

**FIFTH FIVE-YEAR REVIEW REPORT FOR
CHISMAN CREEK SUPERFUND SITE
YORK COUNTY, VIRGINIA**



December 2016

Prepared by

**U.S. Environmental Protection Agency
Region 3
Philadelphia, Pennsylvania**

A handwritten signature in black ink, reading "Karen Melvin", is written over a horizontal line.

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DEC 2 2016

Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FEMA	Federal Emergency Management Agency
FS	Feasibility Study
FYR	Five-Year Review
IC	Institutional Control
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg	Milligrams per kilogram
mg/L	Milligrams per Liter
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
POTW	Publicly Owned Treatment Works
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
TTV	Toxicity Trigger Value
UECA	Uniform Environmental Covenants Act
UU/UE	Unlimited Use and Unrestricted Exposure
VADEQ	Virginia Department of Environmental Quality

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR Reports such as this one. In addition, FYR Reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Chisman Creek Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two operable units (OUs) and both will be addressed in this FYR. OU1 addresses exposure to fly ash, ingestion of groundwater, and protection and restoration of wetlands. OU2 addresses the surface drainage modifications for Ponds A, B and C and a monitoring program for the ponds, the Chisman Creek estuary and a fresh water tributary.

The FYR was led by Andrea Bain of EPA Region 3. Participants included Angela McGarvey, Virginia Department of Environmental Quality (VADEQ) project manager; Darriel Swatts, EPA Community Involvement Coordinator; Mindi Snoparsky, Hydrogeologist; Nancy Rios-Jafolla, Toxicologist; John McCloskey, Biological Technical Assistance Group (BTAG). The potentially-responsible party (PRP), Dominion Power, was notified of the initiation of the FYR. The review began on 1/21/2016.

Site Background

The Site is located in southeastern York County, Virginia, in a 520-acre sub-watershed of the Chisman Creek Coastal Basin on the Virginia Peninsula. The Site includes three abandoned sand and gravel pits that were filled with over 500,000 tons of fly ash from the Virginia Power (formerly Virginia Electric and Power Company) Yorktown Power Generating Station from 1957 to 1974 (Areas A, B, and C¹); contaminated groundwater; freshwater ponds (Ponds A, B and C); the fresh water tributary stream; and the Chisman Creek estuary (see Figure D-2 in Appendix D). Areas A (approximately 13.5 acres), B (approximately 4.5 acres) and C (approximately 13 acres) are located along Wolf Trap Road. Ponds A, B and C are located west of Wolf Trap Road and immediately north of Area A. The fresh water tributary stream consists of two branches in the area of the ponds; the confluence of the branches is near Pond C. From the confluence of the two branches, the tributary flows eastward under Wolf Trap Road, along the north face of Area C, and into the Chisman Creek estuary.

The former gravel pits and pond areas are located within a residential area with homes adjacent to and between these areas. During the remedial design, the residents in the area expressed opposition to leaving these areas fenced off at the end of the cleanup. Virginia Power (now Dominion Power) subsequently entered into a lease agreement with York County whereby soccer fields were constructed over Area A and baseball fields were constructed over Area C in concert with the site cleanup. Additional details are provided in Appendix C.

¹ A fourth area, Area D, warranted no remedial action because the fly ash originally placed there had been removed and placed at Area C in the early 1970s.

FIVE-YEAR REVIEW SUMMARY FORM

Site Name: Chisman Creek		
EPA ID: VAD073613663		
Region: 3	State: VA	City/County: Newport News/York
NPL Status: Final		
Multiple OUs? Yes	Has the site achieved construction completion? Yes	
Lead agency: EPA		
Author name: Andrea Bain, with additional support provided by Skeo		
Author affiliation: EPA Region 3		
Review period: 1/21/2016 - 12/7/2016		
Date of site inspection: 6/15/2016		
Type of review: Statutory		
Review number: 5		
Triggering action date: 12/7/2011		
Due date (five years after triggering action date): 12/7/2016		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1980, the owner of a private drinking well on Wolf Trap Road, just west of Area C, reported that the well water was discolored. In 1980 and 1981, the Virginia State Water Control Board (now part of VADEQ) and the Virginia State Board of Health sampled the residential wells near the three abandoned disposal pits to determine the types and concentrations of contaminants affecting the local groundwater. These and other tests revealed elevated levels of heavy metals in the groundwater, sediments, surface water, and soils in and around the disposal areas. EPA added the Site to the Superfund program's National Priorities List (NPL) in September 1983.

Remedial investigations found contamination in the fly ash; in the sediments of Chisman Creek and its tributaries; in groundwater within and adjacent to the disposal pits (Areas A, B and C); and in ponds and tributaries to Chisman Creek. Nickel and vanadium were the most ubiquitous and abundant of the trace metal contaminants. Arsenic, beryllium, chromium, copper, molybdenum and selenium were also present at elevated concentrations.

Potential health risks identified in the OU1 risk evaluation included consumption of contaminated groundwater and ingestion of fly ash. The OU2 risk evaluation indicated no unacceptable risks due to consumption of fish and

oysters in the ponds and estuary. The human health risks associated with the accidental ingestion of surface water and sediments at the Site were also found to be within EPA guidelines for acceptable risk.

Response Actions

EPA issued the Record of Decision (ROD) for OU1 on September 30, 1986. The remedial action objectives of the OU1 ROD are:

- Direct Contact: Prevent human contact with or consumption of fly ash or fly ash-contaminated soils.
- Ingestion of Contaminated Water: Prevent human consumption of water contaminated by fly ash in excess of relevant human health standards and criteria.
- Wetlands Protection: Minimize disruption or destruction of existing wetlands that might result from the implementation of remedial actions at the Site.
- Water Protection: Prevent further degradation of groundwater quality to levels that could jeopardize human health or the environment.
- Water Restoration: Restore the quality of groundwater in the shallow Tabb Formation. Surface waters may incidentally be benefitted by measures taken in the ROD.

To address these objectives, the remedy selected in the OU1 ROD contains the following major components:

- Install an alternate water supply to homes along Wolf Trap and Allens Mill roads.
- Install a low-permeability cap in the area of the filled sand and gravel pit designated as Area C and a soil cap in those Areas designated as Areas A & B.²
- Collect contaminated groundwater from Area C using horizontal wells, with treatment at an on-site treatment plant and discharge to the Chisman Creek non-tidal tributary.
- Initiate post-closure monitoring of ground- and surface water.
- Attempt to place deed restrictions or other land use controls at the four Areas, including the prohibition of excavation and building on site, and restriction of groundwater use.

The ROD did not specify contaminants of concern (COCs) or groundwater cleanup goals, although it did specify that applicable or relevant and appropriate requirements (ARARs) were to be met.

On March 22, 1994, EPA issued an Explanation of Significant Differences (ESD) to revise the location for the treatment and disposal of the contaminated groundwater from the on-site treatment plant to an off-site publicly owned treatment works (POTW). EPA determined the untreated groundwater collected from Area C suitable for direct discharge into the existing POTW because it meets the existing POTW's established pre-treatment requirements. As a result of EPA's issuance of the ESD in March 1994, the original ARARs established for the on-site treatment plant were no longer required.

EPA issued the ROD for OU2 on March 31, 1988. The ROD addresses the surface drainage modifications for Ponds A, B, and C, a monitoring program for the ponds, the Chisman Creek estuary, and a fresh water tributary.

² A fourth area, Area D, warranted no remedial action since the fly ash originally placed there had been removed and placed at Area C in the early 1970s.

The remedial action objectives of the OU2 ROD are:

- Direct Contact: Prevent human contact with surface water and sediments containing trace elements that are in excess of ARARs or otherwise may adversely affect human health.
- Ingestion of Contaminated Surface Water or Sediment: Prevent human consumption of water or sediments containing trace elements that are in excess of ARARs or otherwise may adversely affect human health.
- Wetlands Protection: Protect environment by preventing or minimizing disruption of existing wetlands that might result from the implementation of remedial actions at the Site.
- Surface Water and Sediment Protection: Prevent degradation of surface water and sediments to levels that are in excess of ARARs and that may adversely affect human health or the environment.
- Surface Water Restoration: Restore the quality of surface water to levels that attain ARARs or levels that are otherwise necessary to protect human health and the environment.

The remedy selected in the 1988 OU2 ROD contains the following major components:

- Implement a stream water quality monitoring program for the freshwater tributary to evaluate the effectiveness of the OU1 remedial actions.
- Relocate approximately 2,100 feet of the freshwater tributary adjacent to Area C and fill in the old reach.
- Implement a water quality monitoring program for the ponds and the estuary to monitor the effectiveness of the OU1 remedial actions.

The RODs did not specify contaminants of concern or surface water or sediment cleanup goals, although it did specify that ARARs were to be met. Monitoring requirements and performance standards were to be developed during the remedial design.

Status of Implementation

In a Consent Decree negotiated between EPA and Virginia Power (now Dominion Power) in 1987, Virginia Power agreed to conduct the design and construction of the remedy. Construction activities for OU1 were initiated in November 1987 and were completed in December 1988. Construction activities for OU2 were also completed in December 1988. As documented in a Superfund Site Interim Closeout Report, dated December 21, 1990, all construction activities were completed to EPA's specifications and met the full intention of the OU1 ROD. Newport News Water Works completed the water line extension serving the homes on Wolf Trap and Allens Mill Roads and York County completed the connections to the waterline. The Area C groundwater collection underdrain system drains to a pumping station where the impacted water is pumped to the POTW for off-site treatment.

The June 2010 Groundwater Investigation Report recommended an additional study to delineate the extent of vanadium present in the groundwater at the Site based on identified data gaps north, west and south of Area C. After groundwater and soil investigations in 2010, 2011 and 2013, EPA determined that fly ash in Area C extends westward across the current route of Wolf Trap Road. Dissolved vanadium has been detected in the uppermost aquifer at concentrations above the EPA Regional Screening Level (RSL) at several locations, but is not considered fully delineated. Due to vanadium detections west of Wolf Trap Road (Figure D-3), in 2013 EPA requested that Dominion Power evaluate whether additional remedial measures are needed to supplement the existing underdrain collection system at Area C, specifically to improve hydraulic control in the northwestern portion, upgradient from Wolf Trap Road properties.

During the 1987 remedial design phase, and based on numerical modeling results, Dominion concluded that 95 percent of the ash would be dewatered by the drain system as constructed. However, a 2014 study of the drain system performance indicated the system has not dewatered the ash completely and was only operating at 30

percent of the anticipated rate modeled in the 1980s. Based on a 2014 assessment, Dominion Power has installed an interceptor trench along the western site boundary to augment the existing underdrain system.

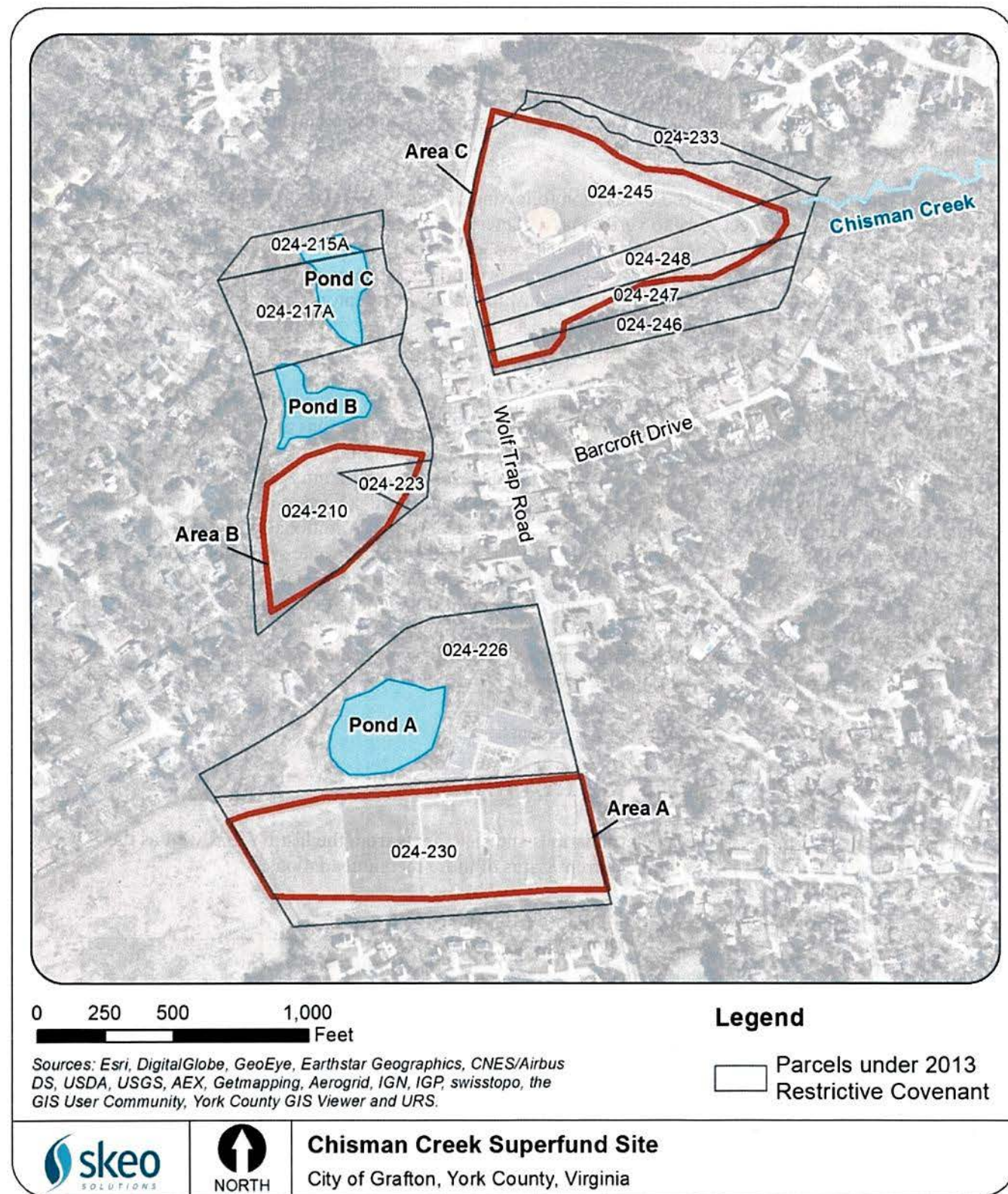
In 2015, EPA approved work to resolve a groundwater seep identified at Area B. The work included constructing a 3-foot wide, 4-foot deep trench approximately 150 feet long, placing 6-inch PVC pipe at the bottom of the trench, backfilling with fine graded aggregate, and discharging through a level spreader.

An environmental covenant is in place to protect the integrity of the remedy and limit potential exposures. In 2013, Dominion recorded a Uniform Environmental Covenants Act (UECA) Environmental Covenant for all its affected parcels, including Areas A, B, and C, the ponds and Chisman Creek (Table 1, Figure 1). The covenant prohibits groundwater use and soil disturbance for the specified parcels.

Table 1: Summary of Implemented Institutional Controls (ICs)

Media, Engineered Controls and Areas that do not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or Planned)
Groundwater and Soils	Yes	Yes	024-245 024-246 024-210 024-226 024-230 024-248 024-215A 024-247 024-217A 024-223 024-233	Prohibit use of groundwater, soil excavation and building construction except those in support of the parks' recreational use.	2013 UECA Environmental Covenant

Figure 1: Institutional Control Map



Systems Operations/Operation & Maintenance (O&M)

A 1991 Consolidated Monitoring Plan includes requirements for groundwater, surface water and sediment monitoring, and site inspections. Groundwater sampling is completed on a semi-annual basis. The York County Parks and Recreation Department is responsible for inspection and maintenance of the capped areas at Area A and Area C, now Wolf Trap Park and Chisman Creek Park. The PRP remains responsible for inspection and maintenance of Area B, and maintenance of monitoring wells, operation and maintenance of the groundwater extraction system, and monitoring of all media.

The O&M requirements are now in need of revision following completion of the interceptor trench. Inspections of the interceptor trench will be necessary to verify that the interceptor trench, soil cover and associated site restoration features are functioning as intended. The site inspections will include monitoring the functionality of the new interceptor trench (e.g., measuring flow volumes), sampling and gauging of the monitoring/recharge wells (to confirm that the trench is effective), regular flushing of the interceptor trench through the cleanouts, and maintenance of soil cover. Ground maintenance will be a cooperative effort of Dominion Power and York County, which currently leases the property from Dominion Power.

In 2013, the sediment monitoring program was updated to incorporate new data and technologies. The April 2013 Sediment Monitoring Plan requires sediment monitoring of four estuarine stations as well as two tributary sites immediately upstream and downstream of Area C. Annual sediment sampling also occurs at Ponds A, B, and C. According to the plan, if bulk vanadium at EP-1A or EP-2 exceeds 145 milligrams per kilogram (mg/kg), chronic sediment toxicity tests using *Leptocheirus plumulosus* are conducted until sufficient data are accumulated to calculate a chronic toxicity trigger value (TTV) for vanadium and arsenic. Additionally, if the sediment acid volatile sulfide and simultaneously extracted metals TTV is exceeded then chronic sediment toxicity tests are initiated (using the same sediment collected during the period of vanadium TTV development or, later, a follow-up sample). If toxicity tests are required, the lab control sediment (Old House Creek, Ware River) is also analyzed for the relevant TTV analytes. Chemical results from non-toxic samples are used to adjust TTV values as appropriate. If toxicity occurs in two consecutive samples, then a plan for benthic evaluation or toxicity identification evaluation is to be submitted to EPA within 180 days

Surface water is sampled during sediment sampling events.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2011 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The remedy for OU1 is protective of human health and the environment in the short term because of the actions taken to date. Extending the water lines to Wolf Trap and Allens Mill Roads to serve homes in the area of the Site is preventing human exposure to the contaminated groundwater. Capping the former pits is preventing human and environmental exposures to the fly ash. Temporary institutional controls in the form of a lease agreement between Virginia Power and York County are preventing contact with the fly ash and contaminated groundwater under the former Areas A and C disposal pits. In order for the OU1 remedy to be protective in the long term, legally enforceable institutional controls must be put in place by Virginia Power to ensure protectiveness.

OU #	Protectiveness Determination	Protectiveness Statement
		Furthermore, the extent and cause of increasing levels of vanadium contamination in the shallow groundwater aquifer need to be determined in order for the OU1 remedy to be protective in the long term.
2	Short-term Protective	The remedy for OU2 is protective of human health and the environment in the short term because of the actions taken to date. Relocating the tributary to Chisman Creek and filling in the old reach is preventing human and environmental exposure to the sediments in the old reach. In order for the remedy to be protective in the long term, the Sediment Monitoring Plan should be reviewed for several issues, including toxicity testing trigger values and testing procedures. Also, EPA has not determined whether follow-up actions are necessary because of the sediment data being reported as wet weight values instead of dry weight values.
Sitewide	Short-term Protective	The remedy for the Chisman Creek Site is protective of human health and the environment in the short term because the remedial action at both of the operable units is protective in the short term.

Table 3: Status of Recommendations from the 2011 FYR

OU #	Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Vanadium contamination not fully delineated.	Continue vanadium investigation until full extent of contamination is delineated.	Ongoing	Additional investigations will determine the full extent of contamination.	N/A
1	Area of attainment was never designated.	Issue an ESD to select area of attainment for groundwater.	Ongoing	Will be established in ESD.	N/A
1	Cleanup levels for arsenic and vanadium have not been revised.	Issue an ESD to formally adopt revised cleanup levels for arsenic and vanadium.	Ongoing	Will be established in ESD.	N/A
1	Groundwater sampling must include speciation of vanadium.	EPA will direct that all future groundwater sampling events include speciation of vanadium.	Ongoing	Will be determined by EPA.	N/A
1	Present institutional controls are not contained in a legal document that is protective over time.	Issue an ESD to require institutional controls contained in a legal document that are protective over time and meet EPA requirements.	Completed	It was determined that an ESD is not necessary and in 2013 a UECA Environmental Covenant was filed for all affected Dominion Power properties.	5/31/2013

OU #	Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date (if applicable)
2	Dominion Power submitted sediment data in wet weight rather than dry weight.	Complete review of Sediment Monitoring Plan and give direction on whether follow-up action is needed.	Completed	Sediment reports now report dry weight results.	9/25/2012

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by newspaper posting in the Daily Newspaper, on 11/4/2016, stating that a FYR is underway and inviting the public to submit any comments to EPA (Appendix F). The results of the review and the report will be made available at the Site's information repository, located at Yorktown Library, 8500 George Washington Memorial Hwy, Yorktown, VA 23692.

During the FYR process, EPA conducts interviews to document any perceived problems or successes with the remedy that has been implemented to date. Interviews included residential interviews along Wolf Trap Road and Allens Mill Road during the site inspection, as well as interviews with a York County official, EPA and VADEQ managers, and Dominion Power. Complete interviews are included in Appendix I. Overall, the residents aware of the cleanup are happy with the remedy in place. Several residents were unaware of the remedy but are happy to see that the areas are now utilized as county parks. An interviewed York County official who worked on the park development praised the project and expressed no concerns. EPA and VADEQ project managers believe that the remedy is currently preventing unacceptable exposures, but that continued investigation is needed to delineate the full extent of subsurface contamination.

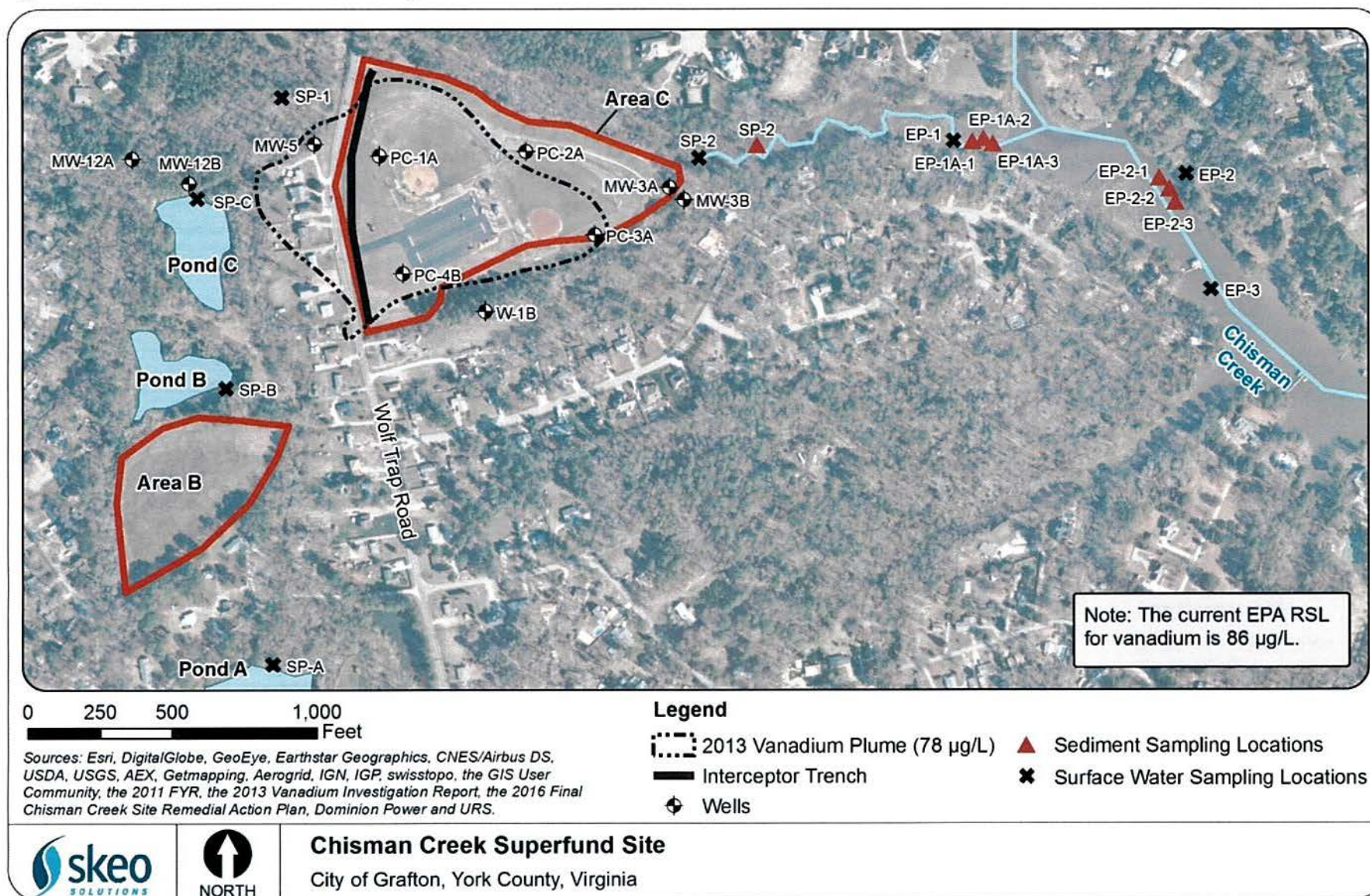
Data Review

Groundwater

Groundwater monitoring at the Site consists of semi-annual sampling at 10 monitoring wells (Figure D-3): MW-3A, MW-3B, MW-5, MW-10A, MW-10B, MW-12A, MW-12B, MW-13A, MW-13B and MW-18. Six of the monitoring wells are constructed in the shallow Tabb aquifer: MW-3B, MW-5, MW-10B, MW-12B, MW-13B and MW-18. The remaining four monitoring wells are constructed in the deeper Yorktown aquifer: MW-3A, MW-10A, MW-12A and MW-13A. Groundwater beneath Area C flows toward the northeast toward the stream channel and Chisman Creek Estuary. Due to lack of wells west of Area C, insufficient data exist to characterize potentiometric conditions in that direction.

EPA reviewed data for this FYR through November 2015. Concentrations in most wells have decreased over time and are below the detection limit (Appendix H). However, groundwater exceedances of arsenic and vanadium are present at shallow wells MW-5, upgradient of Area C, and MW-13B and MW-18B, downgradient of Area A (Figures 2 and D-3, Table 4). A Mann-Kendall analysis indicates statistically significant increases of arsenic in MW-13B and MW-18B and of vanadium in MW-13B (Figures 3 and 4). The PRP will conduct additional investigations to fully delineate groundwater contamination in this area and determine the extent of the fly ash. It is known from the vanadium investigations conducted to date that the vanadium contamination is located west of Area C. Because everyone along Wolf Trap Road in that vicinity are connected to the public water supply, no one is presently exposed to the contaminated groundwater.

Figure 2. Detailed Area B and Area C Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 3. Wells with Increasing Arsenic Concentrations

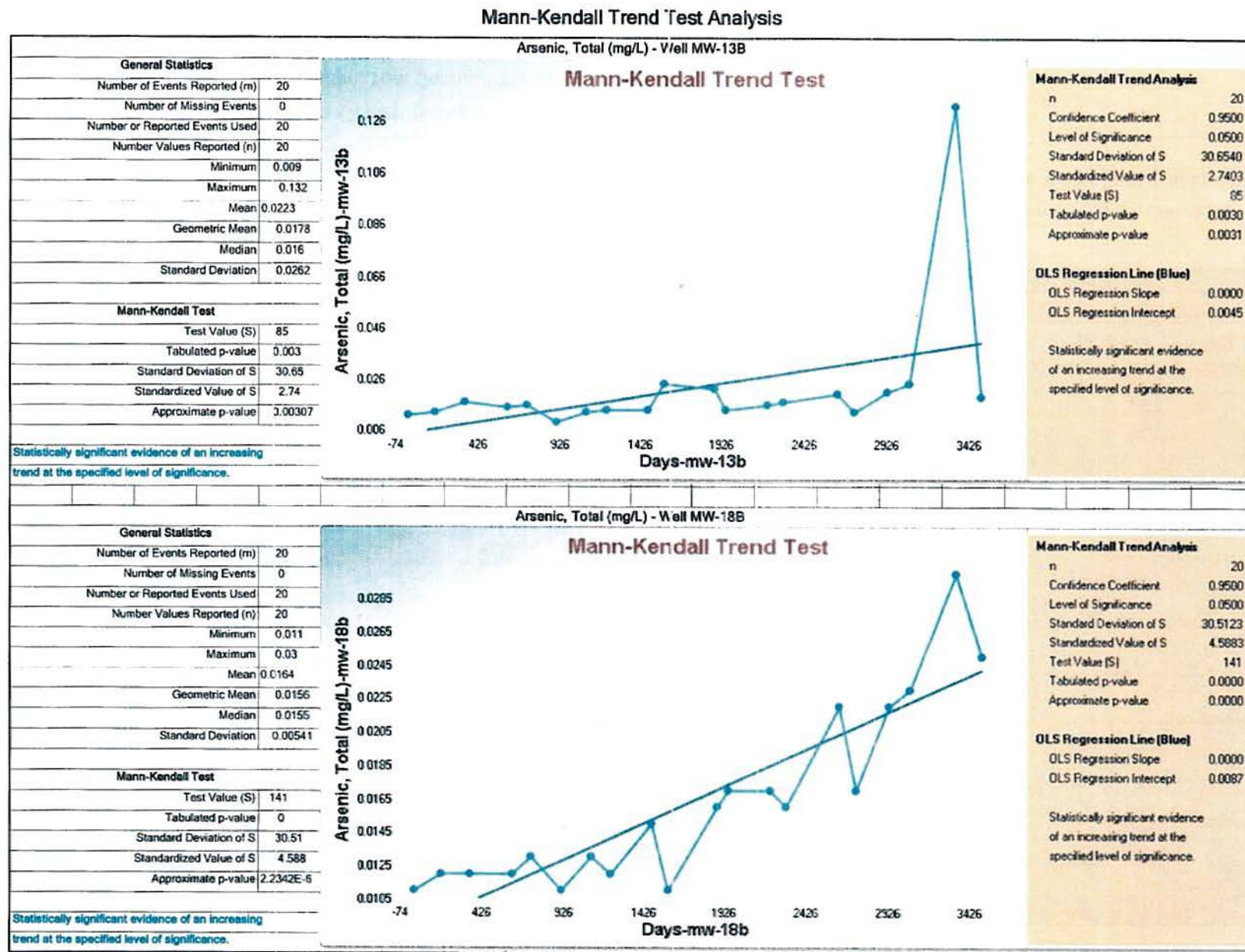


Figure 4. Wells with Increasing Vanadium Concentrations

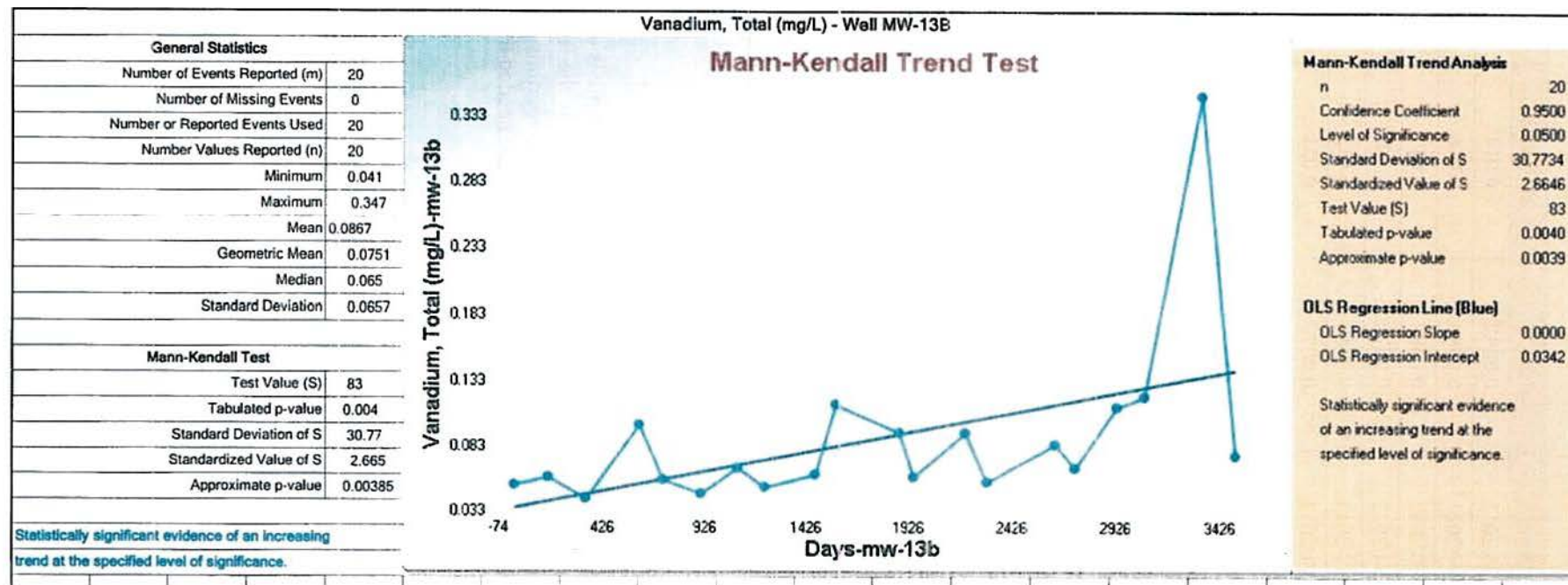


Table 4. Arsenic and Vanadium Groundwater Monitoring Results

COC	Units	Standard	Date	MW-5	MW-13B	MW-18B
Arsenic (total)	milligrams per liter (mg/L)	0.01 (MCL)	1/25/2011	0.009 J	0.014	0.017
			10/4/2011	0.008 J	0.016	0.017
			1/10/2012	0.008 J	0.017	0.016
			12/4/2012	0.007 J	0.02	0.022
			3/12/2013	0.005 J	0.013	0.017
			10/1/2013	0.007 J	0.021	0.022
			2/11/2014	0.006 J	0.024	0.023
			11/18/2014	0.011	0.132	0.03
			4/28/2015	0.006 J	0.019	0.025
			11/4/2015	0.008 J	0.020	0.031
Vanadium (total)	mg/L	0.086 (RSL)	1/25/2011	2.702	0.058	<0.002
			10/4/2011	2.591	0.092	0.003 J
			1/10/2012	1.38	0.054	<0.002
			12/4/2012	2.513	0.083	<0.002
			3/12/2013	1.625	0.065	<0.002
			10/1/2013	2.367	0.111	0.002 J
			2/11/2014	1.775	0.119	<0.002
			11/18/2014	3.115	0.347	<0.002
			4/28/2015	1.476	0.074	<0.002
			11/4/2015	1.880	0.073	<0.002
Bold indicates an exceedance of the Maximum Contaminant Level (MCL) or Regional Screening Value (RSL). J indicates an estimated value.						

Surface Water

The most recent surface water data available for this FYR are from January 2016. One sample is collected from each of the ponds as well as five samples from the creeks (Figure 3). All results were below the Region 3 ecological screening levels, with the exception of vanadium in SP-A, which was 113 micrograms per liter (µg/L) (Appendix H, Table H-2). EPA will determine if additional evaluation and sampling are needed to assess potential impacts to ecological receptors.

Sediment

Sediment monitoring consists of semi-annual monitoring of the estuarine stations EP-1A and EP-2 as well as annual monitoring of station SP-2, an area of brackish water immediately downstream of fly ash Area C. Results are included in Appendix H.

TTV criteria for arsenic and vanadium were not exceeded in any of the 2013 through 2015 samples. Arsenic concentrations are variable among all stations depending on the sampling period but vanadium concentrations do not show this trend (Appendix H, Figure H-2). Overall, there does not appear to be an upward or downward trend for either metal.

Generally, stations EP-2 and upstream EP-1A had similar metals concentrations during the 2013 to 2015 period, with EP-2 frequently having slightly higher values than EP-1A (Appendix H). Both estuarine stations have similar

contaminant concentrations as the reference Poquosin River site except for nickel and vanadium. Arsenic and vanadium TTV were not exceeded at any of the stations. Toxicity or benthic impairment from these metals is considered unlikely. The Poquosin River reference site had the highest concentrations, which were still below the TTV.

Because no threshold values were exceeded in the first two years of semi-annual monitoring, the PRP will conduct annual monitoring of the EP-1A, EP-2, SP-2 and Poquosin River stations. Dominion will propose final site-specific arsenic and vanadium remedial action levels for sediment. Sediment will be monitored for bulk metals, total organic carbon, grain size, and AVS/SEM. The next sampling event will occur between January 1, 2017 and March 15, 2017.

Metals at the tributary site SP-1 have all been below BTAG and Probable No Effects Concentration values since Dominion began monitoring, no additional monitoring at this location is deemed necessary and it has been eliminated from the monitoring plan.

Soil

In 2014, in response to homeowner concerns, Dominion Power conducted a soil investigation at a residential parcel on Wolf Trap Road. The purpose of the soil investigation was to assess the exposure risk of vanadium in the shallow soil zone most likely to be encountered by the residents of the parcel. The PRPs compared analytical soil composite results to the vanadium risk-based screening criteria listed in the November 2013 EPA RSL table for residential soil. All soil sample results were significantly less than the RSL value.

Site Inspection

The site inspection took place on 6/15/2016. In attendance were Andrea Bain, EPA Remedial Project Manager; Darriel Swatts, EPA Community Involvement Coordinator; a representative of VADEQ; a representative of Dominion Power; and representatives of Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. For a full list of site inspection activities, see the Site Inspection Checklist in Appendix G. Site photographs are available in Appendix G.

Site inspection participants met at the Chisman Creek Park. Participants discussed current site status, monitoring data and planned construction of the interceptor trench. The interceptor trench has since been constructed. The softball fields were well maintained and in good condition. The participants viewed the proposed interceptor trench area and on-site groundwater monitoring wells. The inspection also included the Wolf Trap Park soccer fields and Pond A. During the inspection, York County staff were addressing bald spots on the soccer fields. No significant issues were noted during the site inspection.

Skeo staff visited the designated site repository, Margaret R. Grundy Memorial Library, located at 8500 George Washington Memorial Hwy, Yorktown, Virginia. No site documents were available.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Groundwater and soil investigations in 2010, 2011 and 2013 found vanadium groundwater contamination and fly ash west of Area C, across Wolf Trap Road. These investigations revealed that although most of the components of the remedy are functioning as intended there are other components that are not currently operating and functioning as designed.

Extending the water lines to Wolf Trap and Allens Mill Roads to serve homes in the area of the Site is preventing human exposure to the contaminated groundwater. Capping the former pits is preventing human and environmental

exposures to the fly ash. Finally, the institutional controls are presently preventing contact with the fly ash and contaminated groundwater under all Dominion Power parcels. The OU2 relocation of the tributary to Chisman Creek and filling in the former path of the tributary, the old reach, is preventing human and environmental exposure to the sediments in the old reach and surface water monitoring is ongoing to assess the effectiveness of the OUI remedy.

The subsurface drainage system at Area C was not functioning as intended. The PRP concluded that due to the fairly low aquifer conductivity and limited saturated thickness the current drain system will likely be unable to reverse the hydraulic gradient in the area. Based on a 2014 assessment, Dominion Power has installed an interceptor trench along the western site boundary to augment the existing underdrain system.

Dissolved vanadium has been detected in the uppermost aquifer at concentrations above the EPA RSL at several locations, but is not considered fully delineated. Although not specifically stated in either ROD, EPA expects that the maximum contaminant level (MCL) for arsenic and the tap water RSL for vanadium will be achieved for the remedy to be protective in the long term. However, groundwater contamination remains in downgradient wells MW-5, MW-13B and MW-18B and the full extent of contamination is unknown.

Until EPA determines why vanadium is being detected in the area west of Area C, EPA cannot determine if the groundwater portion of the remedy is functioning as intended by the decision documents. Because water lines were extended along Wolf Trap Road and residences along Wolf Trap Road in this area are connected to the public water supply, no one is exposed to the contaminated groundwater. Additional soil investigation is also needed in this area to determine the complete delineation of fly ash in Area C.

An environmental covenant is in place to protect the integrity of the remedy and limit potential exposures. In 2013, Virginia Power recorded a UECA Environmental Covenant for all its affected parcels, including Areas A, B, and C, the ponds and Chisman Creek. The covenant prohibits groundwater use and soil disturbance.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure assumptions, toxicity data, and RAOs described in the decision documents remain valid. However, EPA has not defined the COCs, groundwater cleanup goals or area of attainment in the earlier decision documents. Contaminant concentrations in groundwater are currently compared to the current MCLs and, in the absence of MCLs, to RSLs. EPA intends to clarify the groundwater cleanup goals and area of attainment in a future decision document.

EPA intends to fully delineate soil and groundwater contamination west of Wolf Trap Road. In the interim, there are no known private wells in the area. The vanadium RSL of 390 mg/kg for residential soil applied in the 2014 screening of a residential parcel remains valid.

Groundwater data were compared to Region 3 ecological freshwater screening values as part of an evaluation of potential ecological risk from the groundwater to surface water pathway. Concentrations of arsenic in MW-5, MW-13B and MW-18B exceed the arsenic ecological screening value of 0.005 mg/L and concentrations of vanadium in MW-5 and MW-13B exceed the vanadium ecological screening value of 0.02 mg/L. The November 2015 vanadium concentration in MW-5 was 1.88 mg/L, which is 94 times greater than the ecological screening value. Once the extent of the groundwater plume and where it intercepts the tributary is determined, groundwater seeps and/or pore water should be sampled for arsenic and vanadium and any other potential COCs to analyze whether there is potential risk to ecological receptors. MW-3B is the closest shallow well to the Chisman Creek estuary and there were no exceedances of Region 3 ecological freshwater screening values.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

EPA has considered climate change vulnerabilities at the Site. Area A is in what is considered the Active River Area (Nature Conservancy designation). Chisman Creek, just north of Area C is in the Federal Emergency Management Agency (FEMA) 100-year flood plain and would be impacted by three feet or more of sea level rise. Area B does not appear to be vulnerable to flooding. Since the York County Parks and Recreation Department is responsible for maintenance of Areas A and C, they could take predicted sea level rise and increases in precipitation into consideration as they continue to inspect and maintain the soil cap on Area A and low-permeability cap on Area C. However, this is not believed to impact the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues and Recommendations Identified in the FYR:

OU(s): OU1	Issue Category: Changed Site Conditions			
	Issue: The extent of contamination in soil (Area C) and groundwater (Area A and C) has not been fully delineated.			
	Recommendation: Complete investigations to fully delineate the extent of all contamination in soil and groundwater, including speciation of vanadium.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA	12/7/2017

OU(s): OU1	Issue Category: Remedy Performance			
	Issue: The area of groundwater attainment has not been designated.			
	Recommendation: Clarify the area of attainment in a future decision document.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA	12/7/2017

OU(s): OU1	Issue Category: Remedy Performance			
	Issue: Contaminants of concern and associated cleanup levels are not defined in decision documents.			
	Recommendation: Clarify the groundwater cleanup goals in a future decision document.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA	12/7/2017

OU(s): OU1	Issue Category: Changed Site Conditions			
	Issue: It has been 30+ years since homes were hooked up to public water and in the interim there could be homes with new private wells installed. It was also never confirmed if private wells were left in place for those homes where public water was installed.			
	Recommendation: Recheck all properties in the groundwater impact area to determine if any private wells are present and if so, if they are in use (drinking water and/or irrigation). A self-addressed postcard well survey will be necessary. Also, a county records search is necessary to confirm public water use for homes in the area(s) of groundwater impact.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
Yes	Yes	PRP	EPA	12/7/2017

OU(s): OU2	Issue Category: Monitoring			
	Issue: Vanadium concentrations in the January SP-A surface water sample exceed the EPA region 3 ecological freshwater screening level.			
	Recommendation: Conduct additional evaluation and sampling to assess potential impacts to ecological receptors.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	EPA	EPA	12/7/2017

OTHER FINDINGS

In addition, the following are recommendations that were identified during the FYR, but do not affect current and/or future protectiveness:

- The O&M requirements are in need of revision following completion of the interceptor trench.
- The PRP is completing a well survey to locate and assess all historical monitoring wells.
- The local repository should be updated with relevant site documents including this FYR.

VII. PROTECTIVENESS STATEMENT

<i>Operable Unit: 1</i>	<i>Protectiveness Determination:</i> Short-term Protective	<i>Planned Addendum Completion Date:</i> N/A
<i>Protectiveness Statement:</i> The OU1 remedy is currently protective of human health and the environment. Exposure pathways have been eliminated by extending the public water lines to Wolf Trap and Allens Mill roads, capping the former ash pits, and implementing institutional controls to preventing contact with the fly ash and contaminated groundwater under the former Areas A and C disposal pits. For the remedy to be protective over the long term, the following actions should be taken: complete investigations to fully delineate the extent of all contamination in soil (Area C) and groundwater (Area A and C); clarify the area of attainment in a future decision document; specify contaminants of concern and cleanup goals; and recheck all properties in the groundwater impact areas to identify well use.		

<i>Operable Unit: 2</i>	<i>Protectiveness Determination:</i> Short-term Protective	<i>Planned Addendum Completion Date:</i> N/A
<i>Protectiveness Statement:</i> The OU2 remedy is currently protective of human health and the environment. The relocation of the tributary to Chisman Creek and filling in the old reach is preventing human and environmental exposure to the sediments and monitoring is ongoing to assess the effectiveness of the remedy. For the remedy to be protective over the long term, the following action should be taken: determine if additional surface water or biotic sampling is needed to ensure no unacceptable exposures.		

<i>Protectiveness Determination:</i> Short-term Protective	<i>Planned Addendum Completion Date:</i> N/A
<i>Protectiveness Statement:</i> The remedies at OU1 and OU2 are currently protective of human health and the environment in the short term. To be protective over the long term, the recommendations for OU1 and OU2 should be implemented.	

VIII. NEXT REVIEW

The next FYR Report for the Chisman Creek Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Coastal Bioanalysts, Inc., Chisman Creek Superfund Site York County, Virginia Sediment Monitoring Program Annual Report September 2014.

Coastal Bioanalysts, Inc., Chisman Creek Superfund Site York County, Virginia Sediment Monitoring Program Annual Report September 2015.

Dominion. Chisman Creek Superfund Site Sediment Monitoring Plan. April 2013.

Dominion Power, Chisman Creek, Chisman Park, February 2016 Monthly Report.

Haley & Aldrich. Report ON Chisman Creek - Area C, Ash Drain System Evaluation & Feasibility Study, York County, Virginia. May 2014.

Haley & Aldrich. Chisman Creek Area C Remedial Action Plan, Area C Underdrain Augmentation. June 2016.

United States Environmental Protection Agency (EPA). Record of Decision for Operable Unit One, Chisman Creek Superfund Site, Newport News, York County, Virginia. September 1986.

EPA. Record of Decision for Operable Unit Two, Chisman Creek Superfund Site. Newport News, York County, Virginia. March 1988.

EPA. Explanation of Significant Differences from OU-1 Rod, Chisman Creek Superfund Site Newport News, York County, Virginia. March 1994.

EPA. Five-Year Review for Chisman Creek Superfund Site, Grafton, York County, Virginia. September 1994.

EPA. Second Five-Year Review for Chisman Creek Superfund Site, Grafton, York County, Virginia. November 2001.

EPA. Third Five-Year Review for Chisman Creek Superfund Site, Grafton, York County, Virginia. December 2007.

EPA. Fourth Five-Year Review for Chisman Creek Superfund Site, Grafton, York County, Virginia. December 2011.

URS, 2011 Vanadium Investigation Report, Chisman Creek Superfund Site, EPA ID No. VAD980712913, Wolf Trap Road, York County, Virginia. March 24, 2011.

URS, 2013 Vanadium Investigation Report, Chisman Creek Superfund Site, EPA ID No. VADd980712913, Wolf Trap Road, York County, Virginia. May 22, 2013.

