



State of Ohio Environmental Protection Agency

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ENTERED DIRECTOR'S JOURNAL

Mr. Tim Browning
Director of Public Works
City of Delaware
1 South Sandusky Street
Delaware, Ohio 43015

**RE: Delaware County; City of Delaware Curve Road Landfill.
OAC 3745-27-10(D)(7)(c) Demonstration**

Dear Mr. Browning:

On February 27, 2002, a ground water sampling event was conducted at the closed Curve Road Landfill. The results of that sampling event were submitted to this agency in a report titled "Statistical Analysis of Groundwater Quality Data, February 2002 Detection Monitoring Event". This report also served as notification to the Director of Ohio EPA of a statistically significant increase in chloride at monitoring wells MW-5 and MW-7, statistically significant increases in COD, barium, copper, and thallium in well MW-7, and statistically significant increases in copper, thallium, and lead at MW-8.

Ohio Administrative Code Rule 3745-27-10(D)(7)(c) requires facilities who have identified statistically significant increases in ground water monitoring parameters to receive approval from the Director of Ohio EPA to remain in detection monitoring. If a facility does not receive approval within 180 days of ground water sampling, the facility is required to initiate their assessment monitoring program.

Based upon the information submitted in the aforementioned report and historical data for this site, the Agency considers the statistically elevated results from monitoring wells MW-5, MW-7, and MW-8 to be false positives related to spatial ground water quality variability or high sample turbidity. As such, the City of Delaware may continue the detection monitoring program in accordance with OAC Rule 3745-27-10(D)(7)(c) at the closed Curve Road Landfill for the next ground water sampling event. The attached inter-office communication dated June 17, 2002, discusses the findings of Central District Office DDAGW's review.

As has been previously discussed, it is imperative that the City of Delaware take steps to reduce the false positive rate at the Curve Road Landfill. We have received your letter

Bob Taft, Governor
Maureen O'Connor, Lieutenant Governor
Christopher Jones, Director

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.
By: *Anna J. Clements* 7-02

Mr. Tim Browning
Director of Public Works
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dated June 6, 2002, indicating that you will be going to low-flow purging and sampling and switch to intrawell statistics. Please revise your ground water sampling and analysis plan accordingly and submit the revised plan for approval.

You are hereby notified that this action of the Director of Environmental Protection is final and may be appealed to the Environmental Review Appeals Commission pursuant to Ohio Revised Code Section 3745.04. The appeal must be in writing and set forth the action complained of and the ground upon which the appeal is based. It must be filed with the Commission within thirty (30) days after notice of the Director's action. A copy of the appeal must be served on the Director within three (3) days of filing with the Commission. An appeal may be filed with the Commission at the following address:

Environmental Review Appeals Commission
236 East Town Street, Room 300
Columbus, Ohio 43215

If you should have any questions or comments on the above, feel free to contact Phil Farnlacher in the Central District Office at (614) 728-3890.

Sincerely,



R. Bruce Coleman, Chief, Central District Office
for Christopher Jones, Director
Ohio Environmental Protection Agency

cc: Doug Sams, Delaware City-County Health Department, w/attachment
Scott Hester, DSIWM/CO, w/attachment ✓
Mike Leone, Burgess & Niple, Limited, w/attachment
Linnea Saukko, DDAGW/CDO, w/o attachment
Duane Snyder, DSIWM/CDO, w/o attachment

RBC/PF/jl

Ohio EPA

Central District Office

3232 Alum Creek Drive • Columbus, Ohio 43207-3417 • 614-728-3778

INTEROFFICE COMMUNICATION

TO: Phil Farnlacher, DSIWM-CDO

FROM:  Carl James through  Linnea Saukko, DDAGW-CDO

DATE: June 17, 2002

SUBJECT: February 2002 Ground Water Sampling Event and Evaluation of False-Positive Results, Curve Road Landfill Facility (Delaware County)

