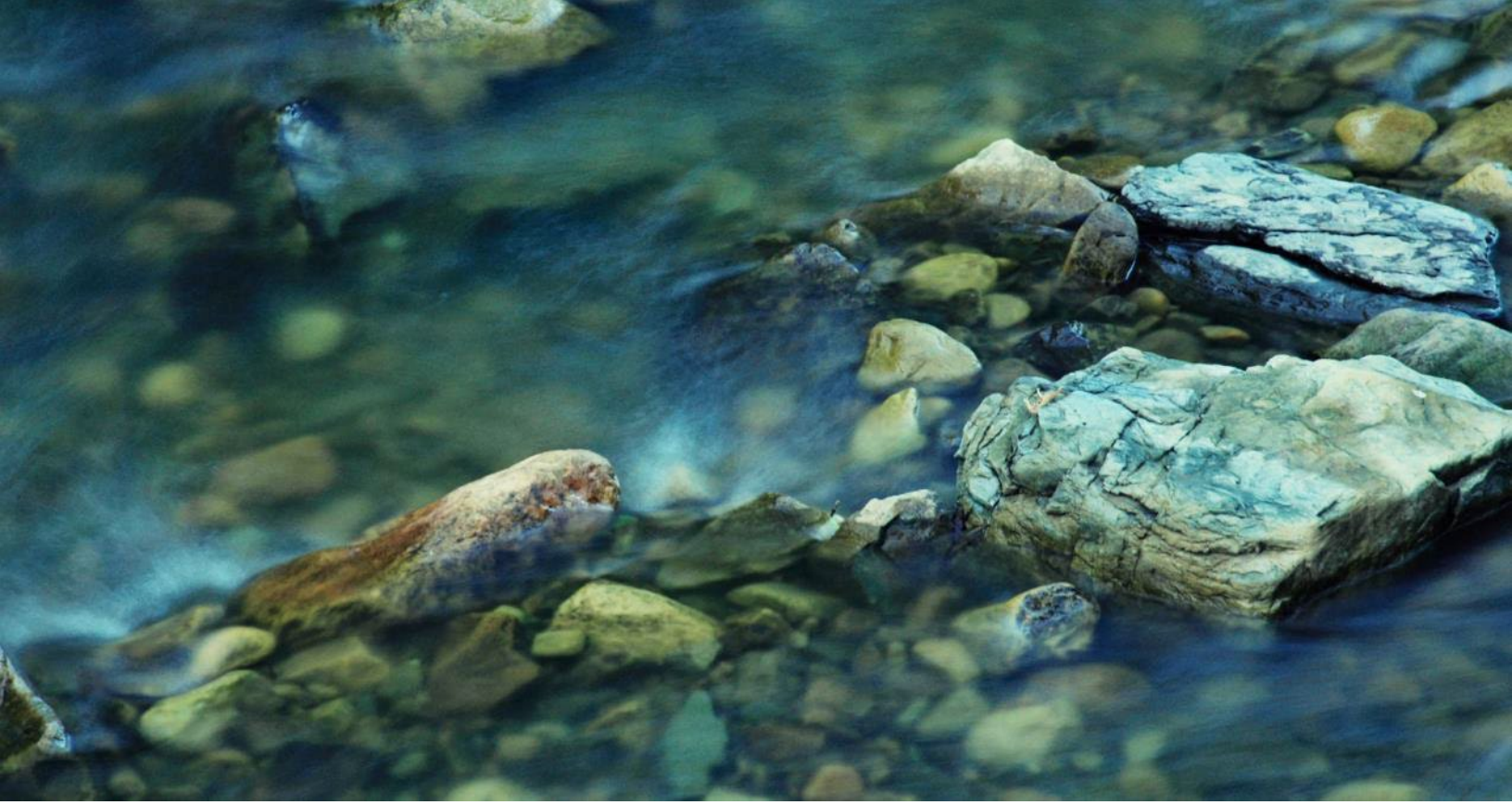
Appendix E
Subsurface Investigation



August 2022
Oklahoma Dam Relicensing

ANCHOR QEA

Grand Lake Subsurface Investigation Field Report

Prepared for Grand River Dam Authority

August 2022
Oklahoma Dam Relicensing

Grand Lake Subsurface Investigation Field Report

Prepared for
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https://anchorqea-my.sharepoint.com/personal/bteske_anchorqea_com/Documents/Documents/Anchor QEA/00 Projects/GRDA/08 Deliverables/USR/SharedFolder/Appendix E - Subsurface Investigation/SourceFiles/220815_SBP-Report.docx

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APPENDICES

1 Introduction

GRDA performed an investigation of sediment deposition on the Neosho River at multiple locations to estimate bottom sediment layer thicknesses. The goal of the survey was to determine the volume of sediment deposited in these areas since the construction of the Pensacola Dam. Historical records indicate that a delta feature had accumulated in this reach of the system, and GRDA used a sub-bottom profiler (SBP) to assess deposition thicknesses.

Two methods were used to investigate the sediment accumulation. The first was an SBP survey, and the second was vibracoring for sediment samples. The SBP survey covered nine transects of the Neosho River and was completed in January 2022. The vibracore sampling was completed in February 2022 and included multiple samples at each SBP transect.

An SBP uses sonar pulses to determine depth of a water body. There is an emitter and a receiver on the SBP head unit, and by measuring the amount of time necessary for the emitted pulse to reach an object and return to the receiver, the SBP is able to measure the distance the pulse traveled. This allows the SBP to measure bathymetry, but the pulse is also powerful enough to penetrate a soft sediment bed, such as clay, silt, and sand before reaching a harder layer. Using the same principles, the SBP can then estimate the thickness of a soft sediment layer above gravel or bedrock.