URS, Summary of Soil Investigation at 1305 Wolf Trap, March 31, 2014.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Dominion Power placed fly ash into former sand and gravel pits	1957-1974
Virginia State Water Control Board and the Virginia State Board of Health sampled the residential wells in the vicinity of the pits	1980-1981
EPA placed the Site on the Superfund program's National Priorities List	September 8, 1983
EPA completed OU1 remedial investigation and feasibility study (RI/FS)	September 30, 1986
EPA issued OU1 Record of Decision (ROD)	
EPA completed OU2 RI	August 18, 1987
PRP completed OU1 remedial design	October 15, 1987
PRP completed OU2 FS	March 31, 1988
EPA issued OU2 Record of Decision	
PRP began construction for OU1 remedial action	April 4, 1988
PRP completed construction for OU1 remedial action	December 1988
PRP completed OU2 remedial design and began OU2 remedial action	January 25, 1989
PRP completed OU1 remedial action	March 31, 1989
PRP completed OU2 remedial action	December 21, 1990
EPA completed Preliminary Close-out Report	
York County opened Chisman Creek Park softball fields at Area C	May 4, 1991
York County opened Wolf Trap Park soccer fields at Area A	1992
EPA issued Explanation of Significant Differences (ESD) modifying the requirement to treat collected groundwater	March 22, 1994
EPA issued first five-year review (FYR)	September 30, 1994
EPA issued second FYR	November 2, 2001
EPA issued third FYR	December 7, 2006
PRP conducted first round of direct push groundwater sampling	November 9, 2010
EPA issued fourth FYR	December 7, 2011
EPA approved modifications to the sediment monitoring plan	September 25, 2012
PRP began FS for additional OU1 remedial components	December 1, 2013
PRP submitted vanadium investigation report	May 30, 2013
PRP completed soil investigation at residence along Wolf Trap Road	March 31, 2014
PRP submitted Area C drain modification evaluation	June 11, 2014
EPA approved Area B groundwater seep action	April 28, 2015
PRP submitted the final remedial action plan for the interceptor trench	June 12, 2016
PRP completed construction of interceptor trench	August 2016

APPENDIX C – SITE BACKGROUND

The Chisman Creek Superfund site is located in southeastern York County, Virginia, in a 520-acre sub-watershed of the Chisman Creek Coastal Basin on the Virginia Peninsula. Chisman Creek is a tributary to the Chesapeake Bay. The Site consists of three abandoned sand and gravel pits that were filled with fly ash from the Virginia Power (formerly Virginia Electric and Power Company) Yorktown Power Generating Station. A fourth area, Area D, warranted no remedial action since the fly ash originally placed there had been removed and placed at Area C in the early 1970s. The fly ash disposal pits are located adjacent to Wolf Trap Road (State Route 630), approximately 0.7 miles northeast of the intersection of Route 630 and Route 17. The southernmost pit, Area A, is approximately 13.5 acres and is bordered on the west by the former York County municipal landfill and on the east by Route 630. Area B, approximately 4.5 acres, is 700 feet north of Area A and is bordered on the east and west by intermittent streams. Area C, approximately 12.9 acres, is 500 feet northeast of Area B, and is bordered by Route 630 to the west and Chisman Creek to the northeast. Area D, approximately 5 acres, is 150 feet northwest of Area C. Parts of Areas A and C are elevated between 5 and 20 feet above the surrounding land. The relief of Areas B and D is similar to that of the surrounding land.

After completing cleanup, the PRP worked with EPA, the state, local officials and the community, to design and build two recreational parks at the site. Area A was capped with a soil layer overlaid with topsoil and vegetative growth and the soccer fields were placed on top. Area C was capped with a low-permeability cover overlaid with topsoil and vegetative growth and the baseball fields were placed on top. The recreational complex opened in 1991 and supports several sports teams, ponds, private and commercial marinas, and a County Memorial Tree Grove. The site's cleanup became part of a larger water quality improvement effort that led to the reopening of the Chisman Creek estuary for private and commercial fishing.

The predominant surface hydrologic feature of the area is Chisman Creek, which is located directly east of the fly ash pits. Chisman Creek is a tidal estuary 3.75 miles long which flows easterly into Chesapeake Bay. The Creek is approximately 0.5 miles wide at its mouth, where the average depth is 12 feet. The mean range of the tide in the creek is approximately 2.5 feet.

Surface drainage of the area around the fly ash pits occurs through wetlands and a number of small, unnamed tributaries to Chisman Creek. Natural drainage throughout the area has been altered by man-made ponds which resulted from the excavation of sand and gravel from the Tabb Formation. A number of these ponds also drain into the tributaries of the creek.

The four fly ash disposal pits are situated on the Hornsbyville Flat, a 0.5-mile wide plateau characteristically 25 to 30 feet above mean sea level. The Site and surrounding area are underlain by two geologic formations, the shallow Tabb Formation and deeper Yorktown Formation. The Late Pleistocene Tabb Formation is composed primarily of medium sand with some gravel or fine silty clayey sand, and is of moderate to high permeability. Locally, the thickness of the Tabb is as much as 20 feet. In some areas the Tabb has been completely excavated or removed by natural erosion.

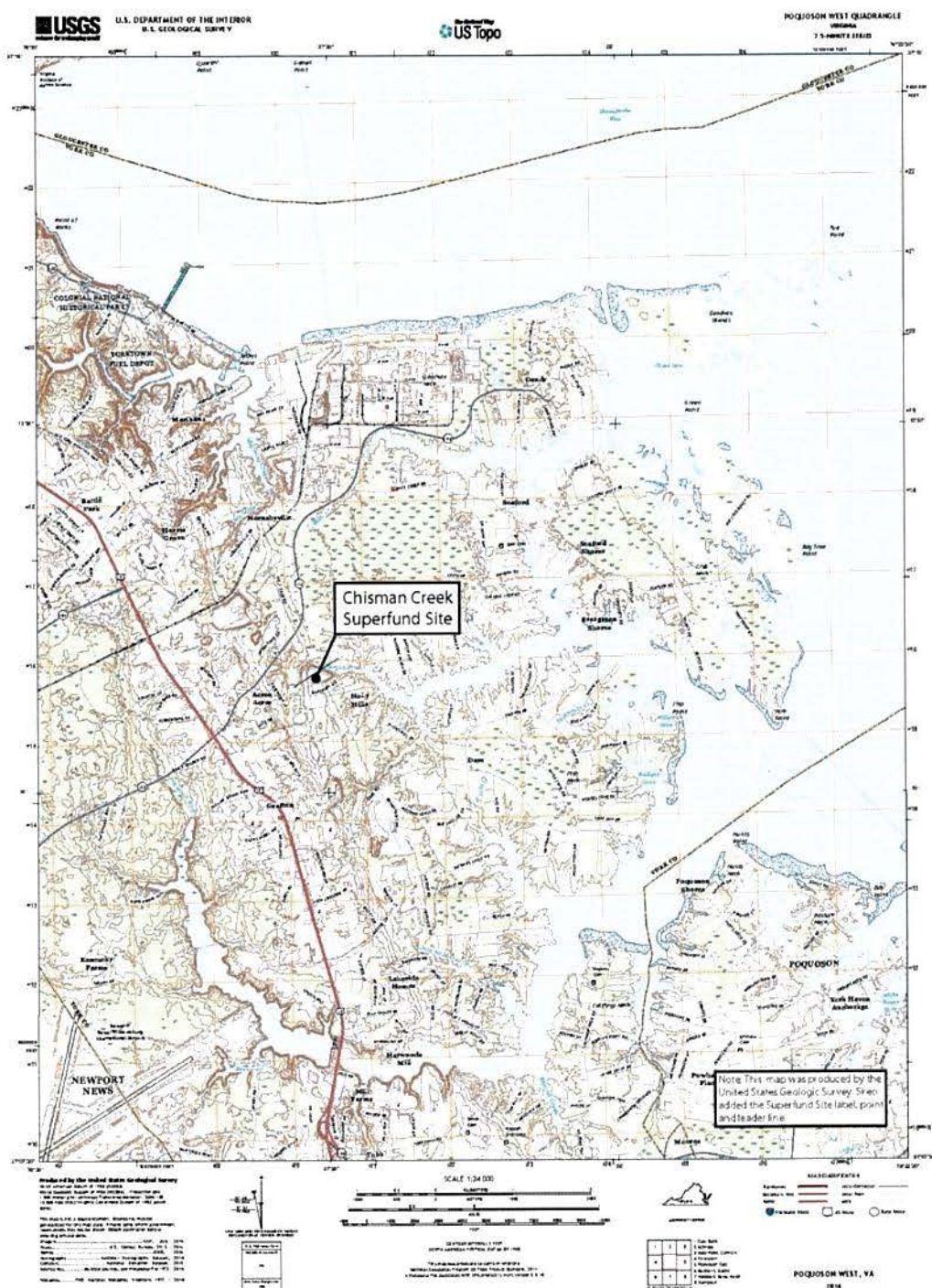
The late Miocene/early Pleistocene Yorktown Formation underlies the Tabb Formation at the Site. The Yorktown consists primarily of greenish gray, silty sand with whole and broken calcareous fossils (shells) interspersed or heavily bedded throughout; it is of relatively low permeability. The thickness of the Yorktown at the Site is unknown, but it is estimated to be between 100 to 150 feet.

Groundwater beneath Area C flows toward the northeast toward the stream channel and Chisman Creek Estuary. Due to lack of wells west of Area C, insufficient data exists to characterize potentiometric conditions in that direction. However, based on topography in the area, the assumption is that groundwater also flows radially west

from Area C toward the unnamed tributary located west of the Site. Groundwater flow from the Site is limited to the north and west by the unnamed tributaries of the Chisman Creek Estuary.

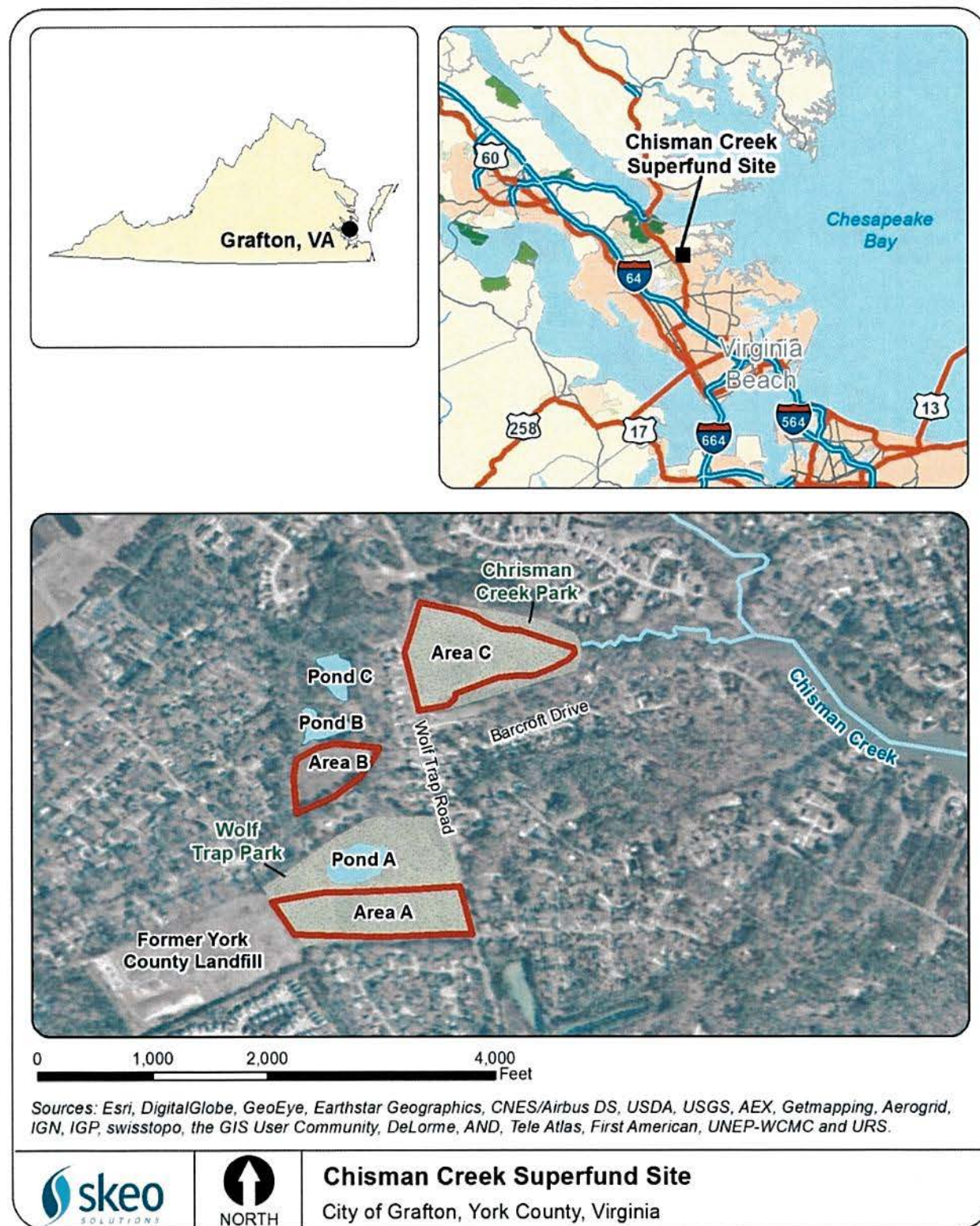
APPENDIX D – SITE MAPS

Figure D-1: USGS Map



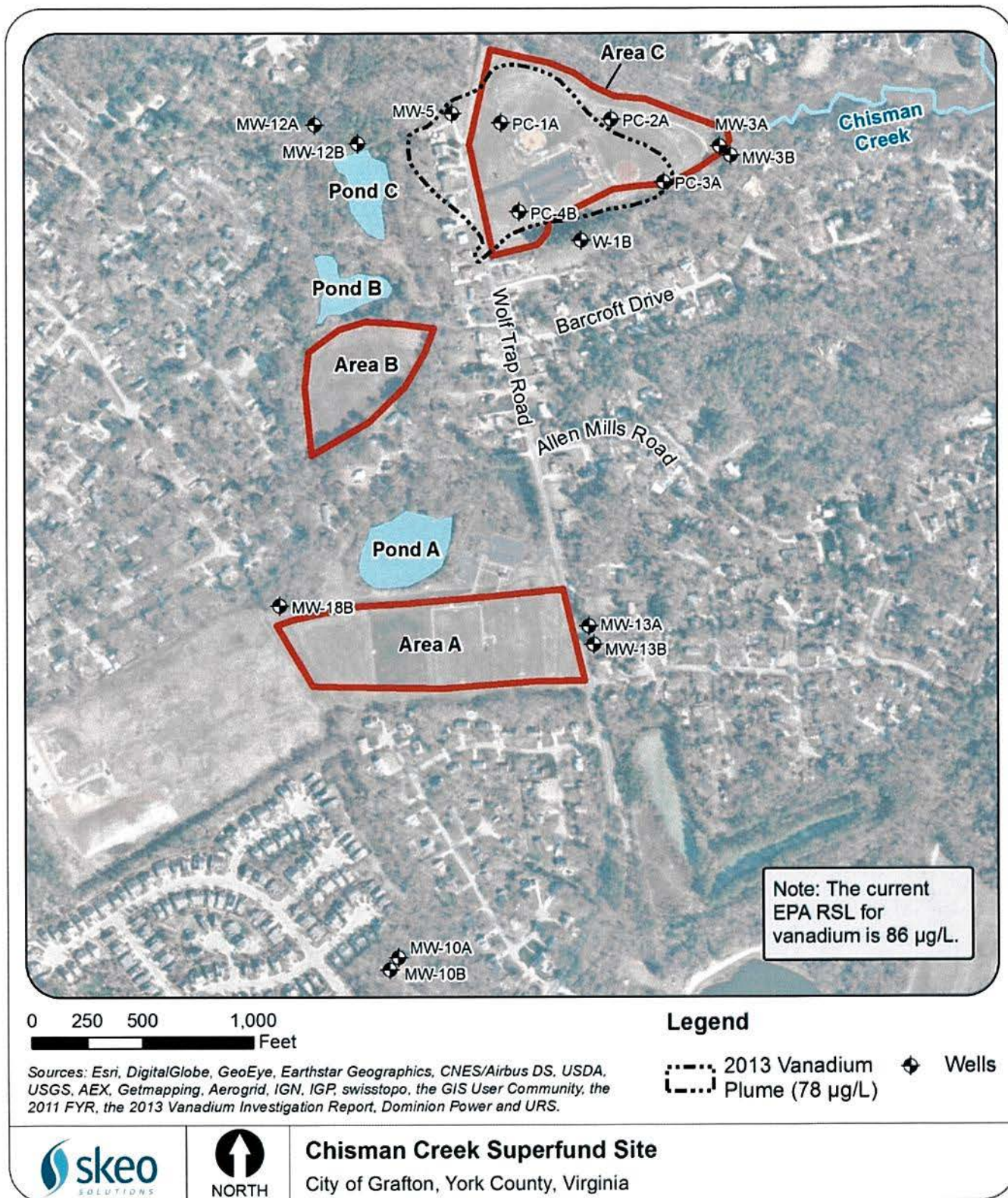
Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure D-2: Site Vicinity Maps



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure D-3: Groundwater Monitoring Wells



APPENDIX E – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST				
I. SITE INFORMATION				
Site Name: <u>Chisman Creek</u>		Date of Inspection: <u>06/15/2016</u>		
Location and Region: <u>Region 3</u>		EPA ID: <u>VAD073613663</u>		
Agency, Office or Company Leading the Five-Year Review: <u>3</u>		Weather/Temperature: <u>Overcast, 85 degrees F</u>		
Remedy Includes: (Check all that apply) ☒ Landfill cover/containment ☐ Access controls ☒ Institutional controls ☒ Groundwater pump and treatment ☐ Surface water collection and treatment ☐ Other: _____ ☐ Monitored natural attenuation ☐ Groundwater containment ☐ Vertical barrier walls				
Attachments: ☐ Inspection team roster attached ☐ Site map attached				
II. INTERVIEWS (check all that apply)				
1. O&M Site Manager				
Name _____		Title _____		Date _____
Interviewed ☐ at site ☐ at office ☐ by phone		Phone: _____		
Problems, suggestions ☐ Report attached: _____				
2. O&M Staff				
Name _____		Title _____		Date _____
Interviewed ☐ at site ☐ at office ☐ by phone		Phone: _____		
Problems/suggestions ☐ Report attached: _____				
3. Local Regulatory Authorities and Response Agencies (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.				
Agency <u>VADEQ</u>				
Contact	<u>Angela McGarvey</u>	Project	_____	_____
	Name	Manager	Title	Phone No.
Problems/suggestions ☐ Report attached: _____				
Agency _____				
Contact	_____	Name	_____	_____
		Title	Title	Phone No.
Problems/suggestions ☐ Report attached: _____				
Agency _____				
Contact	_____	Name	_____	_____
		Title	Title	Phone No.
Problems/suggestions ☐ Report attached: _____				
Agency _____				
Contact	_____	Name	_____	_____
		Title	Title	Phone No.
Problems/suggestions ☐ Report attached: _____				

Agency _____ Contact _____ Name _____ Title _____ Date _____ Phone No. _____ Problems/suggestions ☐ Report attached: _____			
4. Other Interviews (optional) ☐ Report attached: _____			
Residents along Wolf Trap Road			
III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)			
1. O&M Documents ☒ O&M manual ☒ As-built drawings ☒ Maintenance logs ☒ Readily available ☒ Readily available ☒ Readily available ☒ Up to date ☒ Up to date ☒ Up to date ☐ N/A ☐ N/A ☐ N/A Remarks: _____			
2. Site-Specific Health and Safety Plan ☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A Remarks: _____			
3. O&M and OSHA Training Records ☐ Readily available ☐ Up to date ☒ N/A Remarks: _____			
4. Permits and Service Agreements ☐ Air discharge permit ☐ Effluent discharge ☐ Waste disposal, POTW ☐ Other permits: _____ ☐ Readily available ☐ Readily available ☐ Readily available ☐ Readily available ☐ Up to date ☐ Up to date ☐ Up to date ☐ Up to date ☒ N/A ☒ N/A ☒ N/A ☒ N/A Remarks: _____			
5. Gas Generation Records ☐ Readily available ☐ Up to date ☒ N/A Remarks: _____			
6. Settlement Monument Records ☐ Readily available ☐ Up to date ☒ N/A Remarks: _____			
7. Groundwater Monitoring Records ☐ Readily available ☒ Up to date ☐ N/A Remarks: _____			
8. Leachate Extraction Records ☐ Readily available ☐ Up to date ☒ N/A Remarks: _____			
9. Discharge Compliance Records ☐ Air ☐ Water (effluent) ☐ Readily available ☐ Readily available ☐ Up to date ☐ Up to date ☒ N/A ☒ N/A Remarks: _____			
10. Daily Access/Security Logs ☐ Readily available ☐ Up to date ☒ N/A			

Remarks: _____																																							
IV. O&M COSTS																																							
1.	O&M Organization ☐ State in-house ☒ PRP in-house ☐ Federal facility in-house ☐ _____ ☐ Contractor for state ☐ Contractor for PRP ☐ Contractor for Federal facility																																						
2.	O&M Cost Records ☐ Readily available ☐ Funding mechanism/agreement in place Original O&M cost estimate: _____ ☐ Up to date ☐ Unavailable ☐ Breakdown attached Total annual cost by year for review period if available <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">From: _____ Date</td> <td style="width: 25%;">To: _____ Date</td> <td style="width: 25%;">_____ Total cost</td> <td style="width: 25%; text-align: right;">☐ Breakdown attached</td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;">☐ Breakdown attached</td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;">☐ Breakdown attached</td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;">☐ Breakdown attached</td> </tr> <tr><td colspan="4"> </td></tr> <tr> <td>From: _____ Date</td> <td>To: _____ Date</td> <td>_____ Total cost</td> <td style="text-align: right;">☐ Breakdown attached</td> </tr> </table>			From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached					From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached					From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached					From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached					From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
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From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached																																				
3.	Unanticipated or Unusually High O&M Costs during Review Period Describe costs and reasons: _____																																						
V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A																																							
A. Fencing																																							
1.	Fencing Damaged ☐ Location shown on site map ☐ Gates secured ☒ N/A Remarks: _____																																						
B. Other Access Restrictions																																							
1.	Signs and Other Security Measures ☐ Location shown on site map ☒ N/A Remarks: _____																																						
C. Institutional Controls (ICs)																																							

1. Implementation and Enforcement Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A Type of monitoring (e.g., self-reporting, drive by): _____ Frequency: _____ Responsible party/agency: _____ Contact _____ Name Title Date Phone no. Reporting is up to date ☐ Yes ☐ No ☒ N/A Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A Violations have been reported ☐ Yes ☐ No ☒ N/A Other problems or suggestions: ☐ Report attached			
2. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A Remarks: _____			
D. General			
1. Vandalism/Trespassing ☐ Location shown on site map ☒ No vandalism evident Remarks: _____			
2. Land Use Changes On Site ☒ N/A Remarks: _____			
3. Land Use Changes Off Site ☒ N/A Remarks: _____			
VI. GENERAL SITE CONDITIONS			
A. Roads ☒ Applicable ☐ N/A			
1. Roads Damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A Remarks: _____			
B. Other Site Conditions			
Remarks: _____			
VII. LANDFILL COVERS ☒ Applicable ☐ N/A			
A. Landfill Surface			
1. Settlement (low spots) ☐ Location shown on site map ☒ Settlement not evident Arial extent: _____ Depth: _____ Remarks: _____			
2. Cracks ☐ Location shown on site map ☒ Cracking not evident Lengths: _____ Widths: _____ Depths: _____ Remarks: _____			

3.	Erosion Aerial extent: _____ Remarks: _____	☐ Location shown on site map	☒ Erosion not evident Depth: _____
4.	Holes Aerial extent: _____ Remarks: _____	☐ Location shown on site map	☒ Holes not evident Depth: _____
5.	Vegetative Cover ☐ No signs of stress Remarks: _____	☒ Grass ☐ Trees/shrubs (indicate size and locations on a diagram)	☒ Cover properly established
6.	Alternative Cover (e.g., armored rock, concrete) Remarks: _____	☒ N/A	
7.	Bulges Aerial extent: _____ Remarks: _____	☐ Location shown on site map	☐ Bulges not evident Height: _____
8.	Wet Areas/Water Damage ☐ Wet areas ☐ Ponding ☐ Seeps ☐ Soft subgrade Remarks: _____	☒ Wet areas/water damage not evident ☐ Location shown on site map ☐ Location shown on site map ☐ Location shown on site map ☐ Location shown on site map	Aerial extent: _____ Aerial extent: _____ Aerial extent: _____ Aerial extent: _____
9.	Slope Instability ☒ No evidence of slope instability Aerial extent: _____ Remarks: _____	☐ Slides	☐ Location shown on site map
B. Benches ☐ Applicable ☒ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	Flows Bypass Bench Remarks: _____	☐ Location shown on site map	☐ N/A or okay
2.	Bench Breached Remarks: _____	☐ Location shown on site map	☐ N/A or okay
3.	Bench Overtopped Remarks: _____	☐ Location shown on site map	☐ N/A or okay
3C. Letdown Channels ☒ Applicable ☐ N/A (Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			

1.	Settlement (Low spots) ☐ Location shown on site map Arial extent: _____ Depth: _____ Remarks: _____	☒ No evidence of settlement Depth: _____
2.	Material Degradation ☐ Location shown on site map Material type: _____ Remarks: _____	☒ No evidence of degradation Arial extent: _____
3.	Erosion ☐ Location shown on site map Arial extent: _____ Remarks: _____	☒ No evidence of erosion Depth: _____
4.	Undercutting ☐ Location shown on site map Arial extent: _____ Remarks: _____	☒ No evidence of undercutting Depth: _____
5.	Obstructions Type: _____ ☐ Location shown on site map Arial extent: _____ Size: _____ Remarks: _____	☒ No obstructions
6.	Excessive Vegetative Growth Type: _____ ☒ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Arial extent: _____ Remarks: _____	
D. Cover Penetrations ☐ Applicable ☒ N/A		
1.	Gas Vents ☐ Active ☐ Passive ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A Remarks: _____	
2.	Gas Monitoring Probes ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A Remarks: _____	
3.	Monitoring Wells (within surface area of landfill) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A Remarks: _____	
4.	Extraction Wells Leachate ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition	

☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A	
Remarks: _____	
5.	Settlement Monuments ☐ Located ☐ Routinely surveyed ☒ N/A
Remarks: _____	
E. Gas Collection and Treatment ☐ Applicable ☒ N/A	
1.	Gas Treatment Facilities ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs maintenance Remarks: _____
2.	Gas Collection Wells, Manifolds and Piping ☐ Good condition ☐ Needs maintenance Remarks: _____
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs maintenance ☐ N/A Remarks: _____
F. Cover Drainage Layer ☒ Applicable ☐ N/A	
1.	Outlet Pipes Inspected ☒ Functioning ☐ N/A Remarks: _____
2.	Outlet Rock Inspected ☐ Functioning ☒ N/A Remarks: _____
G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A	
1.	Siltation Area extent: _____ Depth: _____ ☒ N/A ☐ Siltation not evident Remarks: _____
2.	Erosion Area extent: _____ Depth: _____ ☐ Erosion not evident Remarks: _____
3.	Outlet Works ☐ Functioning ☒ N/A Remarks: _____
4.	Dam ☐ Functioning ☒ N/A Remarks: _____
H. Retaining Walls ☐ Applicable ☒ N/A	
1.	Deformations ☐ Location shown on site map ☐ Deformation not evident Horizontal displacement: _____ Vertical displacement: _____ Rotational displacement: _____ Remarks: _____

2. Degradation	☐ Location shown on site map	☐ Degradation not evident
Remarks: _____		
I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A		
1. Siltation	☐ Location shown on site map	☒ Siltation not evident
Area extent: _____	Depth: _____	
Remarks: _____		
2. Vegetative Growth	☐ Location shown on site map	☒ N/A
☐ Vegetation does not impede flow		
Area extent: _____	Type: _____	
Remarks: _____		
3. Erosion	☐ Location shown on site map	☒ Erosion not evident
Area extent: _____	Depth: _____	
Remarks: _____		
4. Discharge Structure	☐ Functioning	☒ N/A
Remarks: _____		
VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A		
1. Settlement	☐ Location shown on site map	☐ Settlement not evident
Area extent: _____	Depth: _____	
Remarks: _____		
2. Performance Monitoring	Type of monitoring: _____	
☐ Performance not monitored		
Frequency: _____	☐ Evidence of breaching	
Head differential: _____		
Remarks: _____		
IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A		
A. Ground Water Extraction Wells, Pumps and Pipelines ☐ Applicable ☒ N/A		
1. Pumps, Wellhead Plumbing and Electrical		
☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A		
Remarks: _____		
2. Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances		
☐ Good condition ☐ Needs maintenance		
Remarks: _____		
3. Spare Parts and Equipment		
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided		
Remarks: _____		
B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A		

1.	Collection Structures, Pumps and Electrical ☐ Good condition ☐ Needs maintenance Remarks: _____
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances ☐ Good condition ☐ Needs maintenance Remarks: _____
3.	Spare Parts and Equipment ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks: _____
C. Treatment System ☐ Applicable ☒ N/A	
1.	Treatment Train (check components that apply) ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation ☐ Air stripping ☐ Carbon adsorbers ☐ Filters: _____ ☐ Additive (e.g., chelation agent, flocculent): _____ ☐ Others: _____ ☐ Good condition ☐ Needs maintenance ☐ Sampling ports properly marked and functional ☐ Sampling/maintenance log displayed and up to date ☐ Equipment properly identified ☐ Quantity of groundwater treated annually: _____ ☐ Quantity of surface water treated annually: _____ Remarks: _____
2.	Electrical Enclosures and Panels (properly rated and functional) ☐ N/A ☐ Good condition ☐ Needs maintenance Remarks: _____
3.	Tanks, Vaults, Storage Vessels ☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance Remarks: _____
4.	Discharge Structure and Appurtenances ☒ N/A ☐ Good condition ☐ Needs maintenance Remarks: _____
5.	Treatment Building(s) ☒ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair ☐ Chemicals and equipment properly stored Remarks: _____

6. Monitoring Wells (pump and treatment remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs maintenance ☒ N/A Remarks: _____	
D. Monitoring Data	
1. Monitoring Data ☒ Is routinely submitted on time ☒ Is of acceptable quality	
2. Monitoring Data Suggests: ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining	
E. Monitored Natural Attenuation	
1. Monitoring Wells (natural attenuation remedy) ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition ☐ All required wells located ☐ Needs maintenance ☐ N/A Remarks: _____	
X. OTHER REMEDIES	
If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.	
XI. OVERALL OBSERVATIONS	
A. Implementation of the Remedy	
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>Most of the remedy continues to operate and function as designed. However, additional measures are needed to control groundwater contamination.</u>	
B. Adequacy of O&M	
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>No issues noted.</u>	
C. Early Indicators of Potential Remedy Problems	
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>Additional measures are needed to control migration of contaminated groundwater.</u>	
D. Opportunities for Optimization	
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>None noted.</u>	

APPENDIX F – PRESS NOTICE

EPA REVIEWS CLEANUP

Chisman Creek Superfund Site

The U.S. Environmental Protection Agency (EPA) is conducting a Five-Year Review of the Chisman Creek Superfund Site, a 27-acre site located in York County, Virginia. EPA inspects sites regularly to ensure that cleanups conducted remain fully protective of public health and the environment. A prior review of the site conducted in 2011 determined that the remedy was protective; however, more testing was needed to make a long-term protectiveness determination. Since then, additional tests have been conducted, with test results and a protectiveness determination available December 2016.

To access results of the review (starting December 2016):

<http://epa.gov/5yr>

To read detailed site and contact information:

<http://go.usa.gov/xKt3k>

To ask questions or provide site information:

Contact: Darriel Swatts Phone: 215-814-5536

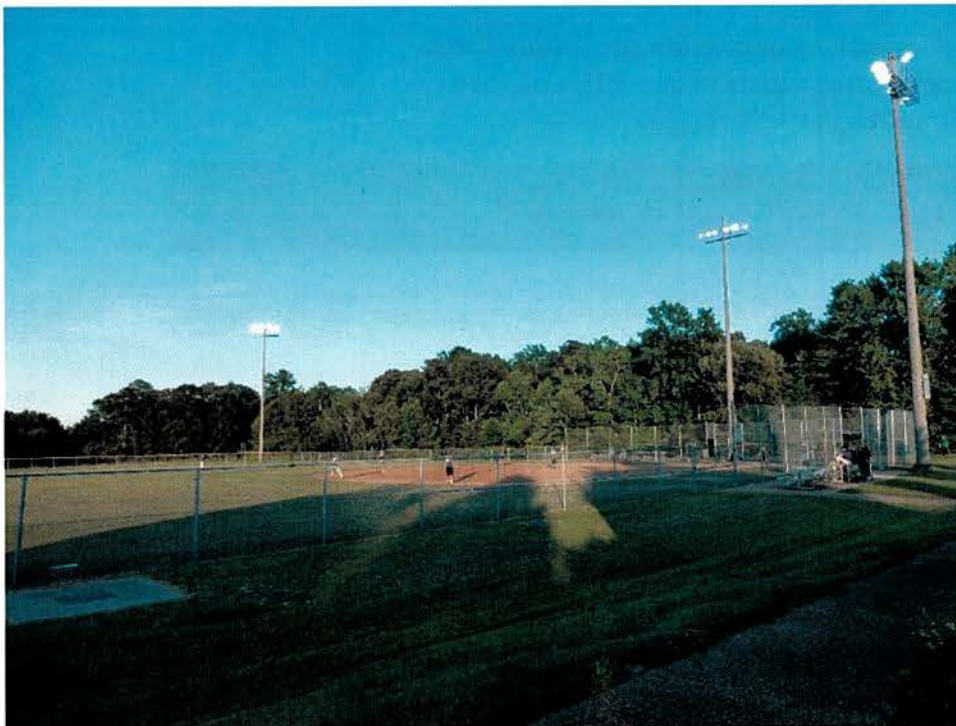
Email: swatts.darriel@epa.gov

Protecting public health and the environment

APPENDIX G –SITE INSPECTION PHOTOS



Chisman Creek Park (Area C), western baseball field in use



Chisman Creek Park (Area C), eastern baseball field in use



Chisman Creek Park (Area C), western field looking east



Looking west to homes across Wolf Trap Road from Chisman Creek Park (Area C)



Looking north from Chisman Creek Park (Area C) entrance; area of planned slurry wall and trench construction



Foundation of former Area C groundwater treatment plant, looking east



Tributary northeast of Area C



Wolf Trap Park (Area A), looking west



Wolf Trap Park (Area A), looking east



Wolf Trap Park (Area A), bare spot on soccer field before repair



Wolf Trap Park (Area A), bare spot on soccer field after repair



Pond A from Area A soccer fields, looking north



MW-5 groundwater sampling

Mann-Kendall Trend Test Analysis

Arsenic, Dissolved (mg/L) - Well MW-3A

Mann-Kendall Trend Test

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.0030

Insufficient statistical evidence of a significant trend at the specified level of significance.

Arsenic, Dissolved (mg/L) - Well MW-3B

Mann-Kendall Trend Test

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.0030

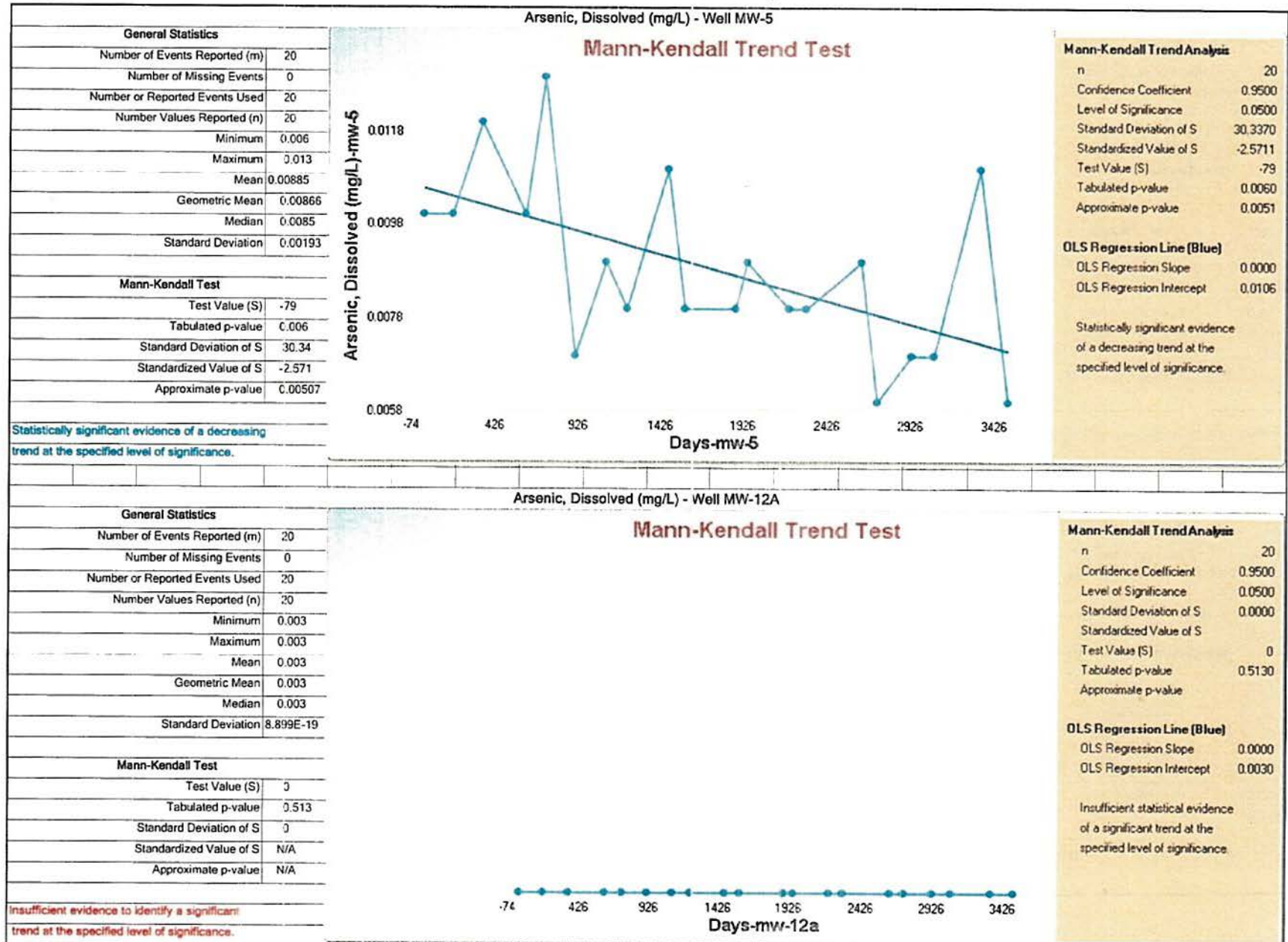
Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

H-10



Mann-Kendall Trend Test Analysis

Arsenic, Dissolved (mg/L) - Well MW-10A

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.0030

Insufficient statistical evidence of a significant trend at the specified level of significance.

Arsenic, Dissolved (mg/L) - Well MW-10B

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.0030

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Arsenic, Dissolved (mg/L) - Well MW-12B

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.0030

Insufficient statistical evidence of a significant trend at the specified level of significance.

Arsenic, Dissolved (mg/L) - Well MW-13A

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.0030

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

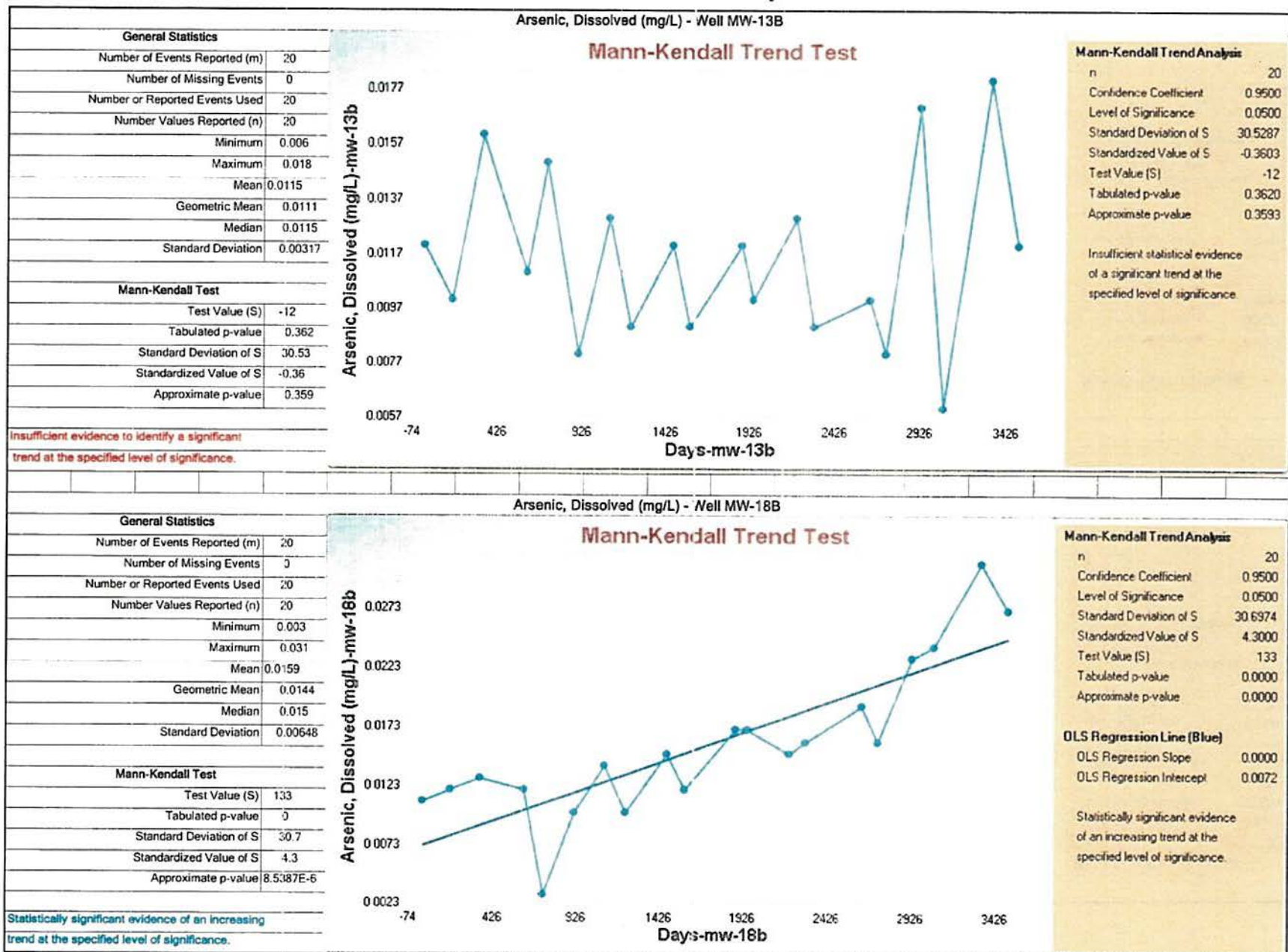
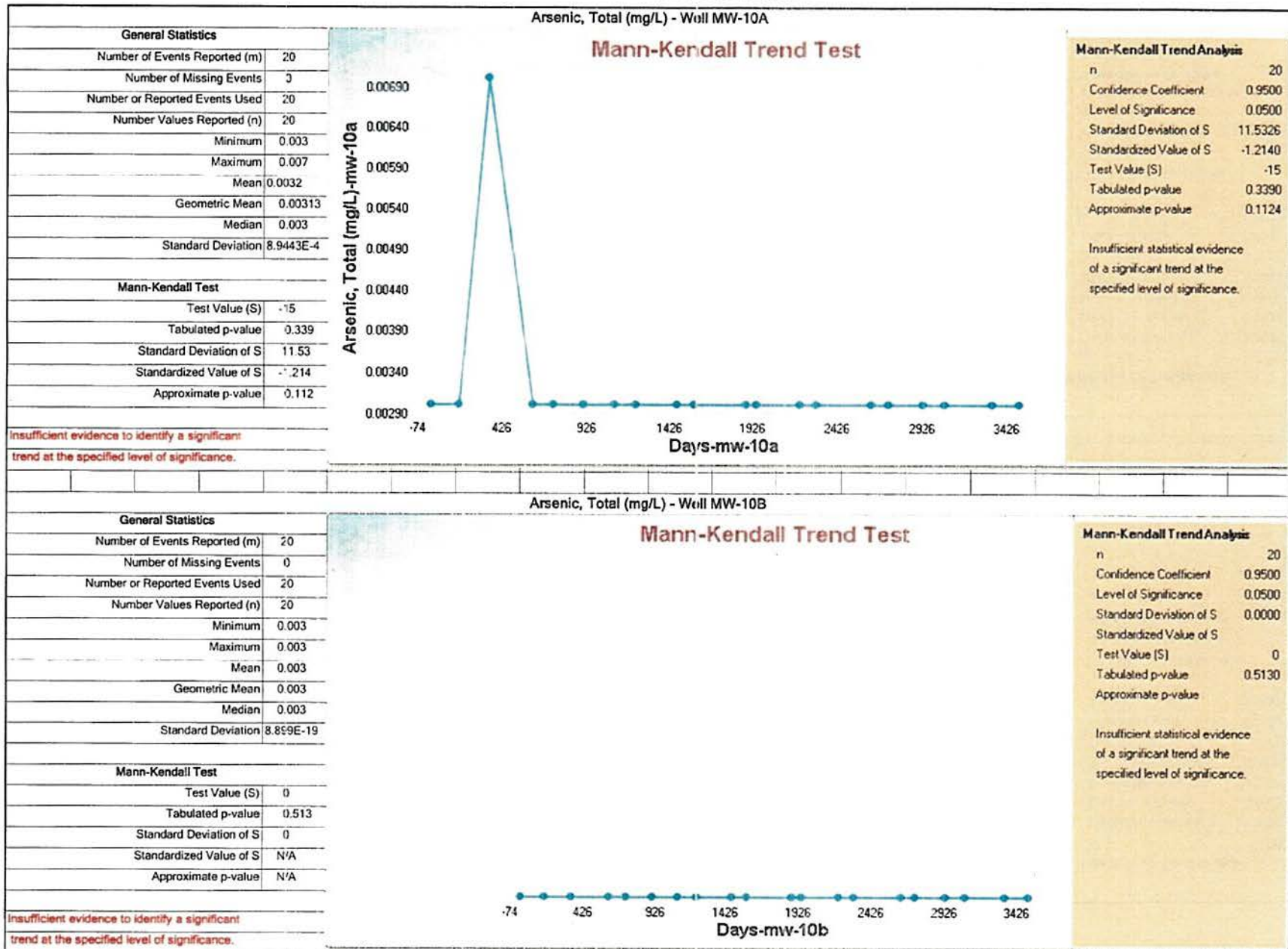


