORING WELL
NEW DEEP 2" MONITORING WELL
NEW AIR SPARGE/ VENT TEST WELL
NEW 2" OBSERVATION WELL
NEW HYDROPUNCH POINT
NEW GEOPROBE POINT
EXISTING SOIL BORING
EXISTING MONITORING WELL
MW152 | 2/5/97 | VC <10 | TCE 150 | 1,2-DCE <5
WELL IDENTIFICATION
SAMPLE DATE
VINYL CHLORIDE
TRICHLOROETHENE
1,2-DICHLOROETHENE
CONCENTRATIONS IN UG/L (PPB)
PLANT 10
STORAGE
ASPHALT
OLIN AVENUE
HOLT ROAD
ALLEY
LITTLE EAGLE CREEK
TREE LINE (TYPICAL)
FENCE
N
0 80 160
SCALE FEET
MW154 | 2/5/97 | VC <10 | TCE <5 | 1,2-DCE <5
MW147 | 2/5/97 | VC <10 | TCE 51 | 1,2-DCE 95
MW132 | 2/5/97 | VC <250 | TCE 15,000 | 1,2-DCE 55,000
MW135 | 2/5/97 | VC <10 | TCE <5 | 1,2-DCE <5
MW158 | 2/6/97 | VC <10 | TCE <5 | 1,2-DCE <5
MW148 | 2/5/97 | VC <10 | TCE <5 | 1,2-DCE 73
MW150 | 2/5/97 | VC <10 | TCE 86 | 1,2-DCE <5
MW155 | 2/6/97 | VC 3,400 | TCE <500 | 1,2-DCE 17,000
MW153 | 2/6/97 | VC <10 | TCE 5.4 | 1,2-DCE <5
MW133 | 2/5/97 | VC <10 | TCE 53 | 1,2-DCE 100
MW200 | 2/5/97 | VC <10 | TCE <5 | 1,2-DCE <5
MW156 | 2/6/97 | VC <10 | TCE 52 | 1,2-DCE 7.5
MW302 | 2/6/97 | VC <10 | TCE <5 | 1,2-DCE 8.2
MW202 | 2/5/97 | VC <10 | TCE <5 | 1,2-DCE <5
MW145 | 2/5/97 | VC <10 | TCE 43 | 1,2-DCE <5
MW10-1 | 2/5/97 | VC <10 | TCE 810 | 1,2-DCE 120
MW157 | 2/6/97 | 2/26/97 | VC <100 | <10 | TCE 60 | 100 | 1,2-DCE <50 | <5
MW146 | 2/6/97 | VC <10 | TCE 43 | 1,2-DCE <5
MW301 | 2/6/97 | VC <10 | TCE <5 | 1,2-DCE <5
MW151 | 2/6/97 | VC <10 | TCE <5 | 1,2-DCE 20
MW201 | 2/6/97 | VC <10 | TCE <5 | 1,2-DCE <5
SB149
SB10-1
SB10-2
SB10-3
SB150
SB134
SB10-5
SB10-4
GP1
GP2
GP3
GP4
GP5
GP6
HP1
SP1
OB1
OB2
FLUOR DANIEL GTI
6330 E. 75TH ST., STE 176
INDIANAPOLIS, IN 46250
(317) 595-6400
REV. NO.:
DRAWING DATE: 3/4/97
ACAD FILE: 0262GVOC
VOC CONCENTRATIONS IN GROUNDWATER
FEBRUARY 5, 6, & 26, 1997
CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE
PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA
PE/RG:
DESIGNED: KG
DETAILED: PJC
PROJECT NO.: 040020262
FIGURE: 8B



LEGEND

⊙ STREAM SAMPLE LOCATION

ST-1	10/96	2/97	
			SAMPLE POINT
			SAMPLE DATE
TCE	<5	<5	TRICHLOROETHENE
DCE	<5	<5	(CIS)1,2-DICHLOROETHENE
VC	<10	<10	VINYL CHLORIDE

CONCENTRATIONS IN UG/L (PPB)

N

0 120 240
SCALE FEET

SOURCE: AERIAL PHOTO

FLUOR DANIEL GTI
7960 CASTLEWAY DRIVE
INDIANAPOLIS, IN 46250
(317) 595-6400

REV. NO.:	DRAWING DATE: 10/18/96	ACAD FILE: STREAM

VOC CONCENTRATIONS IN CREEK

OCTOBER 4, 1996 & FEBRUARY 10, 1997

CLIENT: ALLISON ENGINE COMPANY, INC. PLANT 10 SITE	PM: AG
LOCATION: 700 NORTH OLIN AVENUE INDIANAPOLIS, INDIANA	PE/RG:

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
AG	PJC	040020345	12

DNR Indiana Department of Natural Resources

Frank O'Bannon, Governor
Larry D. Macklin, Director

Diversity and Habitat Protection Unit
Division of Fish and Wildlife
402 W. Washington Street, Rm. W-273
Indianapolis, IN 46204-2781

2 October 2001

Ms. Christina S. Haviland
Senior Project Manager
KERMAMIDA Environmental, Inc.
330 North College Avenue
Indianapolis, IN 46202

RE: DNR #9221 - Proposed endangered species assessment: 700 N. Olin Avenue; Marion County, KERMIDA Project No. 2829E

Dear Ms. Haviland:

The Indiana Department of Natural Resources has reviewed the above referenced proposal per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

This proposal may require the formal approval of our agency pursuant to the Flood Control Act (IC 14-28-1). Please submit more detailed plans to the Division of Water for review and comment.

The Natural Heritage Program's data have been checked. To date, no plant or animal species listed as state or federally threatened, endangered, or rare have been reported to occur in the project vicinity.

Our agency appreciates the opportunity to be of service in this matter. Please do not hesitate to contact me at (317) 232-4080 if we can be of further assistance.

Sincerely,

Stephen H. Jose
Environmental Coordinator

SHJ:lma

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

BLOOMINGTON FIELD OFFICE (ES)
620 South Walker Street
Bloomington, IN 47403-2121
(812) 334-4261 FAX (812) 334-4273

November 7, 2001

Ms. Christina Haviland
Keramida Environmental, Inc.
330 North College Avenue
Indianapolis, Indiana 46202

Dear Ms. Haviland:

This is in response to your letter dated September 21, 2001, requesting information regarding the potential occurrence of critical habitat and/or Federally endangered and threatened species for the Genuine Parts facility at 700 Olin Avenue in Indianapolis, Marion County, Indiana. The site is located in Township 15 North, Range 3 East, Section 5 of the Indianapolis West Quadrangle.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

Any Covenant Not To Sue (CNTS) for natural resource damages granted by the State of Indiana under its Voluntary Remediation Program (VRP) would not represent nor perhaps encompass the position of the federal natural resource trustees under Section 122(j) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended. This letter does not represent formal review of this remediation project by the Department of the Interior (DOI) and therefore, this in no way should be construed to represent a position as to whether or not a CNTS for natural resource damages to federal trust resources would be appropriate.

THREATENED AND ENDANGERED SPECIES

The area described in your letter is within the range of the Federally endangered Indiana bat (*Myotis sodalis*) and the Federally threatened bald eagle (*Haliaeetus leucocephalus*).

The Indiana bat uses woodlands during the summer when maternity colonies utilize trees with loose bark for nesting. These bats forage primarily over wooded stream corridors, although they have been collected in grazed woodlots, mature deciduous forests, and pastures with trees. A survey done in 1993 by our office found Indiana bats in the northeast section of Marion County. In addition, the Indiana bat is known to occur in adjacent Hendricks County.

There are fairly recent wintering records for the bald eagle in Marion County. A large portion of the West Fork of the White River in Morgan County is considered a primary wintering area for eagles in Indiana. Eagles nest in close proximity to lakes, rivers, or reservoirs. They construct their nests near habitat ecotones, such as lakeshores, rivers, and timber management areas (clearcuts or selective cuts). Tolerance of human activity during the nesting season has been variable, but, ideally, human disturbance of eagles should be avoided. The bald eagle's food base from the watershed includes carrion, waterfowl, and especially fish.

OTHER SPECIES OF CONCERN

In addition to the above mentioned species, the Kirtland's snake (*Clonophis kirtlandii*) is also potentially found within or near the area of interest. The snake is not afforded legal protection under the authorities of the Endangered Species Act (as amended); however, the FWS encourages consideration of the species in project planning because there is general concern among resource agencies for its status.

Contamination from this site may migrate to nearby wetlands, Little Eagle Creek, or other areas of ecological significance. Pathways of migration may include leachate/ground water, surface water, and sediment. Under conditions that allow certain contaminants to accumulate in waterways, aquatic organisms can bioaccumulate these elements; consequently, elevated or toxic concentrations may be reached. We recommend that sampling and monitoring efforts address the potential for off-site migration of any possible contaminants.

The National Wetland Inventory (NWI) map indicates that there may be riverine wetlands near the area of interest. Water and other habitat resources of wetlands are attractive to numerous wildlife species, including bats, snakes, and birds. In particular, migratory birds such as wood ducks (*Aix sponsa*), mallards (*Anas platyrhynchos*), and tree swallows (*Tachycineta bicolor*) will utilize open-water wetlands and are subject to potential impacts from contaminants. We recommend that project plans be designed to avoid impacts to the wetland habitat, particularly regarding contamination.

The information provided does not include concerns for other wildlife resources. Therefore, the we recommend that you also contact the Indiana Department of Natural Resources, Division of Nature Preserves, and Division of Fish and Wildlife concerning possible State-listed species and other resource concerns. Their addresses are:

Indiana Department of Natural Resources
Division of Nature Preserves
402 West Washington, Rm W267
Indianapolis, Indiana 46204

Indiana Department of Natural Resources
Division of Fish & Wildlife
402 West Washington, Rm W273
Indianapolis, Indiana 46204

In the event that federally listed species are found within the project area or determined to be adversely affected by project plans, further coordination may be required under provisions of the Endangered Species Act of 1973, as amended.

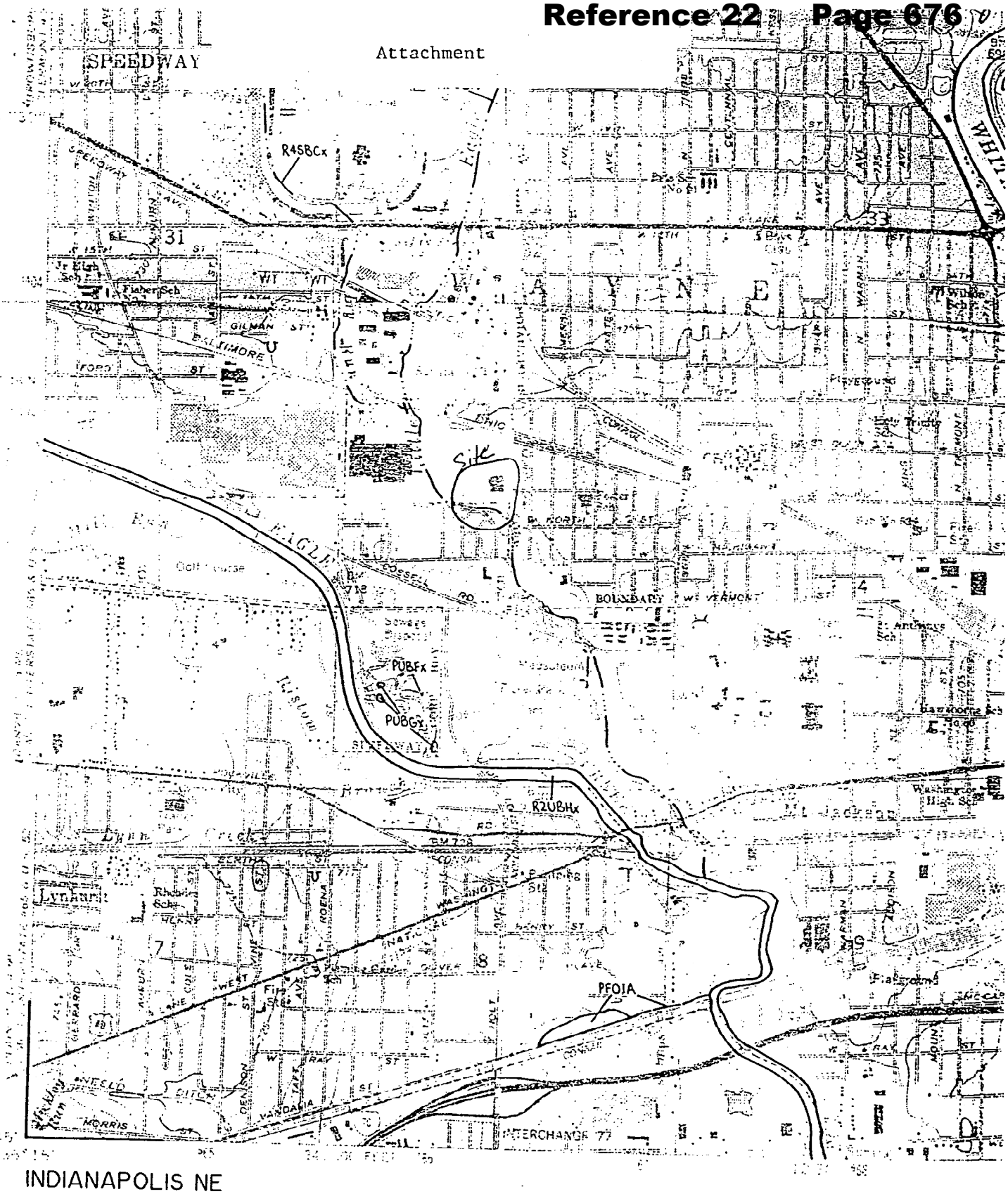
We appreciate the opportunity to comment at this early stage of project planning. If we can be of further assistance please contact Robin McWilliams-Munson of my staff at (812) 334-4261 ext. 207.

Sincerely yours,

Scott Pruitt,
Field Supervisor

cc: Katie Smith, Division of Fish and Wildlife, IDNR, Indianapolis, IN
Jim Smith, IDEM, Indianapolis, IN
Wayne Faatz, IDNR, Indianapolis, IN
IDEM, Office of Land Quality, VRP, Indianapolis, IN

Attachment



INDIANAPOLIS NE
INDIANAPOLIS

SCALE 1 24 000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

SPECIAL NOTE

This document was prepared primarily by
analysis of high altitude aerial photographs. W
identified on the photographs based on veget
hydrology, and geography in accordance wit
tion of Wetlands and Deepwater Habitats c
States (FWS/OBS - 79/31 December 1979
photographs typically reflect conditions durin
year and season when they were taken. In ac

STANDARD OPERATING PROCEDURES
FOR
PUSH-PROBE SOIL SAMPLING

REVISED: November 13, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

MATERIALS

Latex or nitrile gloves
Plastic sheeting
Plastic bags
Photoionization detector

1. Place clean piece of plastic sheeting over work area.

2. Place clean latex vinyl examination gloves on hands.

3. Obtain the soil sample in the dedicated, disposable, plastic liner from the push-probe operator.

4. Classify the soil samples for lithology, moisture content, odor, staining, color (Munsel Chart) and any other significant characteristic once the sampler is opened. Classify the soils using the U.S. Department of Agriculture system.

5. Samples will be collected from each two-foot interval unless specified in the site-specific SAP or QAPP.

6. Once the sample is classified, split the sample longitudinally into two equal portions: place one portion of the sample into a new, clean, sealed, and labeled plastic bag for field screening; place the other portion of the sample into a new, clean, sealed, and labeled sample container obtained from the laboratory.

7. Immediately place the laboratory container sample on ice in a cooler. Allow the field screening sample to sit for 10 to 15 minutes to allow organic vapors to equilibrate in the air space of the bag. All field screening samples must be treated identically to ensure accurate comparisons. For example, if one field screening sample is placed in the sun to warm then all are placed in the sun.

8. Field screen the volatilized sample using an appropriate, calibrated organic vapor detector. Push the tip of the detector into the plastic bag and record the highest reading.

9. At the completion of the field screening process, determine which, if any, of the sample intervals will be sent to the laboratory for analysis. All samples that are not sent to the laboratory will be disposed of in accordance with the site-specific SAP or QAPP.

10. Complete the chain of custody form with the appropriate sampling information.

11. Keep detailed notes in the field logbook per KERAMIDA's Field Logbook SOP.

STANDARD OPERATING PROCEDURES
FOR
FIELD SCREENING OF SOIL SAMPLES

REVISED: November 13, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

FIELD SCREENING OF SOIL SAMPLES

The soil samples collected for field screening and possible laboratory consideration should be classified in the field for lithology, moisture content, odor, staining and any other significant characteristics upon collection. Once the sample is classified, split the sample longitudinally into two equal portions: place one portion of the sample into a new, clean, sealed, and labeled plastic bag for field screening; place the other portion of the sample into a new, clean, sealed, and labeled sample container obtained from the laboratory.

