ARS Aleut Remediation, LLC

TECHNICAL MEMORANDUM

CUT AND COVER TANK TUNNEL SURFACE WATER TREND ANALYSIS, ROCKY POINT MANAGEMENT AREA, DUTCH HARBOR, UNALASKA, ALASKA
FINAL

Date:	7 February 2023
Project:	Rocky Point Management Area Groundwater Monitoring ADEC File Number 2542.38.018
To:	Cascade Galasso-Irish, ADEC
Copy to:	Christina Bentz, Amanda Dotten, Eric Hetrick
From:	Jennifer Anderson
Attachments:	Attachment 1 – Figures Attachment 2 – Tables Attachment 3 – Trend Diagrams Attachment 4 – Response to Comments

This Technical Memorandum presents the findings of a trend analysis conducted on surface water samples collected from the Cut and Cover Tank Tunnels within the Rocky Point Management Area (RPMA) in Dutch Harbor, Unalaska, Alaska.

1. INTRODUCTION

This document was prepared by ARS Aleut Remediation, LLC (Aleut) to discuss trends that may be present in surface water accumulating in the Cut and Cover Tank Tunnels (tank tunnels) within the RPMA in Dutch Harbor, Unalaska, Alaska (Figure 1). The RPMA is located south of the Delta Western Fuel Dock on Amaknak Island. East Point Loop Road runs along the western edge of the site, and Dutch Harbor and Iliuliuk Bay border the site to the east (Figure 2). This area has been used as a bulk petroleum storage and distribution facility for more than 60 years and is currently operated by Delta Western LLC (Delta Western) under a lease from the Ounalashka Corporation.

There are currently five Cut and Cover Tank Tunnel Systems within the RPMA that are being regulated as aboveground storage tanks (ASTs) by the Alaska Department of Environmental Conservation (ADEC) under 18 Alaska Administrative Code (AAC) 75. Water accumulates in the heater pits and utility tunnels associated with the Cut and Cover Tank Tunnel Systems and has historically had detected concentrations of diesel range organics (DRO), residual range organics (RRO), and polycyclic aromatic hydrocarbons (PAHs). Weirs were constructed in each tank tunnel

to keep any light non-aqueous phase liquid (LNAPL) or floating product from flowing out of the tank tunnels if the water levels reached a level higher than the entrance of the tank tunnel.

Annual surface water samples are collected from the water present within the tank tunnels and analyzed for gasoline range organics (GRO); DRO; RRO; benzene, toluene, ethylbenzene, and xylenes (BTEX); and PAHs. Analytical results from surface water samples collected from within the tank tunnels are presented in an Annual Area-Wide Groundwater Monitoring and Operation and Maintenance Report.

Regular inspections of these weirs and water within the tank tunnels are conducted to ensure the weirs are functioning as intended and product is not migrating out of the Cut and Cover Tank Tunnel Systems through the tank tunnel openings. These inspections were conducted weekly until Delta Western submitted a request to ADEC in 2019 to reduce the frequency to monthly monitoring starting in January 2020. ADEC agreed with this request for a period of two years with the understanding that a trend analysis would be completed to determine the future frequency of these inspections. Findings of the tank tunnel and weir inspection activities are presented in an annual Cut and Cover Tank Tunnel Weir Inspection Summary Report.

This document presents a summary of the trend analysis conducted on specific analytes in the tank tunnel surface water to determine if monthly inspections are sufficient for monitoring surface water within the tank tunnels, or if a return to weekly inspections is warranted. Historical data was compiled from previous annual reports and trends were generated for select analytes.

2. TREND ANALYSIS ON CUT AND COVER TANK TUNNEL SURFACE WATER

The Mann-Kendall trend analysis is a non-parametric statistical method used to identify trends in analyte concentrations at discrete sampling locations over time. This analysis was performed on GRO, DRO, RRO, BTEX, and/or PAH analytical results that met the applicability threshold in Tank Tunnels 12, 13, 16, 17, and 18 (Tables 1A and 1B, Attachment 2). Overall, 23 analytes for each tank tunnel were consolidated and screened for a minimum of four detected, but not estimated results, as required for the method to provide statistically significant determinations. Data collected between 2004 and 2022 was used during this screening exercise. Table 2 in Attachment 2 presents the determination of method applicability for each analyte.

A Mann-Kendall trend analysis was run on those analytes determined to have sufficient data to provide a statistically significant determination. An EPA ProUCL software program was used to run the trend analysis for each of these analytes with a 95% confidence to determine if an increasing or decreasing trend is present. Table 3 in Attachment 2 presents the summarized

results of each trend analysis per tank tunnel for the applicable analytes. Out of 64 analytes run through the Mann-Kendall trend analysis, 46 analytes indicated no trend was present. Table 2-1 provides a list of the remaining 18 analytes that indicated either an increasing or decreasing trend. ProUCL output files and graphs for each test are provided in Attachment 3.

Table 2-1 List of Analytes with an Increasing or Decreasing Trend Indicated and Associated Criteria

TANK TUNNEL ID	ANALYTE	INDICATED TREND	RPMA ACLS[1] (µg/L)	ADEC TABLE C CLEANUP LEVELS[2] (µg/L)	HISTORICAL ANALYTE CONCENTRATION RANGE (µg/L)
Tank Tunnel 12	Acenaphthene	Decreasing	2,200	530	<0.0021 to 0.6
	DRO	Decreasing	15,000	1,500	280 to 2,600
	Pyrene	Decreasing	11,000	120	0.035 to 0.792
Tank Tunnel 13	DRO	Increasing	15,000	1,500	160 to 3,080
	RRO	Increasing	11,000	1,100	<76 to 1,700
Tank Tunnel 16	Benzo(a)anthracene	Decreasing	10	0.30	0.045 to 37
	Benzo(a)pyrene	Decreasing	2	0.25	< 0.0182 to 35
	Benzo(b)fluoranthene	Decreasing	10	2.5	0.023 to 81
	Benzo(k)fluoranthene	Decreasing	100	0.80	0.034 to 23
	Chrysene	Decreasing	1,000	2	0.018 to 35
	Dibenzo(a,h)anthracene	Decreasing	1	0.25	0.010 to 12
	DRO	Decreasing	15,000	1,500	2,200 to 220,000
	Fluoranthene	Decreasing	14,600	260	<0.0095 to 3
	Indeno(1,2,3-c,d)perylene	Decreasing	10	0.19	0.037 to 38
	Naphthalene	Decreasing	7,000	1.7	<0.029 to <2.6 (highest detection 2)
	Pyrene	Decreasing	11,000	120	<0.0455 to 95

Table 2-1 List of Analytes with an Increasing or Decreasing Trend Indicated and Associated Criteria

TANK TUNNEL ID	ANALYTE	INDICATED TREND	RPMA ACLS[1] (µg/L)	ADEC TABLE C CLEANUP LEVELS[2] (µg/L)	HISTORICAL ANALYTE CONCENTRATION RANGE (µg/L)
Tank Tunnel 17	GRO	Increasing	13,000	2,200	<10 to <330 (highest detection 77)
Tank Tunnel 18	Pyrene	Decreasing	11,000	120	0.0282 to 15

Notes:

[1] Groundwater screening criteria based on 2006 ADEC determination that shallow groundwater is non-potable. Groundwater cleanup levels were developed for GRO, DRO, RRO, BTEX, PAHs, and lead by multiplying the Table C values by 10, as provided in 18 AAC 75.345 in effect in 2006. Alaska cleanup regulations were revised in 2008 and the "10-times" rule was repealed; however, at that time, ADEC confirmed that it would typically allow continued use of the "10-times" rule at sites where it had been applied. In December 2008, Stantec Consulting Corporation petitioned ADEC to allow the continued use of the previously approved groundwater site-specific alternative cleanup levels for the site based on the "10-times" rule and received approval from ADEC via an email dated February 10, 2009 from John Halverson to Luke Smith, Stantec Consulting Corporation.

[2] 18 AAC 75 Table C Groundwater Cleanup Levels (ADEC 2021)

µg/L = microgram per liter
ACL = Alternative Cleanup Level
ADEC = Alaska Department of Environmental Conservation
DRO = diesel range organics
GRO = gasoline range organics
ID = identification
RPMA = Rocky Point Management Area
RRO = residual range organics

3. CONCLUSION AND RECOMMENDATIONS

Forty-six of 64 analytes run through the Mann-Kendall trend analysis indicated "no trend," with five analytes in Tank 12 indicating stable concentrations and the remaining analytes in Tank 12 and all other tanks indicated as unstable. Table 3 identifies concentration stability for each analyte.

Fourteen of the analytes indicate a decreasing trend. Of these fourteen analytes, concentrations have been non-detect or below ADEC Table C cleanup levels for at least the last three years of annual sampling activities in 12 analytes. The remaining two analytes are DRO in Tank Tunnels 12 and 16. Although DRO in these tank tunnels has exceeded the ADEC Table C cleanup levels, concentrations are below the RPMA alternative cleanup levels (ACLs) and trends are decreasing. The trend analysis indicates an increasing trend for GRO in Tank Tunnel 17; however, analytical results for GRO have been non-detect since 2016 and have always been below ADEC Table C

cleanup levels. The identified increasing trend is due to changes in reporting limits and not trends in actual detected concentrations.

DRO and RRO were both found to have increasing trends in Tank Tunnel 13. Monthly inspections at this tank tunnel have noted that light sheen and minor LNAPL globules have been present on water located within the tank tunnel, but water was not noted as discharging from the tank tunnel at any point during the 2021 monthly inspections (TZ Engineering 2022).

He 2022 DRO and RRO results in Tank Tunnel 17 were observed to have increased by an order of magnitude above the 2021 results. Although the reasoning is unclear, as there were no changes to the sampling metods, it is possible that the decreased amount of water within the tank tunnels at the time of sampling (compared to the previous year) may have contributed to the increased relative concentration for fuel constituents. Further recommendations are provided in the 2022 Annual Groundwater Monitoring and Operation and Maintenance Report.

It is recommended that monthly monitoring of the tank tunnels continue for the next year (2023), at which point, it is recommended that another evaluation of monitoring frequency be conducted to determine if less frequent monitoring is justified.

Additionally, surface water sampling should continue to be collected from the tank tunnels on an annual basis; however, because there have been no detections of GRO or BTEX analytes above the ADEC Table C cleanup levels in any of the water samples collected since 2008, it is recommended that these analytes be removed from the annual sampling program and surface water samples are only analyzed for DRO, RRO, and PAHs.

4. REFERENCES

Alaska Department of Environmental Conservation (ADEC). 2021. *18 AAC 75 Oil and Other Hazardous Substances Pollution Control.* June.

ADEC. 2006. Letter regarding Rocky Point Management Area, Amaknak Island, Unalaska – Approval of Alternative Soil Cleanup Levels. From John Halverson. To Tom Bauhs, Chevron Environmental Management Co. May 16.

Stantec Consulting Services, Inc. (Stantec). 2018. *Focused Feasibility Study, Cut and Cover Tank Utility Tunnels, Rocky Point Management Area, Dutch Harbor, Unalaska, Alaska.* May.

TZ Engineering, LLC (TZ Engineering). 2022 *Cut and Covered Tank Tunnel Weir Inspection Summary January 2021 – December 2021 Rocky Point Management Area, Dutch Harbor, Unalaska, Alaska.* February.

ATTACHMENT 1

FIGURES

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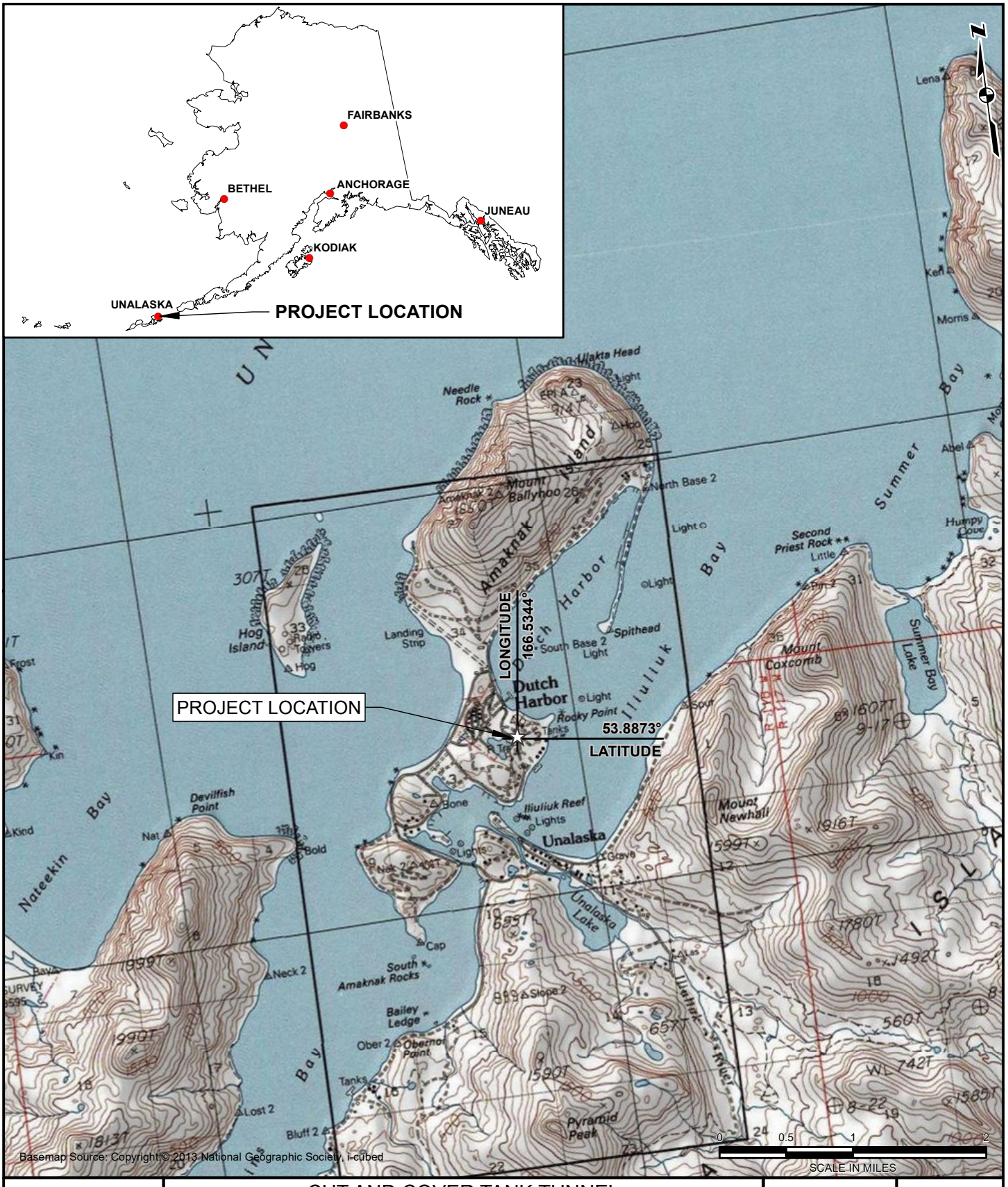
1 INCH



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CUT AND COVER TANK TUNNEL
SURFACE WATER TREND ANALYSIS – 2022
ROCKY POINT MANAGEMENT AREA

DUTCH HARBOR, UNALASKA, ALASKA

STATE AND SITE VICINITY

DATE: 9/28/2022

PROJECT No.: 311034

DRAWN: K.T.

FIGURE: 1

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CUT AND COVER TANK TUNNEL SURFACE WATER TREND ANALYSIS – 2022 ROCKY POINT MANAGEMENT AREA

DUTCH HARBOR, UNALASKA, ALASKA

ROCKY POINT MANAGEMENT AREA CUT AND COVER TANK TUNNEL LOCATIONS

Legend

- Lake Gauge

Area Boundaries

- Watershed Area
- Rocky Point Management Operational/Boundaries

Site Features

- Drainage Culvert
- Drainage Ditch
- EPLR Treatment System
- Interceptor Trench
- TTA
- Public and Private Streets

Fuel Storage Tanks

- Existing Fuel Storage Tank
- Former Fuel Storage Tank
- Cut and Cover Tanks
- Cut and Cover Tank Tunnels

Abbreviations

EPLR	East Point Loop Road
TTA	Thermal Treatment Area

Notes

1. For conceptual purposes only. All locations are approximate.
2. Map produced using ESRI ArcMap v. 10.7.

References

1. Imagery source: Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.
2. Lake Gauge, Site Features, and Area Boundary locations were drafted from the georeferenced Figure 4 Site Plan of Farallon Consulting. 2020. *Farallon PN: 1154-001. Rocky Point Management Area Dutch Harbor, Unalaska, Alaska.* January.
3. Public and private streets shapefile was downloaded from the City of Unalaska, Alaska. Last updated July 2021.

ALEUT

ALASKA STATE PLANE COORDINATE SYSTEM ZONE 10, U.S. SURVEY FEET

HORIZONAL DATUM: NAD83 (2011) | VERTICAL DATUM: NAVD88

200 100 0 200

SCALE IN FEET

PROJECT No.:	DATE:	FIGURE:
311304	10/12/2022	2
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ATTACHMENT 2

TABLES

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Table 1A - GRO, DRO, RRO, and BTEX Results
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Tank Tunnel	Date	Analytical Results (micrograms per liter)						
		DRO	RRO	GRO	Benzene	Toluene	Ethyl-benzene	Total Xylenes
ADEC Table C Groundwater Cleanup Levels[1]		**1,500**	**1,100**	**2,200**	**4.6**	**1,100**	**15**	**190**
ADEC Groundwater Screening Criteria[2]		**15,000**	**11,000**	**13,000**	**50**	**10,000**	**7,000**	**100,000**
Tank 12	6/25/2004	**2,430**	795	< 50.0	< 0.200	< 0.500	< 0.500	< 1.00
	8/15/2005	1,300	960	< 10	< 0.5	< 0.5	< 0.5	< 1.5
	5/25/2006	1,000	160	< 10	< 0.5	< 0.5	< 0.5	< 1.5
	6/15/2007	1,200	< 210	< 10	< 1	< 1	< 1	< 2
	6/16/2008	**2,400**	**2,300**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	6/16/2009	1,300	310	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	12/14/2016	**2,600**	**1,700**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	5/17/2017	710	710	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	11/7/2017	690 B	230	< 330	< 0.42	< 0.24	< 0.21	< 0.72
	6/21/2018	960	650 B	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	10/22/2018	280 B	190 J B	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	6/17/2019	530	210 J	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	12/9/2020	< 566	< 472	< 100	< 0.40	< 1.0	< 1.0	< 3
	6/29/2021	1,170	632	< 100	< 0.5	< 1	< 1	< 3
	6/29/2022	**2,230**	**2210**	< 100	< 0.4	< 1	< 1	< 3
Tank 13	6/25/2004	**2,640**	< 500	224	0.626	< 0.500	**18.3**	9.22
	8/15/2005	200	86	< 10	< 0.5	< 0.5	< 0.5	< 1.5
	5/25/2006	190	93	< 10	< 0.5	0.6	< 0.5	< 1.5
	6/15/2007	1,200	76	100	< 1	< 1	9	6
	6/19/2008	400 J	350	< 10	< 0.5	< 0.5	< 0.5	< 5.0
	6/16/2009	310	100	< 10	< 0.5	< 0.5	< 0.5	< 5.0
	5/21/2010	1,100	--	< 10	< 0.5	< 0.5	< 0.5	< 5.0
	4/27/2011	690	--	< 10	< 0.5	< 0.5	< 0.5	< 5.0
	12/14/2016	160 J	< 76	< 10	< 0.5	< 0.5	< 0.5	< 5.0
	5/17/2017	650	< 160	57 J	< 0.5	< 0.5	< 0.5	< 5.0
	11/7/2017	**1,700 B**	410	< 330	< 0.42	< 0.24	< 0.21	< 0.72
	6/21/2018	350	210 J B	< 250	< 3.0	0.55 J	1.0 J	5.5 J
	10/22/2018	590 B	160 J B	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	6/17/2019	930	810	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	12/9/2020	**2,380**	589	< 100	< 0.40	< 1.0	< 1.0	< 3.0
	6/29/2021	**2,460**	**1,700**	40 J	< 0.5	< 1	< 1	< 3
	6/29/2022	**3,080**	**1580 B**	< 100	< 0.4	0.36 J	< 1	< 3

Table 1A - GRO, DRO, RRO, and BTEX Results
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Tank Tunnel	Date	Analytical Results (micrograms per liter)						
		DRO	RRO	GRO	Benzene	Toluene	Ethyl-benzene	Total Xylenes
ADEC Table C Groundwater Cleanup Levels[1]		**1,500**	**1,100**	**2,200**	**4.6**	**1,100**	**15**	**190**
ADEC Groundwater Screening Criteria[2]		**15,000**	**11,000**	**13,000**	**50**	**10,000**	**7,000**	**100,000**
Tank 16	8/16/2005	**220,000**	**56,000**	12	< 0.5	< 0.5	< 0.5	< 1.5
	6/19/2008	**11,000 J**	**2,200**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	6/16/2009	**8,800**	**1,500**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	5/21/2010	**6,400**	--	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	4/27/2011	**3,300**	--	16	< 0.5	< 0.5	< 0.5	< 0.5
	12/14/2016	**5,400**	**1,100**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	5/17/2017	**12,000**	**1,600 J**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	11/7/2017	**3,500 B**	430	< 330	< 0.42	< 0.24	< 0.21	< 0.72
	10/22/2018	**4,300 B**	610 B	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	6/17/2019	**2,200**	910	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	12/9/2020	**4,900**	1,010	< 100	< 0.40	< 1.0	< 1.0	< 3.0
	6/29/2021	**2,290**	1,050	< 100	< 0.5	< 1	< 1	< 3
	6/29/2022	**3,310**	1090 B	< 100	< 0.4	< 1	< 1	< 3
Tank 17	5/24/2006	**37,000**	500	< 10	< 0.5	< 0.5	< 0.5	< 1.5
	5/24/2006[3]	**40,000**	**1,400**	< 10	< 0.5	< 0.5	< 0.5	< 1.5
	6/15/2007	**150,000**	**< 2,000**	20	< 1	< 1	< 1	< 2
	6/19/2008	**200,000**	**< 9,400**	20	< 0.5	< 0.5	< 0.5	< 0.5
	6/16/2009	**94,000**	**< 2,400**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	5/21/2010	**210,000**	--	28	< 0.5	< 0.5	< 0.5	< 0.5
	4/27/2011	**190,000**	--	77	< 0.5	< 0.5	< 0.5	0.6
	12/14/2016	**2,100**	< 76	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	5/17/2017	**1,600**	110 J	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	11/7/2017	**1,800 B**	410	< 330	< 0.42	< 0.24	< 0.21	< 0.72
	6/21/2018	**65,000**	**5,000 B**	< 250	< 3.0	< 2.0	0.75 J	3.7 J
	10/22/2018	**54,000 B**	**1,700 B**	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	6/17/2019	**1,600**	600	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	12/9/2020	**4,470**	1,060	< 100	< 0.40	< 1.0	< 1.0	< 3.0
	6/29/2021	**166,000**	**6,110**	< 100	< 0.5	< 1	< 1	< 3
	6/29/2022	**2,780,000**	**66,300**	< 100	< 0.4	< 1	< 1	< 3

Table 1A - GRO, DRO, RRO, and BTEX Results
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Tank Tunnel	Date	Analytical Results (micrograms per liter)						
		DRO	RRO	GRO	Benzene	Toluene	Ethyl-benzene	Total Xylenes
ADEC Table C Groundwater Cleanup Levels[1]		**1,500**	**1,100**	**2,200**	**4.6**	**1,100**	**15**	**190**
ADEC Groundwater Screening Criteria[2]		**15,000**	**11,000**	**13,000**	**50**	**10,000**	**7,000**	**100,000**
Tank 18	6/21/2004	**7,770**	**3,450**	< 50.0	< 0.200	< 0.500	< 0.500	< 1.00
	8/16/2005	**31,000**	**30,000**	< 10	< 0.5	< 0.5	< 0.5	< 1.5
	8/16/2005[3]	**4,200**	**4,300**	< 10	< 0.5	< 0.5	< 0.5	< 1.5
	6/15/2007	**2,300**	270	80	**5**	3	5	20
	6/19/2008	**28,000**	**24,000**	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	6/16/2009	390	230	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	5/21/2010	720	--	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	12/14/2016	170 J	< 76	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	5/17/2017	210 J	130 J	< 10	< 0.5	< 0.5	< 0.5	< 0.5
	11/7/2017	330 B	80 J	< 330	< 0.42	< 0.24	< 0.21	< 0.72
	10/22/2018	**4,700 B**	250 J B	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	6/17/2019	210	130 J	< 250	< 3.0	< 2.0	< 3.0	< 5.0
	12/9/2020	< 566	< 472	< 100	< 0.40	< 1.0	< 1.0	< 3.0
	12/9/2020[3]	**3,950 J**	999	< 100	< 0.40	< 1.0	< 1.0	< 3.0
	6/29/2021	**1,860 JD**	914 JD	< 100	< 0.5	< 1	< 1	< 3
	6/29/2021[3]	539 J, JD	175 J, JD	< 100	< 0.5	< 1	< 1	< 3
	6/29/2022	**73,900**	999 B	< 100	< 0.4	< 1	< 1	< 3

NOTES:

Results in **bold** denote concentrations exceeding ADEC Table C cleanup levels.
Results in **bold** and highlighted blue denote concentrations exceeding RPMA ACLs.
< denotes analyte not detected at or exceeding the reporting limit listed.
--- denotes sample not analyzed.

[1]Levels established in Table C, Groundwater Cleanup Levels, in Section 345 of Chapter 75 of Title 18 of the Alaska Administrative
[2]Groundwater screening criteria based on 2006 ADEC determination that shallow groundwater is non-potable. Groundwater cleanup levels were developed for GRO, DRO, RRO, BTEX, PAHs, and lead by multiplying the Table C values by 10, as provided in 18 AAC 75.345 in effect in 2006. Alaska cleanup regulations were revised in 2008 and the "10-times" rule was repealed; however, at that time, ADEC confirmed that it would typically allow continued use of the "10-times" rule at sites where it had been applied. In December 2008, Stantec Consulting Corporation petitioned ADEC to allow the continued use of the previously approved groundwater site-specific alternative cleanup levels for the site based on the "10-times" rule and received approval from ADEC via an email dated February 10, 2009 from John Halverson to Luke Smith, Stantec Consulting Corporation.

[3]Sample is a quality assurance/quality control field duplicate.

ADEC = Alaska Department of Environmental Conservation
B = Sample result may be biased high as it was detected in the associted method blank.
BTEX = benzene, toluene, ethylbenzene, and xylenes
DRO = total petroleum hydrocarbons (TPH) as diesel-range organics
GRO = TPH as gasoline-range organics
J = Result is considered an estimate.
JD = Result is considered estimated due to duplicate imprecision.
PAHs = polynuclear aromatic hydrocrabons
RRO = TPH as residual-range organics

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Table 1B - PAH Results
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Tank Tunnel	Date	Analytical Results (micrograms per liter)															
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)perylene	Naphthalene	Phenanthrene	Pyrene
ADEC Table C Groundwater Cleanup Levels[1]		**530**	**260**	**43**	**0.30**	**0.25**	**2.5**	**0.26**	**0.80**	**2.0**	**0.25**	**260**	**290**	**0.19**	**1.7**	**170**	**120**
ADEC Groundwater Screening Criteria[2]		**2,200**	**NA**	**110,000**	**10.0**	**2.0**	**10**	**NA**	**100**	**1,000**	**1.0**	**14,600**	**14,600**	**10.0**	**7,000**	**NA**	**11,000**
Tank 12	6/25/2004	0.515	< 0.100	0.436	0.277	0.139	< 0.100	< 0.100	< 0.100	0.495	< 0.100	0.158	0.396	< 0.100	< 0.100	0.495	0.792
	8/15/2005	0.6	0.03	0.3	0.06	0.020	< 0.02	< 0.02	< 0.01	0.090	< 0.02	0.060	0.100	< 0.02	0.200	0.300	0.300
	5/25/2006	0.34	< 0.02	0.19	0.021	< 0.02	< 0.02	< 0.02	< 0.01	0.022	< 0.02	0.027	0.031	< 0.02	0.100	0.080	0.180
	6/15/2007	0.15	< 0.01	< 0.01	0.13	0.086	0.064	0.039	< 0.01	0.290	0.013	0.082	< 0.01	0.012	0.077	< 0.01	0.680
	6/19/2008	< 0.0095	< 0.0095	0.045	0.054	0.029	0.027	0.018	0.010	0.160	< 0.0095	0.053	< 0.0095	< 0.0095	0.053	0.019	0.260
	6/16/2009	0.11	0.017	0.013	< 0.0095	0.010	< 0.0095	0.011	< 0.0095	< 0.0095	< 0.0095	0.030	0.018	< 0.0095	0.046	0.031	0.160
	12/14/2016	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	0.011 J	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.028	< 0.028	0.04 J
	5/11/2017	< 0.0095	< 0.0095	0.016 J	0.023 J	0.035 J	0.018 J	0.050	< 0.0095	0.082	0.010 J	0.017 J	< 0.0095	0.016 J	< 0.028	< 0.028	0.089
	11/7/2017	< 0.0021	< 0.0021	< 0.0031	0.0064 J B	0.011 J B	< 0.0082	0.012 J B	< 0.0093	0.015 J B	0.0066 J B	< 0.0021	< 0.0031	0.0083 J	< 0.013	< 0.0041	0.035 B
	6/21/2018	< 0.10	< 0.052	< 0.10	0.019 J	0.011 J	0.016 J	0.016 J	< 0.052	0.039 J	< 0.10	< 0.21	< 0.10	< 0.052	< 0.10	< 0.10	0.051 J
	10/22/2018	< 0.10	< 0.052	< 0.10	< 0.052	< 0.10	< 0.052	< 0.052	< 0.052	< 0.10	< 0.10	< 0.21	< 0.10	< 0.052	< 0.10	< 0.10	< 0.10
	6/17/2019	< 0.10	< 0.051	< 0.10	< 0.051	< 0.10	< 0.051	< 0.051	< 0.051	< 0.10	< 0.10	< 0.21	< 0.10	< 0.051	< 0.10	< 0.10	< 0.10
	12/9/2020	< 0.0463	< 0.0463	< 0.0463	< 0.0463	< 0.0185	< 0.0463	< 0.0463	< 0.0463	< 0.0463	< 0.0185	< 0.0463	< 0.0463	< 0.0463	< 0.0926	< 0.0463	< 0.0463
	6/29/2021	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	0.0277 J	< 0.0455	0.108	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0909	< 0.0455	0.134
	6/29/2022	< 0.0481	< 0.0481	< 0.0481	0.16	0.096	< 0.0481	0.0452 J	< 0.0481	0.314	< 0.0192	0.114	< 0.0481	< 0.0481	< 0.0962	0.451	0.597
Tank 13	6/25/2004	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	0.951	< 0.100	< 0.100	< 0.100	< 0.100
	8/15/2005	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.02
	5/25/2006	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	< 0.02	0.017	< 0.01	< 0.02
	6/15/2007	0.29	< 0.0099	0.13	< 0.0099	< 0.0099	< 0.0099	< 0.0099	< 0.0099	0.015	< 0.0099	0.031	0.85	< 0.0099	0.31	0.078	0.072
	6/19/2008	< 0.0096	< 0.0096	< 0.0096	0.015	0.016	0.024	< 0.0096	< 0.0096	0.019	< 0.0096	0.043	< 0.0096	< 0.0096	< 0.0096	0.027	0.03
	6/16/2009	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096
	5/21/2010	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	0.014	< 0.0098	< 0.0098	0.034	0.020	0.010
	4/27/2011	0.027	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	0.13	< 0.0096	< 0.0096
	12/14/2016	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.0098	< 0.029	< 0.029	< 0.0098
	5/11/2017	< 0.0098	< 0.0098	< 0.0098	0.011 J	0.012 J	0.016 J	0.016 J	0.011 J	0.015 J	0.015 J	0.021 J	< 0.0098	0.019 J	< 0.029	< 0.029	0.014 J
	11/7/2017	< 0.0024	< 0.0024	< 0.0035	0.0089 J B	0.0067 J B	< 0.0094	0.0056 J B	< 0.011	< 0.0071	0.0077 J B	< 0.0024	< 0.0035	< 0.0082	< 0.015	< 0.0047	< 0.0047
	6/21/2018	< 0.52	< 0.26	< 0.52	< 0.26	**< 0.52**	< 0.26	< 0.06	< 0.26	< 0.52	**< 0.52**	< 1.0	< 0.52	**< 0.26**	< 0.52	< 0.52	< 0.52
	10/22/2018	< 0.10	< 0.052	< 0.10	< 0.052	< 0.10	< 0.052	< 0.052	< 0.052	< 0.10	< 0.10	< 0.21	< 0.10	< 0.052	< 0.10	< 0.10	< 0.10
	6/17/2019	0.078 J	< 0.051	0.051 J	0.031 J	0.033 J	< 0.051	< 0.051	< 0.051	0.016 J	< 0.10	0.18 J	0.082 J	< 0.051	0.15	0.31	0.15
	12/9/2020	0.0575	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	0.198	< 0.0455	< 0.0909	< 0.0455	< 0.0455
	6/29/2022	< 0.0481	< 0.0481	< 0.0481	< 0.0481	< 0.0192	< 0.0481	< 0.0481	< 0.0481	< 0.0481	< 0.0192	< 0.0481	< 0.0481	< 0.0481	< 0.0962	< 0.0962	< 0.0481
Tank 16	8/16/2005	11	2	28	**37**	**35**	**81**	**44**	**23**	**35**	**12**	0.9	3	**38**	**2**	12	95
	6/19/2008	< 0.0095	0.15 J	0.18 J	**0.47 J**	**0.51 J**	1.6 J	**0.55 J**	0.69 J	1.1 J	0.17 J	1.1 J	< 0.0095	**0.58 J**	0.29 J	0.49 J	0.97 J
	6/16/2009	< 0.0095	0.26	< 0.0095	0.13	0.18	0.50	0.18	0.21	0.27	0.11	0.31	< 0.0095	0.18	0.21	< 0.0095	0.44
	5/21/2010	< 0.096	< 0.096	0.16	**0.65**	**1.1**	**3.2**	**2.2**	**1.0**	1.4	**0.43**	1.4	< 0.096	**1.8**	< 0.096	0.38	2.1
	4/27/2011	0.17	0.049	0.11	0.082	0.023	0.13	0.041	0.055	0.13	0.010	0.57	0.38	0.037	0.15	0.081	0.38
	12/14/2016	< 0.0096	< 0.0096	< 0.0096	**0.50**	**1.2**	**3.5**	**0.8**	**1.1**	1.4	0.230	1.1	0.07	**0.81**	< 0.029	< 0.029	2.4
	5/11/2017	< 0.048	< 0.048	< 0.048	**2.7**	**3.8**	**7.4**	**4.8**	**2.3**	**2.6**	**1.1**	3.2	< 0.048	**4.2**	< 0.14	< 0.14	4.5
	11/7/2017	< 0.010	< 0.010	< 0.015	0.083 J B	0.089 J B	0.35	0.021 B	0.11 J	0.018 B	0.049 J B	0.28 B	0.024 B	**0.25**	< 0.066	< 0.020	0.32 B
	10/22/2018	< 0.10	< 0.050	< 0.10	< 0.050	< 0.10	0.023 J	< 0.050	< 0.050	< 0.10	< 0.10	< 0.20	< 0.10	< 0.050	0.23	< 0.10	0.091 J
	6/17/2019	< 2.6	< 1.3	< 2.6	**3.4**	**5.6**	**10**	**7.8**	**3.3**	**5.2**	**1.6 J**	5.1 J	0.50 J	**11**	**< 2.6**	< 2.6	9.3
	12/9/2020	0.116	< 0.0463	< 0.0463	< 0.0463	< 0.0185	< 0.0463	< 0.0463	< 0.0463	< 0.0463	< 0.0185	0.167	0.146	< 0.0463	< 0.0926	< 0.0463	0.153
	6/29/2021	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0909	< 0.0455	< 0.0455
	6/29/2022	< 0.0446	< 0.0446	< 0.0446	0.045	0.0646	0.122	0.0513	0.034 J	0.0432 J	< 0.0179	< 0.0446	< 0.0446	0.0444 J	0.0703 J	< 0.0893	0.333

Table 1B - PAH Results
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Tank Tunnel	Date	Analytical Results (micrograms per liter)															
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)perylene	Naphthalene	Phenanthrene	Pyrene
ADEC Table C Groundwater Cleanup Levels[1]		**530**	**260**	**43**	**0.30**	**0.25**	**2.5**	**0.26**	**0.80**	**2.0**	**0.25**	**260**	**290**	**0.19**	**1.7**	**170**	**120**
ADEC Groundwater Screening Criteria[2]		**2,200**	**NA**	**110,000**	**10.0**	**2.0**	**10**	**NA**	**100**	**1,000**	**1.0**	**14,600**	**14,600**	**10.0**	**7,000**	**NA**	**11,000**
Tank 17	5/24/2006	1.1	< 0.02	< 0.02	0.026	< 0.02	0.088	0.054	0.022	0.16	< 0.02	< 0.01	0.26	0.031	0.16	< 0.01	0.51
	5/24/2006[3]	1.5	< 0.02	< 0.02	0.052	0.028	0.13	0.072	0.022	0.21	< 0.02	< 0.01	0.41	0.043	0.16	< 0.01	0.84
	6/15/2007	< 0.5	< 0.5	13	**< 0.5**	**< 0.5**	0.71	**< 0.5**	< 0.5	**2.2**	**< 0.5**	7.5	17	**< 0.5**	< 0.5	42	6.6
	6/19/2008	< 0.095	< 0.095	< 0.095	< 0.095	< 0.095	0.33	0.11	< 0.095	1	< 0.095	0.62	< 0.095	< 0.095	0.21	14	2.1
	6/16/2009	< 0.096	< 0.096	21	< 0.096	< 0.096	0.20	< 0.096	< 0.096	0.55	< 0.096	3.0	2.4	< 0.096	0.19	13	1.4
	5/21/2010	0.62	0.15	5.2	0.22	0.10	0.33	0.21	0.15	0.85	< 0.097	2.0	7.3	0.11	0.42	13	3.6
	4/27/2011	10	8.8	9.0	0.17	< 0.10	0.35	0.17	0.12	0.57	< 0.10	4.2	54	0.12	**2.1**	**190**	2.6
	12/14/2016	0.15	< 0.0095	0.2	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	0.02 J	< 0.0095	0.1	0.3	< 0.0095	< 0.028	0.24	0.067
	5/11/2017	< 0.0096	< 0.0096	0.027 J	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.029	< 0.029	< 0.0096
	11/7/2017	< 0.0023	< 0.0023	< 0.0034	0.0079 JB	0.0060 JB	< 0.0092	0.0059 JB	< 0.010	0.0071 J B	0.0068 J B	< 0.0023	< 0.0034	0.0088 J	< 0.015	< 0.0046	< 0.0046
	6/21/2018	0.29	0.20	0.45	**0.43**	**0.40**	0.45	**0.38**	0.37	0.40	**0.40**	0.54	0.68	**0.52**	< 0.10	0.64	0.50
	10/22/2018	0.97	0.75	2.3	0.12 J	0.062 J	< 0.27	0.065 J	< 0.27	0.022 J	**< 0.53**	< 1.1	4.9	**< 0.27**	< 0.53	19	1.1
	6/17/2019	< 0.10	< 0.051	< 0.10	< 0.051	< 0.10	< 0.051	< 0.051	< 0.051	< 0.10	< 0.10	< 0.20	< 0.10	< 0.051	< 0.10	0.036 J	< 0.10
	12/9/2020	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	0.156	< 0.0455	< 0.0909	< 0.0455	0.0555
	6/29/2021	< 1.18	< 1.18	< 1.18	**< 1.18**	**< 0.472**	< 1.18	**< 1.18**	**< 1.18**	< 1.18	**< 0.472**	< 1.18	< 1.18	**< 1.18**	**< 2.36**	< 1.18	1.07 J
	6/29/2022	< 4.46	< 4.46	< 4.46	**1.87 J**	**< 1.79**	**< 4.46**	**1.7 J**	**< 4.46**	**4.52**	**< 1.79**	< 4.46	< 4.46	**< 4.46**	**< 8.93**	**205**	17.4
Tank 18	6/21/2004	< 0.100	< 0.100	< 0.100	**0.868**	**0.509**	0.226	0.226	0.113	1.45	0.189	< 0.100	< 0.100	0.132	< 0.100	< 0.100	4.40
	8/16/2005	3	0.4	9	**2**	**0.9**	0.80	**0.7**	0.1	**3**	0.2	2	4	**0.3**	1	8	15
	8/16/2005[3]	1	0.1	1	0.2	0.1	0.07	0.1	0.03	0.3	0.04	0.3	1	0.05	0.6	1	2
	6/15/2007	1.4	0.12	0.26	0.14	0.11	0.081	0.063	< 0.01	0.25	0.018	0.17	0.98	0.018	0.66	0.7	1.3
	6/19/2008	< 0.0098	< 0.0098	0.086	0.14	0.097	0.062	0.046	0.031	0.31	0.015	0.22	0.036	0.017	0.051	0.37	1.1
	6/16/2009	< 0.0096	< 0.0096	< 0.0096	0.044	0.017	0.023	0.012	< 0.0096	0.053	< 0.0096	0.019	< 0.0096	< 0.0096	0.030	< 0.0096	0.23
	5/21/2010	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	< 0.0096	0.017	< 0.0096	< 0.0096	0.011	< 0.0096	0.047	< 0.0096	0.077
	12/14/2016	< 0.0095	< 0.0095	< 0.0095	0.010 J	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.0095	< 0.028	< 0.028	0.04 J
	5/11/2017	< 0.0098	< 0.0098	< 0.0098	0.047 J	0.013 J	0.020 J	0.025 J	< 0.0098	0.011	< 0.0098	0.032 J	< 0.0098	< 0.0098	< 0.030	< 0.030	0.32
	11/7/2017	< 0.0021	< 0.0021	< 0.0031	0.0064 J B	0.0041 J B	< 0.0083	0.0043 JB	< 0.0093	0.0065 J B	0.0048 J B	< 0.0021	< 0.0031	< 0.0072	< 0.013	< 0.0041	0.049 B
	10/22/2018	< 0.11	< 0.053	< 0.11	< 0.053	< 0.11	< 0.053	< 0.053	< 0.053	0.020 J	< 0.11	< 0.21	< 0.11	< 0.053	< 0.11	< 0.11	0.12
	6/17/2019	< 0.10	< 0.052	< 0.10	< 0.052	< 0.10	< 0.052	< 0.052	< 0.052	< 0.10	< 0.10	< 0.21	< 0.10	< 0.052	< 0.10	< 0.10	< 0.10
	12/9/2020	< 0.0463	< 0.0463	< 0.0463	< 0.0463	< 0.0185	< 0.0463	< 0.0463	< 0.0463	< 0.0463	< 0.0185	< 0.0463	< 0.0463	< 0.0463	< 0.0926	< 0.0463	< 0.0463
	12/9/2020[3]	0.0498	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	0.159	< 0.0455	< 0.0909	< 0.0455	0.0489
	6/29/2021	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	0.0238 J	< 0.0455	< 0.0909	0.0311 J	0.0282 J, JD
	6/29/2021[3]	< 0.0455 J	< 0.0455 J	< 0.0455 J	< 0.0455	< 0.0182	< 0.0455	< 0.0455	< 0.0455	< 0.0455	< 0.0182	< 0.0455	< 0.0455 J	< 0.0455	< 0.0909 J	< 0.0455 J	0.0509 JD
	6/29/2022	< 0.893	< 0.893	< 0.893	0.0663	**< 0.357**	< 0.893	0.0394 J	**< 0.893**	0.145	**< 0.357**	< 0.893	< 0.893	**< 0.893**	**< 1.79**	< 1.79	0.608 J

NOTES:

Results in **bold** denote concentrations exceeding ADEC Table C cleanup levels.

Results in bold and highlighted blue denote concentrations exceeding RPMA ACLs.

< denotes analyte not detected at or above the reporting limit listed.

--- denotes sample not analyzed.

[1]Levels established in Table C, Groundwater Cleanup Levels, in Section 345 of Chapter 75 of Title 18 of the Alaska Administrative Code (18 AAC 75.345) , as amended through November 18, 2021.

[2]Groundwater screening criteria based on 2006 ADEC determination that shallow groundwater is non-potable. Groundwater cleanup levels were developed for GRO, DRO, RRO, BTEX, PAHs, and lead by multiplying the Table C values by 10, as provided in 18 AAC 75.345 in effect in 2006. Alaska cleanup regulations were revised in 2008 and the "10-times" rule was repealed; however, at that time, ADEC confirmed that it would typically allow continued use of the "10-times" rule at sites where it had been applied. In December 2008, Stantec Consulting Corporation petitioned ADEC to allow the continued use of the previously approved groundwater site-specific alternative cleanup levels for the site based on the "10-times" rule and received approval from ADEC via an email dated February 10, 2009 from John Halverson to Luke Smith, Stantec Consulting Corporation.