Vibracoring uses a motorized head unit to press core tubes into the stream- or lakebed. The combined weight and vibration of the head unit allows for deeper penetration than simply pressing the core tube into the bed or relying on gravity coring methods. Once collected, grain size analyses and other testing can be used to determine sediment properties as a function of depth in the sediment layers. The cores were used for two purposes: one was to confirm SBP survey information and evaluate sediment composition; the other was an attempt to determine approximate dates of deposition through the use of cesium-137 (Cs-137) analysis.

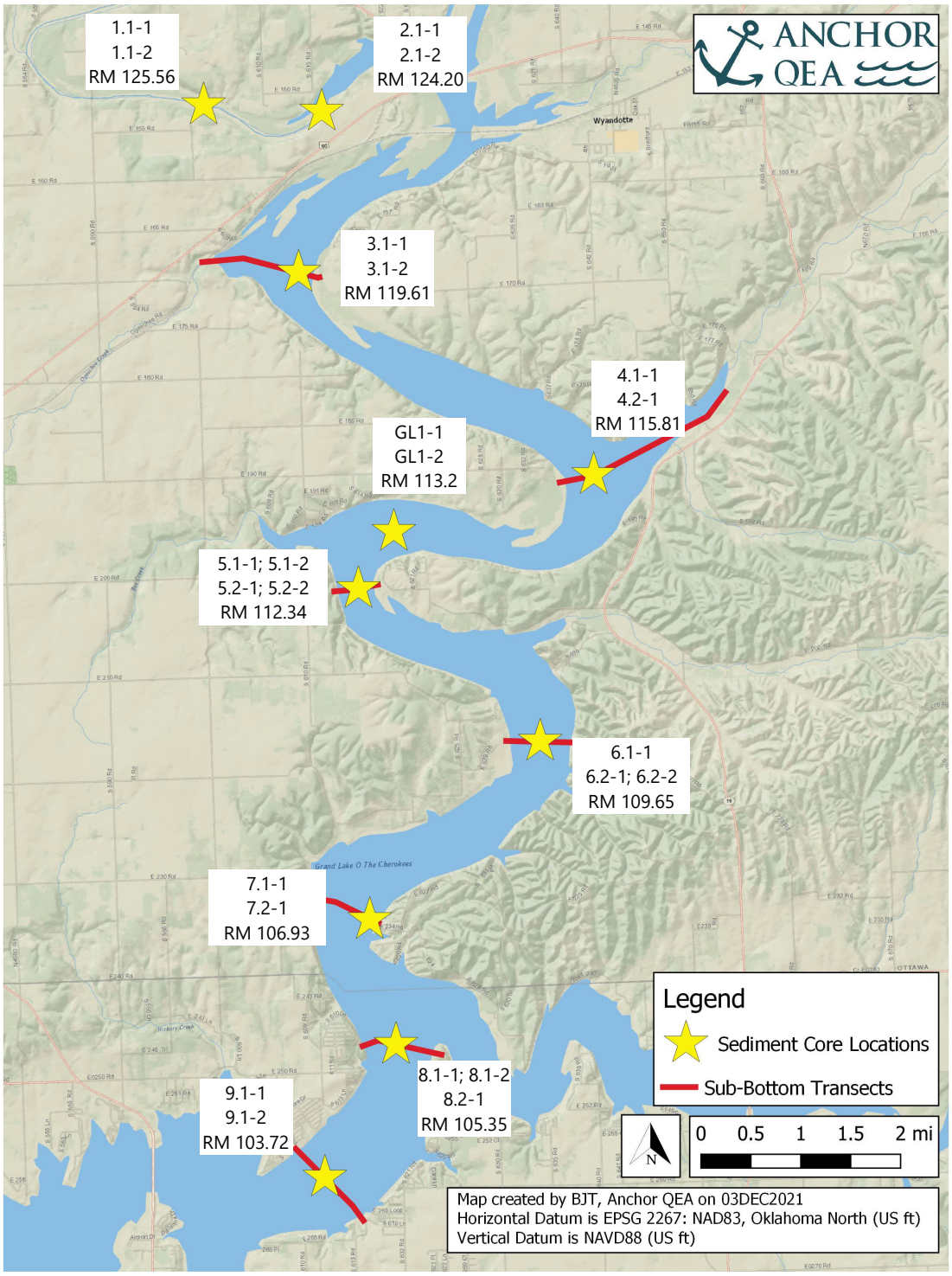
Cs-137 is an isotope that does not occur in nature. It is created by nuclear fission, which humans began developing in the 1940s. As nuclear weapons testing accelerated, atmospheric Cs-137 increased until a 1963 nuclear test ban treaty. The Cs-137 levels then dropped significantly. Atmospheric Cs-137 concentrations are well-correlated with Cs-137 concentrations in soil, showing the same pattern of increase from the 1940s to 1963, then a marked decrease.

Measurement of relative Cs-137 activity in sediment allows researchers to estimate deposition dates for sediment layers. In areas of continual deposition, Cs-137 analysis will find a pattern of increasing Cs-137 activity moving deeper in the column until reaching the 1963 layer. Below that layer, concentrations drop to zero by the 1940s. In disturbed areas or places with non-continuous deposition, there is usually no clear Cs-137 peak. The combination of SBP, vibracore samples, and Cs-137 provides insight into the volume, rate, and timeline of sediment deposition in the Neosho River.

2 Study Area

The study area for this survey was the Neosho River between river mile (RM) 125.56 approximately one mile downstream of Connors Bridge and RM 103.72 approximately two miles below the Elk River confluence. The survey team collected SBP transects at 9 locations to determine sediment layer thicknesses (Figure 1). At least two vibracore samples were collected at each transect. In addition, two additional samples at RM 113.2 for Cs-137 assessment to replicate an earlier USGS (Juracek and Becker 2009) effort.

Figure 1
Locations of SBP Transects and Sediment Cores Collected by GRDA



3 Equipment

3.1 Sub-Bottom Profiler

The survey team used a 19-ft vessel to tow an EdgeTech SB-424 towfish (Figure 2). The towfish was pulled across each of the nine transects on the Neosho River to collect SBP data. The system was processed onboard using the EdgeTech 3100-P portable sub-bottom topside electronics and Discover software that displayed and stored data. The reported SB-424 specifications are shown in Table 1.

