AFFIDAVIT OF James M. Coger

I, James M. Coger, begin first duly sworn, attest as follows:

1) The facts stated in this Affidavit are based on my personal knowledge and I am competent to testify to them.

2) I am a Senior Geologist for the Remediation and Redevelopment Division (RRD) of the Michigan Department of Environmental Quality (MDEQ), in Jackson, Michigan. I work in the Jackson District Office. I have been employed by the MDEQ and its predecessor, the Michigan Department of Natural Resources, since April 1991. I received a Bachelor's of Science degree in Geology from Eastern Michigan University in 1986.

3) My primary responsibilities as Senior Geologist for RRD involve review of complex hydrogeological reports required by Part 201, Environmental Remediation, and Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) for the Jackson District staff.

4) I have been the RRD District Geologist for the Gelman Sciences, Inc. site, located at 600 South Wagner Road, Ann Arbor, Michigan, for approximately four years. As the District Geologist, I have reviewed and commented on the following Pall Life Sciences, Inc. (PLS) submittals that are relevant to this affidavit: Work Plan for Test Boring/Well Installation and Aquifer Testing in the Wagner Road Area, dated August 1,

2005; Performance Monitoring Plan Wagner Road Extraction, dated December 22, 2005; Performance Review Wagner Road Interim Response, dated August 3, 2006; Performance Review Wagner Road Interim Response, dated March 2007; and the PLS Comprehensive Remediation Plan, dated May 4, 2009.

5) Based on my review of the Performance Review Wagner Road Interim Response, dated August 3, 2006 and the Performance Review Wagner Road Interim Response, dated March 2007, and subsequent PLS Quarterly Progress Reports, it is my opinion that purge well TW-18 is not meeting the Wagner Road cleanup objective of preventing further migration of groundwater contamination above 85 parts per billion (ppb) of 1,4-dioxane eastward into the formation designated by PLS as the Unit E aquifer, to the maximum extent feasible.

6) Soil boring logs provided by PLS for monitor wells MW-95, TW-18, MW-96, and MW-94s and d, depict a thick conductive aquifer extending from approximately 80 feet below ground surface, to the bedrock and/or to elevations just above the bedrock, for the general area of Wagner Road between MW-105d and MW-94s and d,. (see attachment 1, PLS Performance Review- Wagner Road Interim Response Cross Section A-A', Figure 2). Approximately 60 – 120 feet of contamination, exceeding 85 ppb, was encountered vertically throughout the aquifer during installation of MW-95, TW-18, MW-96, and MW-94s and d. There is no aquitard or confining unit that hydraulically separates the intermediate (Unit D2) contamination from deeper (Unit E) contamination as it migrates eastward under Wagner Road. The aquifers, designated

by PLS as Unit D2 and Unit E, are a single thick saturated interval between monitoring wells MW-105d and MW-94s.

7) Sufficient hydrogeological investigation activities have not been completed west of Wagner Road to determine where the Unit D2 and Unit E aquifers represent a single saturated interval, and/or where they are separated by an aquitard. As 1,4-dioxane contamination is widespread in the Unit E and D2 aquifers west of Wagner Road, it is my opinion that the intermediate and deep zones of contamination are hydraulically connected throughout the area. The deep and intermediate aquifers should be addressed as a single hydrogeological unit for all remedial activities.

8) Purge well TW-18 was installed for the purpose of intercepting and hydraulically containing 1,4-dioxane contamination in the deep Unit E aquifer. Attachment 2, is Figure 3 from PLS's TW-18 Capture Zone Analysis, August 2005 Wagner Road Work Plan. Figure 3 depicts groundwater flow direction, 1,4-dioxane contaminant distribution, and the modeled capture zones for purge well TW-18 extracting groundwater under various purge rates. The capture zone contours for TW-18 are based on a model that predicts hydraulic capture in an aquifer with homogeneous characteristics, under groundwater extraction rates of 200, 300, 400, and 500 gallons per minutes (gpm).

9) It is my opinion that due to the non-uniform nature and thickness of the aquifer matrix in the Wagner Road area, the actual hydraulic capture of TW-18 is less than the modeled hydraulic capture depicted by Figure 3. PLS has not provided a subsequent analysis of hydraulic head and/or hydraulic gradient data that demonstrates the

modeled Figure 3 capture zone contours are representative of actual hydraulic conditions.