[3]Sample is a quality assurance/quality control field duplicate.

ADEC = Alaska Department of Environmental Conservation

B = Sample result may be biased high as it was detected in the associted method blank.

J = Result is considered an estimate.

JD = Result is considered estimated due to duplicate imprecision.

PAHs = polynuclear aromatic hydrocrabons

Table 2 - Mann-Kendall Applicability
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Location	Analyte	Total Data Points	Valid Data Points	M-K Applicability (at Least 4 Valid Data Points)
Tank 12	Acenaphthene	15	5	Yes
	Acenaphthylene	15	2	No
	Anthracene	15	5	Yes
	Benzene	15	0	No
	Benzo(a)anthracene	15	5	Yes
	Benzo(a)pyrene	15	5	Yes
	Benzo(b)fluoranthene	15	2	No
	Benzo(g,h,i)perylene	15	4	Yes
	Benzo(k)fluoranthene	15	1	No
	Chrysene	15	7	Yes
	Dibenzo(a,h)anthracene	15	1	No
	DRO	15	11	Yes
	Ethylbenzene	15	0	No
	Fluoranthene	15	6	Yes
	Fluorene	15	4	Yes
	GRO	15	0	No
	Indeno(1,2,3-c,d)perylene	15	0	No
	Naphthalene	15	5	Yes
	Phenanthrene	15	5	Yes
	Pyrene	15	8	Yes
	RRO	15	9	Yes
	Toluene	15	0	No
	Xylenes	15	0	No
Tank 13	Acenaphthene	16	3	No
	Acenaphthylene	16	0	No
	Anthracene	16	1	No
	Benzene	17	1	No
	Benzo(a)anthracene	16	1	No
	Benzo(a)pyrene	16	1	No
	Benzo(b)fluoranthene	16	1	No
	Benzo(g,h,i)perylene	16	0	No
	Benzo(k)fluoranthene	16	0	No
	Chrysene	16	2	No
	Dibenzo(a,h)anthracene	16	1	No
	DRO	17	12	Yes
	Ethylbenzene	17	2	No
	Fluoranthene	16	3	No
	Fluorene	16	3	No
	GRO	17	3	No
	Indeno(1,2,3-c,d)perylene	16	0	No
	Naphthalene	16	5	Yes
	Phenanthrene	16	4	Yes
	Pyrene	16	4	Yes
	RRO	15	9	Yes
	Toluene	17	1	No
	Xylenes	17	3	No

Table 2 - Mann-Kendall Applicability
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Location	Analyte	Total Data Points	Valid Data Points	M-K Applicability (at Least 4 Valid Data Points)
Tank 16	Acenaphthene	13	3	No
	Acenaphthylene	13	3	No
	Anthracene	13	3	No
	Benzene	13	0	No
	Benzo(a)anthracene	13	7	Yes
	Benzo(a)pyrene	13	7	Yes
	Benzo(b)fluoranthene	13	8	Yes
	Benzo(g,h,i)perylene	13	7	Yes
	Benzo(k)fluoranthene	13	7	Yes
	Chrysene	13	7	Yes
	Dibenzo(a,h)anthracene	13	7	Yes
	DRO	13	9	Yes
	Ethylbenzene	13	0	No
	Fluoranthene	13	7	Yes
	Fluorene	13	4	Yes
	GRO	13	2	No
	Indeno(1,2,3-c,d)perylene	13	8	Yes
	Naphthalene	13	4	Yes
	Phenanthrene	13	3	No
	Pyrene	13	8	Yes
	RRO	11	8	Yes
	Toluene	13	0	No
	Xylenes	13	0	No
Tank 17	Acenaphthene	15	7	Yes
	Acenaphthylene	15	4	Yes
	Anthracene	15	7	Yes
	Benzene	15	0	No
	Benzo(a)anthracene	15	5	Yes
	Benzo(a)pyrene	15	3	No
	Benzo(b)fluoranthene	15	7	Yes
	Benzo(g,h,i)perylene	15	5	Yes
	Benzo(k)fluoranthene	15	4	Yes
	Chrysene	15	7	Yes
	Dibenzo(a,h)anthracene	15	1	No
	DRO	15	12	Yes
	Ethylbenzene	15	0	No
	Fluoranthene	15	7	Yes
	Fluorene	15	10	Yes
	GRO	15	4	Yes
	Indeno(1,2,3-c,d)perylene	15	5	Yes
	Naphthalene	15	5	Yes
	Phenanthrene	15	8	Yes
	Pyrene	15	11	Yes
	RRO	13	5	Yes
	Toluene	15	0	No
	Xylenes	15	1	No

Table 2 - Mann-Kendall Applicability
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Location	Analyte	Total Data Points	Valid Data Points	M-K Applicability (at Least 4 Valid Data Points)
Tank 18	Acenaphthene	14	4	Yes
	Acenaphthylene	14	3	No
	Anthracene	14	4	Yes
	Benzene	14	1	No
	Benzo(a)anthracene	14	5	Yes
	Benzo(a)pyrene	14	5	Yes
	Benzo(b)fluoranthene	14	5	Yes
	Benzo(g,h,i)perylene	14	5	Yes
	Benzo(k)fluoranthene	14	3	No
	Chrysene	14	7	Yes
	Dibenzo(a,h)anthracene	14	4	Yes
	DRO	14	8	Yes
	Ethylbenzene	14	1	No
	Fluoranthene	14	4	Yes
	Fluorene	14	4	Yes
	GRO	14	1	No
	Indeno(1,2,3-c,d)perylene	14	4	Yes
	Naphthalene	14	5	Yes
	Phenanthrene	14	3	No
	Pyrene	14	9	Yes
	RRO	13	6	Yes
	Toluene	14	1	No
	Xylenes	14	1	No

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Table 3 - Mann-Kendall Results Summary
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Location	Analyte	Statistic (S)	Standard Deviation of S	Standardized Value of S	p-value	Coefficient of Variation	Trend	Stability	Historical Concentration Ranges (micrograms per liter)
Tank 12	Acenaphthene	-47	20.02	-2.297	0.0108	1.31	**Decreasing**	Unstable	< 0.0021 - 0.6
	Anthracene	-22	20.12	-1.044	0.148	1.294	No Trend	Unstable	< 0.0031 - 0.436
	Benzo(a)anthracene	-12	20.18	-0.545	0.293	1.137	No Trend	Unstable	0.0064 J,B - 0.277
	Benzo(a)pyrene	-2	20.13	-0.0497	0.48	0.936	No Trend	Stable	< 0.0095 - 0.139
	Benzo(g,h,i)perylene	6	20.18	0.248	0.402	0.699	No Trend	Stable	< 0.0095 - < 0.1
	Chrysene	8	20.18	0.347	0.364	1.104	No Trend	Unstable	< 0.0095 - 0.495
	DRO	-34	20.18	-1.635	0.051	0.592	**Decreasing**	Stable	280 B - 2600
	Fluoranthene	2	20.12	0.0497	0.48	0.897	No Trend	Stable	< 0.0021 - < 0.21
	Fluorene	-10	19.9	-0.452	0.326	1.476	No Trend	Unstable	< 0.0031 - 0.396
	Naphthalene	-24	19.77	-1.164	0.122	0.585	No Trend	Stable	< 0.013 - 0.2
	Phenanthrene	5	20.09	0.199	0.421	1.303	No Trend	Unstable	< 0.0041 - 0.495
	Pyrene	-34	20.18	-1.635	0.051	1.048	**Decreasing**	Unstable	0.035 B - 0.792
	RRO	-2	20.18	-0.0495	0.48	0.921	No Trend	Stable	160 - 2300
Tank 13	DRO	44	24.28	1.771	0.0383	0.865	**Increasing**	Stable	160 J - 3080
	Naphthalene	25	22.14	1.084	0.139	1.364	No Trend	Unstable	< 0.0096 - < 0.52
	Phenanthrene	26	22.12	1.13	0.129	1.636	No Trend	Unstable	< 0.0047 - < 0.52
	Pyrene	5	22.14	0.181	0.428	1.784	No Trend	Unstable	< 0.0047 - < 0.52
	RRO	53	20.16	2.58	0.0094	1.146	**Increasing**	Unstable	76 - 1700
Tank 16	Benzo(a)anthracene	-40	16.39	-2.379	0.00867	2.914	**Decreasing**	Unstable	0.045 - 37
	Benzo(a)pyrene	-28	16.39	-1.647	0.0498	2.608	**Decreasing**	Unstable	< 0.0182 - 35
	Benzo(b)fluoranthene	-28	16.39	-1.647	0.0498	2.659	**Decreasing**	Unstable	0.023 J - 81
	Benzo(g,h,i)perylene	-20	16.39	-1.159	0.123	2.586	No Trend	Unstable	0.021 B - 44
	Benzo(k)fluoranthene	-38	16.39	-2.257	0.012	2.546	**Decreasing**	Unstable	0.034 J - 23
	Chrysene	-33	16.36	-1.956	0.0252	2.618	**Decreasing**	Unstable	0.018 B - 35
	Dibenzo(a,h)anthracene	-32	16.39	-1.891	0.0293	2.687	**Decreasing**	Unstable	0.01 - 12
	DRO	-44	16.39	-2.623	0.00435	2.693	**Decreasing**	Unstable	2200 - 220000
	Fluoranthene	-31	16.36	-1.834	0.0334	1.331	**Decreasing**	Unstable	< 0.0446 - 5.1 J
	Fluorene	-3	16.36	-0.122	0.451	2.373	No Trend	Unstable	< 0.0095 - 3
	Indeno(1,2,3-c,d)perylene	-30	16.39	-1.769	0.0384	2.405	**Decreasing**	Unstable	0.037 - 38
	Naphthalene	-28	16.39	-1.647	0.0498	1.771	**Decreasing**	Unstable	0.029 J - < 2.6
	Pyrene	-30	16.39	-1.769	0.0384	2.912	**Decreasing**	Unstable	< 0.0455 - 95
	RRO	-21	12.85	-1.557	0.0597	2.696	No Trend	Unstable	430 - 56000
Tank 17	Acenaphthene	3	20.21	0.099	0.461	2.129	No Trend	Unstable	< 0.0023 - 10
	Acenaphthylene	19	20.21	0.891	0.187	2.395	No Trend	Unstable	< 0.0023 - 8.8
	Anthracene	-9	20.21	-0.396	0.346	1.682	No Trend	Unstable	< 0.0034 - 21
	Benzo(a)anthracene	11	20.21	0.495	0.31	1.624	No Trend	Unstable	0.0079 JB - 1.87 J
	Benzo(b)fluoranthene	8	20.18	0.347	0.364	1.407	No Trend	Unstable	< 0.0092 - < 4.46
	Benzo(g,h,i)perylene	3	20.21	0.099	0.461	1.599	No Trend	Unstable	0.0059 JB - 1.7 J
	Benzo(k)fluoranthene	23	20.21	1.089	0.138	1.757	No Trend	Unstable	< 0.0095 - < 4.46
	Chrysene	-9	20.21	-0.396	0.346	1.539	No Trend	Unstable	0.0071 JB - 4.52
	DRO	-8	20.18	-0.347	0.364	2.653	No Trend	Unstable	1600 - 2780000
	Fluoranthene	-9	20.21	-0.396	0.346	1.378	No Trend	Unstable	< 0.0023 - 7.5
	Fluorene	-9	20.21	-0.396	0.346	2.315	No Trend	Unstable	< 0.0034 - 54
	GRO	38	19.85	1.864	0.0312	1.103	**Increasing**	Unstable	< 10 - < 330
	Indeno(1,2,3-c,d)perylene	23	20.21	1.089	0.138	1.72	No Trend	Unstable	0.0088 J - < 4.46
	Naphthalene	10	20.18	0.446	0.328	1.673	No Trend	Unstable	< 0.015 - < 8.93
	Phenanthrene	-2	20.18	-0.0495	0.48	2.04	No Trend	Unstable	< 0.0046 - 205
	Pyrene	-19	20.21	-0.891	0.187	1.799	No Trend	Unstable	< 0.0046 - 17.4
	RRO	16	16.39	0.915	0.18	2.41	No Trend	Unstable	< 76 - 66300

Table 3 - Mann-Kendall Results Summary
Cut and Cover Tank Tunnel Trend Analysis, Rocky Point Management Area, Dutch Harbor, Alaska

Location	Analyte	Statistic (S)	Standard Deviation of S	Standardized Value of S	p-value	Coefficient of Variation	Trend	Stability	Historical Concentration Ranges (micrograms per liter)
Tank 18	Acenaphthene	-6	18.18	-0.275	0.392	2.22	No Trend	Unstable	< 0.0021 - 3
	Anthracene	-9	18.21	-0.439	0.33	3.259	No Trend	Unstable	< 0.0031 - 9
	Benzo(a)anthracene	-22	18.24	-1.151	0.125	1.966	No Trend	Unstable	0.0064 JB - 2
	Benzo(a)pyrene	-18	18.24	-0.932	0.176	1.692	No Trend	Unstable	0.0041 JB - 0.9
	Benzo(b)fluoranthene	-21	18.27	-1.095	0.137	1.674	No Trend	Unstable	< 0.0083 - < 0.893
	Benzo(g,h,i)perylene	-13	18.27	-0.657	0.256	1.643	No Trend	Unstable	0.0043 JB - 0.7
	Chrysene	-23	18.27	-1.204	0.114	2.032	No Trend	Unstable	0.0065 JB - 3
	Dibenzo(a,h)anthracene	-4	18.24	-0.164	0.435	1.191	No Trend	Unstable	0.0048 JB - < 0.357
	DRO	-10	18.24	-0.493	0.311	1.866	No Trend	Unstable	170 J - 73900
	Fluoranthene	-4	18.24	-0.164	0.435	2.062	No Trend	Unstable	< 0.0021 - 2
	Fluorene	-2	18.24	-0.0548	0.478	2.467	No Trend	Unstable	< 0.0031 - 4
	Indeno(1,2,3-c,d)perylene	0	18.24	N/A	N/A	1.584	No Trend	Unstable	< 0.0072 - < 0.893
	Naphthalene	-7	18.21	-0.329	0.371	1.484	No Trend	Unstable	< 0.013 - < 1.79
	Pyrene	-43	18.27	-2.299	0.0107	2.392	**Decreasing**	Unstable	0.0282 J, JD - 15
	RRO	-9	16.36	-0.489	0.312	2.06	No Trend	Unstable	< 76 - 30000

Notes:
Values calculated with ProUCL; non-detect values entered at the reporting limit with a designator of "0".
A negative S value with confidence > 95% indicates a decreasing concentration trend.
A positive S value with confidence > 95% indicates an increasing concentration trend.
Any S value with confidence < 95% indicates there is likely no significant concentration trend.
A coefficient of variation < 1 indicates concentrations are stable regardless of the trend. The closer to zero the coefficient of variation, the less variation in concentations between sampling events.

ATTACHMENT 3

TREND DIAGRAMS

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Tank Tunnel 12

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	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:27:23 PM	
From File	Tank12_Acenaphthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Acenaphthene

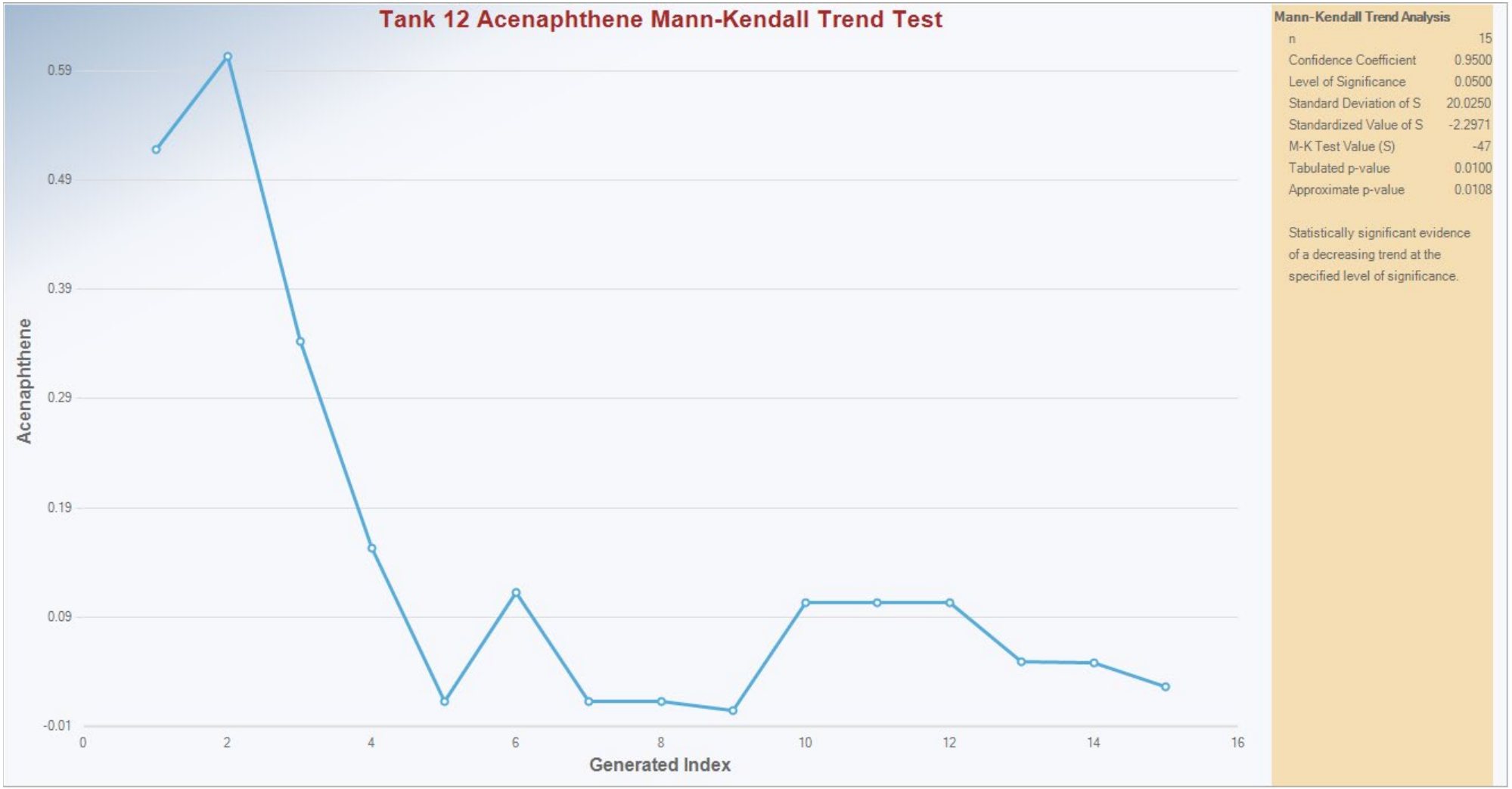
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0021
Maximum	0.6
Mean	0.144
Geometric Mean	0.0558
Median	0.1
Standard Deviation	0.189
Coefficient of Variation	1.31

Mann-Kendall Test

M-K Test Value (S)	-47
Tabulated p-value	0.01
Standard Deviation of S	20.02
Standardized Value of S	-2.297
Approximate p-value	0.0108

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


Tank 12 Acenaphthene Mann-Kendall Trend Test
0.59
0.49
0.39
0.29
0.19
0.09
-0.01
Acenaphthene
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.0250
Standardized Value of S -2.2971
M-K Test Value (S) -47
Tabulated p-value 0.0100
Approximate p-value 0.0108
Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:46:35 PM	
From File	Tank12_Anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Anthracene

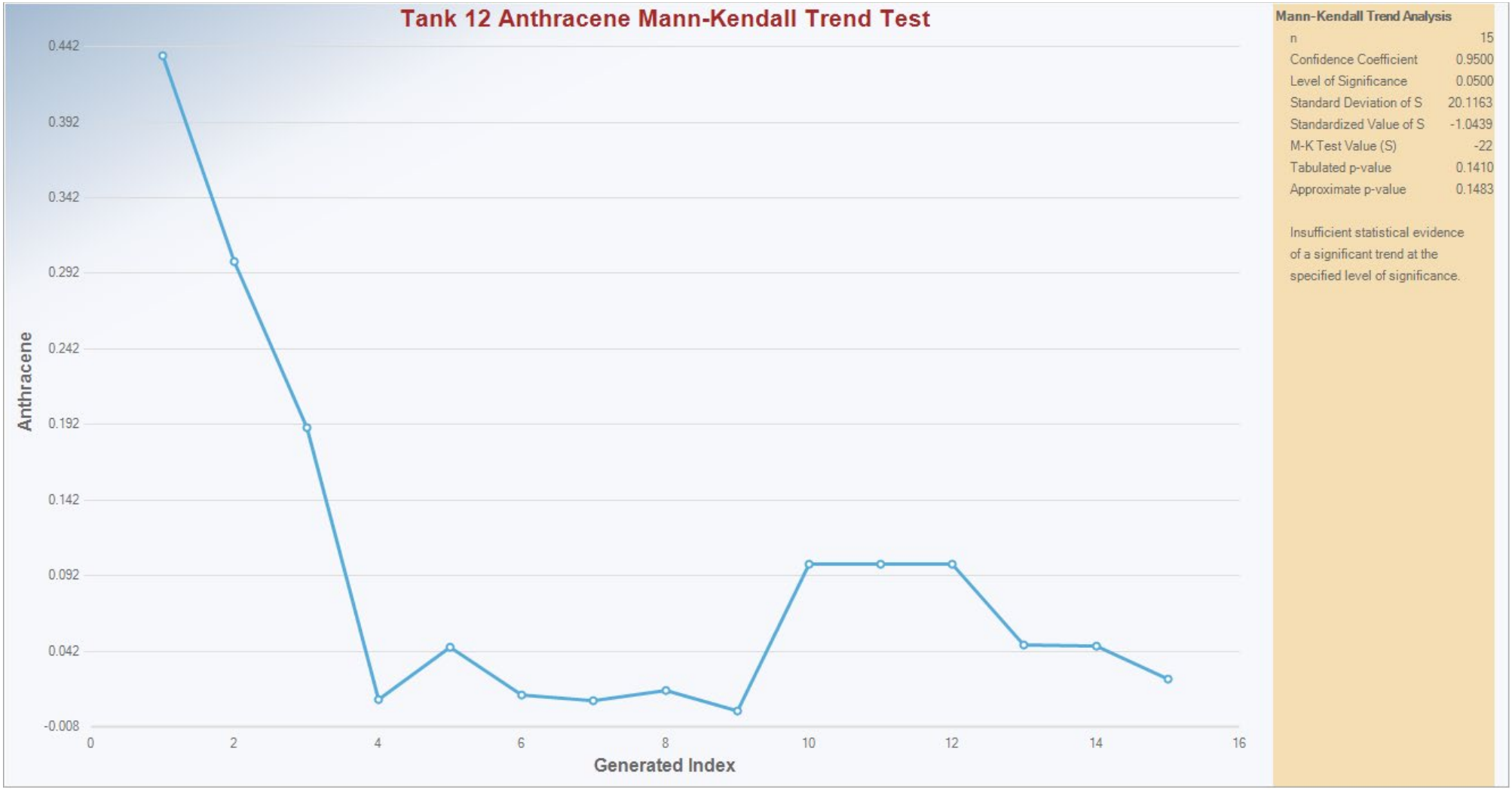
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0031
Maximum	0.436
Mean	0.0959
Geometric Mean	0.0432
Median	0.0455
Standard Deviation	0.124
Coefficient of Variation	1.294

Mann-Kendall Test

M-K Test Value (S)	-22
Tabulated p-value	0.141
Standard Deviation of S	20.12
Standardized Value of S	-1.044
Approximate p-value	0.148

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


Tank 12 Anthracene Mann-Kendall Trend Test
0.442
0.392
0.342
0.292
0.242
0.192
0.142
0.092
0.042
-0.008
Anthracene
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1163
Standardized Value of S -1.0439
M-K Test Value (S) -22
Tabulated p-value 0.1410
Approximate p-value 0.1483
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 2:36:33 PM	
From File	Tank12_Benzo(a)anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(a)anthracene

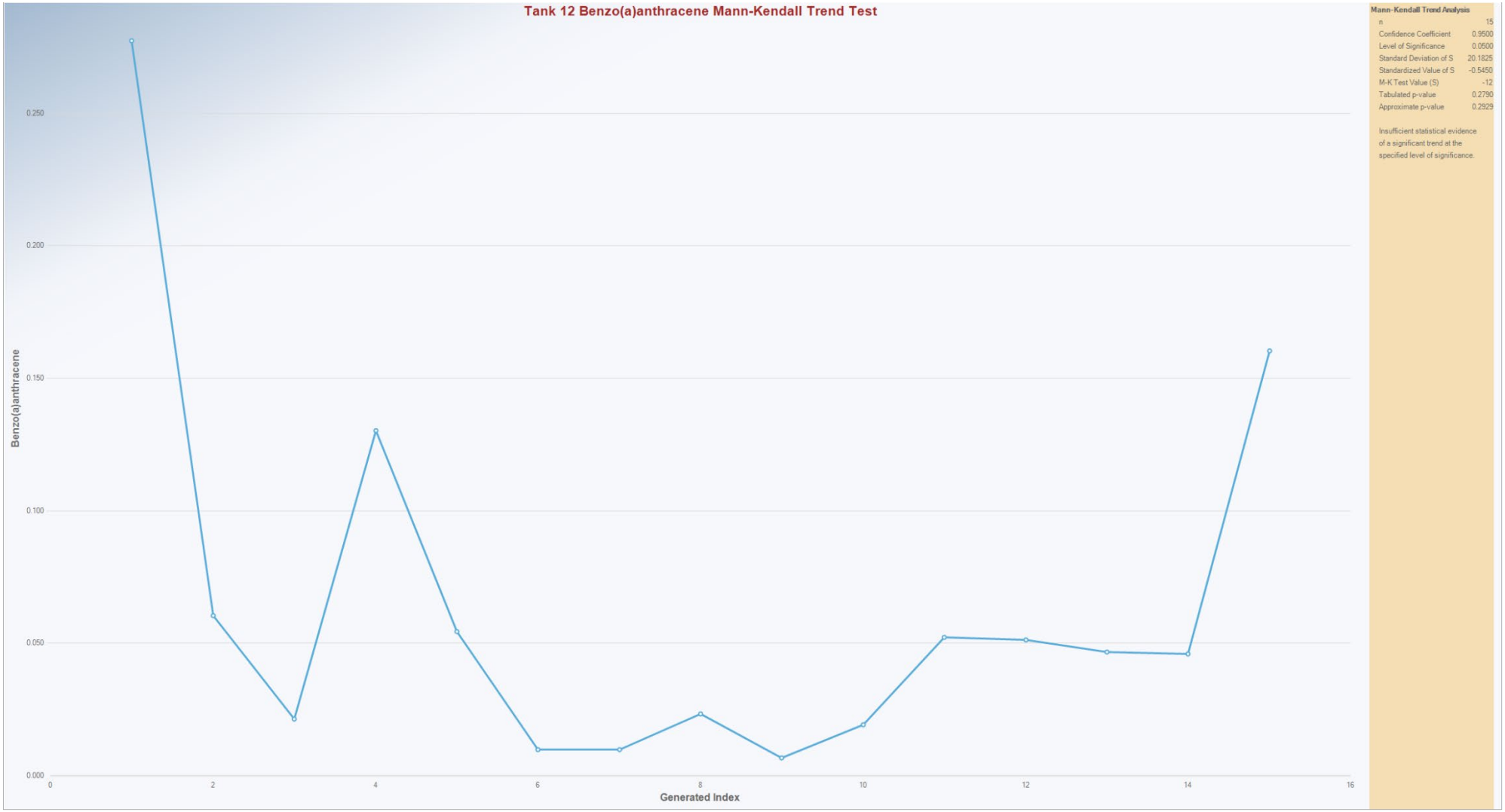
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0064
Maximum	0.277
Mean	0.0643
Geometric Mean	0.0383
Median	0.0463
Standard Deviation	0.0731
Coefficient of Variation	1.137

Mann-Kendall Test

M-K Test Value (S)	-12
Tabulated p-value	0.279
Standard Deviation of S	20.18
Standardized Value of S	-0.545
Approximate p-value	0.293

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


Tank 12 Benzo(a)anthracene Mann-Kendall Trend Test
Benzo(a)anthracene
0.250
0.200
0.150
0.100
0.050
0.000
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S -0.5450
M-K Test Value (S) -12
Tabulated p-value 0.2790
Approximate p-value 0.2929
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 2:38:43 PM	
From File	Tank12_Benzo(a)pyrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(a)pyrene

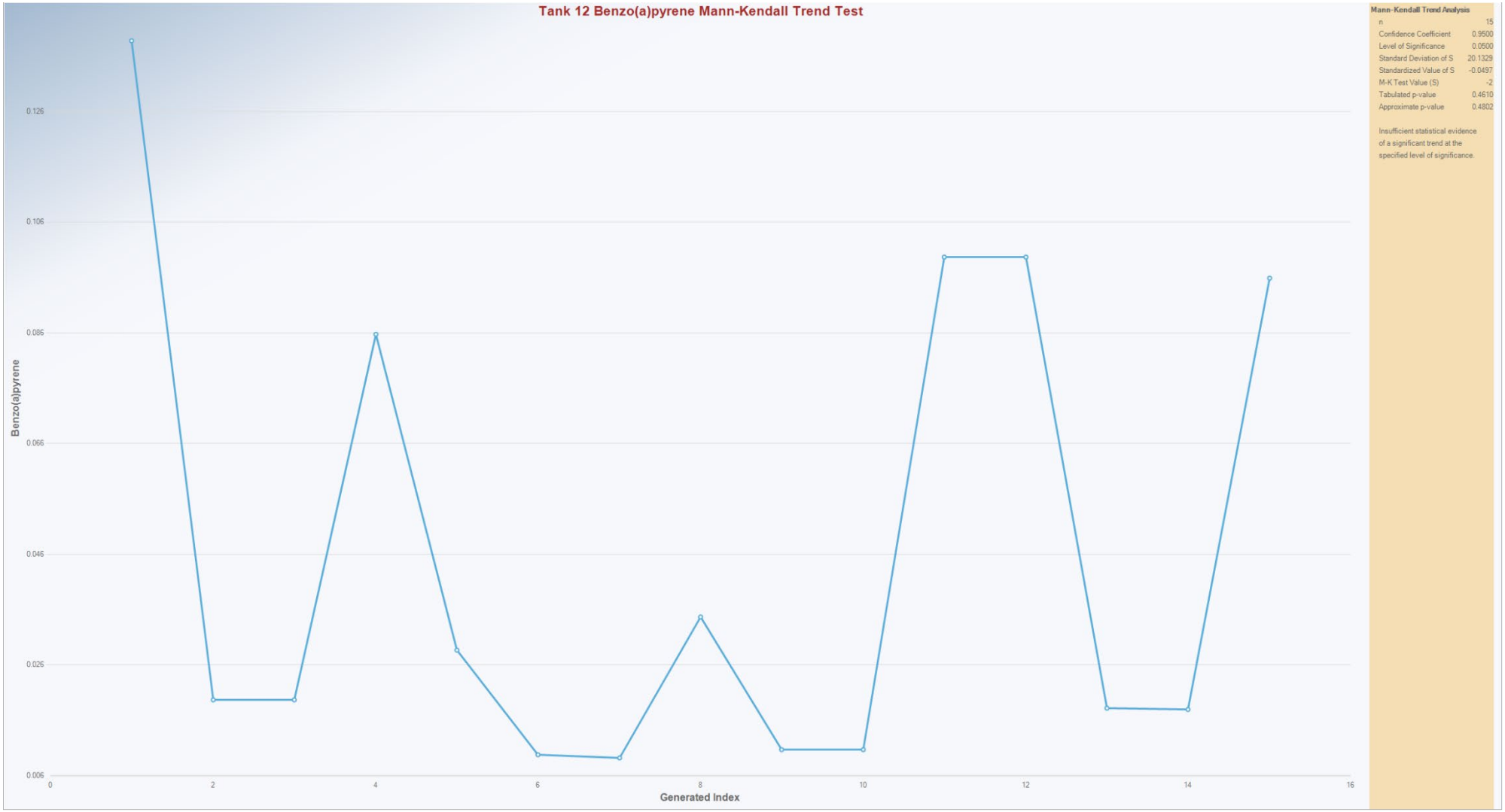
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0095
Maximum	0.139
Mean	0.0469
Geometric Mean	0.0305
Median	0.02
Standard Deviation	0.0439
Coefficient of Variation	0.936

Mann-Kendall Test

M-K Test Value (S)	-2
Tabulated p-value	0.461
Standard Deviation of S	20.13
Standardized Value of S	-0.0497
Approximate p-value	0.48

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


Tank 12 Benzo(a)pyrene Mann-Kendall Trend Test
Benzo(a)pyrene
0.126
0.106
0.086
0.066
0.046
0.026
0.006
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1329
Standardized Value of S -0.0497
M-K Test Value (S) -2
Tabulated p-value 0.4610
Approximate p-value 0.4802
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 3:01:42 PM	
From File	Tank12_Benzo(g,h,i)perylene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(g,h,i)perylene

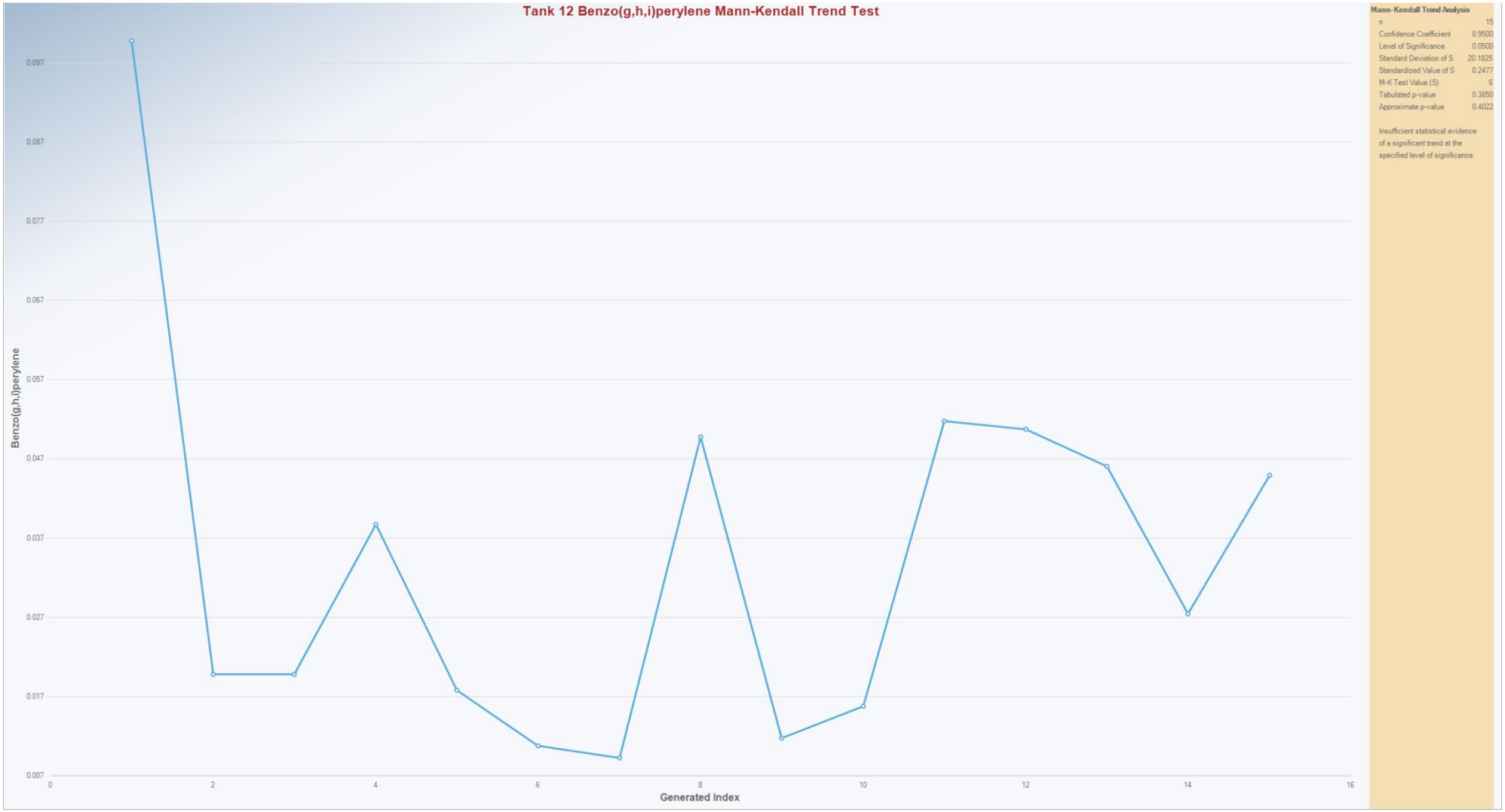
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0095
Maximum	0.1
Mean	0.0345
Geometric Mean	0.0277
Median	0.0277
Standard Deviation	0.0241
Coefficient of Variation	0.699

Mann-Kendall Test

M-K Test Value (S)	6
Tabulated p-value	0.385
Standard Deviation of S	20.18
Standardized Value of S	0.248
Approximate p-value	0.402

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


Tank 12 Benzo(g,h,i)perylene Mann-Kendall Trend Test
Benzo(g,h,i)perylene
0.097
0.087
0.077
0.067
0.057
0.047
0.037
0.027
0.017
0.007
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S 0.2477
M-K Test Value (S) 6
Tabulated p-value 0.3850
Approximate p-value 0.4022
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 2:42:55 PM	
From File	Tank12_Chrysene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Chrysene

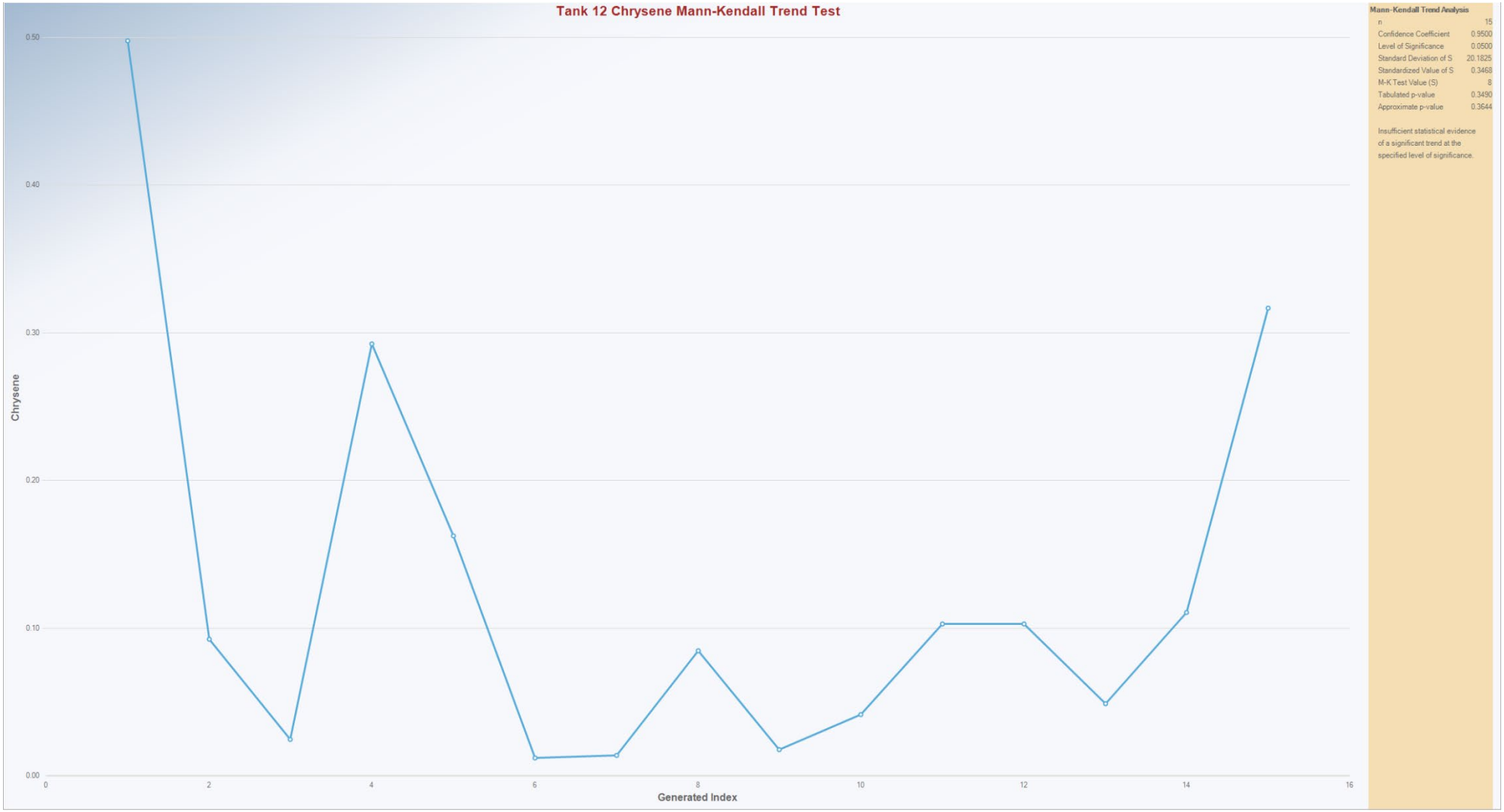
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0095
Maximum	0.495
Mean	0.125
Geometric Mean	0.0687
Median	0.09
Standard Deviation	0.138
Coefficient of Variation	1.104

Mann-Kendall Test

M-K Test Value (S)	8
Tabulated p-value	0.349
Standard Deviation of S	20.18
Standardized Value of S	0.347
Approximate p-value	0.364

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


Tank 12 Chrysene Mann-Kendall Trend Test
Chrysene
Generated Index
0.50
0.40
0.30
0.20
0.10
0.00
0
2
4
6
8
10
12
14
16
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S 0.3468
M-K Test Value (S) 8
Tabulated p-value 0.3490
Approximate p-value 0.3644
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:09:43 AM	
From File	Tank12_DRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

DRO

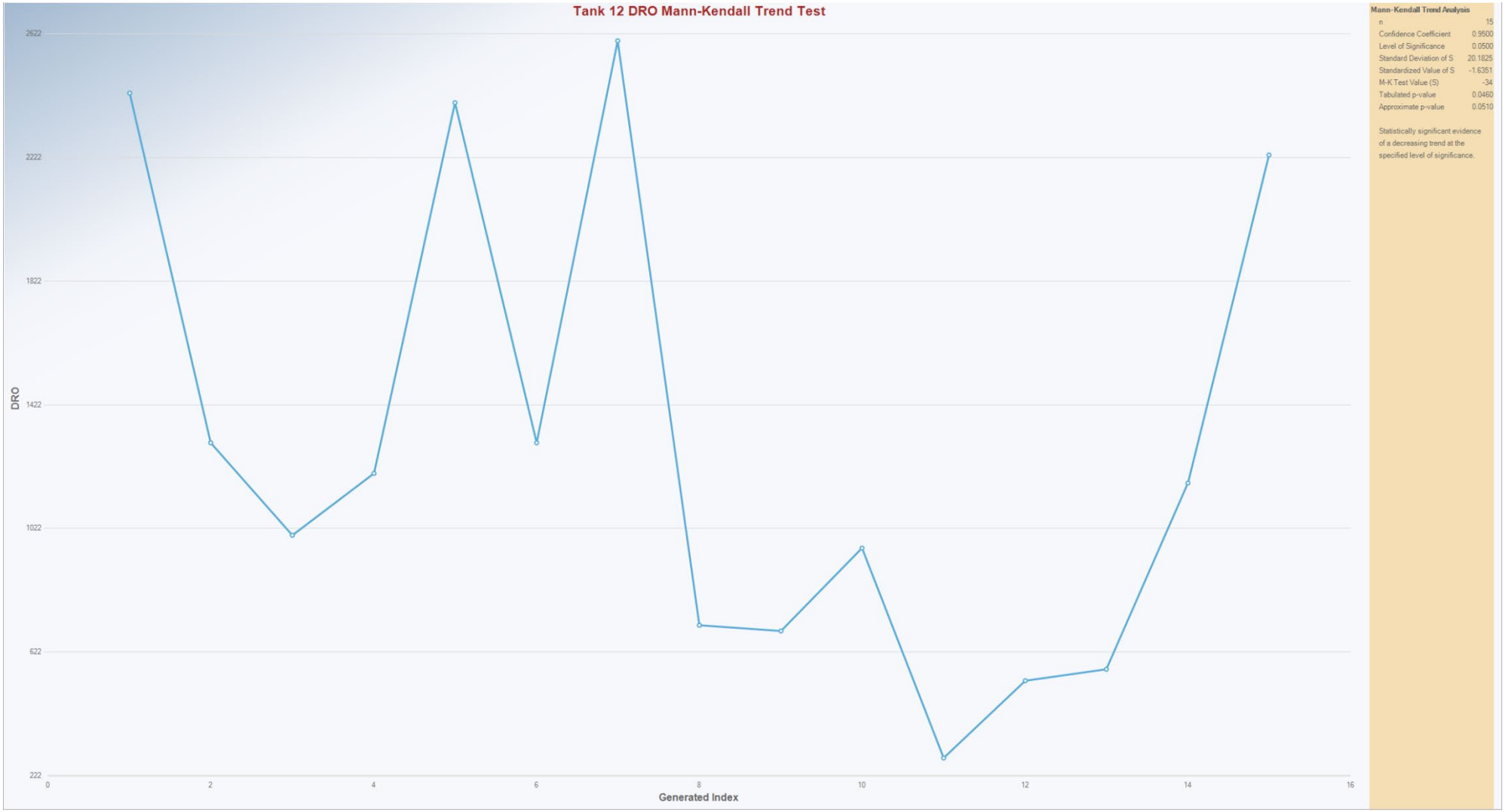
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	280
Maximum	2600
Mean	1291
Geometric Mean	1080
Median	1170
Standard Deviation	763.7
Coefficient of Variation	0.592