Figure H-1. Mann-Kendall Results

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis



Mann-Kendall Trend Test Analysis

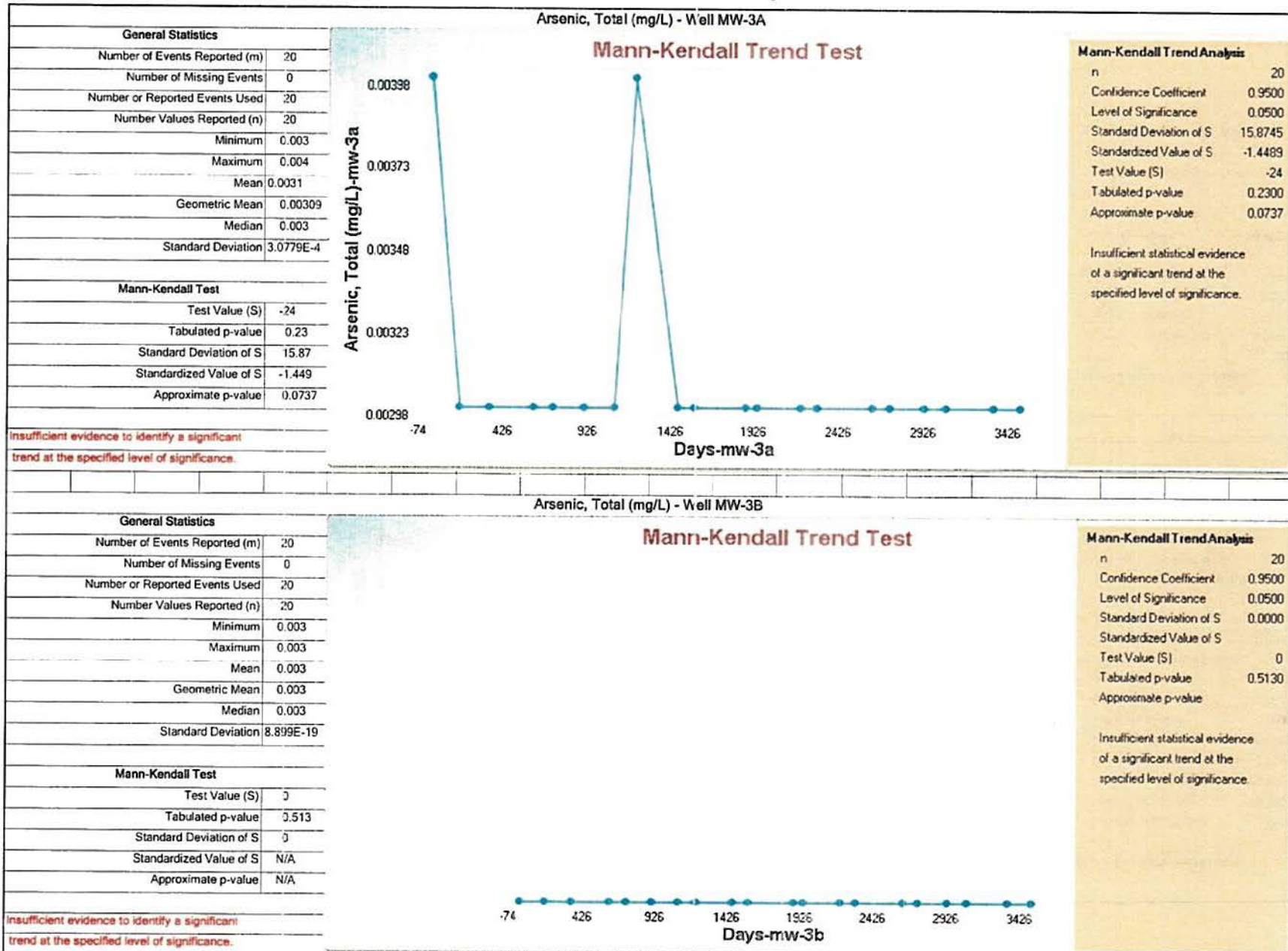


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

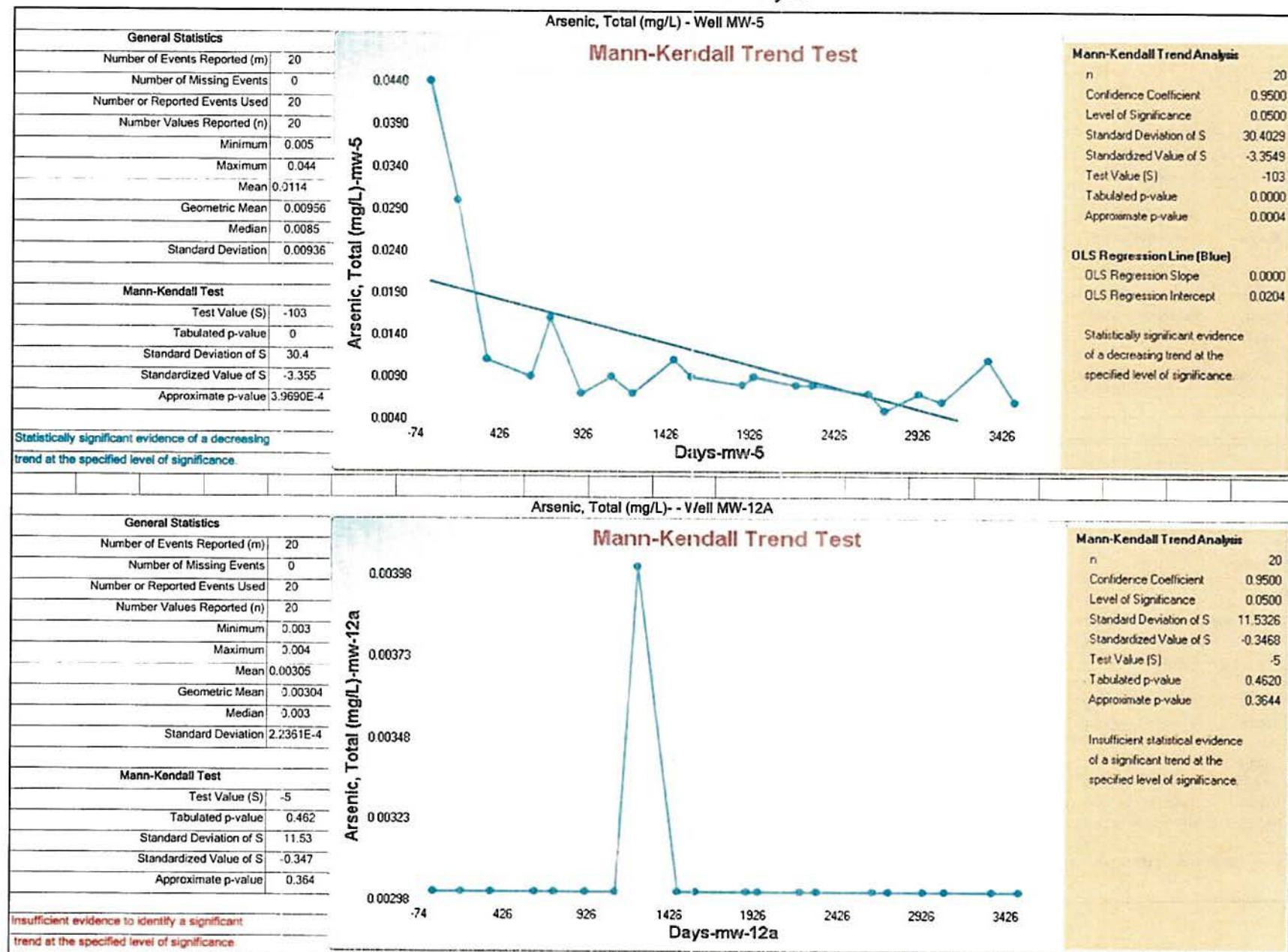


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

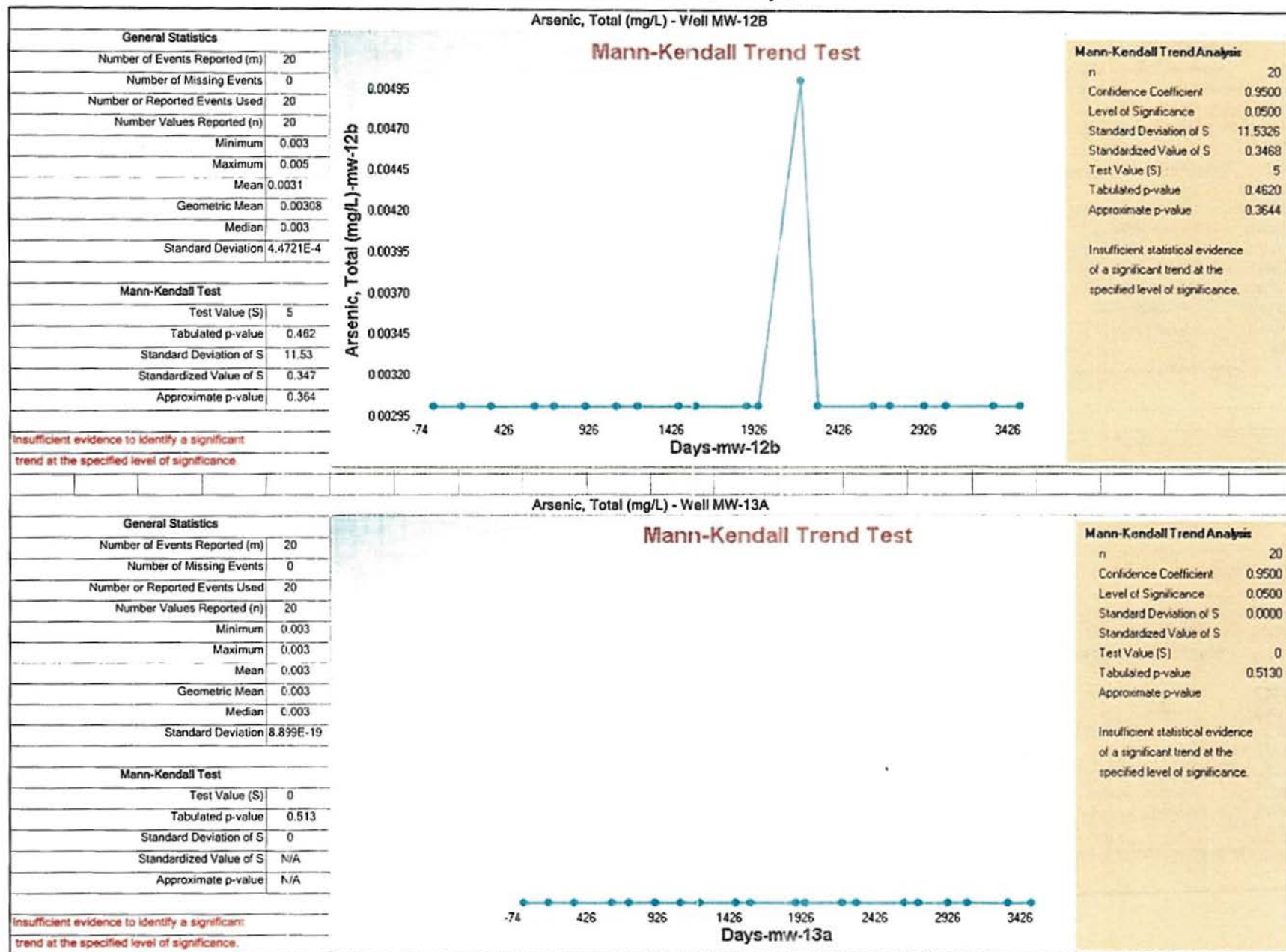


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

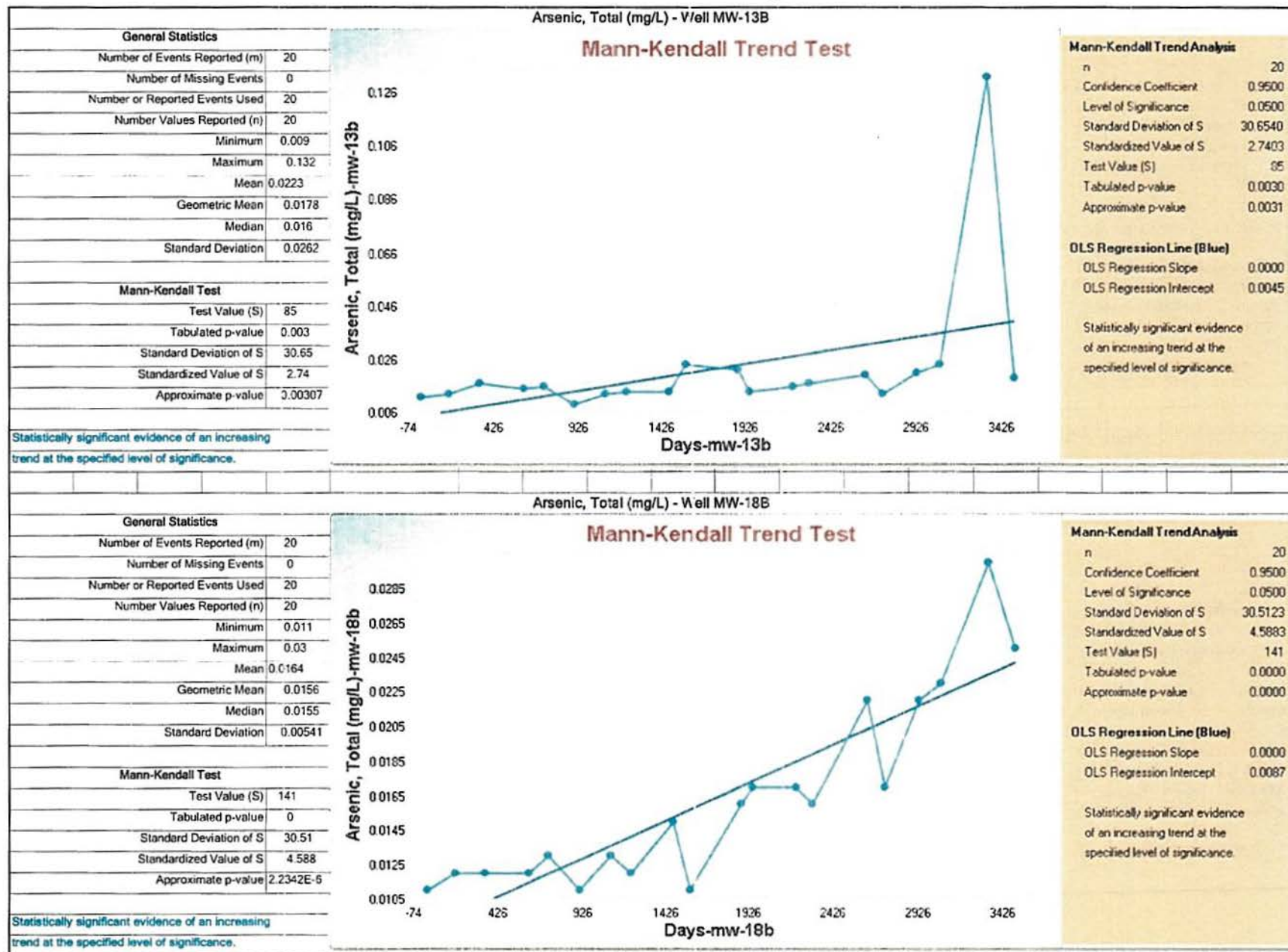


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Cadmium, Dissolved (mg/L) - Well MW-10A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

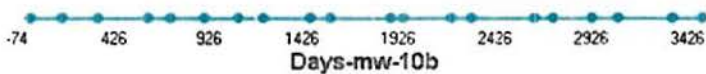
Cadmium, Dissolved (mg/L) - MW-10B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

Cadmium, Dissolved (mg/L) - Well MW-3A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Cadmium, Dissolved (mg/L) - Well MW-3B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

Cadmium, Dissolved (mg/L) - Well MW-5

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Cadmium, Dissolved (mg/L) - Well MW-12A

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Cadmium, Dissolved (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Cadmium, Dissolved (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

Cadmium, Dissolved (mg/L) - MW-13B

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Cadmium, Dissolved (mg/L) - Well MW-18B

Mann-Kendall Trend Test

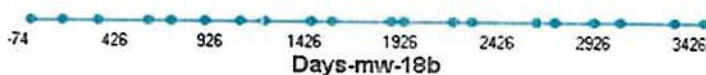
General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Cadmium, Total (mg/L) - Well MW-10A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Cadmium, Total (mg/L) - Well MW-10B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Cadmium, Total (mg/L) - Well MW-3A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

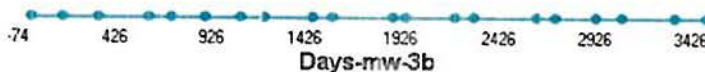
Cadmium, Total (mg/L) - Well MW-3B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



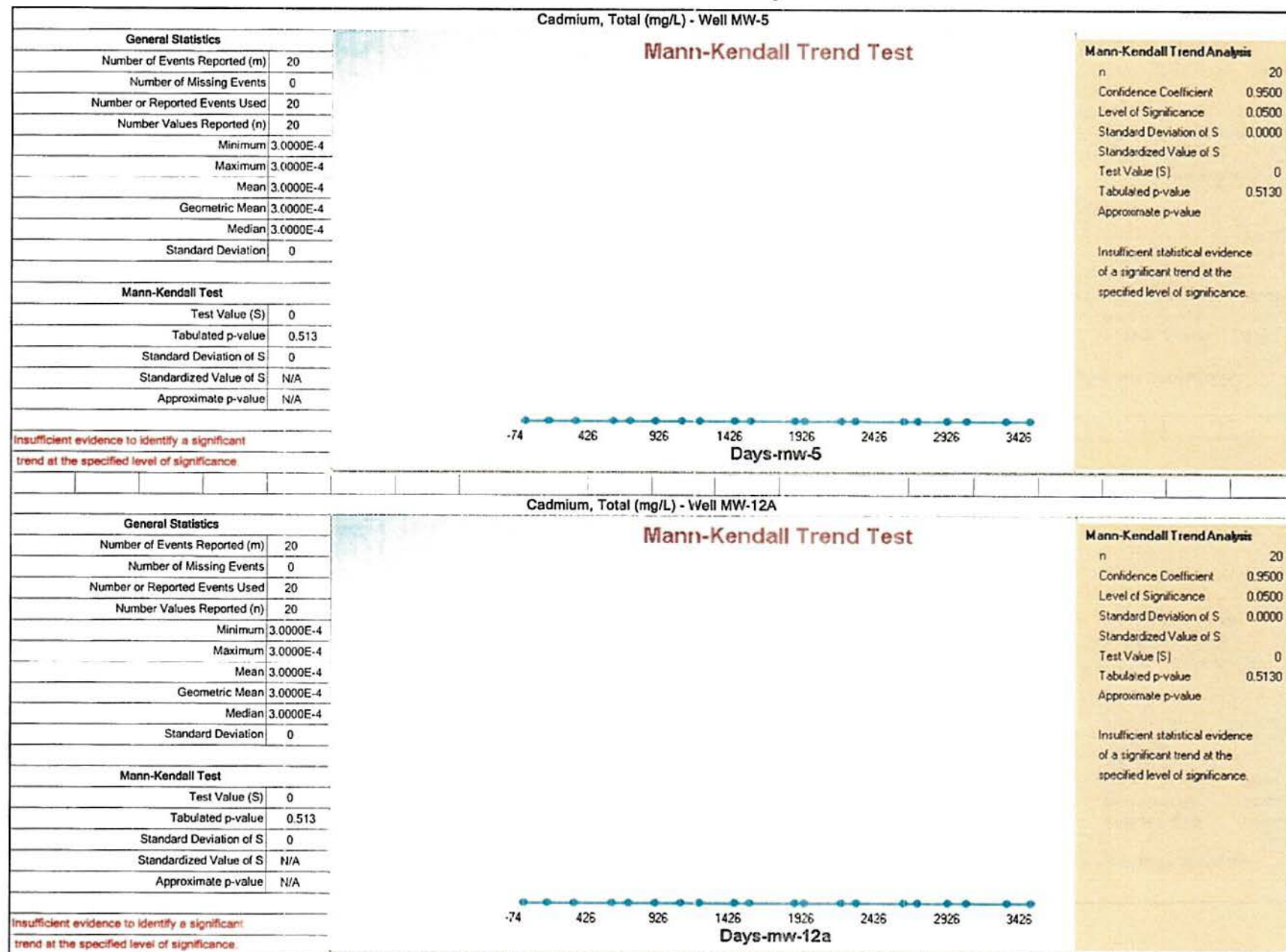
General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

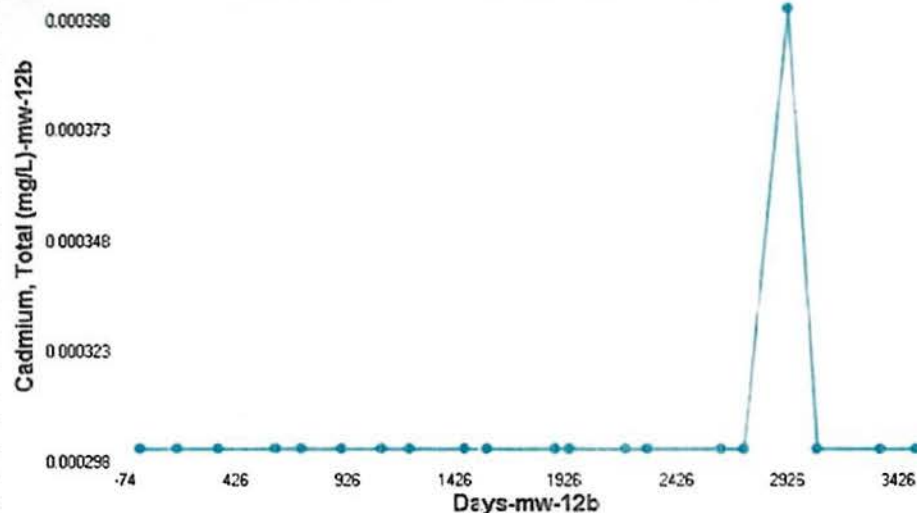
Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Cadmium, Total (mg/L) - Well MW-12B

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.5326
Standardized Value of S	1.0405
Test Value (S)	13
Tabulated p-value	0.3620
Approximate p-value	0.1490

Insufficient statistical evidence of a significant trend at the specified level of significance.

Insufficient evidence to identify a significant trend at the specified level of significance.

Cadmium, Total (mg/L) - Well MW-13A

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Cadmium, Total (mg/L) - Well MW-13B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Cadmium, Total (mg/L) - Well MW-18B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	3.0000E-4
Maximum	3.0000E-4
Mean	3.0000E-4
Geometric Mean	3.0000E-4
Median	3.0000E-4
Standard Deviation	0

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Copper, Dissolved (mg/L) - Well MW-10A

Mann-Kendall Trend Test

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Copper, Dissolved (mg/L) - Well MW-10B

Mann-Kendall Trend Test

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Copper, Dissolved (mg/L) - Well MW-3A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Copper, Dissolved (mg/L) - Well MW-3B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Copper, Dissolved (mg/L) - Well MW-5

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Copper, Dissolved (mg/L) - Well MW-12A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Copper, Dissolved (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Copper, Dissolved (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

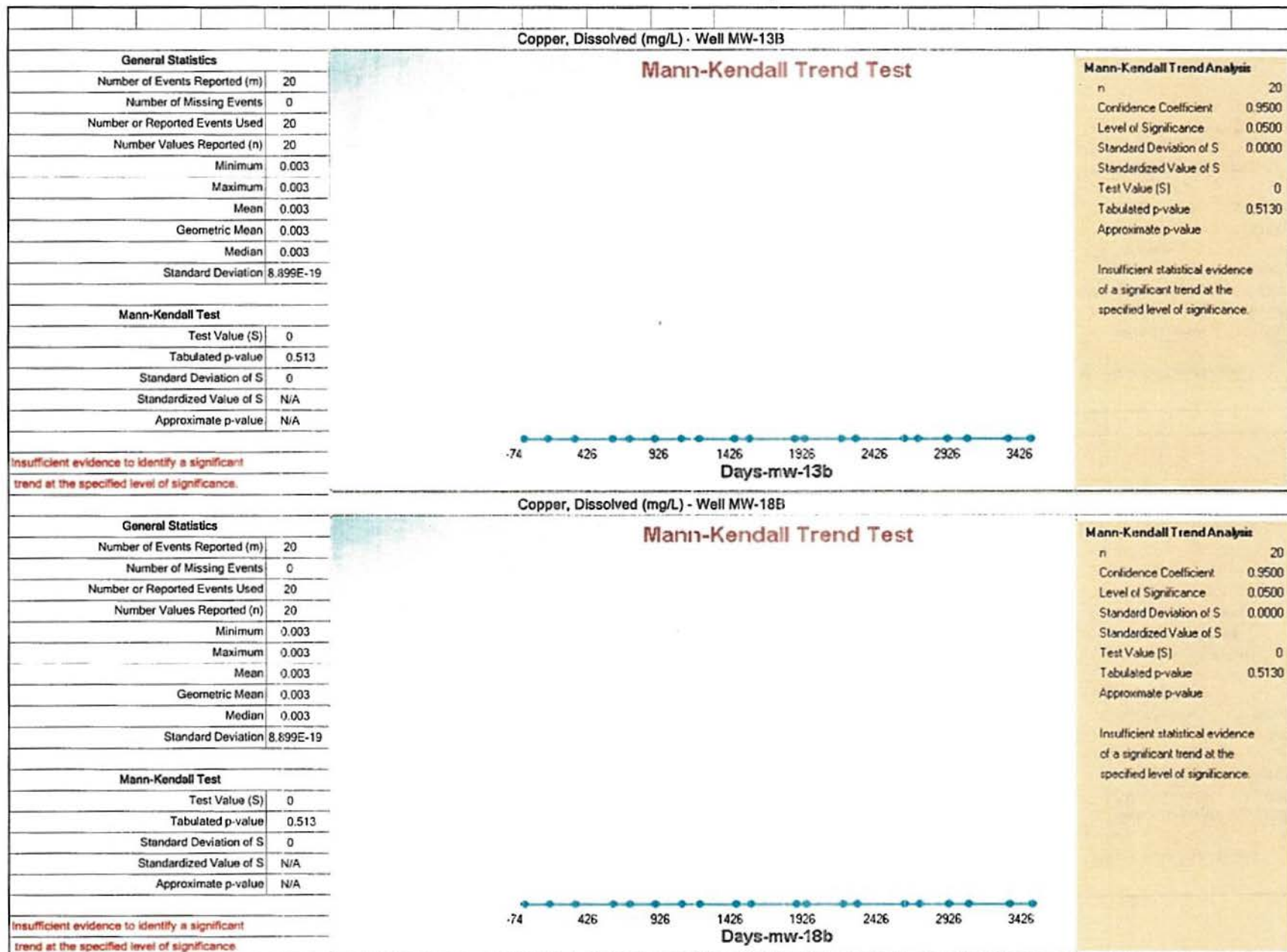


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Copper, Total (mg/L) - Well MW-10A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

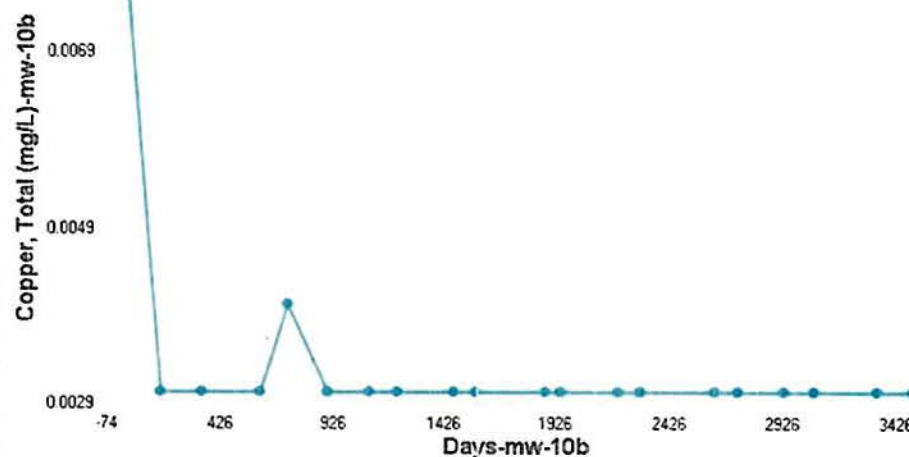
Copper, Total (mg/L) - Well MW-10B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	15.9060
Standardized Value of S	-1.8861
Test Value (S)	-31
Tabulated p-value	0.1760
Approximate p-value	0.0296

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.008
Mean	0.0033
Geometric Mean	0.0032
Median	0.003
Standard Deviation	0.00113

Mann-Kendall Test

Test Value (S)	-31
Tabulated p-value	0.176
Standard Deviation of S	15.91
Standardized Value of S	-1.886
Approximate p-value	0.0296

Insufficient evidence to identify a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

Copper, Total (mg/L) - Well MW-3A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

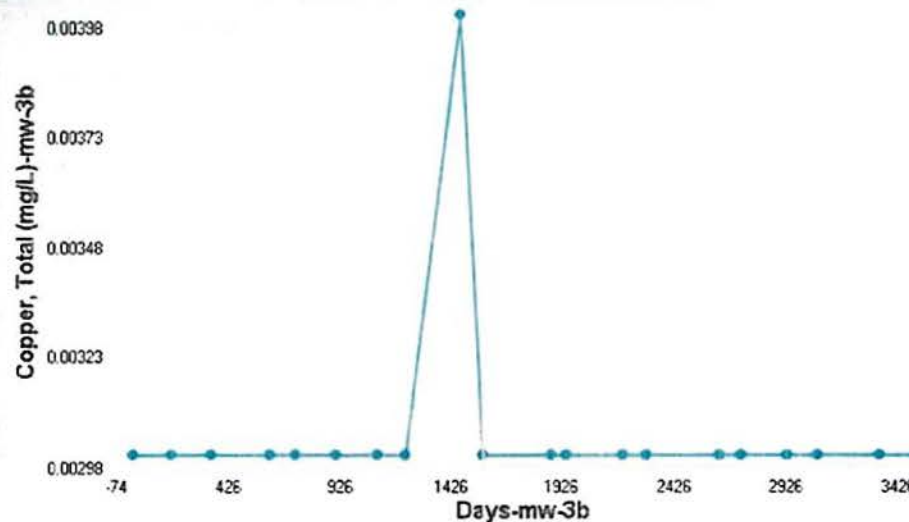
Copper, Total (mg/L) - MW-3B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.5326
Standardized Value of S	-0.1734
Test Value (S)	-3
Tabulated p-value	0.4870
Approximate p-value	0.4312

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.004
Mean	0.00305
Geometric Mean	0.00304
Median	0.003
Standard Deviation	2.2361E-4

Mann-Kendall Test	
Test Value (S)	-3
Tabulated p-value	0.487
Standard Deviation of S	11.53
Standardized Value of S	-0.173
Approximate p-value	0.431

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Copper, Total (mg/L) - MW-5

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Copper, Total (mg/L) - Well MW-12A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

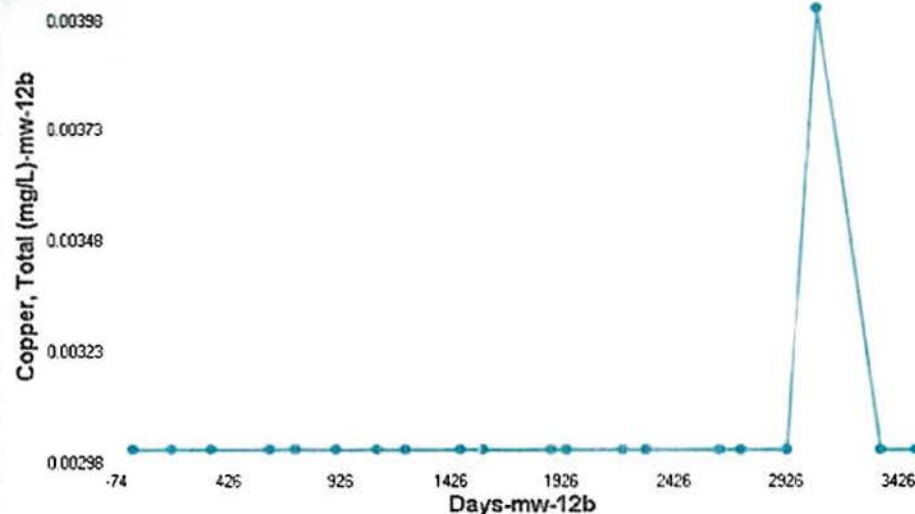
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

Copper, Total (mg/L) - Well MW-12B

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.5326
Standardized Value of S	1.2140
Test Value (S)	15
Tabulated p-value	0.3390
Approximate p-value	0.1124

Insufficient statistical evidence of a significant trend at the specified level of significance.

Insufficient evidence to identify a significant trend at the specified level of significance.

Copper, Total (mg/L) - Well MW-13A

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	0.0000
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1.1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Copper, Total (mg/L) - MW-13B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Copper, Total (mg/L) - Well MW-18B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

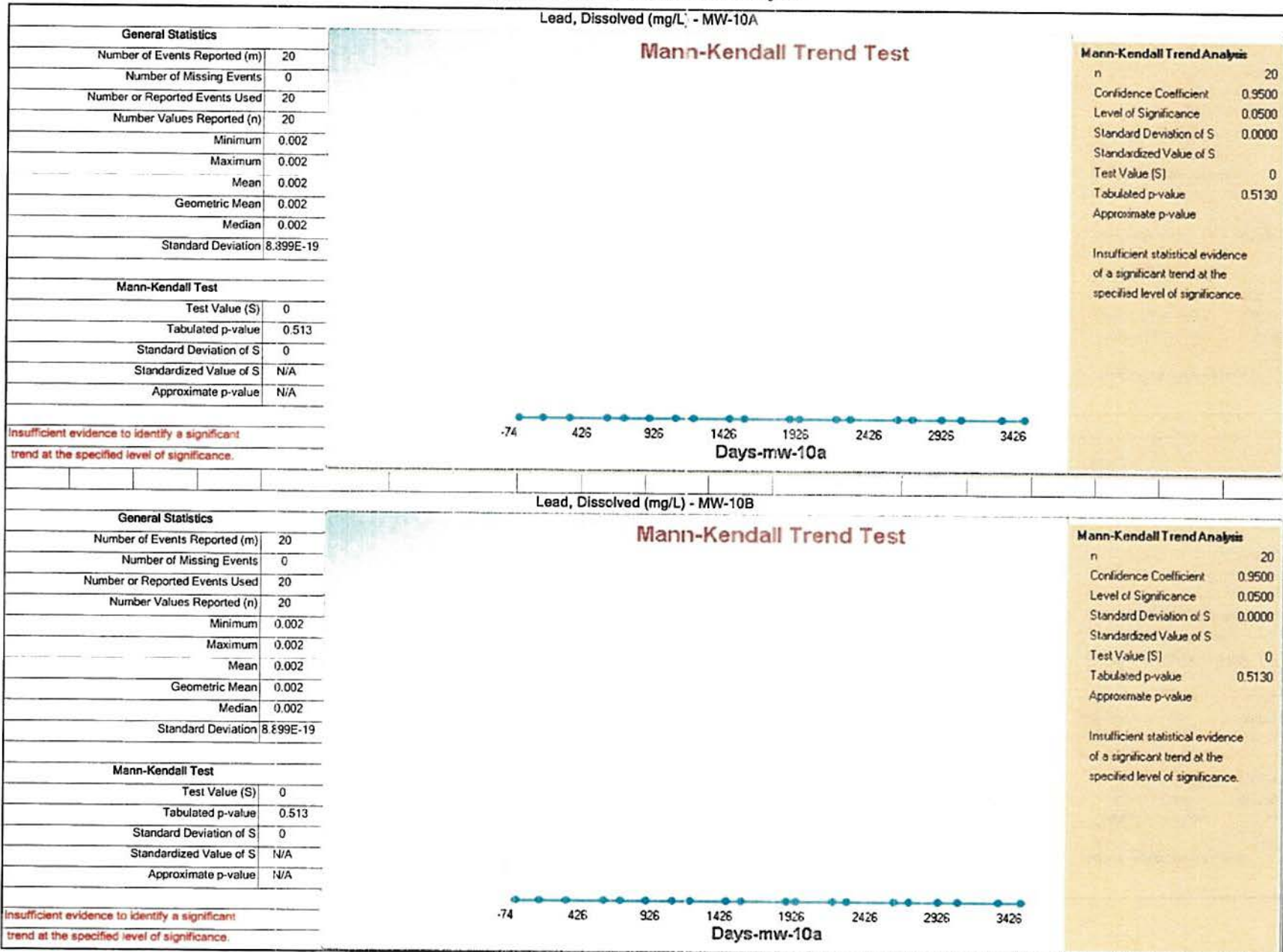


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Lead, Dissolved (mg/L) - Well MW-3A

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Lead, Dissolved (mg/L) - Well MW-3B

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Lead, Dissolved (mg/L) - Well MW-5

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Lead, Dissolved (mg/L) - Well MW-12A

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Lead, Dissolved (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Lead, Dissolved (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Lead, Dissolved (mg/L) - Well MW-13B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

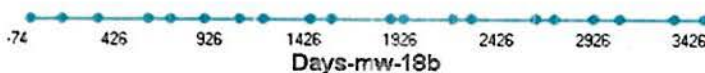
Lead, Dissolved (mg/L) - Well MW-18B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Lead, Total (mg/L) - Well MW-10A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Lead, Total (mg/L) - Well MW-10B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

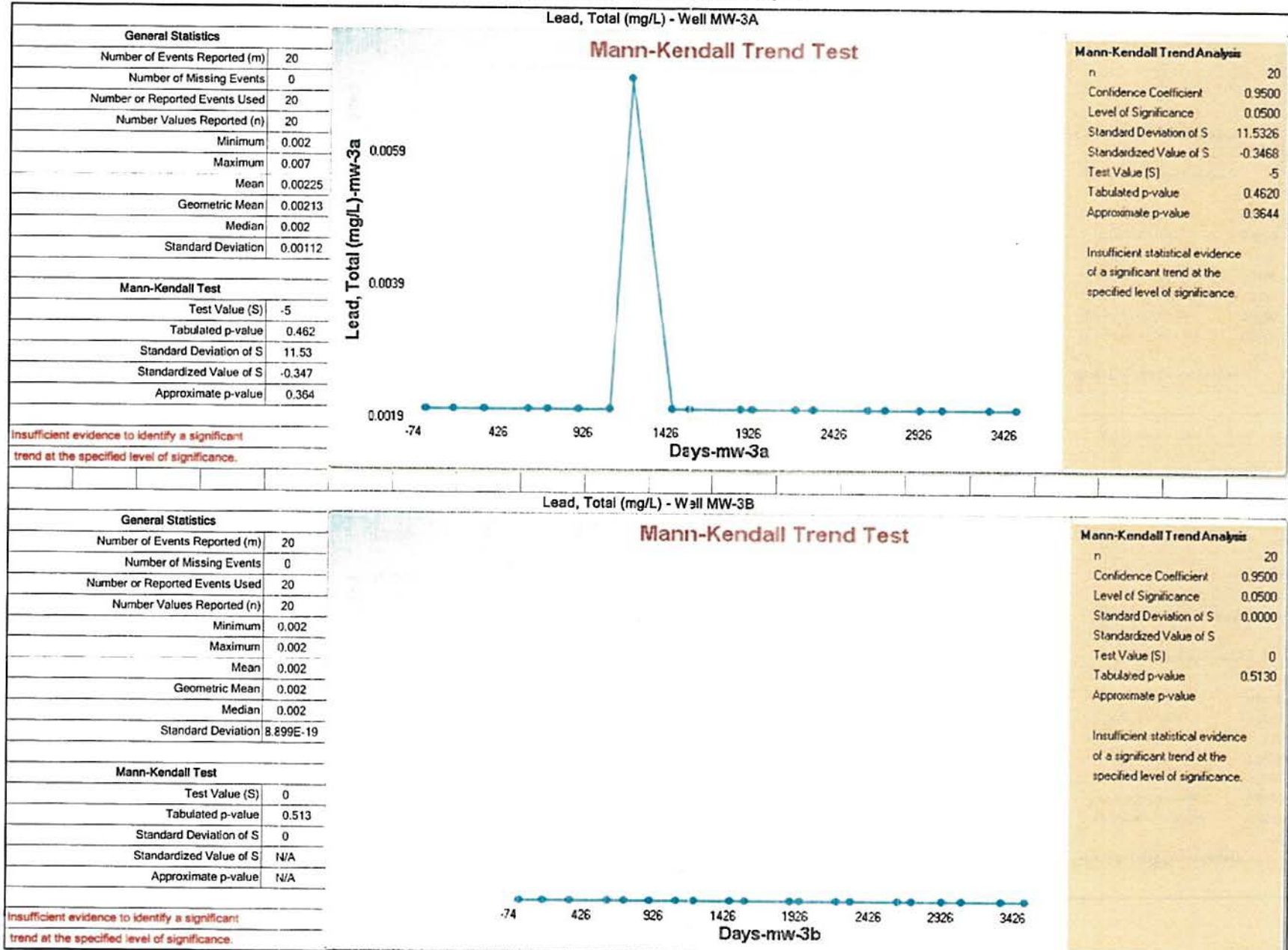
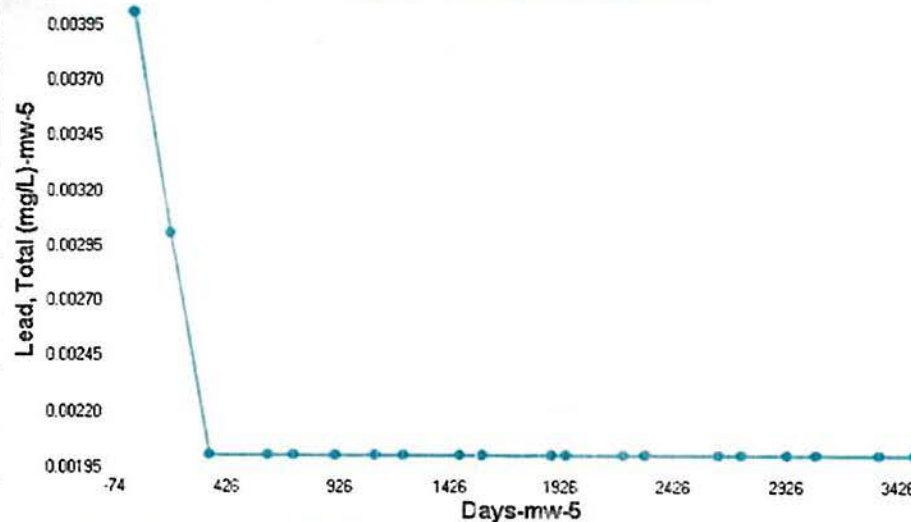


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Lead, Total (mg/L) - Well MW-5

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	15.9060
Standardized Value of S	-2.2633
Test Value (S)	-.37
Tabulated p-value	0.1300
Approximate p-value	0.0118

Insufficient statistical evidence of a significant trend at the specified level of significance.

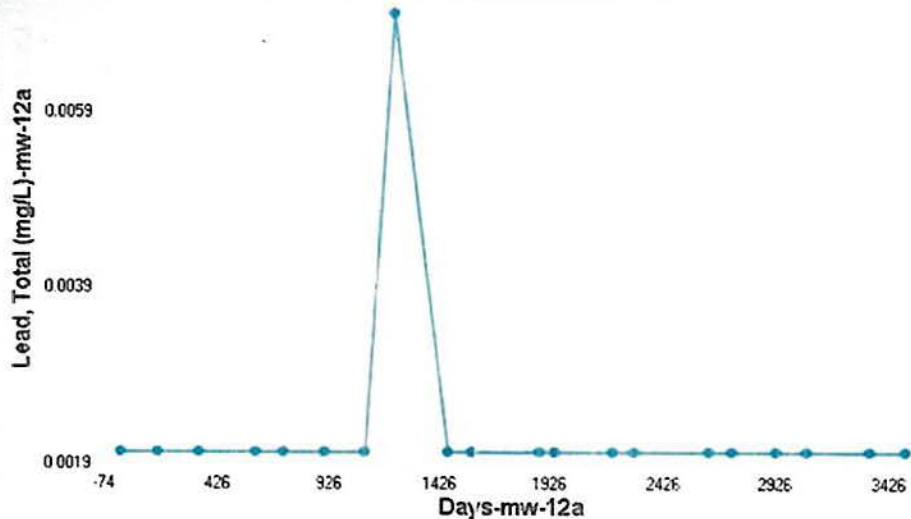
General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.004
Mean	0.00215
Geometric Mean	0.00211
Median	0.002
Standard Deviation	4.8936E-4

Mann-Kendall Test	
Test Value (S)	-.37
Tabulated p-value	0.13
Standard Deviation of S	15.91
Standardized Value of S	-2.263
Approximate p-value	0.0118

Insufficient evidence to identify a significant trend at the specified level of significance.

Lead, Total (mg/L) - Well MW-12a

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.5326
Standardized Value of S	-0.3468
Test Value (S)	-.5
Tabulated p-value	0.4620
Approximate p-value	0.3644

Insufficient statistical evidence of a significant trend at the specified level of significance.