Immediately place the laboratory container sample on ice in a cooler. Allow the field screening sample to sit for 10 to 15 minutes to allow organic vapors to equilibrate in the air space of the bag. All field screening samples must be treated identically to ensure accurate comparisons. For example, if one field screening sample is placed in the sun to warm then all are placed in the sun.

The samples are field screened using a photoionization detector (PID) or a flame-ionization detector (FID) depending on the suspected contaminants. FID instruments are more sensitive to the presence of heavier organic compounds such a polynuclear aromatic hydrocarbons. The selected instrument is properly calibrated in accordance with the methods presented in its respective operations manual. At a minimum, the instrument should be "bump checked" once per day. The samples are field screened by inserting the PID or FID's probe into the plastic bag, while the bag remains closed. The readings are recorded in the field log book.

At the completion of the field screening process, determine which, if any, of the sample intervals will be sent to the laboratory for analysis. All samples that are not sent to the laboratory will be disposed of in accordance with the site-specific SAP or QAPP.

The samples selected for laboratory analyses should remain in the cooler, maintaining a temperature of 4°C, until delivery to the selected laboratory with all proper chain-of-custody documentation. Detailed project notes are entered in the field logbook per KERAMIDA's Field Logbook SOP.

STANDARD OPERATING PROCEDURES
FOR
PUSH-PROBE GROUNDWATER SAMPLING PROCEDURES

REVISED: January 4, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

MATERIALS

Field book
Latex or nitrile gloves
Peristaltic pump (Geopump)
Polyethylene tubing
Silicon tubing
Sample bottles, labels, indelible markers, and clear tape
Ice and coolers
Pocketknife or scissors
Proper personal protective equipment (PPE)

1. Place clean latex vinyl examination gloves on hands.

2. Advance Geoprobe water sampler to the desired depth.

3. Assemble Geopump peristaltic pump per operating manual instructions, which accompany pump.

4. Silicon tubing is to be used only through the head of the peristaltic pump.

5. At the pump intake, attach polyethylene tubing to the silicon tubing. The polyethylene tubing should be long enough to extend to the bottom of the water sampler. At the pump discharge end of the pump, attach a short length of polyethylene tubing.

6. Turn on the pump and draw the water from the water sampler, through the pump, and into the sample container. If the sample is exceptionally silty, purge the system by running the water into a bucket until it clears enough for sampling.

7. Sample first for VOA, taking care to remove all air bubbles from the vial and minimize agitation. If bubbles persist, VOA samples may be taken in unpreserved 40ml vials. Note this on the chain of custody as this changes the holding time for the sample. Collect remaining organic samples then inorganic samples.

8. The recommended order of sample collection is as follows:

   In-situ measurements (e.g., temperature, pH, specific conductance)
   Field test kits (e.g., ferrous iron, hydrogen sulfide)
   Volatile organic analytes (VOA)
   Total organic halons (TOX)
   Total organic carbon (TOC)
   Semi-volatile organic analytes (SVOA)
   Total metals
   Dissolved metals

Phenols
Cyanide
Sulfate and chloride
Turbidity
Nitrate and ammonia
Radionuclides

9. Affix a sample label to each sample container and complete all required information (sample no., date, time, sampler's initials, analysis, preservatives). Record sample ID, date, and time in the field book. Complete chain-of-custody forms with appropriate sampling information.

10. Thoroughly decontaminate all non-dedicated and non-disposable equipment used. Discard used tubing, towels, gloves, etc., in a plastic bag.

STANDARD OPERATING PROCEDURES
FOR
MONITORING-WELL DESIGN AND INSTALLATION

REVISED: November 26, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

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INTRODUCTION

Scope

This document outlines procedures for the design and installation of monitoring wells. For a more complete discussion of techniques, equipment, and the theory behind developing a ground water monitoring well system, refer to the related geotechnical standard operating procedures for drilling methods and borehole and ground water sampling. Driscoll (1986), in Groundwater and Wells, provides a good discussion of drilling methods and monitoring well installation. Freeze and Cherry (1979), in Groundwater, cover the theories related to ground water and the rationale used in deciding the placement of monitoring wells.

Monitoring wells, are installed in accordance with all applicable federal, state and local requirements. In Indiana, IDNR Code is used as guidance for monitoring well design and installation.

Objectives

The principal goal of the well installation is to provide ground water monitoring points that meets the objectives of the sampling and analysis plan. Ground water samples provide information on ground water quality and aid in the definition and tracking of ground water contaminant plumes. Secondary objectives of monitoring well drilling and installation may include the following:

- To provide water-level data so that potentiometric maps can be constructed and flow directions determined.
- To provide access to aquifers so that aquifer tests can be conducted.
- To provide soil and rock samples for geologic characterization of the study area.

Special Construction Adaptations

Monitoring well design and construction can be accomplished using a variety of techniques. Standard water well design and construction techniques are used, but significant modifications are required for adaptation to the specifications of a monitoring well. These modifications include provisions for the health and safety concerns inherent in hazardous waste site work, as well as special procedures to prevent the introduction of contaminants to the well. In addition, the design and construction techniques take into account the specific requirements of the monitoring program; that is, wells are designed to monitor only a limited, discrete zone within an aquifer.

Monitoring well construction techniques and materials must not alter the chemical or physical properties of the ground water being sampled. Wells must provide samples that are truly representative of the aquifers sampled, because test results are often subject to legal scrutiny. An understanding of the site geology and chemical properties of suspected contaminant determines the proper selection of construction techniques and materials.

WELL DESIGN

Data Collection

Before a ground water monitoring program is designed, available hydrogeologic background data are reviewed. As the objectives of the program are developed, the background database is referenced continually. This process ensures that the installed wells meet the objectives of the monitoring program.

Monitoring Well Elements

Monitoring wells are designed considering the following elements: 1) location, 2) diameter, 3) depth, 4) casing, 5) screen, 6) seal, and 7) well development. These seven elements are discussed below.

Well Location

Monitoring wells are located both spatially and vertically to ensure that ground water within the flow regime of concern is monitored. The number of wells and their location are generally determined by the objectives of the monitoring program.

The initial placement of monitoring wells depends on preliminary data such as anticipated ground water flow direction, behavior of suspected contaminants in the subsurface, and site geology. As the study progresses, and better data on flowpaths and site geology are generated, wells are more confidently located to intercept contaminants.

Wells are typically located in source areas as well as upgradient and downgradient of suspected contaminant sources. Upgradient wells are necessary to provide data on background water quality, as well as additional data points for water level gauging and determination of flow directions. Downgradient wells provide data on plume movement and potential impacts to sensitive receptors.

Well Diameter

The diameter of a monitoring well depends on the objectives of the monitoring program and on the size of the sampling device or pump used to withdraw a water sample. The most common sizes used are 2 inches and 4 inches in outside diameter (OD). Reasons for using smaller diameter wells include the following:

- Lower construction costs.
- Better adaptability to marginal water producing zones (i.e., less problem in removing water volumes than from a larger diameter well; shorter recharge time).
- Smaller quantities of water to be disposed of during development and purging.

Large diameter wells can be useful in permeable formations where monitoring may be followed by a remedial action. In this instance, the "monitoring" well becomes a "recovery" well to remove contaminated water from the ground for treatment. Larger diameter wells are also more versatile in conducting aquifer tests because they can accommodate larger pumps.

Depth

The depth of each monitoring well is determined by hydrogeologic conditions at the site being monitored and by the subsurface behavior of suspected contaminants. Many monitoring wells are completed in the first relatively permeable water-bearing zone encountered because potential sources of contamination are frequently near the ground surface. Care is taken to assure that the well is completed at a depth sufficient to allow for seasonal water table fluctuations.

Under confined or semi-confined (leaky) conditions, the water level will rise above the top of the water-bearing zone. In these instances, the well is completed (has a screened interval) within the water-bearing zone only and not above it.

Multiple Wells

If the water-bearing zone is thick (greater than 10 feet) or if contamination is known or suspected in deeper formations, multiple wells are typically completed at different depths. Multiple wells are also used to determining vertical hydraulic gradients. This is done by comparing water levels measured in the wells.

Depth-Discrete Wells

It is important that monitoring wells be constructed so that they are depth discrete, that is, so that they sample from one specific formation or zone without interconnection to others. To ensure that this requirement is met, provisions for the placement of a well sealant are made. Commonly used well sealants are pelletized bentonite and bentonite and cement grout. Sealants are placed around the well casing above and, if necessary, below the well intake.

Monitoring Well Construction Materials and Methods

Well-Casing and Screen Materials

The type of material used for a monitoring well can have a detrimental effect on the quality of the sample to be collected. The materials of choice should retain their structural integrity for the duration of the monitoring program under actual subsurface conditions. The materials should neither adsorb nor leach chemical constituents that would bias the collection of representative samples. Therefore, a strategy for ground water monitoring must consider the effects of contaminated water on well-construction materials.

Commonly used materials include polyvinyl chloride (PVC), stainless steel, polytetrafluoroethylene (PTFE; Teflon is a brand name) and others. Each material has advantages and disadvantages relating to factors such as cost, long-term structural integrity, chemical inertness under site conditions (including exposure to acids, caustic substances, and various organic solvents), and sorptive properties. For a detailed discussion on the selection of materials, see Barcelona, Gibb, and Miller (1983).

PVC

Polyvinyl chloride, with its low cost and widespread availability, is one of the most commonly used materials in monitoring wells. Though PVC is sufficiently sturdy for most applications, it has the disadvantage of leaching and sorbing certain organics. For many applications, however, such leaching does not present a problem. PVC is also subject to degradation by certain organics, including low molecular weight ketones, aldehydes, and chlorinated solvents (Barcelona et al., 1983). A cost-effective alternative is the use of PVC casing above the water table, and more inert materials (stainless steel or PTFE) below the water table.

Stainless Steel and PTFE

These materials are significantly more expensive than PVC, but offer some advantages. Stainless steel and PTFE are preferred for some long-term monitoring projects because of their chemical inertness and long-term structural integrity. Stainless steel (type 316 is preferred) is slightly susceptible to corrosion by halide solutions and certain acids, and can also leach metals under very corrosive conditions (Barcelona et al., 1983). PTFE is the most inert material available, but is also the most costly

Centering Guides

Where casing or screen assemblies over 40 feet long are installed in holes having diameters 2 inches or larger than the outside diameter of the casing, centering guides (centralizers) are typically installed. Such guides not only hold the casing in the center of the hole, but offer support, against bending and buckling because of axial and unbalanced horizontal loads. Centering guides are essential for centering casing and screens in preparation for grouting and gravel pack installation. The guides are placed at the bottom and the 20- to 40-foot intervals up the borehole.

Well Screen Characteristics

All well screens should allow unobstructed entry of formation water. The purpose of the screen is to prevent fine materials from entering the well. Two factors are important in enhancing a sediment-free flow: 1) the slot size of the well screen and 2) a filter pack compatible with the selected screen size.

Another important consideration is the length of the well screen. Several factors influence this decision:

- Thickness of the monitored formation.
- Objective of the monitoring program.
- Nature (e.g., density) of the contaminant(s) monitored.

Well Seal

It is critical that the screened portion of each monitoring well access ground water from a specific depth interval. Vertical movement of ground water in the vicinity of the intake can greatly influent sample quality. Rain water can infiltrate backfill, potentially diluting or contaminating the sample. Vertical seeping of leachate along the well casing can also produce unrepresentative samples. Most important, the creation of a conduit in the annulus of the monitoring well can hasten the spread of contamination; hence the

necessity for proper well sealing techniques. When a telescoping well is drilled to prevent cross-contamination between formations, it is imperative that a seal be placed at the top of each telescoped section.

Several techniques are available for sealing monitoring wells and abandoned boreholes. Virtually all of these methods involve pumping grout (cement, bentonite, or combinations of both) down the borehole. Typically, bentonite in pellet form is placed above the gravel pack to occupy an interval of one to several feet. This is followed by the placement of grout. The grout is pumped in from just above the bentonite to several feet below the ground surface. A cement plug (collar) can then be placed around the casing and mounded to divert surface drainage from the casing area. This collar typically extends below the frost line.

WELL INSTALLATION

Drilling Methods

Inspecting and Cleaning Equipment

The construction of monitoring wells should be accomplished in a manner that minimizes the introduction of contaminants and the disturbance of subsurface materials. Care is taken to steam clean the drill rig and all other equipment and well components before they are transported to the site. Repeated cleaning of drilling equipment and well constructed materials at the site also is necessary, especially before drilling at a new on-site location. The drill rig is checked repeatedly for oil and hydraulic fluid leaks. These precautions are essential to ensure that trace contaminants from the drilling process are not introduced to the monitoring wells.

Choosing a Drilling Method

The selection of a drilling method best suited for a particular installation is based on the following factors, listed in order to importance:

1. Hydrogeologic information: types of formations, depth of drilling, and depth of desired screen setting below water table.
2. Types of contaminants suspected.
3. Location of drilling site (e.g., dry land or inside a lagoon).
4. Design of monitoring well desired.
5. Availability of drilling equipment.

The principles of operation and the advantages and disadvantages of the more common types of drilling techniques suitable for constructing ground water monitoring wells are discussed by Scalf (1981), and Barcelona, et al. (1983).

Installation Procedures

Pre-emplacement Activities

Care must be given to the preparation of the casing and well screen materials before their installation. As a minimum, both should be washed with detergent and rinsed thoroughly with clean water. Steam cleaners and high pressure, hot water cleaners effectively remove cutting oils and lubricants left on casings and screens after their manufacture. To ensure that these and other sampling materials are protected from contamination, some type of temporary storage cover, such as plastic sheeting, is recommended. Well material thermetically sealed at manufacture, does not require cleaning prior to installation as long as seal is not breached prior to emplacement.

Well Emplacement

After drilling the borehole to the desired well depth, the borehole is reamed (cleaned out) and the well prepared for emplacement. The screen and casing sections are joined and slowly lowered into the borehole. Threaded pipe with O-ring seals are simply twisted together. Threaded joints without O-ring seals are wrapped with Teflon tape to inhibit leakage. Threaded joints are preferred to joints requiring solvent. Solvents should never be applied to monitoring well casing. It is imperative that the well assembly not be dropped to the bottom of the borehole, because the screen and casing could be damaged.

Placement of the well screen should be as precise as project objectives warrant. If it is essential that the screen intersect a specific interval, field personnel should ensure that this point is reached. This may entail removing the well and recleaning the borehole.

Backfilling the Annulus

This procedure generally involves three operations: 1) placement of the filter pack, 2) grouting (sealing), and 3) installation of the concrete plug. The filter pack is placed around the well screen in the borehole annulus to a depth approximately one to two feet above the screened interval. Emplacement of the filter pack can be accomplished by jetting or washing down the pack, pouring the pack material down the annulus (in shallow holes only), or by allowing cave-in of the in-site formation. If performed, these activities are recorded in the field notebook.

The grout seal (bentonite or a combination of bentonite and cement) is emplaced in the borehole annulus above the filter pack to the depth of the frost line in one continuous operation. The grout may be placed by means of a tremie pipe and pump. The grout is allowed to set up before the concrete collar (plug) is installed at the surface.

Well Security

To provide well security, protective covers are placed over the wellhead. These protective covers may be a steel or a flush-mounted traffic-rated road box. The well casing is centered around and embedded in the concrete plug (stick-up cover). The stick-up protective casing is of sufficient diameter to allow easy access to the well casing. Drain hole(s) are made in the protective casing to facility drainage. Locking caps are placed on the tops of the well casings on both stick-up and flush-mount wells. As an alternative, locks may be placed on the outer protective casings.
If the stick-up monitoring well is in a location accessible to vehicular traffic, bumper guards are to be installed around the well. These guards should be constructed of steel pipes filled and embedded in concrete. Several guards may be used to protect the well.

WELL DEVELOPMENT

Rationale

Removing the Mudcake

During the drilling process, fine-grained materials are forced into the open borehole, forming a mudcake that reduces the hydraulic conductivity of the materials opposite the screened portion of the well. To allow free entry of water into the monitoring well and to maximize well yields (a particularly important factor for low-yield geologic materials), this mudcake must be broken down and its particles removed from the well.

Filtering and Preserving Samples

Additionally, monitoring wells must be developed to provide water samples free of suspended solids. At the time of collection for metal ions and other inorganic constituents, water samples must be filtered and preserved. Improperly developed monitoring wells will produce samples containing suspended sediments that will both bias the chemical analysis of the collected samples and frequently cause clogging of the field filtering mechanisms (Barcelona et al., 1983).