Mann-Kendall Test

M-K Test Value (S)	-34
Tabulated p-value	0.046
Standard Deviation of S	20.18
Standardized Value of S	-1.635
Approximate p-value	0.051

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


Tank 12 DRO Mann-Kendall Trend Test
DRO
2622
2222
1822
1422
1022
622
222
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S -1.6351
M-K Test Value (S) -34
Tabulated p-value 0.0460
Approximate p-value 0.0510
Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:33:14 PM	
From File	Tank12_Fluoranthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluoranthene

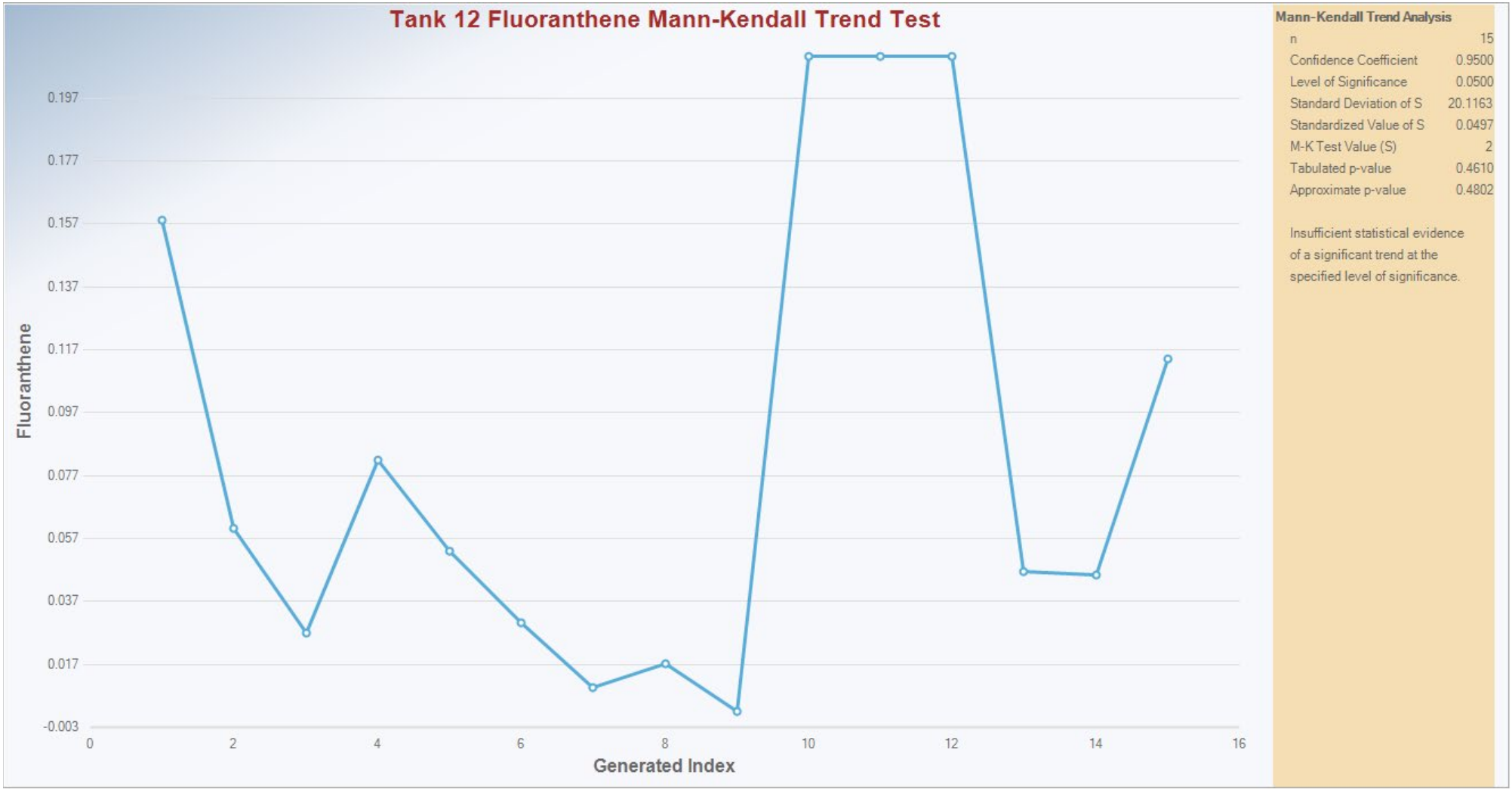
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0021
Maximum	0.21
Mean	0.085
Geometric Mean	0.0494
Median	0.053
Standard Deviation	0.0762
Coefficient of Variation	0.897

Mann-Kendall Test

M-K Test Value (S)	2
Tabulated p-value	0.461
Standard Deviation of S	20.12
Standardized Value of S	0.0497
Approximate p-value	0.48

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


Tank 12 Fluoranthene Mann-Kendall Trend Test
Fluoranthene
0.197
0.177
0.157
0.137
0.117
0.097
0.077
0.057
0.037
0.017
-0.003
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1163
Standardized Value of S 0.0497
M-K Test Value (S) 2
Tabulated p-value 0.4610
Approximate p-value 0.4802
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:35:46 PM	
From File	Tank12_Fluorene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluorene

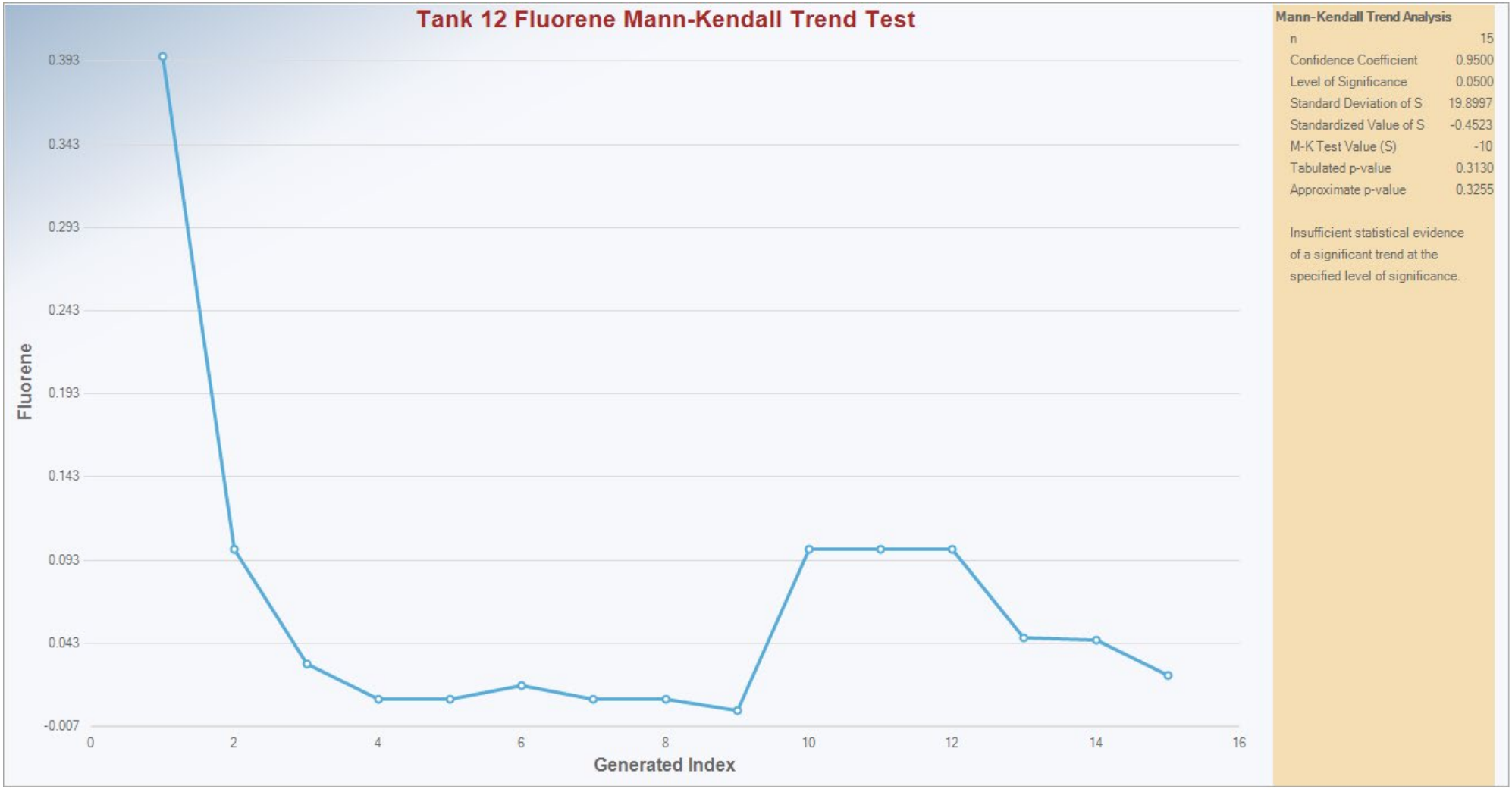
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0031
Maximum	0.396
Mean	0.0668
Geometric Mean	0.0315
Median	0.031
Standard Deviation	0.0987
Coefficient of Variation	1.476

Mann-Kendall Test

M-K Test Value (S)	-10
Tabulated p-value	0.313
Standard Deviation of S	19.9
Standardized Value of S	-0.452
Approximate p-value	0.326

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


Tank 12 Fluorene Mann-Kendall Trend Test
Fluorene
0.393
0.343
0.293
0.243
0.193
0.143
0.093
0.043
-0.007
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.8997
Standardized Value of S -0.4523
M-K Test Value (S) -10
Tabulated p-value 0.3130
Approximate p-value 0.3255
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:38:03 PM	
From File	Tank12_Naphthalene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Naphthalene

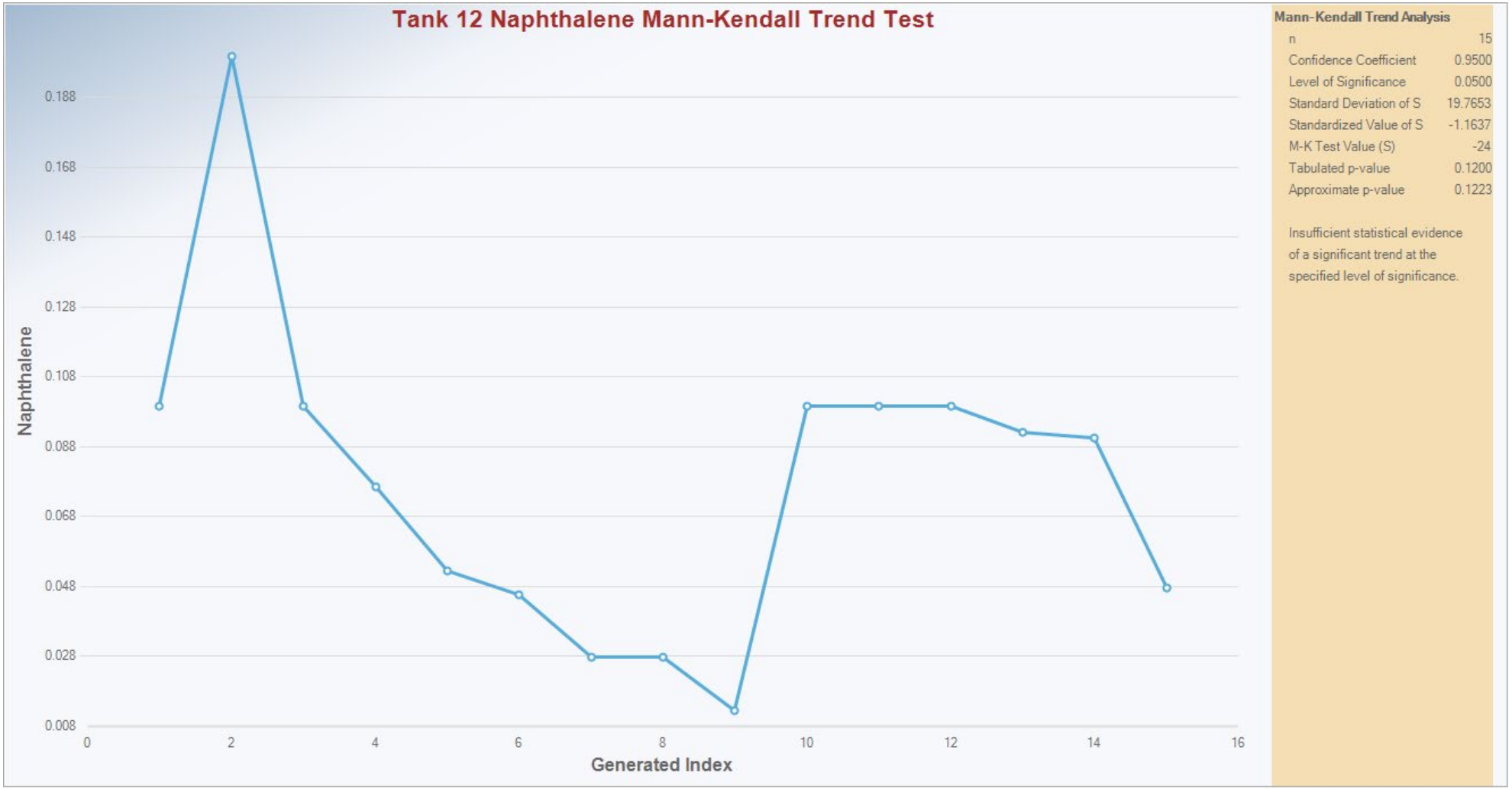
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.013
Maximum	0.2
Mean	0.0784
Geometric Mean	0.065
Median	0.0909
Standard Deviation	0.0459
Coefficient of Variation	0.585

Mann-Kendall Test

M-K Test Value (S)	-24
Tabulated p-value	0.12
Standard Deviation of S	19.77
Standardized Value of S	-1.164
Approximate p-value	0.122

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


Tank 12 Naphthalene Mann-Kendall Trend Test
Naphthalene
0.188
0.168
0.148
0.128
0.108
0.088
0.068
0.048
0.028
0.008
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.7653
Standardized Value of S -1.1637
M-K Test Value (S) -24
Tabulated p-value 0.1200
Approximate p-value 0.1223
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:40:12 PM	
From File	Tank12_Phenanthrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Phenanthrene

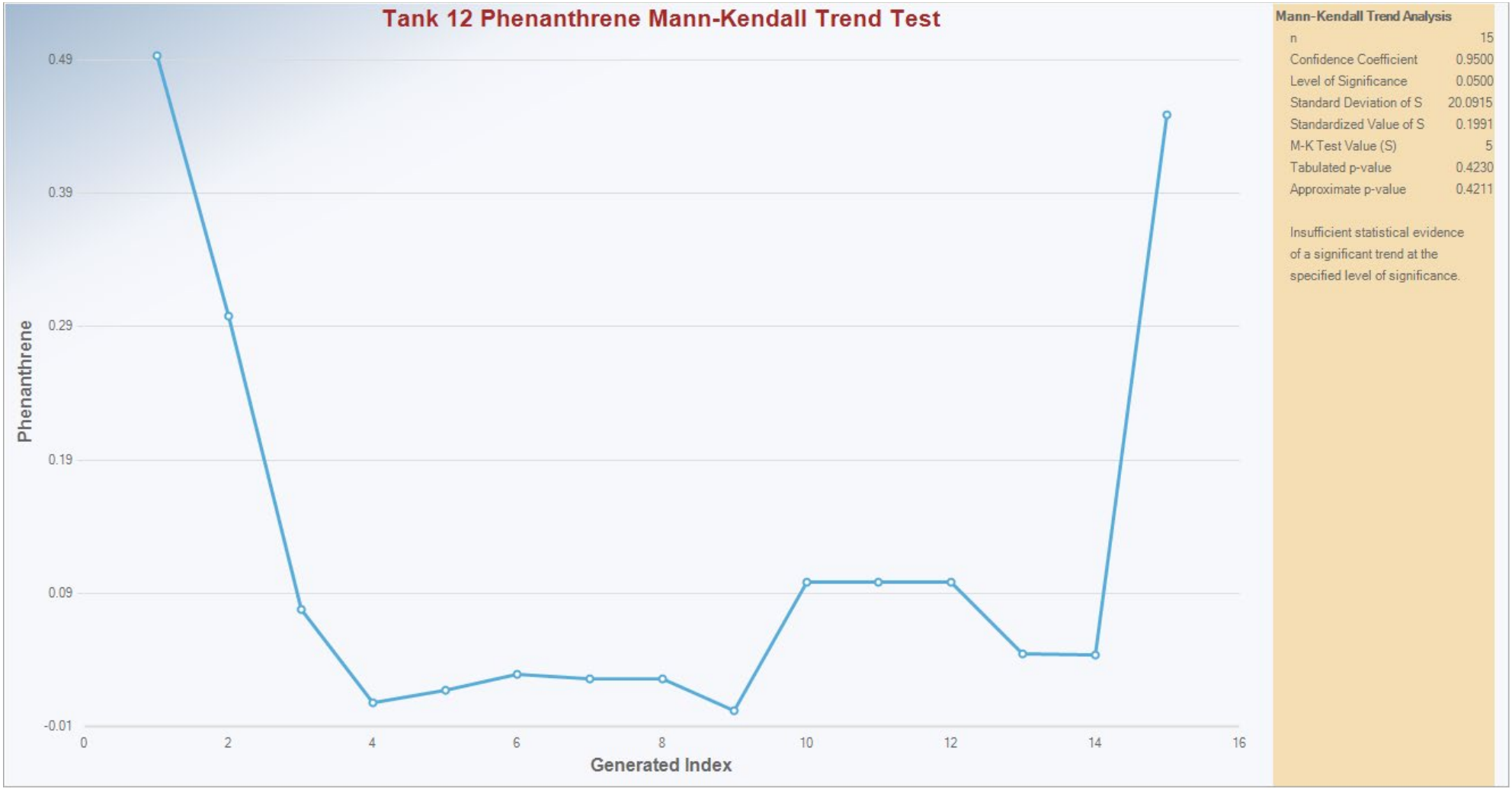
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0041
Maximum	0.495
Mean	0.123
Geometric Mean	0.0569
Median	0.0463
Standard Deviation	0.16
Coefficient of Variation	1.303

Mann-Kendall Test

M-K Test Value (S)	5
Tabulated p-value	0.423
Standard Deviation of S	20.09
Standardized Value of S	0.199
Approximate p-value	0.421

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


Tank 12 Phenanthrene Mann-Kendall Trend Test
0.49
0.39
0.29
0.19
0.09
-0.01
Phenanthrene
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.0915
Standardized Value of S 0.1991
M-K Test Value (S) 5
Tabulated p-value 0.4230
Approximate p-value 0.4211
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:42:02 PM
From File	Tank12_Pyrene_Inputs.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Pyrene

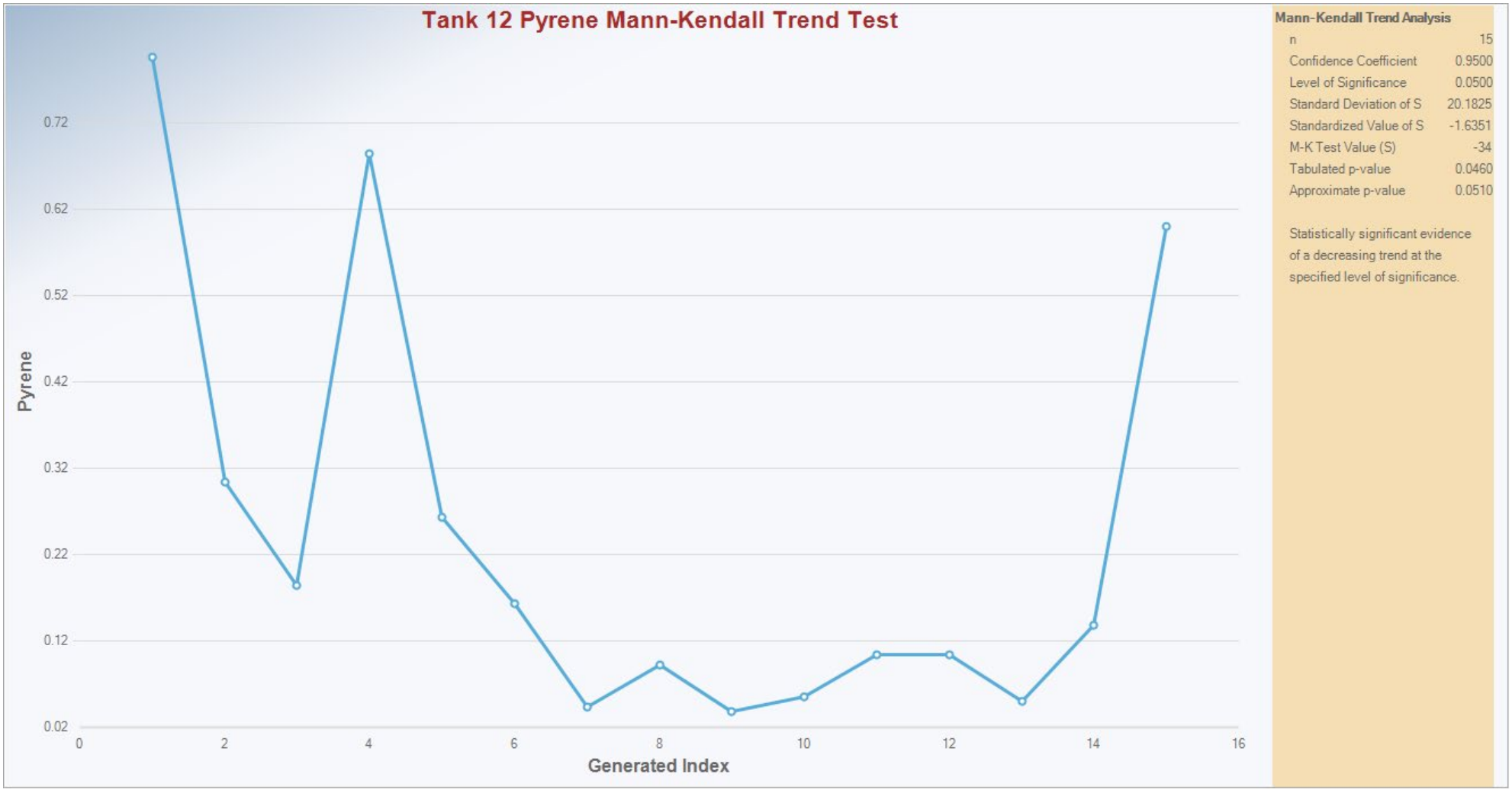
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.035
Maximum	0.792
Mean	0.238
Geometric Mean	0.146
Median	0.134
Standard Deviation	0.249
Coefficient of Variation	1.048

Mann-Kendall Test

M-K Test Value (S)	-34
Tabulated p-value	0.046
Standard Deviation of S	20.18
Standardized Value of S	-1.635
Approximate p-value	0.051

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


Tank 12 Pyrene Mann-Kendall Trend Test
Pyrene
0.72
0.62
0.52
0.42
0.32
0.22
0.12
0.02
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S -1.6351
M-K Test Value (S) -34
Tabulated p-value 0.0460
Approximate p-value 0.0510
Statistically significant evidence of a decreasing trend at the specified level of significance.

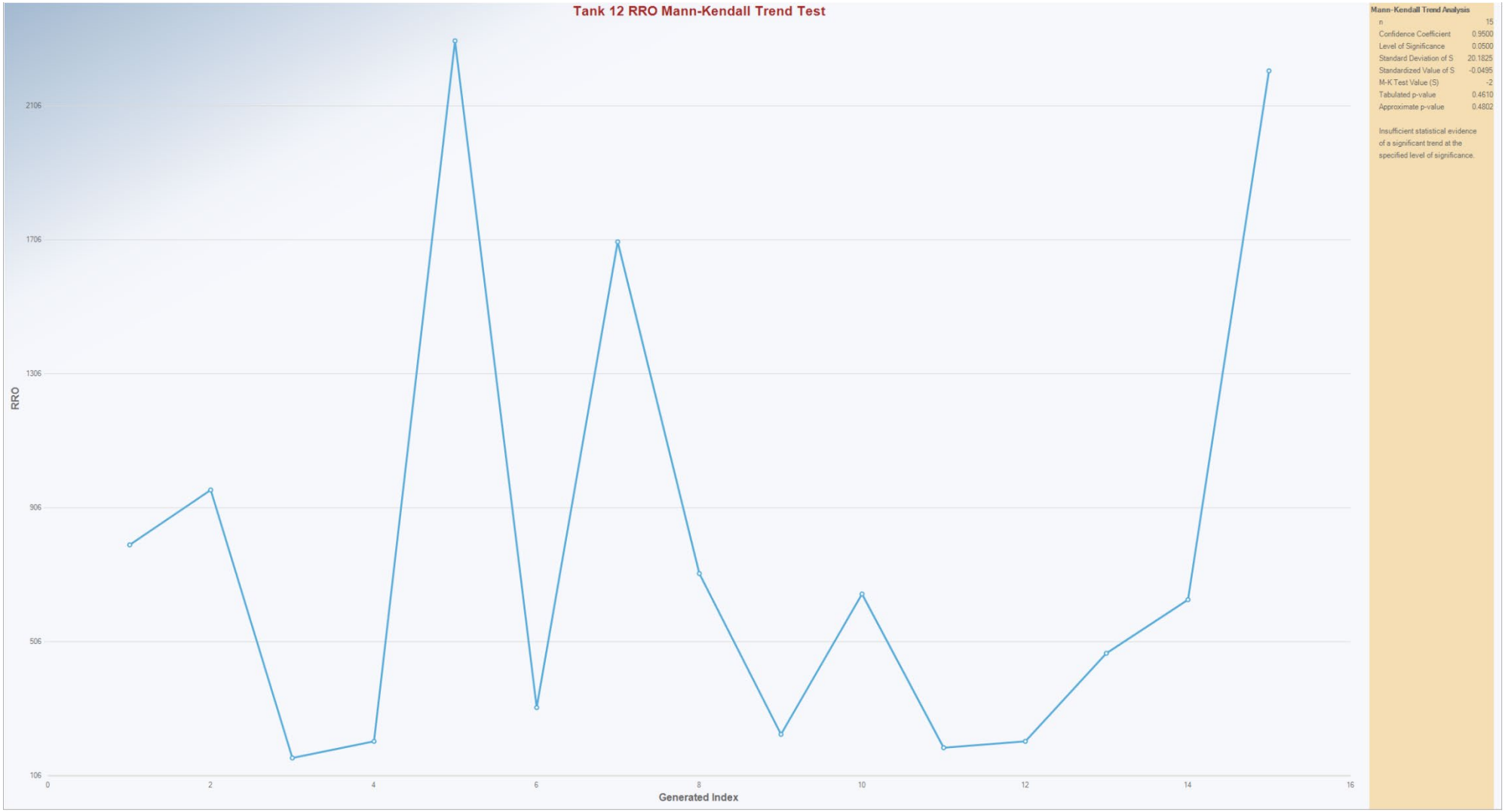
Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:15:49 AM	
From File	Tank12_RRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

RRO

General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	160
Maximum	2300
Mean	782.6
Geometric Mean	536.1
Median	632
Standard Deviation	721
Coefficient of Variation	0.921

Mann-Kendall Test	
M-K Test Value (S)	-2
Tabulated p-value	0.461
Standard Deviation of S	20.18
Standardized Value of S	-0.0495
Approximate p-value	0.48

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


Tank 12 RRO Mann-Kendall Trend Test
RRO
2106
1706
1306
906
506
106
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S -0.0495
M-K Test Value (S) -2
Tabulated p-value 0.4610
Approximate p-value 0.4802
Insufficient statistical evidence of a significant trend at the specified level of significance.

Tank Tunnel 13

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	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:17:20 AM	
From File	Tank13_DRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

DRO

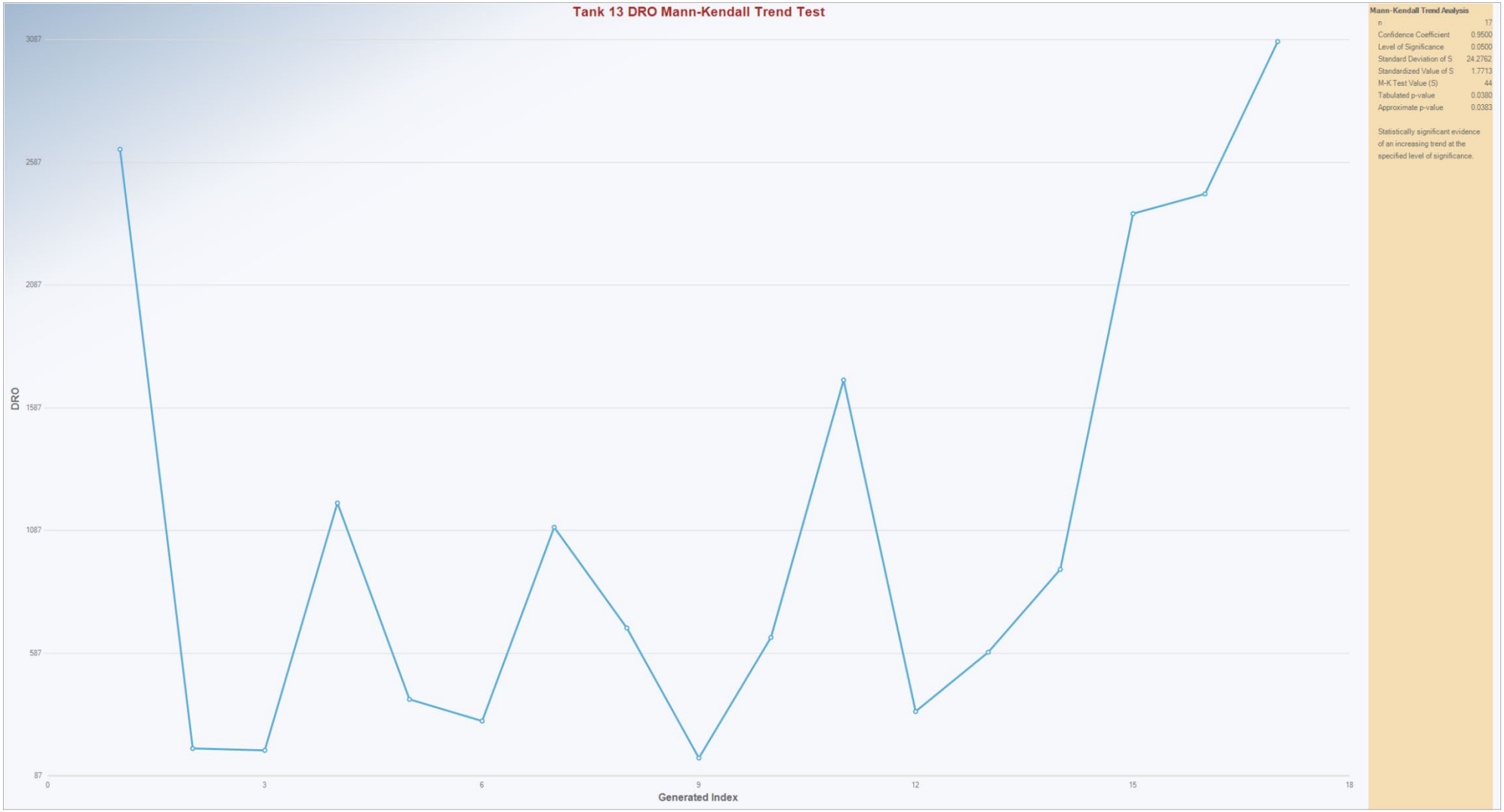
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	17
Number Values Reported (n)	17
Minimum	160
Maximum	3080
Mean	1119
Geometric Mean	746.5
Median	690
Standard Deviation	968.3
Coefficient of Variation	0.865

Mann-Kendall Test

M-K Test Value (S)	44
Tabulated p-value	0.038
Standard Deviation of S	24.28
Standardized Value of S	1.771
Approximate p-value	0.0383

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


Tank 13 DRO Mann-Kendall Trend Test
DRO
3087
2587
2087
1587
1087
587
87
0
3
6
9
12
15
18
Generated Index
Mann-Kendall Trend Analysis
n 17
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 24.2762
Standardized Value of S 1.7713
M-K Test Value (S) 44
Tabulated p-value 0.0380
Approximate p-value 0.0383
Statistically significant evidence of an increasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:54:56 PM	
From File	Tank13_Naphthalene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Naphthalene

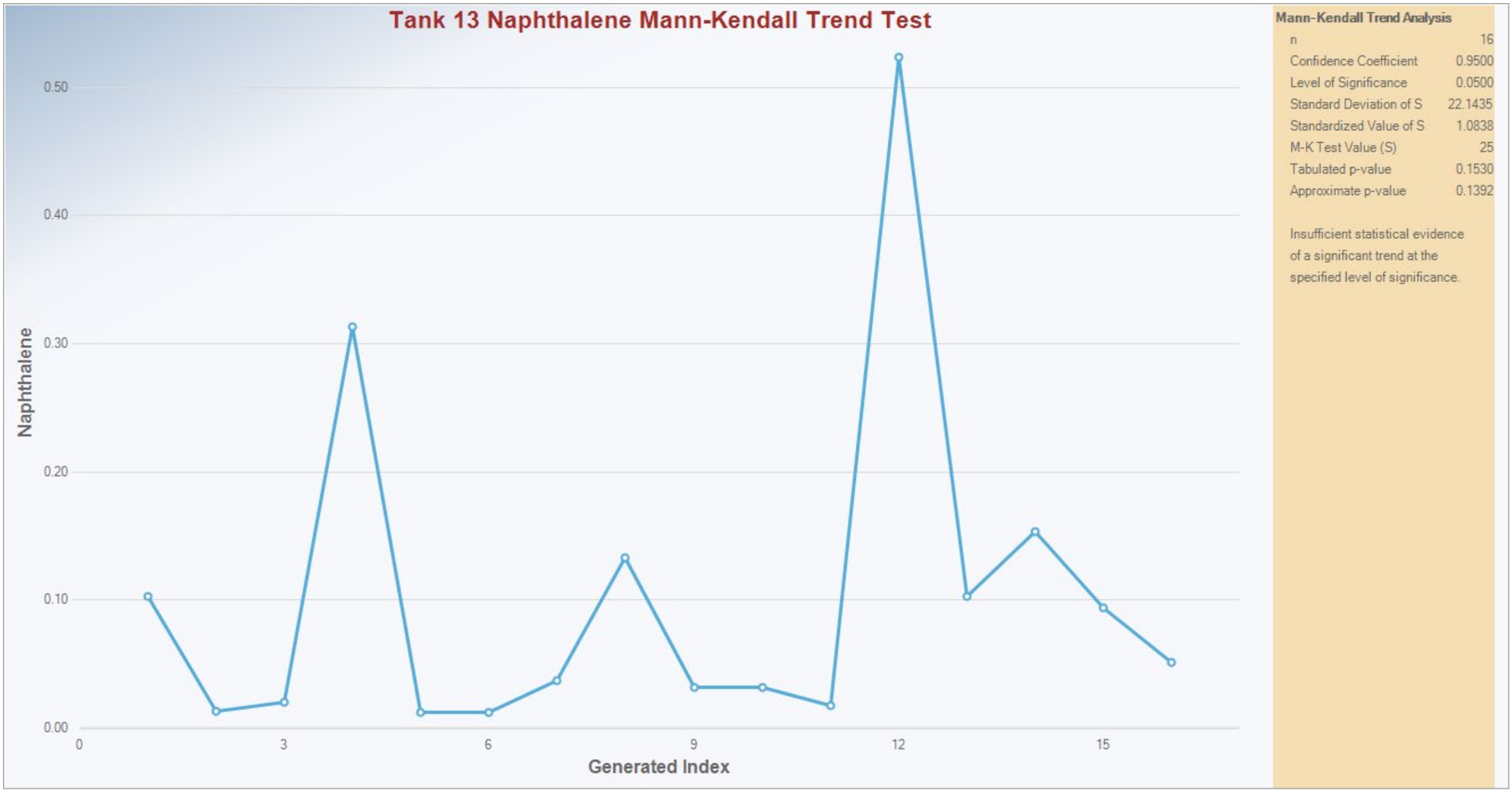
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	16
Number Values Reported (n)	16
Minimum	0.0096
Maximum	0.52
Mean	0.1
Geometric Mean	0.0485
Median	0.0411
Standard Deviation	0.137
Coefficient of Variation	1.364

Mann-Kendall Test

M-K Test Value (S)	25
Tabulated p-value	0.153
Standard Deviation of S	22.14
Standardized Value of S	1.084
Approximate p-value	0.139

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


Tank 13 Naphthalene Mann-Kendall Trend Test
Naphthalene
0.50
0.40
0.30
0.20
0.10
0.00
0
3
6
9
12
15
Generated Index
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1435
Standardized Value of S 1.0838
M-K Test Value (S) 25
Tabulated p-value 0.1530
Approximate p-value 0.1392
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:57:24 PM	
From File	Tank13_Phenanthrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Phenanthrene

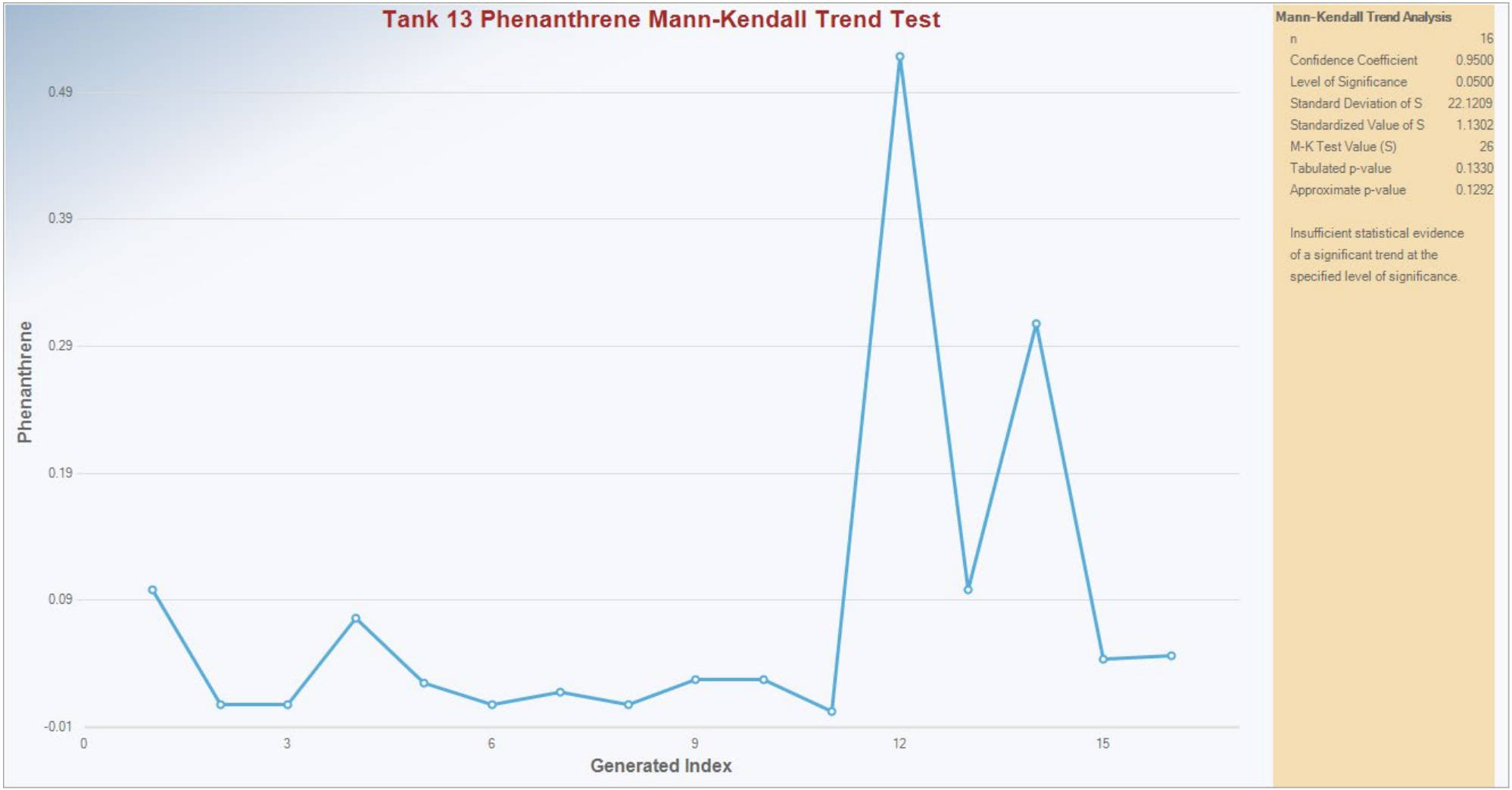
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	16
Number Values Reported (n)	16
Minimum	0.0047
Maximum	0.52
Mean	0.0844
Geometric Mean	0.0351
Median	0.029
Standard Deviation	0.138
Coefficient of Variation	1.636

Mann-Kendall Test

M-K Test Value (S)	26
Tabulated p-value	0.133
Standard Deviation of S	22.12
Standardized Value of S	1.13
Approximate p-value	0.129

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


Tank 13 Phenanthrene Mann-Kendall Trend Test
Phenanthrene
0.49
0.39
0.29
0.19
0.09
-0.01
0
3
6
9
12
15
Generated Index
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1209
Standardized Value of S 1.1302
M-K Test Value (S) 26
Tabulated p-value 0.1330
Approximate p-value 0.1292
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 3:59:22 PM	
From File	Tank13_Pyrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Pyrene

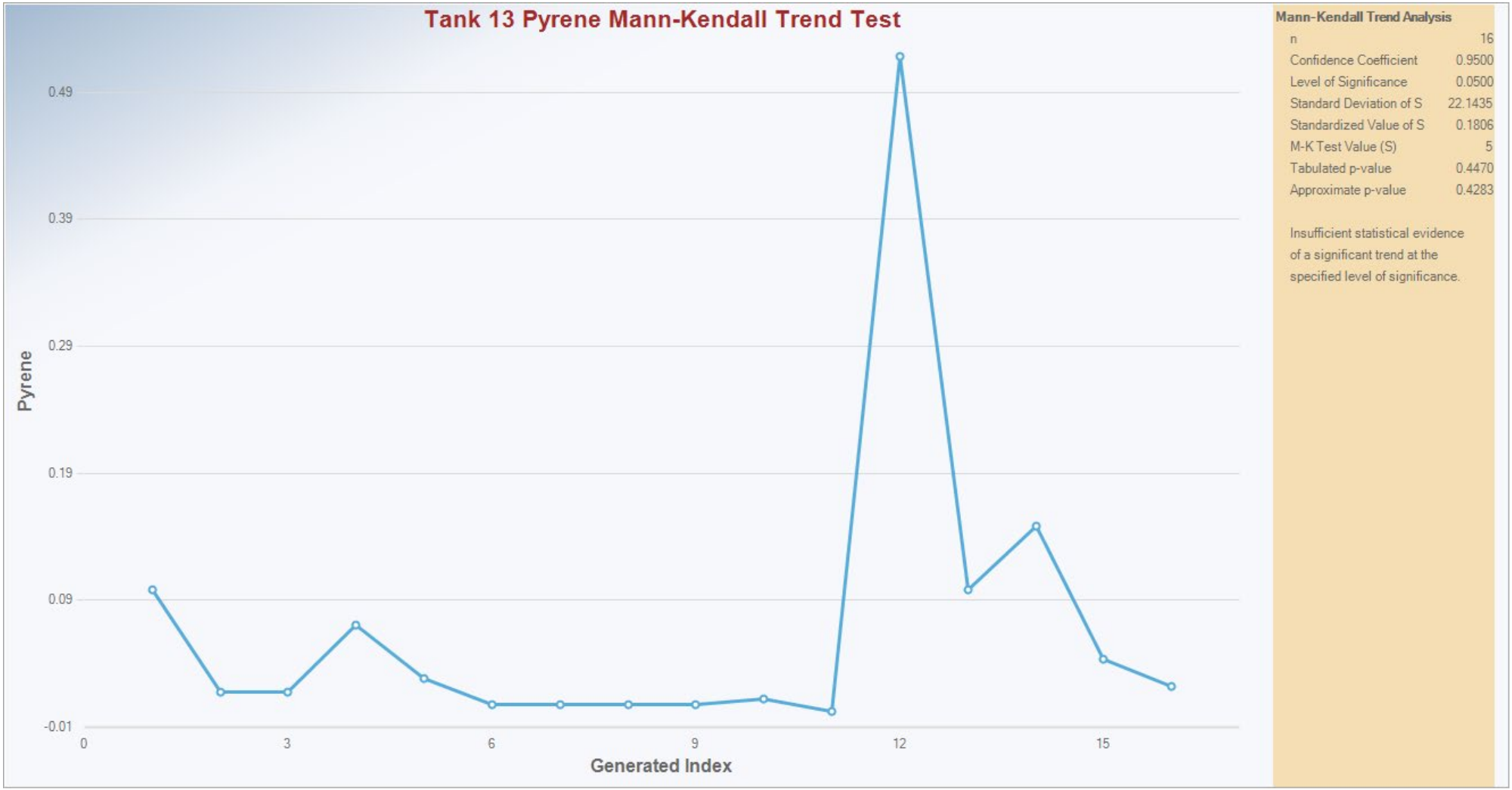
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	16
Number Values Reported (n)	16
Minimum	0.0047
Maximum	0.52
Mean	0.0712
Geometric Mean	0.03
Median	0.022
Standard Deviation	0.127
Coefficient of Variation	1.784

Mann-Kendall Test

M-K Test Value (S)	5
Tabulated p-value	0.447
Standard Deviation of S	22.14
Standardized Value of S	0.181
Approximate p-value	0.428

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


Tank 13 Pyrene Mann-Kendall Trend Test
Pyrene
0.49
0.39
0.29
0.19
0.09
-0.01
0
3
6
9
12
15
Generated Index
Mann-Kendall Trend Analysis
n 16
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 22.1435
Standardized Value of S 0.1806
M-K Test Value (S) 5
Tabulated p-value 0.4470
Approximate p-value 0.4283
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:19:05 AM	
From File	Tank13_RRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

RRO

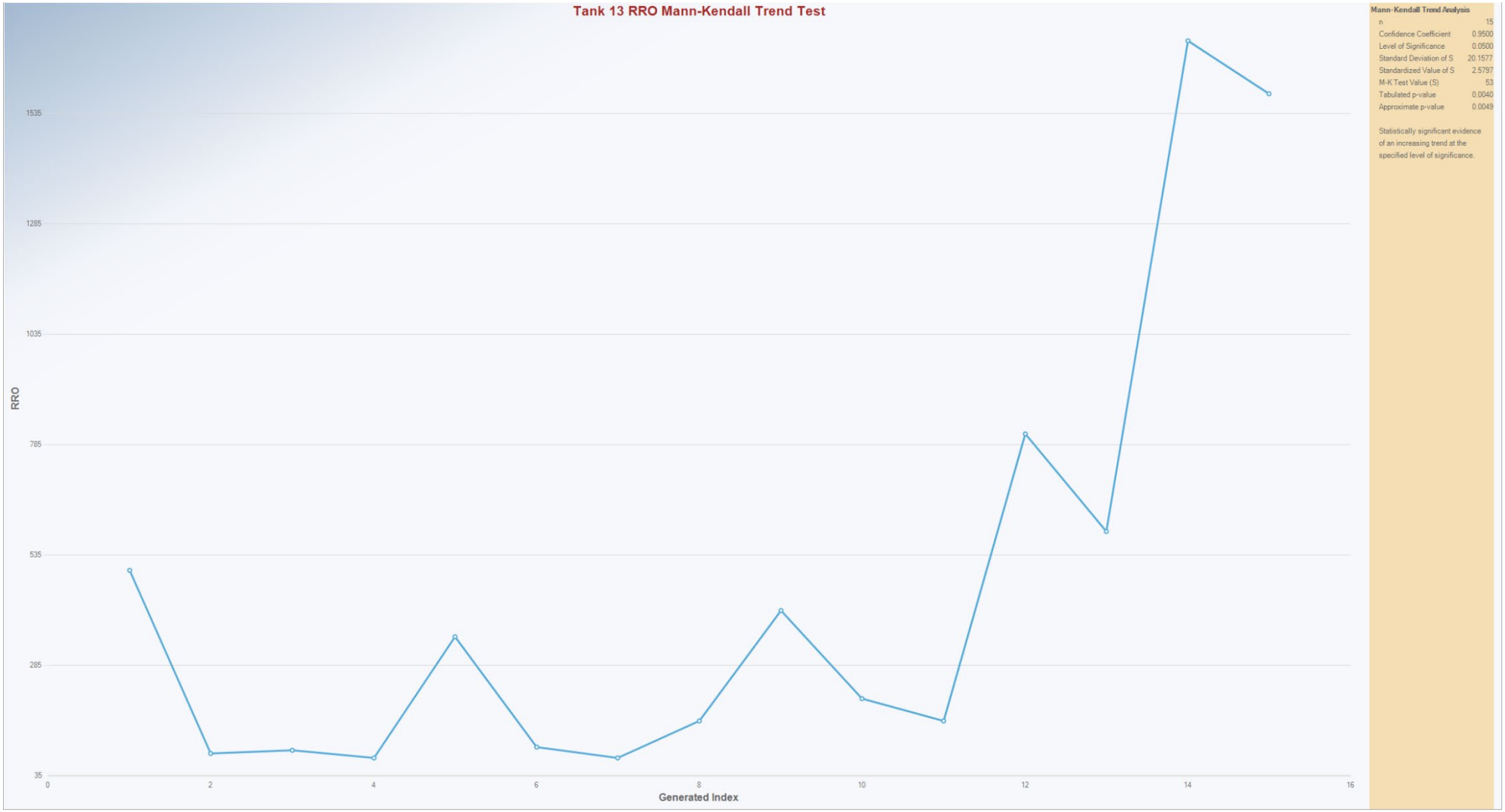
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	76
Maximum	1700
Mean	460
Geometric Mean	265.4
Median	210
Standard Deviation	527
Coefficient of Variation	1.146

Mann-Kendall Test

M-K Test Value (S)	53
Tabulated p-value	0.004
Standard Deviation of S	20.16
Standardized Value of S	2.58
Approximate p-value	0.00494

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


Tank 13 RRO Mann-Kendall Trend Test
RRO
1535
1285
1035
785
535
285
35
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1577
Standardized Value of S 2.5797
M-K Test Value (S) 53
Tabulated p-value 0.0040
Approximate p-value 0.0049
Statistically significant evidence of an increasing trend at the specified level of significance.