Figure 2
EdgeTech 424 Sub-Bottom Profiler Towfish

Note: The EdgeTech SB-424 is a tow vehicle that was pulled across the measured transects. The topside 3100-P portable sub-bottom profiling system with Discover software is not shown in this image.

Table 1
EdgeTech SB-424 Specifications

EdgeTech SB-424 Characteristics	Text
Frequency Range	4-24 kHz
Pulses (user selected)	4-24 kHz, 4-20 kHz, 4-16 kHz
Vertical Resolution	4 cm / 4-24 kHz 6 cm / 4-20 kHz 8 cm / 4-16 kHz
Penetration (typical)	In coarse calcareous sand – 2 m In clay – 40 m
Beam Width (depends on center frequency)	16° / 4-24 kHz 19° / 2-20 kHz 23° / 2-16 kHz
Size (cm)	L – 77 W – 50 H – 34

EdgeTech SB-424 Characteristics	Text
Weight (kg)	45
Optimum Tow height	3-5 m above bed
Tow Speed	3-4 knots optimal, 7 knots maximum safe

The data was geolocated using a Differential GPS (DPGS) antenna. Track lines were set to follow cross sections aligned with the HEC-RAS computer model of the river system as shown in Figure 1.

3.2 Vibracore

The vibracore used for this effort was a Rossfelder P-3 system. The head clamped onto 16-ft clear ceramic tubes and was lowered to the bed with an electric winch from a vessel-mounted tripod system (Figure 3). Location data was collected with an RTK-GPS unit onboard the sampling boat.

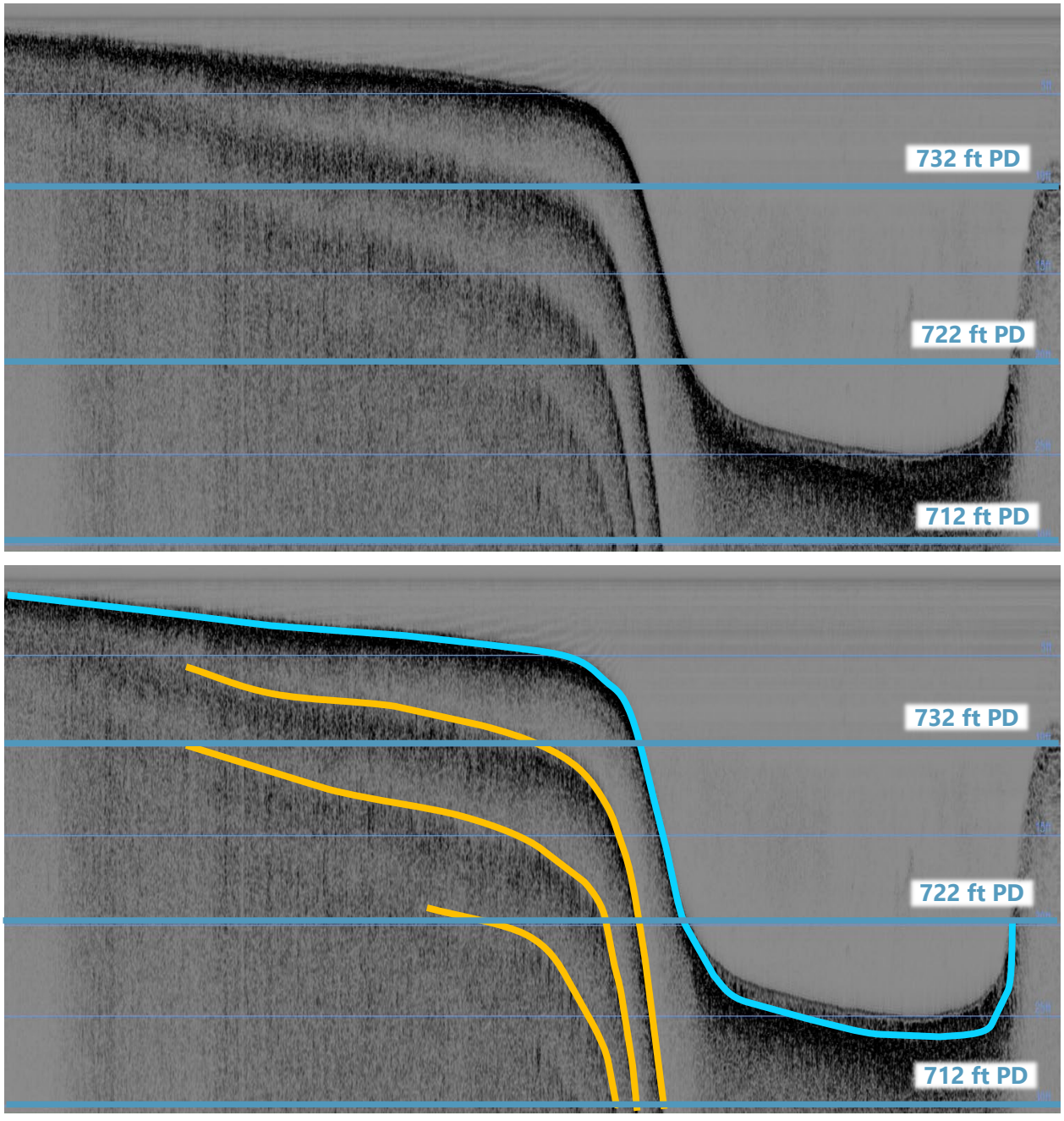
Figure 3
Vibracore System Used during February 2022 Sample Collection

4 Results

4.1 Sub-Bottom Survey Outputs

The SBP will produce a visual output referred to as a “waterfall” that indicates the distances to different objects. The most powerful return signal is often the lakebed or streambed, and subsequent layers are somewhat weaker signals that are still visible in the data. Another type of signal is referred to as a “multiple,” which is produced by pulses bouncing between the SBP sonar head and the bed, several times, resulting in a series of nearly parallel lines. An example image collected during the SBP survey at RM 112.34 showing this is provided in Figure 4. Full images are included in Appendix I.