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.007
Mean	0.00225
Geometric Mean	0.00213
Median	0.002
Standard Deviation	0.00112

Mann-Kendall Test	
Test Value (S)	-.5
Tabulated p-value	0.462
Standard Deviation of S	11.53
Standardized Value of S	-0.347
Approximate p-value	0.364

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

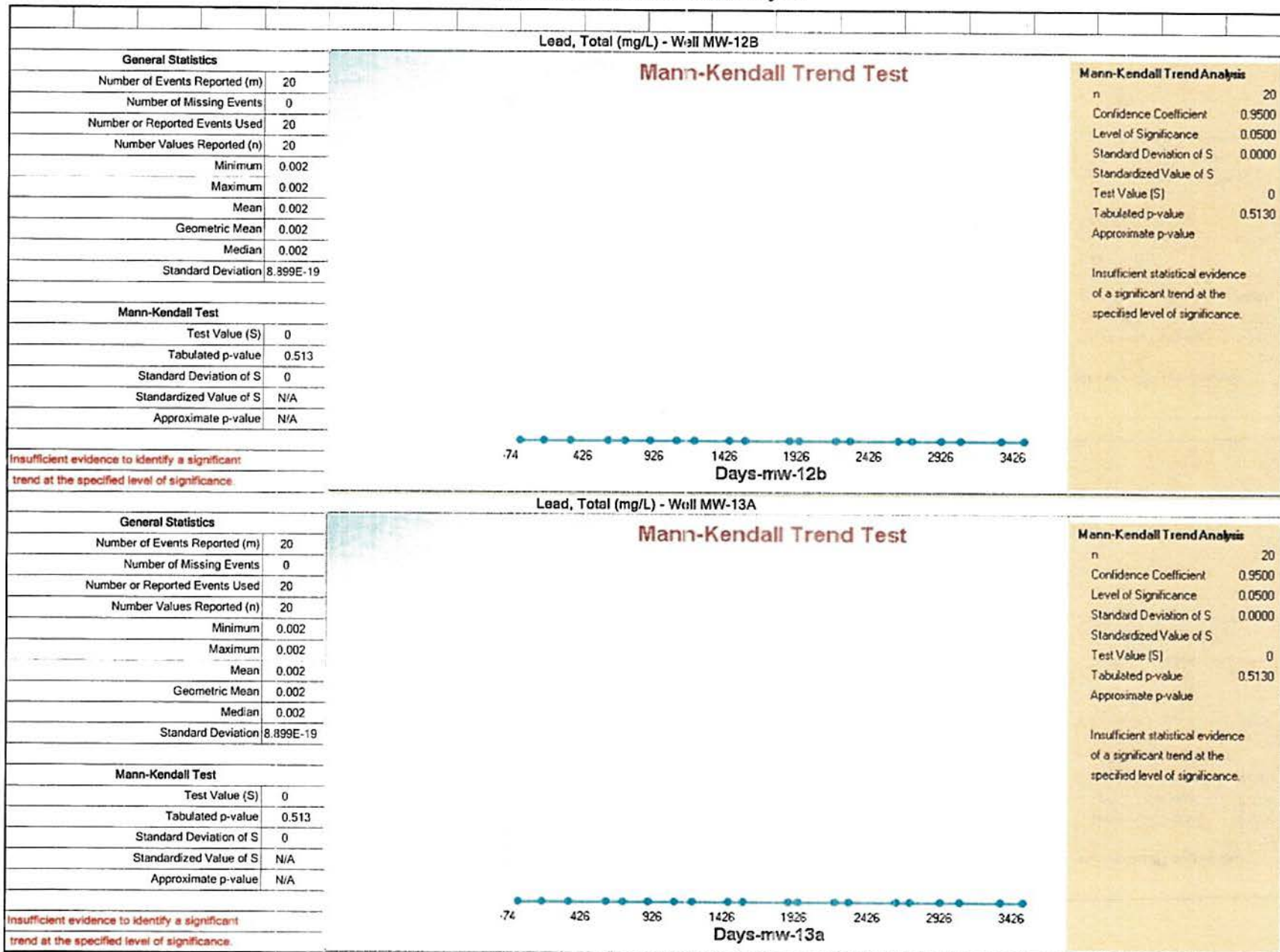


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Lead, Total (mg/L) - Well MW-13B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Lead, Total (mg/L) - Well MW-18B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

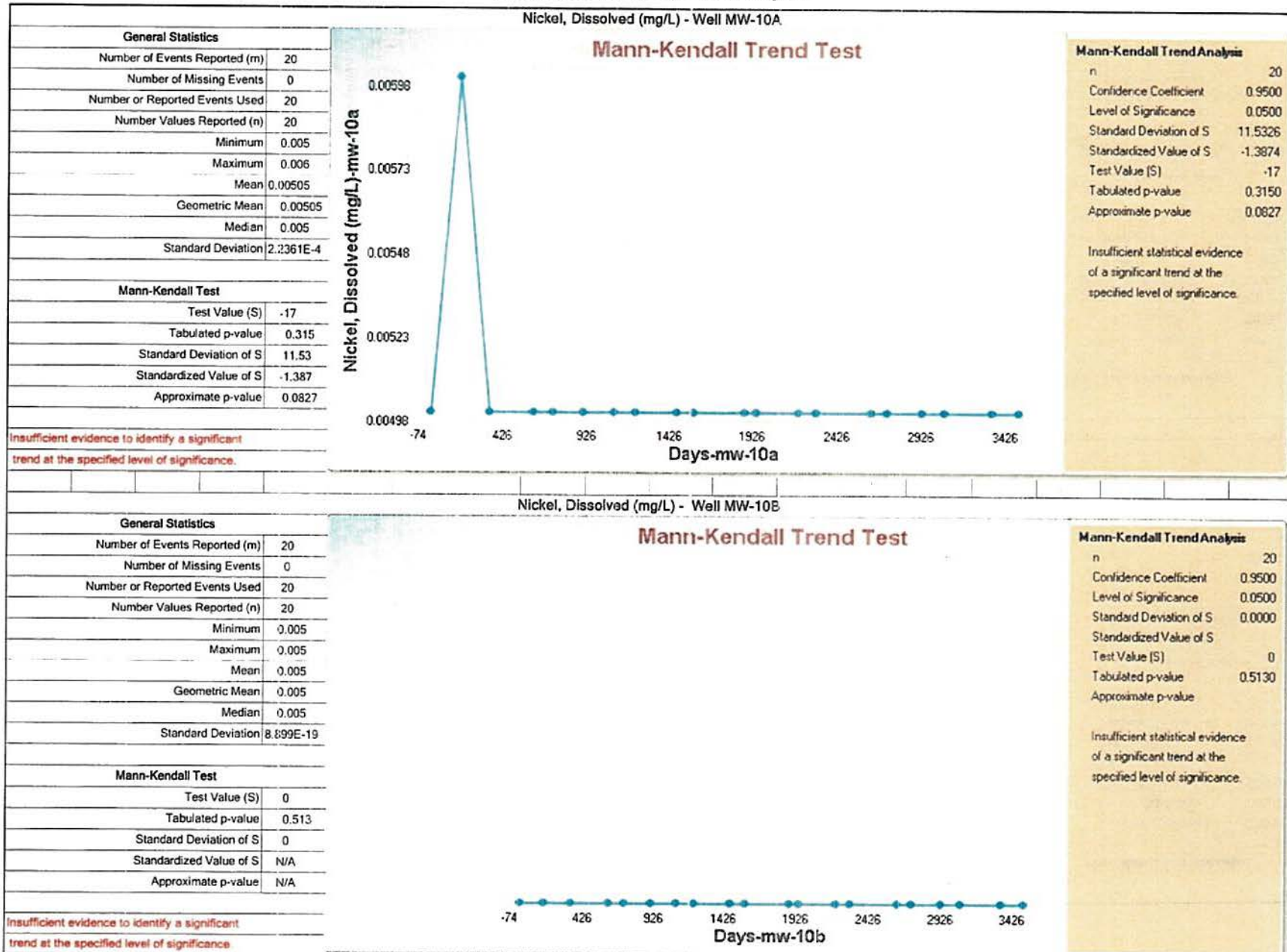


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Nickel, Dissolved (mg/L) - Well MW-3A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Nickel, Dissolved (mg/L) - Well MW-3B

Mann-Kendall Trend Test

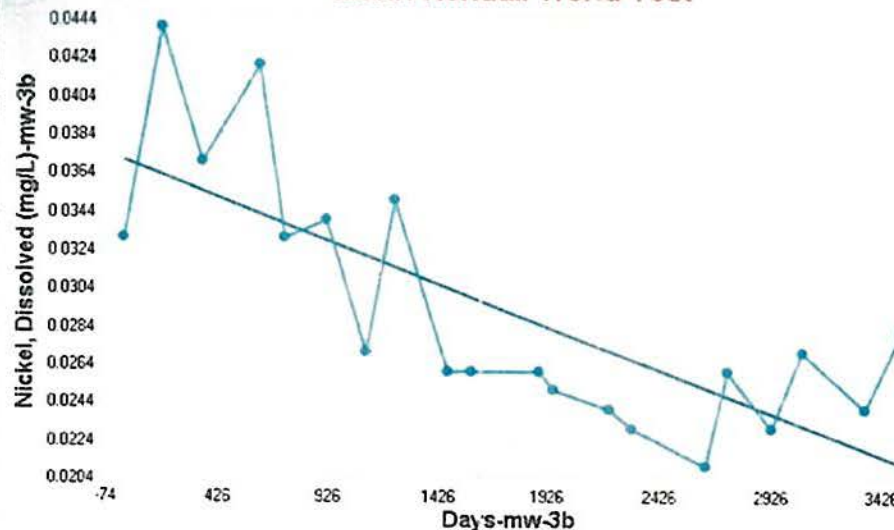
Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.6159
Standardized Value of S	-3.2989
Test Value (S)	-102
Tabulated p-value	0.0000
Approximate p-value	0.0005

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.0371

Statistically significant evidence of a decreasing trend at the specified level of significance.



Statistically significant evidence of a decreasing trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

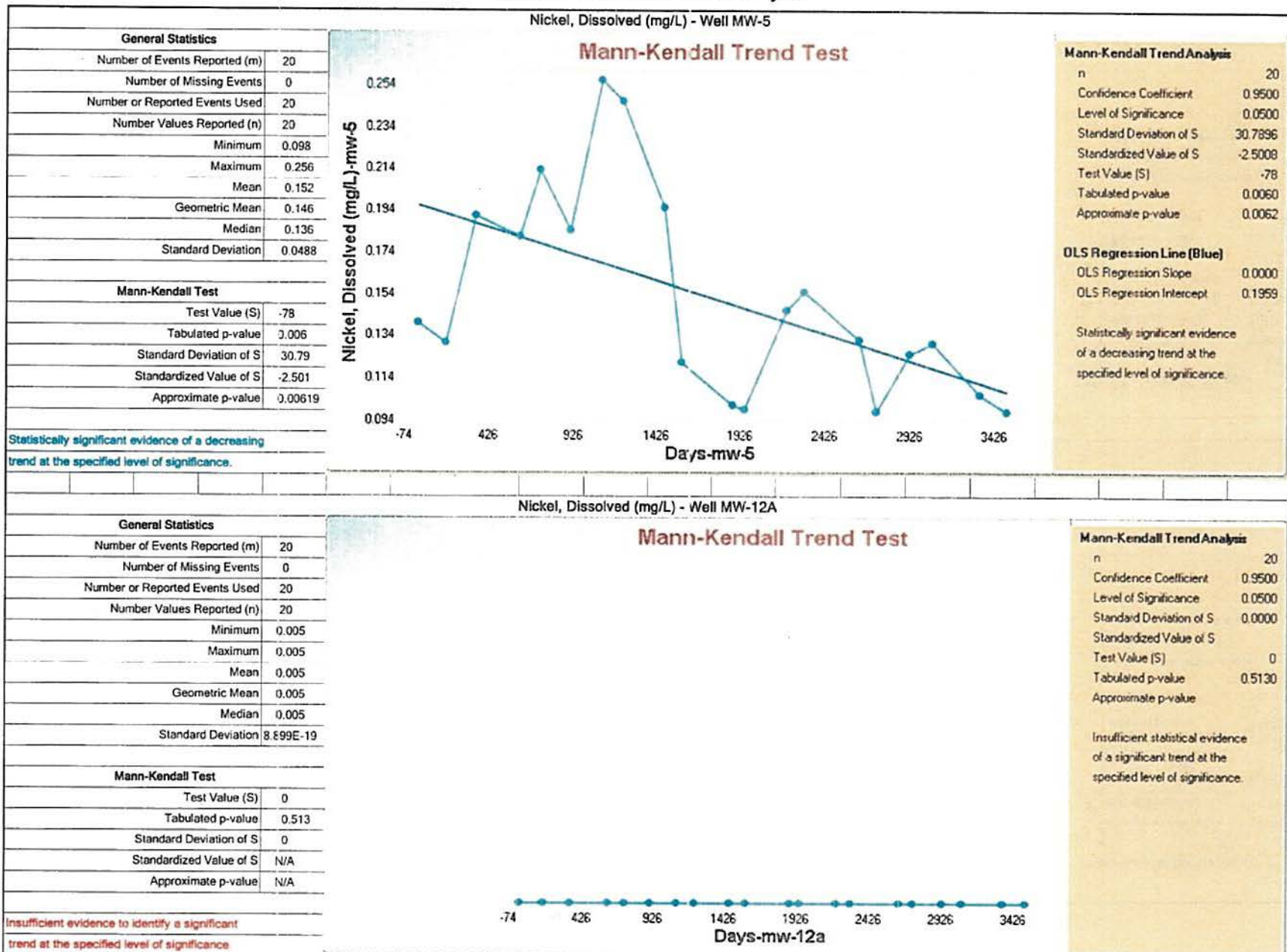


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Nickel, Dissolved (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.005
Maximum	0.005
Mean	0.005
Geometric Mean	0.005
Median	0.005
Standard Deviation	8.399E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Nickel, Dissolved (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.005
Maximum	0.005
Mean	0.005
Geometric Mean	0.005
Median	0.005
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

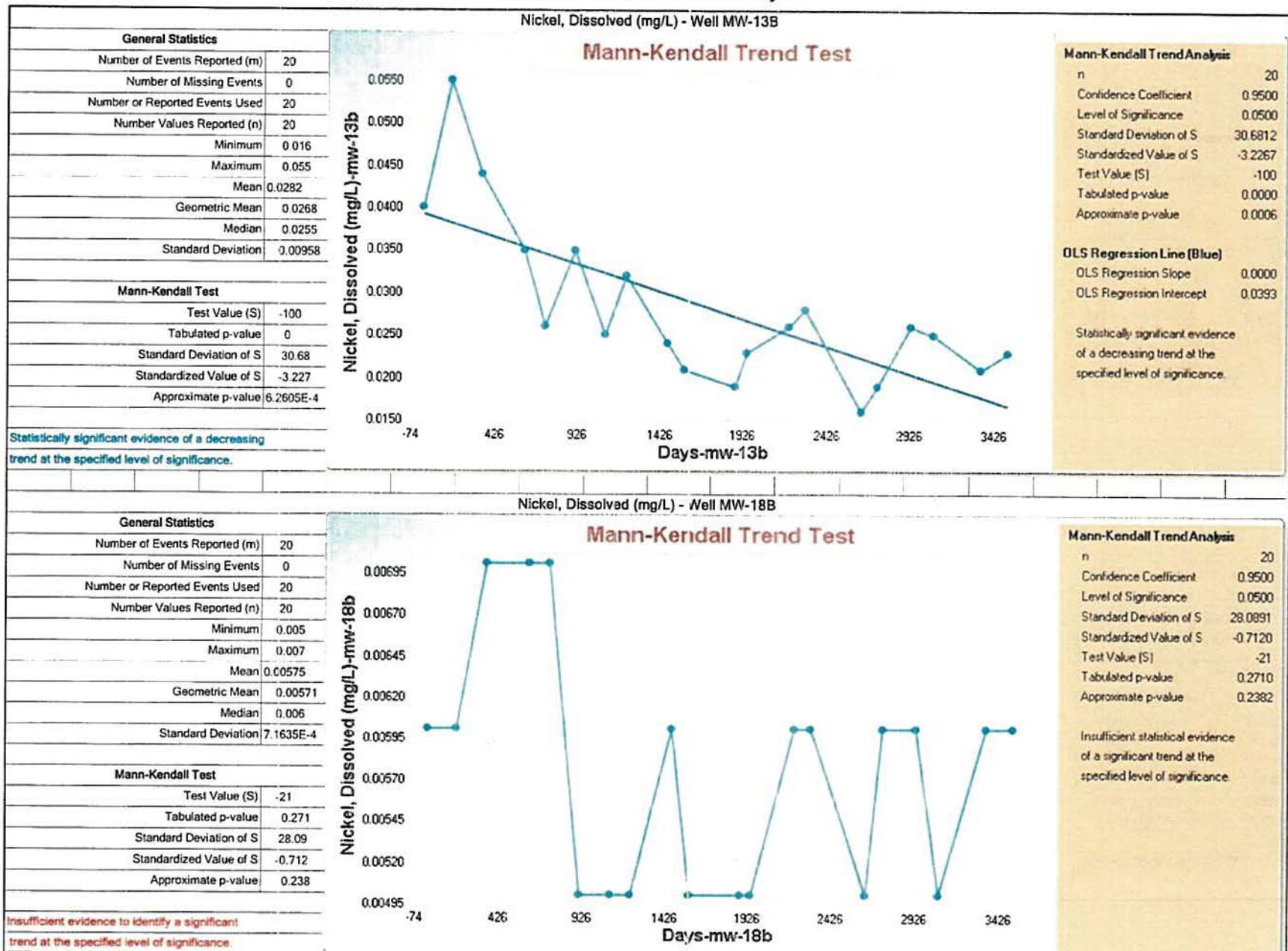


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

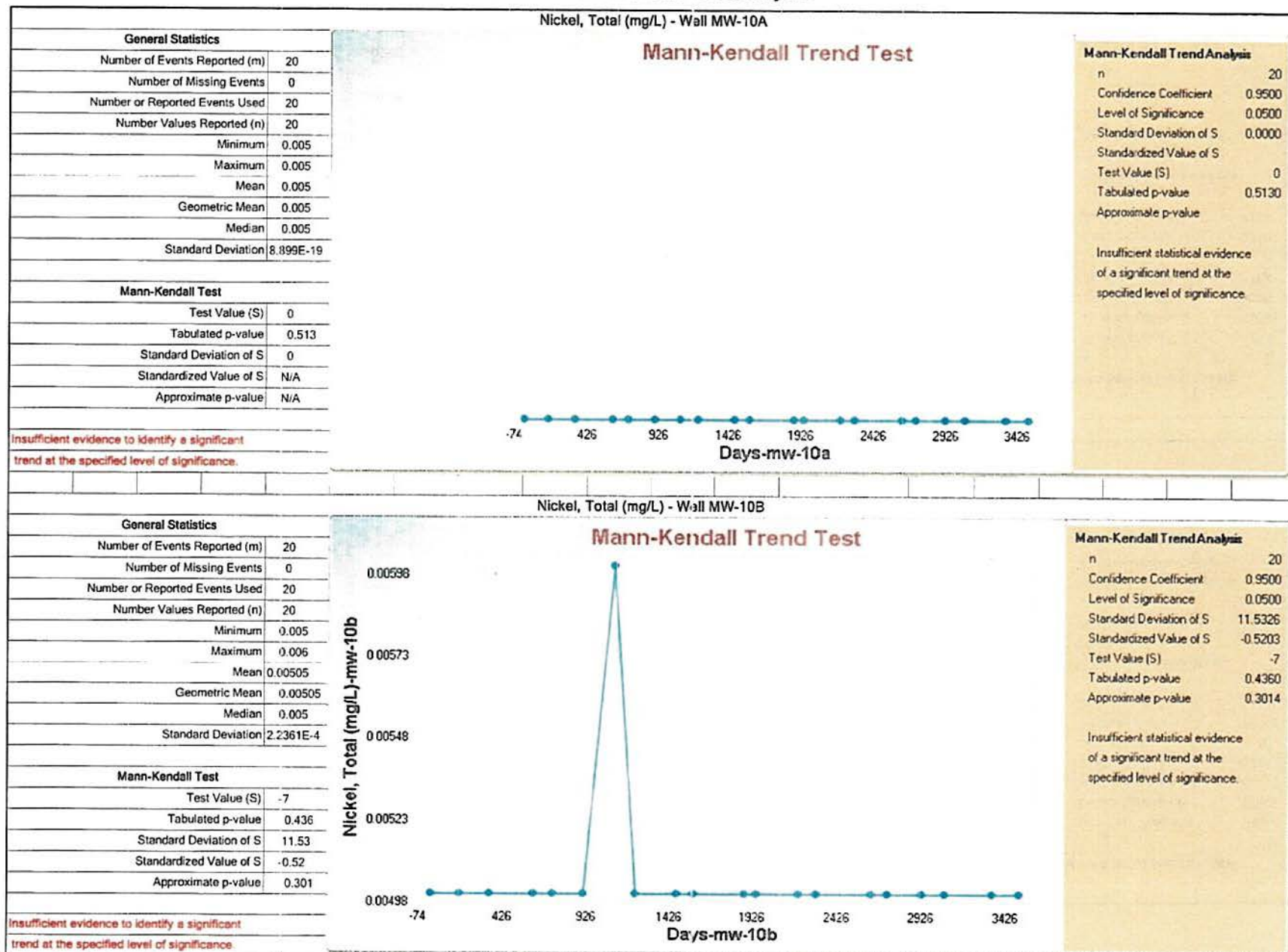


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

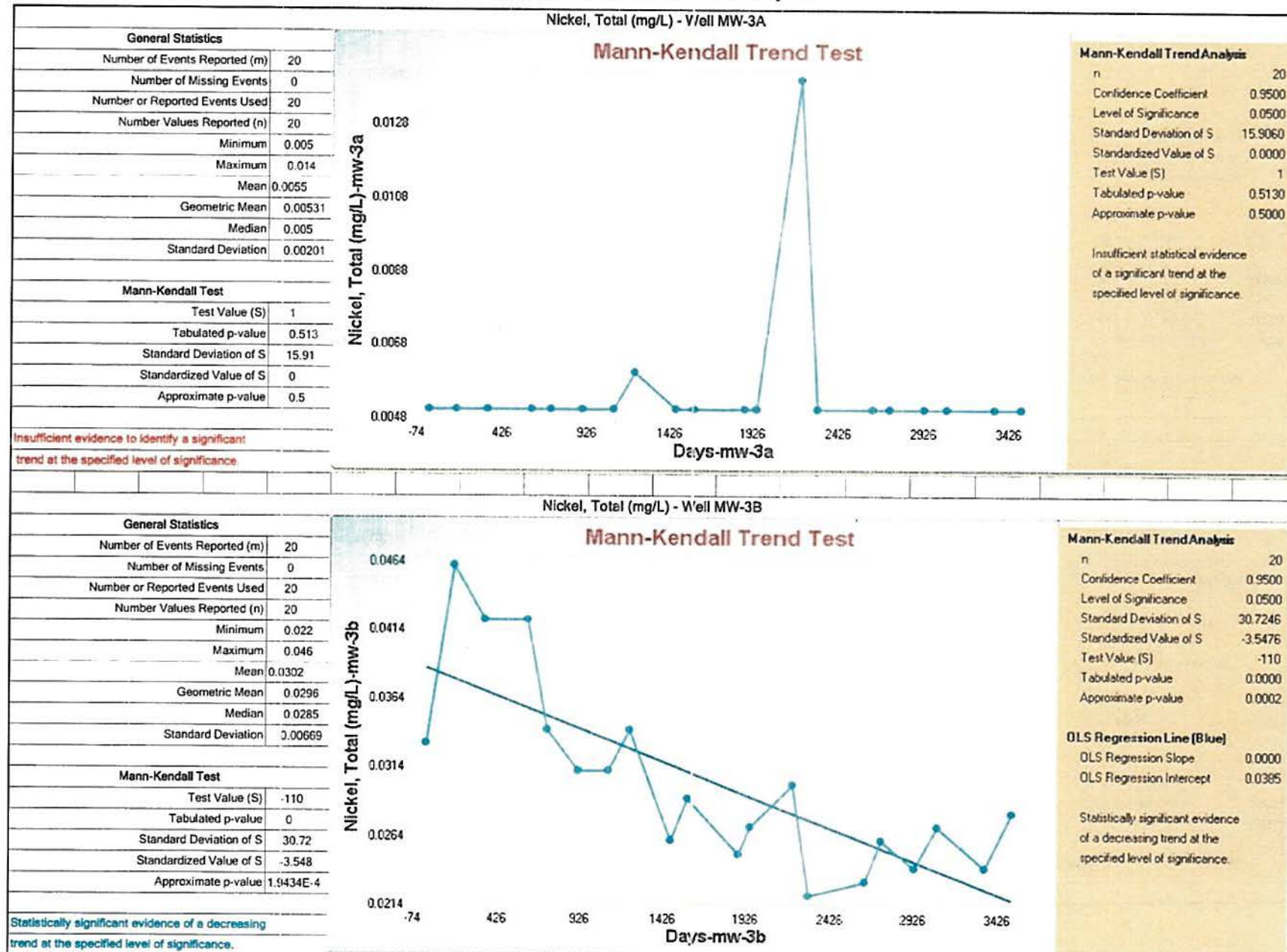


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

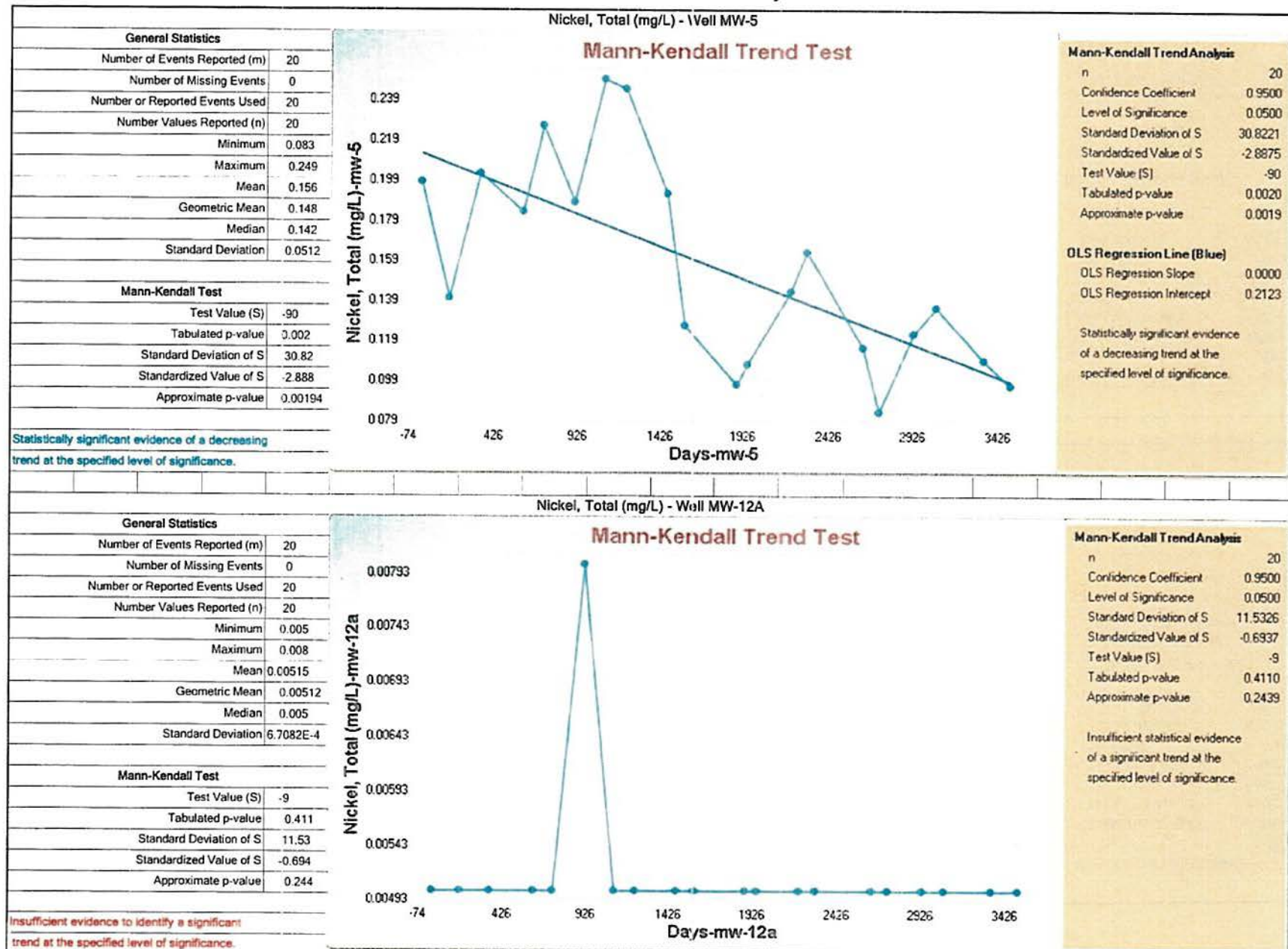


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Nickel, Total (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.005
Maximum	0.005
Mean	0.005
Geometric Mean	0.005
Median	0.005
Standard Deviation	8.399E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Nickel, Total (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.005
Maximum	0.005
Mean	0.005
Geometric Mean	0.005
Median	0.005
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

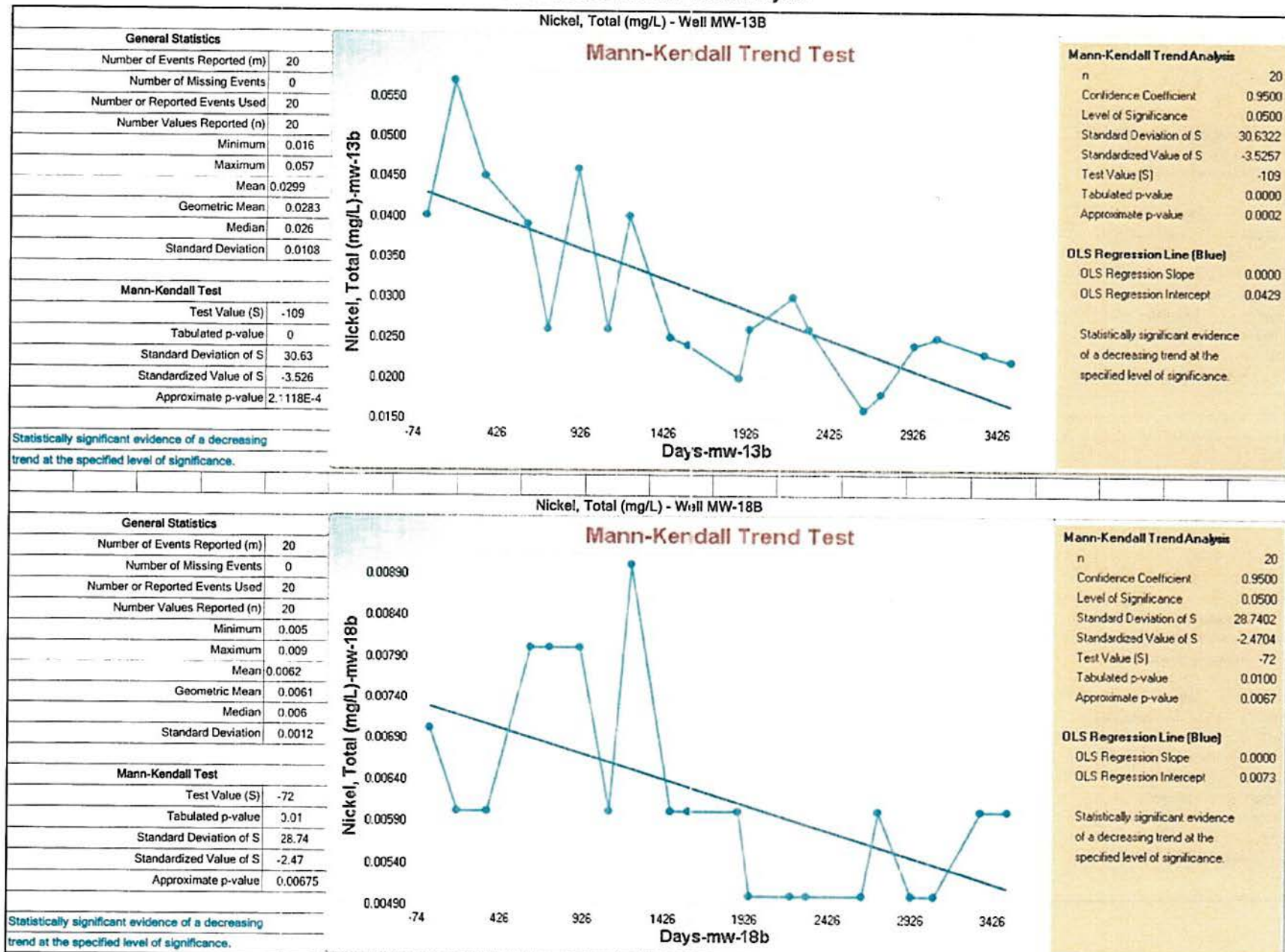


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Selenium, Dissolved (mg/L) - Well MW-10A

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Selenium, Dissolved (mg/L) - Well MW-10B

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Selenium, Dissolved (mg/L) - Well MW-3A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Selenium, Dissolved (mg/L) - Well MW-3B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Mann-Kendall Trend Test Analysis

Selenium, Dissolved (mg/L) - Well MW-5

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Selenium, Dissolved (mg/L) - Well MW-12A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Selenium, Dissolved (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Selenium, Dissolved (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Insufficient evidence to identify a significant
trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

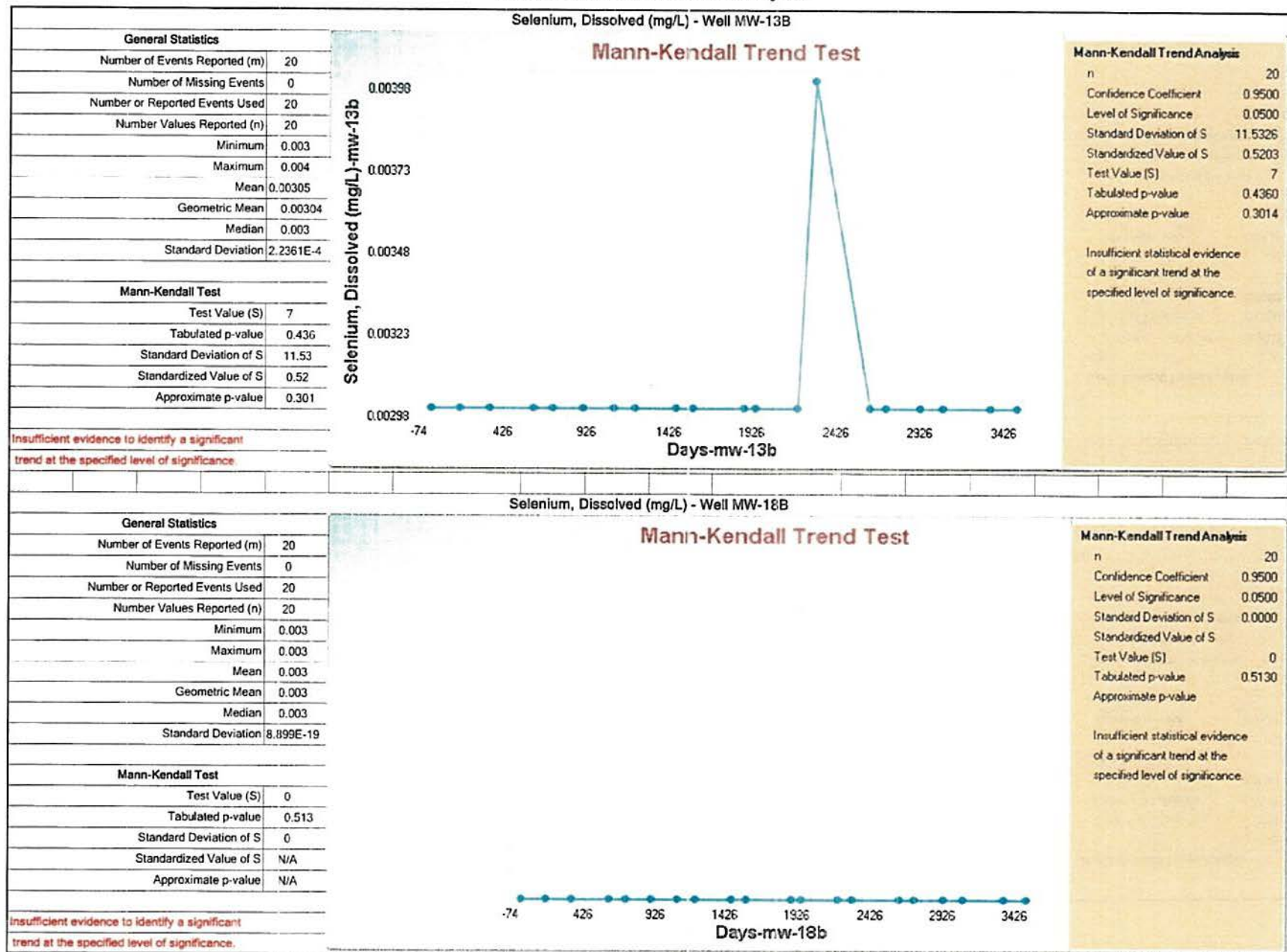


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Selenium, Total (mg/L) - Well MW-10A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Selenium, Total (mg/L) - Well MW-10B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Selenium, Total (mg/L) - Well MW-3A

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Selenium, Total (mg/L) - Well MW-3B

Mann-Kendall Trend Test

General Statistics

Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Selenium, Total (mg/L) - Well MW-5

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

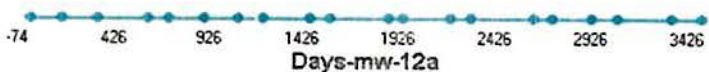
Selenium, Total (mg/L) - Well MW-12A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Selenium, Total (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

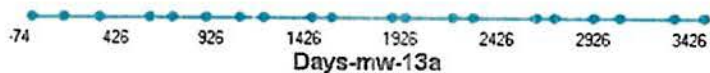
Selenium, Total (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.003
Maximum	0.003
Mean	0.003
Geometric Mean	0.003
Median	0.003
Standard Deviation	8.899E-19

Mann-Kendall Test

Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

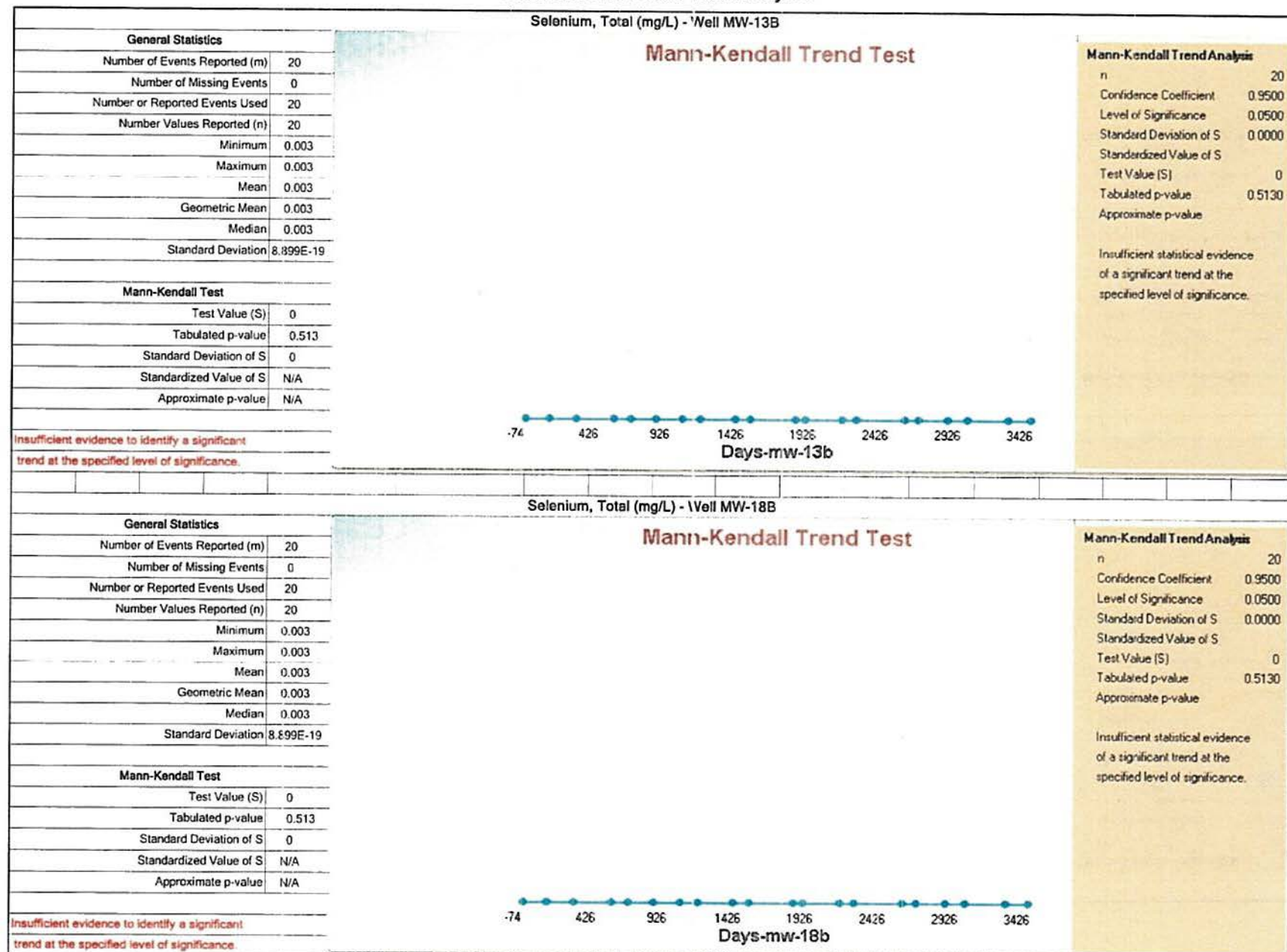


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

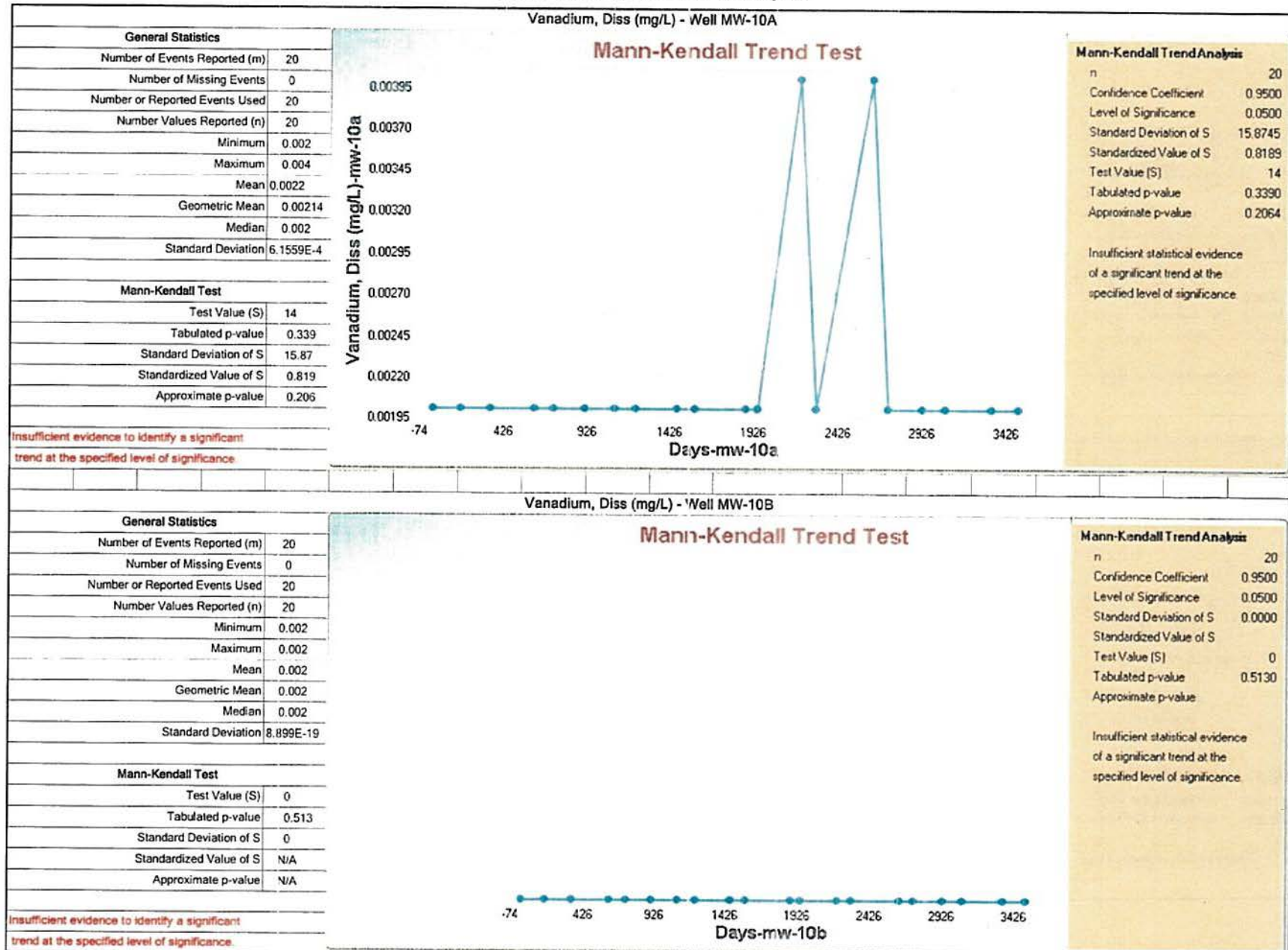


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Vanadium, Diss (mg/L) - Well MW-3A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Vanadium, Diss (mg/L) - Well MW-3B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

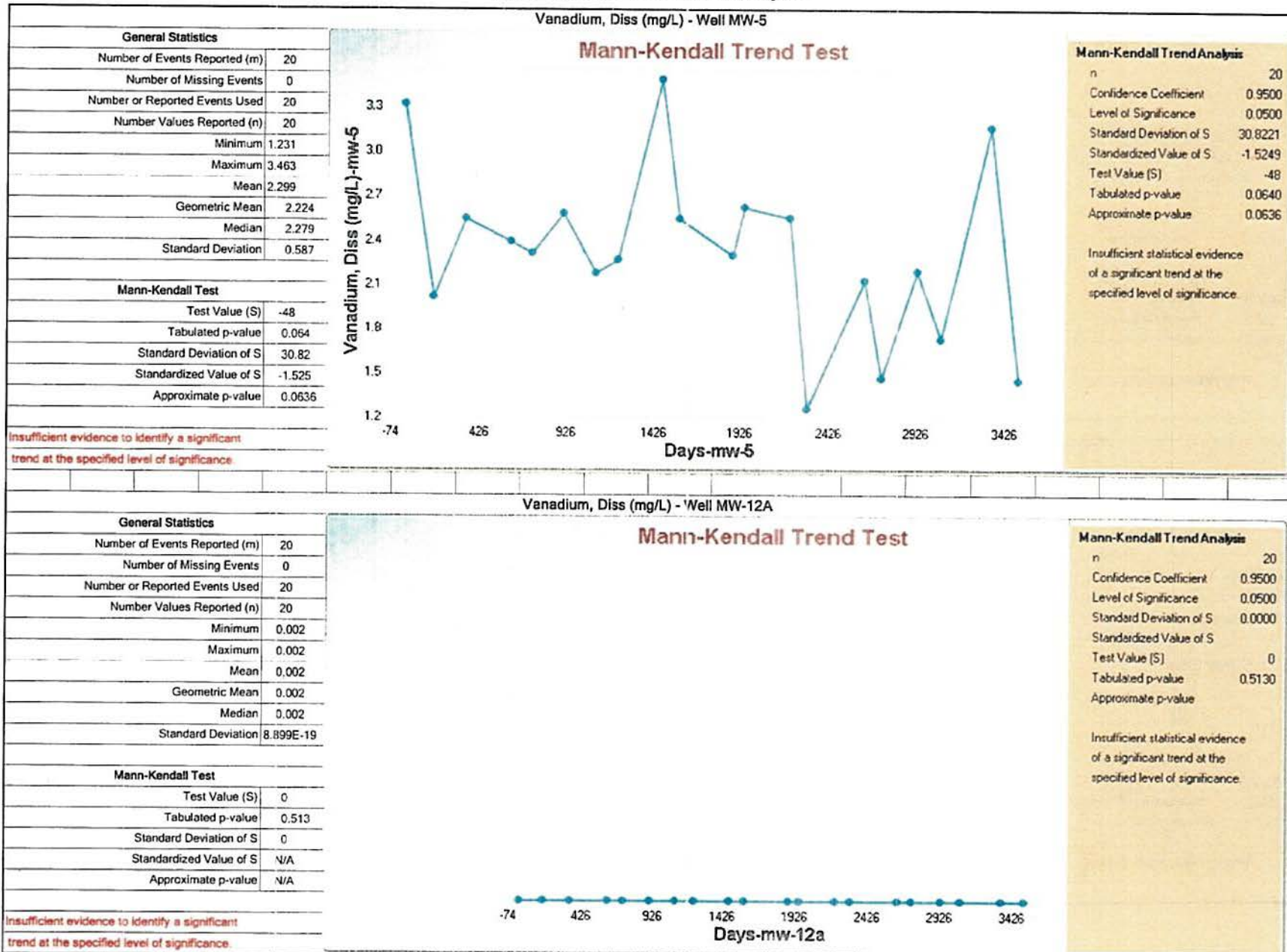


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Vanadium, Diss (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Vanadium, Diss (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.399E-19

Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

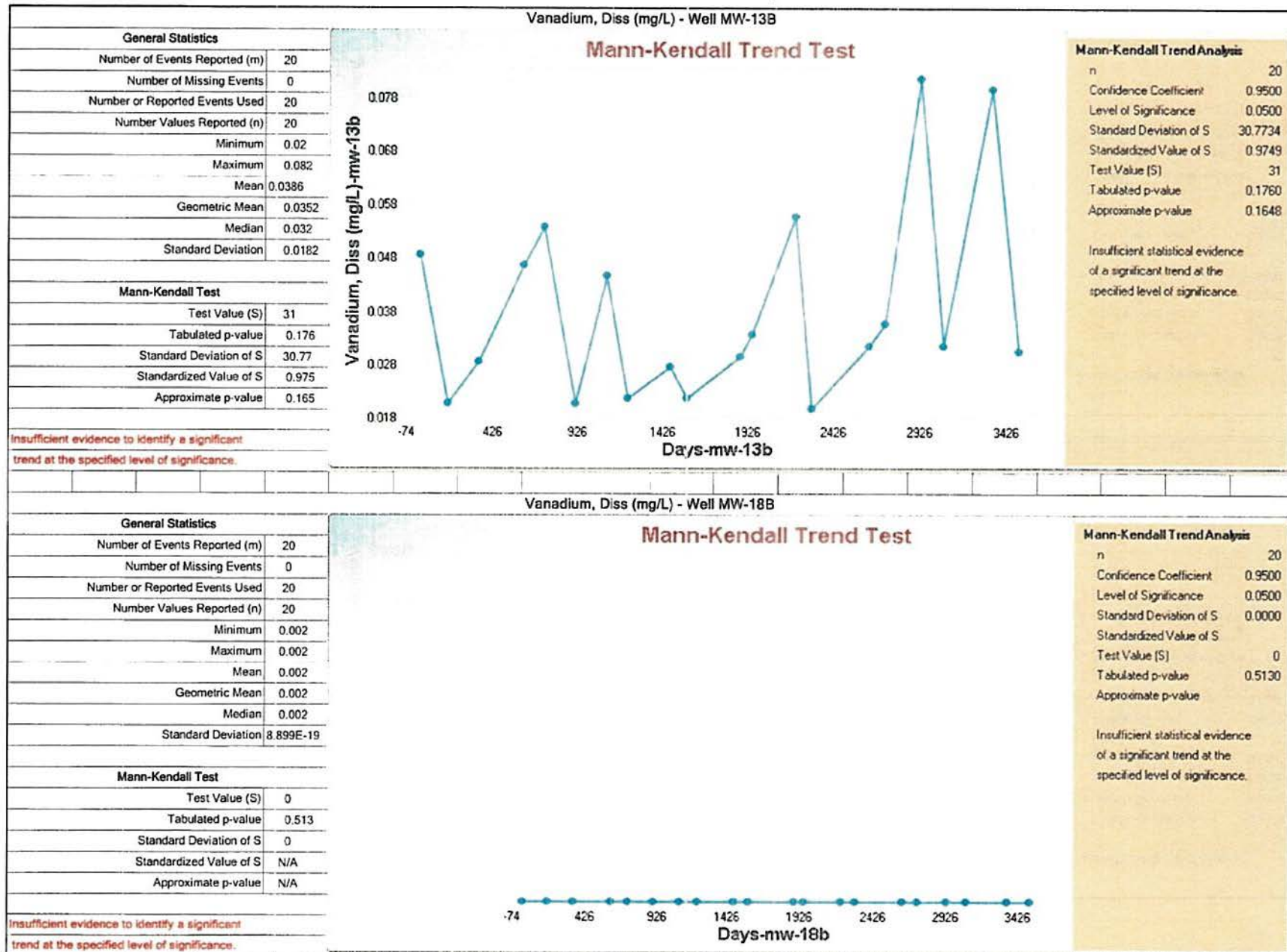


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

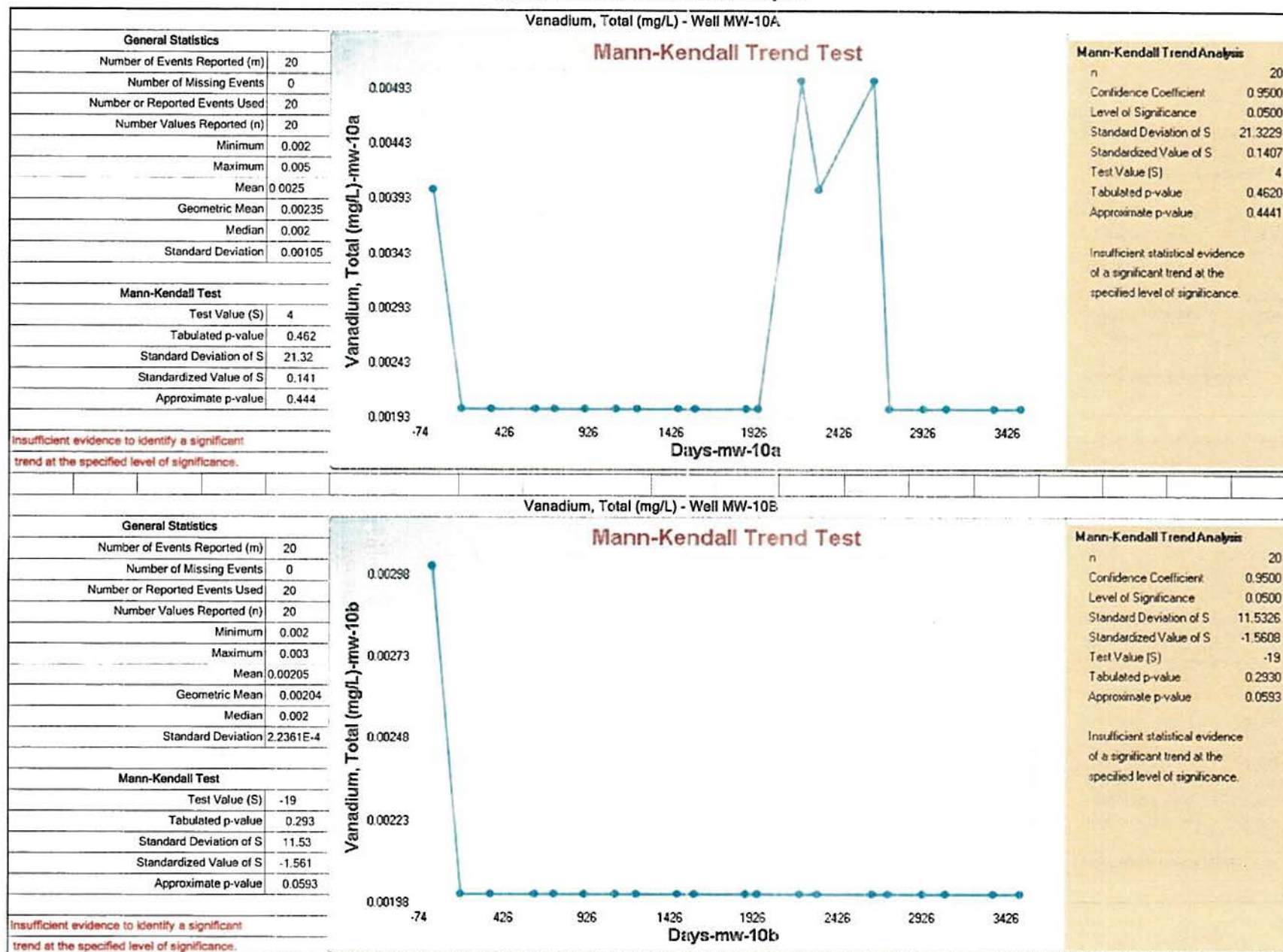


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

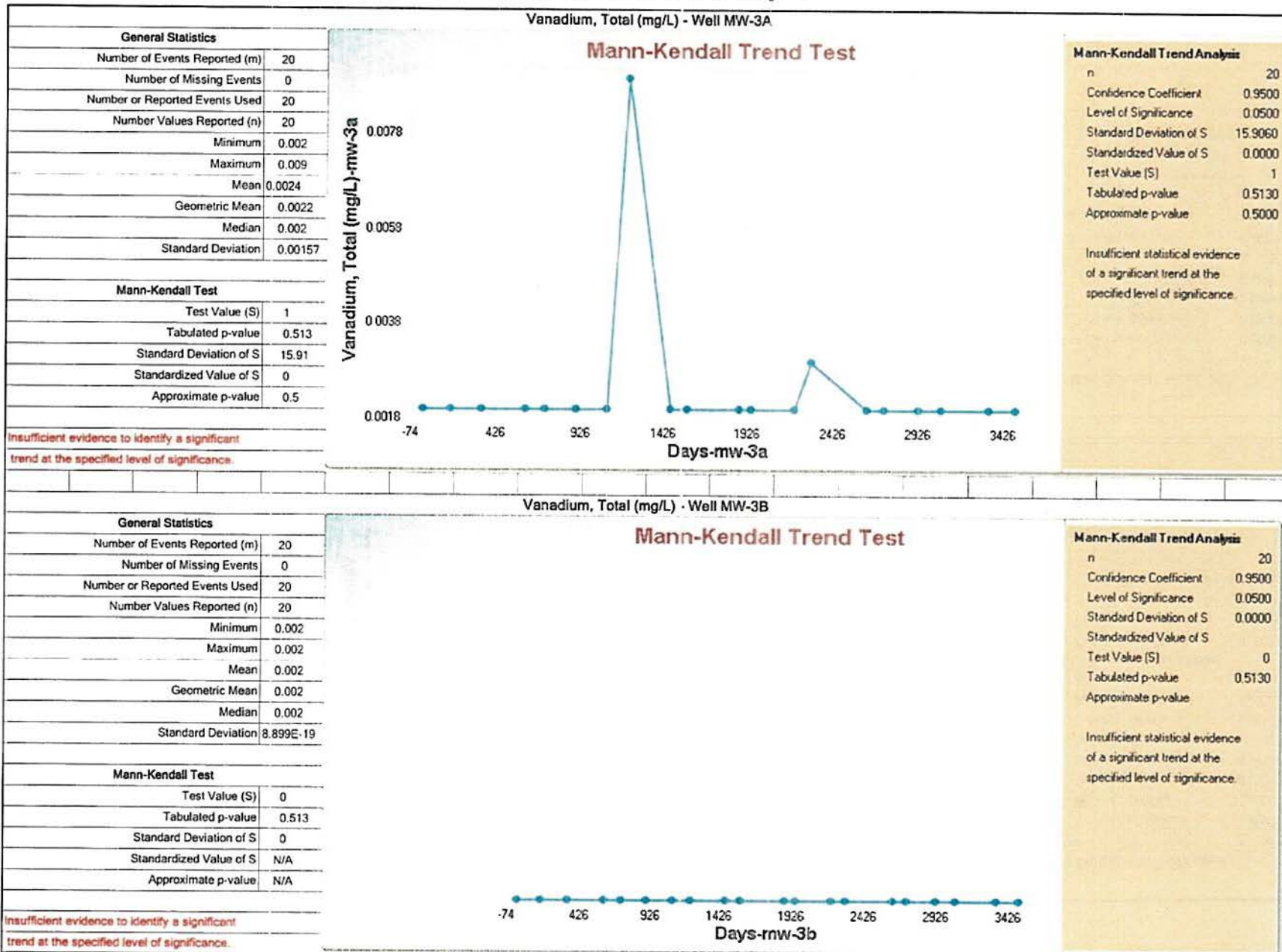


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

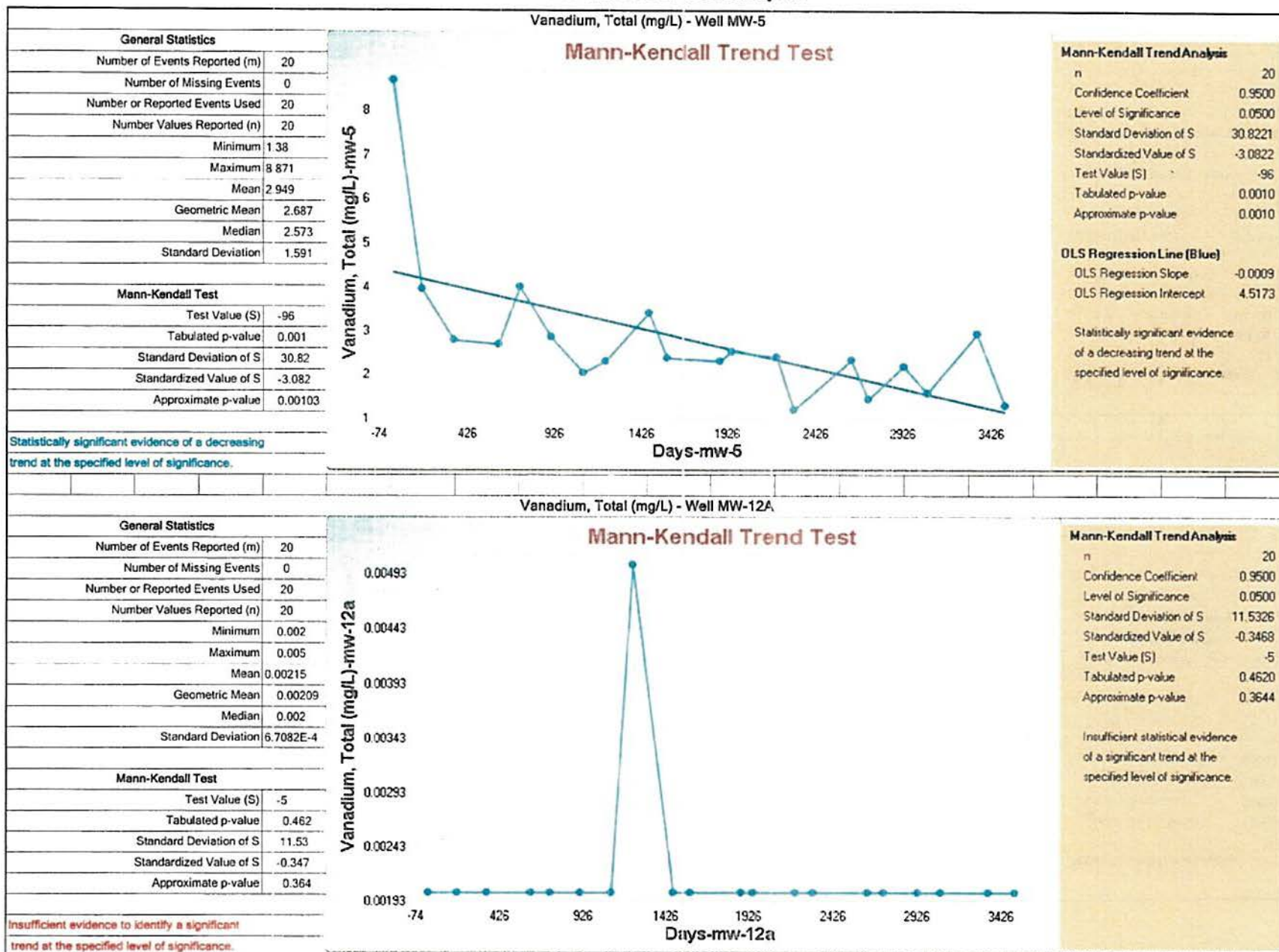


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Vanadium, Total (mg/L) - Well MW-12B

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Vanadium, Total (mg/L) - Well MW-13A

Mann-Kendall Trend Test

Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	0.0000
Standardized Value of S	
Test Value (S)	0
Tabulated p-value	0.5130
Approximate p-value	

Insufficient statistical evidence of a significant trend at the specified level of significance.



General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number of Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.002
Maximum	0.002
Mean	0.002
Geometric Mean	0.002
Median	0.002
Standard Deviation	8.899E-19
Mann-Kendall Test	
Test Value (S)	0
Tabulated p-value	0.513
Standard Deviation of S	0
Standardized Value of S	N/A
Approximate p-value	N/A

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

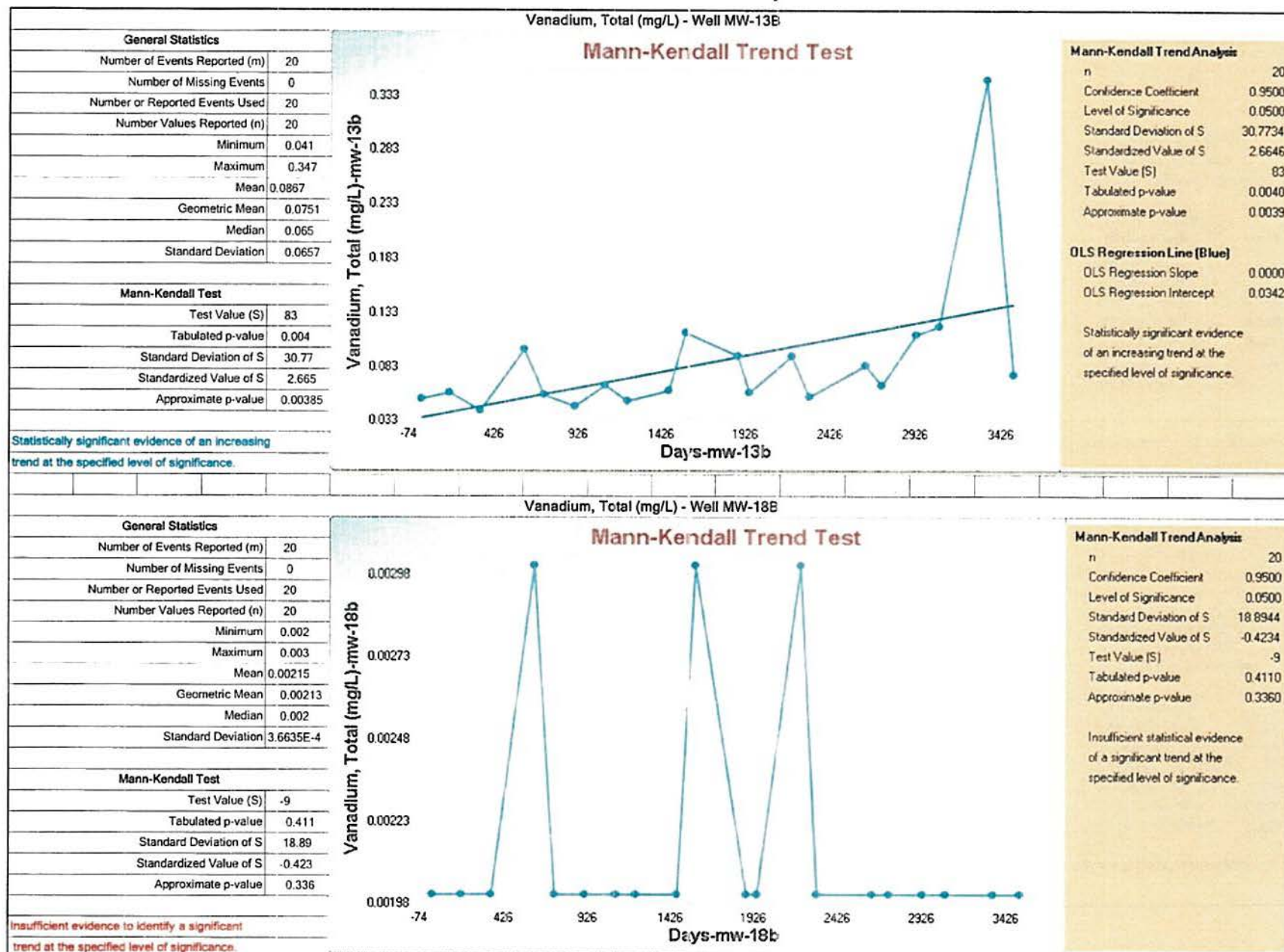


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

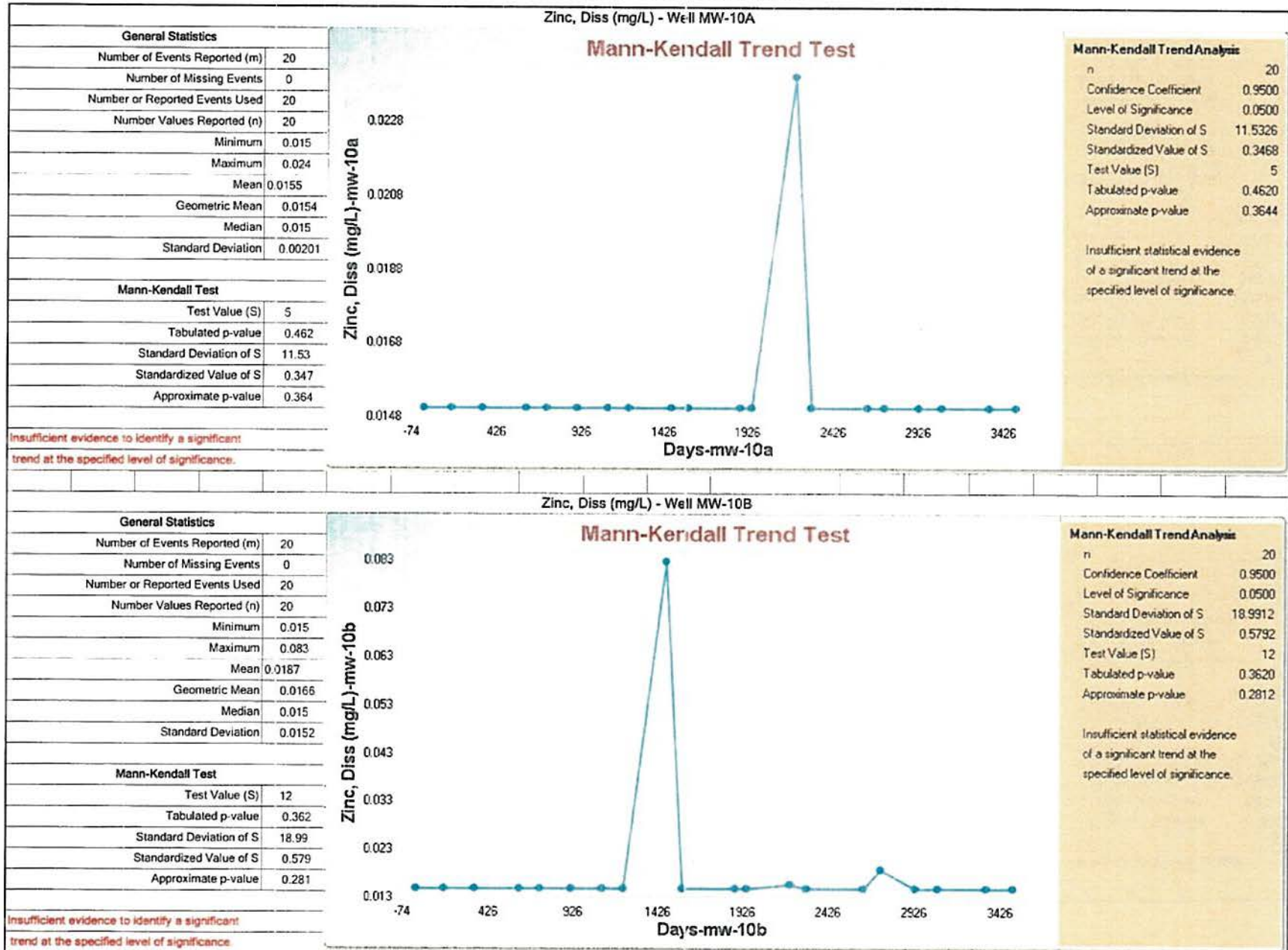


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

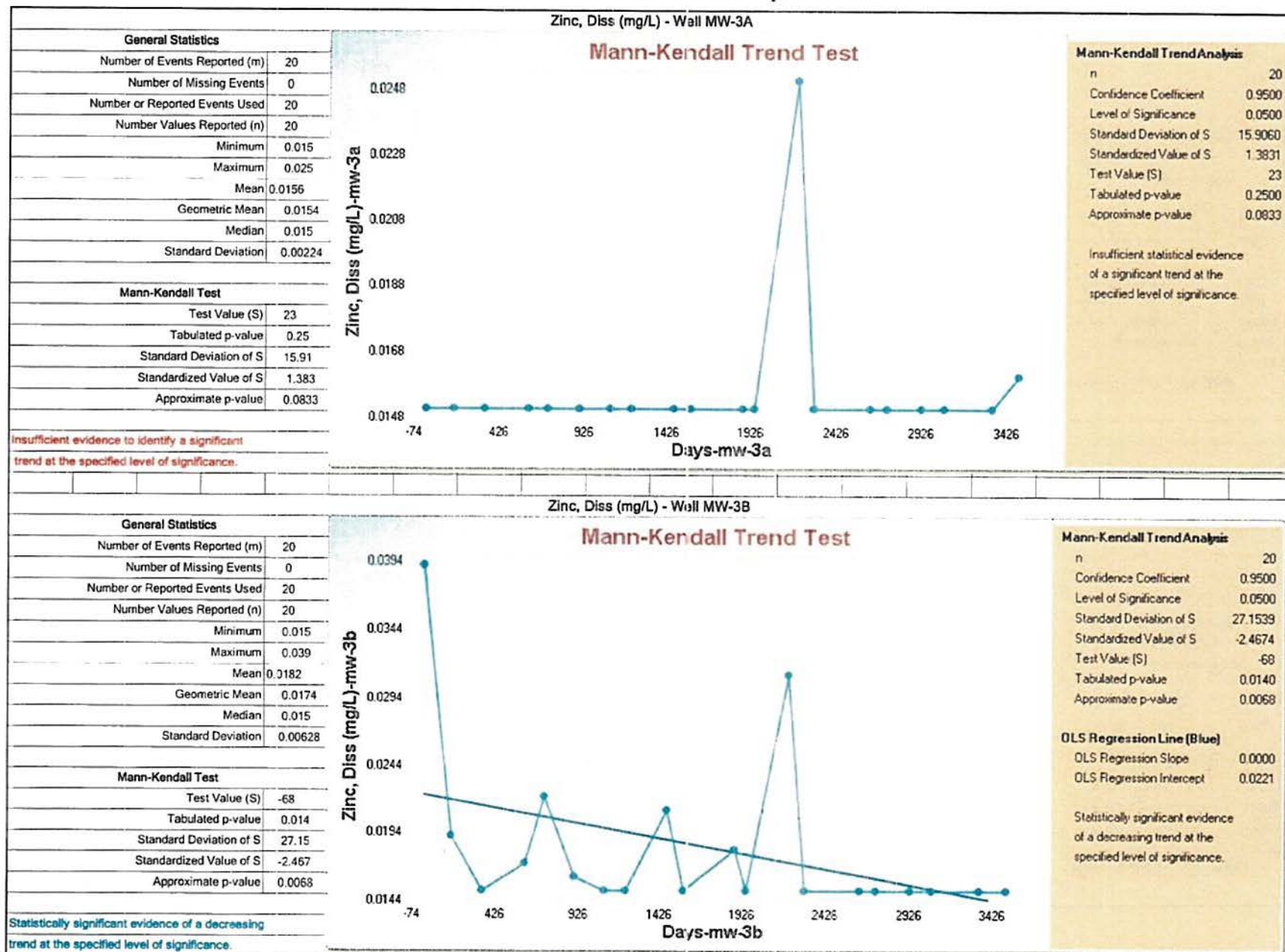


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

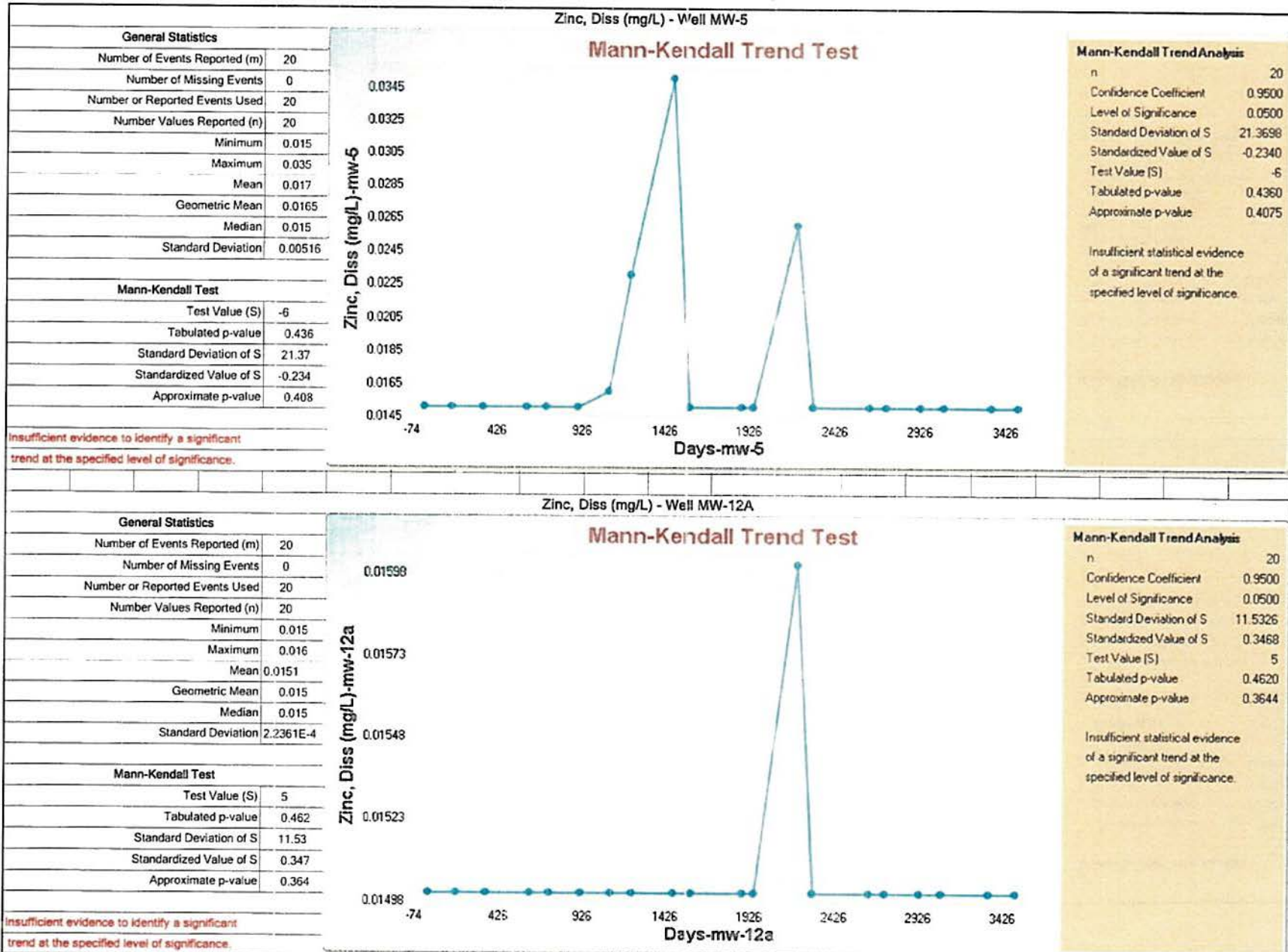
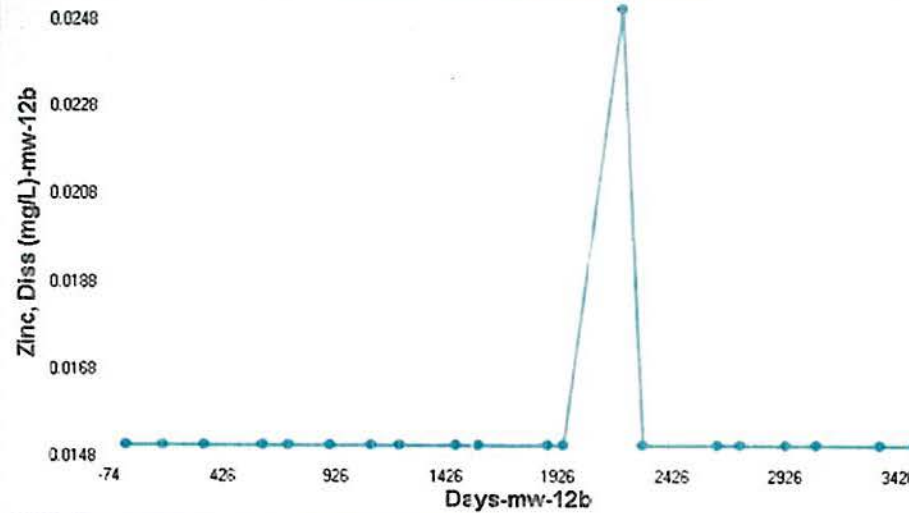


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Zinc, Diss (mg/L) - Well MW-12B

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.5326
Standardized Value of S	0.3468
Test Value (S)	5
Tabulated p-value	0.4620
Approximate p-value	0.3644

Insufficient statistical evidence of a significant trend at the specified level of significance.

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.015
Maximum	0.025
Mean	0.0155
Geometric Mean	0.0154
Median	0.015
Standard Deviation	0.00224

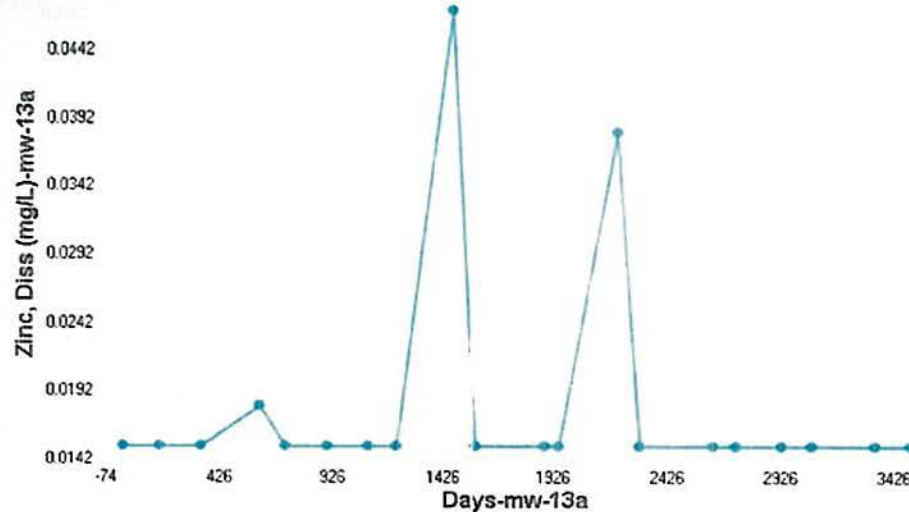
Mann-Kendall Test

Test Value (S)	5
Tabulated p-value	0.462
Standard Deviation of S	11.53
Standardized Value of S	0.347
Approximate p-value	0.364

Insufficient evidence to identify a significant trend at the specified level of significance.

Zinc, Diss (mg/L) - Well MW-13A

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.9912
Standardized Value of S	-0.4739
Test Value (S)	-10
Tabulated p-value	0.3870
Approximate p-value	0.3178

Insufficient statistical evidence of a significant trend at the specified level of significance.

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	0.015
Maximum	0.047
Mean	0.0179
Geometric Mean	0.0168
Median	0.015
Standard Deviation	0.00856

Mann-Kendall Test

Test Value (S)	-10
Tabulated p-value	0.387
Standard Deviation of S	18.99
Standardized Value of S	-0.474
Approximate p-value	0.318

Insufficient evidence to identify a significant trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