Tank Tunnel 16

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	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:20:37 AM	
From File	Tank16_Benzo(a)anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(a)anthracene

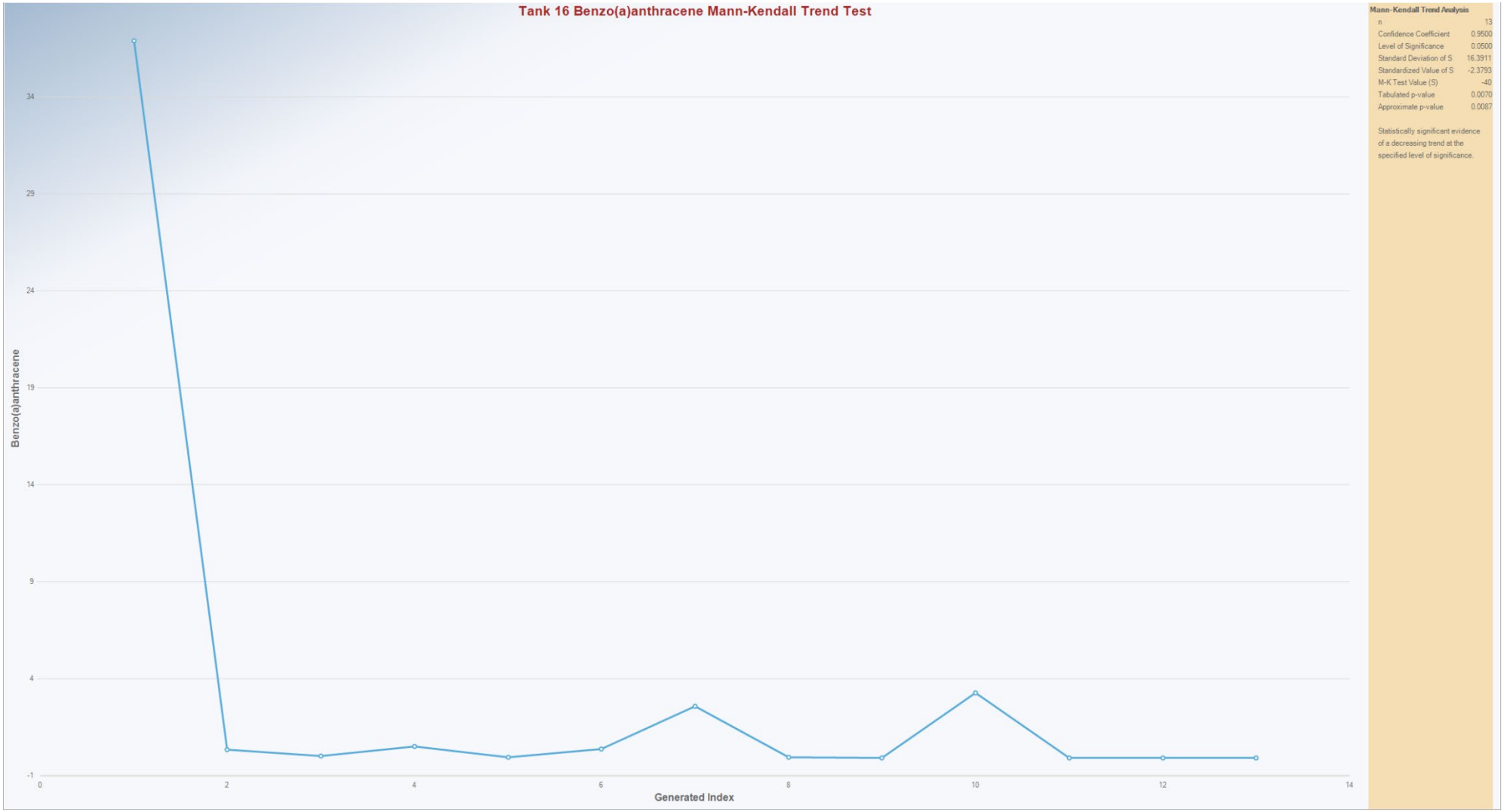
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.045
Maximum	37
Mean	3.477
Geometric Mean	0.307
Median	0.13
Standard Deviation	10.13
Coefficient of Variation	2.914

Mann-Kendall Test

M-K Test Value (S)	-40
Tabulated p-value	0.007
Standard Deviation of S	16.39
Standardized Value of S	-2.379
Approximate p-value	0.00867

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


Tank 16 Benzo(a)anthracene Mann-Kendall Trend Test
Benzo(a)anthracene
34
29
24
19
14
9
4
-1
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -2.3793
M-K Test Value (S) -40
Tabulated p-value 0.0070
Approximate p-value 0.0087
Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:23:52 AM	
From File	Tank16_Benzo(a)pyrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(a)pyrene

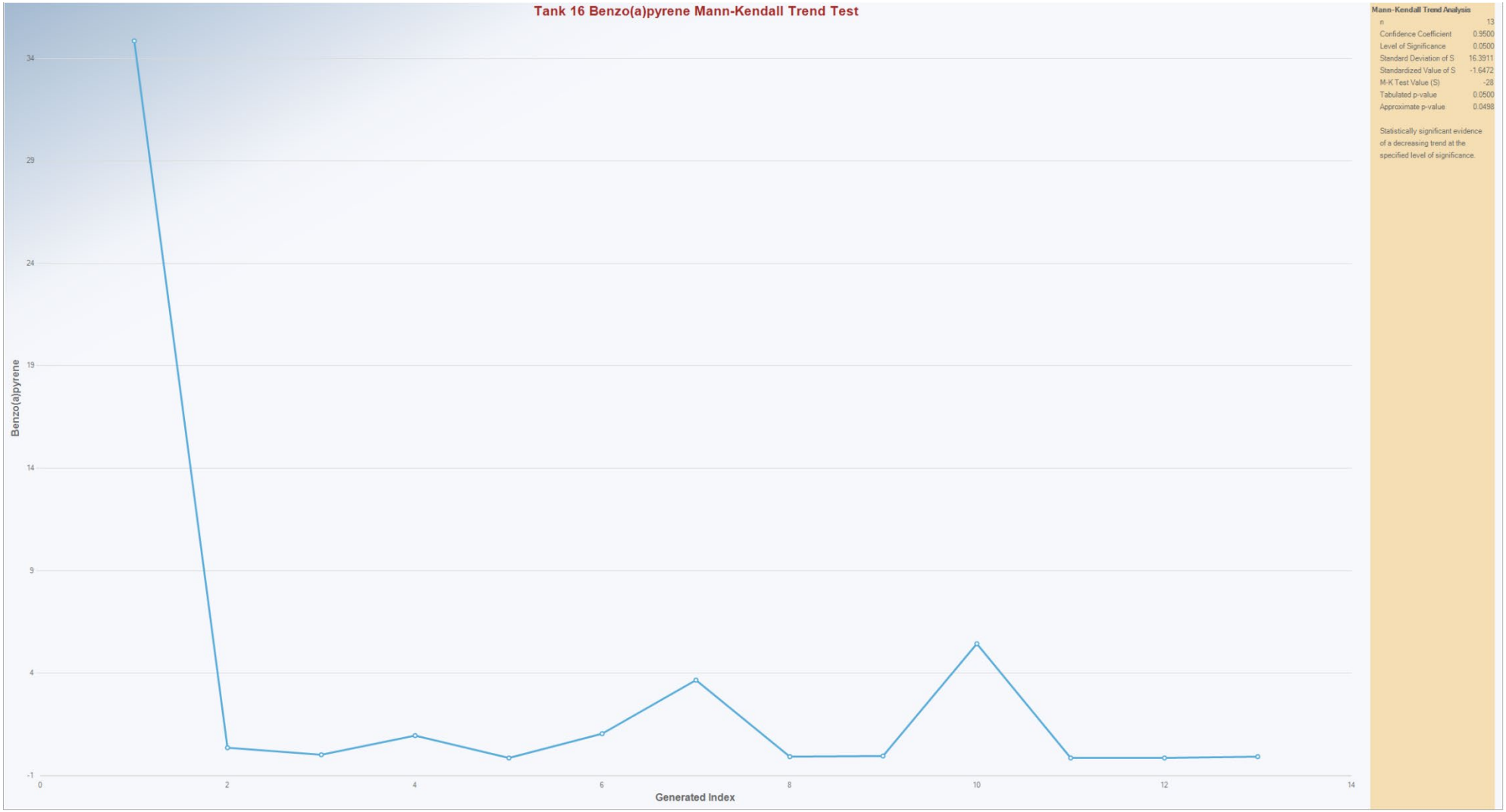
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.0182
Maximum	35
Mean	3.669
Geometric Mean	0.322
Median	0.18
Standard Deviation	9.569
Coefficient of Variation	2.608

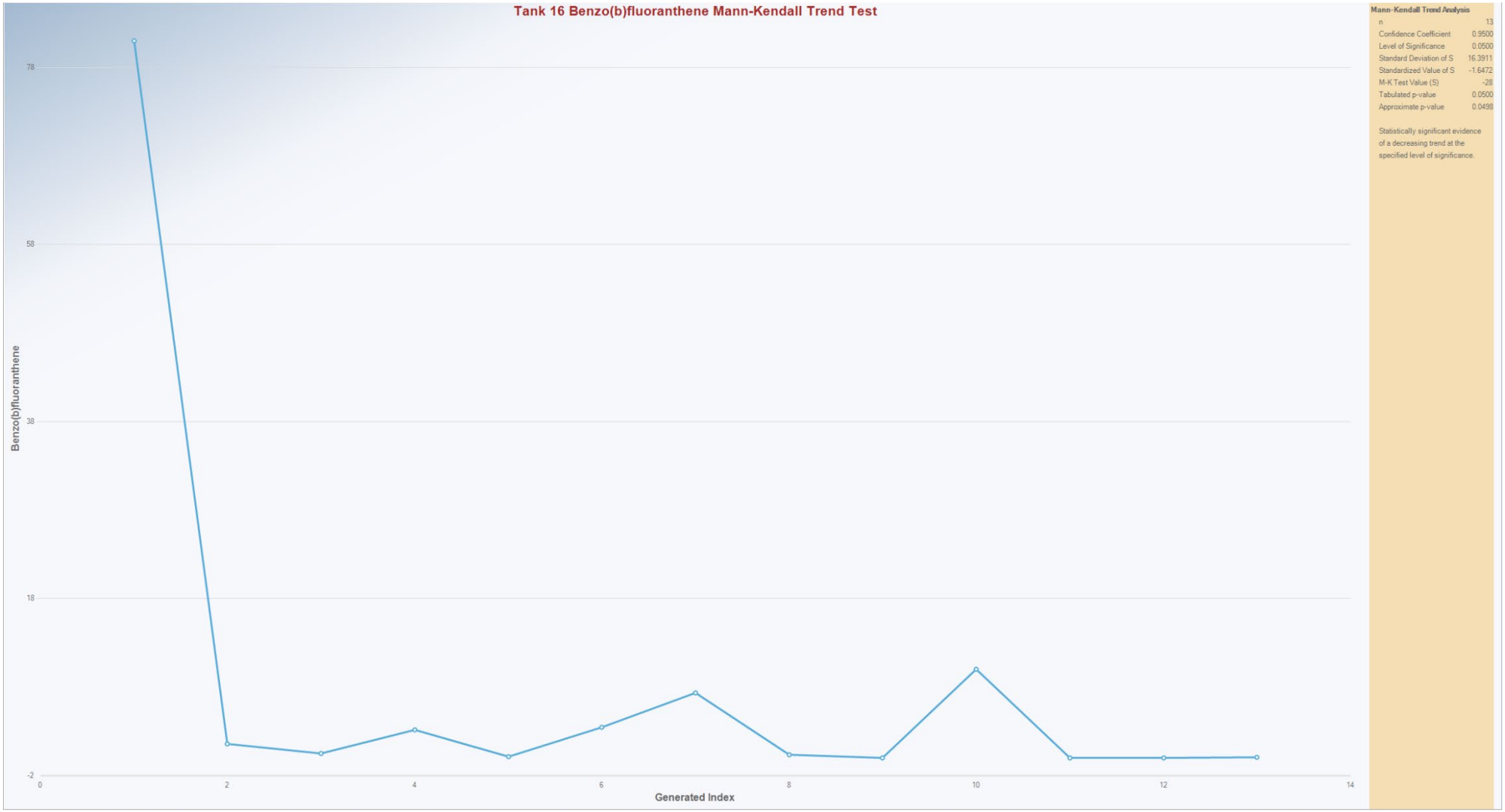
Mann-Kendall Test

M-K Test Value (S)	-28
Tabulated p-value	0.05
Standard Deviation of S	16.39
Standardized Value of S	-1.647
Approximate p-value	0.0498

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


Tank 16 Benzo(a)pyrene Mann-Kendall Trend Test
Benzo(a)pyrene
34
29
24
19
14
9
4
-1
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -1.6472
M-K Test Value (S) -28
Tabulated p-value 0.0500
Approximate p-value 0.0498
Statistically significant evidence of a decreasing trend at the specified level of significance.

1				**Mann-Kendall Trend Test Analysis**								
2			User Selected Options									
3			Date/Time of Computation	ProUCL 5.2 9/26/2022 10:28:02 AM								
4			From File	Tank16_Benzo(b)fluoranthene_Inputs.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	0.95								
7			Level of Significance	0.05								
8												
9			**Benzo(b)fluoranthene**									
10												
11			**General Statistics**									
12			Number or Reported Events Not Used	0								
13			Number of Generated Events	13								
14			Number Values Reported (n)	13								
15			Minimum	0.023								
16			Maximum	81								
17			Mean	8.301								
18			Geometric Mean	0.722								
19			Median	0.5								
20			Standard Deviation	22.07								
21			Coefficient of Variation	2.659								
22												
23			**Mann-Kendall Test**									
24			M-K Test Value (S)	-28								
25			Tabulated p-value	0.05								
26			Standard Deviation of S	16.39								
27			Standardized Value of S	-1.647								
28			Approximate p-value	0.0498								
29												
30	**Statistically significant evidence of a decreasing**											
31	**trend at the specified level of significance.**											


Tank 16 Benzo(b)fluoranthene Mann-Kendall Trend Test
Benzo(b)fluoranthene
78
58
38
18
-2
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -1.6472
M-K Test Value (S) -28
Tabulated p-value 0.0500
Approximate p-value 0.0498
Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:29:51 AM	
From File	Tank16_Benzo(g,h,i)perylene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(g,h,i)perylene

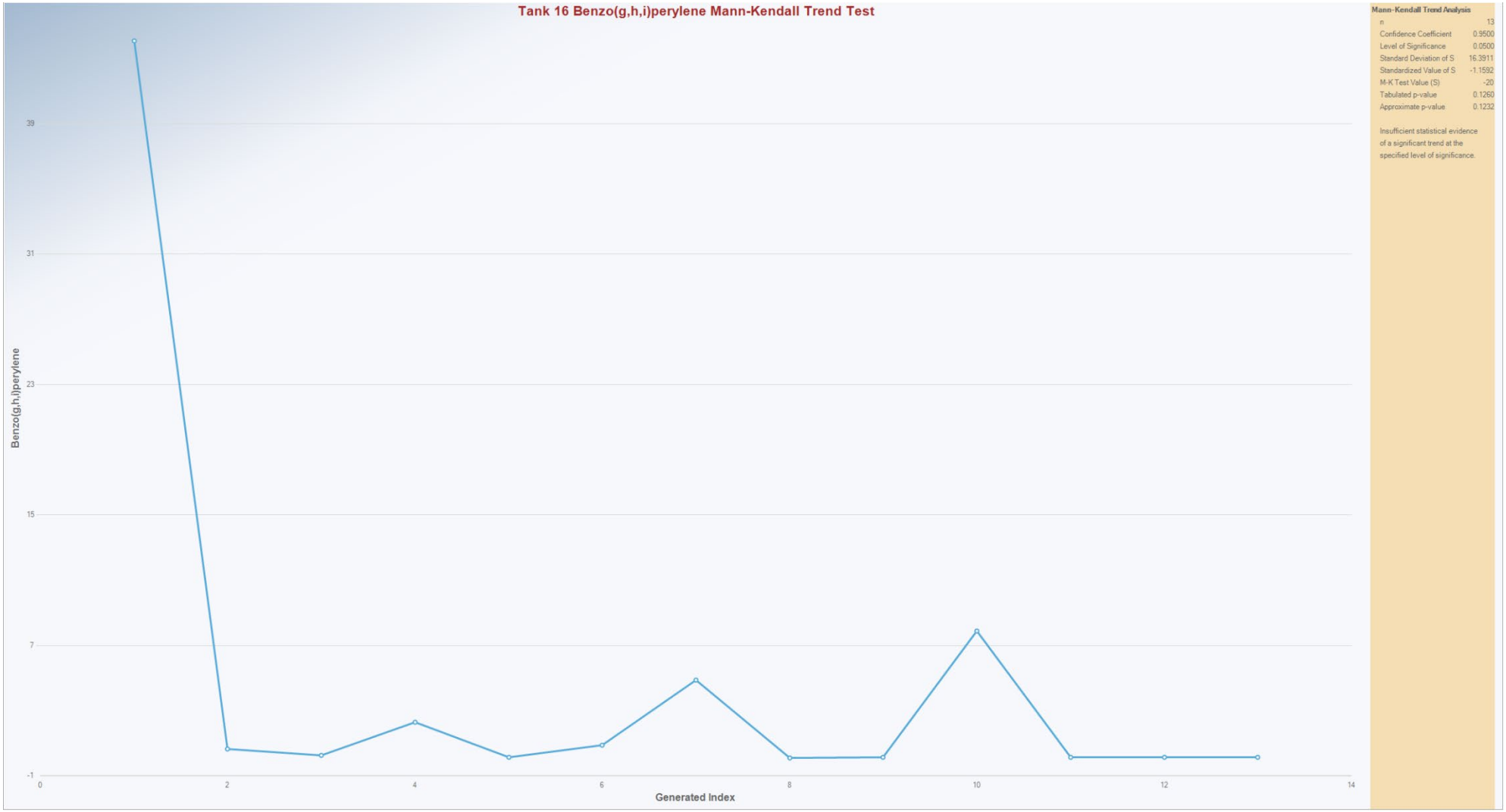
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.021
Maximum	44
Mean	4.66
Geometric Mean	0.353
Median	0.18
Standard Deviation	12.05
Coefficient of Variation	2.586

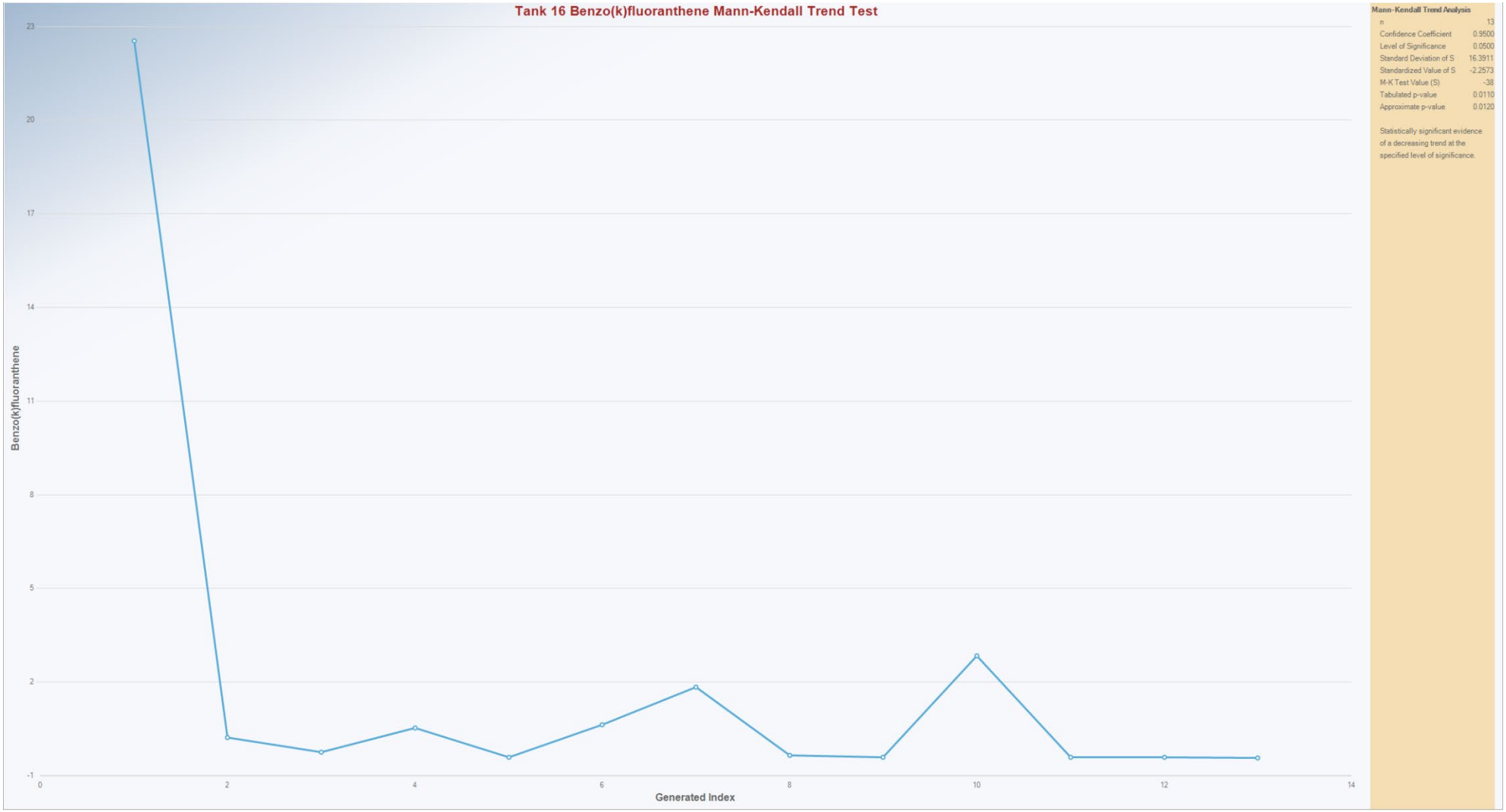
Mann-Kendall Test

M-K Test Value (S)	-20
Tabulated p-value	0.126
Standard Deviation of S	16.39
Standardized Value of S	-1.159
Approximate p-value	0.123

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


Tank 16 Benzo(g,h,i)perylene Mann-Kendall Trend Test
Benzo(g,h,i)perylene
39
31
23
15
7
-1
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -1.1592
M-K Test Value (S) -20
Tabulated p-value 0.1260
Approximate p-value 0.1232
Insufficient statistical evidence of a significant trend at the specified level of significance.

1				**Mann-Kendall Trend Test Analysis**								
2			User Selected Options									
3			Date/Time of Computation	ProUCL 5.2 9/26/2022 10:31:43 AM								
4			From File	Tank16_Benzo(k)fluoranthene_Inputs.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	0.95								
7			Level of Significance	0.05								
8												
9			**Benzo(k)fluoranthene**									
10												
11			**General Statistics**									
12			Number or Reported Events Not Used	0								
13			Number of Generated Events	13								
14			Number Values Reported (n)	13								
15			Minimum	0.034								
16			Maximum	23								
17			Mean	2.457								
18			Geometric Mean	0.332								
19			Median	0.21								
20			Standard Deviation	6.255								
21			Coefficient of Variation	2.546								
22												
23			**Mann-Kendall Test**									
24			M-K Test Value (S)	-38								
25			Tabulated p-value	0.011								
26			Standard Deviation of S	16.39								
27			Standardized Value of S	-2.257								
28			Approximate p-value	0.012								
29												
30	**Statistically significant evidence of a decreasing**											
31	**trend at the specified level of significance.**											


Tank 16 Benzo(k)fluoranthene Mann-Kendall Trend Test
Benzo(k)fluoranthene
Generated Index
23
20
17
14
11
8
5
2
-1
0
2
4
6
8
10
12
14
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -2.2573
M-K Test Value (S) -38
Tabulated p-value 0.0110
Approximate p-value 0.0120
Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:33:33 AM	
From File	Tank16_Chrysene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Chrysene

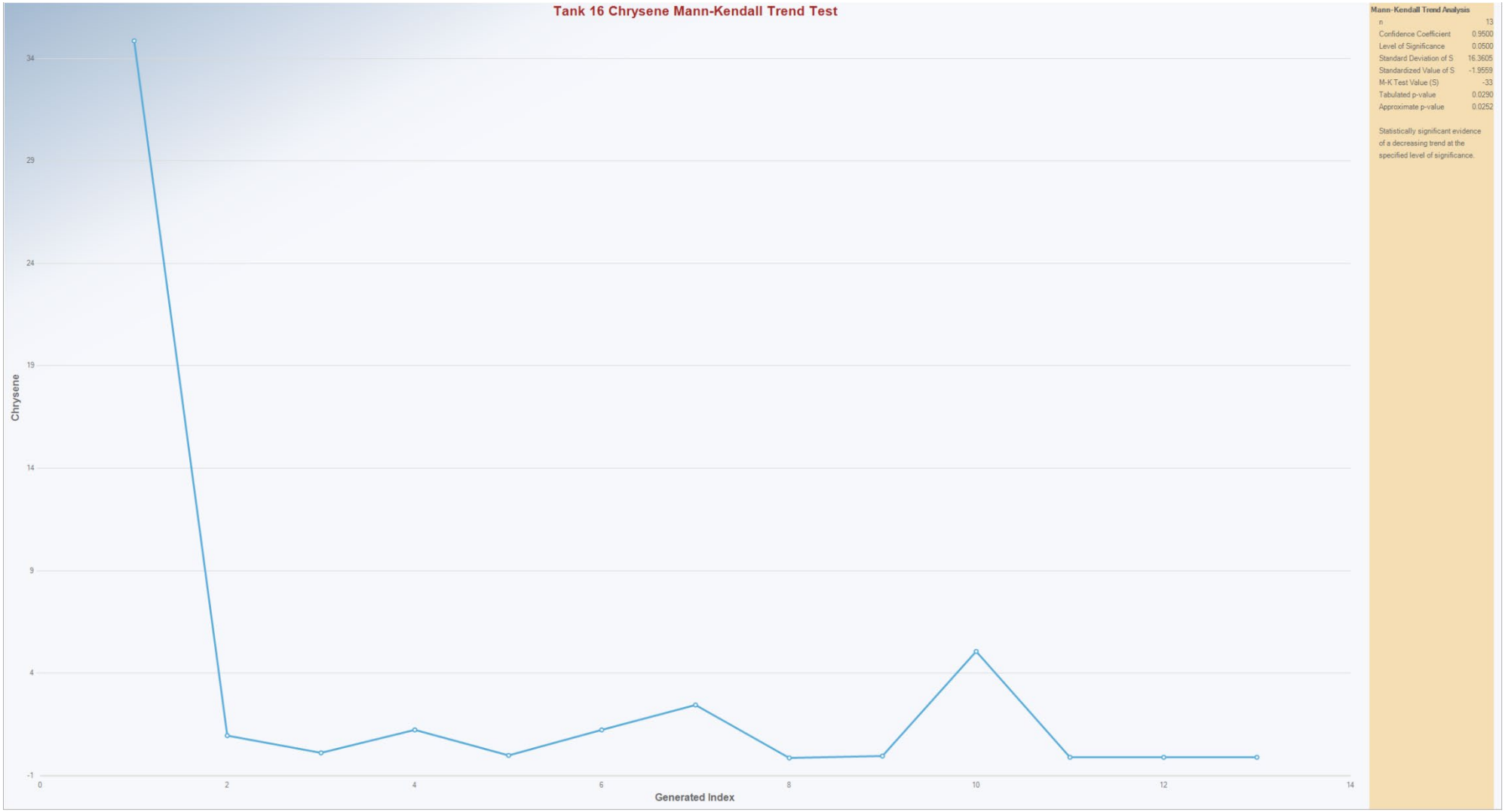
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.018
Maximum	35
Mean	3.643
Geometric Mean	0.396
Median	0.27
Standard Deviation	9.537
Coefficient of Variation	2.618

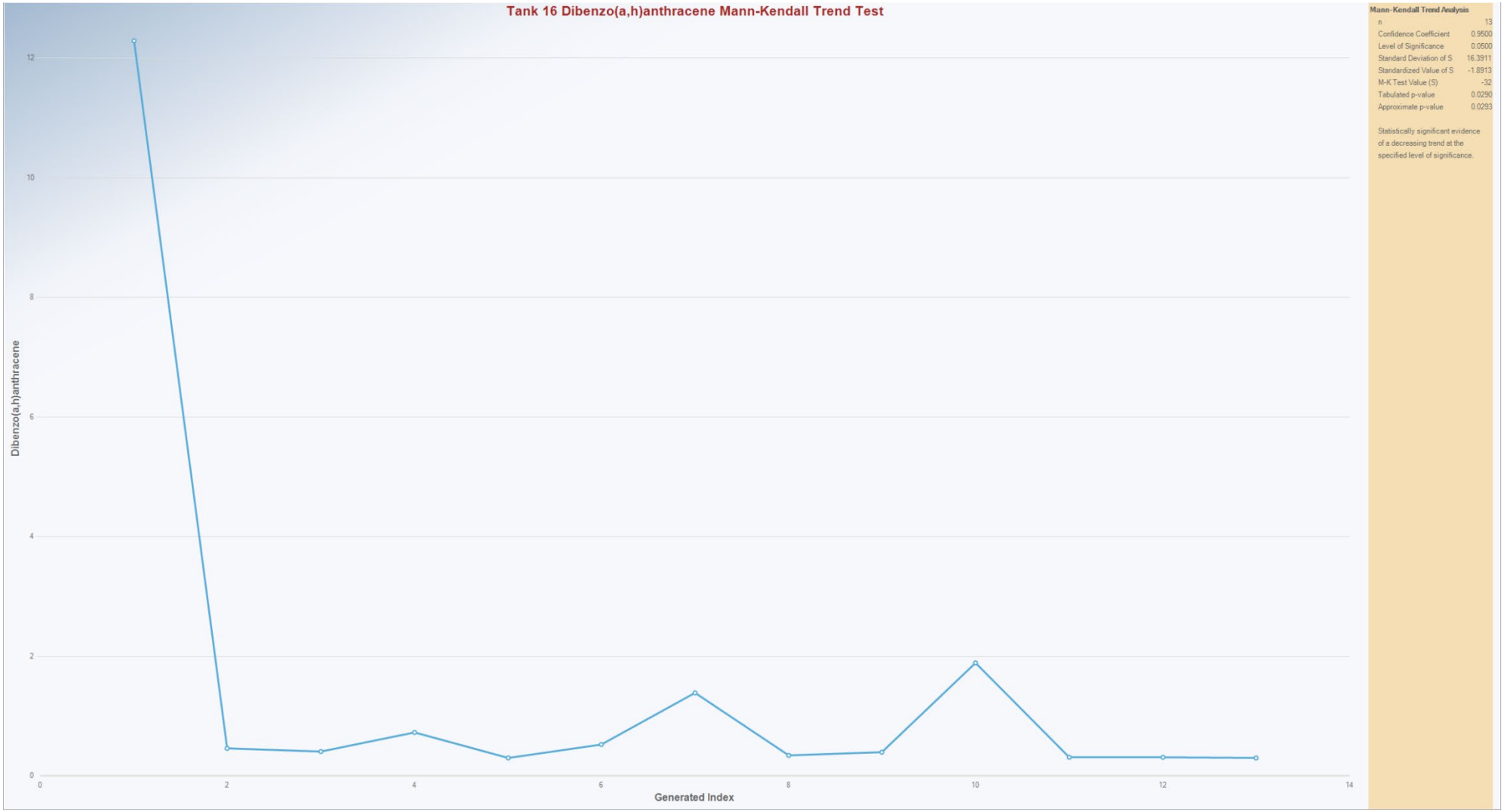
Mann-Kendall Test

M-K Test Value (S)	-33
Tabulated p-value	0.029
Standard Deviation of S	16.36
Standardized Value of S	-1.956
Approximate p-value	0.0252

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


Tank 16 Chrysene Mann-Kendall Trend Test
Chrysene
Generated Index
34
29
24
19
14
9
4
-1
0
2
4
6
8
10
12
14
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3605
Standardized Value of S -1.9559
M-K Test Value (S) -33
Tabulated p-value 0.0290
Approximate p-value 0.0252
Statistically significant evidence of a decreasing trend at the specified level of significance.