Introduction

The February 2002 Statistical Analysis and Ground Water Quality Data Report for the Curve Road Landfill (CRL) facility was received by Ohio EPA May 13, 2002. Ground water samples were taken from four monitoring wells at the site (background well MW-6; downgradient wells MW-5, MW-7 and MW-8; Figure 1). Water level measurements were completed for four piezometers in addition to all monitoring wells. False-positive demonstrations to satisfy OAC 3745-27-10 (D)(7)(c)(June 1, 1994) are proposed by the CRL facility for results from monitoring wells MW-5, MW-7 and MW-8. Appropriate field forms, laboratory data, QA/QC laboratory information, statistical results and a piezometric map are included with the submittal.

Comments and Recommendations

1) Volatile Organic Compounds: No Appendix I volatile organic compounds are detected in any of the monitoring wells at the site for the February 2002 sampling event.

2) Metals Results: Metals concentrations measured in MW-7 and MW-8 account for several statistically significant results for the February 2002 sampling event (Figure 1; Table 1). These metals results are associated with turbidities of 2200 NTU and 1800 NTU for MW-7 and MW-8, respectively. The CRL facility concludes that the statistically elevated metals in MW-7 and MW-8 are false positives related to high turbidity compared to the single background well at the site (Table 2). However, well logs suggest the nature of screened material in the upgradient well compared to downgradient wells is similar. High turbidity in some downgradient wells has been a recurring problem at the site perhaps in part related to the overall fine-grained character of the screened intervals. Filtered and unfiltered metals analyses for the August 1998

and February 1999 sampling events confirm a relation between turbidity and the concentrations of some metals at the site. Wells MW-7 and MW-8 were unsuccessfully redeveloped in June 2000 in an attempt to reduce turbidity.

Based on the information provided, DDAGW-CDO considers the statistically elevated metals results to more likely be false positives related to turbidity as compared to a leachate release from the landfill. Due to the potential for inducing ground water turbidity while sampling monitoring wells at the site, DDAGW-CDO again recommends great care be taken to minimize agitation during the purging and sampling phase. As previously requested by DDAGW-CDO on several occasions, the CRL facility should seriously evaluate low-flow purging and sampling to minimize turbidity and decrease the likelihood of false positive results from metals.

3) Chemical Oxygen Demand (COD) Result: COD is detected at a statistically significant level in MW-7 as it was during the August 2001 sampling event (Table I). The CRL facility states that the COD laboratory method (U.S. EPA 410.4) is a colorometric test dependent on sample clarity. The presence of suspended solids interferes with the accuracy of the analysis. The turbidity measured in MW-7 of 2200 NTU is thought to have resulted in an inaccurate determination of COD resulting in a false positive. In general, there is a positive correlation between COD and turbidity at the site for samples taken from MW-7 since 1998. Based on the information available, DDAGW-CDO concurs that the COD result for the February 2002 sampling event is more likely a false positive related to sample turbidity as opposed to a leachate release.

4) Chloride Results: Chloride is detected at concentrations exceeding its prediction limit in wells MW-5, MW-7 and MW-8 (Table I). There are clear upward trends in chloride concentrations in wells MW-7 and MW-8 from 1998 to the present (Figure 2; Table 3). There is also a clear upward trend, although less pronounced, in MW-5. The CRL facility considers the statistically elevated chloride results in MW-5, MW-7 and MW-8 to be false positives related to ground water quality spatial variability and general increasing chloride concentrations around the site. However, any upward chloride concentration trend associated with upgradient well MW-6 is slight based on the inclusion of data for August 2001 and February 2002 (Table 3). Hence, the use of this latter reason for producing the chloride false positives is no longer a particularly compelling argument. DDAGW-CDO considers the false positive argument for wells MW-5, MW-7 and MW-8 must be related to spatial variability in chloride concentrations between downgradient wells and the single upgradient well, MW-6, or to a landfill release.