Methods

Productive Aquifers

The development procedures used for monitoring wells are similar to those used for production wells. They include: 1) creating alternately high and low velocities of water flow in the well to break down the mudpack or loosen fine particles and 2) pumping to remove the particles from the well and the immediate area outside the well screen. Successful development methods for monitoring wells installed in productive aquifers include the following:

- Surge block.
- Bailing.
- Surging by pumping (water or air).

Unproductive Aquifers

Development procedures for monitoring wells in relatively unproductive geologic materials are somewhat limited. Because these materials have a low hydraulic conductivity, surging of water in and out of the well casing is extremely difficult. Moreover, when the well is pumped, the entry rate of water is inadequate to effectively remove fine particles from the borehole and from the gravel pack material outside the well screen.

In this type of geologic setting, clean water is sometimes circulated down the well casing, out through the screen and gravel pack, and up the open borehole before grout is placed in the annulus. Relatively high water velocities can be maintained, and the mudcake from the borehole wall can be broken down effectively and removed. (Because of the low hydraulic conductivity of geologic materials outside the well, a negligible amount of water will penetrate the formation being monitored.) Immediately following this procedure, the grout is emplaced and the well pumped to stabilize the formation around the outside of the screen and to ensure that the well will produce fairly clear water.

DOCUMENTATION

The well design and installation methods are documented in the field and written report. The following information relating to monitoring well installation:

- Data collection and review, including site history and well-placement process (written report only).
- Drilling method(s) and procedures.
- Well construction -- including specifications.
- Description of seal and backfill of annulus.
- Description of surface protection for the wellhead.
- Lithologic logs with description.
- Well development procedures.
- Well construction diagram, to scale (written report only).

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STANDARD OPERATING PROCEDURES
FOR
MONITORING WELL SAMPLING

REVISED: November 26, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

MATERIALS LIST

Sampling notebook
Groundwater monitoring data log forms
Well key
Adjustable wrench or manhole wrench
Plastic sheeting
Photoionization detector (PID) or Flame-ionization detector (FID)
Flashlight or mirror
Electronic water level indicator and oil/water interface probe
Bailer(s)
Pump (for purging), polyethylene tubing, and battery
Buckets
Nylon or polyethylene rope or monofilament
pH, conductivity, and temperature meters
Sample bottles, labels, indelible markers, and clear tape
Ice and coolers
Geopump
0.45-micron filters (for dissolved metals analysis)
Teflon and polyethylene tubing
Pocketknife or scissors
Proper personal protective equipment (PPE)
Nitrile gloves
Vinyl gloves
Decontamination supplies (Deionized water, Alconox, brushes, bucket, and paper towels)
Toolbox (Wrenches, screwdrivers, and hammer)

SAMPLE COLLECTION

1. Verify locations of wells and parameters to be analyzed as specified in the sampling plan.

2. Prepare field log book in accordance with SOP for Note Taking and Log Book Entries, and include a description of site, weather, participants, and other relevant observations.

3. Complete the groundwater monitoring data log (Figure 1) for each monitoring well or sampling point.

4. Using Level C protection, unless historical data allow downgrading to Level D protection equipment, survey around the base of the well and wellhead with a PID; remove well cap, place probe of PID in wellhead, and record PID response in field book. Survey the

breathing zone to ensure that the level of personal protection is appropriate. Note observations in the groundwater monitoring data log.

5. Inspect water surface in the well, using a flashlight if necessary. Note any observable floating contaminants and record observations in the field book.

6. Measure and record the extent of protrusion of the top of the well casing above the ground. If well is a flush mount, measure and record the depth of the top of the well casing below the ground. Measure the casing inside diameter (CID) and record in inches.

WATER LEVEL MEASURMENTS

7. Liquid-level measurements and well sampling should start with the upgradient (or clean wells) and proceed downgradient (in the order from least to most contaminated) for the remaining monitoring wells.

8. From the top of the casing, measure the depth (in feet) to water (DTW) with an electronic water level indicator and record on the groundwater monitoring data log. Static water level measurements must be recorded from the surveyor's mark at the top of the casing, if present. If no mark is present, mark a location with a metal file or indelible marker on the casing for future reference. Measure and record in feet the total depth (TD) to the bottom of the well (TD). All well depth measurements should be taken to the nearest hundredth (0.01) of a foot.

9. Check for the presence and thickness of light non-aqueous phase liquids (LNAPLs) and dense non-aqueous phase liquids (DNAPLs) using a free product/water interface probe in accordance with the RCRA Groundwater Monitoring Technical Enforcement Guidance Document (September 1986).

10. Calculate the volume of water in gallons in one well casing:

    For a 2-inch well:

    $$vol = [(TD - DTW) * 0.16]$$

    For a 4-inch well:

    $$vol = [(TD - DTW) * 0.65]$$

    For a 6-inch well:

    $$vol = [(TD - DTW) * 1.47]$$

    or calculate the volume using the formula:

    $$vol = 0.04\ d^2h$$

    where:

    $h = TD - DTW$ in feet

    d = diameter of well in inches

WELL PURGING

11. Remove at least three well volumes to purge the well before sampling. To determine the number of gallons required to purge the well, multiply the number of gallons in one well volume (calculations above) by three. Record the minimum purge volume on the groundwater monitoring data log.

12. Assess for the presence of LNAPL by carefully lowering the bailer into the well taking care to prevent the bailer from sinking below the water surface. Remove bailer and inspect it for LNAPL. If required by the sampling plan, secure samples of the LNAPL for analysis and put the samples on ice.

13. Continue bailing at a uniform rate. Each time, empty the bailer into a calibrated container for measurement. After removing the minimum purge volume (at least three well volumes), dispose of the contents in an appropriate container for later disposal in compliance with federal and state laws.

14. A pump may be used in place of a bailer to purge wells when the situation warrants (see Table 1).

Table 4-1
Well Evacuation Equipment and its Uses

Method	Best Use
Peristaltic Pump (e.g., Geopump)	Water table within suction lift. Used on wells that require less than approximately 4 gallons of water for adequate evacuation. Good for slow recovery wells. Not recommended for volatile organic compound analysis.
Centrifugal Pump	Water table within suction lift on wells that have moderate to high recovery rates. Cannot be used for sampling.
Bailer (Teflon, PVC, polyethylene, or stainless steel)	On slow recovery wells and on wells where access is difficult.
4-inch Electric Submersible Pump	On wells where pump is permanently installed or deep, large diameter wells where use of low yield pumps not practical.
Bladder Type (e.g., Geotech, Well Wizard)	May be used to sample for volatile organic compound analysis. Water table below suction lift. Used when water level recovery rates are moderate to high.

15. If a well is bailed dry before removing three well volumes, allow well to recharge and proceed to sample. Wells will not be bailed dry if doing so will cause recharge water to enter the well in a cascading fashion, but instead will be bailed at a rate which will minimize the agitation of recharged water. If full recovery exceeds 2 hours, sample as soon as sufficient volume is available.

SAMPLE COLLECTION

16. All samples should be collected using a bailer unless an alternate method (i.e., bladder pump) is specified in the SAP or QAPP.

17. While collecting samples, lower the bailer slowly to avoid agitating the water. Sample first for VOCs, taking care to remove all air bubbles from the vial and minimize agitation. Collect remaining organic samples then inorganic samples.

19. The recommended order of sample collection is as follows:

In-situ measurements (e.g., temperature, pH, specific conductance)
Field test kits (e.g., ferrous iron, hydrogen sulfide)
Volatile organic analytes (VOA)
Total organic halides (TOX)
Total organic carbon (TOC)
Semi-volatile organic analytes (SVOA)
Total metals
Dissolved metals
Phenols
Cyanide
Sulfate and chloride
Turbidity
Nitrate and ammonia
Radionuclides

20. Affix a sample label to each sample container and complete all required information (sample no., date, time, sampler's initials, analysis, preservatives). Record sample number, well number, date, time, and the sampler's initials on the sample tracking form and in the field book. Complete chain-of-custody forms with appropriate sampling information.

21. Inspect the well for soundness of protective casing and surface ground seal. Record water color, suspended particulates, discoloration of casing, casing diameter and material, any unusual occurrences during sampling, and any pertinent weather details on the groundwater monitoring data log.

22. Thoroughly decontaminate all non-dedicated and non-disposable equipment using the SOP for Decontamination of Sampling Equipment. Discard used bailer cord, disposable bailer, plastic sheeting, towels, gloves, etc., in a plastic bag.

FILTERING OF METAL SAMPLES

A. Assemble Geopump peristaltic pump per operating manual instructions, which accompany pump.

B. Silicon tubing is to be used only through the head of the peristaltic pump.

C. At the pump intake, attach polyethylene tubing to the silicon tubing. The polyethylene tubing should be long enough to extend to the bottom of the bailer. At the pump discharge end of the pump, attach the 0.45-micron filter to the Silicon tubing.

D. Turn on the pump and draw the water from the bailer, through the pump and filter, and into the sample container.

E. Disassemble the pump head and discard the polyethylene and silicon tubing in a plastic bag.

STANDARD OPERATING PROCEDURES
FOR
SOIL SAMPLING USING HAND TROWEL

REVISED: February 18, 1999

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

MATERIALS

Hand trowels (stainless steel)
Nitrile or surgical gloves
Tray, mixing pans, or Ziplock® plastic bags
Stainless steel spoons
Aluminum foil
Sample containers
Sample labels and indelible marker
Photoionization detector (PID)
Saranex or Tyvek suit

PROCEDURES

1. Wear clean latex vinyl gloves and other personal protective equipment as necessary. Nitrile gloves may only be used for hazardous sampling.

2. Decontaminate the sampling trowel per KERAMIDA's Standard Operating Procedures (SOPs) for decontamination of sampling equipment.

3. Remove all surface vegetation (if applicable) with the trowel or another decontaminated tool (i.e., shovel).

4. Place blade tip of trowel into soil and push firmly until the desired depth is reached. If sampling a loose gravelly or sandy soil, carefully remove the trowel so that the blade approaches a position to prevent soil from falling off the blade. If sampling a stiff silty or clayey soil, it will probably be necessary to remove the trowel and reinsert it to further loosen the soil. When the soil has been sufficiently loosened, lift a portion of the soil out with the blade and place into two sealed plastic bags.

5. Shallow subsurface soil samples can be collected by digging a hole or trench (i.e., using a shovel, backhoe, etc.), then removing the loose soil and collecting a soil sample at the desired depth. If a trowel is used to dig the initial hole, properly decontaminate the trowel before collecting the soil sample or use a separate decontaminated trowel for sample collection. Place soil from the trowel into two bags sealed plastic.

6. One bag of soil should be screened with the PID and the resultant readings should be recorded in the field log book per KERAMIDA's SOPs for field screening soil samples.

7. If more soil is needed to provide sufficient sample volume, reinstate trowel at sample location and retrieve as before.

8. Examine contents of the second bag and remove rock, cobble, and organic debris, such as roots, grass, and woody material, with clean latex vinyl gloves.

9. For volatile organic samples, transfer soil directly into sample container with clean latex vinyl gloves, choosing your sample from the bag to ensure homogeneity.

10. Before filling other sample containers, separate clumps of dirt and mix the contents of the bag to a homogeneous particle size and soil texture.

11. Transfer the bag contents to the appropriate laboratory provided glass sample containers using clean latex vinyl gloves.

12. The sample container should be sealed, labeled, and placed on ice in a cooler maintaining a temperature of 4°C., in anticipation of laboratory analysis.

13. Complete chain-of-custody form with appropriate sampling information.

14. The samples selected for laboratory analysis should remain in the cooler until delivery to the laboratory with all proper chain-of-custody documentation.

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STANDARD OPERATING PROCEDURES
FOR
THERMO ENVIRONMENTAL 580B PHOTOIONIZATION DETECTOR
CALIBRATION PROCEDURE

REVISED: September 21, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

Thermo Environmental 580B Photoionization Detector Calibration Procedure

The PID must be calibrated on a daily basis prior to use, and at any time during the day if the field readings are suspect. The calibration information must be noted in the field logbook per KERAMIDA's Field Logbook SOP.

The procedures listed below are valid for both cylinder and bag standards. The sequence requires both zero gas and span gas to be used. Span gas can be either contained as a cylinder or bag, in either case the exact concentration used must be known. This concentration will be entered in to the 580 when the program provides its entry. With respect to zero gas, there are several choices. Either a certified zero air standard in a cylinder or a charcoal scrubber can be used. Another approach which could be used in an emergency is to use room air unscrubbed. Caution must exercised when room air is used.

Prior to calibration or using the equipment in the field, ensure that the battery is fully charged and in good condition. In the event the batteries are leaking, please return to the manufacturer for maintainence.

Calibration Routine

1. Power-up instrument. In the field use battery power and in the office use the power plug.
2. Depress ON/OFF key to ignite the lamp and initiate the sample pump.
3. Depress Mode/Store key.
4. Depress -/CRSR key in response to Log this value? prompt.
5. Depress -/CRSR key to select Parameters Mode from the Main Menu.
6. Depress +/INC key to advance thru the Run Mode selection parameter prompt.
7. Depress +/INC key to advance thru the Auto Logging Mode selection parameter prompt.
8. Depress +/INC key to advance thru the Average Time selection parameter prompt.
9. Depress +/INC key to advance thru the Alarm Setting paramater prompt.
10. Depress +/INC key to advance thru Lamp Selection parameter prompt.

11. Depress +/INC key to advance thru Response Factor Setting parameter prompt.

12. Depress Response key to initiate calibration sequence.

13. Depress Reset -/CRSR key to decline restoration of the backup calibration.

Connect outlet of calibration tubing assembly to the Model 580B Detector Inlet.

14. Introduce zero air to Model 580B by opening flow regulator or attaching the carbon scrubber unit.

15. Depress Reset key to "zero" Model 580B.

16. Close flow regulator or remove the carbon scrubber unit.

17. Span calibration assumes that a span gas of 250 ppm isobutlyene is being used.

18. Simultaneously depress Reset and -/CRSR keys to activate the movable cursor.

19. Repeat step 18 until the cursor is at the ones place.

20. Simultaneously depress Reset and +/INC keys to increment the ones place value.

21. Repeat step 20 until the ones place value reads 0.

22. Repeat step 18 to move cursor to the tens place.

23. Repeat step 20 until the tens place value reads 5.

24. Repeat step 18 to move cursor to the hundreds place.

25. Repeat step 20 until the ones place value reads 2.

26. Repeat step 18 to move cursor to the thousands place.

27. Repeat step 20 until the ones place value reads 0.

28. The LCD should now read:

29. Span PPM = 0250
" + " to Continue

30. Depress +/INC to accept the span concentration value.

31. Connect isobutylene cylinder (250 ppm) to calibration tubing assembly.

32. Connect outlet of calibration tubing assembly to the Model 580B detector inlet.

33. Introduce isobutylene standard to Model 580B by opening flow regulator.

34. Reset key to "calibrate" Model 580B.

35. Depress +/INC key in response to "Reset" to calibrate message.

36. Depress Mode/Store to return to the Run Mode.

The instrument is now calibrated and ready to take measurements. Additional information on the 580B PID is available in the manufacturers service manual.

STANDARD OPERATING PROCEDURES
FOR
DECONTAMINATION OF SAMPLING EQUIPMENT

REVISED: September 21, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

MATERIALS

Tap water
Deionized or distilled water
10% nitric acid solution (mixed in squirt bottle)
Scrub brushes (short- and long-handled)
buckets or trash cans
Nonphosphate detergent (Liquinox or Alquinox)
Pesticide-grade solvent (isopropanol, acetone, or hexane in spray bottle)
Aluminum foil
Polyethylene plastic sheeting, plastic garbage bags, and Ziploc® plastic bags
Paper towels or Kimwipes®
Nalgene squirt bottles
Wire brush
Duct tape
Personal protective equipment (e.g., nitrile gloves, eye protection, skin protection)

Note: All sampling equipment must be decontaminated before shipment to the office.

LABORATORY DECONTAMINATION PROCEDURES

Equipment Used for Sampling Environmental Media Containing Organic or Inorganic Compounds and Metals.

1. Place polyethylene sheeting on firm, flat surface to collect spillage during decontamination. Mix solution of nonphosphate detergent and tap water in bucket.

2. Wear appropriate personal protective equipment to prevent exposure to skin, eyes, and respiratory system.

3. Wipe contaminated sampling equipment with paper towels to remove residual soils or gross contamination. Heavy oils or grease may be removed with paper towels soaked with solvent (acetone or methanol).

4. Disassemble sampling equipment (e.g., split-spoon samplers, bailers). Wash equipment thoroughly with nonphosphate soap and hot tap water solution. Teflon bailers must be disassembled and the inside washed with long-handled bottle brush or short-handled brush pulled through the bailer with rope.