1				**Mann-Kendall Trend Test Analysis**								
2			User Selected Options									
3			Date/Time of Computation	ProUCL 5.2 9/26/2022 10:35:05 AM								
4			From File	Tank16_Dibenzo(a,h)anthracene_Inputs.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	0.95								
7			Level of Significance	0.05								
8												
9	**Dibenzo(a,h)anthracene**											
10												
11	**General Statistics**											
12			Number or Reported Events Not Used	0								
13			Number of Generated Events	13								
14			Number Values Reported (n)	13								
15			Minimum	0.00895								
16			Maximum	12								
17			Mean	1.219								
18			Geometric Mean	0.137								
19			Median	0.11								
20			Standard Deviation	3.276								
21			Coefficient of Variation	2.687								
22												
23	**Mann-Kendall Test**											
24			M-K Test Value (S)	-32								
25			Tabulated p-value	0.029								
26			Standard Deviation of S	16.39								
27			Standardized Value of S	-1.891								
28			Approximate p-value	0.0293								
29												
30	**Statistically significant evidence of a decreasing**											
31	**trend at the specified level of significance.**											


Tank 16 Dibenzo(a,h)anthracene Mann-Kendall Trend Test
Dibenzo(a,h)anthracene
Generated Index
0
2
4
6
8
10
12
14
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -1.8913
M-K Test Value (S) -32
Tabulated p-value 0.0290
Approximate p-value 0.0293
Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:36:32 AM	
From File	Tank16_DRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

DRO

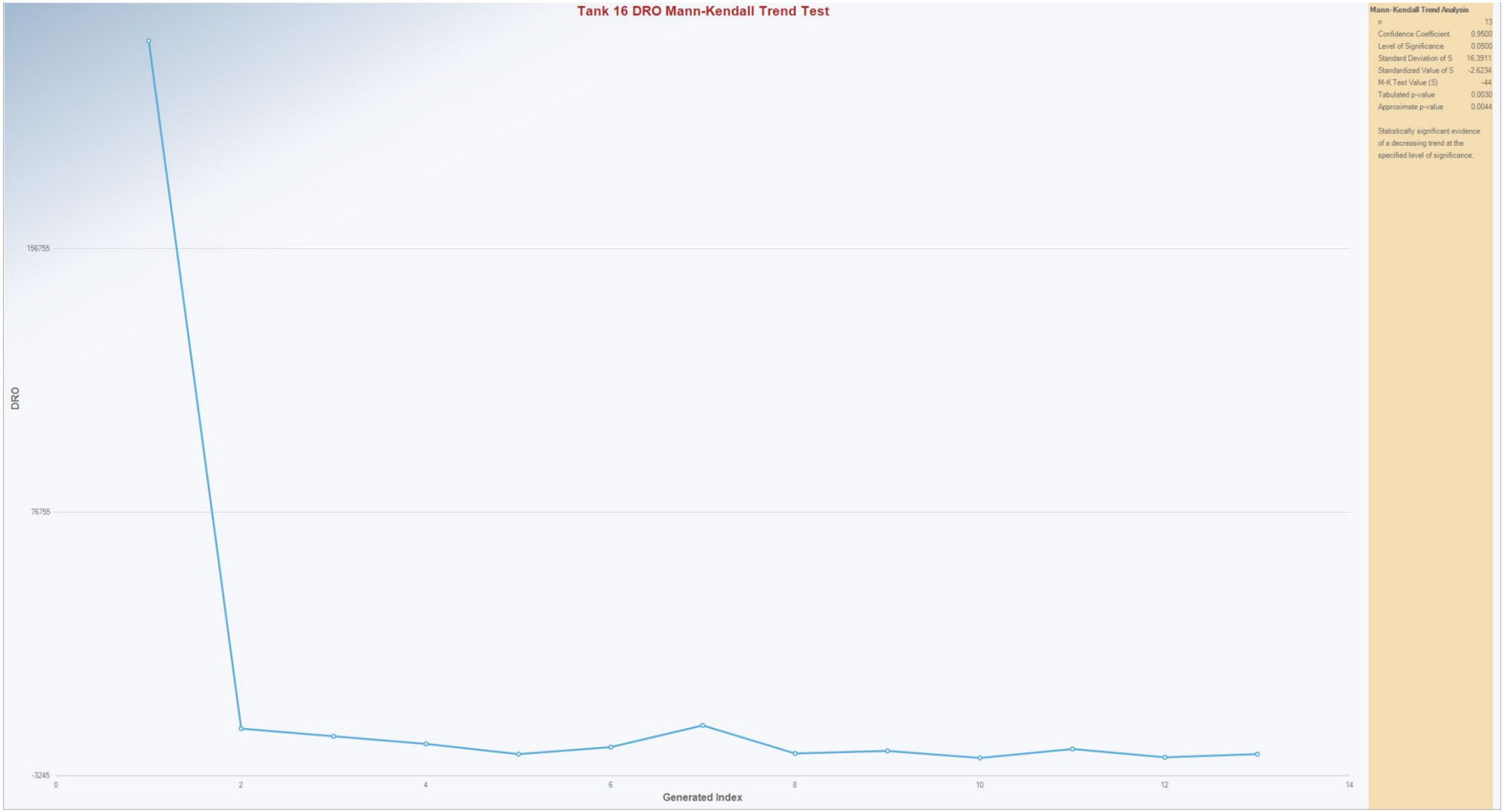
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	2200
Maximum	220000
Mean	22108
Geometric Mean	6484
Median	4900
Standard Deviation	59544
Coefficient of Variation	2.693

Mann-Kendall Test

M-K Test Value (S)	-44
Tabulated p-value	0.003
Standard Deviation of S	16.39
Standardized Value of S	-2.623
Approximate p-value	0.00435

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


Tank 16 DRO Mann-Kendall Trend Test
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -2.6234
M-K Test Value (S) -44
Tabulated p-value 0.0030
Approximate p-value 0.0044
Statistically significant evidence of a decreasing trend at the specified level of significance.
DRO
156755
76755
-3245
0
2
4
6
8
10
12
14
Generated Index

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:01:17 PM	
From File	Tank16_Fluoranthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluoranthene

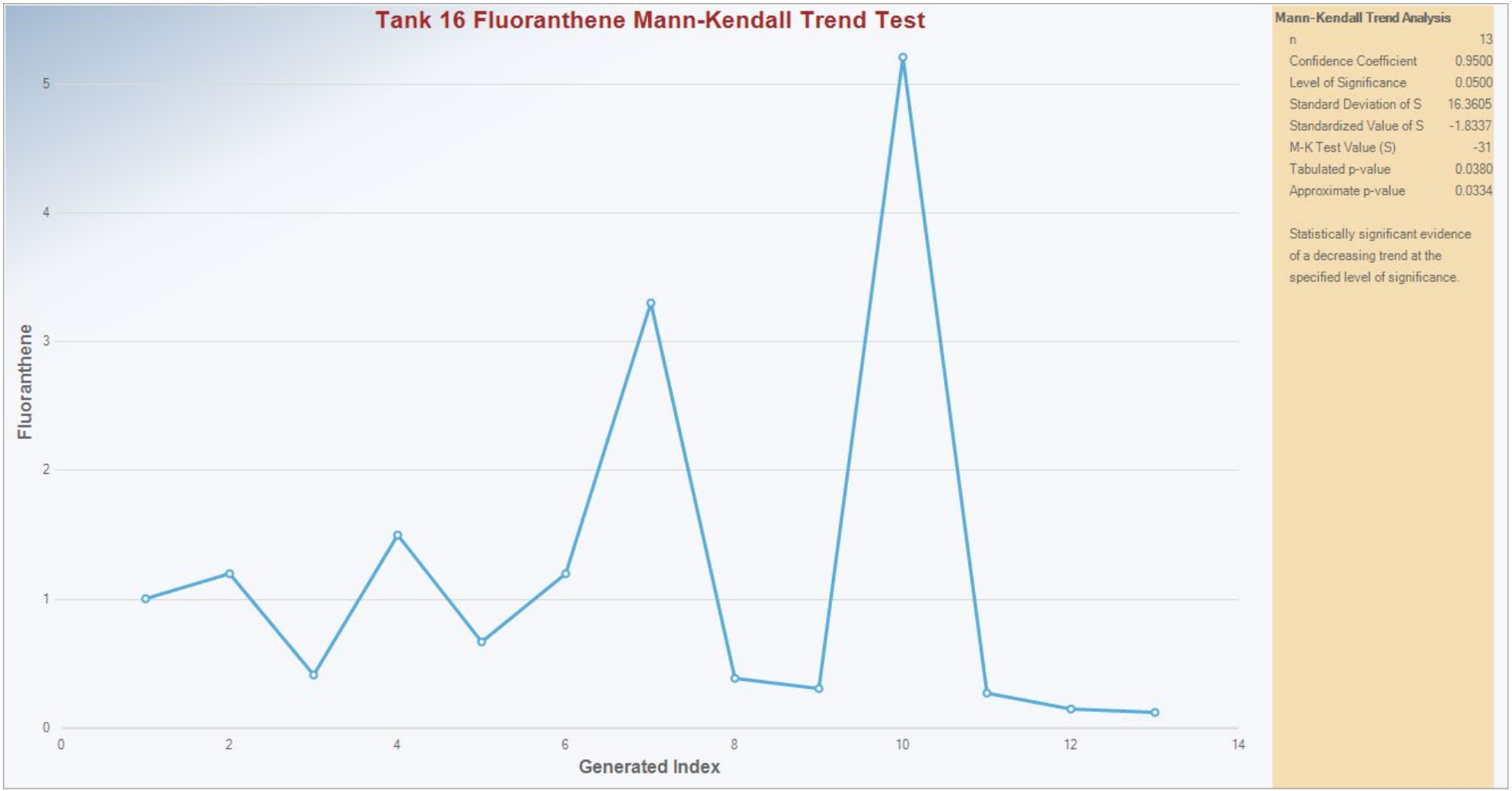
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.0223
Maximum	5.1
Mean	1.107
Geometric Mean	0.46
Median	0.57
Standard Deviation	1.474
Coefficient of Variation	1.331

Mann-Kendall Test

M-K Test Value (S)	-31
Tabulated p-value	0.038
Standard Deviation of S	16.36
Standardized Value of S	-1.834
Approximate p-value	0.0334

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


Tank 16 Fluoranthene Mann-Kendall Trend Test
Fluoranthene
Generated Index
0
1
2
3
4
5
0
2
4
6
8
10
12
14
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3605
Standardized Value of S -1.8337
M-K Test Value (S) -31
Tabulated p-value 0.0380
Approximate p-value 0.0334
Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:03:20 PM	
From File	Tank16_Fluorene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluorene

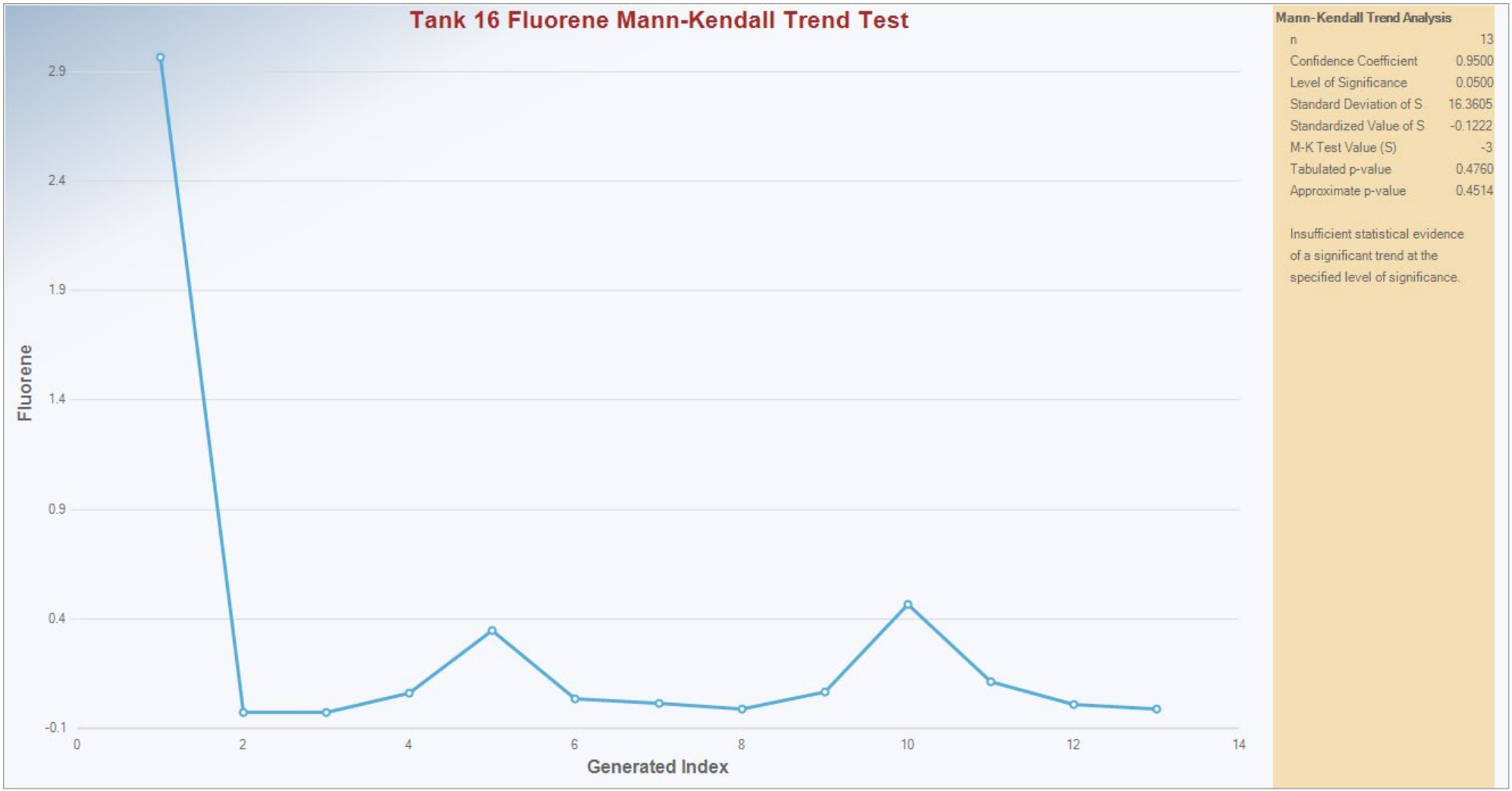
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.0095
Maximum	3
Mean	0.342
Geometric Mean	0.0804
Median	0.07
Standard Deviation	0.812
Coefficient of Variation	2.373

Mann-Kendall Test

M-K Test Value (S)	-3
Tabulated p-value	0.476
Standard Deviation of S	16.36
Standardized Value of S	-0.122
Approximate p-value	0.451

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



Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3605
Standardized Value of S	-0.1222
M-K Test Value (S)	-3
Tabulated p-value	0.4760
Approximate p-value	0.4514

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:38:01 AM	
From File	Tank16_Indeno(1,2,3-c,d)perylene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Indeno(1,2,3-c,d)perylene

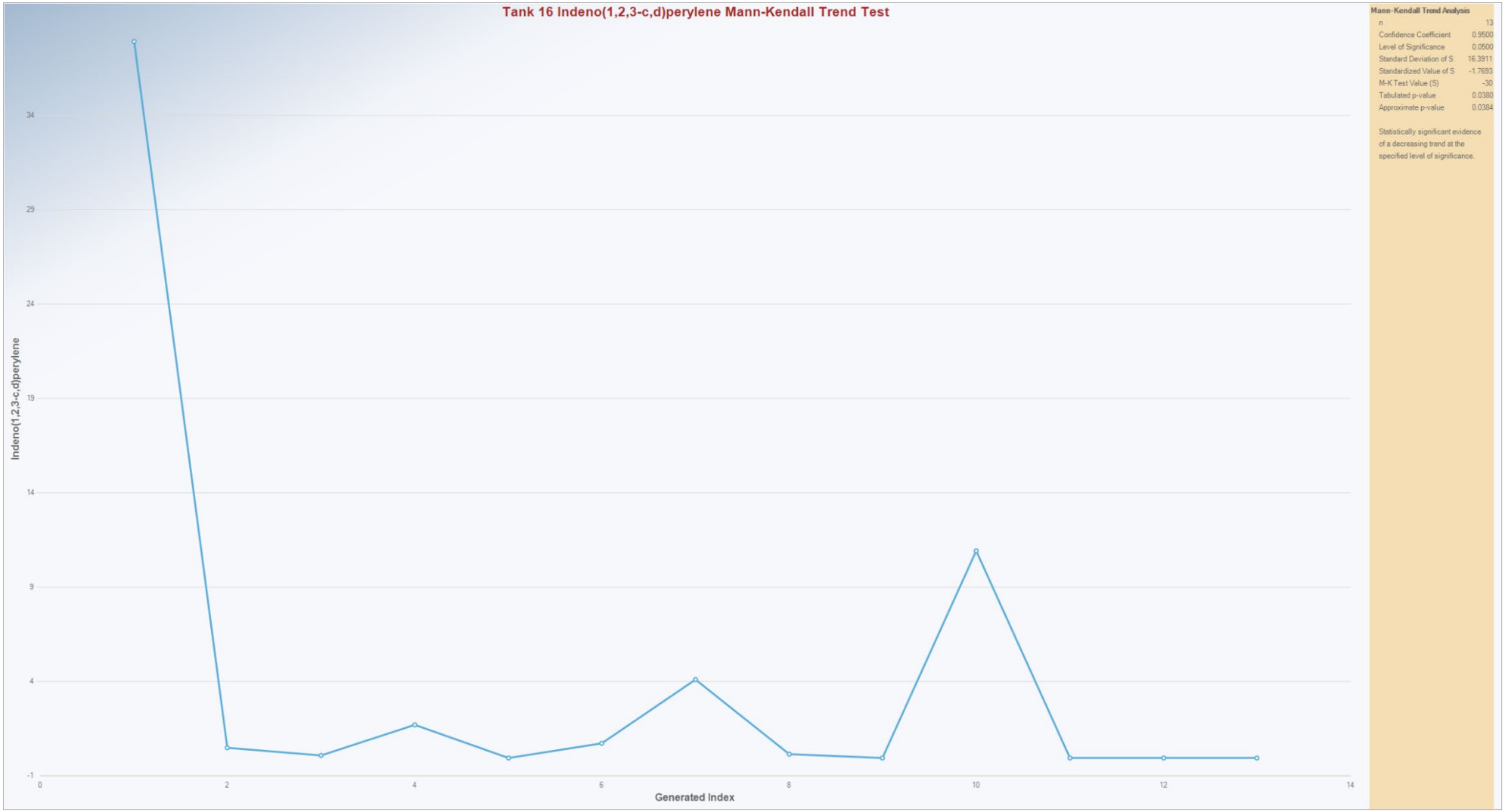
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.037
Maximum	38
Mean	4.388
Geometric Mean	0.417
Median	0.25
Standard Deviation	10.55
Coefficient of Variation	2.405

Mann-Kendall Test

M-K Test Value (S)	-30
Tabulated p-value	0.038
Standard Deviation of S	16.39
Standardized Value of S	-1.769
Approximate p-value	0.0384

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


Tank 16 Indeno(1,2,3-c,d)perylene Mann-Kendall Trend Test
Indeno(1,2,3-c,d)perylene
34
29
24
19
14
9
4
-1
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -1.7693
M-K Test Value (S) -30
Tabulated p-value 0.0380
Approximate p-value 0.0384
Statistically significant evidence of a decreasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:05:18 PM	
From File	Tank16_Naphthalene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Naphthalene

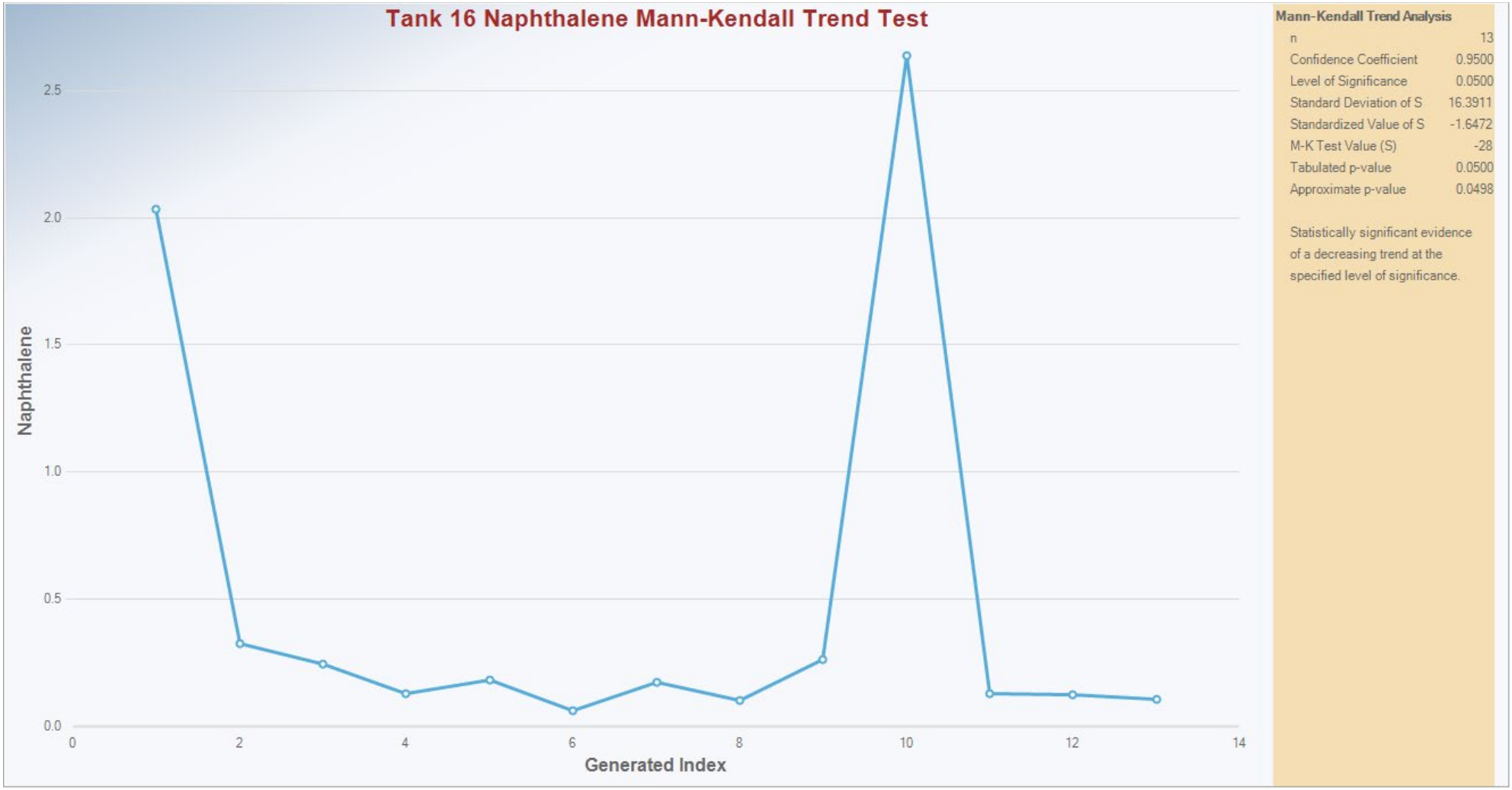
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.029
Maximum	2.6
Mean	0.467
Geometric Mean	0.177
Median	0.14
Standard Deviation	0.826
Coefficient of Variation	1.771

Mann-Kendall Test

M-K Test Value (S)	-28
Tabulated p-value	0.05
Standard Deviation of S	16.39
Standardized Value of S	-1.647
Approximate p-value	0.0498

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


Tank 16 Naphthalene Mann-Kendall Trend Test
Naphthalene
Generated Index
0.0
0.5
1.0
1.5
2.0
2.5
0
2
4
6
8
10
12
14
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -1.6472
M-K Test Value (S) -28
Tabulated p-value 0.0500
Approximate p-value 0.0498
Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:08:02 PM
From File	Tank16_Pyrene_Inputs.xls
Full Precision	OFF
Confidence Coefficient	0.95
Level of Significance	0.05

Pyrene

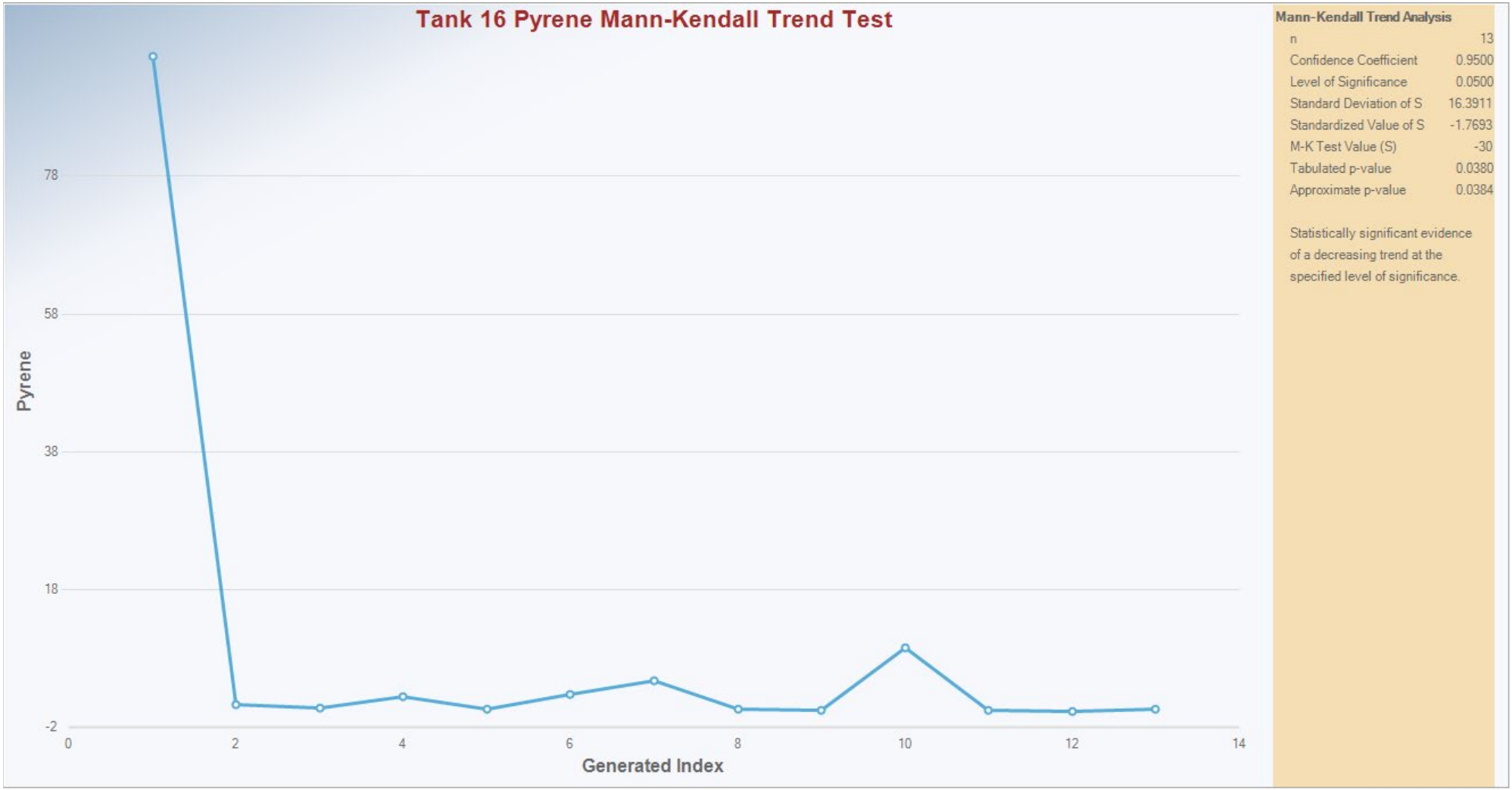
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	0.0455
Maximum	95
Mean	8.926
Geometric Mean	0.89
Median	0.44
Standard Deviation	25.99
Coefficient of Variation	2.912

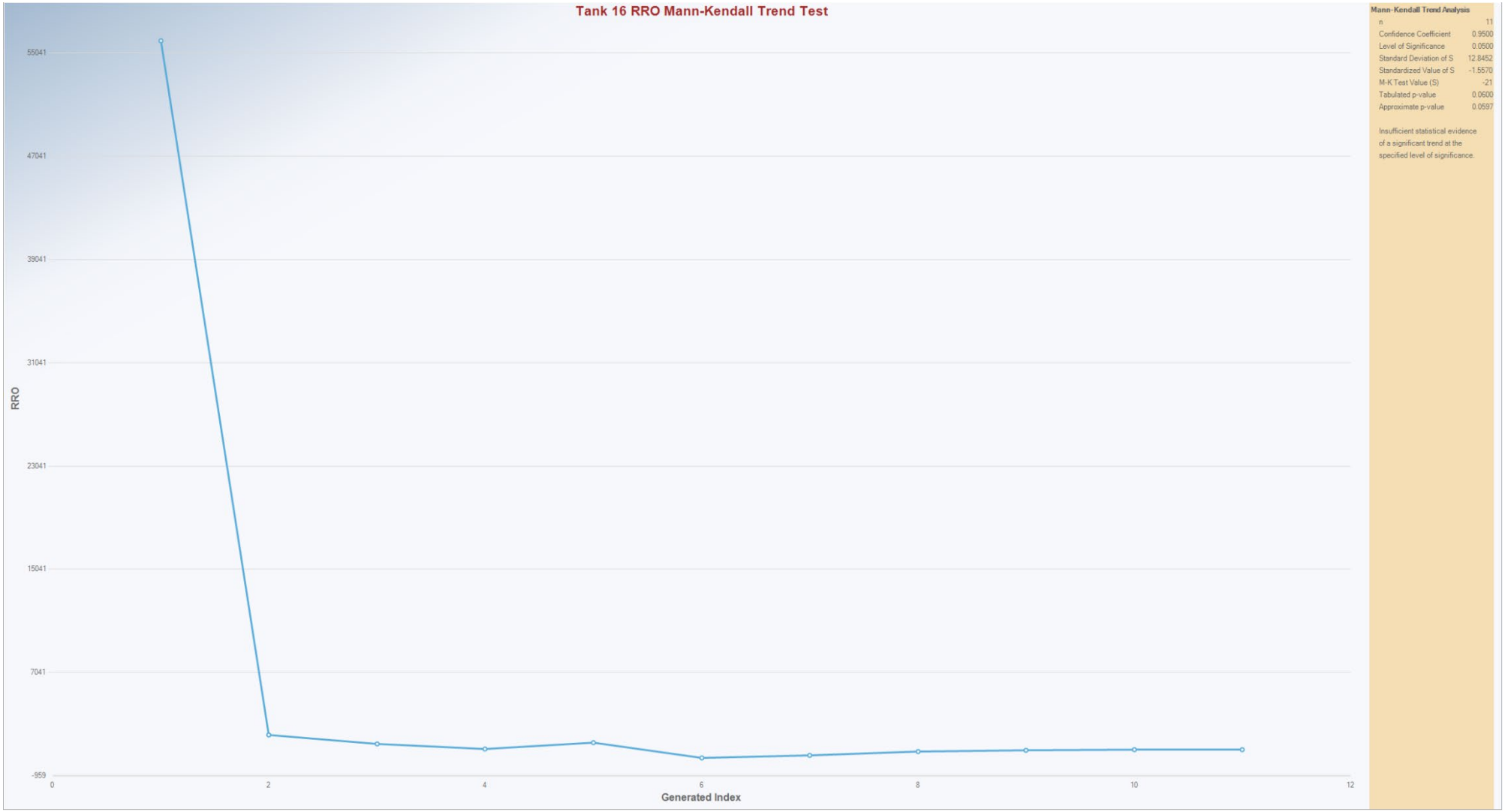
Mann-Kendall Test

M-K Test Value (S)	-30
Tabulated p-value	0.038
Standard Deviation of S	16.39
Standardized Value of S	-1.769
Approximate p-value	0.0384

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


Tank 16 Pyrene Mann-Kendall Trend Test
Pyrene
78
58
38
18
-2
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S -1.7693
M-K Test Value (S) -30
Tabulated p-value 0.0380
Approximate p-value 0.0384
Statistically significant evidence of a decreasing trend at the specified level of significance.

1				**Mann-Kendall Trend Test Analysis**								
2			User Selected Options									
3			Date/Time of Computation	ProUCL 5.2 9/26/2022 10:39:39 AM								
4			From File	Tank16_RRO_Inputs.xls								
5			Full Precision	OFF								
6			Confidence Coefficient	0.95								
7			Level of Significance	0.05								
8												
9			**RRO**									
10												
11			**General Statistics**									
12			Number or Reported Events Not Used	0								
13			Number of Generated Events	11								
14			Number Values Reported (n)	11								
15			Minimum	430								
16			Maximum	56000								
17			Mean	6136								
18			Geometric Mean	1505								
19			Median	1090								
20			Standard Deviation	16545								
21			Coefficient of Variation	2.696								
22												
23			**Mann-Kendall Test**									
24			M-K Test Value (S)	-21								
25			Tabulated p-value	0.06								
26			Standard Deviation of S	12.85								
27			Standardized Value of S	-1.557								
28			Approximate p-value	0.0597								
29												
30	**Insufficient evidence to identify a significant**											
31	**trend at the specified level of significance.**											


Tank 16 RRO Mann-Kendall Trend Test
55041
47041
39041
31041
23041
15041
7041
-959
RRO
0
2
4
6
8
10
12
Generated Index
Mann-Kendall Trend Analysis
n 11
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 12.8452
Standardized Value of S -1.5570
M-K Test Value (S) -21
Tabulated p-value 0.0600
Approximate p-value 0.0597
Insufficient statistical evidence of a significant trend at the specified level of significance.

Tank Tunnel 17

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	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:14:40 PM	
From File	Tank17_Acenaphthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Acenaphthene

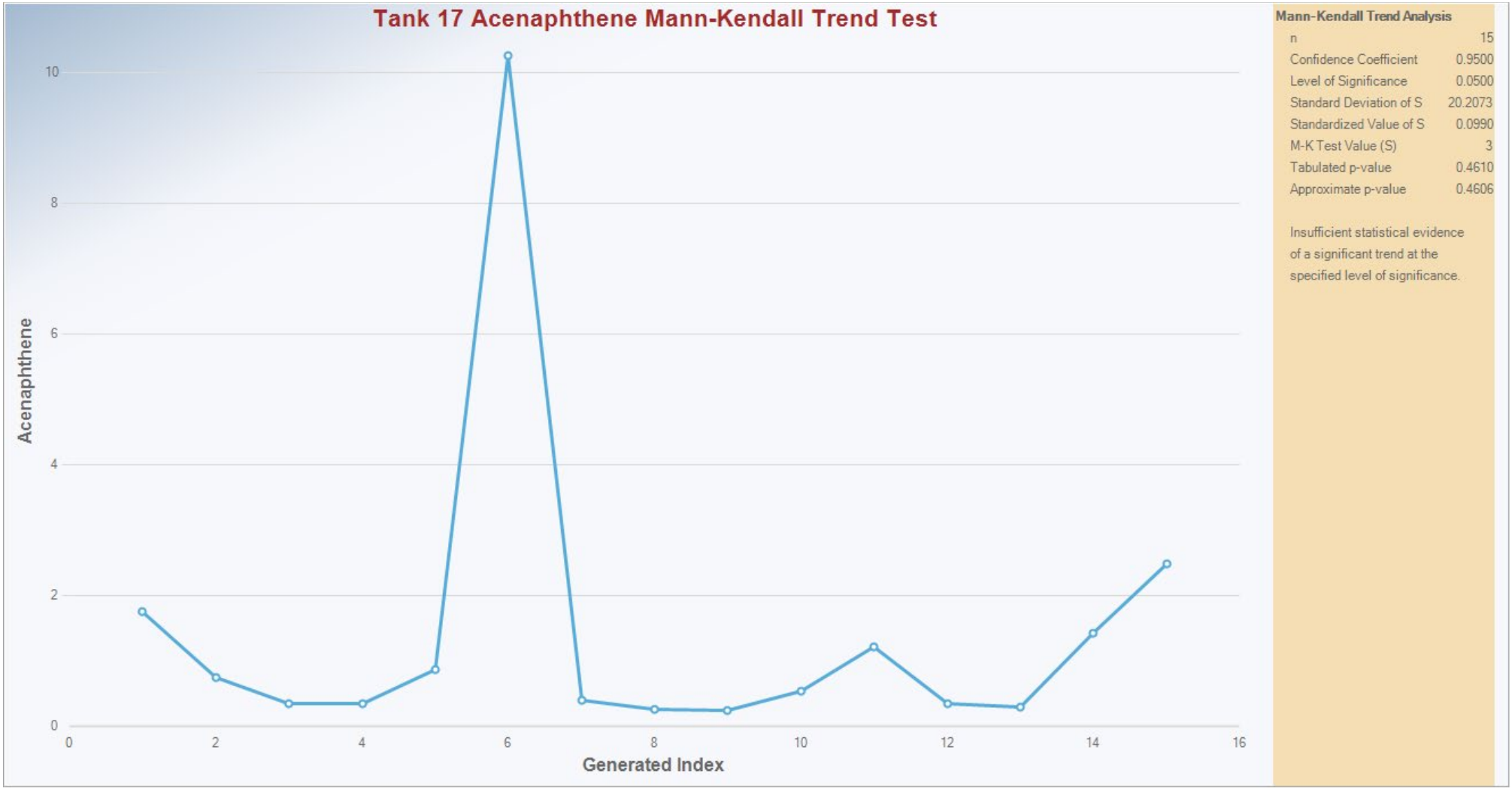
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0023
Maximum	10
Mean	1.186
Geometric Mean	0.239
Median	0.29
Standard Deviation	2.525
Coefficient of Variation	2.129

Mann-Kendall Test

M-K Test Value (S)	3
Tabulated p-value	0.461
Standard Deviation of S	20.21
Standardized Value of S	0.099
Approximate p-value	0.461

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



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	0.0990
M-K Test Value (S)	3
Tabulated p-value	0.4610
Approximate p-value	0.4606

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:11:39 PM	
From File	Tank17_Acenaphthelyne_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Acenaphthylene

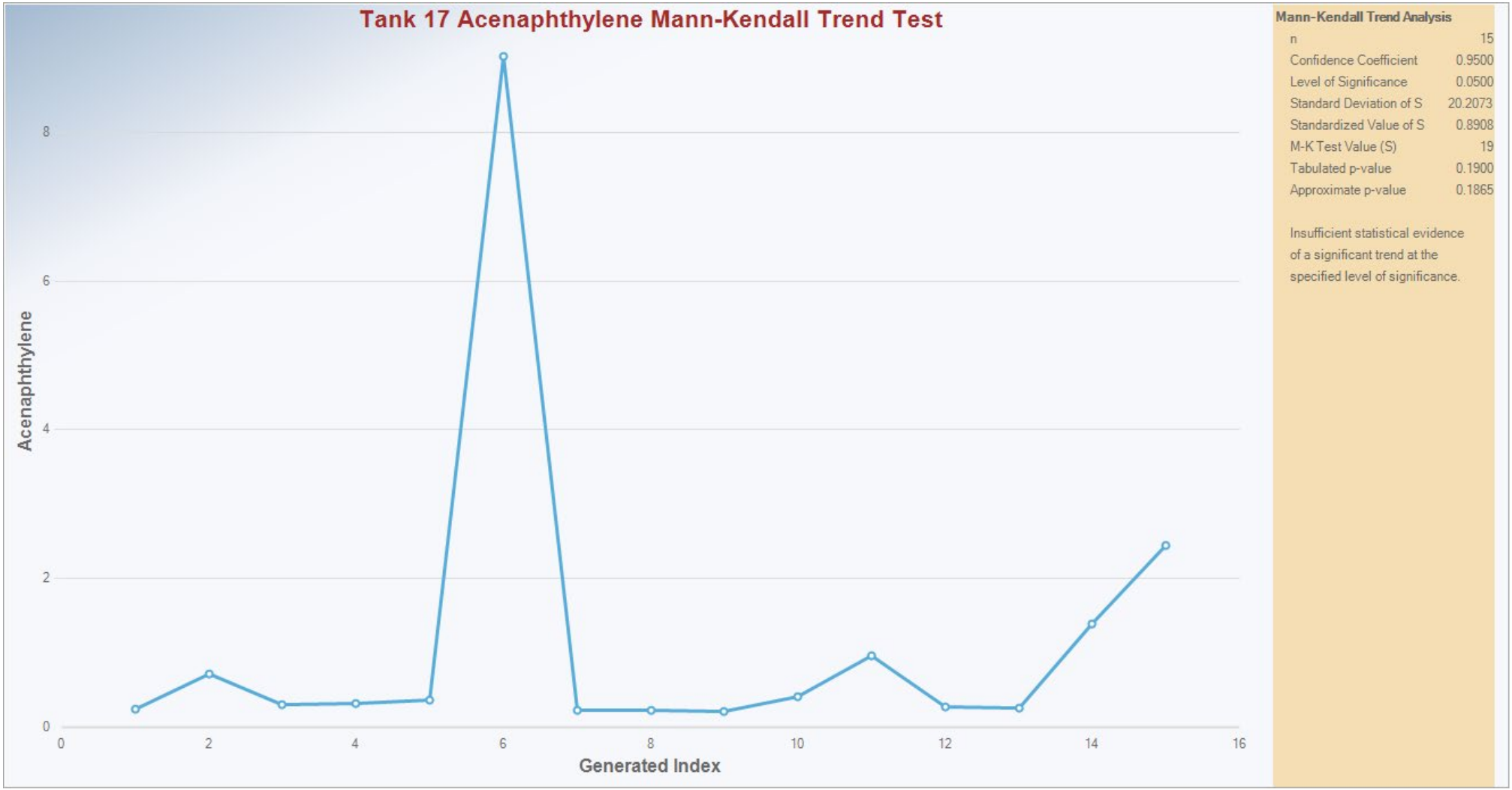
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0023
Maximum	8.8
Mean	0.943
Geometric Mean	0.123
Median	0.096
Standard Deviation	2.258
Coefficient of Variation	2.395

Mann-Kendall Test

M-K Test Value (S)	19
Tabulated p-value	0.19
Standard Deviation of S	20.21
Standardized Value of S	0.891
Approximate p-value	0.187

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



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	0.8908
M-K Test Value (S)	19
Tabulated p-value	0.1900
Approximate p-value	0.1865

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:19:03 PM	
From File	Tank17_Anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Anthracene

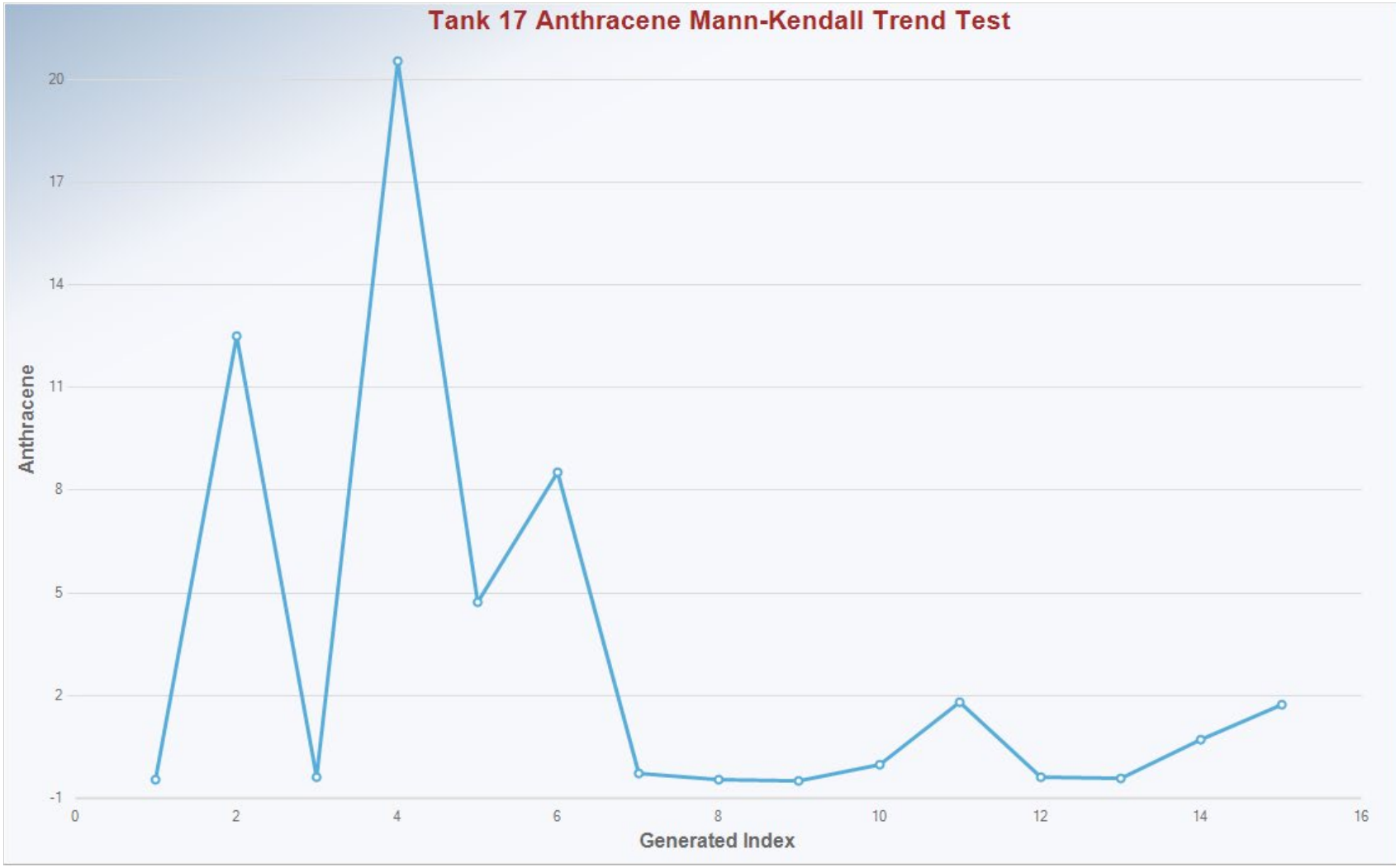
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0034
Maximum	21
Mean	3.657
Geometric Mean	0.446
Median	0.45
Standard Deviation	6.149
Coefficient of Variation	1.682

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.349
Standard Deviation of S	20.21
Standardized Value of S	-0.396
Approximate p-value	0.346

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



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.3959
M-K Test Value (S)	-9
Tabulated p-value	0.3490
Approximate p-value	0.3461

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:45:28 AM	
From File	Tank17_Benzo(a)anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(a)anthracene

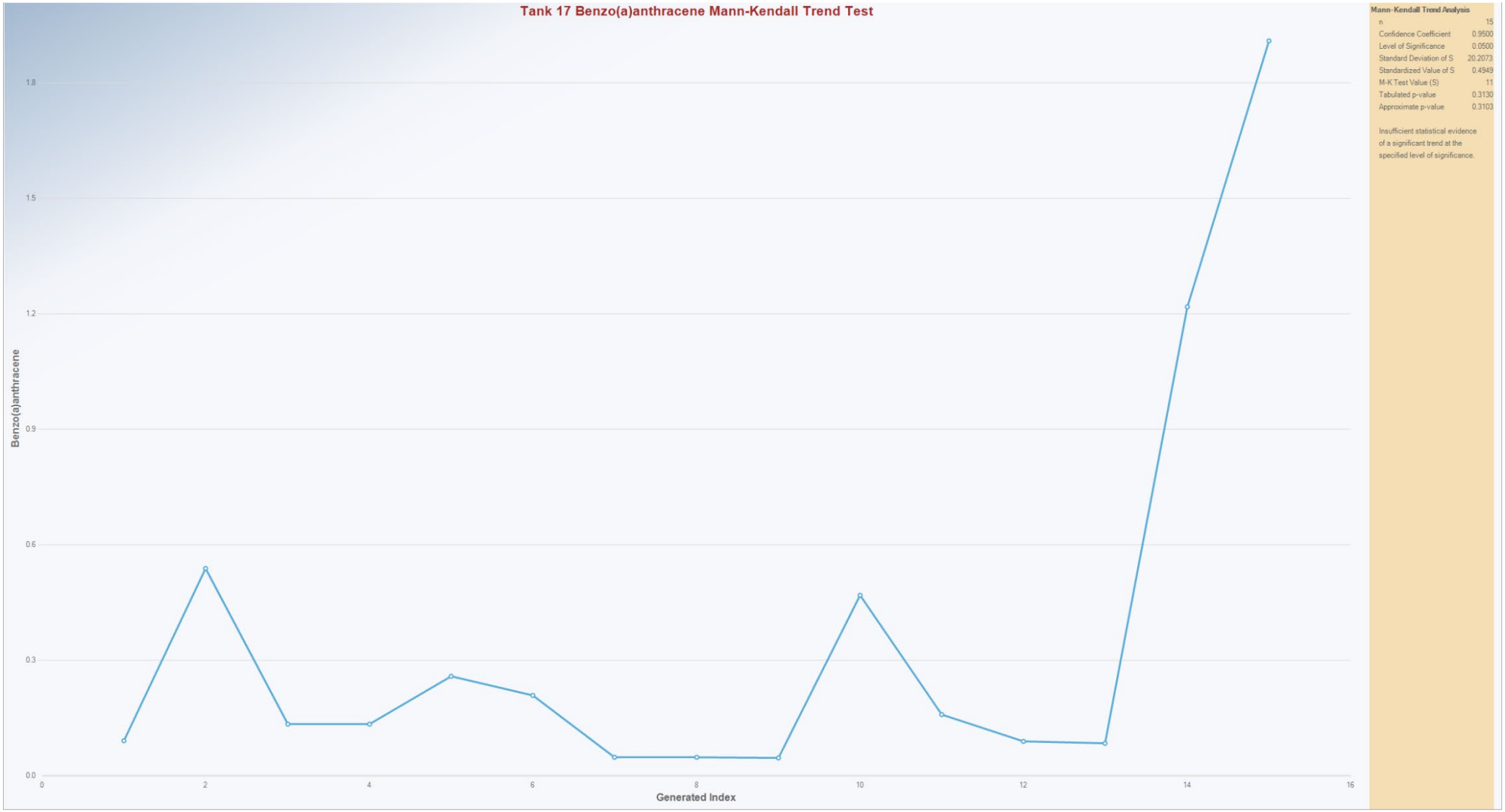
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0079
Maximum	1.87
Mean	0.324
Geometric Mean	0.104
Median	0.096
Standard Deviation	0.526
Coefficient of Variation	1.624

Mann-Kendall Test

M-K Test Value (S)	11
Tabulated p-value	0.313
Standard Deviation of S	20.21
Standardized Value of S	0.495
Approximate p-value	0.31

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


Tank 17 Benzo(a)anthracene Mann-Kendall Trend Test
Benzo(a)anthracene
1.8
1.5
1.2
0.9
0.6
0.3
0.0
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 0.4949
M-K Test Value (S) 11
Tabulated p-value 0.3130
Approximate p-value 0.3103
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:48:21 AM	
From File	Tank17_Benzo(b)fluoranthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(b)fluoranthene