Based on a careful review of all the information provided, DDAGW-CDO concurs with the false positive demonstration presented for the CRL facility for chloride. However, continued increasing chloride concentrations in one or more downgradient wells in the absence of similar increases in upgradient well MW-6 will make further false positive demonstrations based on spatial variability and one background well suspect. DDAGW-CDO strongly recommends the CRL facility follow one of the approaches discussed in the April 22, 2002 meeting with Ohio EPA: 1) background well installation plus interwell statistics; 2) background well installation plus interwell statistics with an

alternate parameter list; or 3) intrawell statistics with low-flow purging and sampling. Any of the three approaches should significantly reduce the false positive rate at the site due to spatial variability without jeopardizing the detection of a landfill release.

Conclusions

DDAGW-CDO recommends the CRL facility remain in detection monitoring based on the results of the February 2002 sampling event. However, the false positive demonstrations made for chloride and other constituents are becoming more difficult to evaluate. Reasonable efforts must be made by the CRL facility in the very near future to address the ground water turbidity issue and the use of a single background well at the site. If present trends in chloride concentrations at the site continue, it is likely in the near future that the current false positive demonstration arguments will be insufficient to avoid assessment.

Lindsay Taliaferro III, DDAGW-CO

ID#s 8333334469

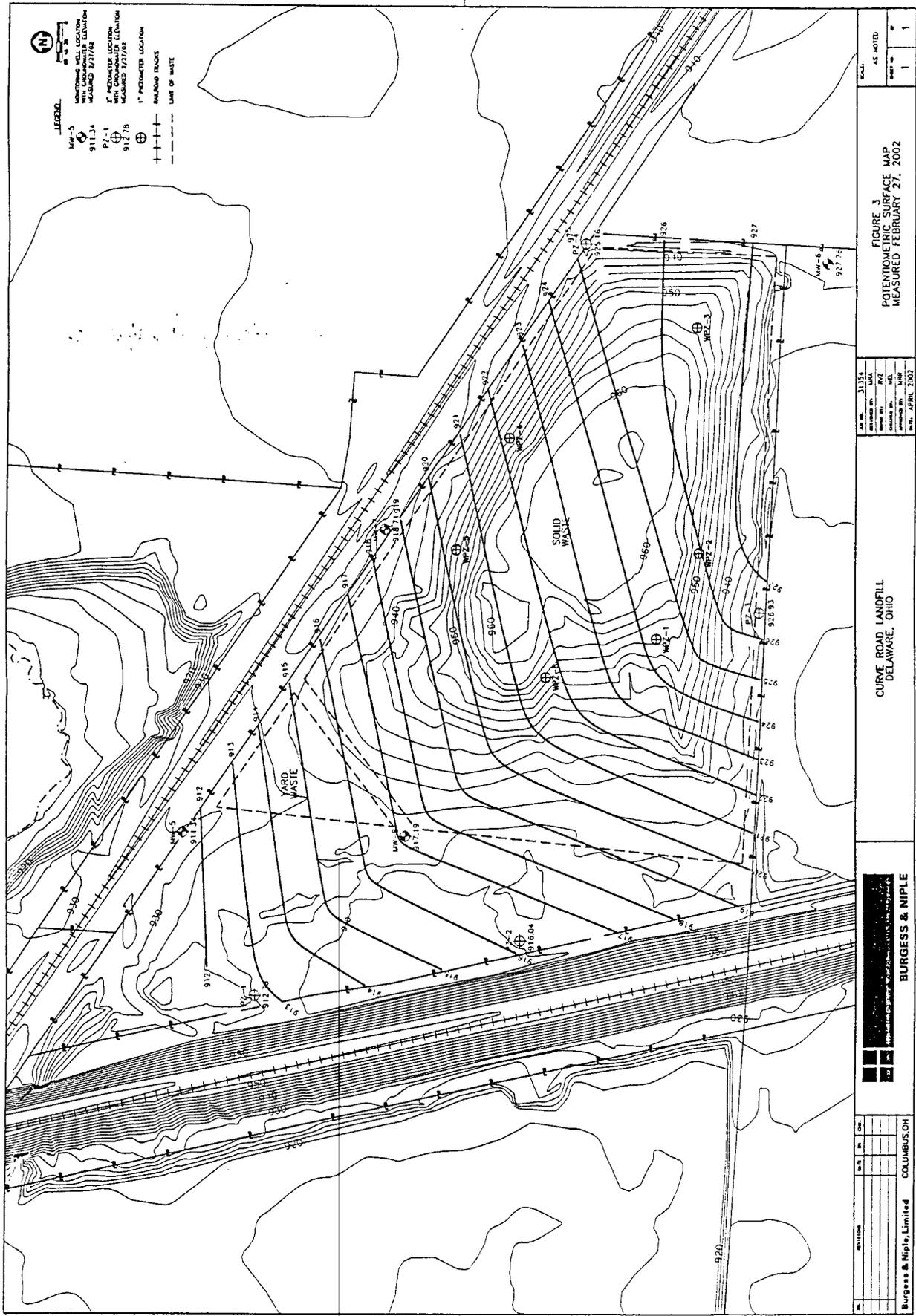


Figure 1. Index map showing sampling point locations and the piezometric surface for the February 2002 ground water sampling event, CRL facility.

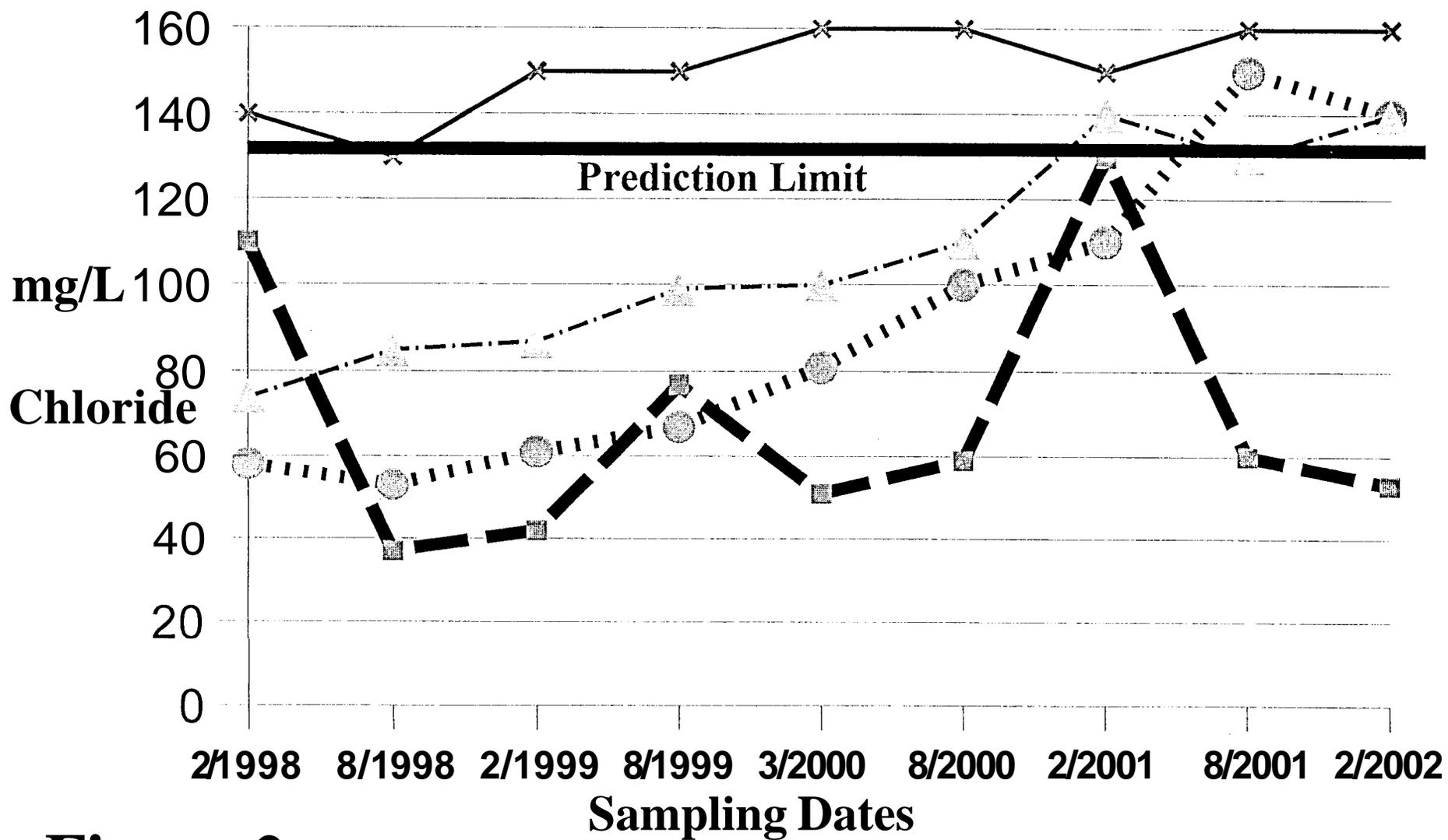
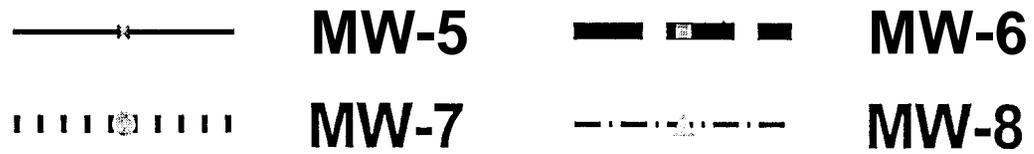