5. Rinse the equipment with hot tap water.

6. If the equipment will be used to collect samples for metals analysis, follow tap water rinse with a 10% nitric acid solution rinse. Metal equipment (e.g., bucket augers) should not be rinsed with nitric acid solution because of problems with oxidizing the metal surfaces. Collect the nitric acid rinse in a separate bucket. Rinse the equipment with tap water.

7. Thoroughly rinse the equipment with deionized water.

8. Spray the equipment with solvents (acetone or methanol followed by hexane) and allow to completely air dry. The solvent equipment rinse must be collected in a separate bucket.

9. Rinse the equipment with analyte-free water using at least five times the volume of solvent used in the previous step.

10. After the equipment has been allowed to completely air dry, each piece must be individually wrapped with aluminum foil (shiny side out), and then wrapped in plastic. **Note: Decontamination solvents may introduce contaminants to environmental samples.** It is very important to ensure that the equipment has completely dried before wrapping the equipment for storage.

11. Label each piece of equipment with the date of decontamination, the initials of decontamination personnel, and the type of decontamination solutions used. This will allow other personnel to select the correct piece of sampling equipment for future use.

FIELD DECONTAMINATION

1. Field sampling equipment should be decontaminated prior to and after each use to minimize the potential for cross-contamination.

2. Place polyethylene sheeting on firm, flat surface (if available) to collect spillage during decontamination (when required). Mix solution of liquinox and distilled water in bucket. A liquinox and tap water solution can be used for push-probe sampling equipment.

3. Wear appropriate personal protective equipment to prevent exposure to skin, eyes, and respiratory system.

4. Wipe contaminated sampling equipment with paper towels to remove residual soils or gross contamination. If necessary, heavy oils or grease may be removed with paper towels soaked with solvent (acetone or methanol).

5. Disassemble sampling equipment (e.g., push-probe samplers, bailers). Wash equipment thoroughly with nonphosphate soap and distilled water (the water for push-probe

equipment) solution. Teflon bailers must be disassembled and the inside washed with long-handled bottle brush or short-handled brush pulled through the bailer with rope.

6. Double rinse the equipment with distilled water (tap water for push-probe equipment).

7. Note any discrepancies from standard decontamination procedures in the project field notebook.

DISPOSAL OF DECONTAMINATION SOLUTIONS

Laboratory Solutions

Decontamination solutions (e.g., washwater, nitric acid rinsewater, and solvent rinsewater) must be handled appropriately. Nonphosphate wash water can be disposed of directly to the municipal sanitary sewer. Nitric acid rinsewater solution must be neutralized with baking soda, diluted to normal pH (i.e., 6.0 to 8.0) and disposed of in the sanitary sewer. Solvent rinsewater should be negligible because of the use of small amounts. Solvents should be allowed to evaporate in a well-ventilated area or under a laboratory hood. Paper towels soaked with solvent should be allowed to dry and be disposed of in a general waste container.

Field Solutions

Field decontamination presents unique problems in disposal of decontamination solutions. Nonphosphate wash water must be containerized and properly disposed of in the facility wastewater treatment system or otherwise in accordance with state and federal laws. The generation of solvent rinsewaters should be minimal in field decontamination. Solvents should be collected in separate buckets and allowed to evaporate.

Paper towels soaked with cleaning solvent should be allowed to air dry and be disposed of with solid waste. Under no circumstances should any decontamination solution be disposed of by pouring it on soil surfaces.

STANDARD OPERATING PROCEDURES
FOR
FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

REVISED: November 26, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

MATERIALS

Ice and cooler
Sample containers
Sample container labels
Indelible marker or pen
Clear tape
Laboratory deionized water
Non-phosphate detergent (Liquinox or Alconox)
Pesticide grade solvent (isopropanol, acetone, or hexane) in a spray bottle (optional, reference QAPP)
Clean sampling equipment
Chain-of-custody forms
Custody seals

PROCEDURES

1. Select the appropriate glassware for the field Quality Assurance/Quality Control (QA/QC) samples from those provided by the analytical laboratory. Refer to the KERAMIDA Standard Operating Procedure for Sample Container, Preservatives, and Holding Times to determine the appropriate bottles to use. As an alternative, contact the analytical laboratory for this information.

2. Field QA/QC samples can include the following:

trip blanks	field blanks
duplicate samples	matrix spike/matrix spike duplicates
equipment blanks	

3. Pre-prepared volatile organic compound (VOC) trip blanks should be provided by the analytical laboratory for all projects where VOCs are analytes. Trip blanks should accompany the sample bottles from the analytical laboratory to the site and accompany the sample containers at all times during the sampling event. One trip blank for each batch of samples, or for each day of sampling activities, should be submitted to the analytical laboratory for analysis of VOCs only.

4. One set of duplicate samples should be collected for every 10 samples of each matrix (e.g., soil and groundwater) collected during each independent sampling event. Duplicates should be collected by equally dividing the material (e.g., soil, sediment, ground water) into the two sample aliquots. Solids (e.g., soil) sample bottles should be filled by alternating between the two sample bottle sets. The procedures outlined in KERAMIDA's Standard Operating Procedure for collection of solids (e.g., soil) samples

should be followed. Groundwater duplicates should be collected by alternately filling the two sample bottle sets from the same sampling vessel (e.g., bailer). The procedures outlined in KERAMIDA's Standard Operating Procedure for collection of groundwater samples should be followed. Field duplicate samples should be analyzed for all the analytes that are being analyzed for during the sampling event. Reference the Sampling and Analysis Plan for a complete list of analytical parameters.

5. One equipment blank should be collected in the field at a rate of one per type of equipment per decontamination event not to exceed one per day. If dedicated sampling equipment is used, reference the QAPP for any site-specific equipment blank requirements. Typically equipment blanks are not necessary for this type of sampling. If field decontamination of sampling equipment is required, the equipment blanks should be prepared after the equipment has been used and field-decontaminated at least once. Equipment blanks should be prepared by filling or rinsing the precleaned equipment with analyte-free water (deionized) and collecting the rinsate in the appropriate sample containers. The samples should be labeled, preserved, and filtered (if required) in the same manner as the collected environmental samples. Equipment blanks should be analyzed for all the analytes that the environmental samples are being analyzed for. Decontamination of the equipment following equipment blank procurement is not required.

6. One field blank should be collected in the field at a rate of one per every 10 samples. Field blanks should be prepared by filling the appropriate sample container with deionized water. The samples should be analyzed for all the analytes that the environmental samples are being analyzed for. Reference the QAPP to determine the need for field equipment blanks.

7. All QA/QC samples should be submitted to the analytical laboratory with unique sample numbers. Therefore, the QA/QC samples and duplicate samples should be labeled as separate environmental samples following the same numbering scheme used during that particular sampling event. However, on KERAMIDA's copy of the chain-of-custody form and in the field notebook the QA/QC samples should be clearly identified. Reference the QAPP for the proper sample numbering scheme.

NOTE: These procedures may not be applicable for all circumstances. For instance, some states or EPA regions may have more stringent or different QA/QC requirements, which should be followed in those cases. Also, always check the QA/QC requirements for the specific program of interest (e.g., VRP, LUST). Reference the QAPP for any site-specific requirements.

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STANDARD OPERATING PROCEDURES
FOR
SAMPLE CONTAINER, PRESERVATIVES, & HOLDING TIMES

REVISED: November 26, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

SCOPE

This operating procedure describes the ways and means of selecting the appropriate sampling containers for environmental sampling.

APPLICATION

The purpose of this procedure is to ensure that sample volumes and preservatives are sufficient for analytical services required under EPA-approved protocols.

MATERIALS

Sample containers
Sample container labels
Indelible (waterproof) markers or pens
Clear tape
Ice and cooler

PROCEDURES

1. Refer to Table 1 for minimum sample volume and glassware types required for sampling a particular matrix and compound class.

2. Select the appropriate glassware (i.e., bottles or jars) from those provided by the analytical laboratory. Verify that the analytical laboratory has provided the correct number of sample containers and the correct preservatives for the project per the sampling plan requirements.

3. The analytical laboratory should always provide extra sample containers for all analytical parameters in case of breakage or other problems encountered in the field. This is particularly true for VOC sample containers (i.e., 40-ml vials).

4. Report any discrepancies or non-receipt of specific types of sample containers to the Quality Assurance Officer immediately. Arrangements should be made with the laboratory to immediately ship the missing or additional sampling containers to the project site.

5. Apply sample labels to the sample containers.

6. Information on the sample labels should contain the following data:

   Site/Project name
   Project/Task number
   Unique sample identification number
   Sample date
   Time of sample collection (military system, e.g., 0000 to 2400 hours)
   Analytical parameters
   Preservative
   Sampling personnel

Table 1
Sample Containers, Preservatives, and Holding Times

Analytical Parameter	Matrix	Required Volume (mls)	Sampling Container Size and Type	Preservatives	Maximum Holding Time
Bacteria:					
Coliform, fecal		100	Sterile	Cool, 4 C	6 hours
Inorganics:					
Acidity		100	P, G	Cool, 4 C	14 days
Alkalinity		100	P, G	Cool, 4 C	14 days
Ammonia		500	P, G	4 C, H2SO4 pH <2	28 days
BOC		1000	P, G	Cool, 4 C	48 hours
CBOD		1000	P, G	Cool, 4 C	48 hours
COD		50	P, G	4 C, H2SO4 pH <2	28 days
Chloride		100	P, G	Cool, 4 C	28 days
Chlorine, Residual**		50	P, G	Cool, 4 C	24 hours
Color		100	P, G	Cool, 4 C	48 hours
Cyanide, Total & Amen.		1000	P, G	4 C, NaOH pH >12	14 days
Fluoride		100	P only	Cool, 4 C	28 days
Hardness, Total & Ca		50	P, G	HNO3 pH <2	6 months
pH		100	P, G	Cool, 4 C	24 hours
TKN		200	P, G	4 C, H2SO4 pH <2	28 days
Nitrate		50	P, G	Cool, 4 C	48 hours
Nitrate+Nitrite		50	P, G	4 C, H2SO4 pH <2	28 days
Nitrite		50	P, G	Cool, 4 C	48 hours
Odor		500	G only	Cool, 4 C	24 hours
Oil & Grease		1000	G only	4 C, H2SO4 pH <2	28 days
Ortho Phosphorus		250	P, G	Cool, 4 C	48 hours
Oxygen, Dissolved		no headspace	P, G	Cool, 4 C	24 hours
Phenol		500	P, G	4 C, H2SO4 pH <2	28 days

P = Plastic G = Glass Teflon = Teflon-lined Cap

Table 1 (continued)
Sample Containers, Preservatives, and Holding Times

Analytical Parameter	Matrix	Required Volume (mls)	Sampling Container Size and Type	Preservatives	Maximum Holding Time
Phosphorus, Total		100	P, G	4 C, H2SO4 pH <2	28 days
Solids, Total		100	P, G	Cool, 4 C	7 days
Solids, Dissolved		100	P, G	Cool, 4 C	7 days
Solids, Suspended		100	P, G	Cool, 4 C	7 days
Solids, Settleable		1000	P, G	Cool, 4 C	48 hours
Solids, Volatile		1000	P, G	Cool, 4 C	7 days
Silica		100	P only	Cool, 4 C	28 days
Specific Conductance		200	P, G	Cool, 4 C	28 days
Sulfate		200	P, G	Cool, 4 C	28 days
Sulfide		200	P, G	NaOH + ZnAc	7 days
Surfactants (MBAS)		500	P, G	Cool, 4 C	48 hours
Turbidity		100	P, G	Cool, 4 C	48 hours
Metals:					
Hex. Chromium		100	P, G	Cool, 4 C	24 hours
Mercury		100	P, G	HNO3 pH <2	28 days
All Other Metals		200	P, G	HNO3 pH <2	6 months
Organics:					
*Acrolein/Acrylonitrile		no headspace	3 G vials	Cool, 4 C pH 4-5	14 days
Acid Extractables		1000	G Teflon	Cool, 4 C	7 day extension
Base Neutrals		1000	G Teflon	Cool, 4 C	7 day extension
PCBs		1000	G Teflon	Cool, 4 C	7 day extension
Pesticides		1000	G Teflon	Cool, 4 C	7 day extension
Herbicides		1000	G Teflon	Cool, 4 C	7 day extension
Volatiles		no headspace	3 G vials	4 C, HCl pH <2	14 days
Volatiles		no headspace	3 G vials	Cool, 4 C, no pres.	7 days

P = Plastic G = Glass Teflon = Teflon-lined Cap

7. Once sample containers are properly labeled, the sample labels should be wrapped with clear tape to prevent deterioration of sample level.

8. Proceed with the sample collection per the sampling plan requirements.

9. Collected samples should be immediately placed in an iced cooler to maintain as close as possible a 4°C atmosphere for shipment to the analytical laboratory. Follow sample shipping procedures detailed in Sample Shipping Standard Operating Procedures.

10. Recommended order of sample collection:

    In-situ measurements (e.g., temperature, pH, specific conductance)
    Volatile organic analytes (VOA)
    Purgeable organic carbon (POC)
    Purgeable organic halogens (POX)
    Total organic carbon (TOC)
    Extractable organics
    Total petroleum hydrocarbons (TPH)
    Total metals
    Dissolved metals
    Microbiologicals
    Phenols
    Cyanide
    Sulfate and chloride
    Turbidity
    Nitriate and ammonia
    Radionuclides

STANDARD OPERATING PROCEDURES
FOR
SAMPLE SHIPPING PROCEDURES

REVISED: January 4, 2001

PREPARED BY:

KERAMIDA ENVIRONMENTAL, INC.
330 North College Avenue
Indianapolis, Indiana 46202
317/685-6600

MATERIALS

Sturdy plastic or metal ice cooler
Chain-of-custody forms
Custody seals
ESC mailing labels
Strapping, clear packing, and duct tape
Ziploc® plastic bags (or equivalent)
Knife or scissors
Tape and dispenser
Extra labels, custody seals
Permanent marker
Surgical gloves on nitrile gloves (only for hazardous waste)
Large plastic bag (garbage can size)
Arrow labels or "This End Up" labels
Minimum eight pounds of ice
Wet ice packs (frozen)
Bubble wrap or other packing material
Federal Express form (with ESC account number)
Vermiculite (or commercially available cat liner)

PROCEDURES

For shipping purposes, samples are segregated into two classes; environmental samples and restricted articles (i.e., hazardous materials). Environmental samples can also be categorized based on expected or historical analyte levels (i.e., low or high). An environmental sample is one that is not defined as a hazardous material by the Department of Transportation (DOT, 49 CFR Part 171.8). The DOT defines a "hazardous material" as a substance which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. Any material of a suspected hazardous nature, previously characterized as hazardous, or known to be hazardous is considered a restricted article.

In general, the two major concerns in shipping samples are protecting the samples from incidental breakage during shipment and complying with applicable DOT and courier requirements for restricted article shipments.

Protecting the samples from incidental breakage can be achieved by following "common sense." All samples should be packed in a manner that will not allow them to freely move about in the cooler or shipping container. Glass surfaces should not be allowed to contact each other. When possible, repack the samples in the same materials that they were originally received in from the laboratory. Each container should be cushioned with plastic bubble wrap, styrofoam, or other

nonreactive cushioning material. Shipping restricted articles should conform to the packaging, marking, labeling and shipping instructions identified in 49 CFR Part 172.101.

Environmental samples shall be packed for shipment using the following procedures:

1. Select a sturdy cooler in good condition. Secure and tape the drain plug with fiber tape. Line the cooler with a large, heavy-duty plastic bag.

2. Place 2-4 inches of bubble wrap or other packing material in the bottom of the cooler.

3. The sample packer should wear eye protection and protective gloves when handling the samples during the packing process.

4. After ensuring that sample container lids are secure, place the bottles in separate and appropriately size Ziploc® polyethylene bags. Seal the bags with tape.

5. Wrap duplicate volatile organic (VOA) vials in one piece of bubble wrap or other packing material as a "VOA sandwich."

6. Place the bottles in the cooler with sufficient space to allow for the addition of more bubble wrap or other packing material between the bottles. Large or heavy sample containers should be placed on the bottom of the cooler with lighter samples (i.e., VOAs) placed on top to eliminate breakage.

7. Put "wet ice" (i.e., ice packs) or ice that has been placed in sealed heavy-duty polyethylene bags on top of or between the samples. Pack enough ice in the cooler to chill the samples during transit. If the cooler is shipped on a Friday or Saturday for Monday delivery, double the amount of ice placed in the cooler. Fill all remaining space with bubble wrap or other packing material. Securely fasten the top of the cooler with tape.

8. Place chain-of-custody form (and, if applicable, CLP traffic reports) into Ziploc® plastic bag and affix to the cooler's inside lid, then close the cooler. Securely fasten the top of the cooler shut with fiber tape. Place two signed and dated chain-of-custody seals on the top and sides of the cooler so that the cooler cannot be opened without breaking the seals.