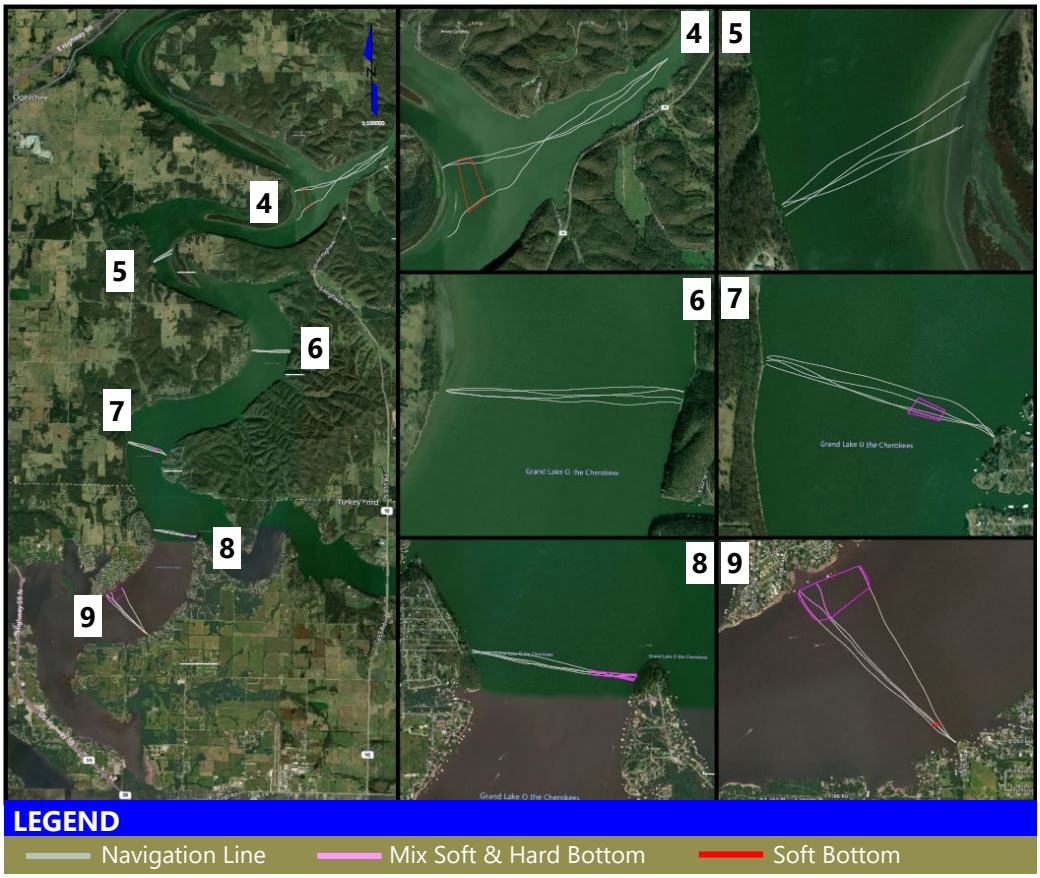
Figure 4
Example SBP Waterfalls showing Layer Transitions and "Multiples"



Notes: Waterfall images taken from SBP survey at RM 112.34 (approximately 1.5 miles upstream of Council Hollow)
Lower image is identical to upper, but locations of layer transitions and multiples are highlighted.
Teal line is the layer transition between soft and hard sediments
Orange lines are "multiples" or secondary reflections

The waterfalls produced during the Neosho River SBP survey showed layer transitions at approximately 2-3 ft below the bed surface. This indicated a thin layer of soft material over firmer sediments throughout much of the survey area. The interpretation was confirmed by an SBP expert, and the representative stated that a majority of the areas surveyed were not characterized by soft sediment beds (Figure 5).

Figure 5
Interpretation of SBP Survey Results at Stations 4 through 9



Source: Interpretation of SBP readings; station numbers adjusted from OARS original to reflect GRDA numbers