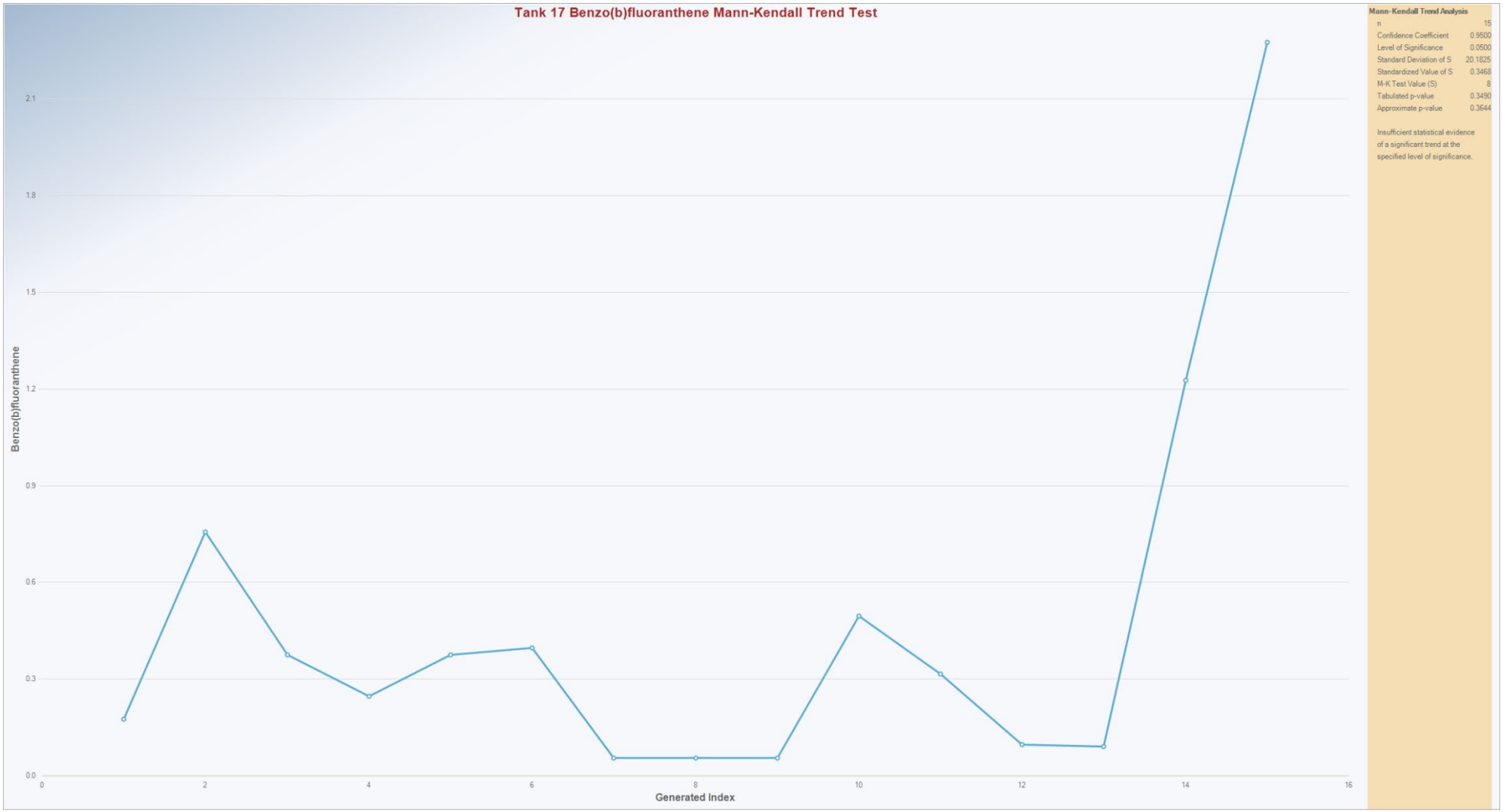
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0092
Maximum	2.23
Mean	0.42
Geometric Mean	0.15
Median	0.27
Standard Deviation	0.591
Coefficient of Variation	1.407

Mann-Kendall Test

M-K Test Value (S)	8
Tabulated p-value	0.349
Standard Deviation of S	20.18
Standardized Value of S	0.347
Approximate p-value	0.364

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


Tank 17 Benzo(b)fluoranthene Mann-Kendall Trend Test
Benzo(b)fluoranthene
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.0
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S 0.3468
M-K Test Value (S) 8
Tabulated p-value 0.3490
Approximate p-value 0.3644
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:49:34 AM	
From File	Tank17_Benzo(g,h,i)perylene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(g,h,i)perylene

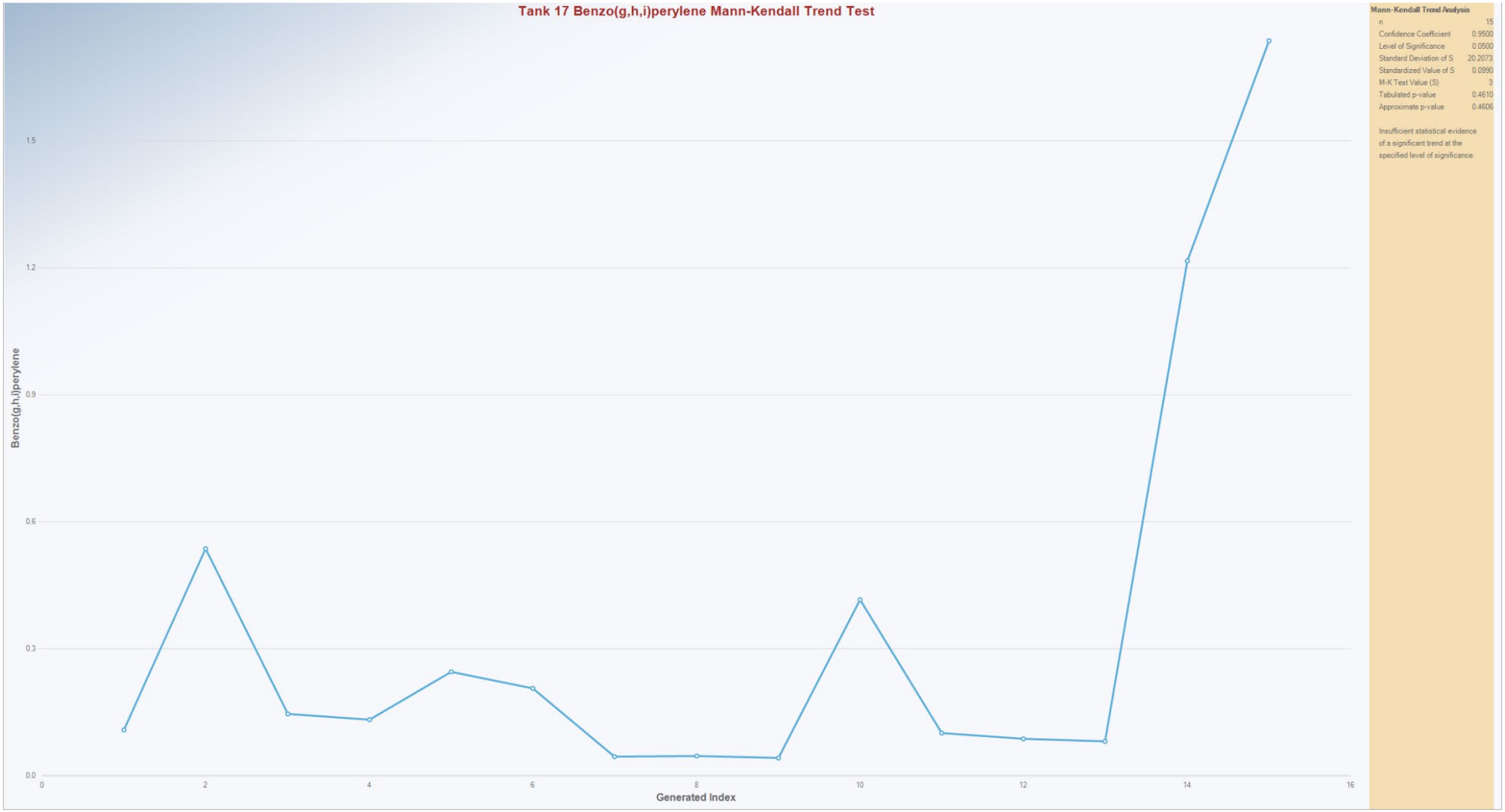
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0059
Maximum	1.7
Mean	0.307
Geometric Mean	0.0988
Median	0.096
Standard Deviation	0.491
Coefficient of Variation	1.599

Mann-Kendall Test

M-K Test Value (S)	3
Tabulated p-value	0.461
Standard Deviation of S	20.21
Standardized Value of S	0.099
Approximate p-value	0.461

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


Tank 17 Benzo(g,h,i)perylene Mann-Kendall Trend Test
Benzo(g,h,i)perylene
1.5
1.2
0.9
0.6
0.3
0.0
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 0.0990
M-K Test Value (S) 3
Tabulated p-value 0.4610
Approximate p-value 0.4606
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:50:45 AM	
From File	Tank17_Benzo(k)fluoranthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(k)fluoranthene

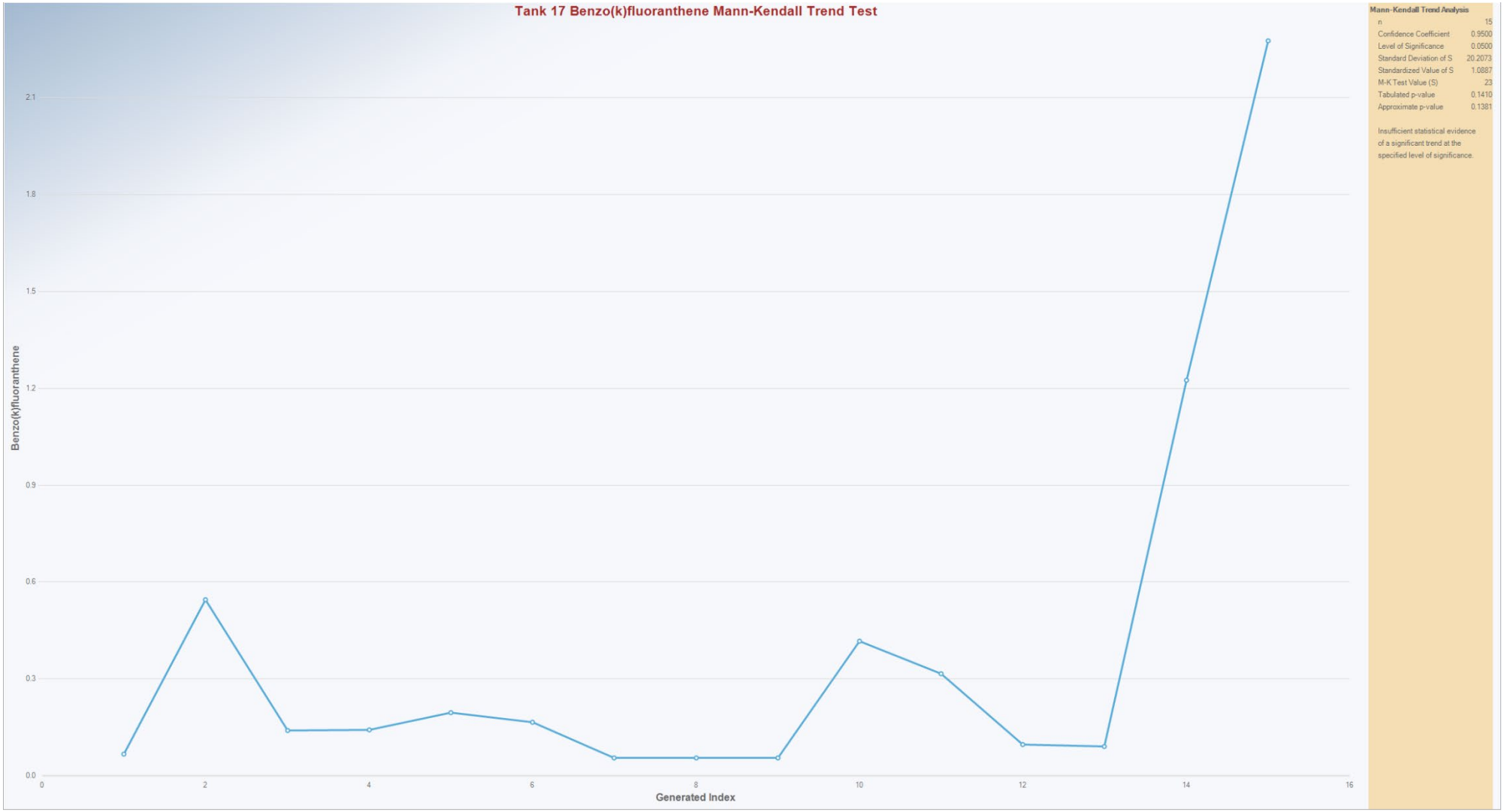
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0095
Maximum	2.23
Mean	0.344
Geometric Mean	0.1
Median	0.096
Standard Deviation	0.604
Coefficient of Variation	1.757

Mann-Kendall Test

M-K Test Value (S)	23
Tabulated p-value	0.141
Standard Deviation of S	20.21
Standardized Value of S	1.089
Approximate p-value	0.138

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


Tank 17 Benzo(k)fluoranthene Mann-Kendall Trend Test
Benzo(k)fluoranthene
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.0
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 1.0887
M-K Test Value (S) 23
Tabulated p-value 0.1410
Approximate p-value 0.1381
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 11:26:44 AM	
From File	Tank17_Chrysene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Chrysene

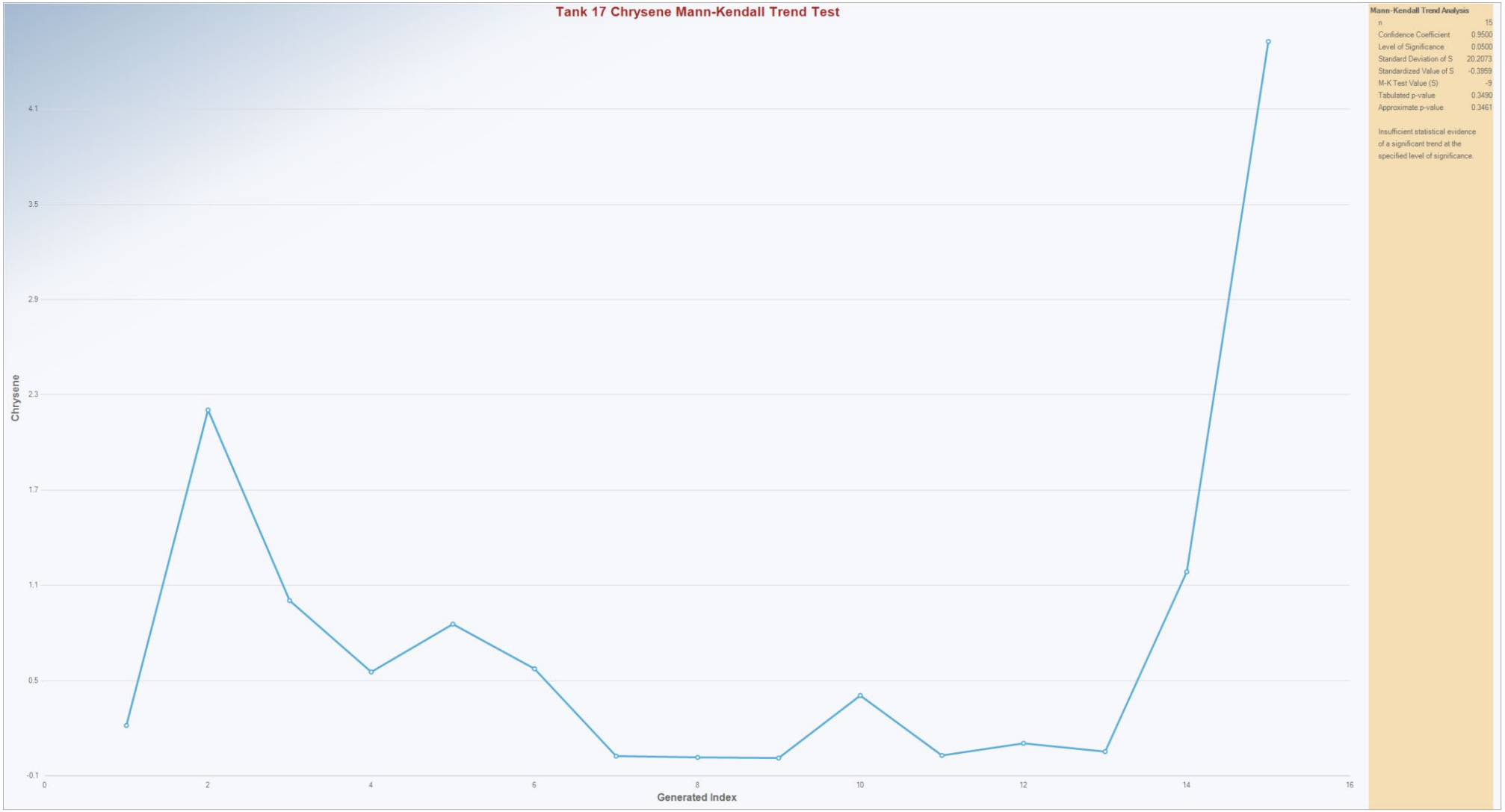
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0071
Maximum	4.52
Mean	0.779
Geometric Mean	0.201
Median	0.4
Standard Deviation	1.199
Coefficient of Variation	1.539

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.349
Standard Deviation of S	20.21
Standardized Value of S	-0.396
Approximate p-value	0.346

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


Tank 17 Chrysene Mann-Kendall Trend Test
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S -0.3959
M-K Test Value (S) -9
Tabulated p-value 0.3490
Approximate p-value 0.3461
Insufficient statistical evidence of a significant trend at the specified level of significance.
Chrysene
4.1
3.5
2.9
2.3
1.7
1.1
0.5
-0.1
0
2
4
6
8
10
12
14
16
Generated Index

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:54:25 AM	
From File	Tank17_DRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

DRO

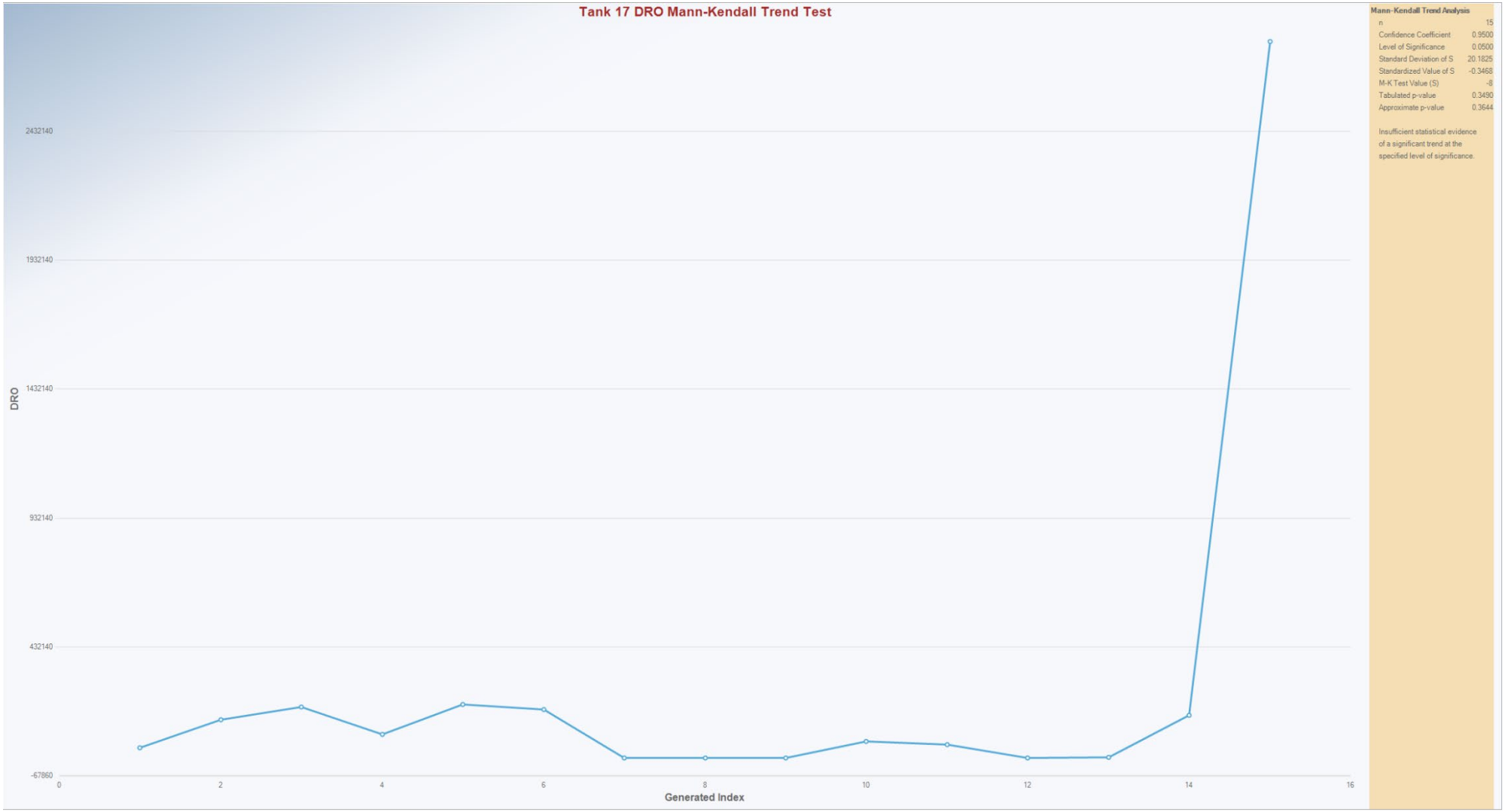
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	1600
Maximum	2780000
Mean	264038
Geometric Mean	36863
Median	65000
Standard Deviation	700537
Coefficient of Variation	2.653

Mann-Kendall Test

M-K Test Value (S)	-8
Tabulated p-value	0.349
Standard Deviation of S	20.18
Standardized Value of S	-0.347
Approximate p-value	0.364

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


Tank 17 DRO Mann-Kendall Trend Test
DRO
2432140
1932140
1432140
932140
432140
-67860
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S -0.3468
M-K Test Value (S) -8
Tabulated p-value 0.3490
Approximate p-value 0.3644
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:21:13 PM	
From File	Tank17_Fluoranthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluoranthene

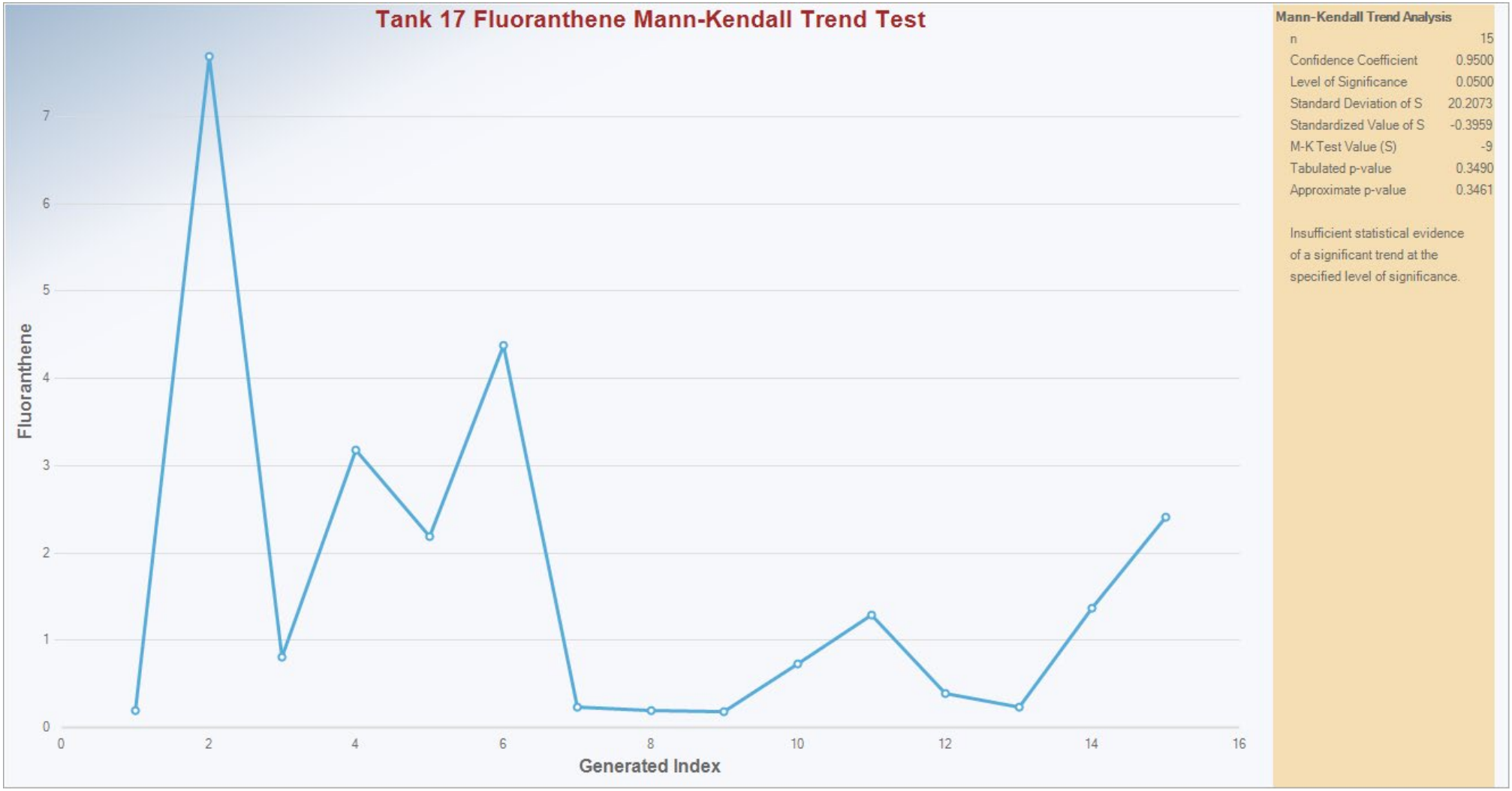
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0023
Maximum	7.5
Mean	1.513
Geometric Mean	0.307
Median	0.62
Standard Deviation	2.085
Coefficient of Variation	1.378

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.349
Standard Deviation of S	20.21
Standardized Value of S	-0.396
Approximate p-value	0.346

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



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.3959
M-K Test Value (S)	-9
Tabulated p-value	0.3490
Approximate p-value	0.3461

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:23:30 PM	
From File	Tank17_Fluorene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluorene

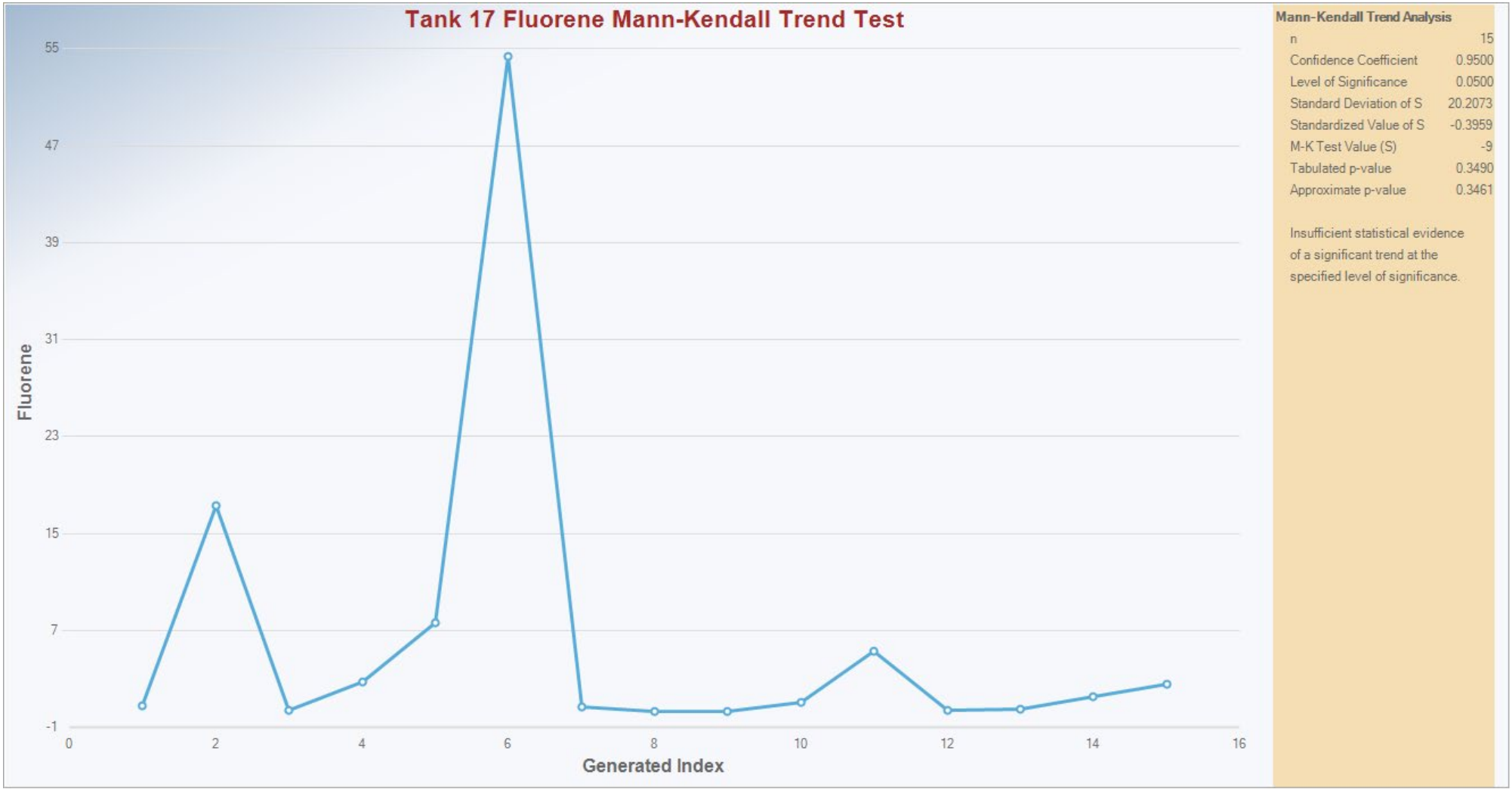
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0034
Maximum	54
Mean	6.051
Geometric Mean	0.624
Median	0.68
Standard Deviation	14.01
Coefficient of Variation	2.315

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.349
Standard Deviation of S	20.21
Standardized Value of S	-0.396
Approximate p-value	0.346

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


Tank 17 Fluorene Mann-Kendall Trend Test
Fluorene
55
47
39
31
23
15
7
-1
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S -0.3959
M-K Test Value (S) -9
Tabulated p-value 0.3490
Approximate p-value 0.3461
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 3:54:52 PM	
From File	Tank17_GRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

GRO

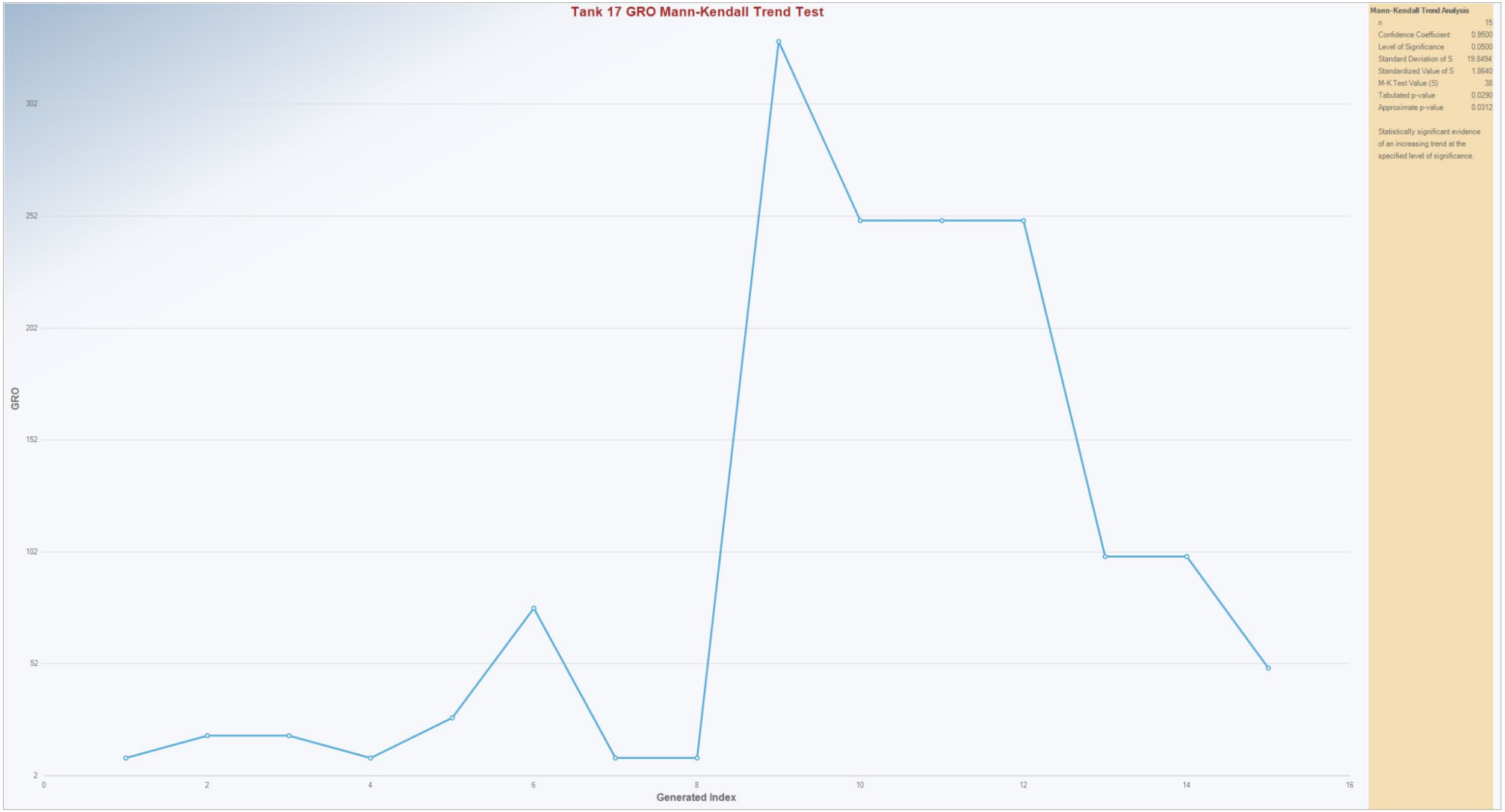
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	10
Maximum	330
Mean	101
Geometric Mean	48.96
Median	50
Standard Deviation	111.4
Coefficient of Variation	1.103

Mann-Kendall Test

M-K Test Value (S)	38
Tabulated p-value	0.029
Standard Deviation of S	19.85
Standardized Value of S	1.864
Approximate p-value	0.0312

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


Tank 17 GRO Mann-Kendall Trend Test
GRO
302
252
202
152
102
52
2
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 19.8494
Standardized Value of S 1.8640
M-K Test Value (S) 38
Tabulated p-value 0.0290
Approximate p-value 0.0312
Statistically significant evidence of an increasing trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:55:51 AM	
From File	Tank17_Indeno(1,2,3-c,d)perylene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Indeno(1,2,3-c,d)perylene

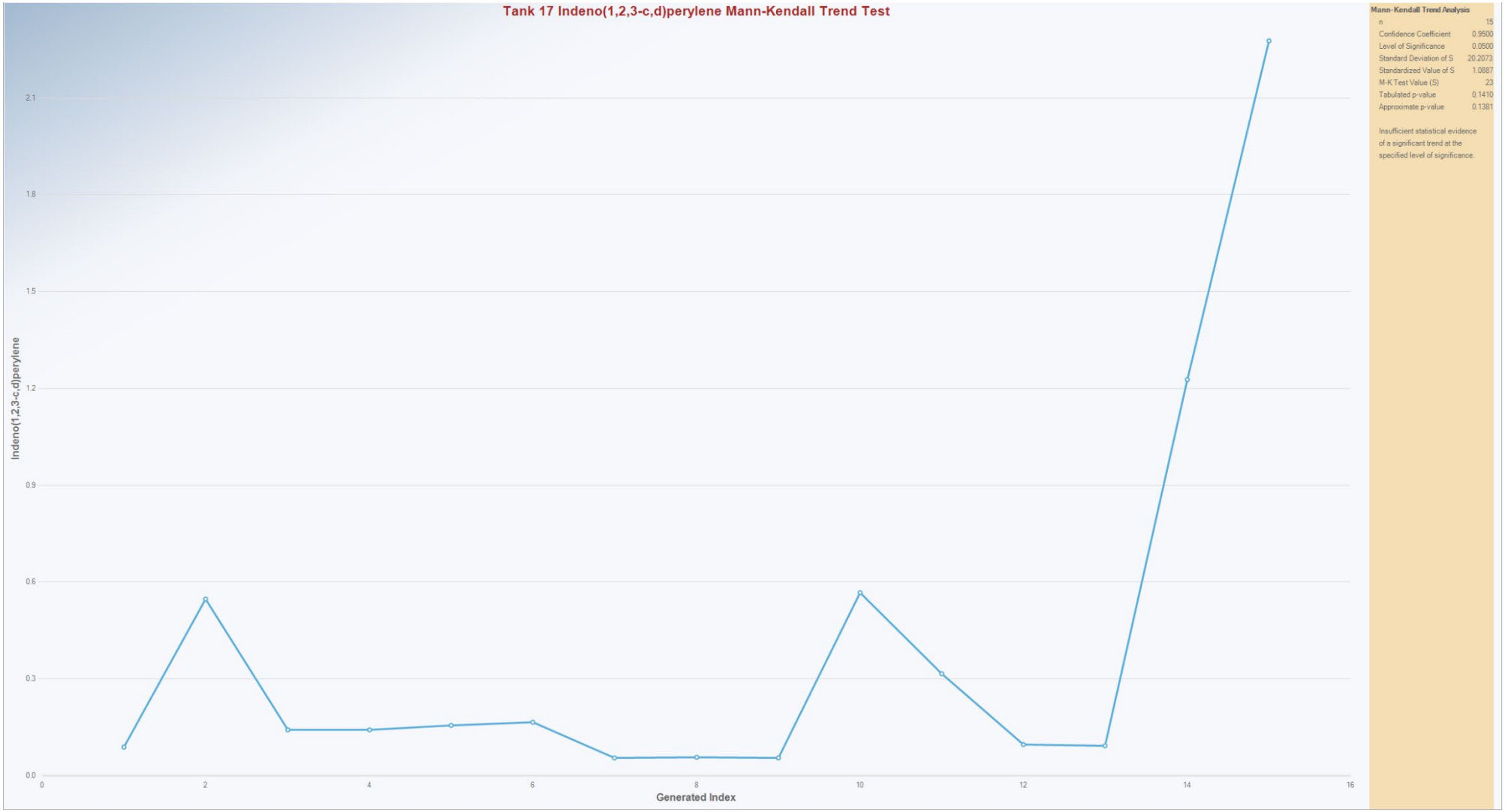
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0088
Maximum	2.23
Mean	0.353
Geometric Mean	0.104
Median	0.096
Standard Deviation	0.606
Coefficient of Variation	1.72

Mann-Kendall Test

M-K Test Value (S)	23
Tabulated p-value	0.141
Standard Deviation of S	20.21
Standardized Value of S	1.089
Approximate p-value	0.138

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


Tank 17 Indeno(1,2,3-c,d)perylene Mann-Kendall Trend Test
Indeno(1,2,3-c,d)perylene
Generated Index
0.0
0.3
0.6
0.9
1.2
1.5
1.8
2.1
0
2
4
6
8
10
12
14
16
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.2073
Standardized Value of S 1.0887
M-K Test Value (S) 23
Tabulated p-value 0.1410
Approximate p-value 0.1381
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:25:17 PM	
From File	Tank17_Naphthalene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Naphthalene

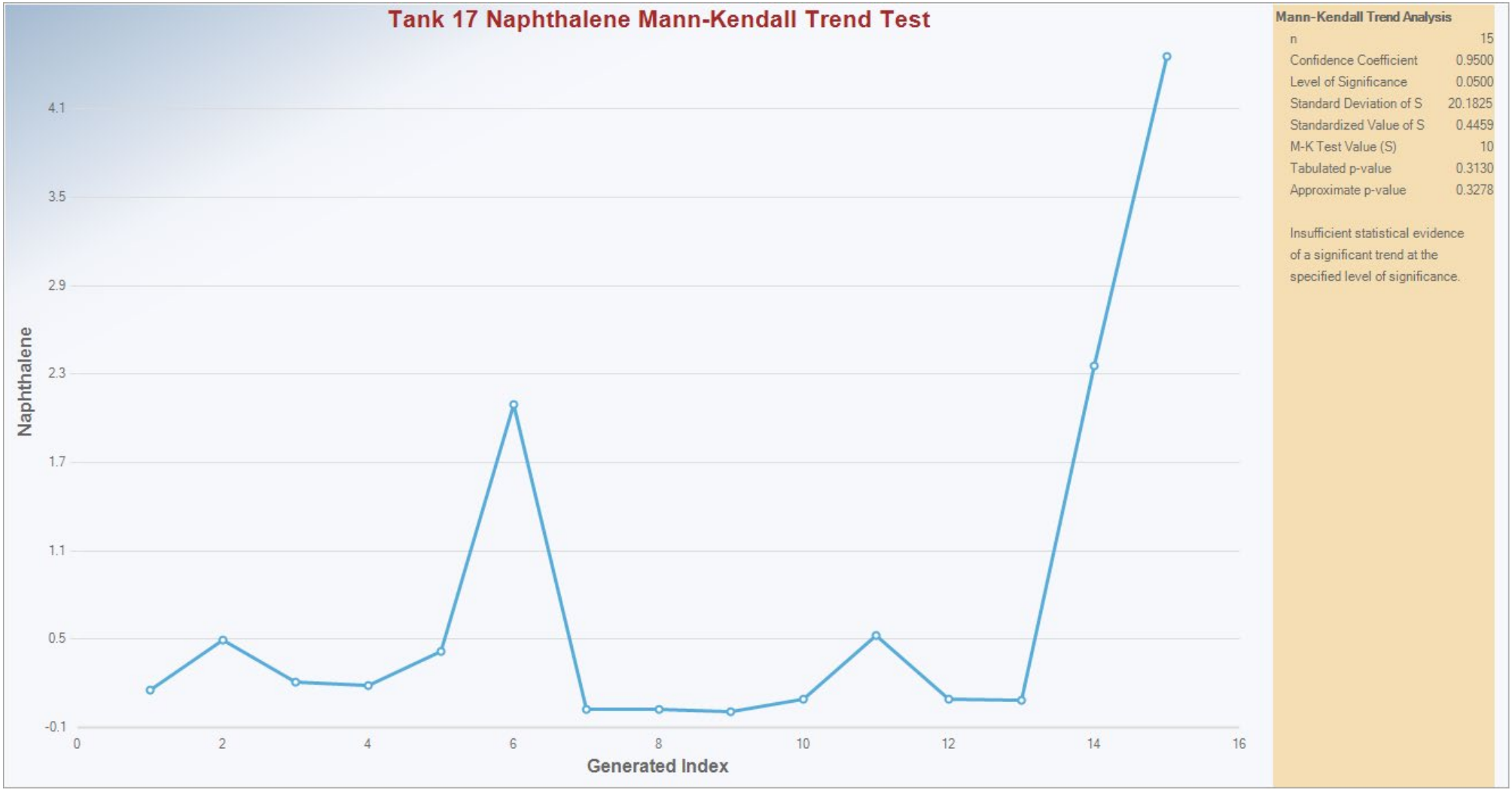
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.015
Maximum	4.46
Mean	0.753
Geometric Mean	0.224
Median	0.19
Standard Deviation	1.26
Coefficient of Variation	1.673

Mann-Kendall Test

M-K Test Value (S)	10
Tabulated p-value	0.313
Standard Deviation of S	20.18
Standardized Value of S	0.446
Approximate p-value	0.328

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


Tank 17 Naphthalene Mann-Kendall Trend Test
Naphthalene
4.1
3.5
2.9
2.3
1.7
1.1
0.5
-0.1
0
2
4
6
8
10
12
14
16
Generated Index
Mann-Kendall Trend Analysis
n 15
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 20.1825
Standardized Value of S 0.4459
M-K Test Value (S) 10
Tabulated p-value 0.3130
Approximate p-value 0.3278
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:27:28 PM	
From File	Tank17_Phenanthrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Phenanthrene