10) Purge well TW-18 began extracting at about 200 gpm in January 2006 and the average monthly extraction rate has increased to about 250 gpm. The highest average monthly extraction rate reported by Pall was 257 gpm in September 2007.

11) It is my opinion, based on TW-18's current purge rate of 254 gpm (June 2009), that 1- 4,-dioxane contamination in the area proximal to, and south of, Jackson Plaza Street and Wagner Road is not being captured. Monitor well MW-105d was installed on the east side of Wagner Road in June 2006, to monitor the ability of TW-18 to capture groundwater contamination greater than 85 ppb, in the general area of Wagner Road south of MW-95.

12) Groundwater sampling data from MW-105d reflects that 1,4-dioxane was first detected at 1,104 ppb in August 2006. Concentrations of 1,4-dioxane were detected at 654 ppb in April 2009 (see attached trend chart for MW-105d). Sampling results from MW-105d indicate that contamination extends father south along Wagner Road than originally depicted by the 2005 Wagner Road Work Plan Figure 3, isoconcentration map. Groundwater contamination at MW-105d, above 85 ppb, is not being captured by TW-18, and continues to migrate eastward under Wagner Road.

13) Concentrations of 1,4-dioxane were detected at 33 ppb in April 2009 in monitoring well MW-65d. MW-65d is located approximately 600 feet south of MW-105d

on Wagner Road. Additional groundwater characterization is needed between MW-105d and MW-65d to determine how far south contamination exceeding 85 ppb extends. The extent of contamination must be defined to determine what purge system design modifications will be required to capture the full extent of contamination.

14) The Figure 3 capture zone contouring and monitoring results for monitor well MW-94s also reflects that TW-18 is not preventing the migration of groundwater contamination above 85 ppb of 1,4-dioxane eastward into the Unit E aquifer for the area of Wagner Road, north of Rhea Street. Concentrations of 1,4-dioxane have generally exceeded 2,000 ppb in MW-94s since it was installed in January 2005 (see attached trend chart for MW-94s). The absence of hydraulic containment is demonstrated by the lack of any downward trend in the MW-94s 1,4-dioxane monitoring results.

15) As noted above, the aquifers designated by PLS as Unit E and D2 are a single undistinguishable saturated unit for the general area of Wagner Road between monitor wells MW-105d and MW-94s. Purge well TW-18, pumping at its current rate, is not influencing hydraulic control at MW-105d or at MW-94s as demonstrated by the monitoring data trend charts.

16) Hydraulic containment of 1,4-dioxane contamination exceeding 85 ppb at Wagner Road can be achieved with the installation of additional purge wells at variable elevations within the aquifer and at locations north and south of TW-18. The MDEQ requested that PLS consider installation of an extraction well at the MW-94s location, as a source control measure, in a letter dated March 7, 2006. Hydraulic containment of the

full vertical extent of contamination throughout the thick saturated interval at Wagner Road will significantly reduce the cost and time associated with remedial activities at downgradient locations.

17) The installation of additional purge wells will give PLS the capability of influencing hydraulic containment on the entire horizontal and vertical extent of contamination exceeding 85 ppb along Wagner Road.

18) Additional hydrogeological investigation will be required north of MW-94s and south of MW105d to determine the vertical and horizontal extent of 1,4-dioxane contamination that requires capture.

19) PLS is currently discharging approximately 1,140 gpm into the Honey Creek Tributary. Their NPDES permit allows up to 1,300 gpm of discharge. There is 160 gpm discharge capacity that PLS is not utilizing. Additional groundwater discharge capacity can be achieved through a purge well optimization plan where existing purge wells could be turned off or operated at reduced purge rates for a period of time.

20) PLS has not conducted sufficient investigation downgradient from Wagner Road to define plume geometries and/or determine what hydrogeological conditions are responsible for plume migration to the northeast into Evergreen and/or east towards Maple Village.

21) Hydraulic containment of 1,4-dioxane contamination exceeding 85 ppb at Wagner Road would significantly minimize the risk and uncertainties associated with the current practice of allowing 1,4-dioxane in the 2000+ ppb range to migrate eastward.

This affiant says nothing further.