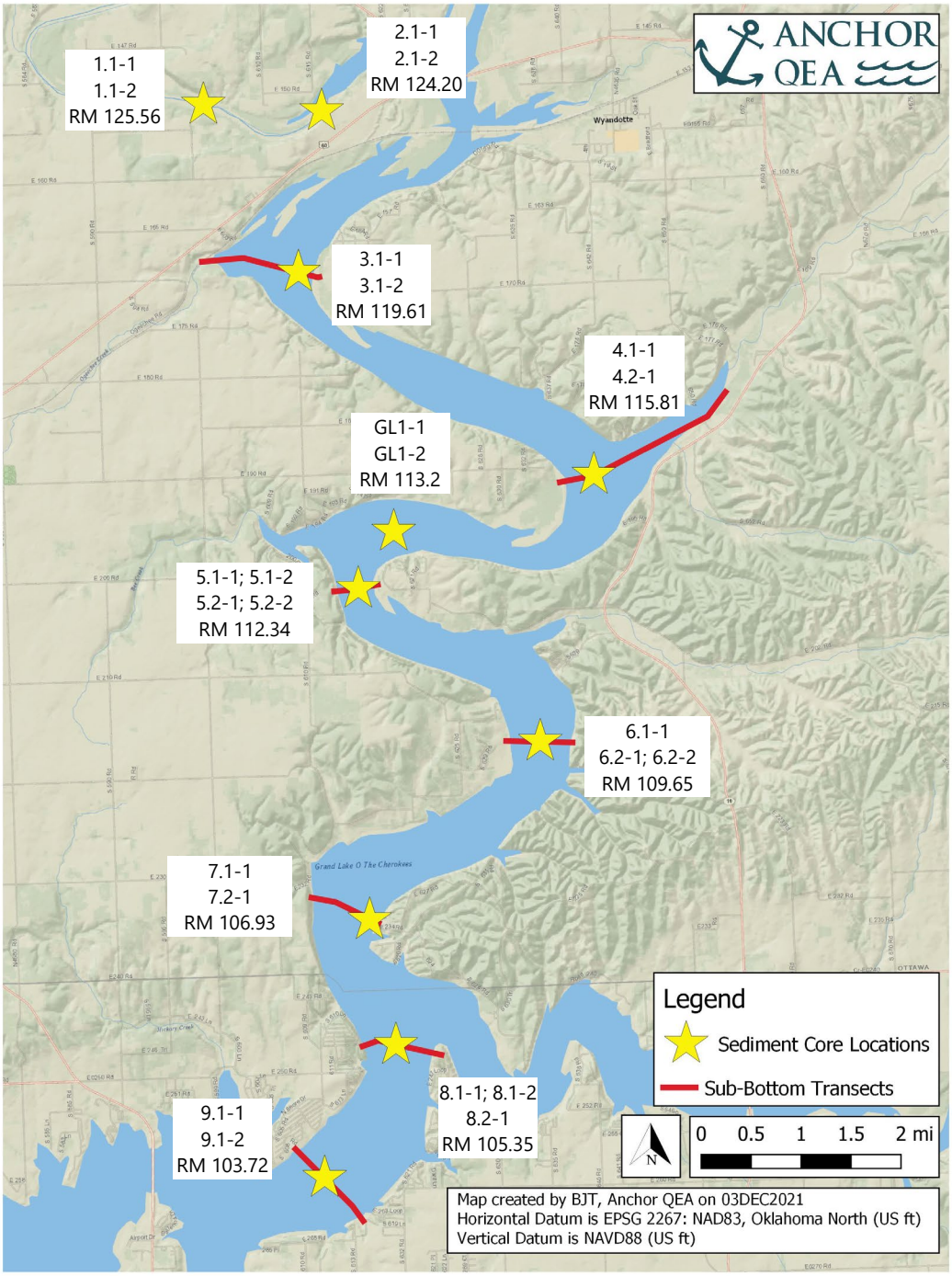
Figure 5 shows the navigation lines from the field SBP survey. Where a mixture of soft and hard beds were noted by the SBP expert (for example at transect 9, bottom right), pink outlines were drawn. Red outlines indicate soft bottom materials (transect 4, top center). Areas not colored were interpreted to consist of hard bottom sediments.

4.2 Vibracore Analysis

The vibracore pushed core tubes into the riverbed at the locations shown in Figure 6 using 16-foot coring tubes. These were chosen to align with the SBP survey discussed in Section 4.1 as a means of

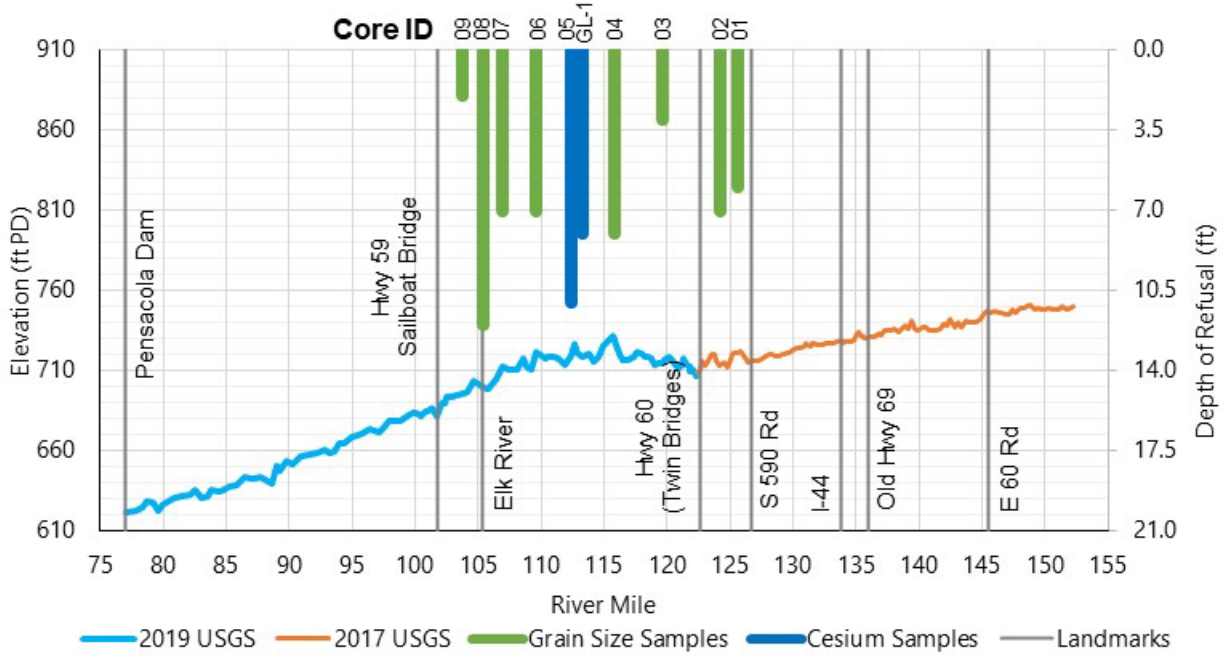
confirming interpretation of the results. SBP survey transects are shown in red with their relationship to the vibracore sample locations.