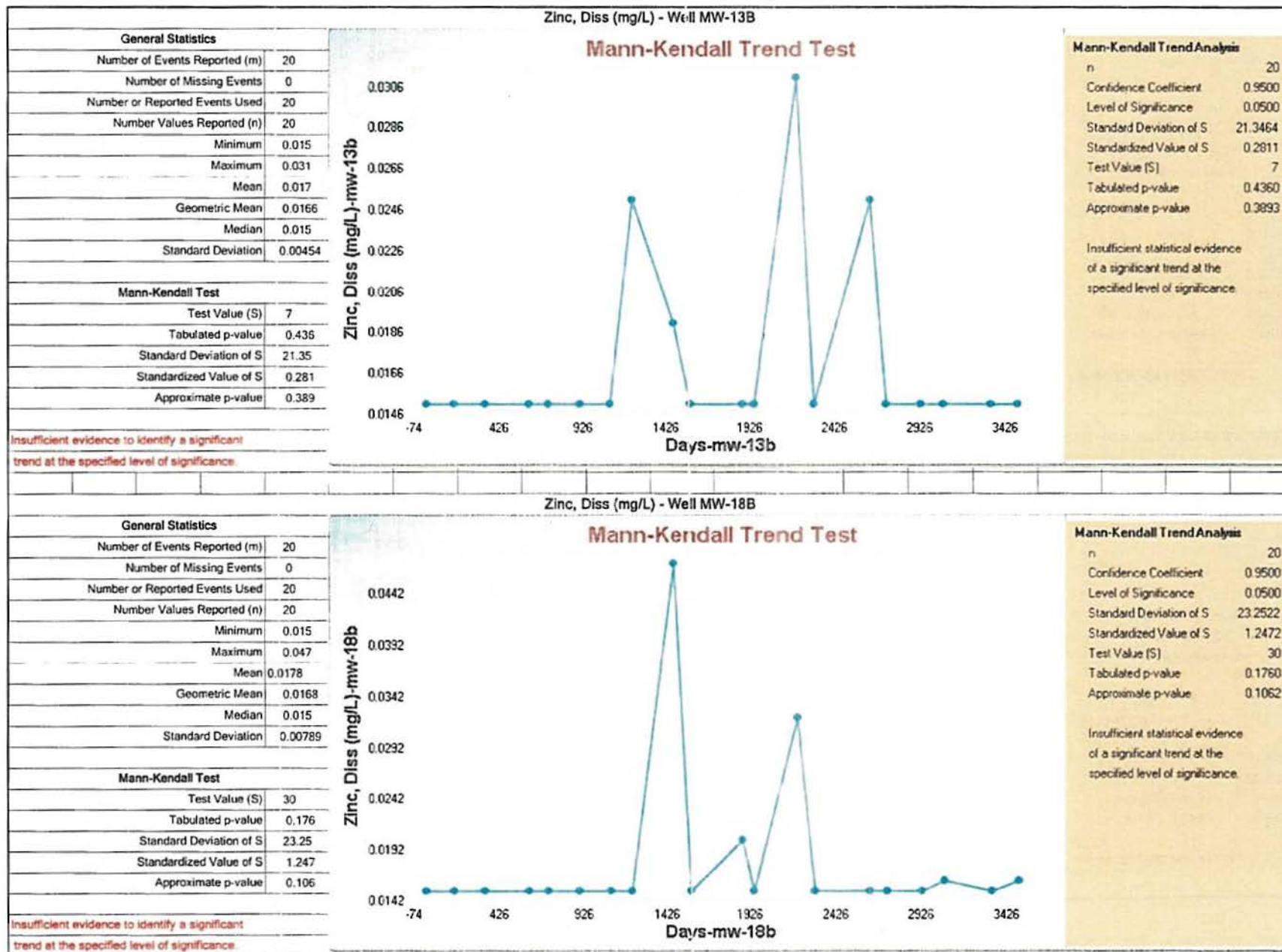


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

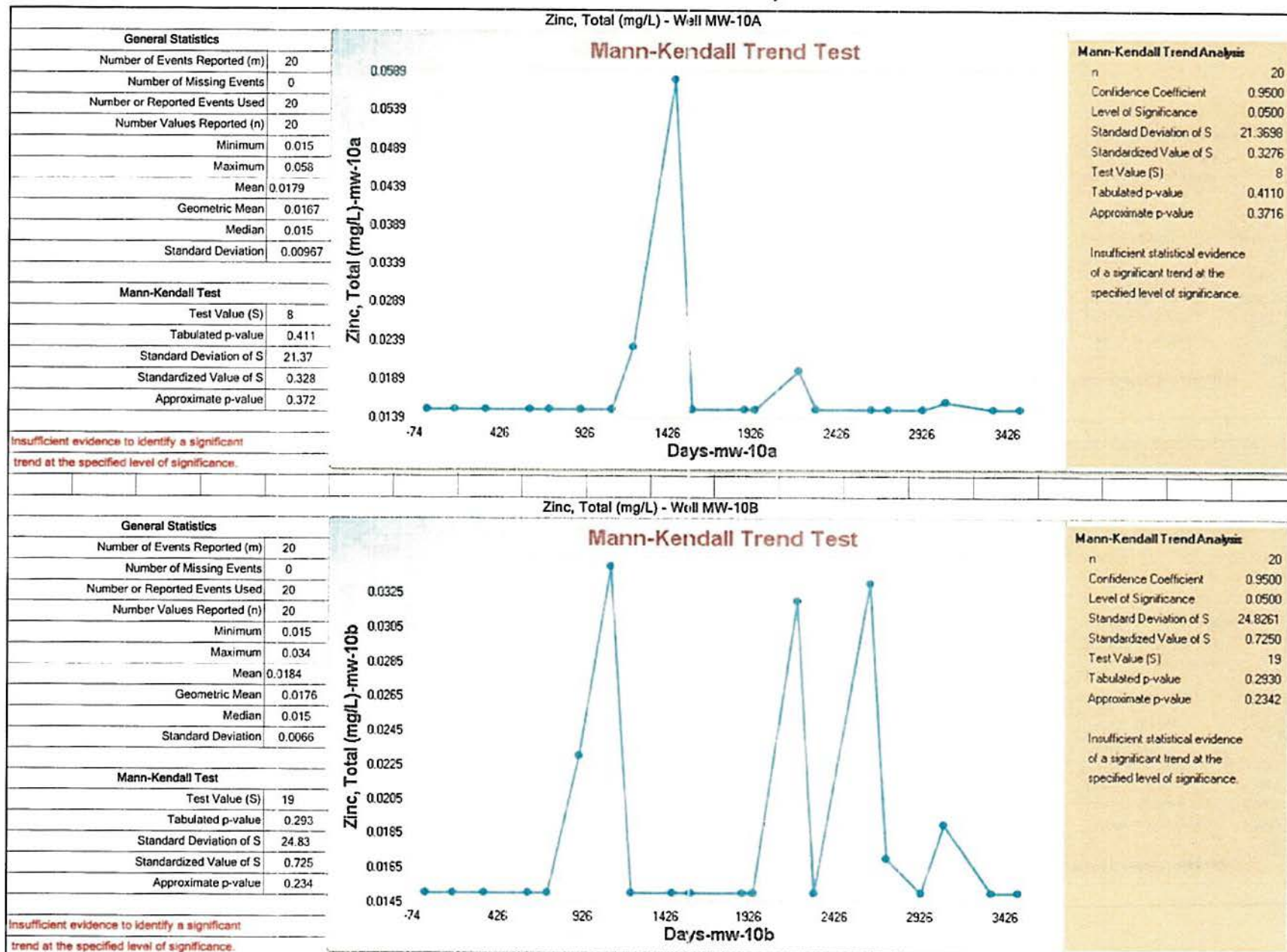


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

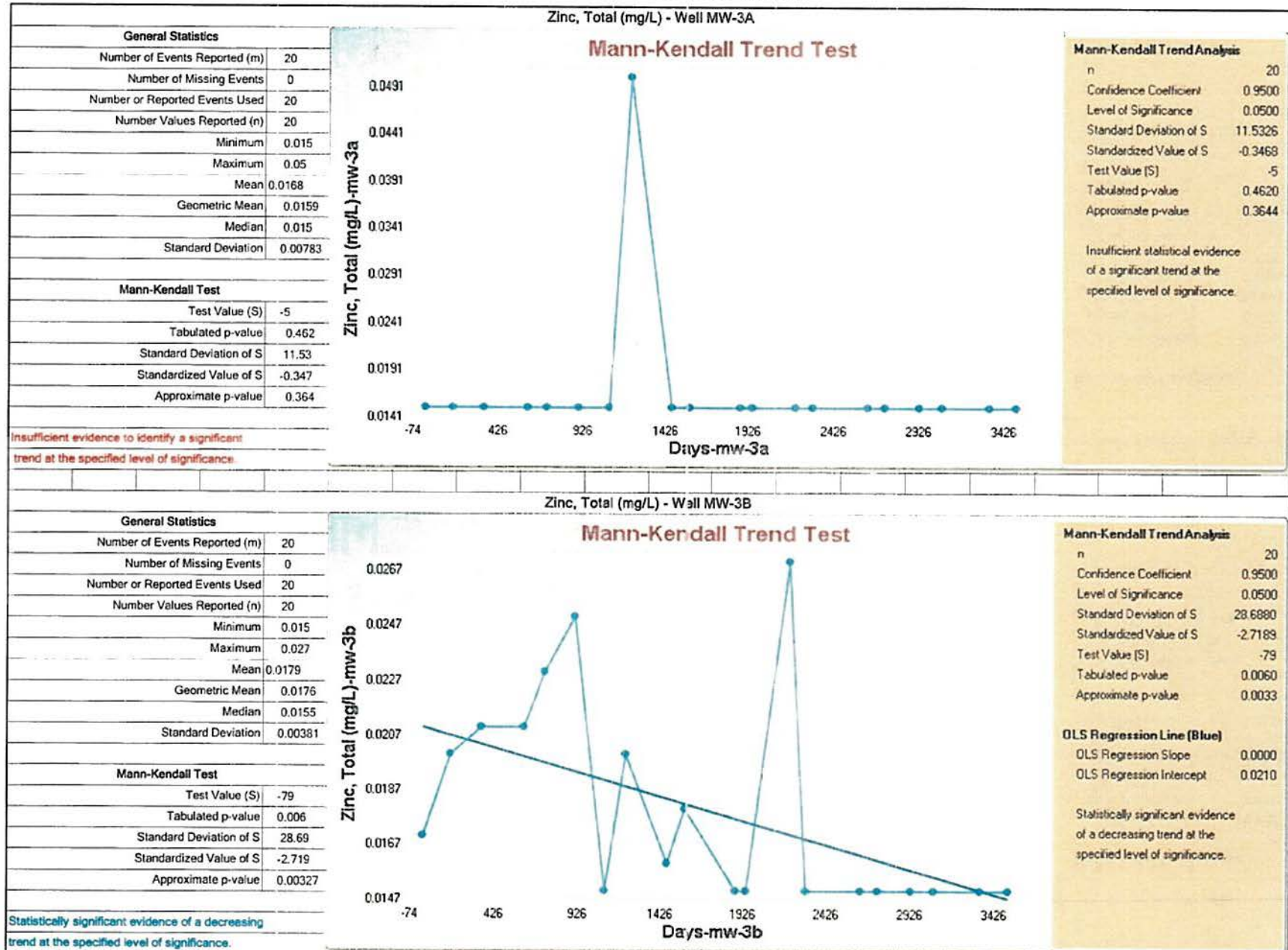


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

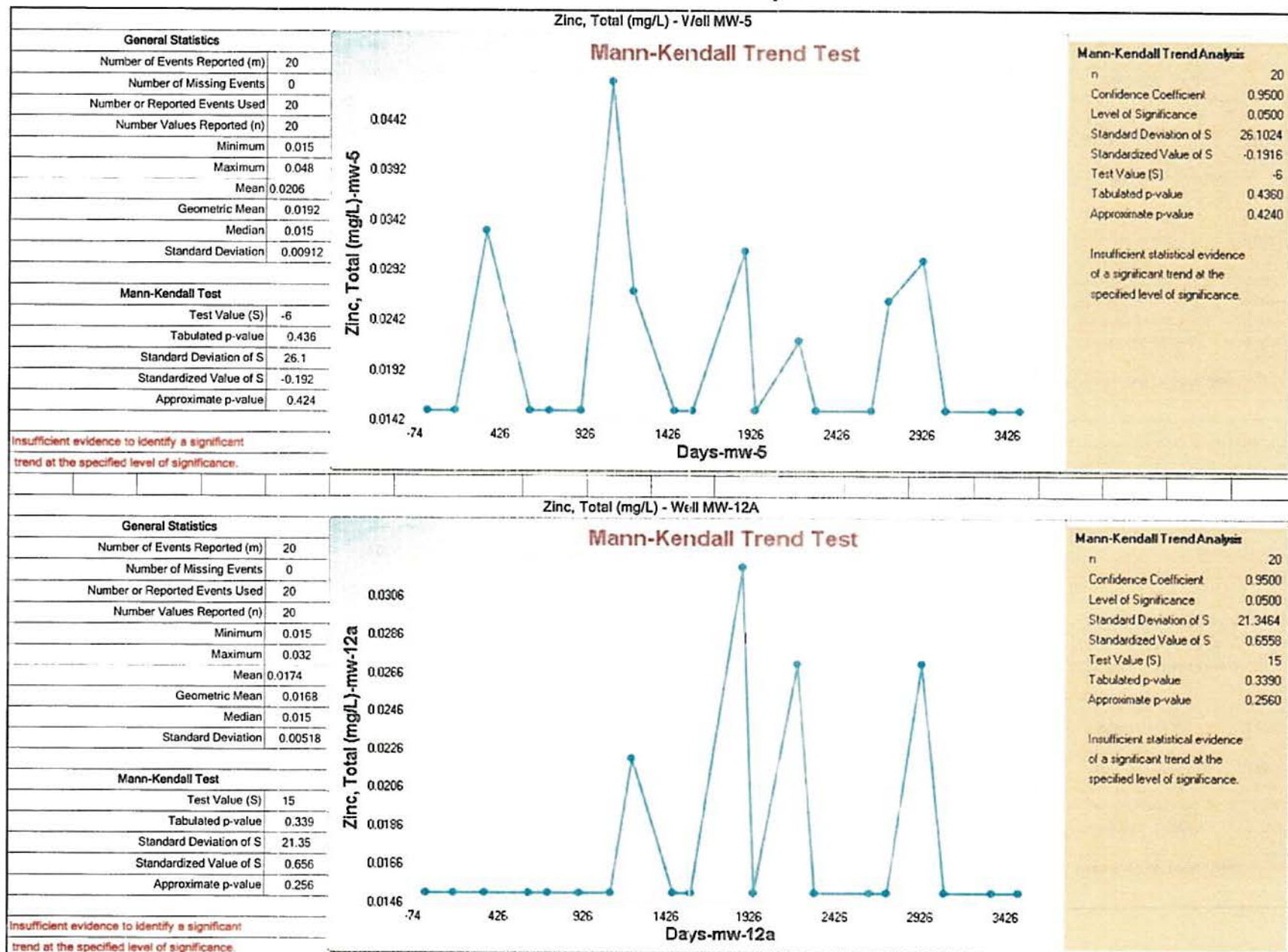


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

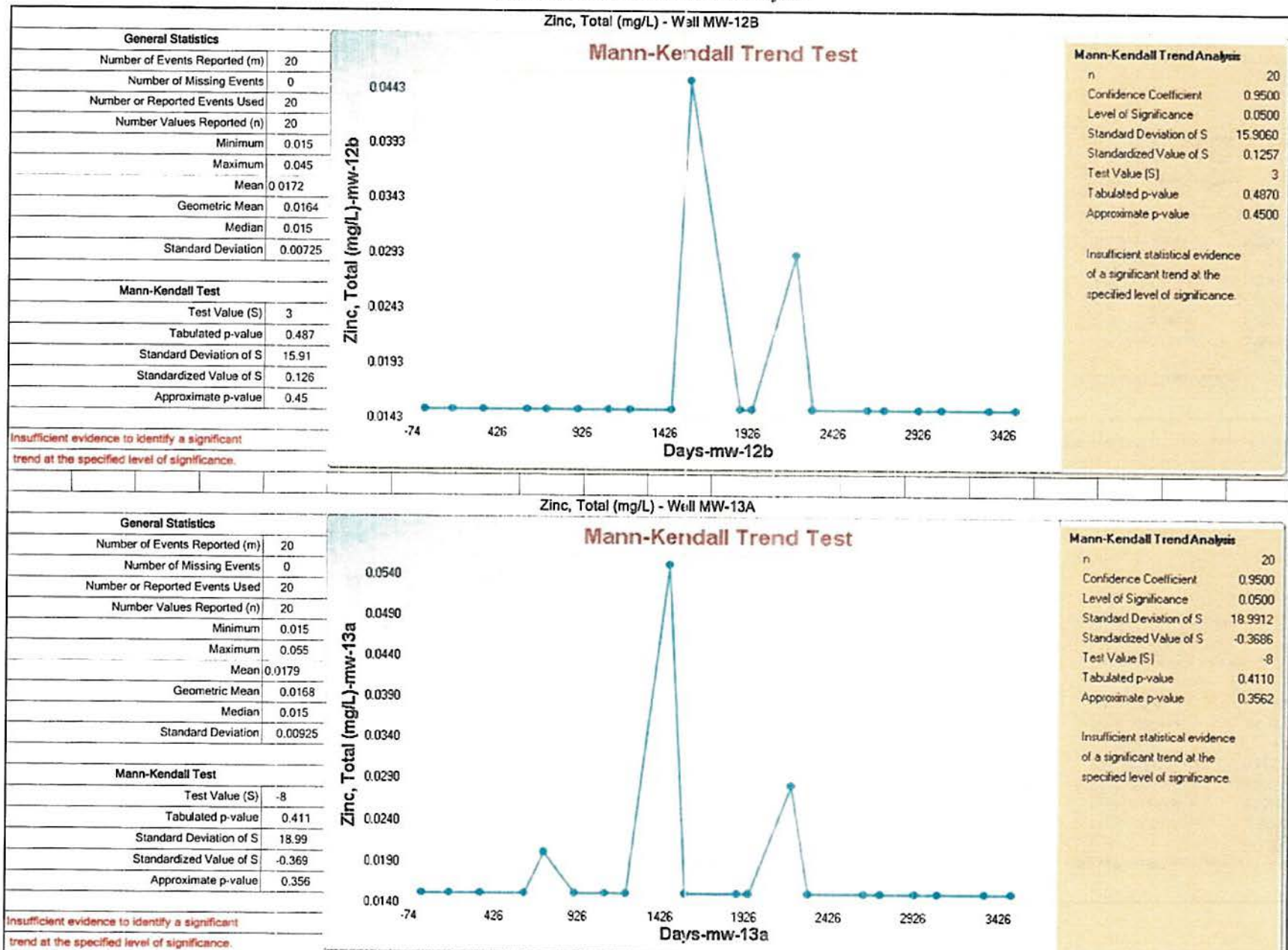


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

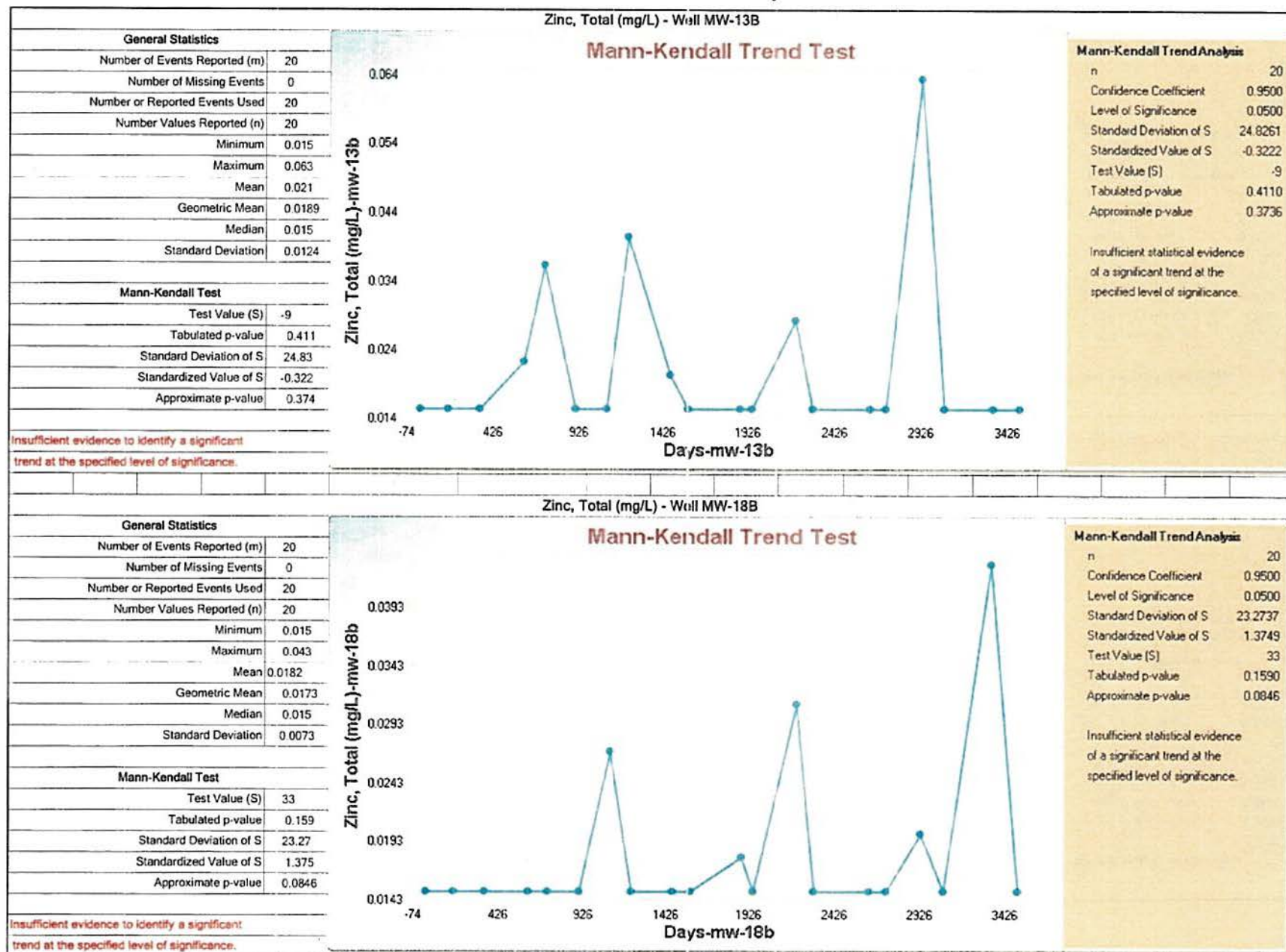
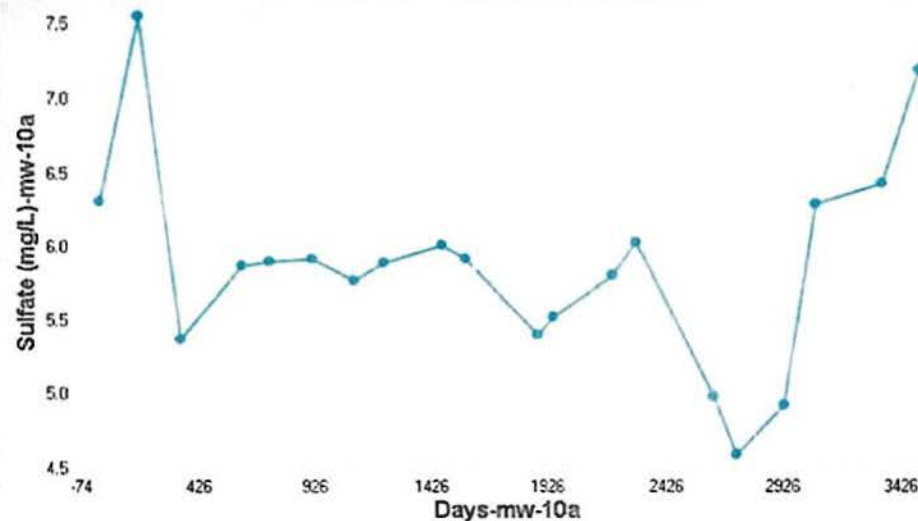


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Sulfate (mg/L) - Well MW-10A

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

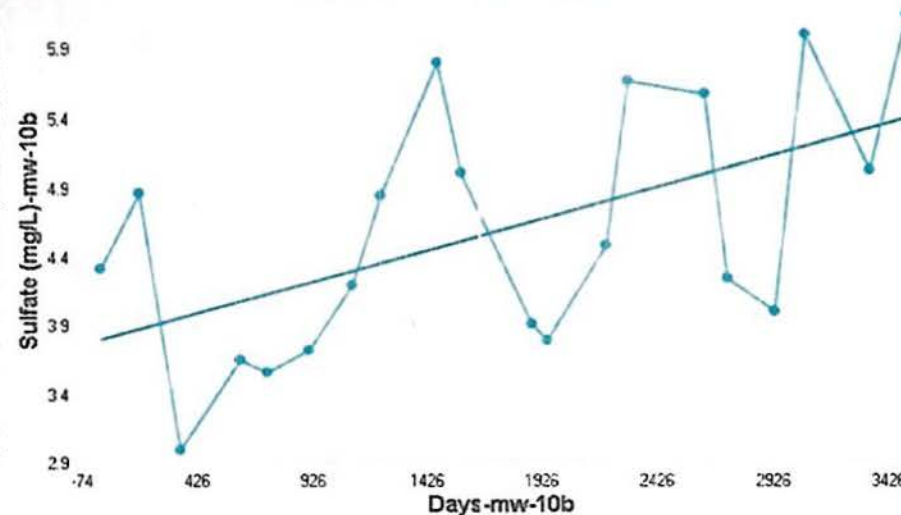
n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.8058
Standardized Value of S	-0.1948
Test Value (S)	-7
Tabulated p-value	0.4360
Approximate p-value	0.4228

Insufficient statistical evidence of a significant trend at the specified level of significance.

Insufficient evidence to identify a significant trend at the specified level of significance.

Sulfate (mg/L) - Well MW-10B

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.8221
Standardized Value of S	2.5631
Test Value (S)	80
Tabulated p-value	0.0050
Approximate p-value	0.0052

OLS Regression Line (Blue)

OLS Regression Slope	0.0005
OLS Regression Intercept	3.7990

Statistically significant evidence of an increasing trend at the specified level of significance.

Statistically significant evidence of an increasing trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

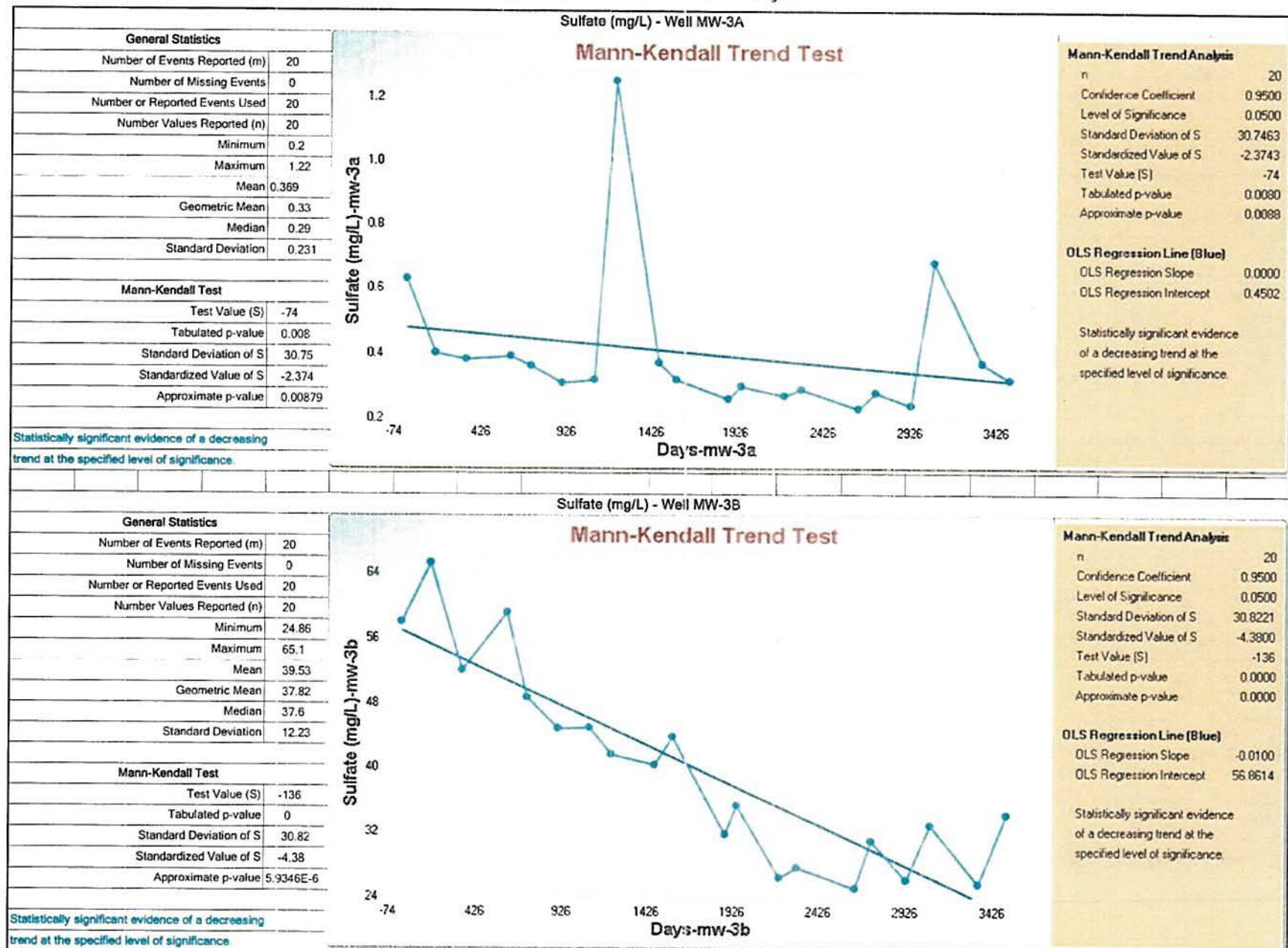


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

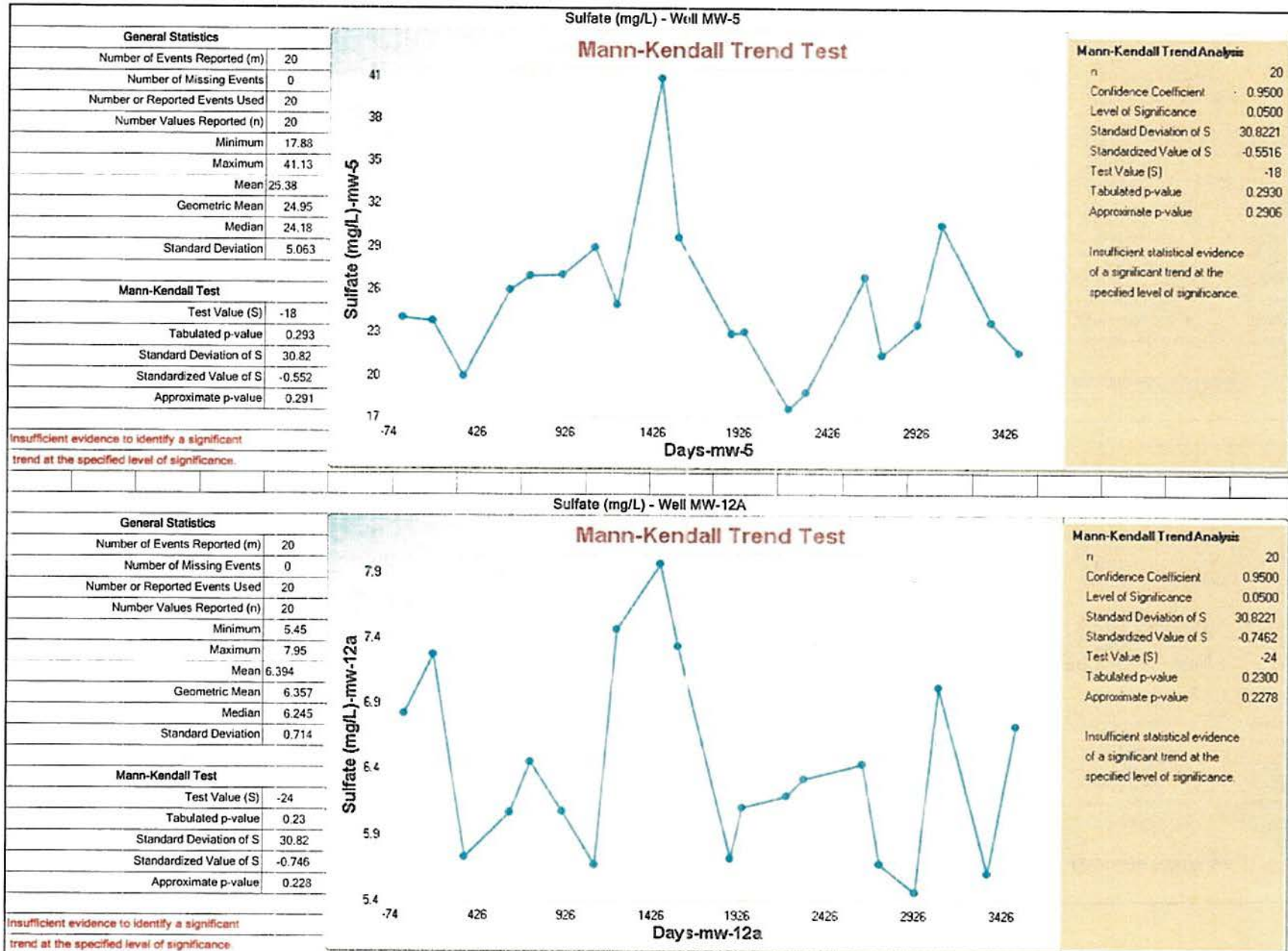


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

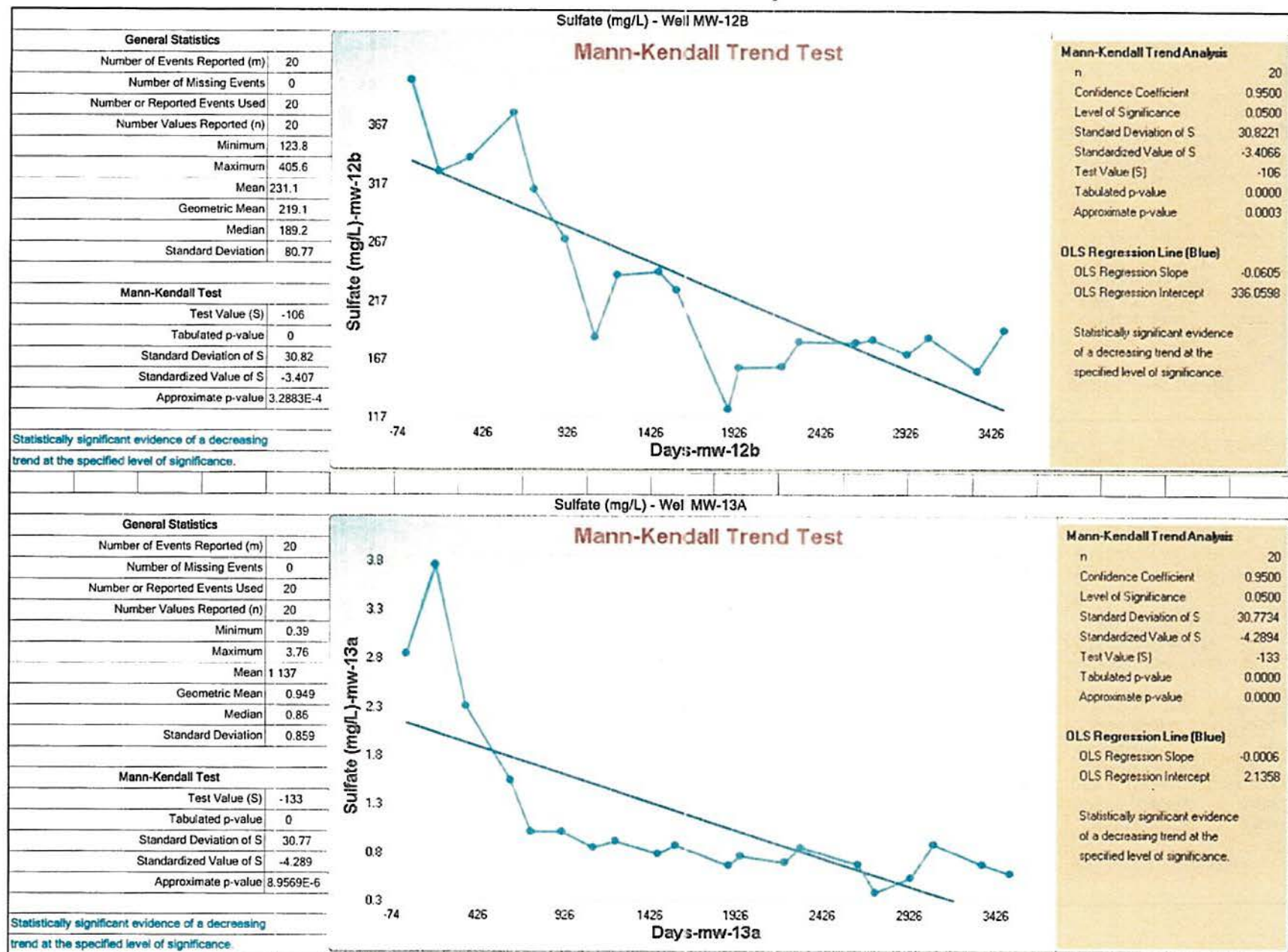


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

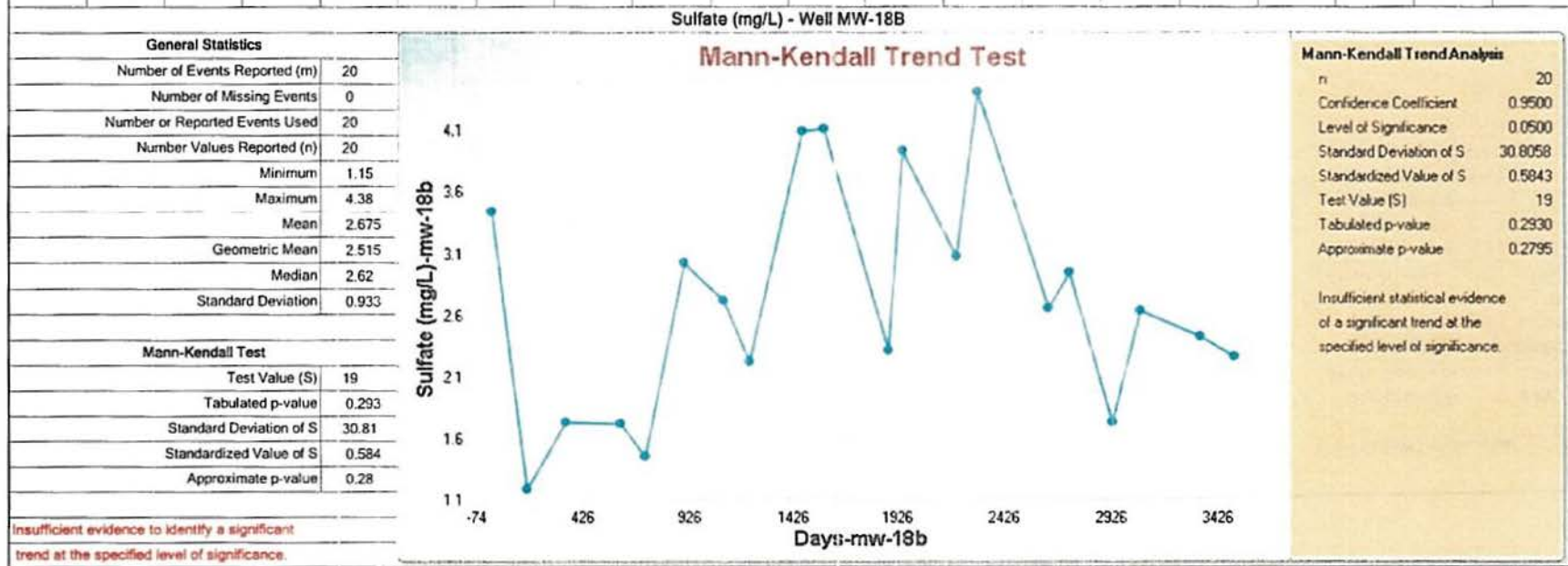
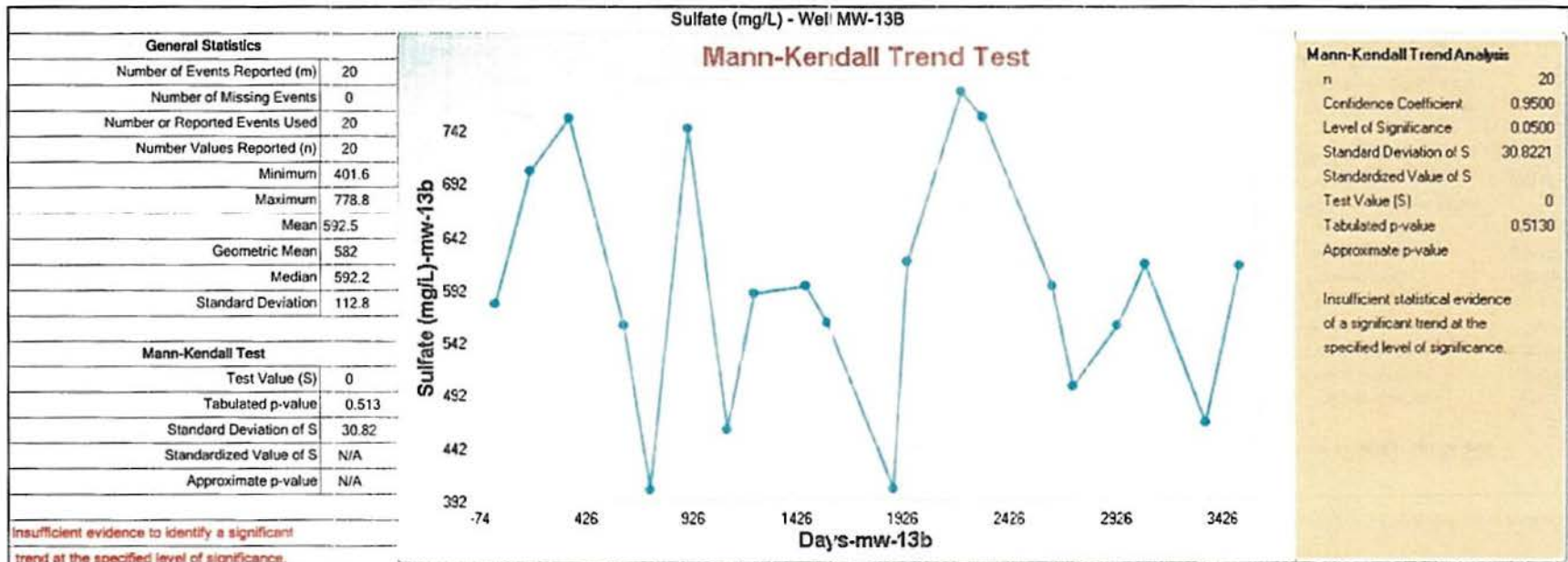


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

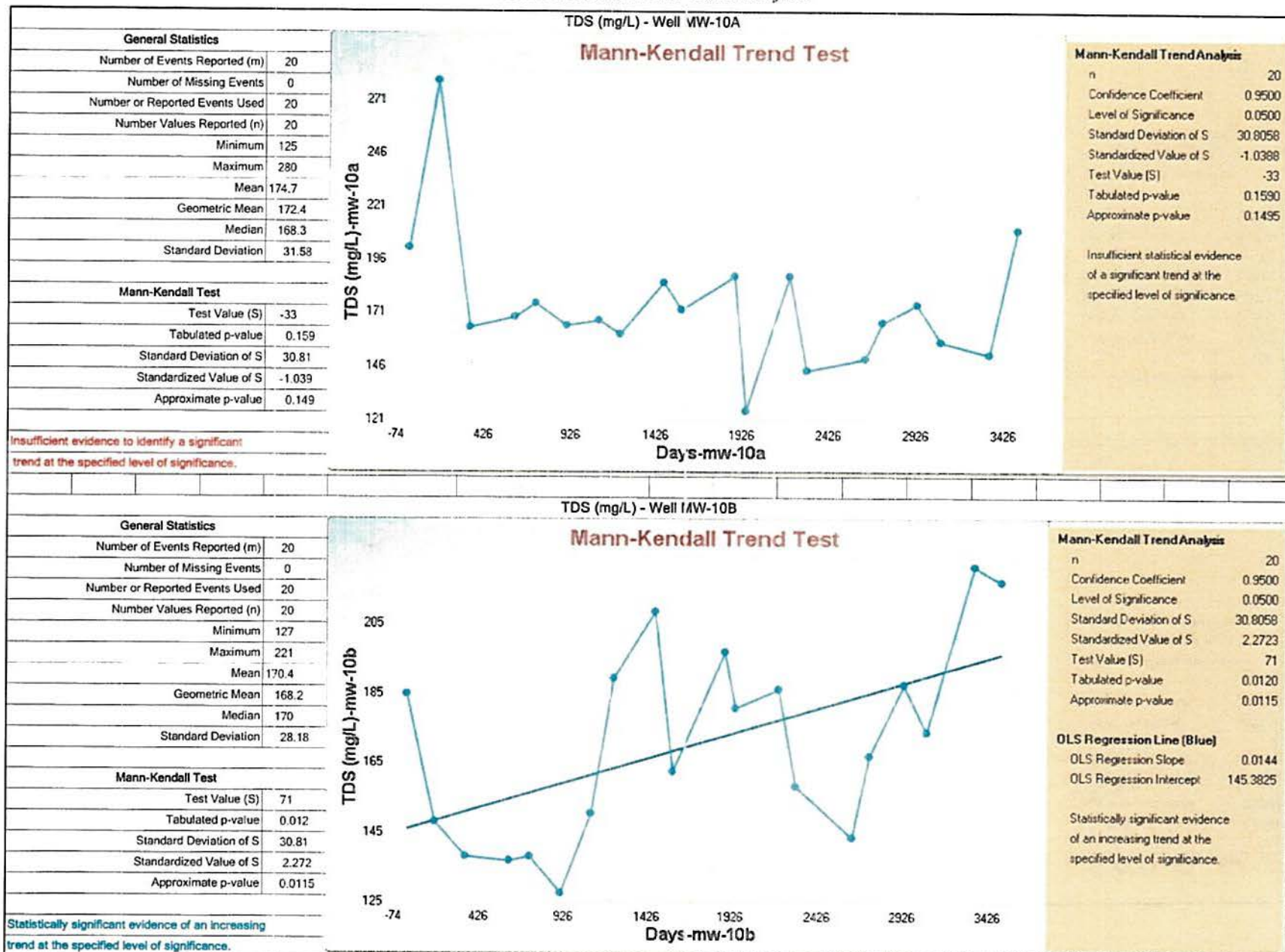


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

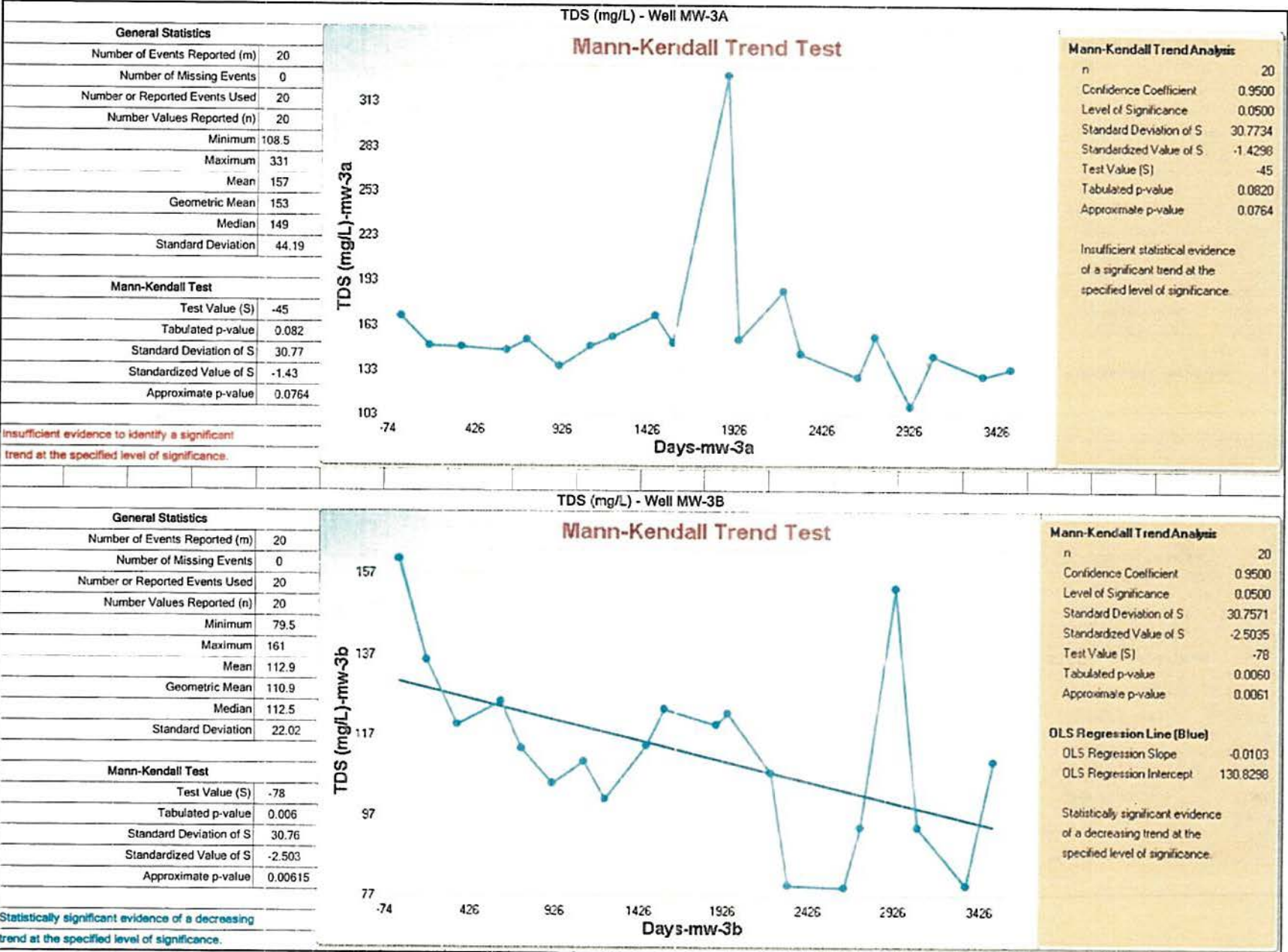


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

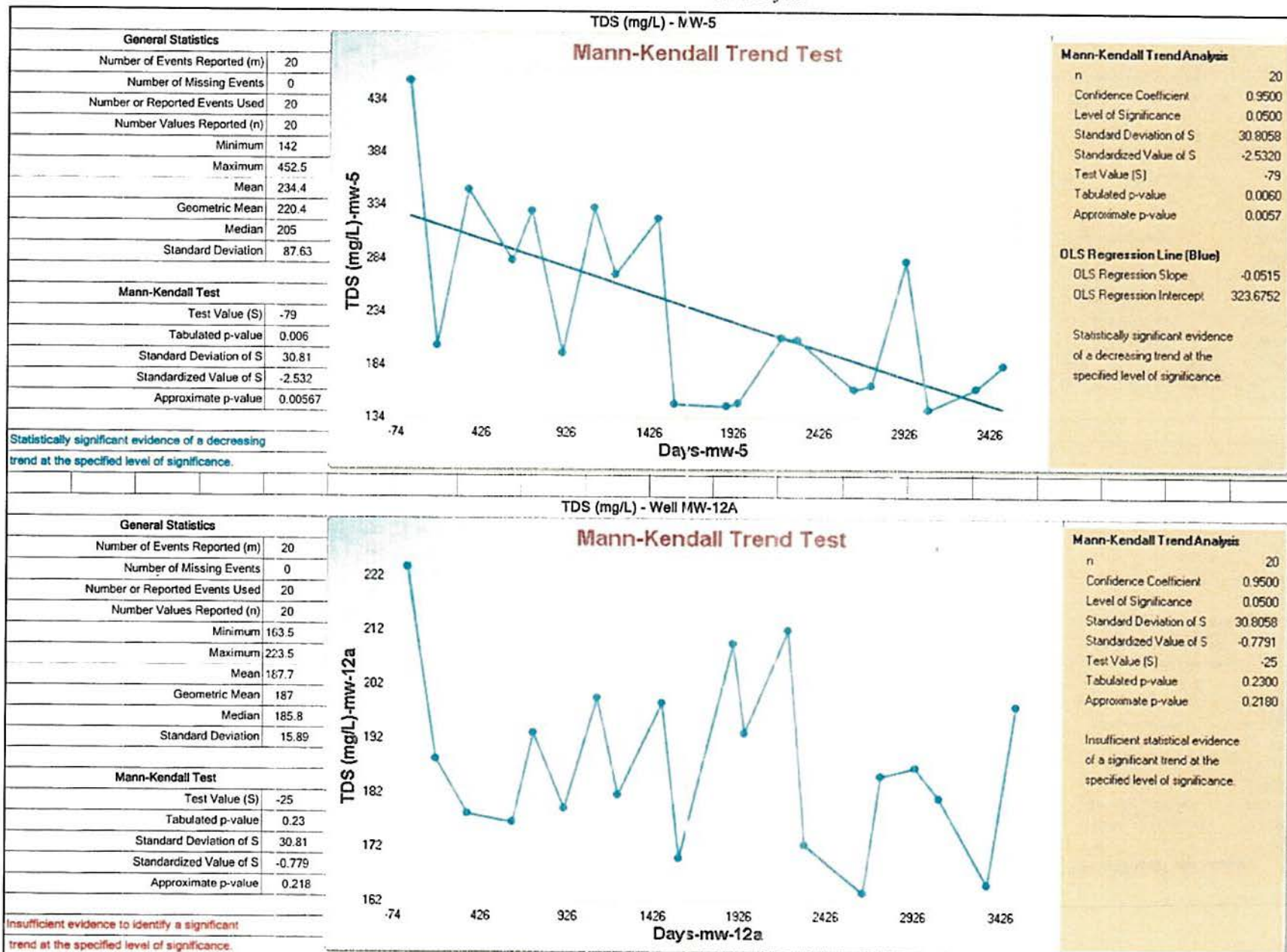


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

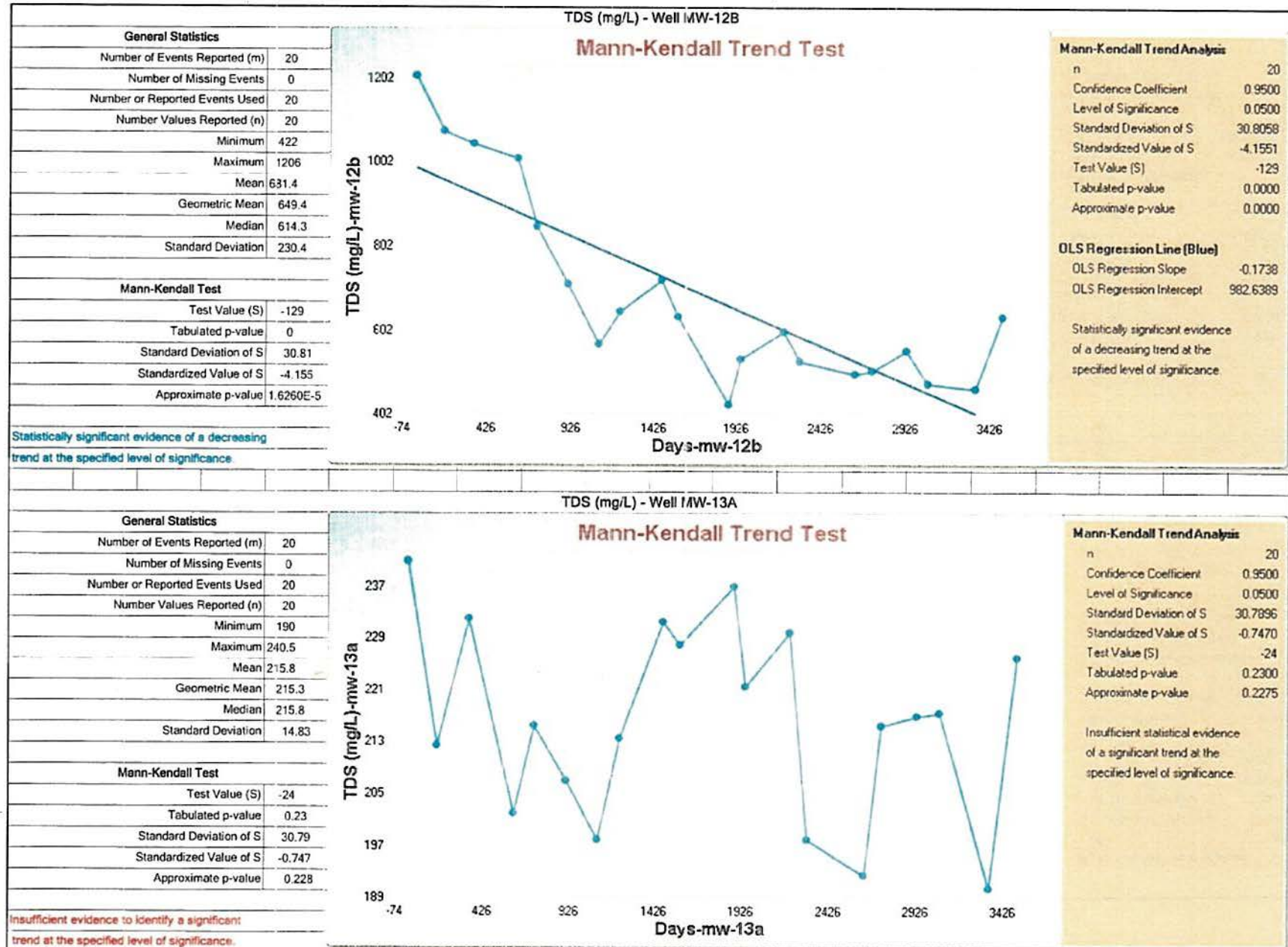


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

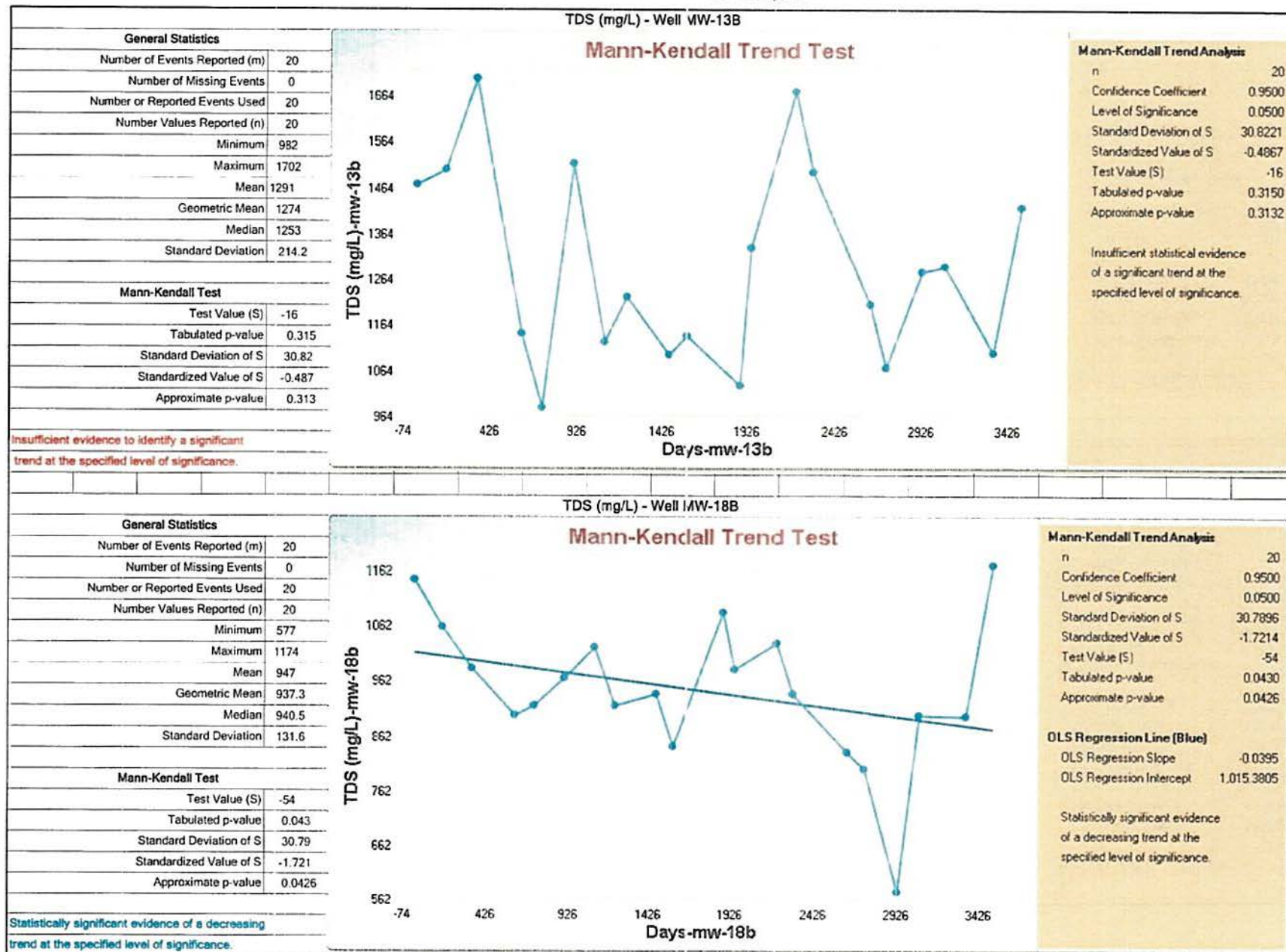
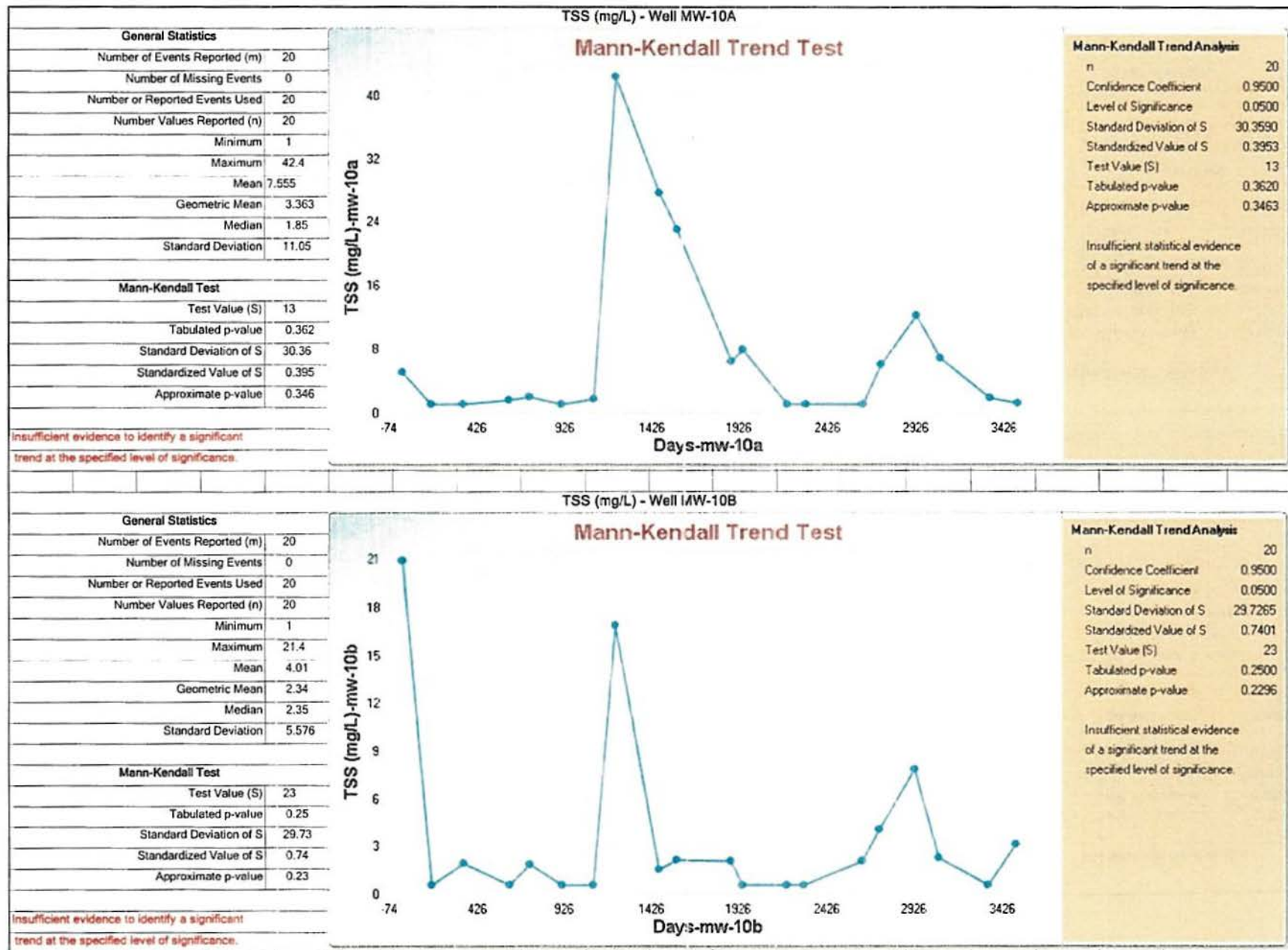