James M. Coger

James M. Coger

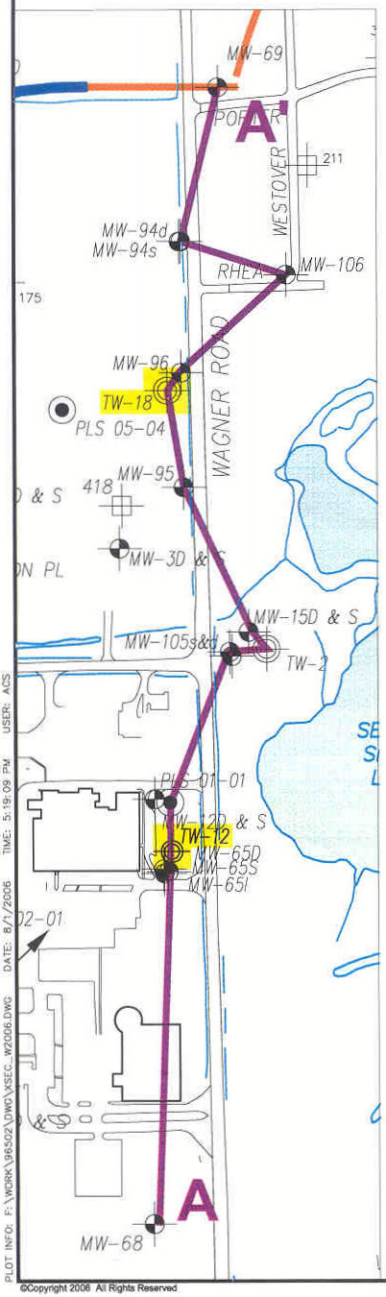
Subscribed and sworn to before me, August 4, 2009.