9. Once cooler is sealed, shake test cooler to make sure that there are no loose sample containers in the cooler. If loose samples are detected, open the cooler and repack the samples.

10. Using clear tape, affix a mailing label and KERAMIDA's return address to the top of the cooler.

11. Mark the cooler with "This End Up" and arrow labels that indicate the proper upward position of the cooler.

12. Ship samples via priority overnight express to the contracted analytical laboratory for next morning delivery. If applicable, check for Saturday delivery.

13. Declare value of samples on the shipping form for insurance purposes. Note this declared value should reflect the cost to recollect the samples.

14. Record the tracking numbers from the express courier forms in the field notebook. Also, retain the customer's copy of the express courier airbill.

Restricted articles should be packed according to the above procedures with the following additions:

1. Place samples in individual Ziploc® plastic bags and secure with a plastic tie.

2. Place samples in paint cans in a manner which would prevent bottle breakage (i.e., do not place glass against glass).

3. Place vermiculite or other absorbent packing material in the paint can around the samples. The amount of packing material used should be sufficient to absorb the entire contents of the sample if the container is broken during shipment.

4. Secure a lid to the paint can with can clips and label the outside of the can with sample numbers and quantity. Mark the paint can with "This End Up" and arrow labels that indicate the property upward position of the paint can.

5. Package the paint cans in DOT boxes or coolers, with appropriate DOT shipping labels and markings on two adjacent sides of the box or cooler.

6. Ship the restricted articles via overnight courier following the courier's documentation requirements. A special airbill must be completed for each shipment. Retain a copy of the airbill for ESC records and tracking purposes, if necessary.

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FLUOR DANIEL GTI

Drilling Log

Soil Boring GP-1

Project Allison-GM Plant 10 Owner General Motors/Allison
Location 700 N. Olin Avenue, Indianapolis, IN Proj. No. 010210261
Surface Elev. ____ Total Hole Depth 12 ft. Diameter 2 in.
Top of Casing ____ Water Level Initial 11 ft. Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core SIMCO
Drill Co. Earth Exploration Method Geoprobe
Driller T. Haskett Log By Krista Gremos Date 12/19/96 Permit # ____
Checked By Krista Gremos License No. ____

See Site Map For Boring Location

COMMENTS:

Geoprobe boring, backfilled with bentonite.

Depth (ft.)	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2					
0					
	4.6	0-2		ML	Clayey SILT; Dark brown to reddish brown, clayey SILT, some sand, trace gravel, moist.
2					
4					
6	5.2	5-7		ML	See above, dark brown to black, very moist.
8					
10					
	52	10-12		SP	SAND: Gray brown, fine to medium SAND, some coarse sand, little to some fines, trace gravel, very moist to saturated (?).
12					Boring terminated at 12 feet. Sampled to 12 feet. Groundwater encountered at approximately 11 feet.
14					
16					
18					
20					
22					
24					

FLUOR DANIEL GTI

Drilling Log

Soil Boring GP-2

Project Allison-GM Plant 10 Owner General Motors/Allison
Location 700 N. Olin Avenue, Indianapolis, IN Proj. No. 010210261
Surface Elev. ____ Total Hole Depth 12 ft. Diameter 2 in.
Top of Casing ____ Water Level Initial 11 ft. Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core SIMCO
Drill Co. Earth Exploration Method Geoprobe
Driller T. Haskett Log By Krista Gremos Date 12/19/96 Permit # ____
Checked By Krista Gremos License No. ____

See Site Map For Boring Location

COMMENTS:

Geoprobe boring, backfilled with bentonite.

Depth (ft.)	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2					
0					
	4.6	0-2		ML	Clayey SILT; Rubble and dark brown clayey silt
2					
4					
6	24	5-7		ML	Clayey SILT; Dark gray-brown, clayey SILT, some sand, trace gravel, moist, crumbly. Thin sand seam @ 6.8 feet.
				SP/ML	
8					
10					
	17	10-12		SP	SAND: Medium to dark brown SAND, some coarse sand, little fines, very moist to saturated.
12					Boring terminated at 12 feet. Sampled to 12 feet. Groundwater encountered at approximately 11 feet.
14					
16					
18					
20					
22					
24					

FLUOR DANIEL GTI

Drilling Log

Soil Boring GP-3

Project *Allison-GM Plant 10* Owner *General Motors/Allison*
Location *700 N. Olin Avenue, Indianapolis, IN* Proj. No. *010210261*
Surface Elev. _____ Total Hole Depth *12 ft.* Diameter *2 in.*
Top of Casing _____ Water Level Initial *11 ft.* Static _____
Screen: Dia _____ Length _____ Type/Size _____
Casing: Dia _____ Length _____ Type _____
Fill Material _____ Rig/Core *SIMCO*
Drill Co. *Earth Exploration* Method *Geoprobe*
Driller *T. Haskett* Log By *Krista Gremos* Date *12/19/96* Permit # _____
Checked By *Krista Gremos* License No. _____

See Site Map For Boring Location

COMMENTS:

Geoprobe boring, backfilled with bentonite.

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0					asph.	Asphalt and fill to approximately 1 foot.
	15	0-2			Fill ML	Clayey SILT: Dark brown, clayey SILT, some sand, trace gravel, stiff.
2						
4						
6	44	5-7			ML	Clayey SILT: Medium gray-brown, clayey SILT, to silty clay, some sand, trace gravel, moist.
8						
10						
	2.5	10-12			SP	SAND: Medium brown, fine to medium SAND, little to some coarse sand, little fines, trace gravel, very moist to saturated.
12						Boring terminated at 12 feet. Sampled to 12 feet. Groundwater encountered at approximately 11 feet.
14						
16						
18						
20						
22						
24						

Drilling Log

FLUOR DANIEL GTI

Soil Boring GP-4

Project Allison-GM Plant 10 Owner General Motors/Allison
Location 700 N. Olin Avenue, Indianapolis, IN Proj. No. 010210261
Surface Elev. ____ Total Hole Depth 12 ft. Diameter 2 in.
Top of Casing ____ Water Level Initial 11 ft. Static ____
Screen: Dia ____ Length ____ Type/Size ____
Casing: Dia ____ Length ____ Type ____
Fill Material ____ Rig/Core SIMCO
Drill Co. Earth Exploration Method Geoprobe
Driller T. Haskett Log By Krista Gremos Date 12/19/96 Permit # ____
Checked By Krista Gremos License No. ____

See Site Map For Boring Location

COMMENTS:

Geoprobe boring, backfilled with bentonite.

Depth (ft.)	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2					
0	1.3	0-2		ML	Clayey SILT; Dark reddish brown, clayey SILT, some sand, moist, crumbly.
2					
4					
6	2.0	5-7		ML	Silty CLAY; Medium brown, silty CLAY, some sand, trace gravel, moist, very stiff. Small sand seam near bottom of sample.
				SP	
8					
10	3.0	10-12		ML	Clayey SILT; Dark brown, clayey SILT, some sand, trace gravel, saturated, plastic to sticky.
12					Boring terminated at 12 feet. Sampled to 12 feet. Groundwater encountered at approximately 11 feet.
14					
16					
18					
20					
22					
24					

Drilling Log

FLUOR DANIEL GTI

Soil Boring GP-5

Project Allison-GM Plant 10 Owner General Motors/Allison
Location 700 N. Olin Avenue, Indianapolis, IN Proj. No. 01021026I
Surface Elev. _____ Total Hole Depth 12 ft. Diameter 2 in.
Top of Casing _____ Water Level Initial 11 ft. Static _____
Screen: Dia _____ Length _____ Type/Size _____
Casing: Dia _____ Length _____ Type _____
Fill Material _____ Rig/Core SIMCO
Drill Co. Earth Exploration Method Geoprobe
Driller T. Haskett Log By Krista Gremos Date 12/19/96 Permit # _____
Checked By Krista Gremos License No. _____

See Site Map For Boring Location

COMMENTS:

Geoprobe boring, backfilled with bentonite.

Depth (ft.)	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2					
0	2.8	0-2		ML	Clayey SILT; Reddish brown, clayey SILT, some sand, trace gravel, moist, crumbly.
2					
4					
6	2.0	5-7		SP / ML	SAND; Medium brown, fine SAND, some fines, moist. Grades to medium brown clayey SILT, some sand, moist, at 6.5 feet.
8					
10	6.4	10-12		SP	SAND; Medium brown, fine to medium SAND, some coarse sand, some fines, trace gravel, very moist to saturated.
12					Boring terminated at 12 feet. Sampled to 12 feet. Groundwater encountered at approximately 11 feet.
14					
16					
18					
20					
22					
24					

Drilling Log

FLUOR DANIEL GTI

Soil Boring GP-6

Project Allison-GM Plant 10 Owner General Motors/Allison
Location 700 N. Olin Avenue, Indianapolis, IN Proj. No. 010210261
Surface Elev. _____ Total Hole Depth 12 ft. Diameter 2 in.
Top of Casing _____ Water Level Initial 11 ft. Static _____
Screen: Dia _____ Length _____ Type/Size _____
Casing: Dia _____ Length _____ Type _____
Fill Material _____ Rig/Core SIMCO
Drill Co. Earth Exploration Method Geoprobe
Driller T. Haskett Log By Krista Gremos Date 12/19/96 Permit # _____
Checked By Krista Gremos License No. _____

See Site Map For Boring Location

COMMENTS:

Geoprobe boring, backfilled with bentonite.

Depth (ft.)	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2					
0					
	8.2	0-2		ML	Clayey SILT; Reddish brown, clayey SILT, some sand, trace gravel, moist, crumbly to plastic.
2					
4					
6	7.0	5-7		SP	SAND; Medium brown, fine to medium SAND, trace coarse sand, little fines, moist.
8					
10					
	4.5	10-12		SP	SAND; Medium brown, fine to medium SAND, little coarse sand, little fines, very moist to saturated.
12					Boring terminated at 12 feet. Sampled to 12 feet. Groundwater encountered at approximately 12 feet.
14					
16					
18					
20					
22					
24					

Drilling Log

GROUNDWATER TECHNOLOGY

Soil Boring HP-1

Project Allison-GM Plant 10 Owner General Motors/Allison
Location 700 N. Olin Avenue, Indianapolis, IN Proj. No. 040020345
Surface Elev. _____ Total Hole Depth 5 ft. Diameter 6 in.
Top of Casing _____ Water Level Initial 5 ft. Static _____
Screen: Dia _____ Length _____ Type/Size _____
Casing: Dia _____ Length _____ Type _____
Fill Material _____ Rig/Core CME-45
Drill Co. Earth Exploration Method Hollow-Stem Auger
Driller S. Phillips Log By Krista Gremos Date 9/6/95 Permit # _____
Checked By Krista Gremos License No. _____

See Site Map For Boring Location

COMMENTS:

Hydropunch

Depth (ft.)	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						
2						
4	0.0	3-5	8 14 14 16		SP SC	SAND: Tan SAND, very fine, dry, stiff, to 4'. Grading into clayey SAND, fine to coarse, moist, trace gravel. Saturated at 5'.
6						Boring terminated at 5 feet. Sampled to 5 feet. Groundwater encountered at 5 feet.
8						
10						
12						
14						
16						
18						
20						
22						
24						

KERAMIDA Environmental, Inc.	LOG OF BORING KB-1 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829D Date Drilled : 3/1/00 Drilling Method : Geoprobe Geologist/Tech : BH Drilling Co : KEI General Location : NE corner of North : and Olin
KERAMIDA Project No. 2829D	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Silty Clay with gravel FILL			ND	
	CL		Silty CLAY, 10YR 4/4, moist	1	80	ND	
5				2	80	ND	
	GW		Silty SAND AND GRAVEL, 10YR 4/5, very moist SAND AND GRAVEL, 10YR 4/5, moist			13.6	
	SW		Medium to Coarse SAND with scattered gravel, 10YR 5/2, moist SAA, 10YR 5/1	3	75	14.4	
10	SP		Silty Fine SAND, 10YR 5/4, tight			17.1	
	GW		Medium to Coarse SAND AND GRAVEL, 10YR 5/1, moist			27.0	Groundwater screen set from (10-15')
	CL		Sandy Silty CLAY with scattered gravel, 10YR 5/1, moist	4	90	1.6	
15							
20							
25							
30							
35							
40							

No soil sampled based on field observations

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-2

(Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829D

Project ID : 2829D
Date Drilled : 3/1/00
Drilling Method : Geoprobe
Geologist/Tech : BH
Drilling Co : KEI

General Location : East of MW-156 in : alley

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Asphalt and gravel				
	FL		Silty Clayey gravelly FILL, moist FILL Sand, 10YR 3/5, moist	1	70	ND ND	
5	GW		SAND AND GRAVEL, 10YR 6/4, dry to slightly moist	2	60	2.4 2.1	
10			SAA, slightly moist	3	75	4.0 11.1	
				4	75	15.0	
15			Blind Drilled (16'-20')			14.4	
				5			Groundwater screen set from (16-20')
20							
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-3

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829D

Project ID : 2829D
Date Drilled : 3/1/00
Drilling Method : Geoprobe
Geologist/Tech : BH
Drilling Co : KEI

General Location : Southeast of
: MW-157

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Topsoil				
	FL		Sandy Silty Clay FILL, 10YR 4/5, moist	1	80	1.0 1.9	
	SW		Medium to Coarse SAND with gravel, 10YR 5/4	2	80	2.4 2.4	
5			SAA, 10YR 4/4	3	80	2.4 3.0	
10			Medium SAND, 10YR 5/4, moist	4	75	2.4 3.0	
15	SP		Fine SAND, 10YR 5/4, very moist				
	GW		SAND AND GRAVEL, 10YR 5/4, moist	5	75	3.5 3.0	
20			Blind Drilled (20'-23')	6			Groundwater screen set from (19-23')
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-4 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829D

Project ID : 2829D
Date Drilled : 3/3/00
Drilling Method : Geoprobe
Geologist/Tech : BH
Drilling Co : KEI

General Location : Michigan Apts.-
: South of MW-161

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Silty CLAY, 10YR 4/3, moist	1	60	0.3	
	SW		Medium to Coarse SAND, 10YR 4/4, moist			1.1	
5	CL		Medium to Coarse Sandy Silty CLAY, 10YR 4/4, moiar Silty CLAY with scattered Sand, 10YR 4/3	2	30	0.6 0.6	
10	FL		Sand and Gravel FILL with concrete Sand and Gravel FILL with wood material	3 4	25 35	0.8 5.6	Refusal at 11.5' moved probe approximately 6' east
	GW		Silty Clayey SAND AND GRAVEL, 10YR 5/1, very moist to wet	5	80	2.3	
15	SW		Medium to Coarse SAND with scattered gravel, 10YR 5/1, wet	6	80	1.8 1.8	
20			SAA	7	80	4.3 6.1	
25	GW		SAND AND GRAVEL, 10YR 5/1, wet SAA with rock, 10YR 5/2	8	85	13.4 8.1	
30			SAND AND GRAVEL, 10YR 5/1, wet	9	85	14.9 9.6	
				10	70	48	Groundwater screen set from (32-36')
35	SP		Fine SAND, 10YR 5/1, wet			27	
	GW		SAND AND GRAVEL, 10YR 5/1, wet				
	CL		Silty CLAY	11	85	17.1 17.1	
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-5 (Page 1 of 2)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829D Date Drilled : 3/6/00 Drilling Method : Geoprobe Geologist/Tech : BH Drilling Co : KEI General Location : In Michigan Apts. : across from MW-160
KERAMIDA Project No. 2829D	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Sandy Silty Clayey Gravelly FILL	1	60	0.3	
			Silty Sandy FILL			1.8	
5				2	60	1.3	
	GW		SAND AND GRAVEL, 10YR 5/4, dry			1.1	
			SAA, slightly moist	3	60	1.6	
10	SM		Silty SAND, 10YR 4/4, very moist SAA, wet			1.8	
	SW		Medium to Coarse SAND, 10YR 5/1, wet	4	60	1.6	
15						2.6	
				5	70	5.8	
						4.6	
20			SAA	6	70	19.4	
						12.1	
	GW		Medium to Coarse SAND AND GRAVEL, 10YR 5/1, wet SAA, 10YR 4/1	7	80	11.9	
25							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-5

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829D

Project ID : 2829D
Date Drilled : 3/6/00
Drilling Method : Geoprobe
Geologist/Tech : BH
Drilling Co : KEI