Figure 6
Locations of Sediment Cores Collected by GRDA



The vibracoring efforts produced 24 core samples for analysis. The cores were pushed to refusal, which ranged from 1.5 to 11 feet in the reach above the Elk River (Figure 7). In the lower reservoir, one core penetrated approximately 12 feet of sediment before refusal. Two cores over 10 feet in length taken in the delta feature (RM 112.34) were evaluated for Cesium-137 (Cs-137) activity. Cores shorter than 10 feet or taken from the lower reservoir were analyzed only for grain size distribution (see Section 3.3). Figure 7 shows the maximum vibracore penetration depths at each site shown in Figure 6.

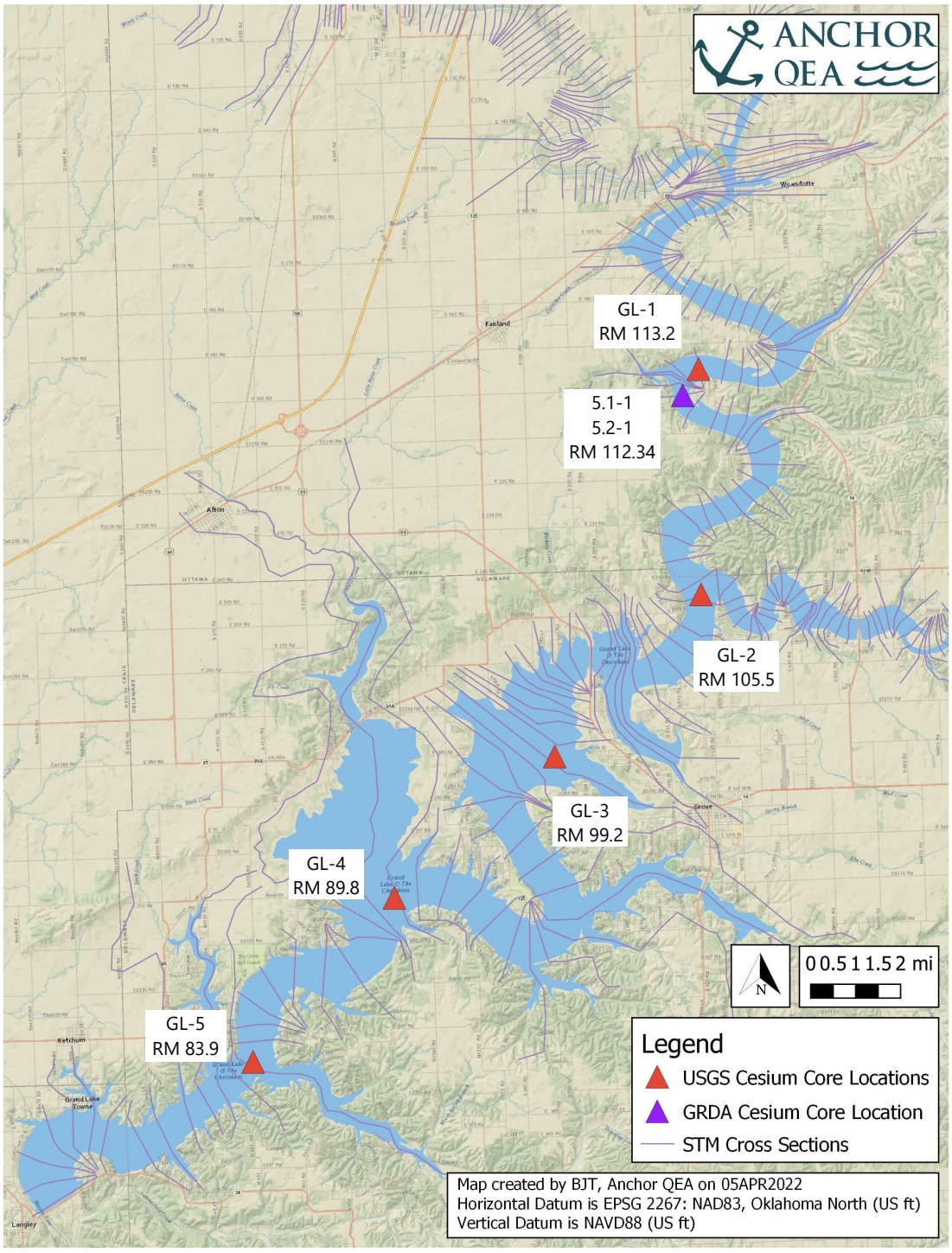
Figure 7
Maximum Vibracore Sample Penetration on Neosho River



Note: GL-1 sample tested for cesium activity by USGS (Juracek and Becker 2009)

The USGS (Juracek and Becker 2009) analyzed sediment Cs-137 levels to determine the approximate age of sediment in various locations within Grand Lake. The 2008 study collected samples from five sites, with one located in the region of the delta feature, one near the confluence with the Elk River, and three others located further downstream in the reservoir (Figure 8). Where USGS data showed a clear, defined Cs-137 peak, the findings were considered settled.

Figure 8
Locations of Sediment Cores Collected for Cesium Analysis



Note: Locations of USGS cores taken from Juracek and Becker (2009)

A major goal of sampling was to collect a significantly deeper sample near USGS site GL-1. The USGS sample was approximately 6 ft, and it was decided that a vibracore sample of approximately 10 ft would be sufficient to trigger re-evaluation and Cs-137 analysis. Shorter cores would not likely produce different results from the USGS (2009) study. Cores lower in the basin were not analyzed as the USGS dataset was sufficiently robust and were not of interest for delta feature analysis. The cores that met this criteria were 5.1-1 and 5.2-1 as shown in Figure 8.

Sediment cores were subdivided by cutting along the length of the core tube using an electric shear. Total recovered length was measured and recorded (Figure 9). Plastic spoons were used to mark the divisions between samples. Cores sent for grain size analyses were divided into 1-ft segments, and Cs-137 samples into 4-cm increments for laboratory assessment by Teledyne Brown Engineering. The spoons were then used to scoop samples into a clean container while avoiding the outer 1.5 cm of the core sample to prevent mixing of material smeared along the sample tube itself. Once used, the spoons were discarded to avoid contamination of any other samples. Sample containers were labeled, sealed, and packaged for transport. Because these were for grain size and Cs-137 analysis, there was no need for preservatives or cooling.