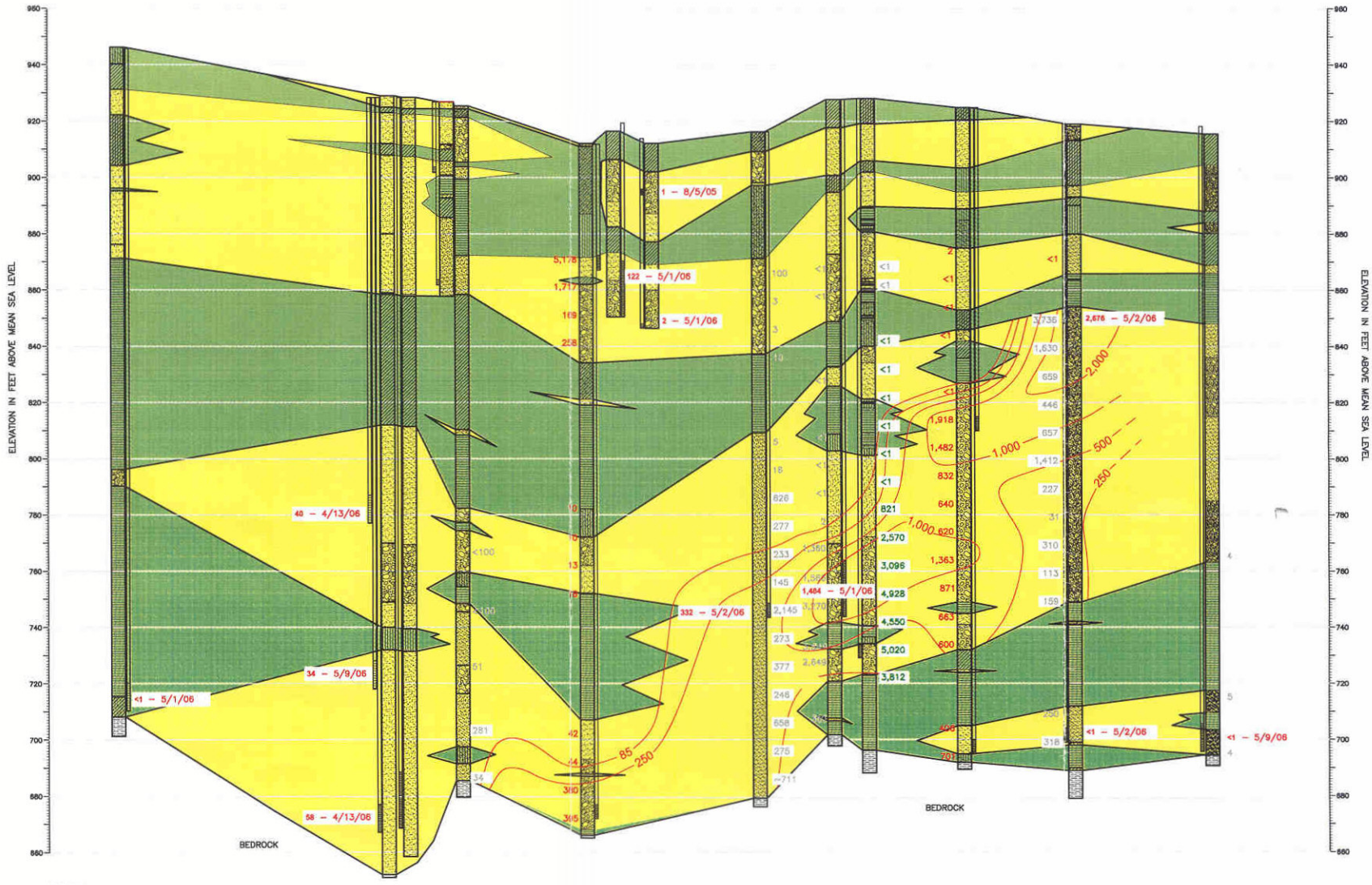
Karen Louise Jordon Notary

Jackson County

My commission expires: 2/18/12

KAREN LOUISE JORDON
Notary Public, Jackson Co., MI
My Comm. Expires Feb. 18, 2012





LEGEND
- MONITOR WELL
- RESIDENTIAL WELL
- PURGE WELL
- HYDROGEOLOGIC TEST BORING
- UV/OX TREATMENT SYSTEM
- TEMPORARY PURGE WELL
- SURFACE WATER ELEVATION POINT

0 400 800
Scale: 1" = 400'
VERTICAL EXAGGERATION = 10X

58 - 4/13/06 - 1,4-Dioxane Results (ug/L) Sampled from Well and Date
119 - 1,4-Dioxane Results (ug/L) Simulprobe sample used in contouring
312 - 1,4-Dioxane Results (ug/L) Simulprobe sample not used in contouring
821 - 1,4-Dioxane Results (ug/L) Rotosonic sample not used in contouring
1,4-Dioxane Isoconcentration Contour (ug/L) May 2006

LEGEND
SAND, CLAY, SILT, DIAMICTON, GRAVEL, SHALE, WELL SCREENED INTERVAL

CROSS SECTION A-A'