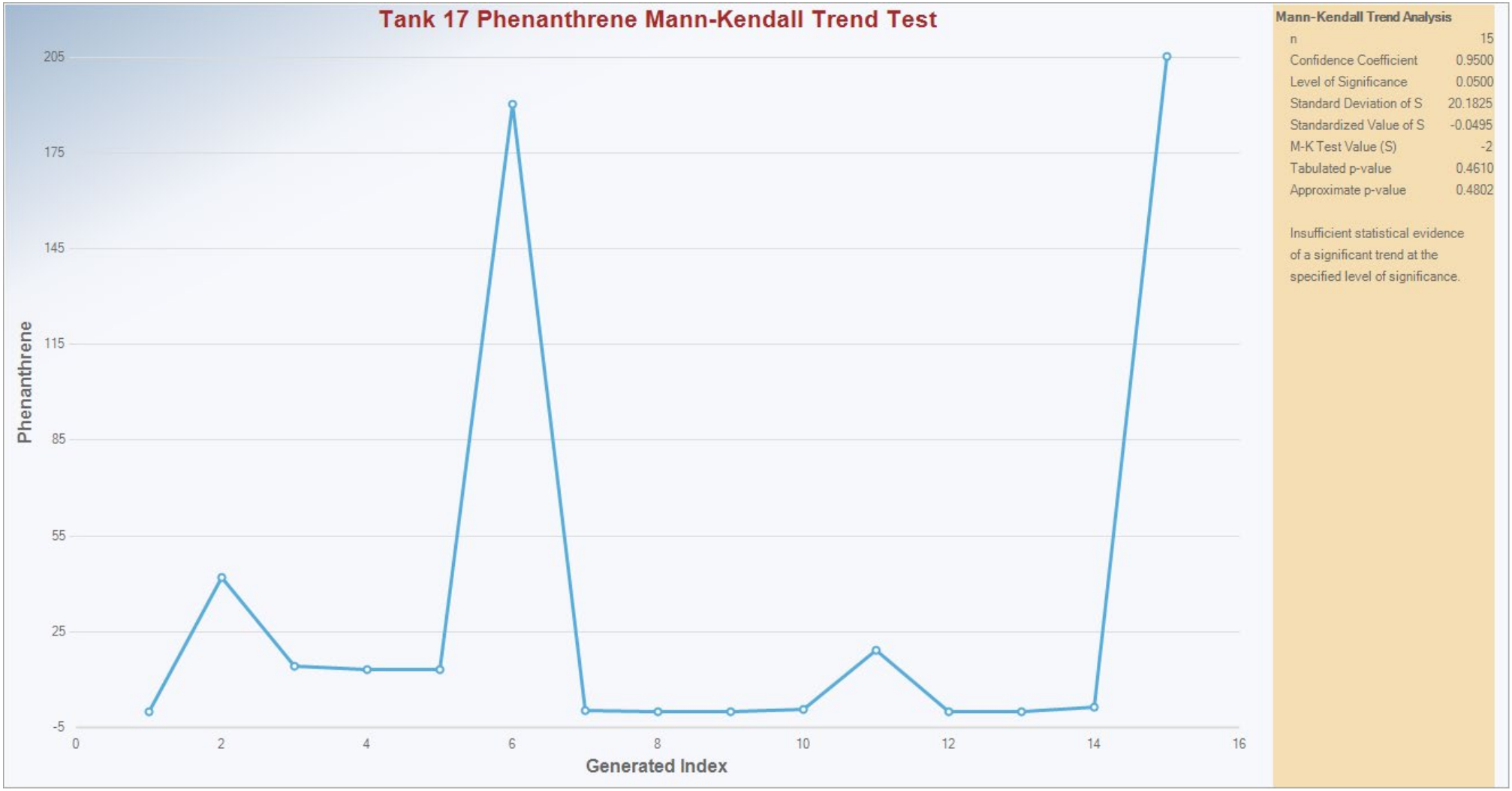
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0046
Maximum	205
Mean	33.21
Geometric Mean	1.252
Median	1.18
Standard Deviation	67.74
Coefficient of Variation	2.04

Mann-Kendall Test

M-K Test Value (S)	-2
Tabulated p-value	0.461
Standard Deviation of S	20.18
Standardized Value of S	-0.0495
Approximate p-value	0.48

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



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.1825
Standardized Value of S	-0.0495
M-K Test Value (S)	-2
Tabulated p-value	0.4610
Approximate p-value	0.4802

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:29:43 PM	
From File	Tank17_Pyrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Pyrene

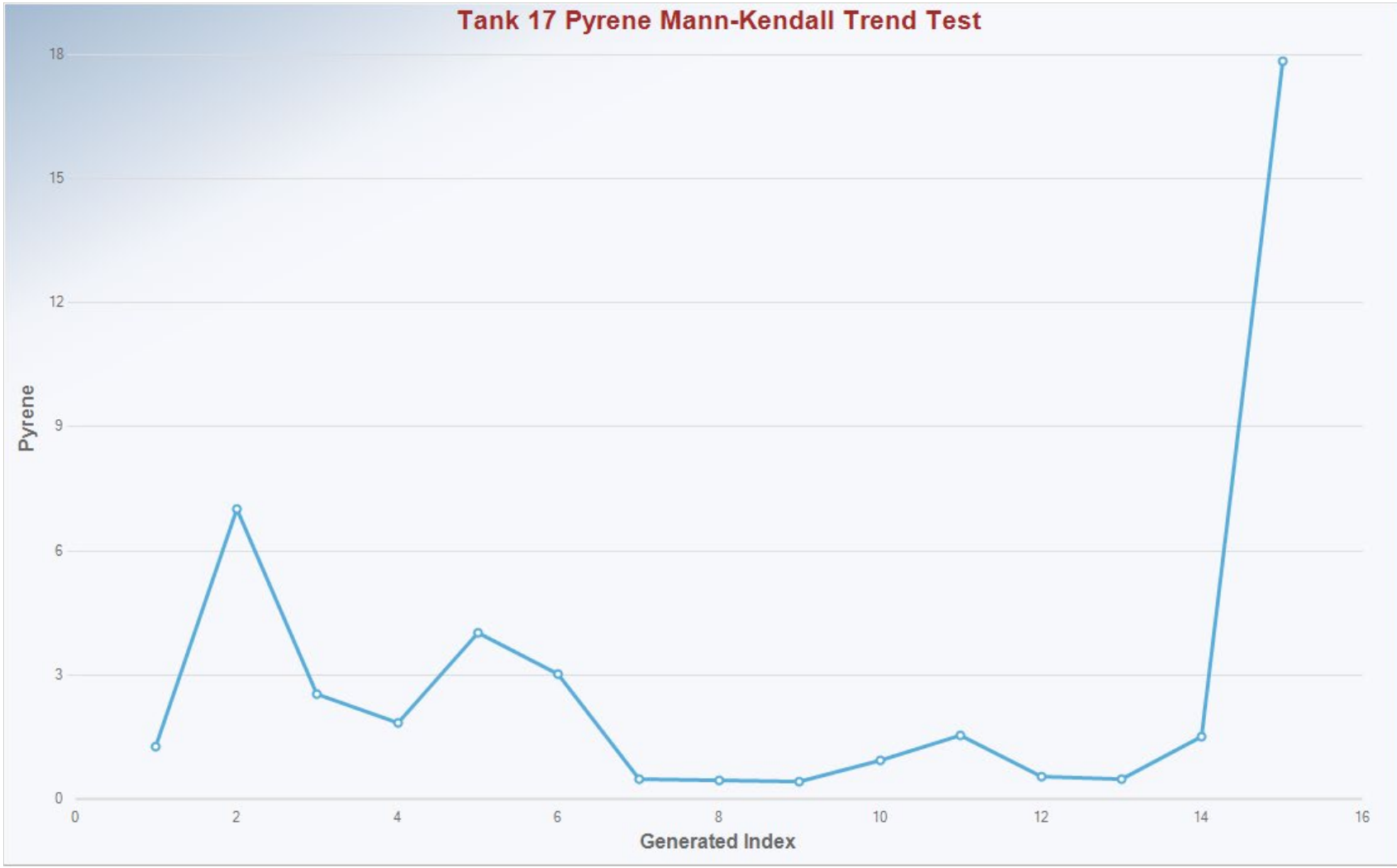
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	15
Number Values Reported (n)	15
Minimum	0.0046
Maximum	17.4
Mean	2.496
Geometric Mean	0.494
Median	1.07
Standard Deviation	4.49
Coefficient of Variation	1.799

Mann-Kendall Test

M-K Test Value (S)	-19
Tabulated p-value	0.19
Standard Deviation of S	20.21
Standardized Value of S	-0.891
Approximate p-value	0.187

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



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-0.8908
M-K Test Value (S)	-19
Tabulated p-value	0.1900
Approximate p-value	0.1865

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:57:13 AM	
From File	Tank17_RRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

RRO

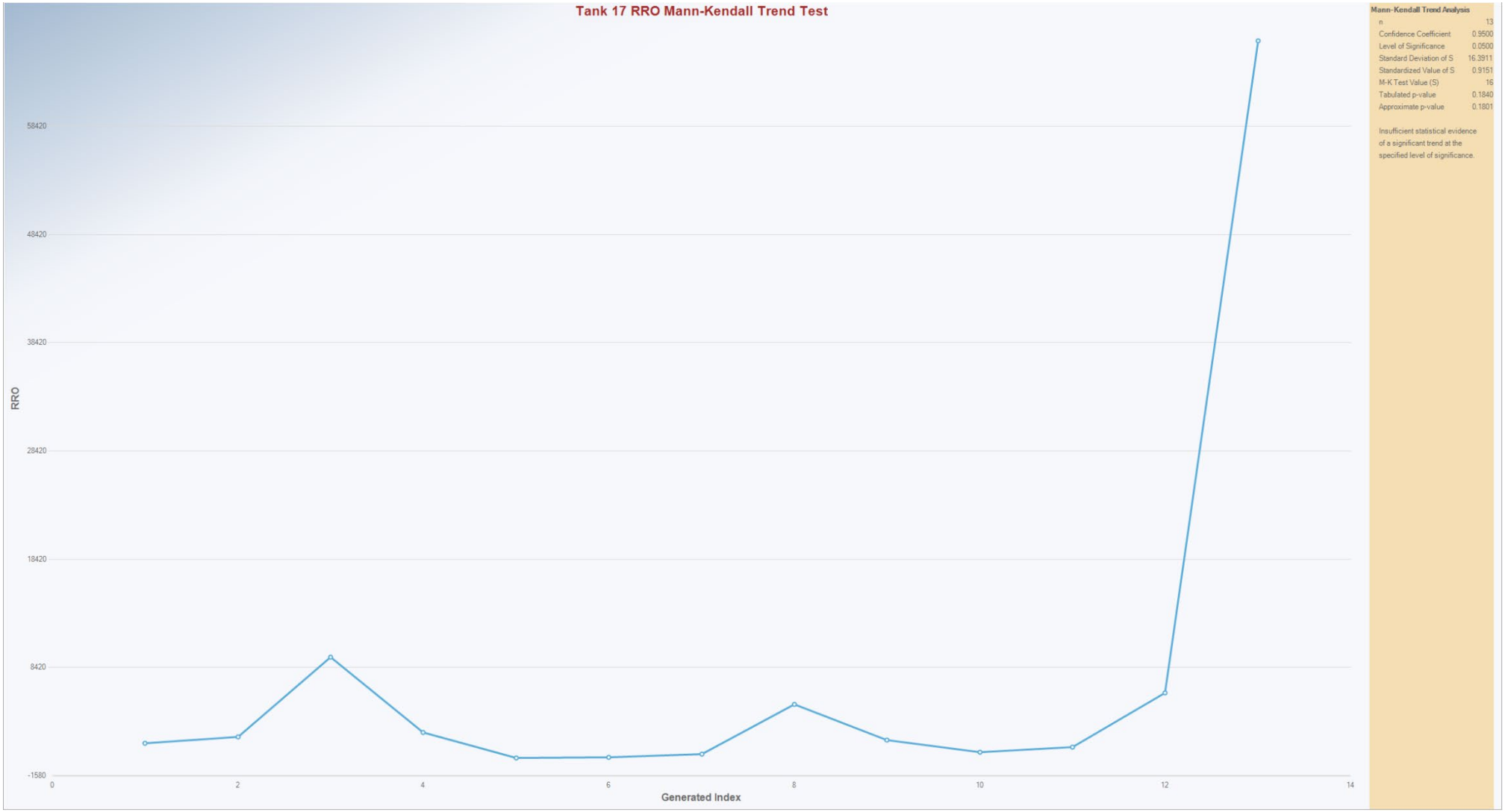
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	76
Maximum	66300
Mean	7428
Geometric Mean	1606
Median	1700
Standard Deviation	17901
Coefficient of Variation	2.41

Mann-Kendall Test

M-K Test Value (S)	16
Tabulated p-value	0.184
Standard Deviation of S	16.39
Standardized Value of S	0.915
Approximate p-value	0.18

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


Tank 17 RRO Mann-Kendall Trend Test
RRO
58420
48420
38420
28420
18420
8420
-1580
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3911
Standardized Value of S 0.9151
M-K Test Value (S) 16
Tabulated p-value 0.1840
Approximate p-value 0.1801
Insufficient statistical evidence of a significant trend at the specified level of significance.

Tank Tunnel 18

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	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:33:31 PM	
From File	Tank18_Acenaphthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Acenaphthene

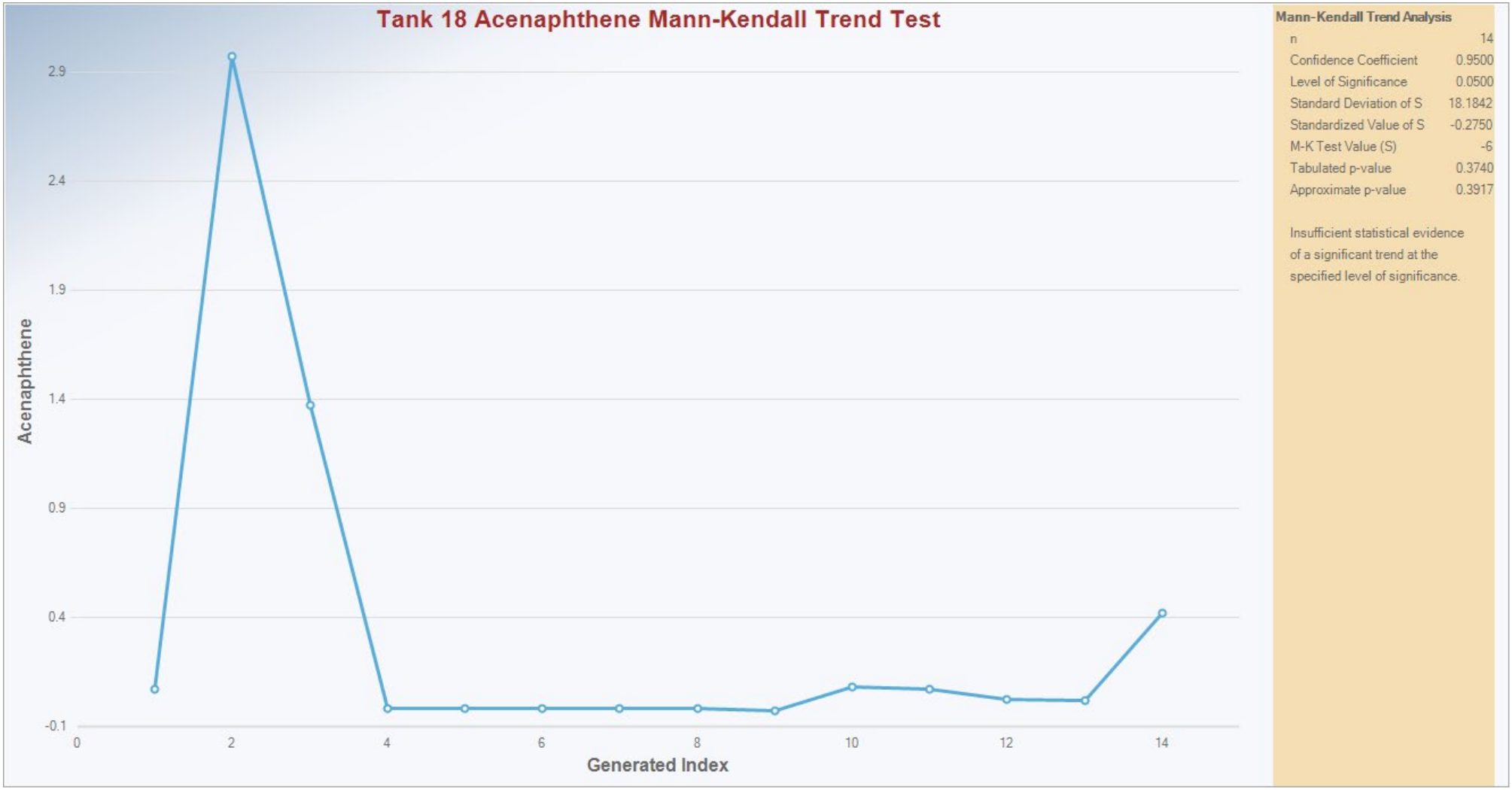
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0021
Maximum	3
Mean	0.379
Geometric Mean	0.0511
Median	0.0477
Standard Deviation	0.841
Coefficient of Variation	2.22

Mann-Kendall Test

M-K Test Value (S)	-6
Tabulated p-value	0.374
Standard Deviation of S	18.18
Standardized Value of S	-0.275
Approximate p-value	0.392

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



Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.1842
Standardized Value of S	-0.2750
M-K Test Value (S)	-6
Tabulated p-value	0.3740
Approximate p-value	0.3917

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:35:52 PM	
From File	Tank18_Anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Anthracene

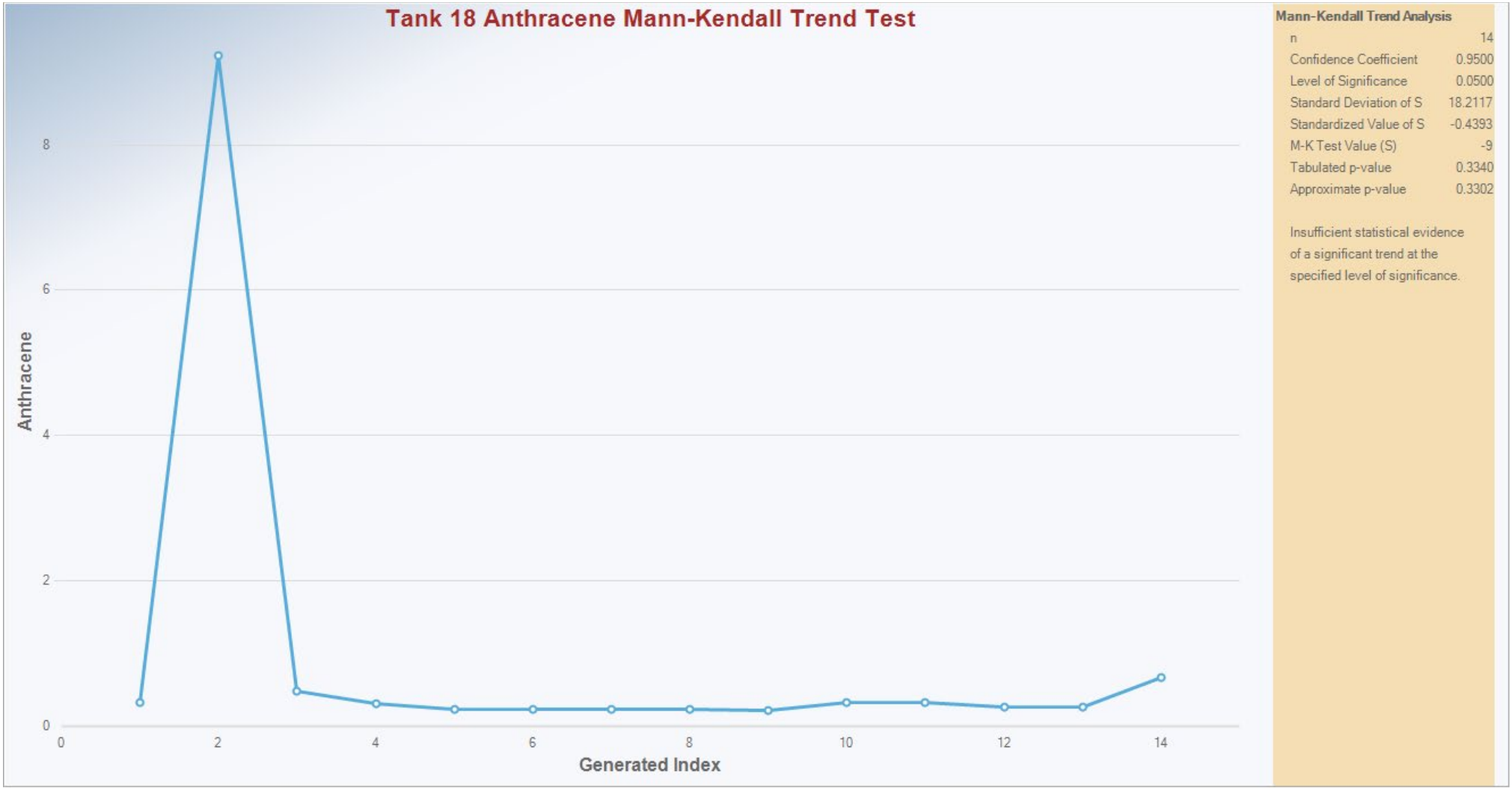
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0031
Maximum	9
Mean	0.731
Geometric Mean	0.0585
Median	0.0662
Standard Deviation	2.383
Coefficient of Variation	3.259

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.334
Standard Deviation of S	18.21
Standardized Value of S	-0.439
Approximate p-value	0.33

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



Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.2117
Standardized Value of S	-0.4393
M-K Test Value (S)	-9
Tabulated p-value	0.3340
Approximate p-value	0.3302

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 4:01:07 PM	
From File	Tank18_Benzo(a)anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(a)anthracene

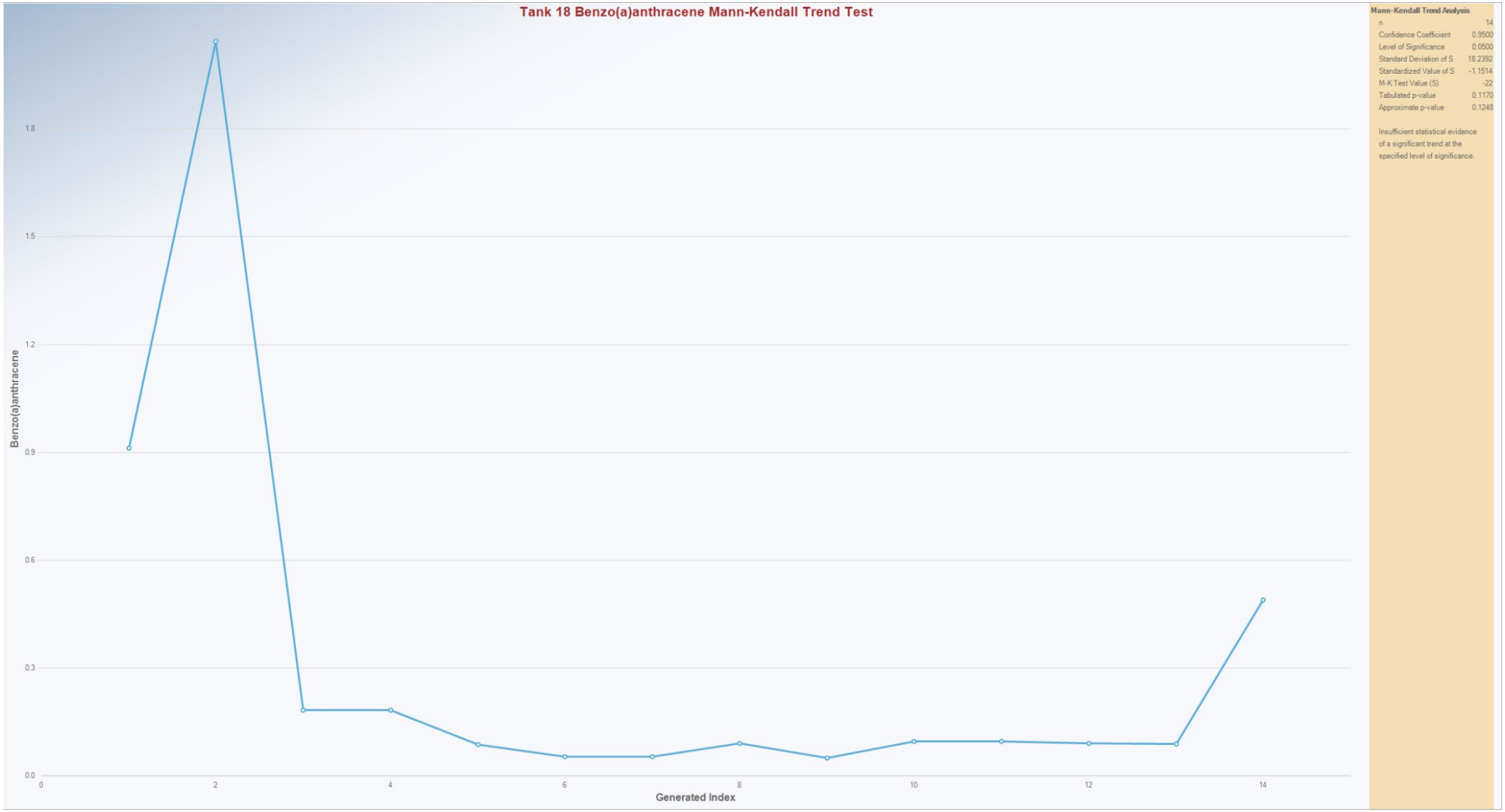
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0064
Maximum	2
Mean	0.279
Geometric Mean	0.0726
Median	0.0495
Standard Deviation	0.549
Coefficient of Variation	1.966

Mann-Kendall Test

M-K Test Value (S)	-22
Tabulated p-value	0.117
Standard Deviation of S	18.24
Standardized Value of S	-1.151
Approximate p-value	0.125

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


Tank 18 Benzo(a)anthracene Mann-Kendall Trend Test
Benzo(a)anthracene
1.8
1.5
1.2
0.9
0.6
0.3
0.0
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2392
Standardized Value of S -1.1514
M-K Test Value (S) -22
Tabulated p-value 0.1170
Approximate p-value 0.1248
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 4:02:19 PM	
From File	Tank18_Benzo(a)pyrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(a)pyrene

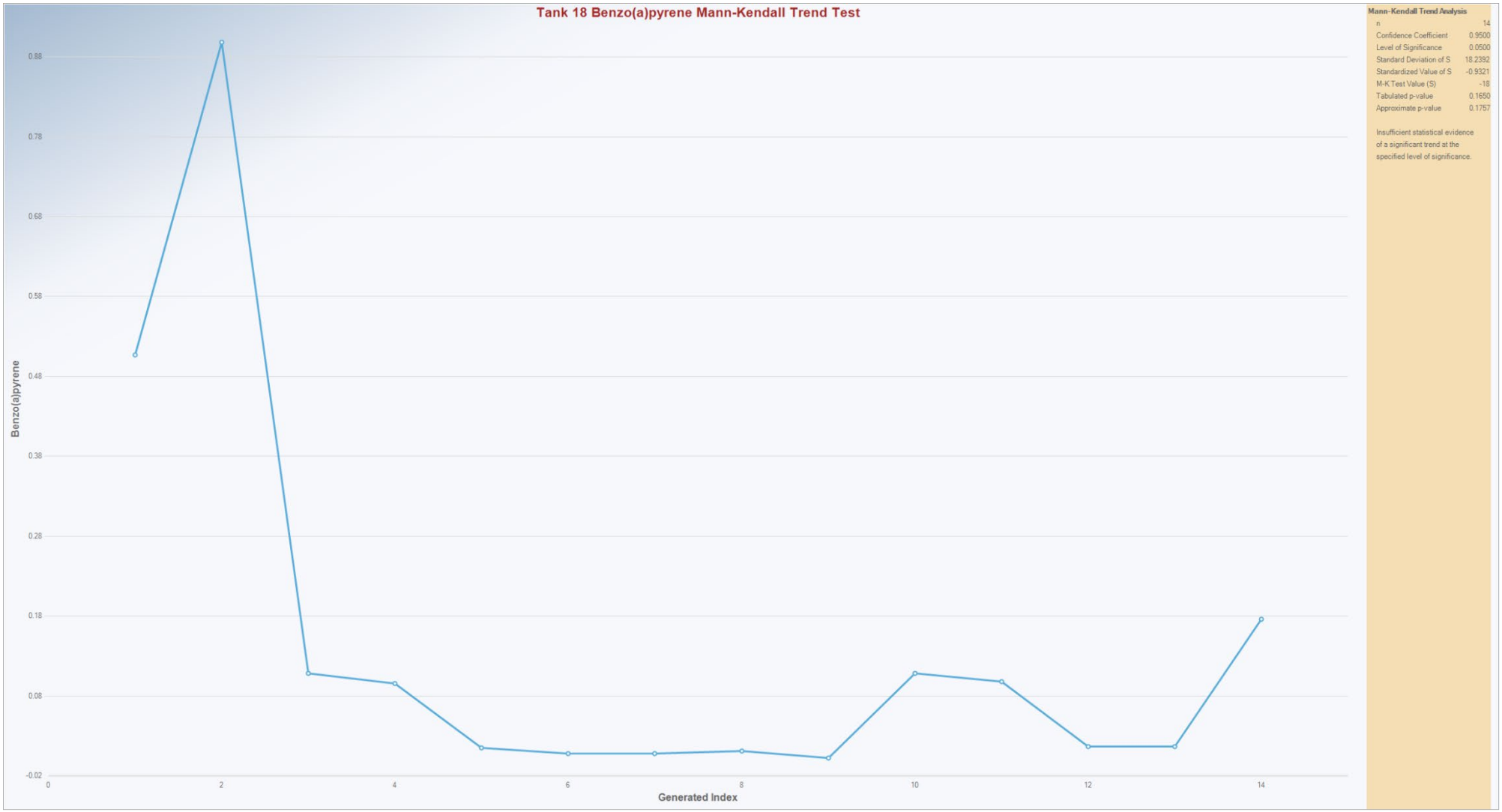
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0041
Maximum	0.9
Mean	0.15
Geometric Mean	0.0471
Median	0.0578
Standard Deviation	0.253
Coefficient of Variation	1.692

Mann-Kendall Test

M-K Test Value (S)	-18
Tabulated p-value	0.165
Standard Deviation of S	18.24
Standardized Value of S	-0.932
Approximate p-value	0.176

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


Tank 18 Benzo(a)pyrene Mann-Kendall Trend Test
Benzo(a)pyrene
0.88
0.78
0.68
0.58
0.48
0.38
0.28
0.18
0.08
-0.02
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2392
Standardized Value of S -0.9321
M-K Test Value (S) -18
Tabulated p-value 0.1650
Approximate p-value 0.1757
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 4:04:17 PM	
From File	Tank18_Benzo(b)fluoranthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(b)fluoranthene

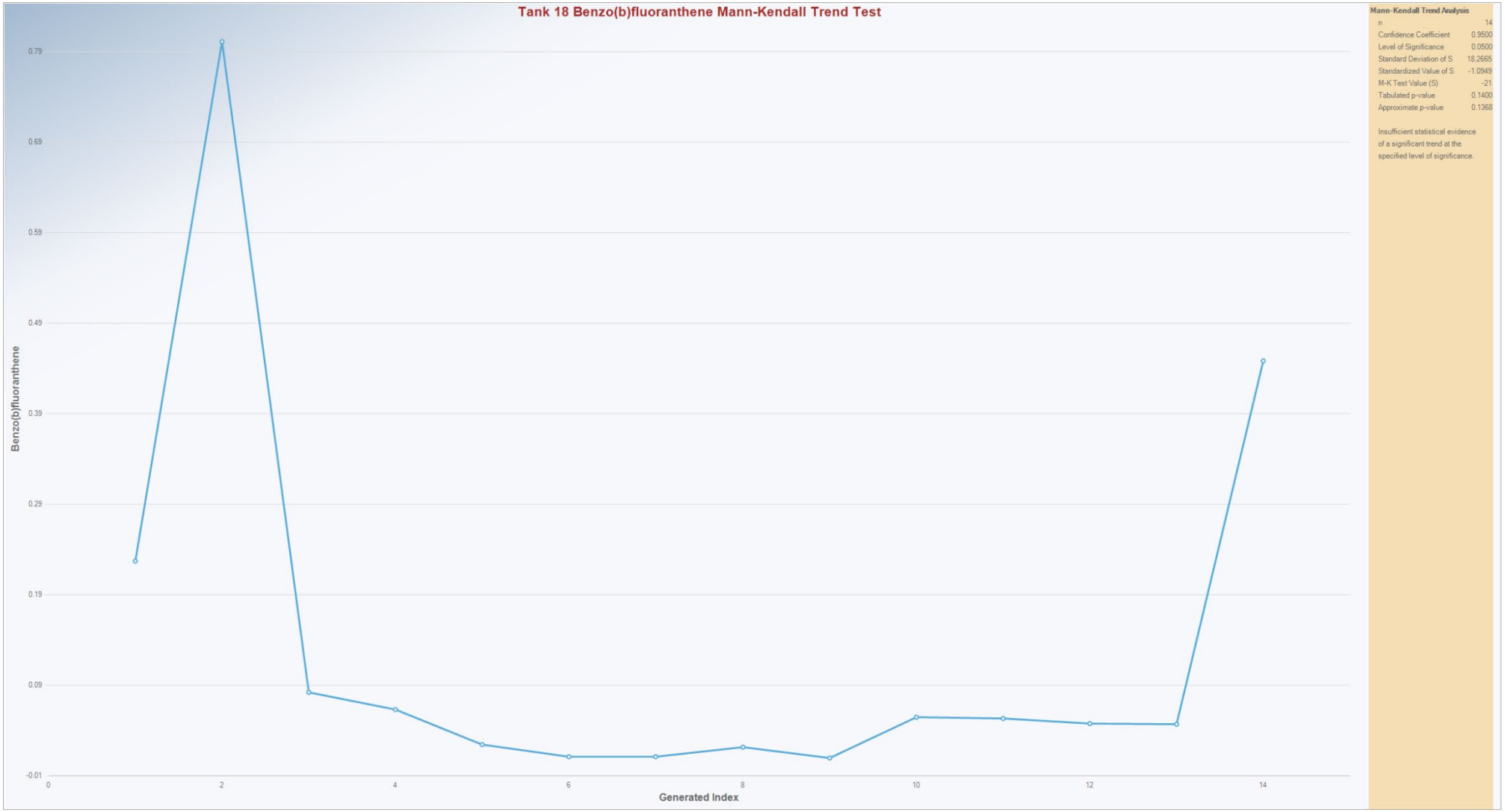
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0083
Maximum	0.8
Mean	0.135
Geometric Mean	0.0511
Median	0.0492
Standard Deviation	0.225
Coefficient of Variation	1.674

Mann-Kendall Test

M-K Test Value (S)	-21
Tabulated p-value	0.14
Standard Deviation of S	18.27
Standardized Value of S	-1.095
Approximate p-value	0.137

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


Tank 18 Benzo(b)fluoranthene Mann-Kendall Trend Test
Benzo(b)fluoranthene
0.79
0.69
0.59
0.49
0.39
0.29
0.19
0.09
-0.01
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2665
Standardized Value of S -1.0949
M-K Test Value (S) -21
Tabulated p-value 0.1400
Approximate p-value 0.1368
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 4:05:49 PM	
From File	Tank18_Benzo(g,h,i)perylene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Benzo(g,h,i)perylene

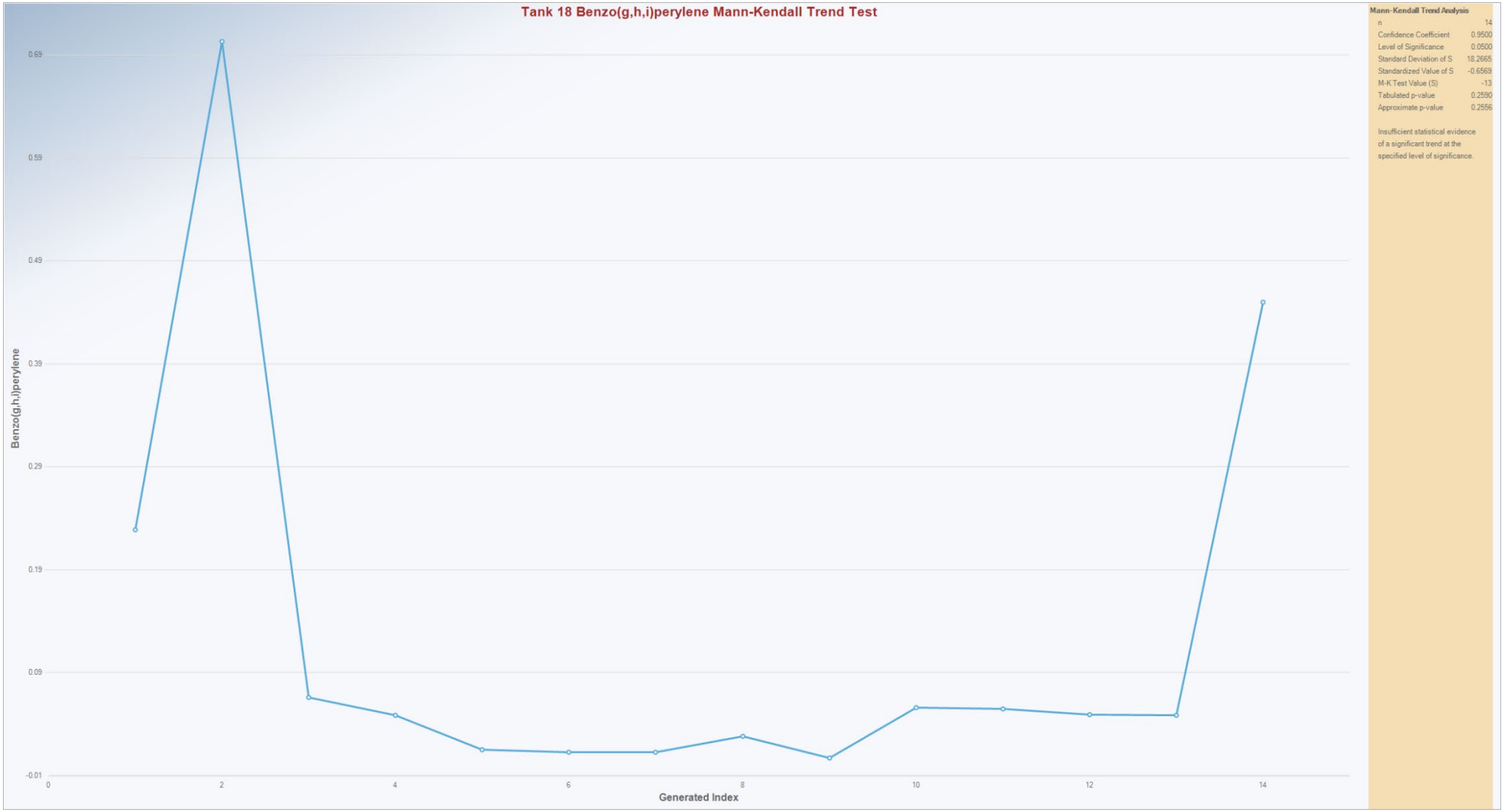
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0043
Maximum	0.7
Mean	0.124
Geometric Mean	0.045
Median	0.0462
Standard Deviation	0.204
Coefficient of Variation	1.643

Mann-Kendall Test

M-K Test Value (S)	-13
Tabulated p-value	0.259
Standard Deviation of S	18.27
Standardized Value of S	-0.657
Approximate p-value	0.256

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


Tank 18 Benzo(g,h,i)perylene Mann-Kendall Trend Test
Benzo(g,h,i)perylene
0.69
0.59
0.49
0.39
0.29
0.19
0.09
-0.01
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2665
Standardized Value of S -0.6569
M-K Test Value (S) -13
Tabulated p-value 0.2590
Approximate p-value 0.2556
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 4:07:16 PM	
From File	Tank18_Chrysene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Chrysene

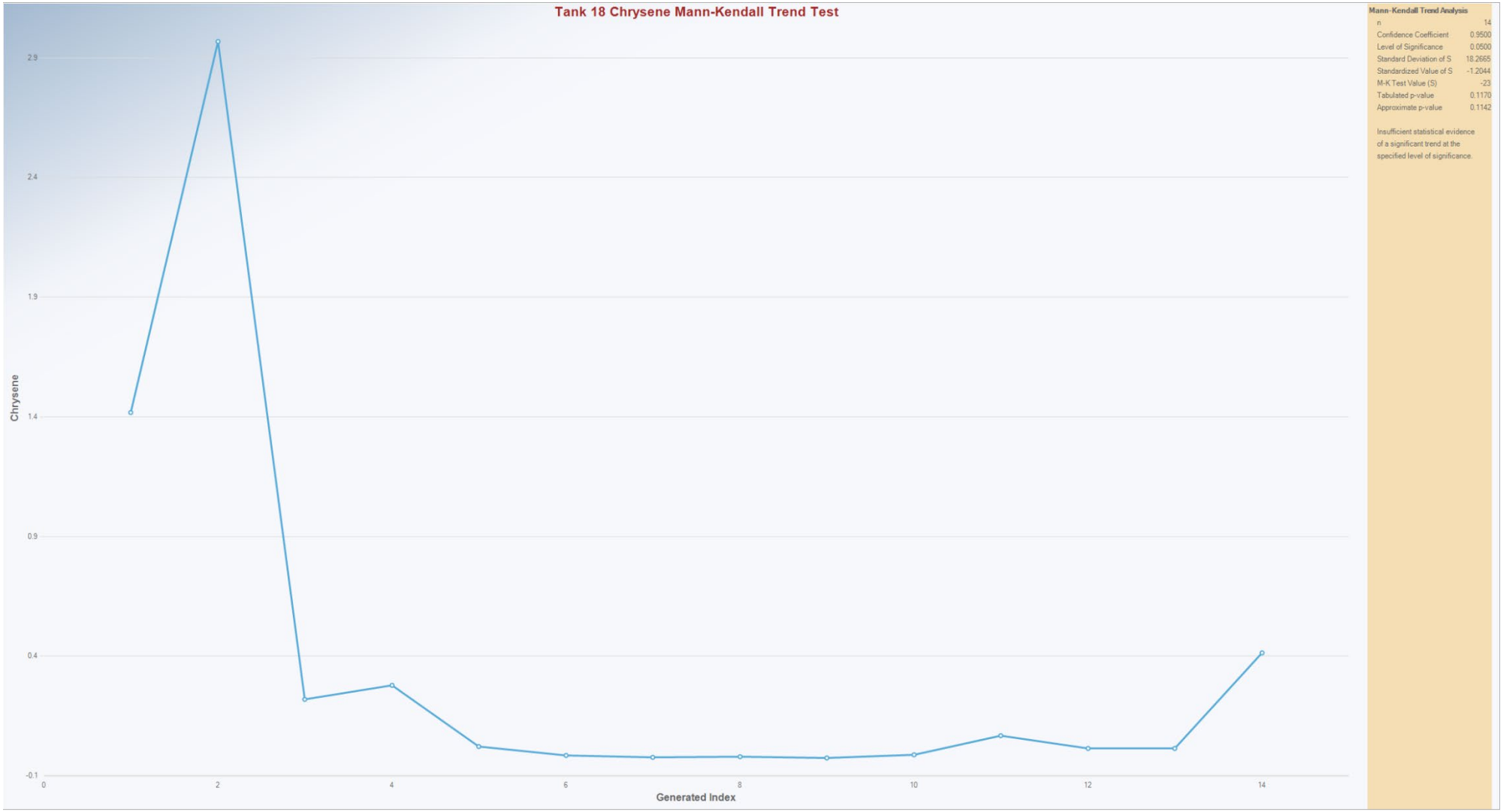
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0065
Maximum	3
Mean	0.412
Geometric Mean	0.0793
Median	0.0497
Standard Deviation	0.837
Coefficient of Variation	2.032

Mann-Kendall Test

M-K Test Value (S)	-23
Tabulated p-value	0.117
Standard Deviation of S	18.27
Standardized Value of S	-1.204
Approximate p-value	0.114

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


Tank 18 Chrysene Mann-Kendall Trend Test
Chrysene
2.9
2.4
1.9
1.4
0.9
0.4
-0.1
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2665
Standardized Value of S -1.2044
M-K Test Value (S) -23
Tabulated p-value 0.1170
Approximate p-value 0.1142
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 4:08:31 PM	
From File	Tank18_Dibenzo(a,h)anthracene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Dibenzo(a,h)anthracene