Figure 2.



Wells	Parameters	Results	Prediction Limits	Proposed Reasons for False Positives
MW-5	Chloride (mg/L)	160	131	Spatial variability
MW-7	Barium (ug/L)	859	550	Turbidity
	Chloride (mg/L)	140	131	Spatial variability
	COD (mg/L)	660	631	Turbidity
	Copper (ug/L)	110	106	Turbidity
	Thallium (ug/L)	2.4	1.7	Turbidity
MW-8	Copper (ug/L)	130	106	Turbidity
	Chloride (mg/L)	140	131	Spatial variability
	Lead (ug/L)	55.8	53.2	Turbidity
	Thallium (ug/L)	2.5	1.7	Turbidity

Table 1. Summary of statistically significant results for the February 2002 sampling event.

Wells / Turbidity	Turbidity Range (NTU)	Average Turbidity (NTU)
MW-6 (upgradient)	230 - 1600	760
MW-5 (downgradient)	360 - 2000	1010
MW-7 (downgradient)	1000 - 6900	2690
MW-8 (downgradient)	660 - 3000	1590

Wells / Mann-Kendall Trend	n	S	Probability	Trend
MW-6 (upgradient)	9	6	0.306	slight positive trend
MW-5 (downgradient)	9	21	0.017	significant positive trend
MW-7 (downgradient)	9	32	0.00012	significant positive trend
MW-8 (downgradient)	9	33	0.00007	significant positive trend

Table 3. Mann-Kendall trend test results for monitoring wells. n = number of monitoring events (semiannual events from February 1998 through February 2002); S = number of positive differences minus the number of negative differences (S = 0 means no increasing trend); probability values (no increasing trend equals a probability value of 0.540 for S = 0, n = 9; the smaller the probability number or the larger S the more positive the trend for n = 9) from R. D. Gibbons and D. E. Coleman, 2001 Statistical Methods for Detection and Quantification of Environmental Contamination, p. 199, Table 16.4. Compare Mann-Kendall trends in Table 3 with time-concentration graphs in Figure 2.