fhc&h 50 years

engineers
scientists
architects
constructors

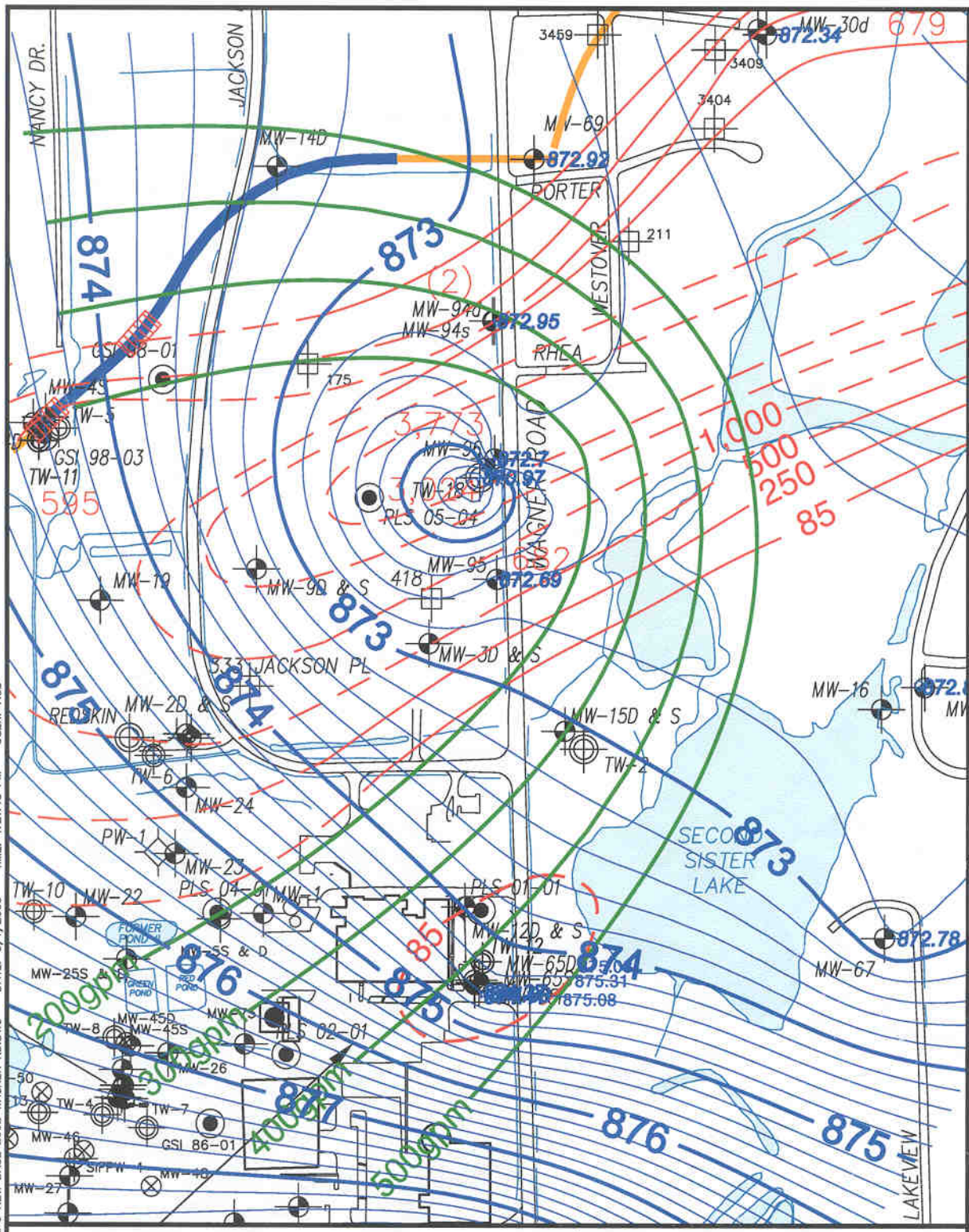
Pall Life Sciences
Scio Twp., Washtenaw County, Michigan
Performance Review - Wagner Road
Interim Response

PROJECT NO.
F96502

FIGURE NO.
2

fishbeck, thompson, carr & huber, inc.

PLOT INFO: F:\WORK\96502\DWG\XSEC_W2006.DWG TIME: 5:19:09 PM DATE: 8/1/2006 USER: AOS



LEGEND

- MONITOR WELL
- RESIDENTIAL WELL
- PURGE WELL
- HYDROGEOLOGIC TEST BORING
- UV/OX. TREATMENT SYSTEM
- TEMPORARY PURGE WELL
- Unit E 1,4-DIOXANE ISOCONCENTRATION CONTOUR (ug/L) – January–March 2005
- Unit E POTENTIOMETRIC SURFACE CONTOUR (Feet amsl) – MAY 25, 2005
- CAPTURE ZONE (Gallons per Minute)

NORTH

0 400 800

Scale: 1" = 400'

TW-18 CAPTURE ZONE ANALYSIS

Fishbeck, Thompson, Carr & Huber
Engineers • Scientists • Architects
Grand Rapids, Michigan (616) 575-3824