General Location : In Michigan Apts.
: across from MW-160

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
25	GW			7	80	5.4	
	SW		Medium SAND, 10YR 5/1, wet	8	15	6.8 6.8	
30	SP		Fine to Medium SAND, 10YR 5/1, wet	9	80	38.2 83.9	Groundwater sample collected for possible lab analysis (32-36')
35	GW		SAND AND GRAVEL, wet	10	90	31.9	
	SW		Medium to Coarse SAND w/gravel, wet			37.4	
40	GW		SAND AND GRAVEL, 10YR 4/1, wet				
	SW		Medium to Coarse SAND with gravel, 10YR 4/1, wet	11	80	69	
	GW		SAND AND GRAVEL, 10YR 4/1, wet			72	
45				12	40	45 45	
50							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-6 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829D Date Drilled : 3/6/00 Drilling Method : Geoprobe Geologist/Tech : BH Drilling Co : KEI General Location : In Michigan Apts. : NE of Tennis Courts
KERAMIDA Project No. 2829D	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Silty CLAY, 10YR 4/3, slightly moist	1	70	0.3	
	FL		Silty Sand and Gravel FILL, moist			1.3	
5				2	80	1.8	
	SM		Silty SAND, 10YR 5/4, dry			1.3	
	SW		Medium to Coarse SAND w/scattered gravel, 10YR 5/4 slightly moist to dry	3	60	2.1	
10						1.8	
	ML		SILT, 10YR 4/2, very moist				
	SW		Medium SAND, 10YR 4/1, moist	4	60	1.6	
15			Medium to Coarse Sand, 10YR 4/1, wet			1.8	
			As above w/scattered gravel, 10YR 5/1				
	SP		Fine to Medium SAND, 10YR 5/1, wet	5	70	1.6	
	SW		Medium to Coarse SAND with gravel, 10YR 5/1, wet			1.8	
20				6	70	1.6	
			SAA			1.6	
25				7	55	1.3	Groundwater screen set from (22.5-26.5')
	CL		Silty CLAY with scattered Sand and Gravel, 10YR 4/1, moist			1.1	
30				8	95	0.6	
						0.6	
35							
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-7 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 4/5-6/00
Drilling Method : Push Probe
Geologist/Tech : RSF
Drilling Co : Terra Probe

General Location : NW corner of Michigan
: Apts. near Holt Road
: Bridge

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Topsoil and Grass	1		0	
	FL		FILL Material, black slag			3.3	
	CL		Sandy CLAY, brown, dry, medium stiff, trace organics				
5			SAA	2		2.7	
						1.5	
			6" sand seam				
			2.5" sand seam	3		0	
10			2" sand seam			1.2	
			Sandy CLAY, brown, dry, medium stiff, trace organics				
	GW		SAND AND GRAVEL, brown, moist	4		2.3	
15						2.3	
				5		NA	
						NA	
20			SAND AND GRAVEL, gray, wet	6		1.0	
						0.4	
25				7		0.4	
						0.4	
30			SAA	8		0.2	
						0.4	
35				9		0	Groundwater well screen set from (33-36')
						1.5	
	CL		Silty CLAY, gray, moist to dry, "hard pan"	10		1.1	
			SAA			1.1	
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-8 (Page 1 of 2)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 4/14/00 Drilling Method : Geoprobe Geologist/Tech : BH Drilling Co : Terra Probe General Location : Near NE corner of : Michigan Apt. #16
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Topsoil				
	CL		Silty CLAY w/gravel	1	85	1.9	
	GW		Silty SAND AND GRAVEL, slightly moist			2.4	
5	SW		Medium SAND, 10YR 4/4, slightly moist SAA, 10YR 5/3	2	85	2.2	
			SAA			2.2	
			Medium to Coarse SAND with gravel, 10YR 5/3, slightly moist	3	80	2.4	
10	SP		Fine to Medium SAND, 10YR 5/1, slightly moist				
	SW		Medium to Coarse SAND, 10YR 4/4, moist			2.4	
	CL		Sandy Silty CLAY w/scattered gravel, 10YR 4/4, moist, mottling, @11.5' Sandy Silty CLAY, 10YR 4/2 moist				
	SW		Medium to Coarse SAND, 10YR 4/2, moist, @13.25			3.3	
	CL		Silty Medium to Coarse SAND with gravel, 10YR 4/2				
			Slightly Sandy Silty CLAY w/scattered gravel, 10YR 4/1, moist	4	80		
15	GW		Medium to Coarse SAND AND GRAVEL, 10YR 4/3, moist			2.8	
			SAA, 10YR 4/1, wet	5	80	3.0	
						2.8	
20				6	70	4.1	
	SP		Fine SAND, 10YR 4/1, wet			17.1	
				7	50	22.4	
25							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-9 (Page 1 of 2)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 4/14/00 Drilling Method : Geoprobe Geologist/Tech : BH Drilling Co : Terra Probe General Location : SW corner of : Michigan Apt. #4
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Topsoil				
	CL		Silty CLAY w/scattered sand and gravel, 10YR 4/3, mois	1	100	0.4	
						ND	
			Sandy, Silty, CLAY, 10YR 4/2, moistt	2	100	0.5	
5						0.8	
				3	90	1.8	
	GW		SAND AND GRAVEL, 10YR 5/4, slightly moist			2.2	
10				4	85	1.9	
	ML		Fine Sandy SILT, 10YR 5/6, very moist; @14.75, SAA, 10YR 5/1			1.6	
15	SW		Medium to Coarse SAND, 10YR 4/1, wet	5	85	1.9	
	GW		SAND AND GRAVEL, 10YR 4/1, wet			1.9	
	SP		Fine to Medium SAND, 10YR 4/1, wet				
20	SW		Medium to Coarse SAND with gravel, 10YR 4/1,wet	6	85	1.8	
						2.2	
				7	75	2.5	
25							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-10 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 4/5/00 Drilling Method : Push Probe Geologist/Tech : RSF Drilling Co : Terra Probe General Location : 642 Luett between road and sidewalk in grass
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Topsoil grass, dry, medium stiff	1		0	
	CL		Sandy CLAY, brown, dry, medium stiff, sand in bottom			1.1	
			Sandy CLAY, brown, dry to moist	2		1.1	
5	SW		Medium SAND, brown, dry to moist			1.1	
	GW		SAND AND GRAVEL, moist to dry	3		1.4	
10						1.7	
			Sand and Gravel, brown/black, no odor	4		1.7	
15						2.1	
				5		1.8	
						2.7	
20				6		3.0	Groundwater sample collected for possible lab analysis (22-25')
			SAA, wet, small band of orange @23'			0.4	Groundwater screen set from (22-25')
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-11

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829D

Project ID : 2829D
Date Drilled : 4/5/00
Drilling Method : Push Probe
Geologist/Tech : RSF
Drilling Co : Terra Probe

General Location : NE corner of Walnut
: Alley east of Olin

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Topsoil grass, dry, medium stiff	1		0	
	CL		Mix of Sandy CLAY and Sand, brown, dry			0	
	GW		SAND AND GRAVEL, brown, dry	2		0	
5						0	
				3		0	
10						1.1	
				4		0.1	
15						0.1	
				5		1.1	
			Same as above, with orange tint at water interface, wet			0	
20				6		0	Groundwater sample collected for possible lab analysis (21-24')
						0	Groundwater screen set from (21-24')
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-12 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 4/5/00
Drilling Method : Push Probe
Geologist/Tech : RSF
Drilling Co : Terra Probe

General Location : East side of Olin Ave

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Gravel, Slag and Asphalt FILL, black and dark brown	1		0	
	CL		Sandy CLAY, brown, dry to moist			0.7	
5				2		0.7	
	GW		SAND AND GRAVEL, brown, dry			0.5	
			SAA, dry to moist	3		0.7	
10			SAA, moist with orange coloring at 11.5'-11.7'			0	
				4		0	
	ML		Sandy SILT, brown, dry to moist, stiff				
15	GW		SAND AND GRAVEL, brown, moist to wet			0.5	
	CL		Sandy CLAY, brown, moist				
	GW		SAND AND GRAVEL, wet	5		NA	Groundwater screen set from (17-20')
20						NA	
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-13 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 4/6/00
Drilling Method : Push Probe
Geologist/Tech : RSF
Drilling Co : Terra Probe

General Location : Located between east : fence line and bldg.

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt and base FILL				
	CL		Sandy CLAY, black/brown, moist, w/organics (wood)	1		2.3	
						2.0	
5	GW		SAND AND GRAVEL, brown, dry	2		3.3	
			Rock			2.6	
10				3		4.0	
						0.5	
			SAND AND GRAVEL, brown, moist to wet	4		0.5	
15			SAA, wet			1.5	Groundwater screen set from (14-17')
				5		2.0	
			SAA, wet			1.5	
20							
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-14 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana KERAMIDA Project No. 2829E	Project ID : 2829E Date Drilled : 4/6/00 Drilling Method : Push Probe Geologist/Tech : RSF Drilling Co : Terra Probe General Location : 50' North of KB-13

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt FILL				
	CL		Sandy CLAY, black/brown, moist, soft	1		0.2	
			Sandy CLAY, brown, moist, soft			0.7	
5				2		1.1	
	GW		SAND AND GRAVEL, brown, dry			0.9	
				3		1.1	
10			Same as above, w/fine SAND, moist			1.7	
			Sand and Gravel w/fine Sand at 12-13', orange tint, moist	4		0.2	
15			SAND AND GRAVEL, brown, wet			1.1	
				5		1.2	Groundwater screen set from (15-18')
			SAA			0	
20							
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-15 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 4/6/00 Drilling Method : Push Probe Geologist/Tech : RSF Drilling Co : Terra Probe General Location : ' South of KB-14
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt FILL				
	CL		Sandy CLAY, black/brown, moist, soft	1		0 2.0	
5			SAA	2		3.0	
	GW		SAND AND GRAVEL, brown, dry			29.0	
10			SAA, moist	3		30 26	
	SP		Fine SAND, brown, moist SAA, with gravel, orange/reddish tint	4		17.6 26	
15	GW		SAND AND GRAVEL, brown, moist to wet	5		0.4 0	Groundwater screen set from (16-19')
20							
25							
30							
35							
40							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-16 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/3/00 Drilling Method : Hurricane Push Probe Geologist/Tech : Brian Harrington Drilling Co : Terre Probe
KERAMIDA Project No. 2829E	General Location : SW corner of Bldg 10, : Grass area of west side of : parking lot adjacent : to brick entrance sign

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Grass and top soil				
	FL		Sand FILL, dry	1		10	
			Medium to Coarse SAND, brown, dry			0	
5				2		0.7	
						0.5	
			SAA,dry to damp, color change to rusty brown at 11'10"	3		1.5	
10						0.6	
				4		0.7	
			Silty Clayey SAND with trace gravel, grayish brown, moist, stiff, slightly plastic				
15			Medium to Coarse SAND with some gravel, light brown, dry to damp			0.5	
			SAA, grayish borwn	5		2.0	
	SW		Well sorted Medium SAND, grayish brown, saturated			0.4	
20				6		0.8	
						1.5	
			SAA				
25				7		5.8	
						NA	
			SAA with some gravel	8		8.3	Groundwater sample collected for possible lab analysis (29-34')
30						4.0	
				9		14.	
35						NA	
	SP		Silty Clayey SAND with trace gravel, dark grayish brown, low moisture, very stiff, non-plastic	10		1.2	
40						0.2	

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KERAMIDA Environmental

LOG OF BORING KB-17

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Avery-Dennison Facility
650 West 67th Avenue
Schererville, Indiana 46320
KERAMIDA Project No. 3334

Project ID	: 2829E	General Location	: Building #1, NW parking
Date Drilled	: 5/2/00-5/3/00		: space in front (south)
Drilling Method	: Push Probe		: parking lot
Geologist/Tech	: Brian Harrington		
Drilling Co.	: Terra-Probe		

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Water Levels	Samples	Rec inches0.	PID ppm	REMARKS
0			Asphalt					
	SP		Silty, Clayey SAND with little gravel, dark brown, dry to damp, cohesive, stiff		1	100	1.4	
							1.5	
5			SAA with increasing sand content, noncohesive		2	100	4.7	
			SAA, grading to sand with little silt				23.8	
	SW		Medium to Coarse SAND with little fine gravel, brown, dry		3	80	13.8	
10			SAA, with 3" of iron staining				50.9	Soil sample collected for laboratory analysis (10-12')
					4	100	50.3	
15	SP		Fine SAND, brown, well sorted, wet	▼			5.2	
	SW		Medium to Coarse SAND with trace gravel, grayish brown, saturated, well sorted		5	NA	NA	
20			SAA, dark gray, saturated, 2" clay stringer @ 20.75'				0	
					6	NA	0	
							0	
25	GW		SAND AND GRAVEL, grayish brown, saturated		7	NA	1.0	Groundwater sample collected for possible lab analysis (24-29')
							1.3	Groundwater screen set from (24.5-29.5')
30	SP		Silty, Clayey SAND with trace gravel, brownish gray, moist, stiff, slightly plastic		8	NA	1.0	
							0.7	
			5" of wood debris and organic material beginning at 30.5'		9	NA	0.4	
35							0.6	
					10	NA	0.9	
40							0.7	

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-18 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 7/10/00 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co : KEI General Location : Along East side of Holt Rd : adjacent to appartments
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Silty clay FILL, with scattered brick fragments and gravel, 10YR 4/3, moist	1	95	15.6	
			Silty Clay FILL with scattered sand, 10YR 3/1, moist			15.6	
5				2	95	9.0	
	SM		Silty CLAY, with sand & gravel, 10YR 4/4, slightly moist			15.6	
10	GW		Silty SAND & GRAVEL, 10YR 5/4, slightly moist	3	60	9.0	
			Same as above, 10YR 4/6			9.0	
			SAND & GRAVEL, 10YR 5/6, slightly moist	4	70	10.7	
15	CL		Sandy silty CLAY, 10YR 4/4, very moist			20.1	
			Same as above, 10YR 4/1	5	40	20.1	
			As above, with scattered gravel			20.1	
20	GW		SAND & GRAVEL, 10YR 5/4, moist				
	SW		Medium SAND, w/ gravel, 10YR 4/1, very moist	6	70	4.0	
			Same as above, wet			4.0	
			Same as above, 10YR 4/2, wet	7	70	40.3	
25	GW		SAND & GRAVEL, 10YR 4/2, wet			48.4	
30	SW		Medium to coarse SAND & GRAVEL, wet, 10YR 4/2	8	70	36.3	
						60.4	
	GW		SAND & GRAVEL, wet, 10YR 4/4	9	30	64.5	
35			As above, 10YR 4/2			64.5	
			Medium to coarse SAND & GRAVEL, wet, 10YR 4/1	10	50	20.1	
40						44.3	
				11	75	52.4	
						48.4	Groundwater sample collected for lab analysis (44-48')
45				12	60	52.4	
			As Above			68.6	
50				13	80	48.4	
						36.3	
	CL		Sandy, silty CLAY , very moist, 10YR 4/1	14	80	40.3	
55						28.2	
60							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-19 (Page 1 of 1)

Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 7/11/00 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co : KEI	General Location	: Along west side of Holt : parallel with north : side of bldg 23
KERAMIDA Project No. 2829E			

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Silty CLAY with scattered Sand & Gravel Fill, 10YR 3/3, slightly moist	1	80	1.0	
			As Above			4.1	
5	GW		SAND & GRAVEL, dry to slightly moist, 10YR 5/4	2	90	1.2	
	SW		Medium SAND, 10YR 5/4, dry to slightly moist			2.2	
10	GW		SAND AND GRAVEL, 10YR 5/4, slightly moist	3	80	12.3	
						14.5	
			Silty Clayey SAND AND GRAVEL, 10YR 4/4, very moist	4	75	10.7	
15			SAA,10YR 4/2			9.8	
			SAA, 10YR 4/1				
	CL		Silty CLAY with Sand and Gravel, 10YR 4/1	5	90	11.0	
	SW		Medium SAND with gravel, 10YR 4/4, moist; @19', SAA, 10YR 5/4			28.0	
20	GW		SAND AND GRAVEL, 10YR 5/3, wet	6	80	32.0	Groundwater sample collected for possible lab analysis (20-24')
						12.2	
25	SW		Medium to Coarse SAND with Gravel, 10YR 5/3, wet	7	80	0.8	
	GW		SAND AND GRAVEL, 10YR 5/3, wet			2.7	
			Medium to Coarse SAND AND GRAVEL, 10YR 4/4, wet	8	80	2.7	
30						2.7	
			SAA, 10YR 5/3	9	40	3.1	
35			SAA,10YR 4/1			2.7	
				10	60	1.8	
40						2.1	
				11	40	3.4	
						3.4	
45	SW		Medium SAND with scattered Gravel, 10YR 4/1, wet	12	85	2.1	Groundwater sample collected for possible lab analysis (44-48')
	GW		SAND AND GRAVEL, 10YR 4/1, wet			3.1	
50				13	85	2.7	
	CL		Silty CLAY with scattered Sand, 10YR 4/1, very moist			3.4	
55							
60							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-20

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 7/12/00
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co : KEI

General Location : Northeast corner of : Michigan St. and Holt Rd.