Figure 9
Image of Core 5.1-2 during Processing

Grain size results showed primarily silts and clays throughout each core. Full results are presented in Appendix II. Cs-137 analysis showed no obvious trend in the activity levels. See Appendix III for the laboratory report.

5 Discussion

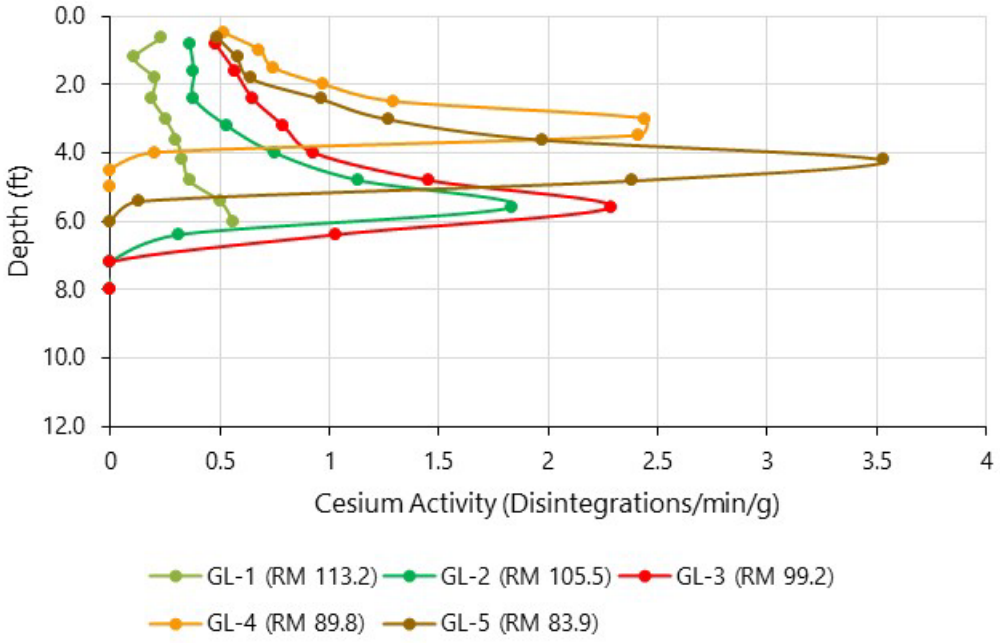
SBP results indicate a primarily firm bed with limited deposition of softer silts and clays. This suggests relatively limited deposition of soft cohesive material. However, these results are contingent upon field sampling to confirm the readings.

The vibracore samples show a thicker sediment deposit which suggests the SBP was not reliably capturing sediment layer thicknesses. Most likely, the penetration of the SBP signal was limited by a layer of biotic activity within the surface of the sediment; several core samples had air bubbles in the top few feet produced by decomposition or other biological activity. This produces readings indicating a softer, air-filled layer above the firmer silt and clay sediment that would register as a separate layer during SBP surveying (Aqua Survey 2004, Science Applications International 2001). As a result, further analyses relied on vibracore sampling rather than SBP results.

Vibracore sampling showed thicker layers of soft sediment deposition, and also provided opportunity to evaluate Cs-137 trends measured by a USGS study (Juracek and Becker 2009).

USGS analysis showed that Cs-137 peaks were located approximately 3 to 6 feet below the bed surface (Figure 10). Those peaks represent sediment that was deposited in approximately 1963, indicating that just 3 to 6 feet of sediment had deposited since 1963 at sites GL-2, -3, -4, and -5 (Figure 8).

Figure 10
Comparisons of Relative Cesium Activity within the USGS Core Samples



Notes: The peak cesium activity indicates the soil layer associated with deposition in approximately 1963. All material above that layer is assumed to have deposited since the nuclear testing ban.

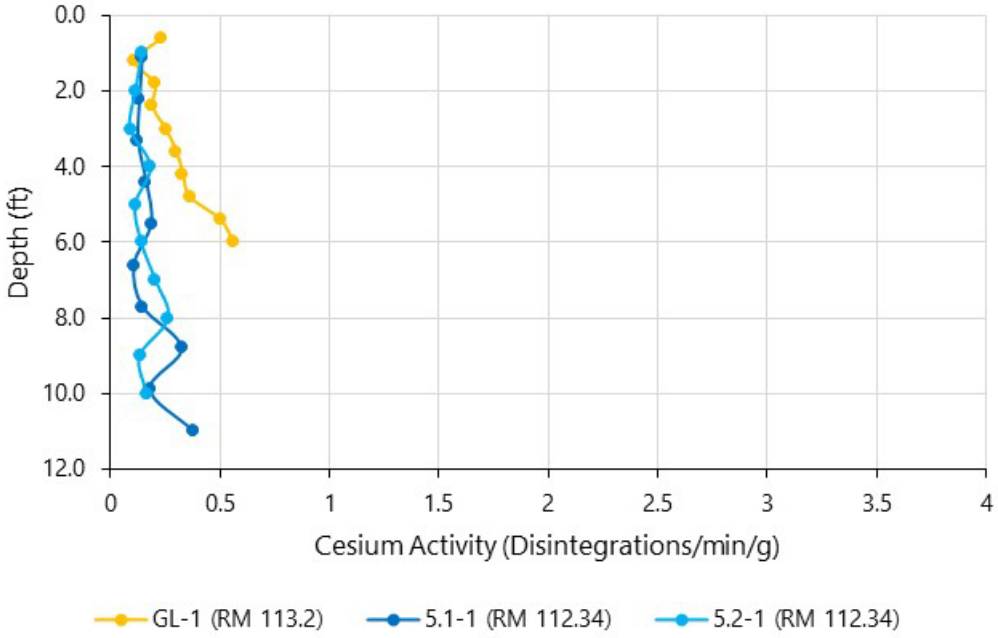
Source: Figure adapted from Juracek and Becker (2009).