PALL LIFE SCIENCES
SCIO TWP., WASHTENAW COUNTY, MICHIGAN

WAGNER ROAD WORK PLAN

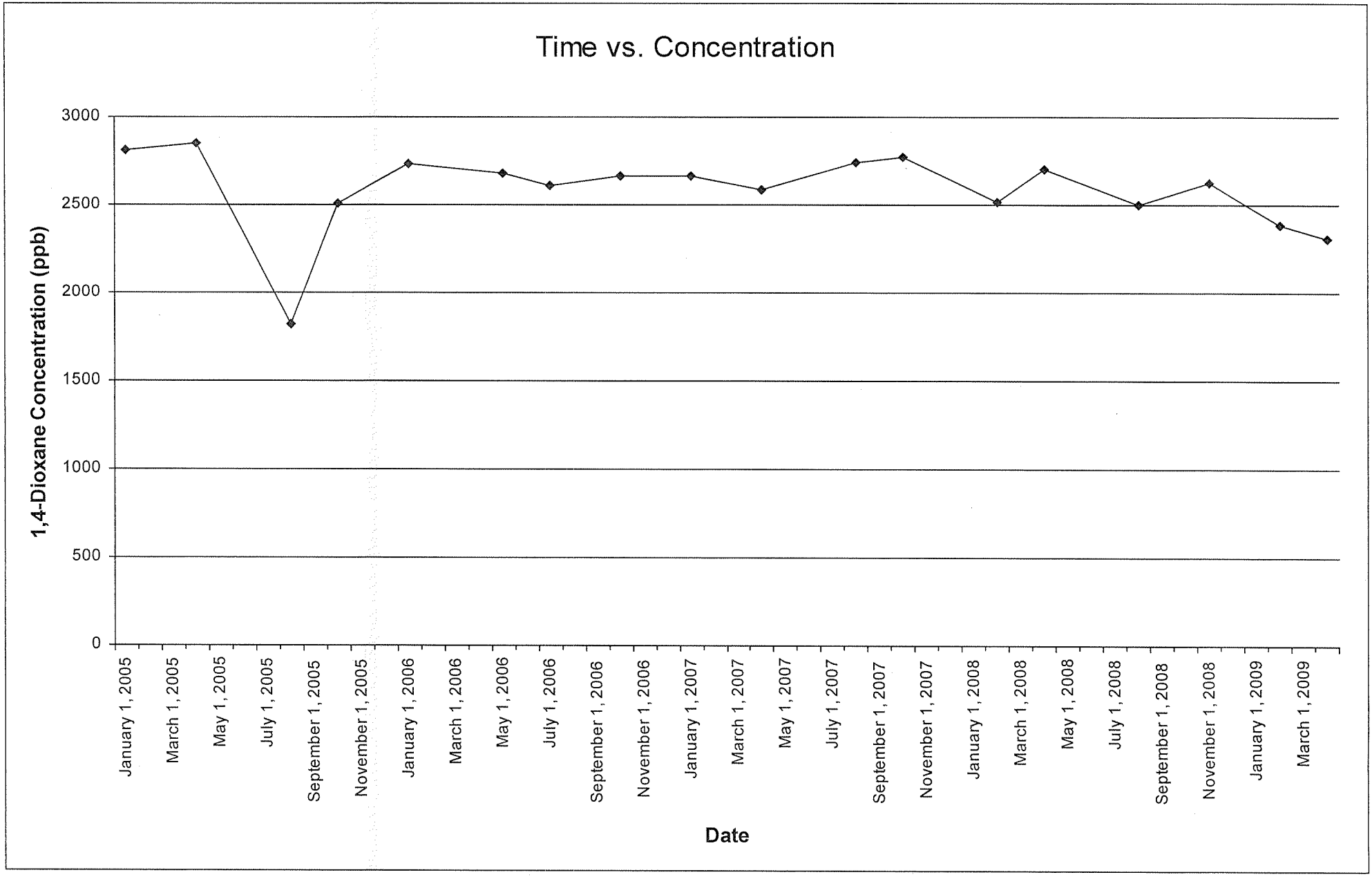
PROJECT NO. F96502

FIGURE NO. 3

PLOT INFO: F:\WORK\96502\DWG\CONTOUR MAPS NEW BASE 2002 WAGNER RD.DWG DATE: 8/1/2005 TIME: 1:21:18 PM USER: ACS
M:\CUSTOM\ACAD2005\SYMBOLS\B-24X36.DWG M:\CUSTOM\ACAD2004\SYMBOLS\B85X11.DWG M:\CUSTOM\ACAD2002\SYMBOLS\B36X48.DWG M:\CUSTOM\ACAD2005\SYMBOLS\B-24X36.DWG PUMPING SURF PUMPING W_
F:\WORK\96502\DOQ\D2710282.JPG F:\WORK\96502\DOQ\D2830282.JPG WASHTENAW CNTY PARCELS

MW-94s

Aquifer: D2
Type of well: Monitoring Wells
Sampling Interval: Quarterly



MW-105d

Aquifer: E
Type of well: Monitoring Wells
Sampling Interval: Quarterly