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Silty Clay with Sand & Gravel FILL, 10YR 4/4, slightly moist	1	40	3.1	
			Sand and Gravel FILL, slightly moist to dry, 10YR 3/1			3.1	
5	GW		SAND & GRAVEL, moist, 10YR 4/4	2	90	2.5	
						7.5	
10	SW		Medium SAND, 10YR 4/4, moist	3	60	9.4	
						3.7	
	GW		SAND AND GRAVEL, 10YR 4/4, moist				
15	SP		Silty Clayey SAND, 10YR 5/2, very moist to wet	4	75	9.7	
						48	Soil sample collected for possible lab analyis (14-16')
20	SW		Medium to Coarse SAND, 10YR 5/4, moist	5	95	53	
			SAA with gravel			2.2	
			SAA, wet				
			SAA, 10YR 4/1	6	75	55.6	
25	GW		SAND AND GRAVEL, 10YR 4/1, wet			91	Groundwater sample collected for possible lab analysis (20-24')
			SAA	7	30	10.7	
						10.7	
30				8	75	10.4	
			SAA			14.5	
35				9	40	9.4	Groundwater sample collected for possible lab analysis (31-35')
			Silty SAND AND GRAVEL, 10YR 5/1, wet			9.4	
	CL		Silty CLAY with scattered Sand, 10YR 5/1, moist	10	100	1.2	
	SW		Medium to Coarse SAND, 10YR 5/1, wet			5.0	
	SP		Fine to Medium SAND, 10YR 5/1, wet				
40							
45							
50							
55							
60							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-21

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 7/12/00
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co : KEI

General Location : Along North side of : Michigan St., North of : Apt. 13

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt				
	CL		Gravelly FILL;@ 0.5' Silty Clay with with Sand & Gravel Fill, 10YR 3/1, moist	1	95	1.2 1.5	
5	GW		Silty CLAY with scattered Sand and Gravel , 10YR 3/3 SAND & GRAVEL, slightly moist, 10YR 5/4	2	85	2.2 3.4	
10			As Above	3	60	5.0 1.8	
15			As Above	4	60	2.2 6.3	
	CL		Sandy, Silty CLAY, 10YR 4/1, moist				
20	GW		Silty, Clayey SAND & GRAVEL, very moist, 10YR 4/1 SAND AND GRAVEL, wet, 10 YR 4/1	5	75	2.2 3.7	
	SP		Fine to Medium SAND, 10YR 5/1, wet	6	60	5.6 3.1	
	GW		SAND & GRAVEL, 10YR 5/1, wet				
25	SW		Medium to Coarse SAND, 10YR 5/1, wet	7	65	6.9 11.3	
30	GW		SAND & GRAVEL, 10YR 5/1, wet SAA	8	45	7.8 12.6	
35	CL		Silty CLAY with scattered sand, moist, 10YR 4/1	9	70	8.0 9.5	Groundwater sample collected for possible lab analysis (30-34')
40							
45							
50							
55							
60							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-22

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 7/13/00
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co : KEI

General Location : Along North side of
: Michigan St. East of Plaza

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Silty CLAY, 10YR 4/4, slightly moist to dry Silty CLAY with Sand & Gravel, slightly moist, 10YR 3/2	1	50	4.5 4.8	
5	SW		Medium SAND with scattered Gravel, 10 YR 4/4, slightly moist	2	30	5.9 5.9	
	GW		Silty, Clayey SAND & GRAVEL, moist, 10YR 4/4				
10	CL		Sandy, Silty CLAY with Gravel	3	80	6.4 8.4	
	GW		SAND & GRAVEL, 10YR 5/4, slightly moist	4	75	9.3 5.7	
15	SW		Medium SAND, 10YR 4/6, slightly moist				
	GW		Silty SAND & GRAVEL, 10YR 4/4, moist				
	SP		Fine to Medium SAND, 10YR 5/4, slightly moist	5	60	6.9	
20	SW		Medium to Coarse SAND with Gravel, 10YR 4/4, wet Medium SAND, 10YR 4/1, wet Medium to Coarse SAND with gravel, 10YR 5/1, wet	6	60	11.3 11.2 12.2	
25	GW		SAND & GRAVEL, 10YR 5/1, wet SAA	7	60	6.7 14.3	
30				8	90	10.1 7.6	Groundwater sample collected for possible lab analysis (26-30')
	CL		Silty CLAY with scattered Sand, 10YR 5/1, moist				
35							
40							
45							
50							
55							
60							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-23 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 7/13/00 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co : KEI General Location : Southwest Corner of Olin Ave. and Michigan Street
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Silty Clayey Sand and Gravel FILL, 10YR 5/4, slightly moist	1	50	8.8	
						7.2	
5			Silty Sandy FILL, moist, 10YR 4/3	2	<10	6.8	
						6.8	
10	GW		Silty Clayey SAND AND GRAVEL, 10YR 4/2, very moist	3	40	3.4	
			SAA, moist			5.0	
15	SP		Fine to Medium SAND, 10YR 4/1, moist	4	60	7.5	
						6.3	
	GW		Silty, SAND & GRAVEL, moist to wet, 10YR 4/2;@19', Medium to Coarse SAND AND GRAVEL, 10YR 3/1, wet, petroleum odor	5	75	10.1	
20	SP					340	Groundwater sample collected for possible lab analysis (18-22')
			Fine to Medium SAND, wet, 10YR 5/1	6	95	13.2	
			SAA			8.0	
25				7	60	8.2	
						7.2	
30	SW		Medium to Coarse SAND with Gravel, 10YR 5/1, wet	8	75	3.7	Groundwater sample collected for possible lab analysis (26-30')
						3.5	
	CL		Silty CLAY with scattered SAND, 10YR 5/1, moist				
35							
40							
45							
50							
55							
60							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-24 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 7/17/00 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co : KEI General Location : Southwest Corner of : Plaza Property
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt				
	CL		Gravelly FILL; @0.5', Silty Clay with Sand and Gravel FILL, 10YR 3/3	1	100	1.8 2.2	
5			Silty CLAY, 10YR 3/3, slightly moist; @2' Silty CLAY with scattered sand and gravel, 10YR 3/3, slightly moist	2	80	2.1 3.4	
	GW		SAND & GRAVEL, 10YR 5/4, Dry	3	70	2.1 1.3	
10			As Above	4	75	2.4 4.4	
15	SP		Fine SAND, 10YR 5/3, slightly moist; @17.5'	5	85	5.1	
	SW		Silty Fine SAND, 10YR 4/, very moist			92	Soil sample was collected for possible lab analysis (18-20')
20	GW		Medium to Coarse SAND, very moist, 10YR 4/1	6	NA	NA NA	
			Silty, Fine SAND, very moist, 10YR 4/1	7	NA	NA NA	
			SAND & GRAVEL, moist, 10YR 5/4	8	NA	NA NA	
25	BD		BLIND DRILL (20'-36')	9	NA	NA NA	Groundwater sample collected for possible lab analysis (32-36')
30							
35							
40							
45							
50							
55							
60							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-25 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 7/17-18/00 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co : KEI General Location : ALong East Edge of Plaza Parking Lot
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		TOPSOIL				
			Silty Clay FILL, 10YR 3/2	1	100	2.1	
	CL		Silty CLAY with scattered Sand and Gravel, 10YR 3/3, moist			2.4	
5			SAA	2	30	2.1	
						2.1	
	GW		SAND & GRAVEL, moist, 10YR 5/4	3	60	4.1	
10						1.3	
				4	75	2.0	
15			As Above			3.4	
				5	50	5.1	
	SP		Fine SAND, moist, 10YR 5/1 @19' SAA, Silty Fine SAND			2.0	
20	GW		SAND & GRAVEL, wet, 10YR 4/1	6	60	2.1	
						1.0	
25	NR		NO RECOVERY	7	0	ND	
						ND	
	GW		SAND & GRAVEL, wet, 10YR 5/1	8	60	2.6	
30			SAA			1.5	
				9	85	3.3	Groundwater sample collected for possible lab analysis (32-36')
35	CL		Sandy, Silty CLAY, moist, 10YR 5/1			2.7	
40							
45							
50							
55							
60							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-26 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 7/18/00 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co : KEI General Location : Near Northeast Corner of Village Pantry
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt Sandy, Gravelly FILL, dry	1	85	1.8	
5	CL		Silty CLAY, slightly moist, 10YR 3/3 Silty CLAY with scattered Sand & Gravel, 10YR 3/3, slightly moist	2	85	1.3 2.7 4.5	
10	GW		SAND & GRAVEL, slightly moist, 10YR 5/4 As Above	3	40	2.4 2.6	
15				4	70	7.3 2.6	
	SP		Fine to Medium SAND, 10\YR 5/4, slightly moist	5	80	1.3	
20	GW		SAND & GRAVEL, moist, 10YR 5/4 Silty SAND AND GRAVEL, 10YR 5/1, very moist SAND AND GRAVEL, 10YR 5/1, wet As Above	6	70	3.2 9.3 9.1	Groundwater sample collected for possible lab analysis (20-24')
25				7	70	4.7 6.4	
30			As Above	8	70	1.0 1.2	
35	CL		Silty CLAY with scattered Sand & Gravel, 10YR 4/1, moist	9	70	1.1 1.0	Groundwater sample collected for possible lab analysis (32-36')
40							
45							
50							
55							
60							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-27

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 7/24/00
Drilling Method : Geoprobe
Geologist/Tech : Frank West
Drilling Co : KEI

General Location : North Olin Ave. Trailor 23
: West side of Rd, 1' off
: sidewalk

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Asphalt and gravel base				
	SP		Moist, dark brown, clayey SAND with gravel	1	80	2.1	
			Dry, light brown, SAND, with gravel			2.1	
5				2	70	3.1	
			As Above, gravel increasing			0.6	
10				3	75	1.5	
						.3	
			As Above, moist, iron staining, grey color	4	95	1.5	
15						3.4	
	GW		Gray and Brown, wet, SAND & GRAVEL			2.7	
	SP		Grayish Brown, wet Medium SAND, little gravel, wet	5	50	NA	
20			As Above, Saturated, 2" clay seam at 22'8"	6	70	1.8	
						1.2	
25			As Above	7	90	1.2	
						1.8	
	NR		NO RECOVERY	8	0	NA	Groundwater sample collected for possible lab analysis (28-32')
30						NA	
				9	0	NA	
35						NA	
	SW		Fine SAND, grayish brown,	10	50	0.9	
40						NA	
				11	75	0.9	
			Grayish brown, Saturated, medium SAND with little gravel.			0.9	
45				12	75	0.9	
	GW		SAND & GRAVEL			0.9	
50							
55							
60							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-28 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/15/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : NE corner of site
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Silty CLAY, 10YR 4/3, moist Sandy Gravelly Clayey FILL			0.3	
	CL		Silty CLAY, 10YR 3/2, moist Sandy Gravelly Silty CLAY, 10YR 4/4, moist	2	75	0.3	
5	GW		Silty SAND AND GRAVEL, 10YR 4/2, moist	3	70	0.3	
	SP		Silty Fine to Medium SAND , 10YR 4/4, very moist			0.3	
	GW		SAND AND GRAVEL, 10YR 4/4, moist	4	70	1.0 1.0	
10			SAA, 10YR 4/2	5	60	0.3	
15			SAA, wet			0.3	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-29 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana KERAMIDA Project No. 2829E	Project ID : 2829E Date Drilled : 5/15/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : East of building, near Sue MW

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt				
			Gravelly FILL				
	CL		Silty CLAY, 10YR 3/2, moist			1.0	
			Sandy Gravelly Silty CLAY, 10YR 3/3, moist	1	100		
						1.0	
			As Above				
5						1.7	
	GW		SAND AND GRAVEL, 10YR 5/3, slightly moist	2	75		
						15.1	
			As Above				
						11.6	
10				3	50		
						17.9	
			As Above, bottom 1" wet				
						15.1	
				4	70		
15						12.3	
	SP		Silty Fine/Medium SAND, very moist to wet				
	GW		SAND AND GRAVEL, 10YR 5/4, wet				
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-30 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana KERAMIDA Project No. 2829E	Project ID : 2829E Date Drilled : 5/15/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : NE corner of site

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Silty CLAY, 10YR 3/2, slightly moist			1.0	
			Sandy Silty CLAY, 10YR 3/2, slightly moist	1	80		
	GW		SAND AND GRAVEL, 10YR 5/4, slightly moist			0.3	
			As Above				
5						1.0	
	SW		Medium/Coarse SAND with gravel, 10YR 5/1	2	75		
						1.0	
			As Above				
						1.0	
10			As Above, wet	3	60		
						1.7	
15							
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-31 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/15/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : East of KB-30, : midway down building
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Sandy Silty CLAY, 10YR 4/2, moist			ND	
	SP		Silty SAND (medium), 10YR 4/4, moist	1	80	ND	
5	GW		SAND AND GRAVEL, 10YR 5/4, moist As Above			ND	
	CL		Sandy Silty CLAY with scattered gravel , 10YR 4/1, moist	2	70	ND	
	SP		Silty SAND, 10YR 5/4, moist Medium SAND, 10YR 5/4, moist As Above			ND	
10	GW		Silty SAND AND GRAVEL, 10YR 4/1, wet SAND AND GRAVEL, 10YR 4/2, wet	3	80	ND	
15							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-32

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/15/01
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co. : Terra Probe

General Location : SE corner of : property

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Sandy Gravelly Silty CLAY, 10YR 3/2, moist	1	80	0.3	
	GW		SAND AND GRAVEL, 10YR 5/4, slightly moist			0.3	
			As Above	2	70		
5						1.7	
						2.4	
			As Above, bottom 1" Silty clay, 10YR 5/1, moist	3	80		
						4.5	
10						10.2	
	CL		Silty CLAY with scattered sand and gravel, 10YR 5/1, moist	4	90		
	SP		Silty Fine to Medium SAND, 10YR 4/1			4.5	
15	SW		Medium to Coarse SAND with gravel, 10YR 4/1, wet			24.9	
20							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-33

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/15/01
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co. : Terra Probe