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis



Mann-Kendall Trend Test Analysis

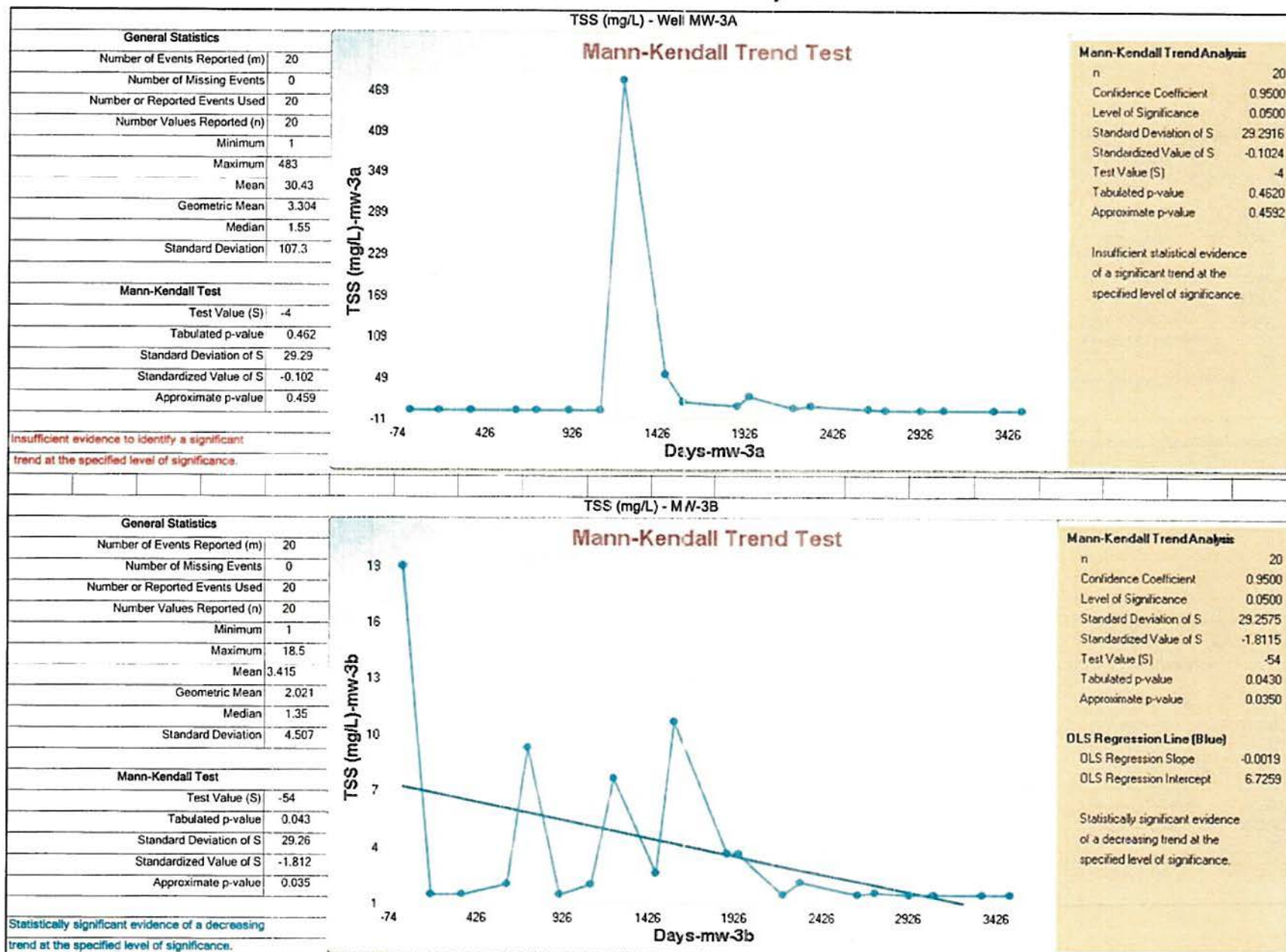


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

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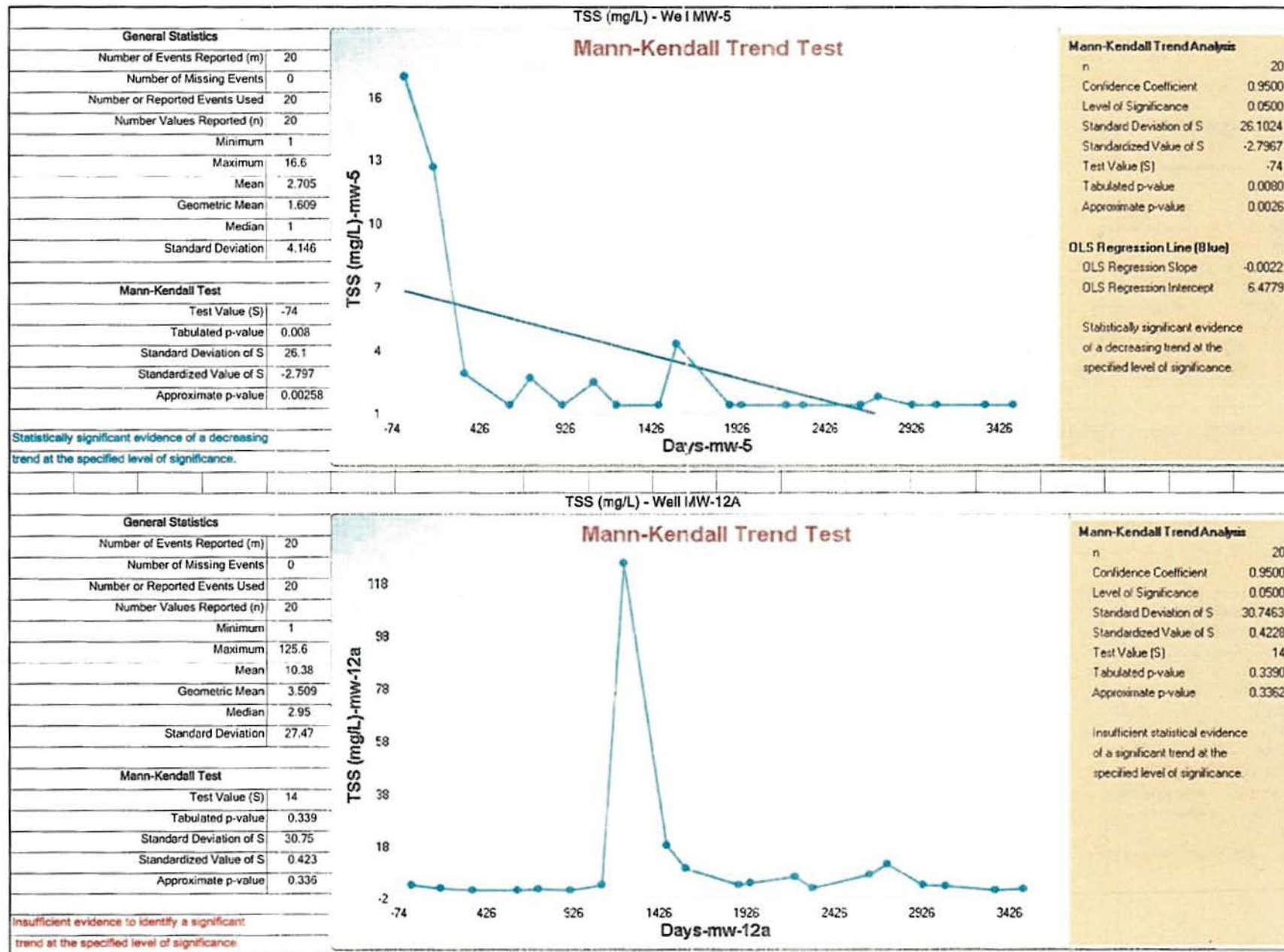


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

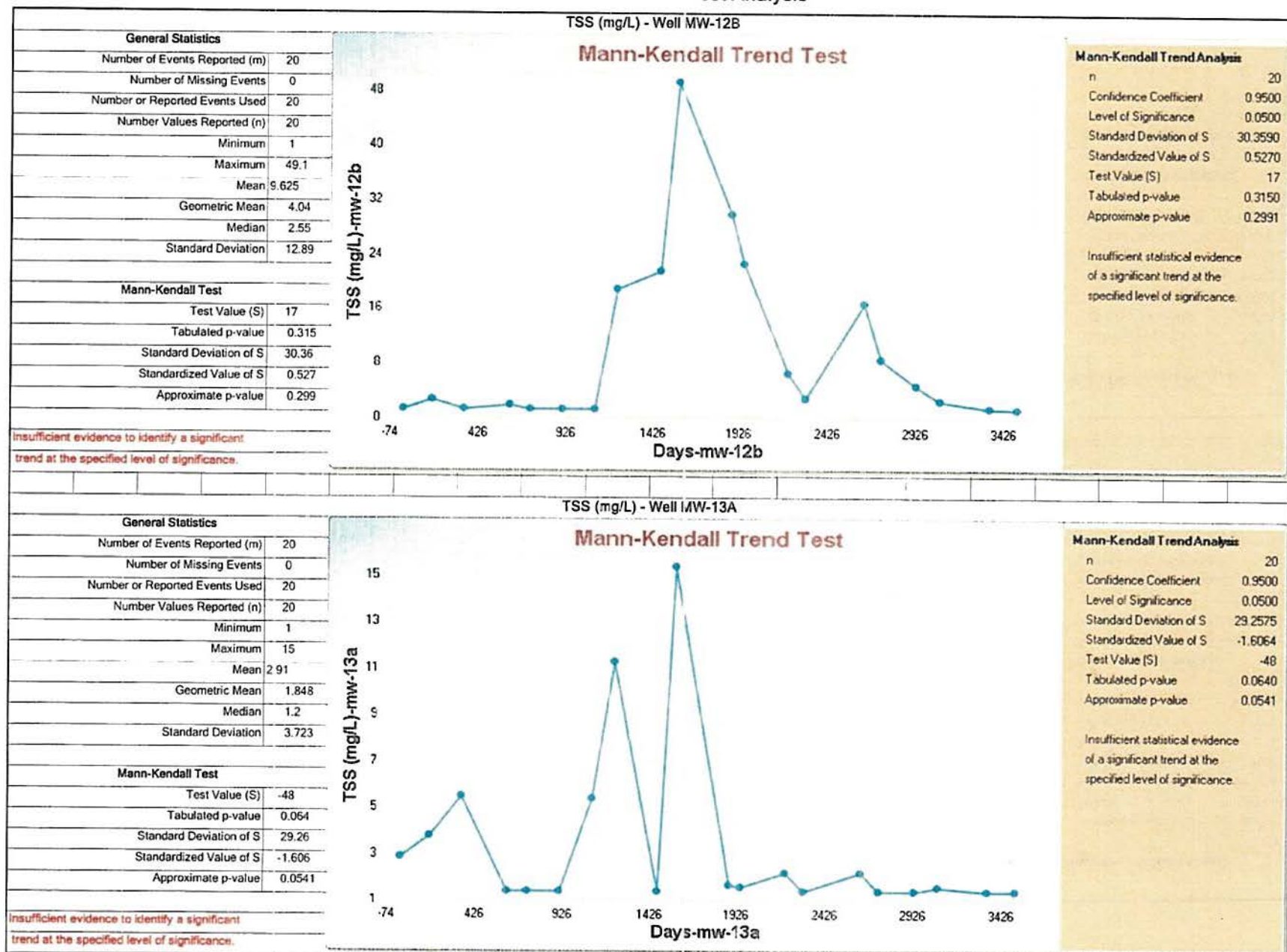


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

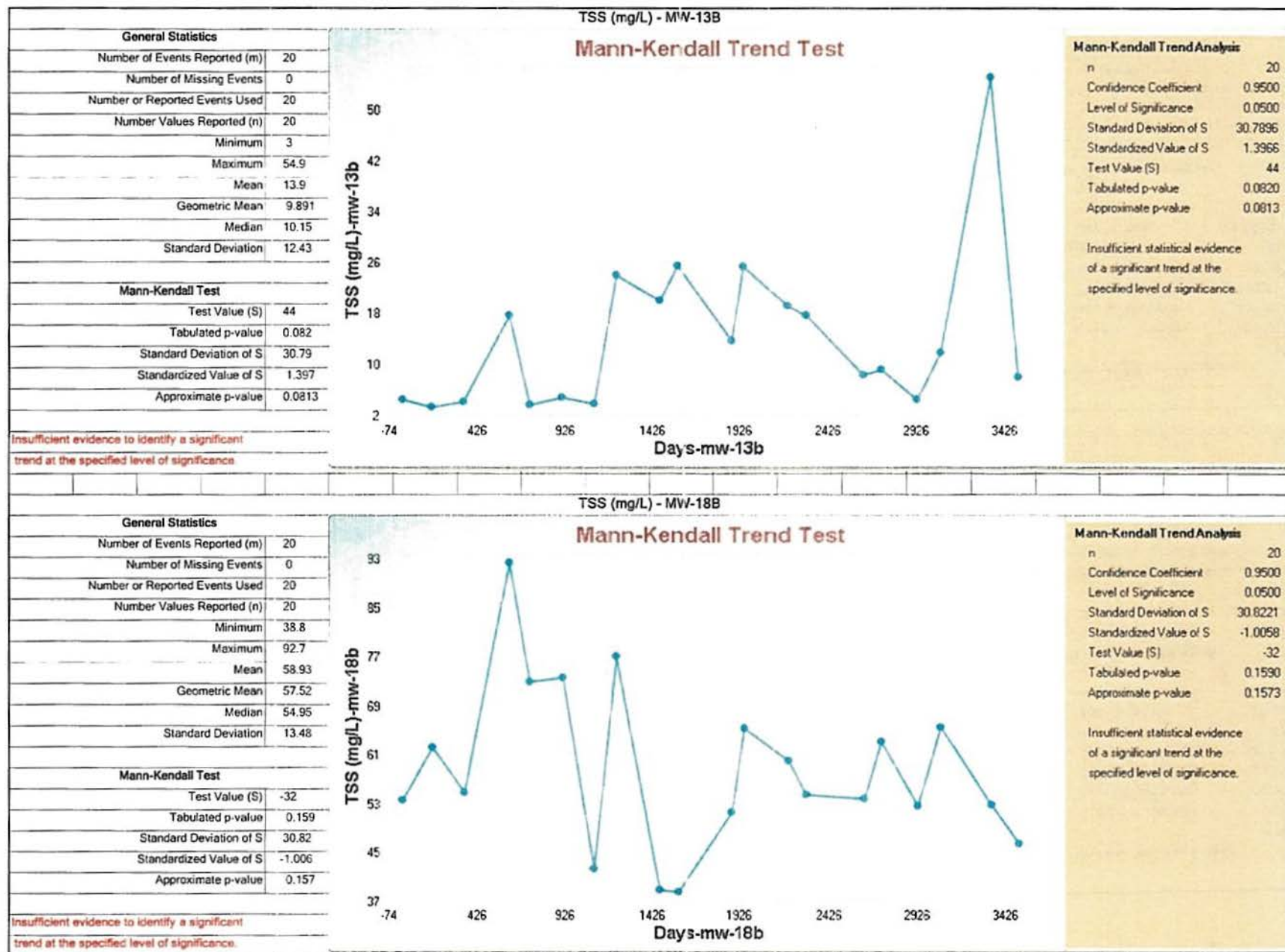
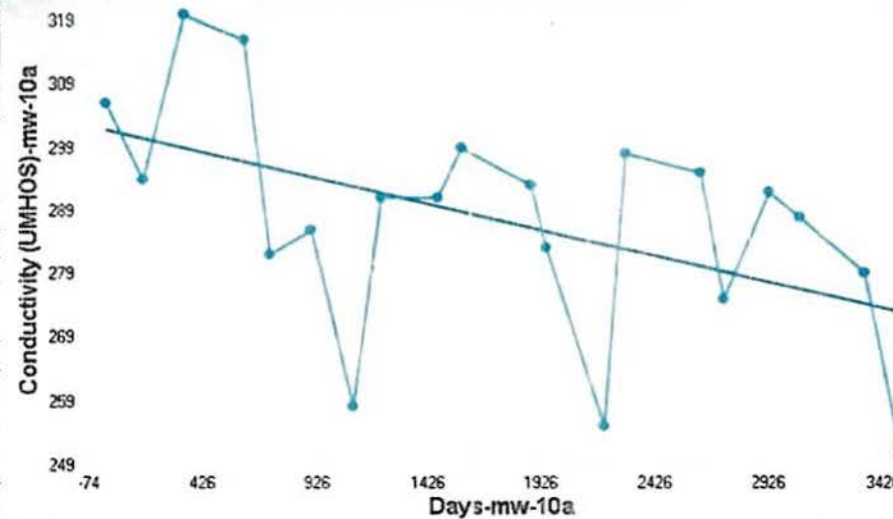


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

Conductivity (UMHOS) - Well MW-10A

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.8058
Standardized Value of S	-2.1425
Test Value (S)	-67
Tabulated p-value	0.0170
Approximate p-value	0.0161

OLS Regression Line (Blue)

OLS Regression Slope	-0.0083
OLS Regression Intercept	301.9302

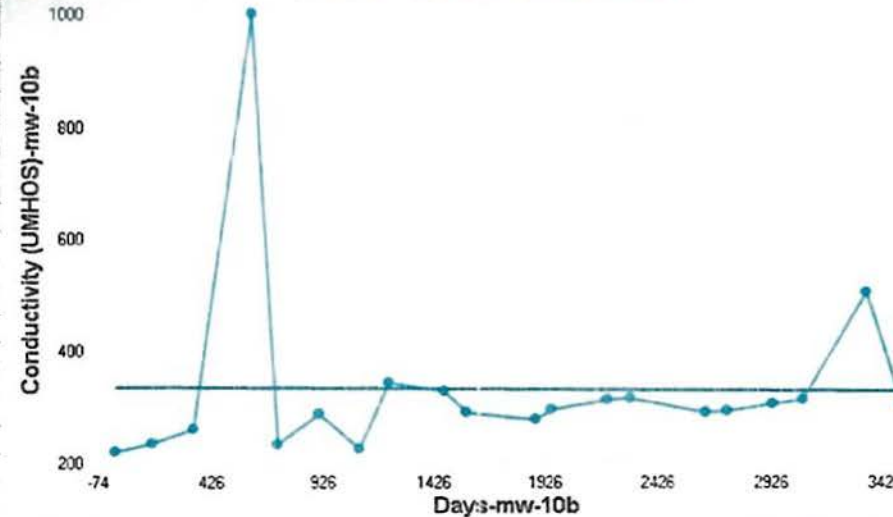
Statistically significant evidence of a decreasing trend at the specified level of significance.

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	251
Maximum	320
Mean	287.6
Geometric Mean	287.1
Median	291
Standard Deviation	18.02
Mann-Kendall Test	
Test Value (S)	-67
Tabulated p-value	0.017
Standard Deviation of S	30.81
Standardized Value of S	-2.142
Approximate p-value	0.0161

Statistically significant evidence of a decreasing trend at the specified level of significance.

Conductivity (UMHOS) - Well MW-10B

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.8221
Standardized Value of S	2.1738
Test Value (S)	68
Tabulated p-value	0.0140
Approximate p-value	0.0149

OLS Regression Line (Blue)

OLS Regression Slope	-0.0021
OLS Regression Intercept	333.8202

Statistically significant evidence of an increasing trend at the specified level of significance.

General Statistics	
Number of Events Reported (m)	20
Number of Missing Events	0
Number or Reported Events Used	20
Number Values Reported (n)	20
Minimum	219
Maximum	999
Mean	330.3
Geometric Mean	308.5
Median	292.5
Standard Deviation	168.3
Mann-Kendall Test	
Test Value (S)	68
Tabulated p-value	0.014
Standard Deviation of S	30.82
Standardized Value of S	2.174
Approximate p-value	0.0149

Statistically significant evidence of an increasing trend at the specified level of significance.

Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

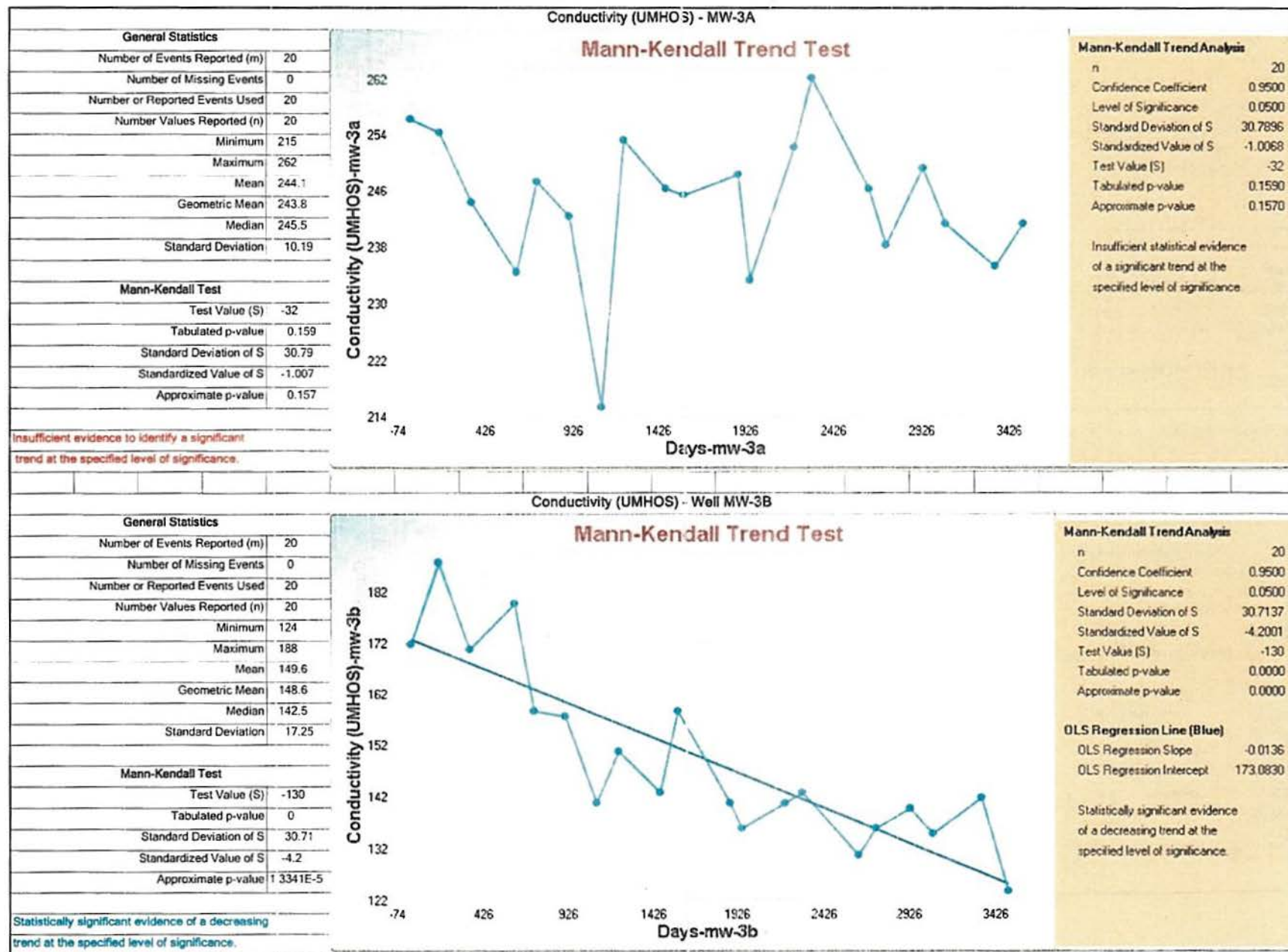


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

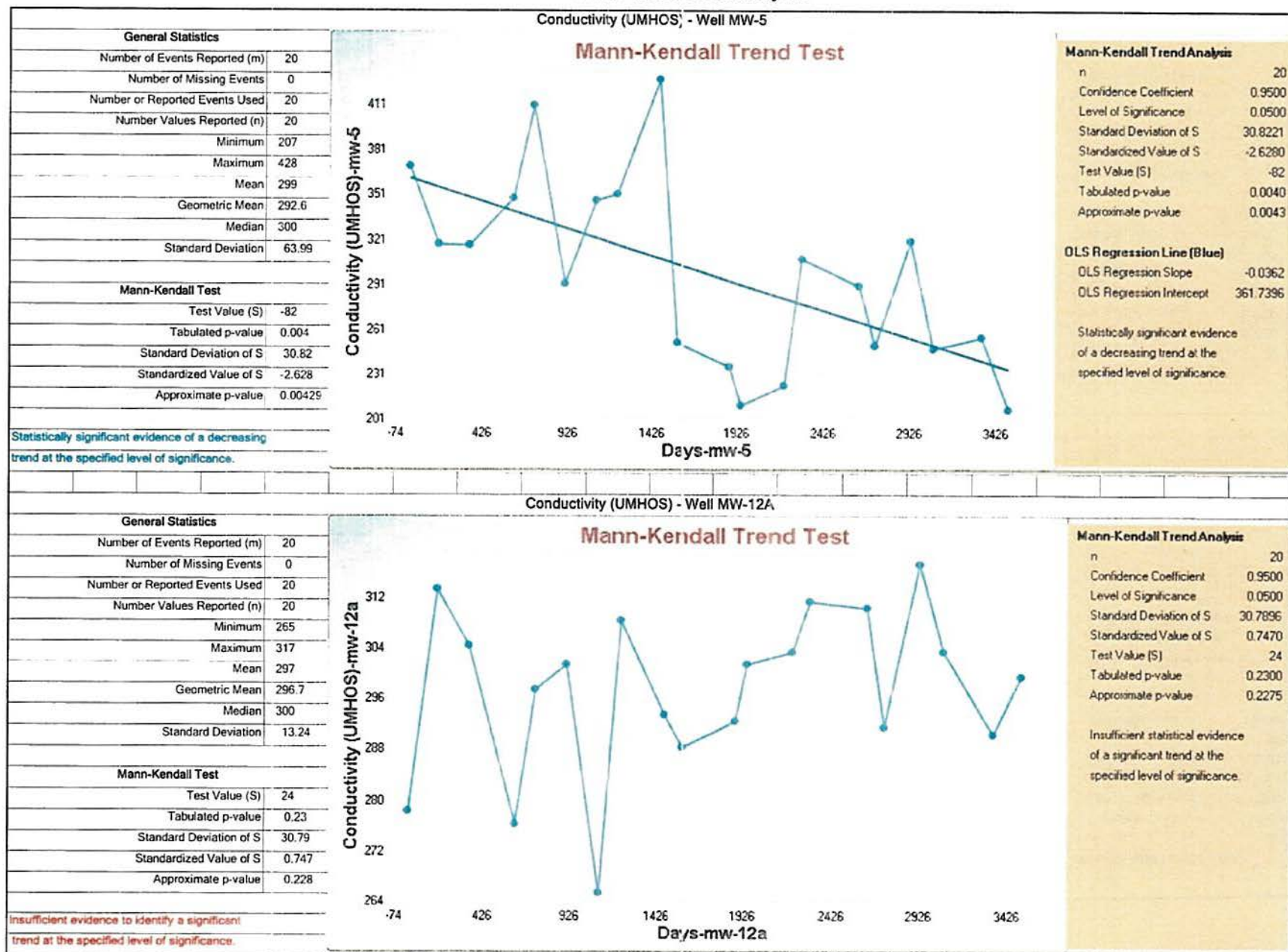


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

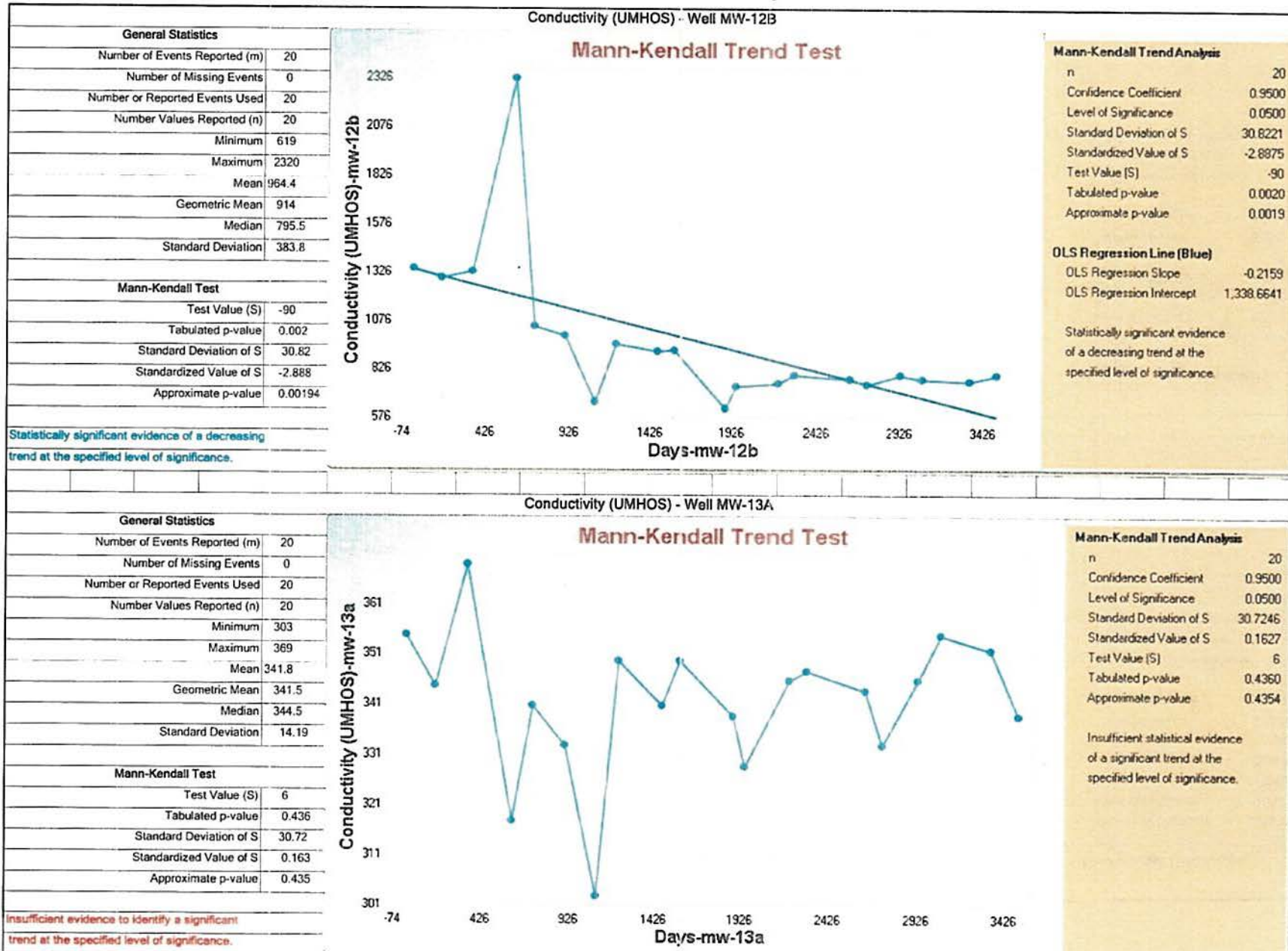


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

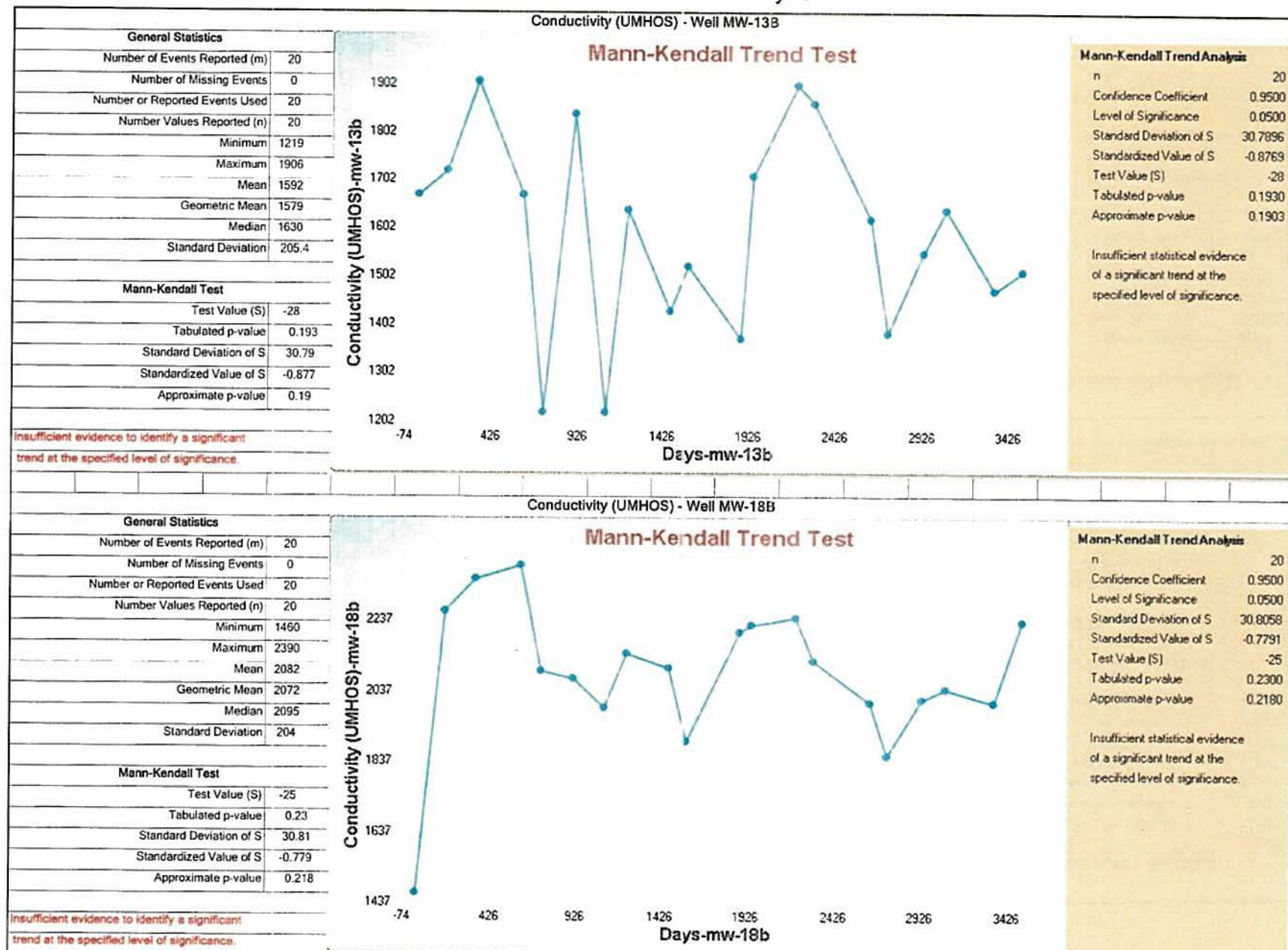


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

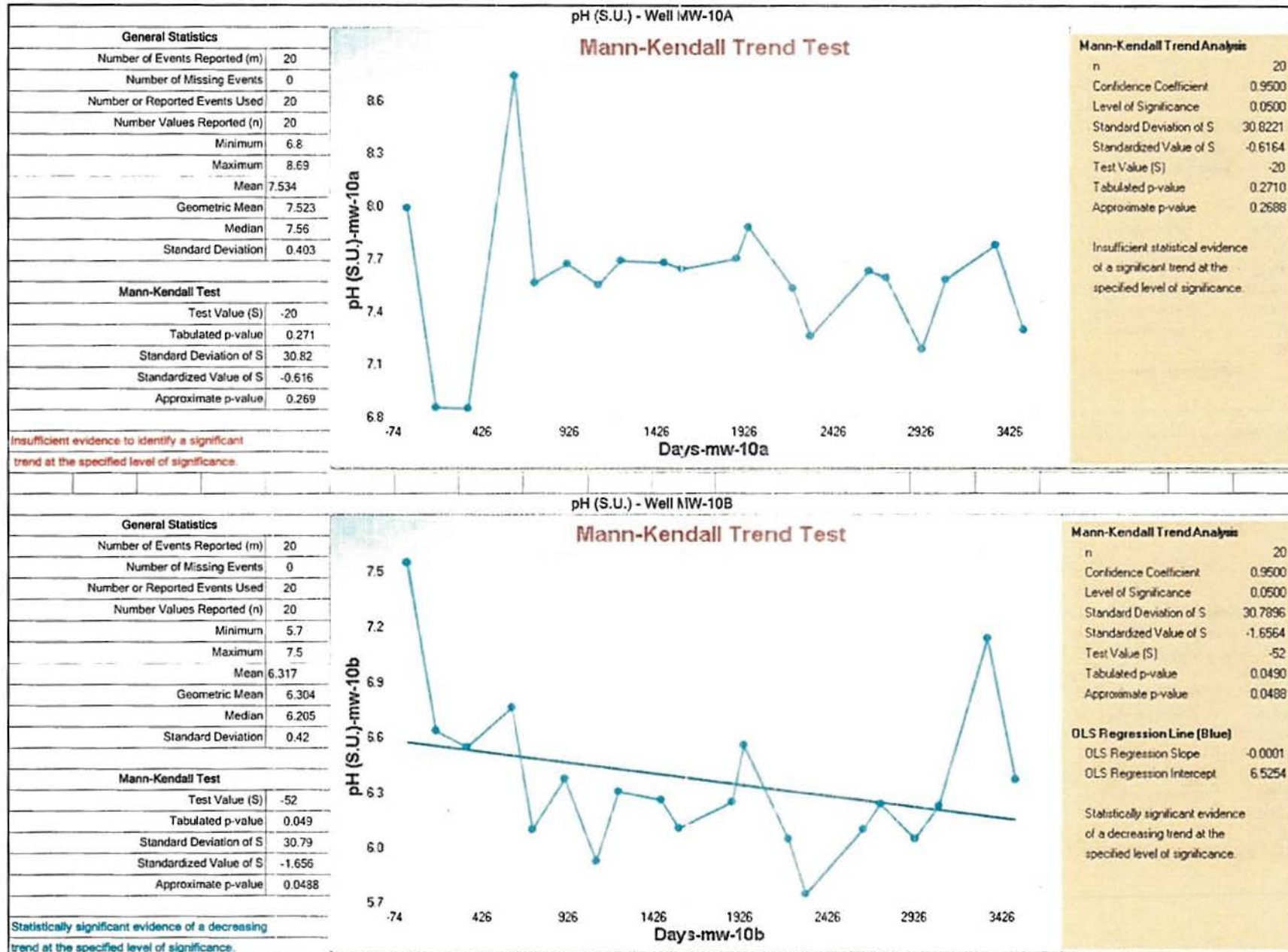


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

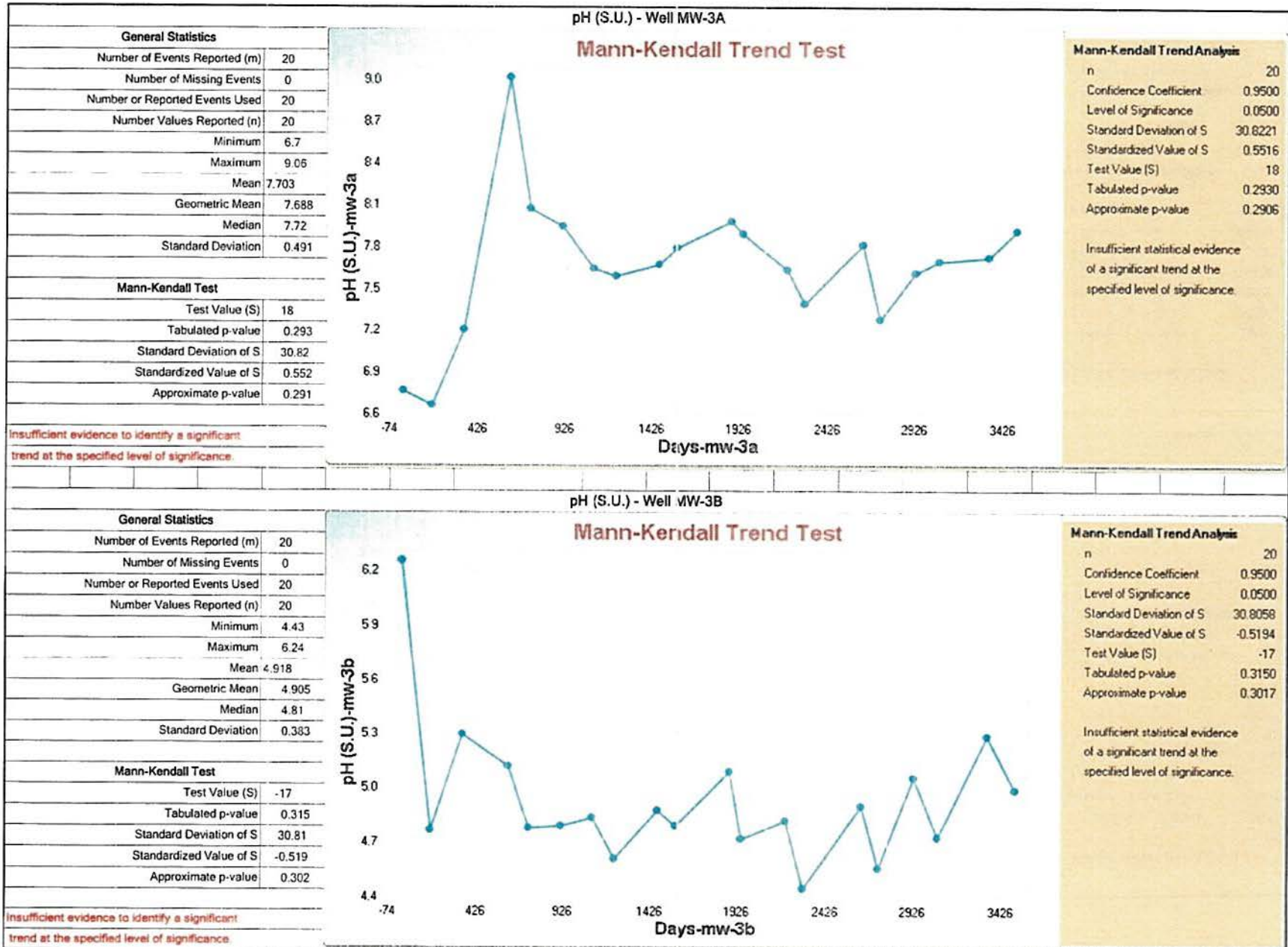


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

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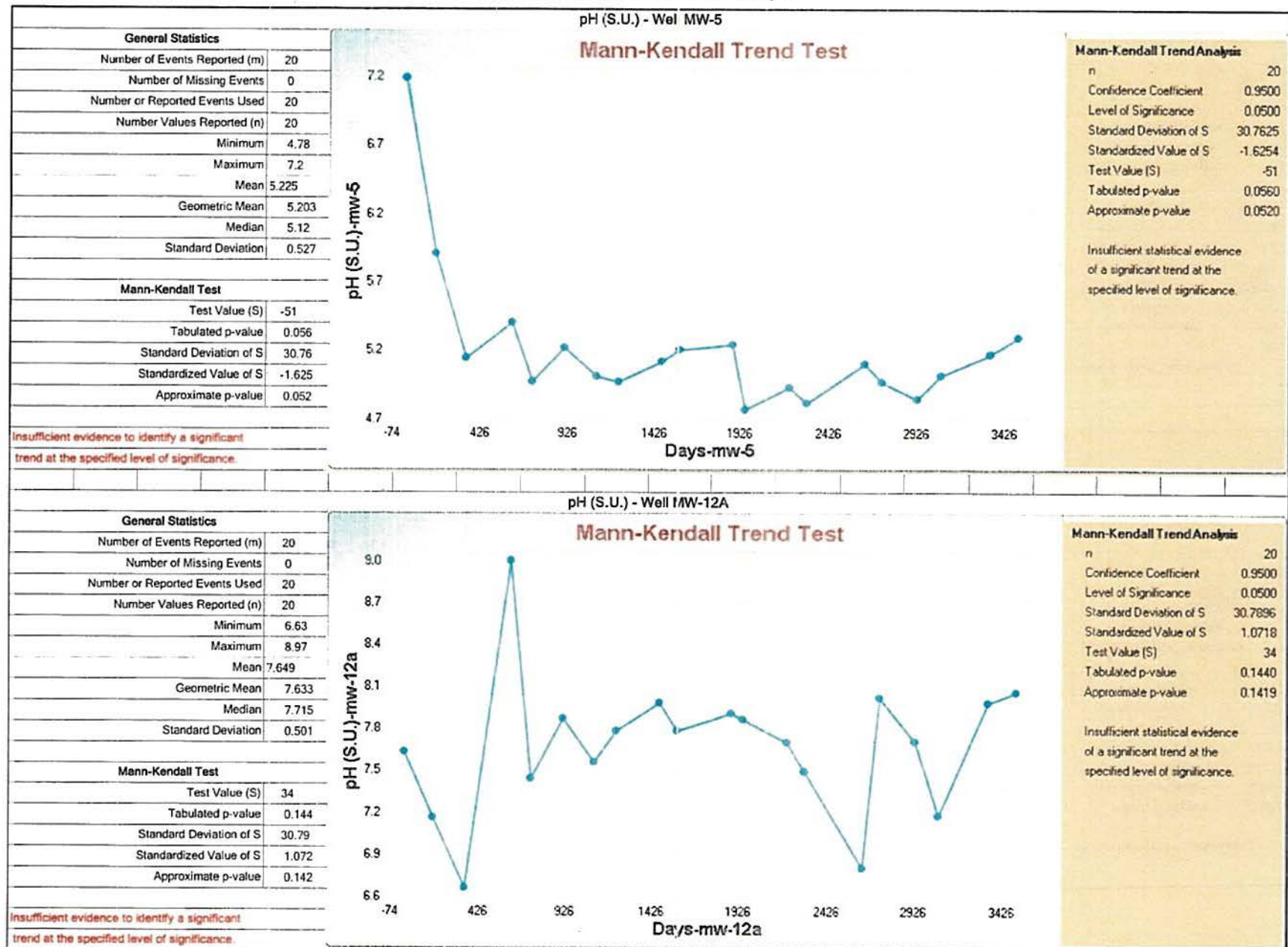