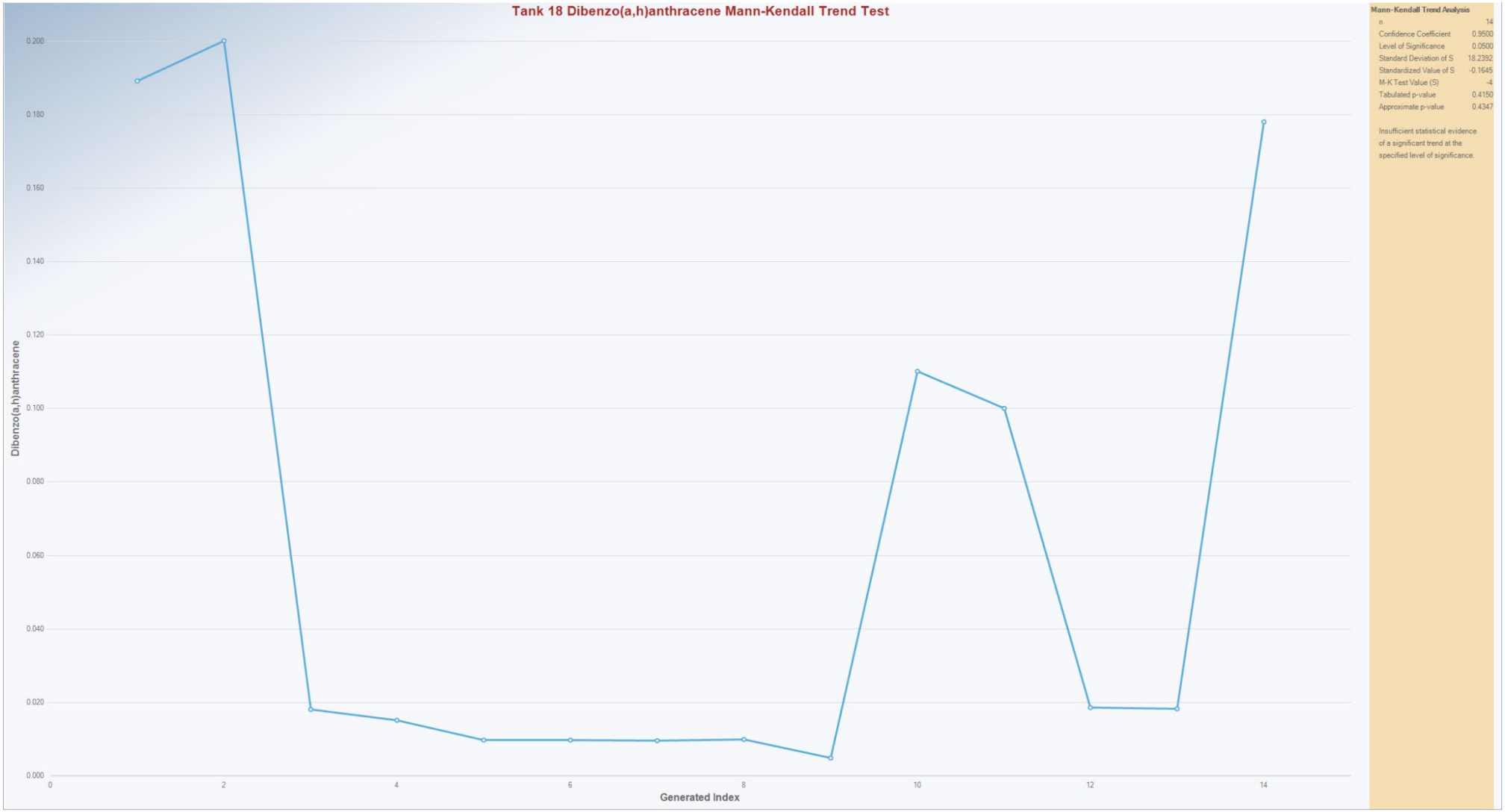
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0048
Maximum	0.2
Mean	0.0636
Geometric Mean	0.0289
Median	0.0181
Standard Deviation	0.0757
Coefficient of Variation	1.191

Mann-Kendall Test

M-K Test Value (S)	-4
Tabulated p-value	0.415
Standard Deviation of S	18.24
Standardized Value of S	-0.164
Approximate p-value	0.435

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


Tank 18 Dibenzo(a,h)anthracene Mann-Kendall Trend Test
Dibenzo(a,h)anthracene
0.200
0.180
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2392
Standardized Value of S -0.1645
M-K Test Value (S) -4
Tabulated p-value 0.4150
Approximate p-value 0.4347
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:58:15 AM	
From File	Tank18_DRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

DRO

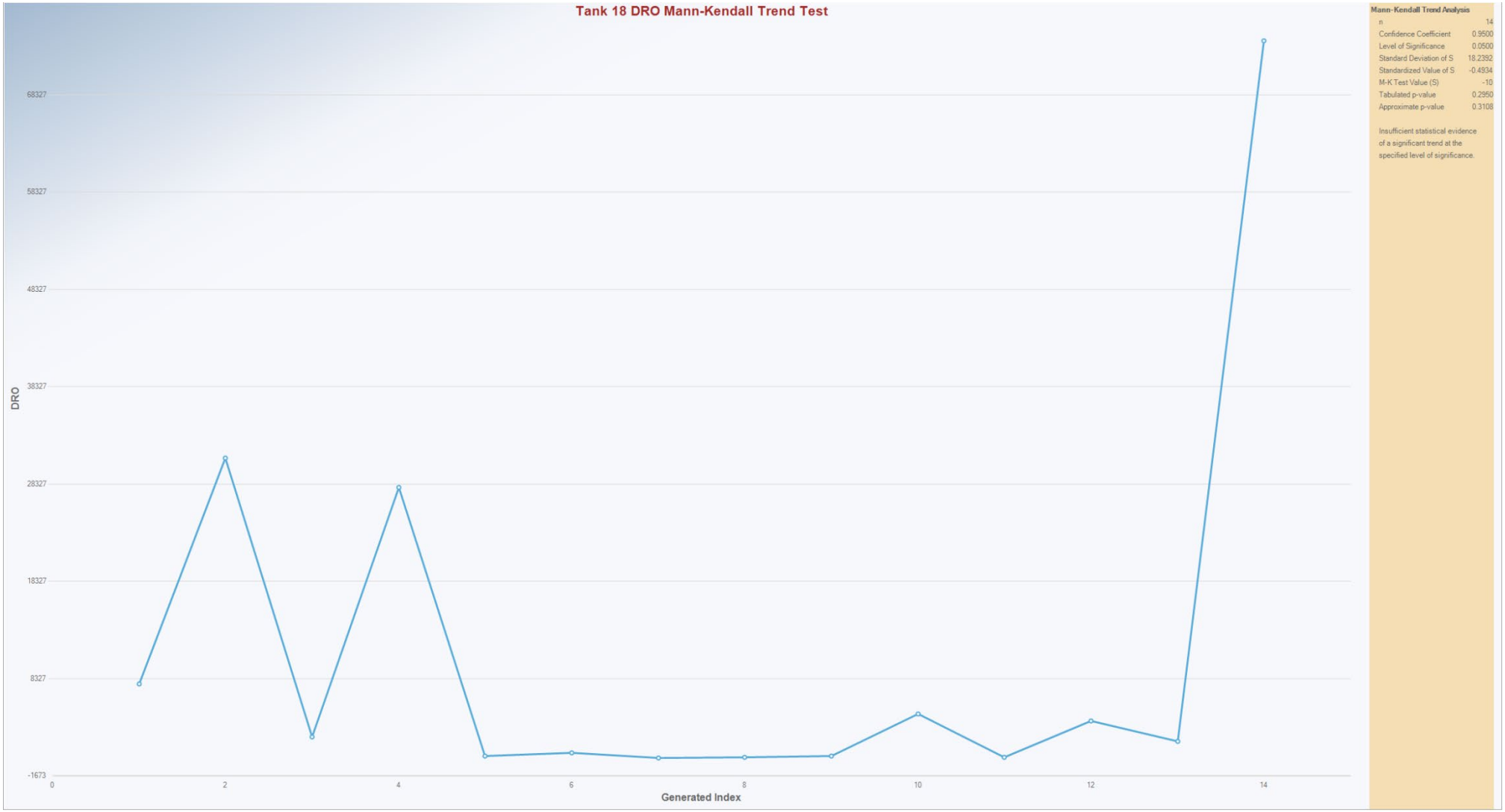
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	170
Maximum	73900
Mean	11108
Geometric Mean	2075
Median	2080
Standard Deviation	20730
Coefficient of Variation	1.866

Mann-Kendall Test

M-K Test Value (S)	-10
Tabulated p-value	0.295
Standard Deviation of S	18.24
Standardized Value of S	-0.493
Approximate p-value	0.311

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


Tank 18 DRO Mann-Kendall Trend Test
DRO
68327
58327
48327
38327
28327
18327
8327
-1673
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2392
Standardized Value of S -0.4934
M-K Test Value (S) -10
Tabulated p-value 0.2950
Approximate p-value 0.3108
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:37:41 PM	
From File	Tank18_Fluoranthene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluoranthene

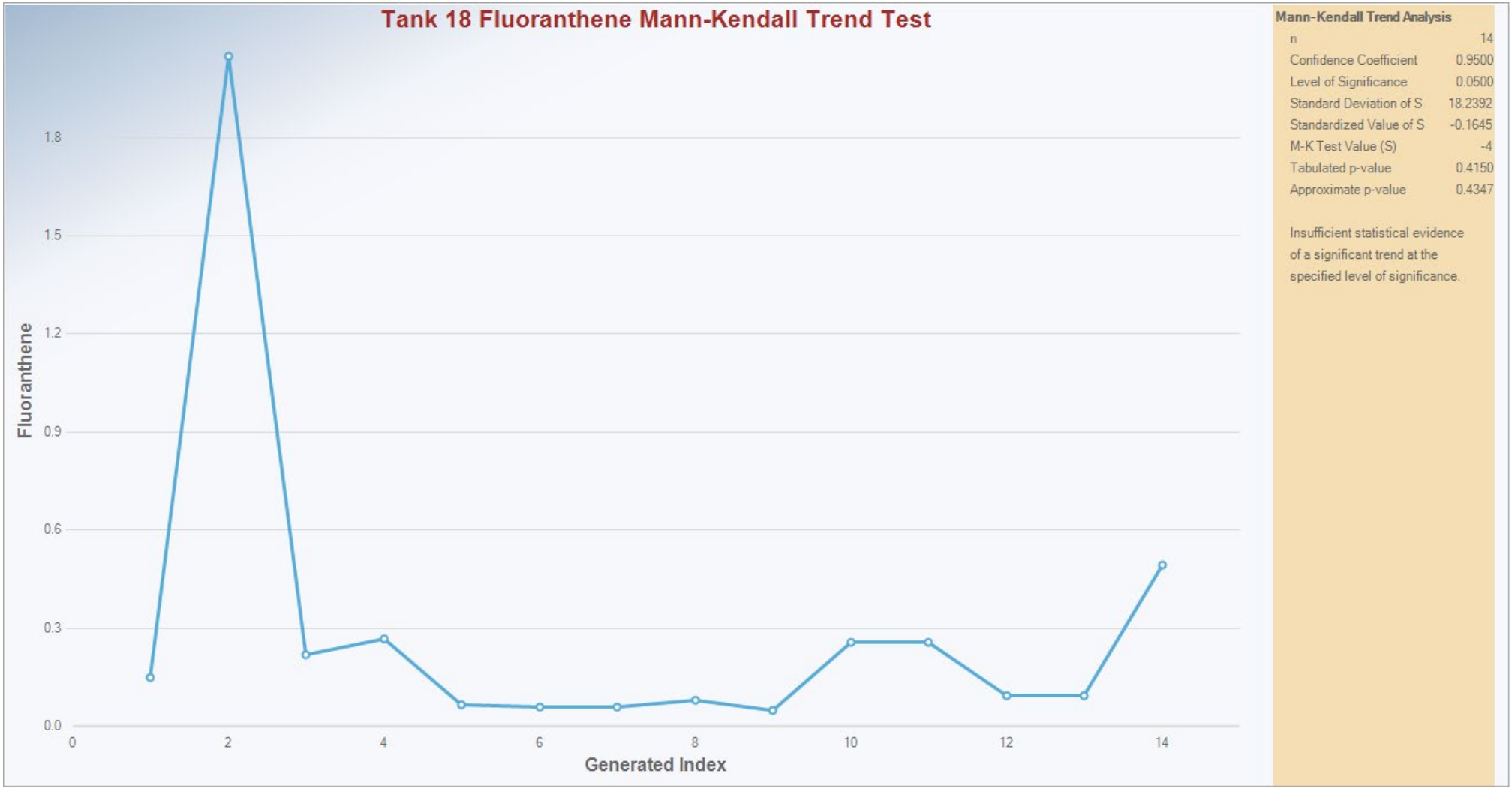
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0021
Maximum	2
Mean	0.252
Geometric Mean	0.0669
Median	0.0732
Standard Deviation	0.519
Coefficient of Variation	2.062

Mann-Kendall Test

M-K Test Value (S)	-4
Tabulated p-value	0.415
Standard Deviation of S	18.24
Standardized Value of S	-0.164
Approximate p-value	0.435

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


Tank 18 Fluoranthene Mann-Kendall Trend Test
Fluoranthene
1.8
1.5
1.2
0.9
0.6
0.3
0.0
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2392
Standardized Value of S -0.1645
M-K Test Value (S) -4
Tabulated p-value 0.4150
Approximate p-value 0.4347
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:39:17 PM	
From File	Tank18_Fluorene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Fluorene

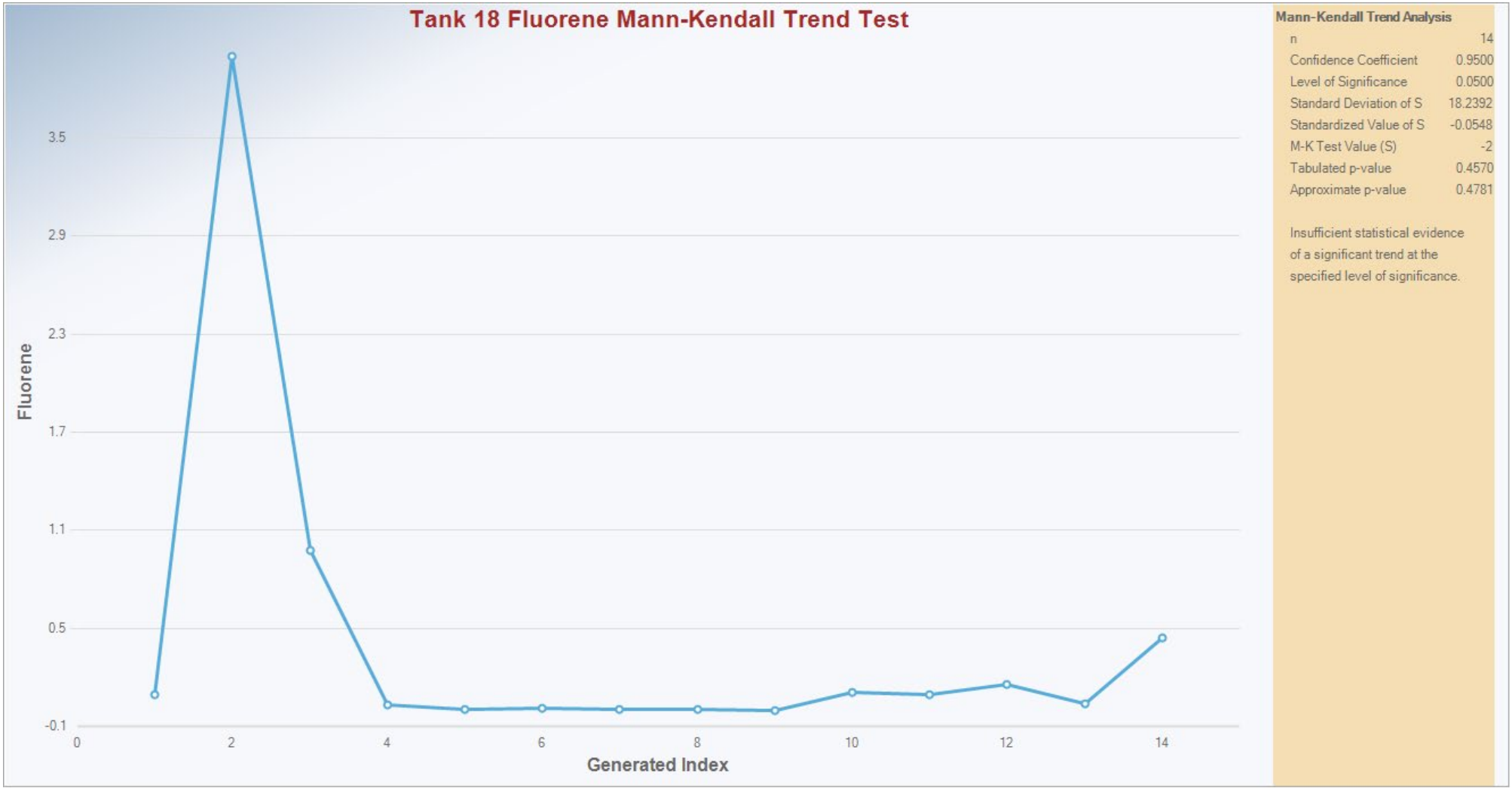
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0031
Maximum	4
Mean	0.43
Geometric Mean	0.0629
Median	0.0728
Standard Deviation	1.061
Coefficient of Variation	2.467

Mann-Kendall Test

M-K Test Value (S)	-2
Tabulated p-value	0.457
Standard Deviation of S	18.24
Standardized Value of S	-0.0548
Approximate p-value	0.478

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


Tank 18 Fluorene Mann-Kendall Trend Test
Fluorene
3.5
2.9
2.3
1.7
1.1
0.5
-0.1
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2392
Standardized Value of S -0.0548
M-K Test Value (S) -2
Tabulated p-value 0.4570
Approximate p-value 0.4781
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/27/2022 4:11:29 PM	
From File	Tank18_Indeno(1,2,3-c,d)perylene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Indeno(1,2,3-c,d)perylene

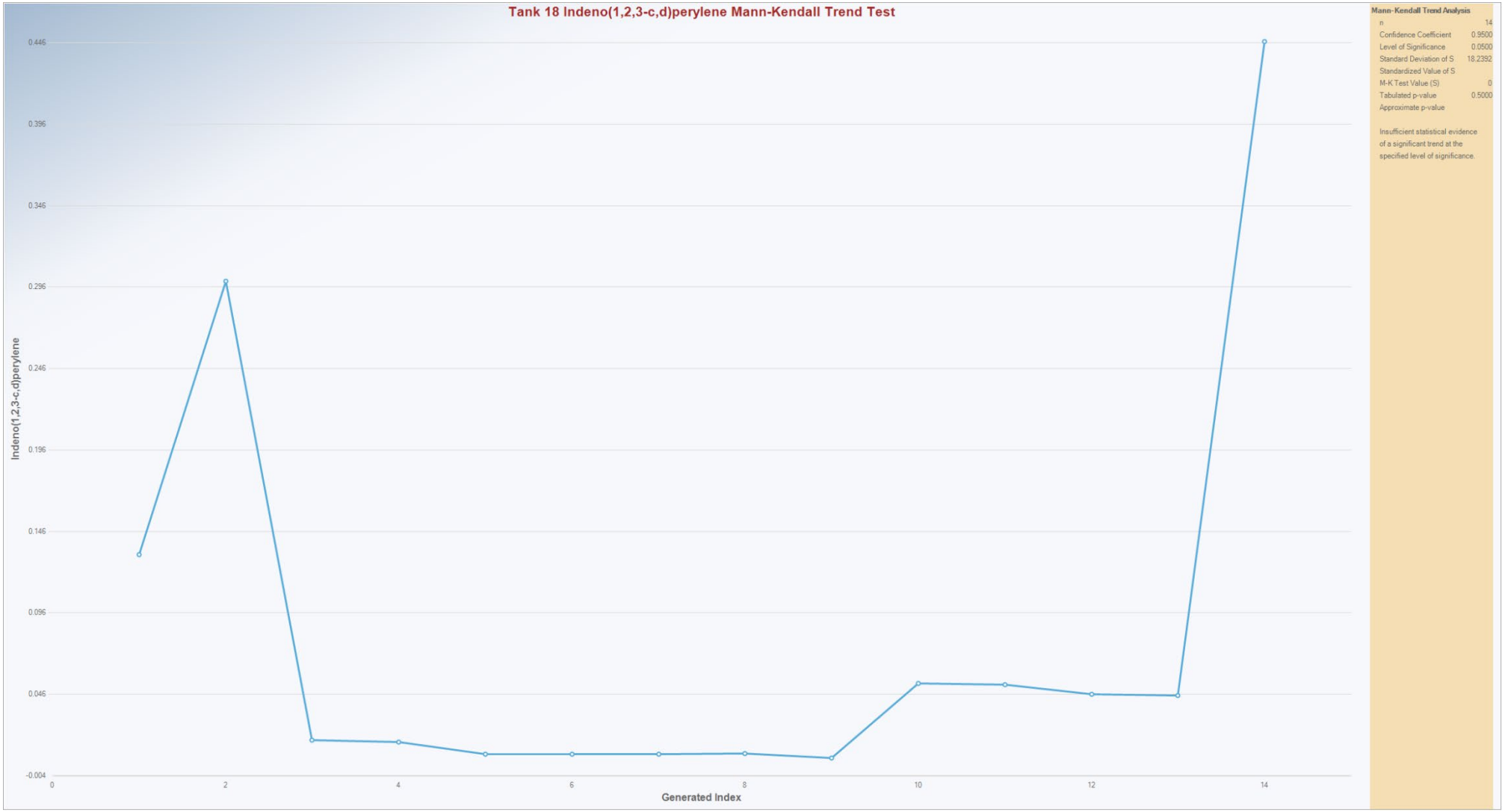
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.0072
Maximum	0.447
Mean	0.0826
Geometric Mean	0.0332
Median	0.0318
Standard Deviation	0.131
Coefficient of Variation	1.584

Mann-Kendall Test

M-K Test Value (S)	0
Tabulated p-value	0.5
Standard Deviation of S	18.24
Standardized Value of S	N/A
Approximate p-value	N/A

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


Tank 18 Indeno(1,2,3-c,d)perylene Mann-Kendall Trend Test
Indeno(1,2,3-c,d)perylene
0.446
0.396
0.346
0.296
0.246
0.196
0.146
0.096
0.046
-0.004
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 14
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 18.2392
Standardized Value of S
M-K Test Value (S) 0
Tabulated p-value 0.5000
Approximate p-value
Insufficient statistical evidence of a significant trend at the specified level of significance.

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:40:51 PM	
From File	Tank18_Naphthalene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Naphthalene

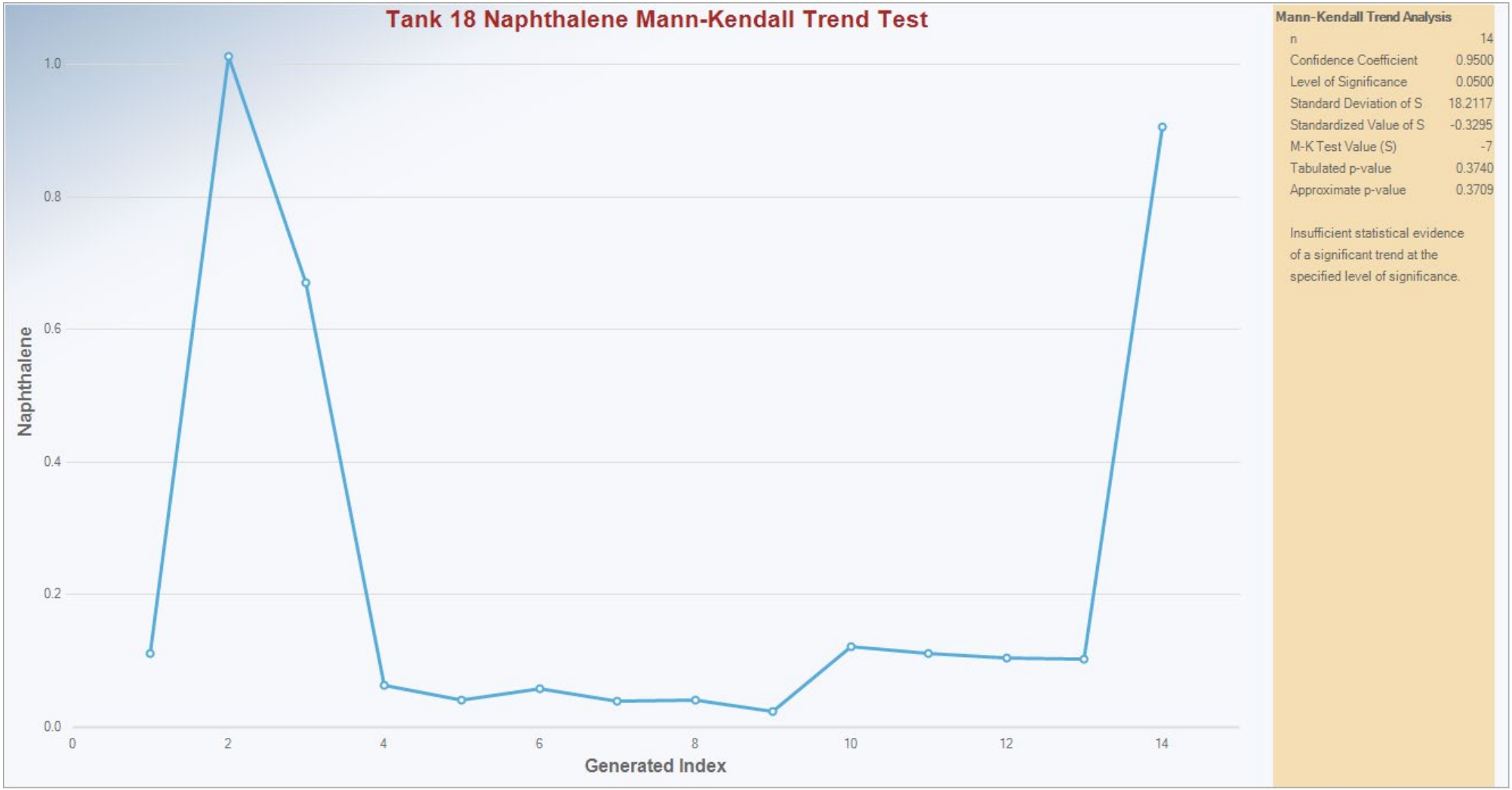
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.013
Maximum	1
Mean	0.232
Geometric Mean	0.0941
Median	0.0918
Standard Deviation	0.344
Coefficient of Variation	1.484

Mann-Kendall Test

M-K Test Value (S)	-7
Tabulated p-value	0.374
Standard Deviation of S	18.21
Standardized Value of S	-0.329
Approximate p-value	0.371

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



Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.2117
Standardized Value of S	-0.3295
M-K Test Value (S)	-7
Tabulated p-value	0.3740
Approximate p-value	0.3709

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/28/2022 4:42:21 PM	
From File	Tank18_Pyrene_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

Pyrene

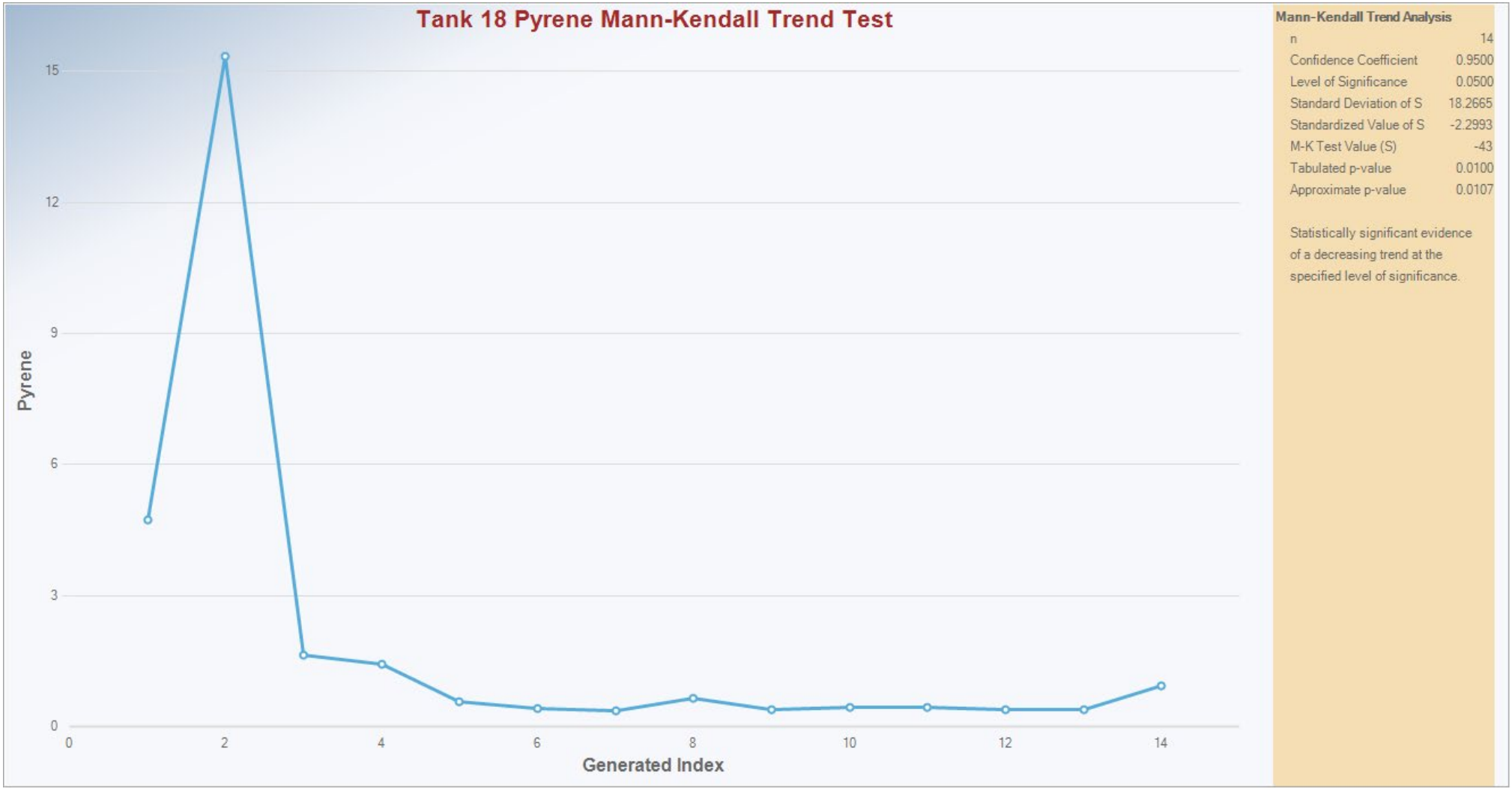
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	14
Number Values Reported (n)	14
Minimum	0.04
Maximum	15
Mean	1.675
Geometric Mean	0.281
Median	0.175
Standard Deviation	4.005
Coefficient of Variation	2.392

Mann-Kendall Test

M-K Test Value (S)	-43
Tabulated p-value	0.01
Standard Deviation of S	18.27
Standardized Value of S	-2.299
Approximate p-value	0.0107

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



Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.2665
Standardized Value of S	-2.2993
M-K Test Value (S)	-43
Tabulated p-value	0.0100
Approximate p-value	0.0107

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 9/26/2022 10:59:15 AM	
From File	Tank18_RRO_Inputs.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

RRO

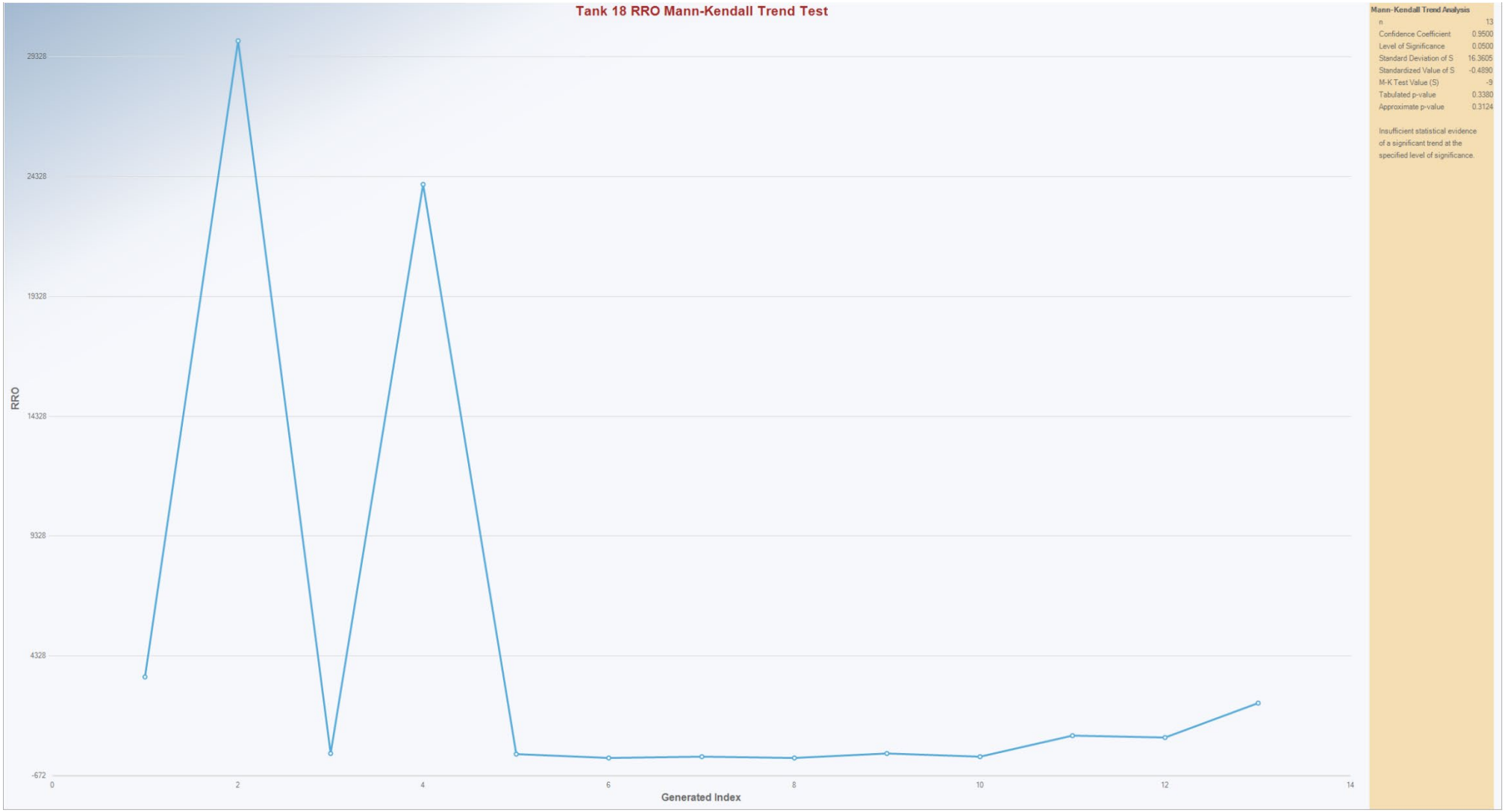
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	13
Minimum	76
Maximum	30000
Mean	4838
Geometric Mean	693.2
Median	270
Standard Deviation	9964
Coefficient of Variation	2.06

Mann-Kendall Test

M-K Test Value (S)	-9
Tabulated p-value	0.338
Standard Deviation of S	16.36
Standardized Value of S	-0.489
Approximate p-value	0.312

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


Tank 18 RRO Mann-Kendall Trend Test
RRO
29328
24328
19328
14328
9328
4328
-672
0
2
4
6
8
10
12
14
Generated Index
Mann-Kendall Trend Analysis
n 13
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 16.3605
Standardized Value of S -0.4890
M-K Test Value (S) -9
Tabulated p-value 0.3380
Approximate p-value 0.3124
Insufficient statistical evidence of a significant trend at the specified level of significance.

ATTACHMENT 4

RESPONSE TO COMMENTS

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REVIEW **PROJECT: Rocky Point Management Area**
DOCUMENT: Tech Memo: Cut and Cover Tank Tunnel Surface Water Trend Analysis, Rocky Point Management Area, Draft Final
LOCATION: Amaknak Island, Unalaska, Alaska
PROJECT NO.: 2542.38.018

ADEC		**Date: December 15, 2022** **RTC: January 31, 2023** **ADEC Reviewer: Cas Galasso** **Phone: (907) 451-2181**	**Date:** **Responder:** **Phone:**	**Date: January 31, 2023**
Item No.	**Page No.**	**ADEC COMMENTS**	**RESPONSIBLE PARTY RESPONSE** **A-Agree D-Disagree**	**ADEC RESPONSE** **A-Agree D-Disagree**
1.	General	Please include the ADEC File number: 2542.38.018.	Agreed. This will be added to the "Project" line of the header.	Agree.
2.	General	In past reporting, ADEC has requested current photos of the tanks and the inspections. Please provide a photo log, either to this Tech Memo or the 2022 Annual Report.	A Weir Inspection report will be generated in the early part of 2023, which will include a photo log documenting inspection activities.	Agree.
3.	Section 1	Statement: "…when compared to adjacent groundwater samples, this water does not appear to be a source for the adjacent groundwater contamination." Please provide more information to support this statement. Surface water at Tanks 12 and 16 indicate DRO levels above Table C Cleanup Levels, and geographically corresponding monitoring wells (MWRP-28 and MWRP-29) have highly elevated levels of DRO detections. Further, there is no recent GW monitoring in wells MWRP-08 or MWRP-09, which are the closest wells to Tanks 17 and 18, which both have elevated levels of DRO in surface water. Is groundwater contamination believed to be the source of rising concentrations in select tanks over the past two years?	This language was from a previous historic document and will be removed from this document. However, it is not believed that groundwater contamination is the source of elevated concentrations in select tanks. Concentrations of DRO and RRO in tanks 12 and 16 are within the range of historical results, and concentrations of DRO and RRO in wells MWRP-28 and MWRP-29 decreased during the 2022 sampling event from previous years. Wells MWRP-08 and MWRP-09 are downgradient from tanks 17 and 18, and we recommend including these wells in the 2023 sampling effort to gather more information about the elevated levels of fuels in surface water from tanks 17 and 18. Further sampling of these wells will be re-evaluated after the 2023 sampling event.	Agree.
4.	Table 2-1	ADEC requests either Table 2-1 is modified to include the 46 analytes that indicate no trend, with the associated historical analyte concentration range, or a separate table is provided with the no trend analytes. This table is misrepresentative of the data,	Agreed. A column will be added to Table 3 in Attachment 2 that provides the analytes historical concentration range.	Agree.

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Item No.	**Page No.**	**ADEC COMMENTS**	**RESPONSIBLE PARTY RESPONSE** **A-Agree D-Disagree**	**ADEC RESPONSE** **A-Agree D-Disagree**
		as it does not include results with no trend that still significantly exceed Table C Cleanup Levels (example: RRO in Tanks 12 and 17, and DRO in Tank 18).		
5.	Table 2-1	Please note, the RPMA ACLs are not representative of ADEC Cleanup Levels in a decision making capacity. The 10x rule was repealed by ADEC in 2008. For an approved site-specific alternative cleanup level, institutional controls would need to be in place to restrict potential groundwater use at the site. Since the promulgation of the Uniform Environmental Covenant Act (UECA) in 2018, this would mean a covenant would need to be filed with ADNR's land records that state the restriction of groundwater use in the area.	As indicated in the annual groundwater reports, surface water collected from the tank tunnels is compared to both ADEC Table C cleanup levels, as well as the RPMA ACLs that were approved via the December 16, 2008 letter allowing for the continued use of the approved ACLs for the site. It is understood that future site closure will require contaminant concentrations to be compared to ADEC cleanup levels as presented in 18 AAC 75.345 (ADEC 2021) and the need for environmental covenants at the site under UECA will be evaluated at that time.	Agree.
6.	Section 3	Please clarify the statement regarding the 46 of 64 analytes that indicate no trend: "None of these analytes have had detectable exceedances in the last three years of annual sampling events." 2021 results for Tank 17 indicate the highest detection of DRO since 2011, and the highest recorded measurement of RRO. 2022 sampling results show both DRO and RRO are an order of magnitude above the 2021 results. These analytes, which according to the data indicate no trend at Tank 17, are detectable and gross exceedances. ADEC also disagrees with the statement that concentrations are remaining at relatively steady concentrations, as an OoM increase in one year is not indicative of this.	Agreed. The referenced sentence will be removed. Language will be updated to address stability and Table 3 will be updated to include a column that indicates stability: "…indicated "no trend," *with five analytes in Tank 12 indicating stable concentrations and the remaining analytes in Tank 12 and all other tanks indicated as unstable. Table 3 identifies concentration stability for each analyte."*	Agree.

REVIEW **PROJECT: Rocky Point Management Area**
DOCUMENT: Tech Memo: Cut and Cover Tank Tunnel Surface Water Trend Analysis, Rocky Point Management Area, Draft Final
LOCATION: Amaknak Island, Unalaska, Alaska
PROJECT NO.: 2542.38.018

ADEC		**Date: December 15, 2022** **RTC: January 31, 2023** **ADEC Reviewer: Cas Galasso** **Phone: (907) 451-2181**	**Date:** **Responder:** **Phone:**	**Date: January 31, 2023**
Item No.	**Page No.**	**ADEC COMMENTS**	**RESPONSIBLE PARTY RESPONSE** **A-Agree D-Disagree**	**ADEC RESPONSE** **A-Agree D-Disagree**
			Discussion about Tank 17 concentrations will be added as a new paragraph between Paragraphs 3 and 4 of Section 3: "*The 2022 DRO and RRO results in Tank 17 were observed to have increased by an order of magnitude above the 2021 results. Although the reasoning is unclear, as there were no changes to the sampling methods, it is possible that the decreased amount of water within the tank tunnels at the time of sampling (compared to the previous year) may have contributed to the increased relative concentration for fuel constituents. Further recommendations are provided in the 2022 Annual Groundwater Monitoring and Operation and Maintenance Report.*"	
7.	Section 3	Due to the rising concentrations of DRO and RRO in select tanks, ADEC recommends the surface water is removed and treated appropriately. The 2020 approval of monthly tank inspections was provided based on the requirement to assess water sample results taken during this period to determine if there is data variability in the water samples due to concentration fluctuations or sampling method. This appears to be the case, as concentrations in some of the tanks have increased by an order of magnitude. ADEC will agree with the monthly monitoring of the tank tunnels continue for the next year (2023), provided the annual reporting identifies a recommendation for the rising concentrations in the tanks.	It is unclear why the concentrations of DRO and RRO had increased concentrations during this sampling event; there have not been any changes to the sampling methods and there have been no obvious changes to the environment that would explain this increase outside of potentially low water levels. The water level in tank 17 was lower during the time of sampling than it had been last year, and the decreased amount of water within the tank tunnels may have contributed to the increased relative concentration for fuel constituents. It is recommended that wells	ADEC agrees with the recommendation to sample Wells MWRP-08 and MWRP-09 in 2023 for additional information, and to collect and sample an additional set of surface water samples from Tank Tunnels 17 and 18 during a relatively high-water event to determine if the 2022 results were representative.

REVIEW **PROJECT: Rocky Point Management Area**
DOCUMENT: Tech Memo: Cut and Cover Tank Tunnel Surface Water Trend Analysis, Rocky Point Management Area, Draft Final
LOCATION: Amaknak Island, Unalaska, Alaska
PROJECT NO.: 2542.38.018

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Item No.	**Page No.**	**ADEC COMMENTS**	**RESPONSIBLE PARTY RESPONSE** **A-Agree D-Disagree**	**ADEC RESPONSE** **A-Agree D-Disagree**
		Additionally, in the annual report, please provide additional discussion on why the concentrations of surface water has been shown to increase in the last two years of sampling. Is this a difference in sampling method? Have cracks in the tanks allowed contamination from the surrounding area to enter the tanks?	MWRP-08 and MWRP-09 are added back into the sampling plan for 2023 to gather additional information. Further sampling of these wells will be re-evaluated after the receipt of 2023 sampling results. Additionally, it is recommended that another set of surface water samples be collected from Tank Tunnels 17 and 18 during a high-water event (preferably during the first quarter of the year) to determine if this was an anomalous result. We are seeking ADEC's concurrence for this sampling at this time. The continued monthly inspections of the weirs will ensure that product remains within the tank tunnels. We will determine if additional evaluation is required to monitor trends or assess treatment options following high water-event surface water/groundwater monitoring of the tunnels for Tank 17 and 18. Discussion about Tank 17 concentrations will be added. See response to comment #6.	
8.	Section 3	Pending the recommendations in the 2022 annual report, ADEC agrees with the annual sampling of surface water and with the removal of GRO and BTEX analytes from the surface water	Agreed. These recommendations will be included in the annual report.	Agree.

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Item No.	**Page No.**	**ADEC COMMENTS**	**RESPONSIBLE PARTY RESPONSE** **A-Agree D-Disagree**	**ADEC RESPONSE** **A-Agree D-Disagree**
		sampling. Please incorporate this recommendation in the 2022 annual groundwater monitoring report.		
9.		End of comments.		

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