General Location : North of power : line tower

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Slightly Silty CLAY with scattered gravel, 10YR 4/2, slightly moist			131	
	FL		Silty Clay FILL with brick and glass fragments, 10YR 3/1, solvent odor	1	90	>1400	
5	CL		Silty CLAY, 10YR 3/1, solvent odor	2	90	>1500	
			Silty CLAY with scattered sand and gravel, 10YR4/2, solvent odor, moist			>1100	
			Sandy Silty CLAY with scattered sand and gravel, 10YR 5/1, solvent odor, very moist			>1900	
10				3	90	>1800	
	SW		Medium to Coarse SAND with gravel, 10YR 5/1, very moist				
			As Above, wet	4	90	364	
15						52	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-34 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/16/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : SW portion of : property
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	CL		Silty CLAY with scattered sand and gravel, 10YR 3/2, slightly moist Sandy Silty CLAY, 10YR 3/3, slightly moist	1	70	66	
	SW		Medium to Coarse SAND with scattered gravel, 10YR 4/3, slightly moist As Above			13.9	
5	GW		SAND AND GRAVEL, 10YR 6/3, slightly moist	2	50	3.1 1.0	
	CL		Sandly Silty CLAY with gravel, 10YR 5/1, very moist	3	75	5.9	
10	GW		Silty SAND AND GRAVEL, 10YR 5/1, very moist to wet SAND AND GRAVEL, 10YR 5/1, wet As Above			8.7	
				4	75	155	
15						216	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-35 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/16/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : South of SW corner of building
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Asphalt				
	FL		Gravelly FILL				
	CL		Sandy Gravelly Silty CLAY, 10YR 3/2 SAA, 10YR 5/6, slightly moist	1	80	1.7	
	GW		SAND AND GRAVEL, 10YR 5/6, slightly moist			2.4	
5	CL		Silty CLAY, 10YR 4/2, moist Sandy Silty CLAY with scattered gravel, 10YR 5/1, very moist			37.2	
			As Above	2	80		
	SW		Silty Medium SAND with scattered gravel, 10YR 5/1 very moist Medium SAND, 10YR 5/1, very moist to wet Medium to Coarse SAND with gravel, 10YR 5/1, very moist to wet			32.0	
						78.4	
10			SAA, wet	3	80		
						28.5	
15							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-36 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/16/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : South of building : in asphalt parking lot
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Asphalt				
	FL		Gravelly FILL			0.3	
	CL		Silty CLAY with scattered sand and gravel, 10YR 3/2, moist	1	85		
			Sandy Gravelly Silty CLAY, 10YR 3/2, moist			1.0	
			Sandy Silty CLAY with scattered gravel, 10YR 5/1, moist				
5						1.0	
	SP		Medium SAND with scattered gravel, 10YR 5/1, moist	2	60		
			As Above			1.0	
	GW		Silty SAND AND GRAVEL; 10YR 5/1, very moist			1.7	
10	SP		Medium SAND, slightly moist	3	80		
	GW		Very Silty SAND AND GRAVEL, 10YR 5/1, very moist			1.0	
	SW		Medium to Coarse SAND with gravel, 10YR 4/1, wet			1.7	
				4	80		
15						1.7	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-37 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/16/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : South of KB-36, : near fence line
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Asphalt				
	FL		Gravelly FILL				
	CL		Sandy Silty CLAY with scattered gravel, 10YR 4/4, moist	1	85	1.7 0.3	
	GW		SAND AND GRAVEL, 10YR 5/6, slightly moist As Above				
5				2	80	0.3	
	CL		Silty CLAY w/scattered sand and gravel, 10YR 4/2, moist Sandy Silty CLAY with gravel, 10YR 5/1, very moist			0.3	
	GW		SAND AND GRAVEL, 10YR 4/1, moist As Above			0.3	
	CL		Sandy Silty CLAY with gravel, 10YR 5/1, very moist				
	SP		Silty Medium SAND with gravel, 10YR 5/1, very moist	3	90		
10	GW		SAND AND GRAVEL, 10YR 4/1, very moist				
	SW		Silty Medium SAND with gravel, 10YR 5/1, wet Medium to Coarse SAND with gravel, 10YR 5/1, wet			0.3	
15							
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-38 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/16/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : Near SE corner of building
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0	FL		Asphalt				
			Gravelly FILL				
	CL		Silty CLAY with scattered sand and gravel, 10YR 3/1			1.0	
			SAA, 10YR 4/3, moist	1	95	0.3	
			SAA, 10YR 4/2, moist				
5			Sandy Silty CLAY with gravel, 10YR 4/4	2	90	0.3	
	SP		Medium SAND, 10YR 5/1, slightly moist			1.7	
			As Above				
	CL		Silty CLAY with scattered sand and gravel, 10YR 4/2, moist			10.2	
10	SW		Medium to Coarse SAND with gravel, 10YR 5/4, moist	3	90		
			SAA, wet			10.9	
15							
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i1 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/1/01 Drilling Method : Geoprobe Geologist/Tech : A. Sargent Drilling Co : IEGS Location : 1st row, middle grid point, : inside garage door
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete Floor				
	FL		Sand FILL material, 10 YR 4/3			0.1	
			FILL mixed w/ parts, wood, glass, black staining	1	70	1.3	Soil samples collected for lab analysis (2-4' and 4-6')
5	CL		CLAY, dark, black-brown	2	100	0.0	
						0.5	
			CLAY w/ sand & gravel				
10			1" sand seams at 9' and 9.5', tan, 1" sand seams at 9' and 9.5'	3	100	0.1	
						0.2	
	SW		SAND, brown, moist				
			Same as above, brown, wet				
	GW		SAND & GRAVEL, brown, wet	4	80	0.0	
15						0.1	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i2 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/1/01
Drilling Method : Geoprobe
Geologist/Tech : A. Sargent
Drilling Co : IEGS

Location : Row 1, south grid, : point 1

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (2")				
	FL		FILL, black clay mixed with parts, wood, glass	1	70	1.5	
						0.0	Soil sample collected for lab analysis (2-4' and 5-6')
5	CL		CLAY w/ sand & gravel, green-gray (2.5 Y 3/1)	2	100	85.3	
						10.7	
			CLAY mixed w/ sand & gravel, brown (10 YR 5/3)	3	90	4.5	
10			Same as above, gray (10 YR 4/1)			2.8	
			Same as above, moist				
	GW		SAND & GRAVEL, wet	4	100	0.7	Groundwater sample collected for lab analysis (13-17')
15							
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i3 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/1/01 Drilling Method : Geoprobe Geologist/Tech : A. Sargent Drilling Co : IEGS Location : Row 1, north grid : point
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (8")				
	CL		CLAY (2.5 Y 3/1) w/ sand & gravel	1	70	168 11.9	
5			SAA	2	30	32.6 5.3	Soil samples collected for lab analysis (2-4' and 4-6')
10	GW		SAND & GRAVEL	3	30	79.4 17.1	
15			SAA, wet	4	NA	3.9 4.1	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i4 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/1/01
Drilling Method : Geoprobe
Geologist/Tech : A. Sargent
Drilling Co : IEGS

Location : 2nd row, middle grid : point

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (8")				
	FL		FILL Black CLAY w/ parts, sand & gravel, glass	1	50	1.2	
	CL		CLAY w/ sand & gravel Olive (2.5 Y 5/3) sandy CLAY w/ trace gravel			4.1	Soil samples collected for lab analysis (2-4' & 4-6')
5				2	80	0.6	
			2" sand seam Sandy CLAY w/ trace gravel, gray (10 YR 5/1), moist			0.7	
10				3	70	0.6	
			1" sand seam			1.3	
			Black CLAYseam w/ sand & gravel & parts			2.1	Soil sample collected for lab analysis (13-13.5')
	SP		Fine SAND layer, brown, 10 YR 5/3	4	90		
15	GW		SAND & GRAVEL, wet			8.9	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i5 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/1/01
Drilling Method : Geoprobe
Geologist/Tech : A. Sargent
Drilling Co : IEGS

Location : 2nd row north grid : point

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (2")				
	FL		FILL Sandy / gravelly CLAY, brown Layer of parts, glass, black sand & gravel	1	60	0.0	
	CL		Dark green-gray (5 Y 3/2) CLAY w/ sand & gravel Olive-green (5 Y 5/3), sandy CLAY			0.9	Soil samples collected for lab analysis (2-4' & 4-6')
5				2	100	7.7	
	GW		SAND & GRAVEL w/ some clay			3.3	
						7.1	
10	SP		Fine SAND w/ trace gravel	3	70	15.0	
	GW		SAND & GRAVEL, wet	4	90	17.8	
15						1.6	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i6 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/1/01
Drilling Method : Geoprobe
Geologist/Tech : A. Sargent
Drilling Co : IEGS

Location : 2nd row, south grid : point

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (2")				
	CL		Black sandy, gravelly CLAY	1	70	28.6	
			Fine powder, dark red-brown			3.9	
5	CL		Sandy CLAY w/ gravel, olive-green (2.5 Y 5/3)	2	100	2.0	Soil samples collected for lab analysis (3-4' & 4-6')
			1" sand seam			0.9	
10				3	80	3.3	
						3.2	
	GW		SAND & GRAVEL	4	100	6.7	
15			Same as above, wet			2.3	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i7 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/1/01
Drilling Method : Geoprobe
Geologist/Tech : A. Sargent
Drilling Co : IEGS

Location : 3rd row, north grid : point

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (2")				
	CL		Brown (10 YR 3/3) CLAY w/ sand & gravel	1	80	0.5	Soil sample collected for lab analysis (2-4')
			SAA			0.0	
5				2	80	0.0	
	GW		SAND & GRAVEL, brown (10 YR 4/3)			0.3	
			SAA			0.0	
10	CL		Gray-brown (10 YR 4/2) CLAY w/ sand & gravel	3	90		
	SP		Fine SAND, brown (10 YR 4/3)			0.0	
	GW		SAND & GRAVEL			0.0	
			SAA, wet at 14'	4	100		
15						0.0	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i8 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/1/01 Drilling Method : Geoprobe Geologist/Tech : A. Sargent Drilling Co : IEGS Location : 3rd row, middle grid : point
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (2")				
	CL		Dark brownish-gray (2.5 Y 3/1) CLAY w/ sand & gravel	1	80	0.2 0.2	Soil sample collected for lab analysis (2-4')
	GW		SAND & GRAVEL, dry, tan (10 YR 7/2)				
5	CL		Dark brown (10 YR 3/2) CLAY w/ sand & gravel	2	90	0.5	
	GW		SAND & GRAVEL w/ some clay			0.0	
	SP		Fine SAND, brown (10 YR 4/3)			0.2	
10	CL		Brown-gray CLAY w/ sand & gravel (10 YR 4/2)	3	100		
	SP		Fine SAND, brown (10 YR 4/3)			0.0	
	GW		Clayey SAND & GRAVEL, moist, (10 YR 4/3) SAND & GRAVEL, wet, (10 YR 4/3)	4	90	0.0	
15						0.0	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i9 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/1/01
Drilling Method : Geoprobe
Geologist/Tech : A. Sargent
Drilling Co : IEGS

Location : 3rd row, south grid : point

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (2")				
	CL		Dark brownish-gray CLAY w/ sand & gravel	1	100	0.2	Soil sample collected for lab analysis (2-4')
						8.8	
5				2	90	3.2	
						2.5	
			Same as above, gray	3	90	1.5	
10			SAND & GRAVEL			0.0	
	GW					0.8	
			Same as above, wet	4	100		
15						0.0	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i12 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/1/01 Drilling Method : Geoprobe Geologist/Tech : A. Sargent Drilling Co : IEGS Location : 4th row, south grid : point
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete floor (4') w/ sand base (8")				
	CL		Sandy CLAY w/ trace gravel, dark brown-gray (10 YR 3/2)	1	80	0.5 0.6	Soil sample collected for lab analysis (2-4')
5	CL		Same as above, olive-green (2.5 Y 5/3)	2	100	0.0 0.1	
	GW		SAND & GRAVEL			1.2	
10	CL		Sandy, gravelly CLAY, gray (10 YR 4/1)	3	80	0.5	
	GW		SAND & GRAVEL	4	100	0.0 0.1	Groundwater sample collected for lab analysis (13-17')
15							
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i13 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/16/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : Adjacent to floor drain in NE corner of building
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete				
	FL		Sand and Gravel FILL				
	CL		Sandy Gravelly Silty CLAY, 10YR 3/2, moist Sandy Silty CLAY with scattered gravel, 10YR 3/2	1	95	0.3	
			Slightly Sandy Silty CLAY with scattered gravel, 10YR 3/2			0.3	
			As Above				
5				2	80	0.3	
			Sandy Silty CLAY with gravel, 10YR 3/2, moist			0.3	
	GW		SAND AND GRAVEL, 10YR 5/4, slightly moist As Above				
				3	80	0.3	
10						0.3	
			As Above				
				4	75	0.3	
15			As Above, wet			0.3	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i14 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/16/01
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co. : Terra Probe

General Location : NW corner of old building by sump

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete				
	FL		Sand and gravel FILL			0.3	
	CL		Sandy Silty CLAY with scattered gravel, 10YR 4/4, moist	1	75	0.3	
			As Above				
5	GW		Silty SAND AND GRAVEL, 10YR 3/3, moist	2	60	0.3	
			SAND AND GRAVEL, 10 YR 5/4			0.3	
			Silty SAND AND GRAVEL, 10YR 4/4, moist			0.3	
10	CL		Sandy Silty CLAY, 10YR 4/2, very moist	3	80	0.3	
	SP		Fine to Medium SAND, 10YR 5/3, moist				
15							
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i15 (Page 1 of 1)

Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/16/01
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co. : Terra Probe

General Location : Along south wall, : west boring

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete				
	FL		Sand and gravel FILL, 10YR 4/4				
	CL		Sandy Silty CLAY with scattered gravel, 10YR 4/2, moist	1	80	0.3	
						1.0	
5			Silty CLAY with scattered sand and gravel, 10YR 4/2, moist	2	95	1.7	
						1.0	
	GW		Silty SAND AND GRAVEL, 10YR 5/6, moist				
			Sand and gravel, 10YR 5/6, slightly moist			13.7	
10	CL		Silty CLAY with scattered sand and gravel, 10YR 4/2, (wet sand seams, less than one inch thick at 10" and 10.5"), moist	3	95		
			Sandy silty clay with gravel, 10YR 5/1, very moist			29.2	
			As Above			45.3	
	SP		Medium SAND, 10YR 5/4, moist				
15	GW		SAND AND GRAVEL, 10YR 5/4, moist				
			As Above			39.0	
20							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-i16

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/16/01
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co. : Terra Probe

General Location : Along south wall, : east boring

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete			0.3	
	FL		Sand and Gravel FILL, 10YR 4/4	1	60		
	CL		Silty CLAY with sand, 10YR 3/2, moist			1.0	
			SAA, 10YR 4/2				
5						1.0	
			Sandy Silty CLAY with gravel, 10YR 3/2	2	95		
						3.1	
			SAA				
						15.1	
10	SP		Medium SAND, 10YR 5/3, moist	3	80		
	GW		Silty SAND AND GRAVEL, 10YR 5/4, moist			12.3	
	CL		Sandy Silty CLAY with scattered gravel, 10YR 4/2, very moist				
	GW		SAND AND GRAVEL, 10YR 5/3			19.3	
				4	95		
15			SAND AND GRAVEL, 10YR 4/2, wet			10.2	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i17 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana	Project ID : 2829E Date Drilled : 5/18/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : Along southern wall, : middle boring
KERAMIDA Project No. 2829E	

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete				
	FL		Sand and Gravel FILL, 10YR 4/4				
	CL		Sandy Silty CLAY with gravel, 10YR 4/4, slightly moist	1	95	23.5	
			Silty CLAY with scattered sand and gravel, 10YR 3/2, slightly moist			11.6	
			Sandly Silty CLAY, 10YR 3/2, slightly moist	2	95		
5			Sandy Gravelly Silty CLAY, 10YR 4/4, slightly moist			18.6	
			SAA, 10YR 5/6			22.8	
	GW		SAND AND GRAVEL, 10YR 5/4, slightly moist	3	85	84.0	
10	CL		Sandy Silty CLAY with scattered gravel, 10YR 4/4, moist				
			Silty CLAY with scattered sand and gravel, 10YR 5/1			77	
	GW		Silty SAND AND GRAVEL, 10YR 4/4, moist to very moist	4	85	132	
			SAND AND GRAVEL, 10YR 4/4, very moist				
15			SAA, wet			163	
20							

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KERAMIDA Environmental, Inc.

LOG OF BORING KB-i18

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Genuine Parts Company
700 North Olin Avenue
Indianapolis, Indiana

KERAMIDA Project No. 2829E

Project ID : 2829E
Date Drilled : 5/18/01
Drilling Method : Geoprobe
Geologist/Tech : Brian Harrington
Drilling Co. : Terra Probe

General Location : NE of KB-I17, : adjacent to floor : drain

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete				
	FL		Sand and Gravel FILL			3.8	
	CL		Sandy Silty CLAY with gravel, 10YR 3/2, slightly moist	1	70		
			Sandy Silty CLAY with scattered gravel, 10YR, 3/2 moist			3.1	
			Sandy Silty CLAY with gravel, 10YR 3/2, moist				
5				2	95	6.6	
	GW		Silty SAND AND GRAVEL, 10YR 5/4, moist			21.4	
			SAND AND GRAVEL, SAA				
			SAND AND GRAVEL, 10YR 5/3, moist				
						42.5	
10				3	90		
	CL		Sandy Silty CLAY with scattered gravel, 10YR 4/2, moist			40.2	
	GW		SAND AND GRAVEL, 10YR 4/4, moist				
			SAND AND GRAVEL, 10YR 5/3, moist			38.0	
				4	90		
15			SAA, wet			17.2	
20							

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KERAMIDA Environmental, Inc.	LOG OF BORING KB-i19 (Page 1 of 1)
Genuine Parts Company 700 North Olin Avenue Indianapolis, Indiana KERAMIDA Project No. 2829E	Project ID : 2829E Date Drilled : 5/18/01 Drilling Method : Geoprobe Geologist/Tech : Brian Harrington Drilling Co. : Terra Probe General Location : North of KB-I16, adjacent to flow drain

Depth in feet	USCS	GRAPHIC	DESCRIPTION	Samples	Rec %	PID ppm	REMARKS
0			Concrete				
	FL		Gravelly FILL				
	CL		Sandy Gravelly Silty CLAY, 10YR 3/2, slightly moist	1	95	4.5	
			Silty CLAY with scattered sand and gravel, 10YR 3/2, slightly moist			5.9	
5			As Above	2	95	4.5	
						8.7	
	GW		Silty SAND AND GRAVEL, 10YR 5/6, moist SAND AND GRAVEL, 10YR 5/3, slightly moist	3	80	34.1	
10	CL		Silty CLAY with scattered sand and gravel, 10YR 4/2			7.3	
			As Above	4	80		
			Sandy Silty CLAY with scattered gravel, 10YR 5/1, very moist			9.5	
	GW		SAND AND GRAVEL, 10YR 5/3, moist				
15	CL		Silty CLAY with scattered sand and gravel, 10YR 5/1, very moist			1.0	
	GW		SAND AND GRAVEL, 10YR 5/3, wet				
20							

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