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

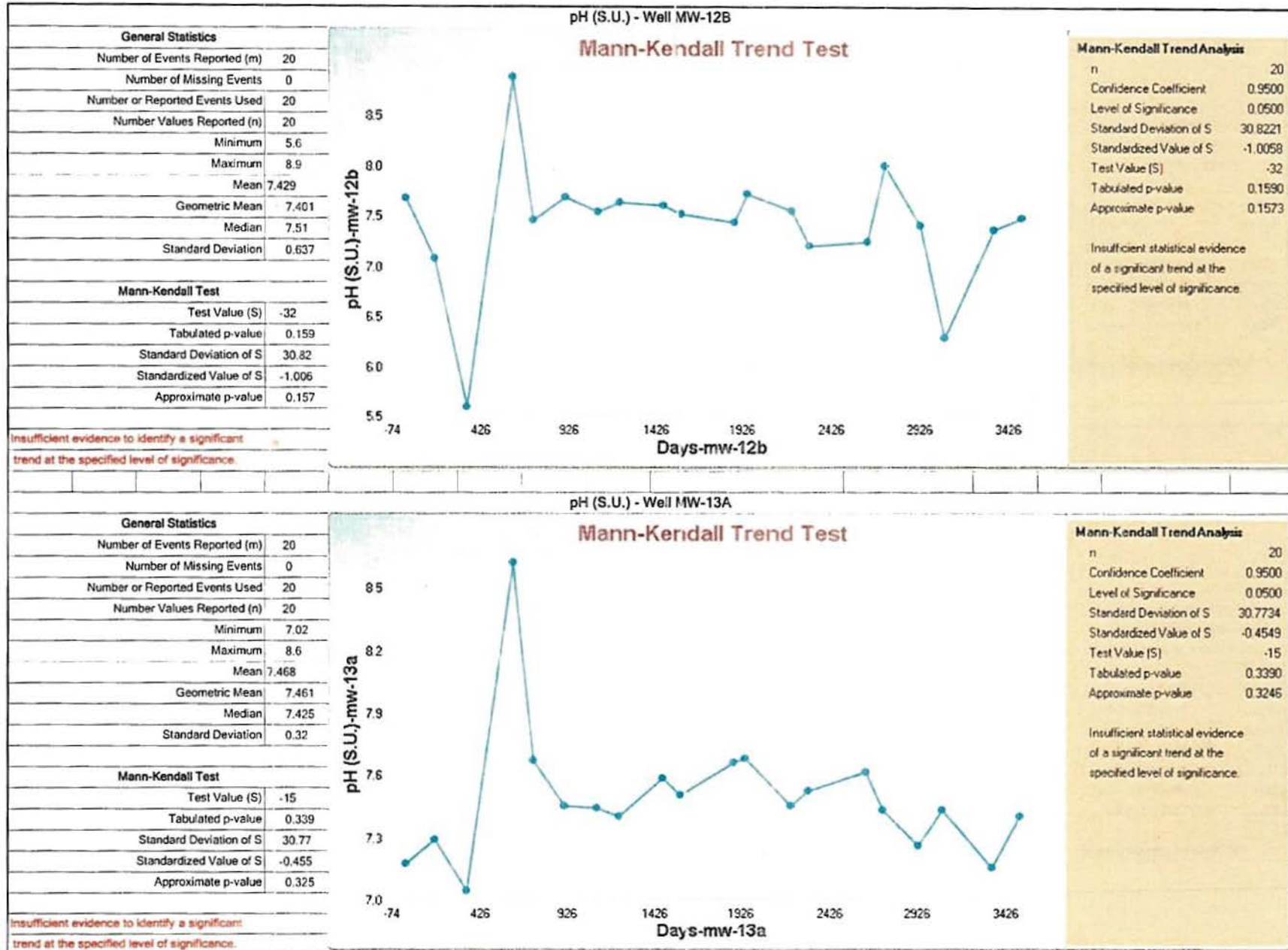


Figure H-1. Mann-Kendall Results

Mann-Kendall Trend Test Analysis

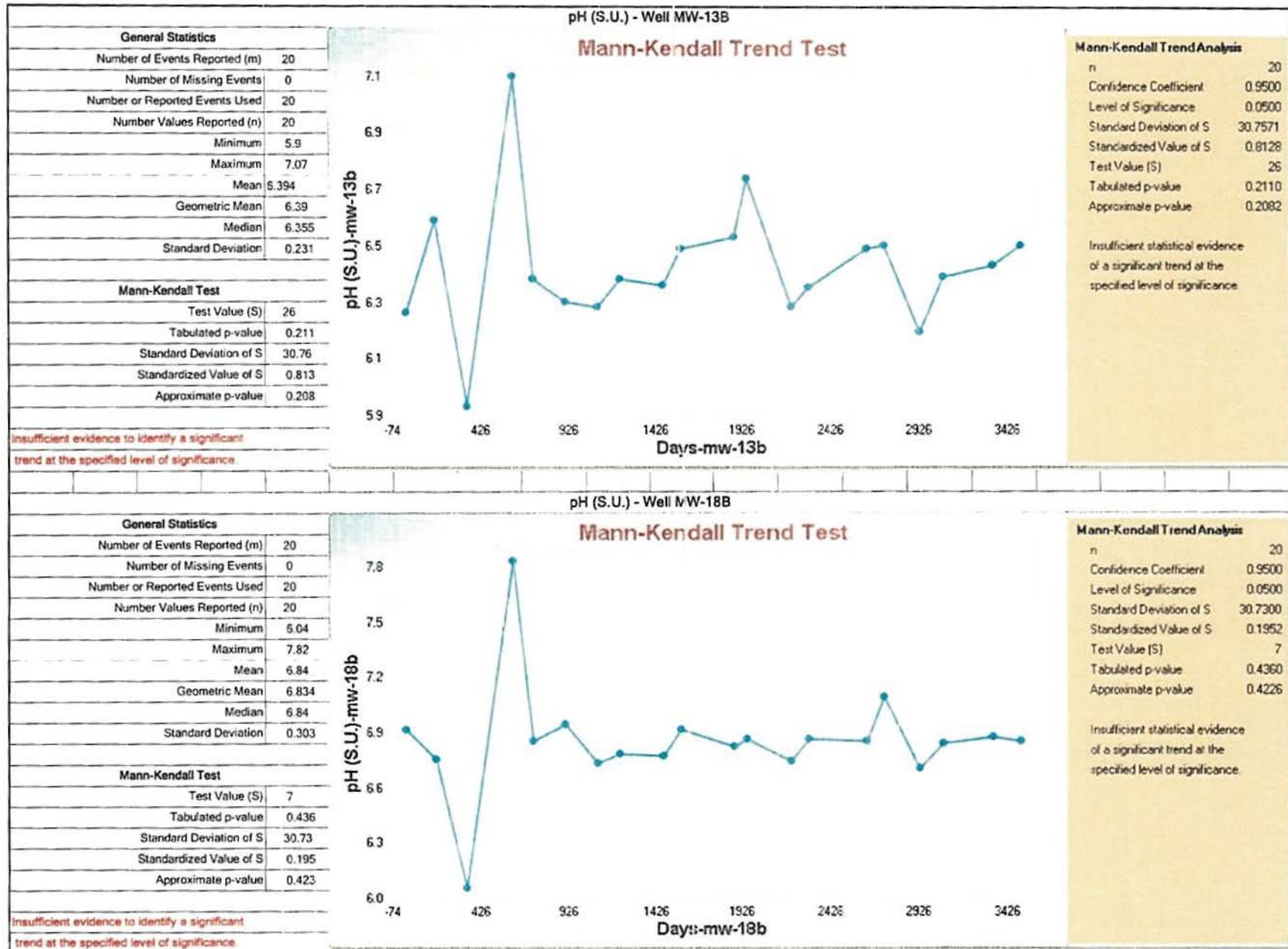


Figure H-1. Mann-Kendall Results

Table H-2. January 2016 Surface Water Results

DOMINION LABORATORY SERVICES

REPORT PRODUCED ON 02/26/2016

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CHISMAN CREEK SURFACE WATER SAMPLES

Location: CHISMAN CREEK

Submitter: DON HINTZ

Note: .

Lab Number Description Sample Date Time	439672 SP1 01/19/16 1200	439673 SP2 01/19/16 1130	439674 SPA 01/19/16 1315	439675 SPB 01/19/16 1340	439676 SPC 01/19/16 1535
Arsenic as As, ppb	< 3.	< 3.	< 3.	5.	< 3.
Cadmium as Cd, ppb	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Conductivity, umhos	223.	335.	336.	505.	284.
Copper as Cu, ppb	< 3.	< 3.	< 3.	< 3.	< 3.
Dissolved Oxygen, PPM	12.16	13.12	13.07	10.73	8.09
Lead as Pb, ppb	< 2.	< 2.	< 2.	< 2.	< 2.
Nickel as Ni, ppb	< 5.	< 5.	6.	< 5.	< 5.
pH, SU	7.37	7.52	7.79	7.76	7.86
Salinity, PPT	0.20	0.20	0.30	0.40	0.20
Selenium as Se, ppb	< 3.	< 3.	< 3.	< 3.	< 3.
T-Hard. as CaCO ₃ , PPM	150.48	174.42	205.20	359.10	198.36
Temperature, Deg C	2.18	2.83	5.72	4.81	5.06
TSS, PPM	2.4	3.4	4.4	2.0	4.2
Vanadium as V, ppb	5.	7.	113.	18.	< 2.
Zinc as Zn, PPM	< 0.015	0.019	< 0.015	0.031	< 0.015

DOMINION LABORATORY SERVICES
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REPORT PRODUCED ON 02/26/2016

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CHISMAN CREEK SURFACE WATER SAMPLES

Location: CHISMAN CREEK

Submitter: DON HINTZ

Note: .

Lab Number Description Sample Date Time	439677 EP1 01/19/16 1430	439678 EP2 01/19/16 1510	439679 EP3 01/19/16 1400	439680 SP2 DUP 01/19/16 1135	439681 FIELD BLANK 01/19/16 1120
Arsenic as As, ppb	< 3.	< 3.	< 3.	< 3.	< 3.
Cadmium as Cd, ppb	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Conductivity, umhos	5470.	12047.	12872.	335.	
Copper as Cu, ppb	< 3.	< 3.	< 3.	< 3.	< 3.
Dissolved Oxygen, PPM	12.84	11.50	11.10	13.12	
Lead as Pb, ppb	< 2.	< 2.	< 2.	< 2.	< 2.
Nickel as Ni, ppb	< 5.	< 5.	< 5.	< 5.	< 5.
pH, SU	7.82	7.38	7.52	7.52	
Salinity, PPT	0.40	11.20	11.40	0.20	
Selenium as Se, ppb	< 3.	< 3.	< 3.	< 3.	< 3.
T-Hard. as CaCO3, PPM	299.25	3078.00	4018.50	174.42	< 3.00
Temperature, Deg C	3.52	5.41	5.17	2.83	
TSS, PPM	5.4	158.5	256.7	3.7	< 1.0
Vanadium as V, ppb	8.	8.	12.	5.	< 2.
Zinc as Zn, PPM	< 0.015	0.042	0.044	< 0.015	< 0.015

Table H-3. Sediment Sampling Results

Table 1. Characteristics of sediments collected December 2014 and February 2015.

Sample Date	Station	% Dry Weight	% TOC	Acid Volatile Sulfide (mg/kg)	% Gravel	% Sand	% Silt	% Clay	pH (S.U.)	Temp. (°C)
12/10/14	EP-1A-1	41.34	7.2	27	0	57.8	31.1	11.1	6.80	N.M.
	EP-1A-2	46.6	2.9	130	0	75.2	17.7	7.1	6.67	N.M.
	EP-1A-3	26.32	7.3	120	0	29.8	55.6	14.6	6.68	N.M.
	EP-2-1	31.94	11						6.77	N.M.
	EP-2-2	29.54	10	120	0	24.0	58.5	17.5	6.88	N.M.
	EP-2-2 DUP	28.36	8.4	340	0	28.4	53.6	18.0	6.88	N.M.
	EP-2-3	30.9	6.1						6.74	N.M.
	POQ	32.61	3.6	19	0	42.6	39.5	17.9	7.08	N.M.
2/9/15	EP-1A-1	33.51	7.6	88	0	53.3	34	12.7	6.59	7.9
	EP-1A-2	27.9	13	13	0	46.9	32.4	20.7	6.84	8.0
	EP-1A-3	29.04	11	93	0	38.8	42.2	19	6.85	8.2
	EP-2-1	33.6	9						6.78	7.8
	EP-2-2	29.16	9	30	0	24.7	56.3	19	6.55	7.7
	EP-2-2 DUP	31.84	6.3	75	0	25.3	52.1	22.6	6.57	8.1
	EP-2-3	30.84	5						6.50	7.5
	POQ	32.97	2.7	11	0	37	39.8	23.2	6.40	7.2
	SP2	75.74	0.24		0	98.6	1	0.3	6.93	8.9

N.M. = Not measured due to instrument malfunction.

Table 2. Bulk metals (as dry weight) for sediments collected December 2014 and February 2015.

Sample Date	Station	As (mg/kg)	Cd (mg/kg)	Cu (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	V (mg/kg)	Zn (mg/kg)
12/10/14	EP-1A-1	5.208	0.172	19.606	16.33	16.471	53.145	59.509
	EP-1A-2	3.582	0.105	14.908	11.206	10.298	37.468	87.283
	EP-1A-3	8.416	0.266	30.35	26.007	28.442	83.245	122.302
	EP-2-1	11.202					93.707	
	EP-2-2	13.714	0.295	50.575	35.003	39.1	100.711	149.276
	EP-2-2 DUP	12.916	0.314	45.663	42.948	37.588	113.822	146.252
	EP-2-3	12.091					88.479	
	POQ	12.015	0.129	44.526	16.848	23.401	36.737	104.52
2/9/15	EP-1A-1	5.419	0.209	24.56	17.261	22.396	95.673	78.395
	EP-1A-2	11.24	0.262	32.875	25.566	29.925	100.215	113.731
	EP-1A-3	9.353	0.21	31.563	24.542	26.388	132.438	93.22
	EP-2-1	11.36					76.964	
	EP-2-2	11.2	0.233	29.489	14.739	34.060	97.462	99.63
	EP-2-2 DUP	10.141	0.204	39.761	26.058	38.097	54.209	137
	EP-2-3	10.298					83.722	
	POQ	13.282	0.1	34.607	11.316	8.526	29.672	137.91
	SP2	<0.396	<0.040	<0.396	<0.660	0.578	19.276	5.334

Table 3. Sediment acid volatile sulfide (AVS) and simultaneously extracted metals (SEM) for sediments collected December 2014. (All values are dry weight basis. AVS and SEM in $\mu\text{mol/g}$).

Station	Cd	Cu	As	Pb	Ni	Zn	Cr	ΣSEM	AVS	$\Sigma\text{SEM}/\text{AVS}$	f_{oc} (g/g)	$\Sigma\text{SEM-AVS}/f_{\text{oc}}$
EP-1A-1	0.00035	0.036	0.012	0.022	0.072	0.42	0.056	0.62	0.85	0.73	0.072	-3.2
EP-1A-2	0.00047	0.015	0.0034	0.012	0.019	0.21	0.021	0.28	4.1	0.07	0.029	-131.7
EP-1A-3	0.00079	0.061	0.0089	0.035	0.05	0.49	0.05	0.70	3.9	0.18	0.073	-43.9
EP-2-2	0.0012	0.31	0.022	0.094	0.12	1.1	0.15	1.80	3.7	0.49	0.1	-19.0
EP-2-2 DUP	0.0017	0.43	0.036	0.13	0.14	1.5	0.19	2.43	10	0.24	0.084	-90.1
POQ	0.00019	0.1	0.012	0.041	0.026	0.52	0.073	0.77	0.59	1.31	0.036	5.1

Table 4. Sediment acid volatile sulfide (AVS) and simultaneously extracted metals (SEM) for sediments collected February 2015. (All values are dry weight basis. AVS and SEM in $\mu\text{mol/g}$).

Station	Cd	Cu	As	Pb	Ni	Zn	Cr	ΣSEM	AVS	$\Sigma\text{SEM}/\text{AVS}$	f_{oc} (g/g)	$\Sigma\text{SEM-AVS}/f_{\text{oc}}$
EP-1A-1	0.0011	0.06	0.012	0.046	0.085	0.64	0.064	0.91	2.7	0.34	0.076	-23.6
EP-1A-2	0.00047	0.052	0.0086	0.02	0.032	0.28	0.029	0.42	0.4	1.06	0.130	0.2
EP-1A-3	0.0011	0.26	0.024	0.079	0.1	0.85	0.13	1.44	2.9	0.50	0.110	-13.2
EP-2-2	0.0018	0.42	0.037	0.13	0.17	1.5	0.21	2.47	0.94	2.63	0.090	17.0
EP-2-2 DUP	0.0014	0.3	0.022	0.091	0.13	1.2	0.18	1.92	2.3	0.84	0.096	-3.9
POQ	0.00059	0.31	0.021	0.065	0.064	0.81	0.17	1.44	0.33	4.37	0.030	37.6

Table 5. Substation variability of bulk metals in station EP-1A sediments collected December 2013 through February 2015.

Station Date		As (mg/kg)	Cd (mg/kg)	Cu (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	V (mg/kg)	Zn (mg/kg)
EP-1A Dec. 2013	Mean:	6.66	0.16	17.99	34.32	16.35	108.99	60.36
	SD:	4.72	0.08	11.92	28.75	10.60	97.37	34.85
	CV (%):	70.9	51.3	66.3	83.8	64.8	89.3	57.7
EP-1A Feb. 2014	Mean:	11.09	0.26	32.42	23.91	27.85	108.35	102.04
	SD:	2.27	0.05	6.44	7.16	6.90	16.88	20.81
	CV (%):	20.5	18.3	19.9	29.9	24.8	15.6	20.4
EP-1A Dec. 2014	Mean:	5.74	0.18	21.62	17.85	18.40	57.95	89.70
	SD:	2.46	0.08	7.92	7.52	9.23	23.26	31.47
	CV (%):	42.9	44.7	36.6	42.1	50.1	40.1	35.1
EP-1A Feb. 2015	Mean:	8.67	0.23	29.67	22.46	26.24	109.44	95.12
	SD:	2.97	0.03	4.47	4.53	3.77	20.04	17.74
	CV (%):	34.3	13.4	15.1	20.2	14.4	18.3	18.7

Table 6. EP-1A substation variability for sediment acid volatile sulfide (AVS) and simultaneously extracted metals (SEM) in sediments collected December 2013 through February 2015. (All values are dry weight basis. AVS and SEM in $\mu\text{mol/g}$).

Station		Cd	Cu	As	Pb	Ni	Zn	Cr	ΣSEM	AVS	f_{oc} (g/g)	$\Sigma\text{SEM-AVS}/f_{oc}$
EP-1A Dec. 2013	Mean:	0.0011	0.12	0.014	0.055	0.183	0.59	0.09	1.0578	5.1	0.068	-82.8
	SD:	0.0005	0.09	0.010	0.016	0.217	0.31	0.06	0.6429	2.5	0.046	58.0
	CV (%):	46.6	71.9	70.9	28.4	118.8	51.6	67.6	60.8	48.4	67.6	70.1
EP-1A Feb. 2014	Mean:	0.0010	0.13	0.020	0.061	0.112	0.83	0.12	1.2733	3.6	0.079	-35.0
	SD:	0.0005	0.14	0.006	0.039	0.050	0.43	0.05	0.6986	1.4	0.045	19.3
	CV (%):	52.3	104.2	27.8	63.6	44.9	51.7	43.4	54.9	38.6	56.7	55.1
EP-1A Dec. 2014	Mean:	0.0005	0.04	0.008	0.023	0.047	0.37	0.04	0.5316	3.0	0.058	-59.6
	SD:	0.0002	0.02	0.004	0.012	0.027	0.15	0.02	0.2206	1.8	0.025	65.7
	CV (%):	42.4	61.7	53.8	50.1	56.7	39.0	44.2	41.5	61.7	43.3	110.2
EP-1A Feb. 2015	Mean:	0.0009	0.12	0.015	0.048	0.072	0.59	0.07	0.9248	2.0	0.105	-12.2
	SD:	0.0004	0.12	0.008	0.030	0.036	0.29	0.05	0.5112	1.4	0.027	11.9
	CV (%):	40.9	95.0	54.4	61.2	49.4	48.9	69.0	55.3	69.5	25.9	97.5

Figure H-2. Historical Sediment Concentrations

Figure 3. Comparison of historical metals concentrations with February 2015 values for station SP-2

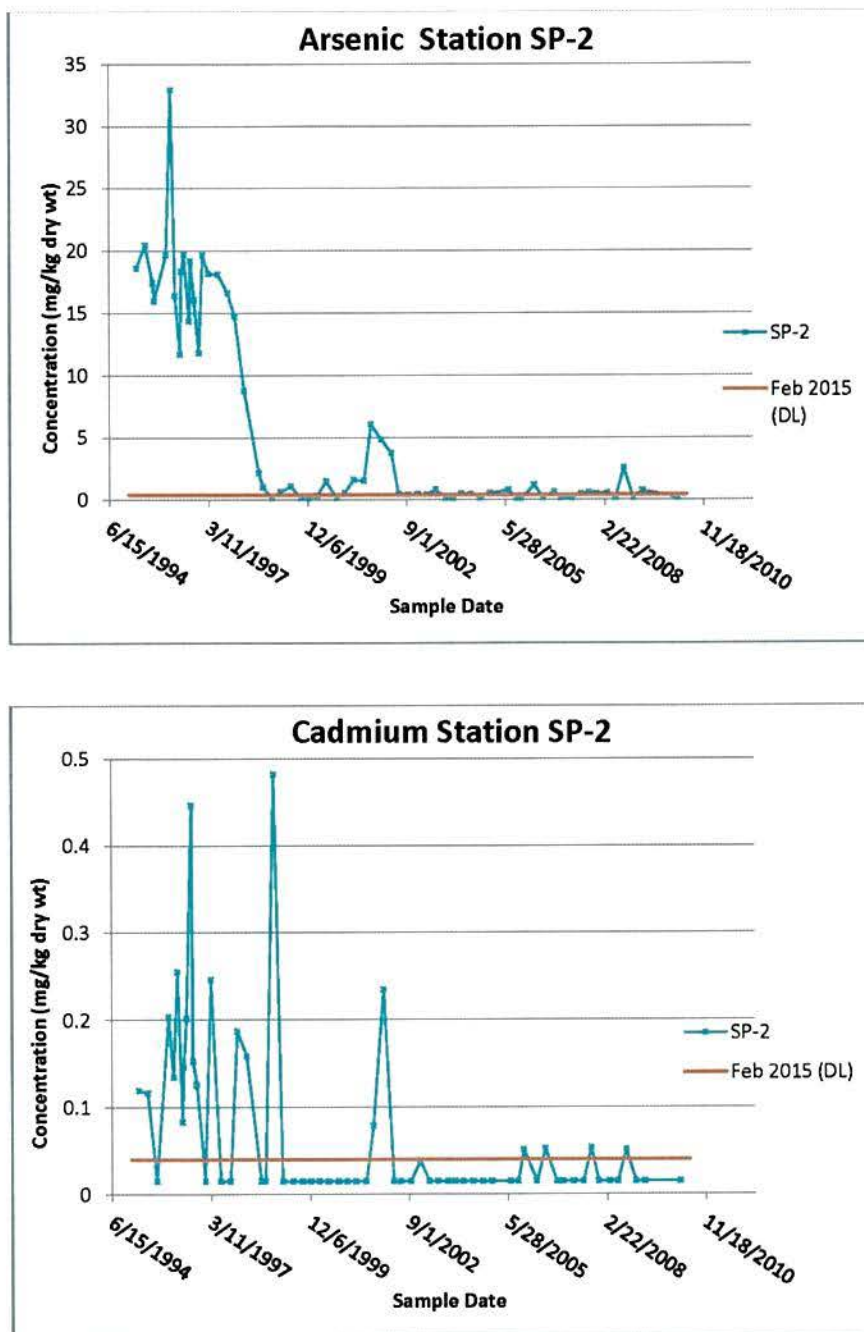


Figure 3 (continued). Comparison of historical metals concentrations with February 2015 values for station SP-2

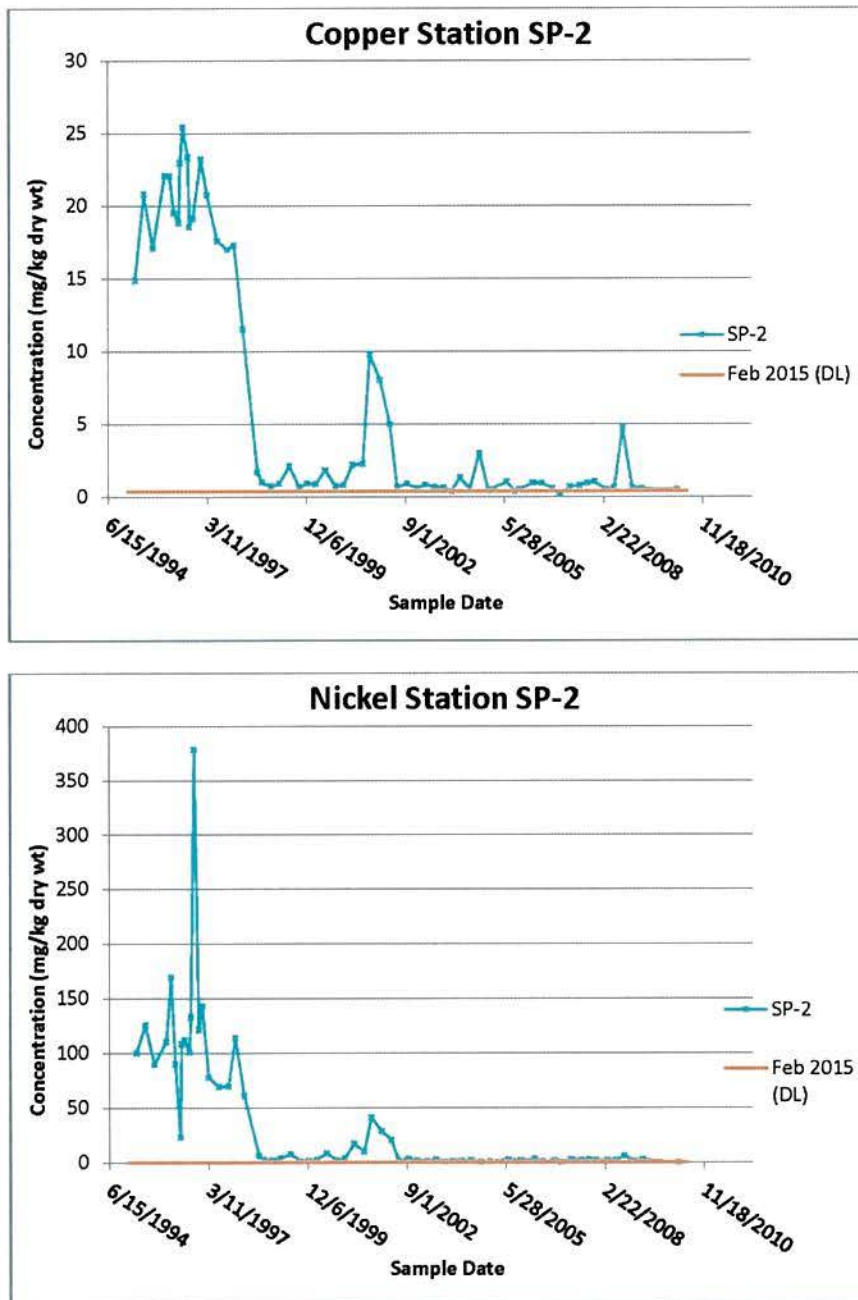


Figure 3 (continued). Comparison of historical metals concentrations with February 2015 values for station SP-2

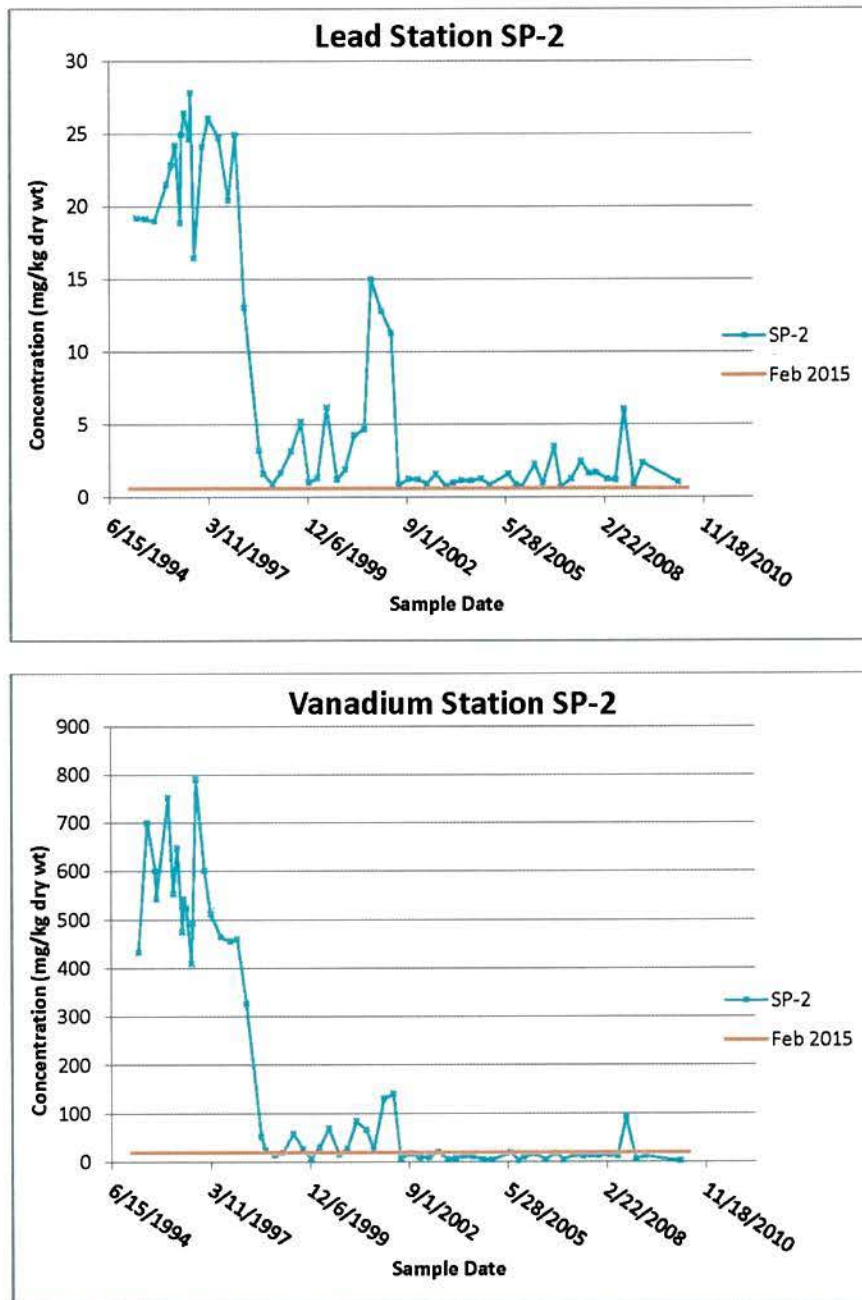


Figure 3 (continued). Comparison of historical metals concentrations with February 2015 values for station SP-2

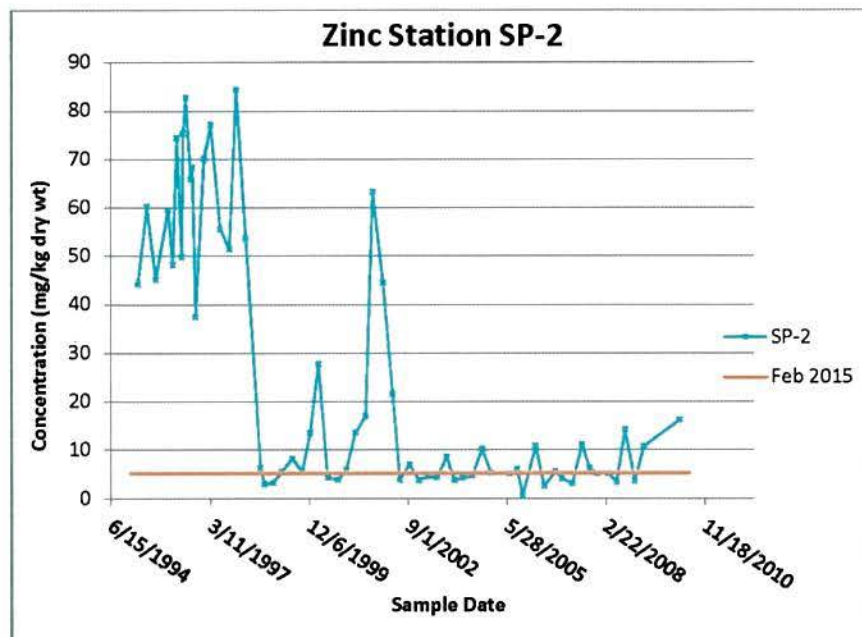


Figure 4. Comparison of arsenic concentrations for estuarine stations December 2013 through February 2015. Mean values presented for stations with duplicate or substation analyses.

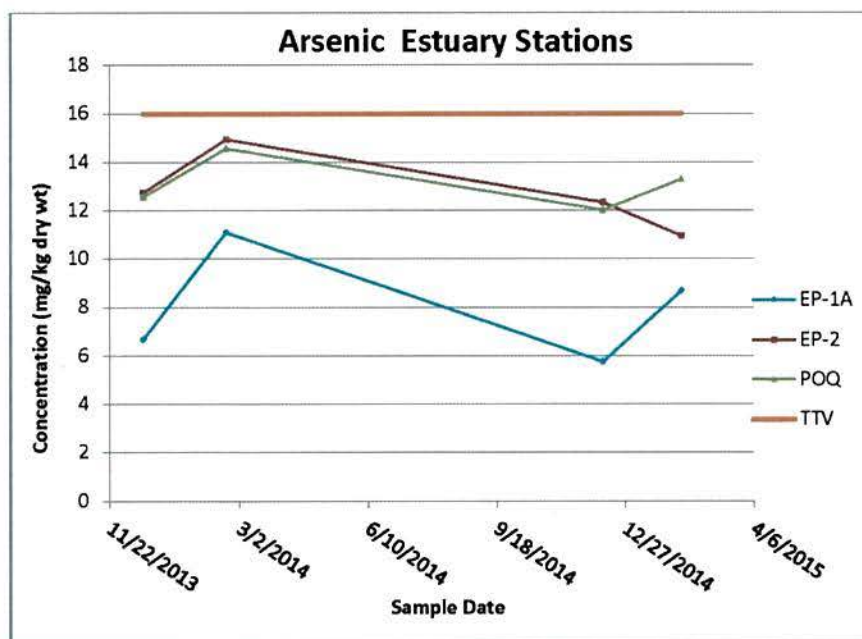


Figure 5. Comparison of vanadium concentrations for estuarine stations December 2013 through February 2015. Mean values presented for stations with duplicate or substation analyses.

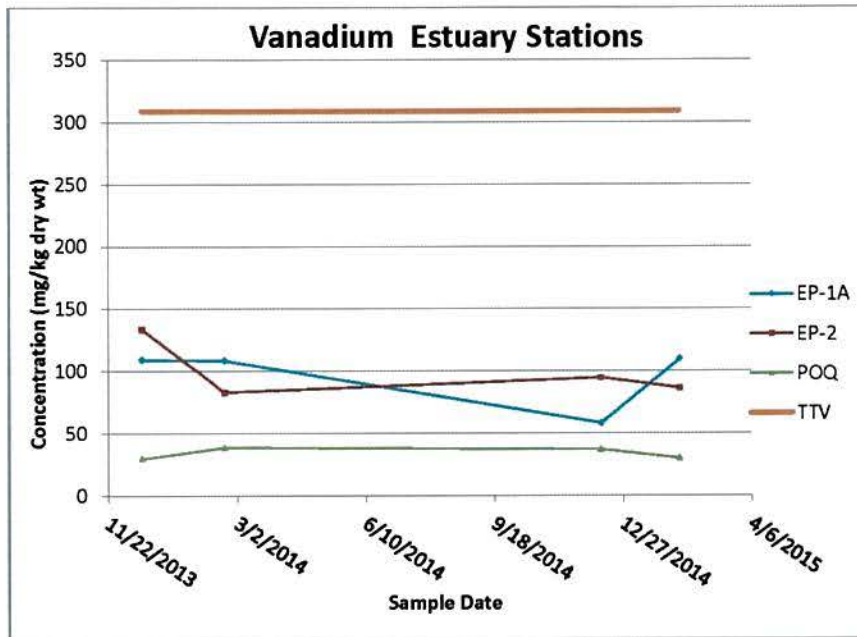
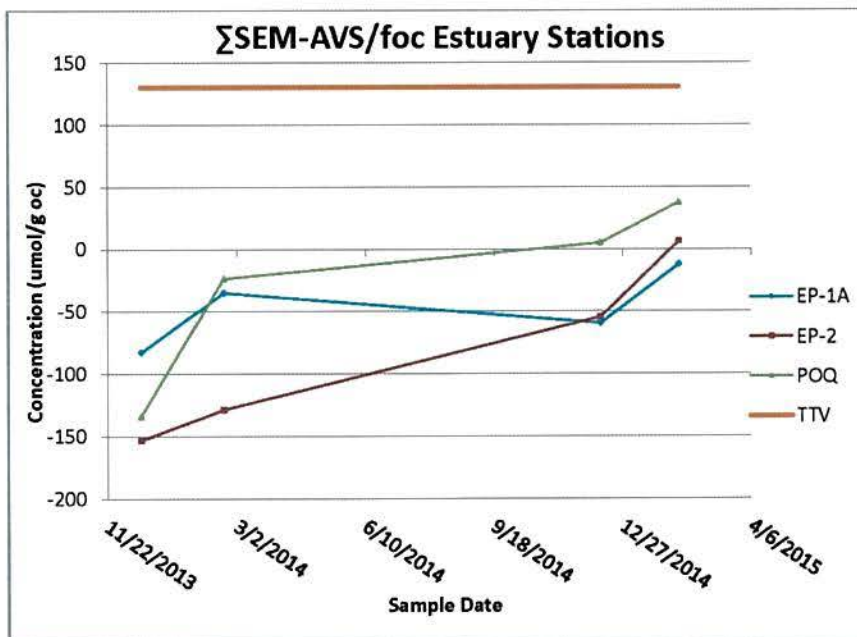


Figure 6. Comparison of SEM-AVS concentrations for estuarine stations December 2013 through February 2015. Mean values presented for stations with duplicate or substation analyses.



APPENDIX I – INTERVIEW FORMS

Chisman Creek Superfund Site

Five-Year Review Interview Form

Site Name: Chisman Creek

EPA ID No.: VAD980712913

Interviewer Name: Darriel Swatts

Affiliation: EPA

Subject Name: Brian Fuller

Affiliation: York County Community Services

Interview Format: In Person Phone Mail Other:

Interview Category: Local Government

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

Yes, I am. I have been with the county since 1984. I was here during the design and construction and was responsible for overseeing the scheduling up until the past few years.

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

Yes, we have had a great relationship with Dominion Power. Anytime any minor issues have come up, we have worked together to address them.

3. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

No, we have been very fortunate and have had little to no vandalism or trespassing. There is trash every now and then, such as broken bottles. The two parks are near the road and they get a lot of use, which deters any vandalism. We lock the gates at night.

4. Are you aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedy?

None that I am aware of.

5. Are you aware of any changes in projected land use(s) at the Site?

No, we understood the land use options when we designed the parks. Dominion is doing some work at Chisman Creek Park, adding an interceptor trench along the roadway. Dominion has been coordinating with everyone on that.

6. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

On an ongoing basis we do not know what EPA has done since we have had no complaints or issues. We know Dominion does the monitoring of the water and used to have a treatment system, which has been discontinued.

EPA can pass along information through York County. We tell the story of the parks on our website and that they had been cleaned up. The County is proud to have participated in building these parks

7. Do you have any comments, suggestions or recommendations regarding the project?

No, everything has worked great. It has been a great project.

Chisman Creek Superfund Site**Five-Year Review Interview Form****Site Name:** Chisman Creek**EPA ID No.:** VAD980712913**Subject Name:** Andrea Bain**Affiliation:** EPA**Interview Format:** In Person Phone E-Mail Other:**Interview Category:** EPA

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

My impression of the Site is that the remedy is operating as designed and is protective in the short term. The Site has already been determined ready for reuse, in fact parts of it is currently being used as a ball park and soccer field.

2. What have been the effects of this Site on the surrounding community, if any?

The effects on the surrounding community have been positive because the Site has already been redeveloped as recreational space for the community and with their input.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities since the implementation of the cleanup?

Yes, one resident located on Wolf Trap Road has inquired about additional soil sampling in his backyard. Dominion did sample the resident's backyard.

4. What is your assessment of the current performance of the remedy in place at the Site?

Currently, the remedy is operating as designed. There have been a few maintenance issues which are currently being addressed.

5. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

Yes.

6. Are you aware of any community concerns regarding the Site or the operation and management of its remedy? If so, please provide details.

No.

7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

Not currently.

Chisman Creek Superfund Site**Five-Year Review Interview Form****Site Name:** Chisman Creek**EPA ID No.:** VAD980712913**Subject Name:** Angela McGarvey**Affiliation:** VADEQ**Interview Format:** In Person Phone E-Mail Other:**Interview Category:** State

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

Overall, the short-term concerns have been addressed, but several long-term concerns still need to be resolved.

2. What is your assessment of the current performance of the remedy in place at the Site?

The remedy is currently protective of human health and the environment.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities since the implementation of the cleanup?

No.

4. Has your office conducted any site-related activities or communications in the past five years?

No, VADEQ has not. VADEQ does not directly conduct site activities but serves as a support agency to EPA and Dominion to oversee the work conducted at the Site. VADEQ looks out for Virginia residents to ensure the remedy is protective.

5. Are you aware of any changes to state laws that might affect the protectiveness of the remedy?

No, but Virginia regularly evaluates its standards to ensure they are protective.

6. Are you comfortable with the status of institutional controls at the site?

Yes, very satisfied.

7. Are you aware of any changes in projected land use at the site?

No.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

No.

Chisman Creek Superfund Site**Five-Year Review Interview Form****Site Name:** Chisman Creek**EPA ID No.:** VAD980712913**Subject Name:** Donald Hintz**Affiliation:** Dominion – Virginia Power**Interview Format:** In Person Phone E-Mail Other:**Interview Category:** **Potentially Responsible Parties (PRPs)****1. What is your overall impression of the remedial activities at the Site?**

- a. Over 155 million gallons of groundwater have been collected from the site and treated since 1989. The amount of collected groundwater is significant since it is one of the key performance criteria of the original remedy design, essentially preventing contaminated groundwater from migrating off site.
- b. The reuse or redevelopment of both Area A (Wolf Trap Park) and Area C (Chisman Creek Park) to recreational areas has proven to be very successful. Both parks are highly utilized and considered an integral part of the York County Parks and Recreation system.
- c. The efficiency of the groundwater collection system at Area C will be enhanced by approximately twenty percent in July 2016 with the installation of a groundwater interceptor trench along the western property boundary. The trench will further control the migration of contaminated groundwater from the site.
- d. The overall impression of the remedial activities and productive reuse of the site is positive.

2. What have been the effects of this Site on the surrounding community, if any?

- a. Converting or redeveloping Area A and Area C to recreational ball fields has proven to have had a very positive effect on the local community in terms of recreational, athletic and public meeting opportunities.
- b. Dominion is not aware of any negative effects to the local community resulting from the Chisman Creek site following implementation of the remedy.
- c. Installation of Area C interceptor trench will provide additional measures to prevent migration of groundwater offsite to surrounding properties.

3. What is your assessment of the current performance of the remedy in place at the Site?

- a. Over 155 million gallons of groundwater have been collected from the site and treated since 1989. The substantial amount of groundwater collected is significant since it is one of the key performance criteria of the original remedy design.
- b. The remediation system collects on average over 600,000 gallons of contaminated groundwater per month, which is then treated at the regional POTW. Continued collection and treatment of groundwater is essential in containing contaminated groundwater at the site.

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

Responding to a local resident inquire, Dominion conducted an investigation of surface soil at 1305 Wolf Trap Road in 2014 to assess the exposure risk potential to vanadium in the shallow soil zone

most likely to be encountered by the residents. Concentrations of vanadium detected in soil samples were well below risk-based screening criteria.

5. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

Dominion is well-informed regarding site activities and remedial progress given that Dominion owns the property, maintains the remediation system and sustains direct correspondence with the Office of Superfund Site Remediation, U.S. EPA Region 3.

6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

Dominion does not have any additional comments, suggestions or recommendations regarding the management or operation of the Site's remedy.

Chisman Creek Superfund Site**Five-Year Review Interview Form**Site Name: Chisman CreekEPA ID No.: VAD980712913Interviewer Name: Darriel SwattsAffiliation: EPASubject Name: Resident 1Affiliation: ResidentInterview Location: Wolf Trap Road

Interview Format (circle one):

☒ In Person☐ Phone☐ Mail☐ Other:Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

Yes, Dominion Power tells us what is going on.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

It is not clear what the current activities are or should be.

3. What have been the effects of this Site on the surrounding community, if any?

My parents owned the property and wanted the cleanup. Ash used to come into the house and we could not open the windows.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

You are the first EPA person to ever stop by. Dominion Power keeps me informed.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

No, we have city water.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

My husband wanted to plant a vegetable garden but he cannot because of soil contamination. I am not sure who told him that.

Chisman Creek Superfund Site**Five-Year Review Interview Form**Site Name: Chisman CreekEPA ID No.: VAD980712913Interviewer Name: Darriel SwattsAffiliation: EPASubject Name: Resident 2Affiliation: ResidentInterview Location: Wolf Trap Road

Interview Format (circle one):

☒ In Person☐ Phone☐ Mail☐ Other:Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

Yes, Dominion Power comes by to talk about it.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

It looks nice.

3. What have been the effects of this Site on the surrounding community, if any?

Private water wells are restricted.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

EPA has not, but Dominion comes by.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

No.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

No.

Chisman Creek Superfund Site**Five-Year Review Interview Form**Site Name: Chisman CreekEPA ID No.: VAD980712913Interviewer Name: Darriel SwattsAffiliation: EPASubject Name: Resident 3Affiliation: ResidentInterview Location: Wolf Trap Road

Interview Format (circle one):

☒ In Person☐ Phone☐ Mail☐ Other:Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

I am aware of the fields.
2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

It looks ok. Sometimes there is litter.
3. What have been the effects of this Site on the surrounding community, if any?

No effects.
4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

No.
5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

No, no one keeps me informed.
6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

No, I am on city water.
7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

No.

Chisman Creek Superfund Site**Five-Year Review Interview Form**Site Name: Chisman CreekEPA ID No.: VAD980712913Interviewer Name: Darriel SwattsAffiliation: EPASubject Name: Resident 4Affiliation: ResidentInterview Location: Dauids Way

Interview Format (circle one):

☒ In Person☐ Phone☐ Mail☐ Other:Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

Not really.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

I like the fields.

3. What have been the effects of this Site on the surrounding community, if any?

It seems like a good thing.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

No, but I am not sure if people use the ponds.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

No, but it would be nice to be informed if needed.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

No.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

No.

Chisman Creek Superfund Site**Five-Year Review Interview Form**Site Name: Chisman CreekEPA ID No.: VAD980712913Interviewer Name: Darriel SwattsAffiliation: EPASubject Name: Resident 5Affiliation: ResidentInterview Location: Harlans Drive

Interview Format (circle one):

☒ In Person☐ Phone☐ Mail☐ Other:Interview Category: Residents

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

No, but I am new to the neighborhood.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

The fields are great. It is a good place for kids.

3. What have been the effects of this Site on the surrounding community, if any?

People like the fields.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

No, but kids play and sled in the snow.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

No.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

Yes, an irrigation well. We are on city water.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?

No.