The sample in the delta feature (GL-1) showed no spike in Cs-137. Juracek and Becker (2009) concluded the sediment they collected was all deposited post-1963. The USGS interpreted this to indicate that the area was not continually depositional but washes away due to wave action or large flow events before new sediment redeposits. This follows typical reservoir delta feature evolution, with surface sediments at the top of the delta feature washing downstream and extending the delta feature further into the reservoir rather than increasing the top elevation.

During GRDA's vibracore sampling, they repeated the USGS efforts to obtain longer (deeper) cores and see if a longer sample would capture a characteristic Cs-137 spike that denotes a 1963 sediment layer. GRDA collected approximately 11-foot cores near site GL-1 (cores 5.1-1 and 5.2-1) and processed them for Cs-137 analysis. The location of cores 5.1-1 and 5.2-1 are displayed in Figure 8.

GRDA sent 10 samples at equally spaced intervals within each core for Cs-137 evaluation. The results show a similar pattern to those of the USGS study, with no apparent Cs-137 peak (Figure 11).

Figure 11
Comparisons of Relative Cesium Activity Between USGS Core Sample GL-1 and GRDA Samples 5.1-1 and 5.2-1



Notes: GL-1 activity levels taken from Juracek and Becker (2009)
The lack of a defined cesium activity peak indicates that all sediment collected in the core was deposited after 1963.

This further suggests that deposition in the top 10 feet of the soil column is all post-1963 and that the site is not continuously depositional, instead indicating regular mixing of the materials at the top of the delta feature. These results agree with the USGS (Juracek and Becker 2009) findings that this location sees regular disturbance and is not continually depositional.

6 References

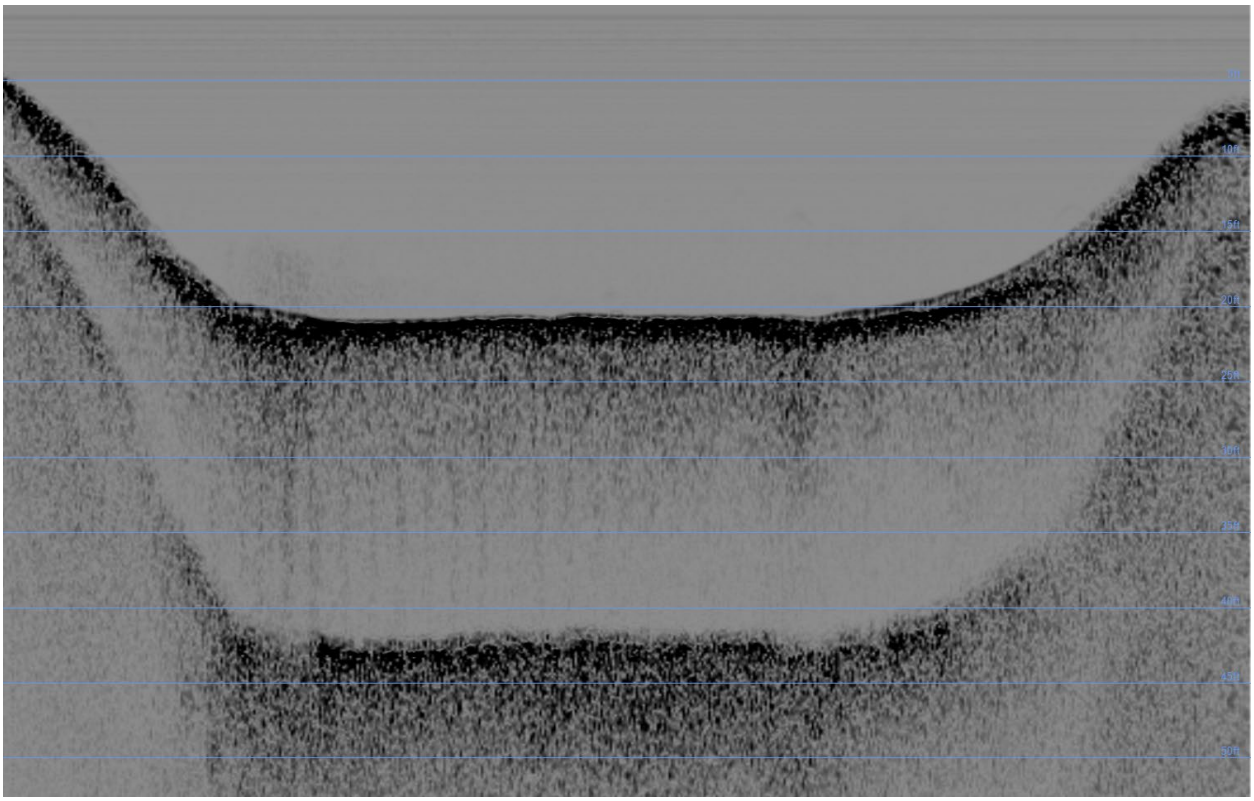
Aqua Survey, 2004. *Technical Report Environmental Dredging and Sediment Decontamination Technology Demonstration Pilot Study Lower Passaic River Restoration Project Magnetometer and Sub-Bottom Profiler Debris Survey*. December 3, 2004.

Juracek, K.E. and M.F. Becker, 2009. *Occurrence and Trends of Selected Chemical Constituents in Bottom Sediment, Grand Lake O' the Cherokees, Northeast Oklahoma, 1940–2008*. U.S. Geological Survey Scientific Investigations Report 2009–5258, 28 p.

Science Applications International Corporation, 2001. *Results of the March 2001 Sub-Bottom Profiling and Sediment Profile Imaging of the Outer Gloucester Harbor*. SAIC Report 541. June 2001.

Appendix I
Waterfall Images from Sub-Bottom Survey

AI.1 Transect 1



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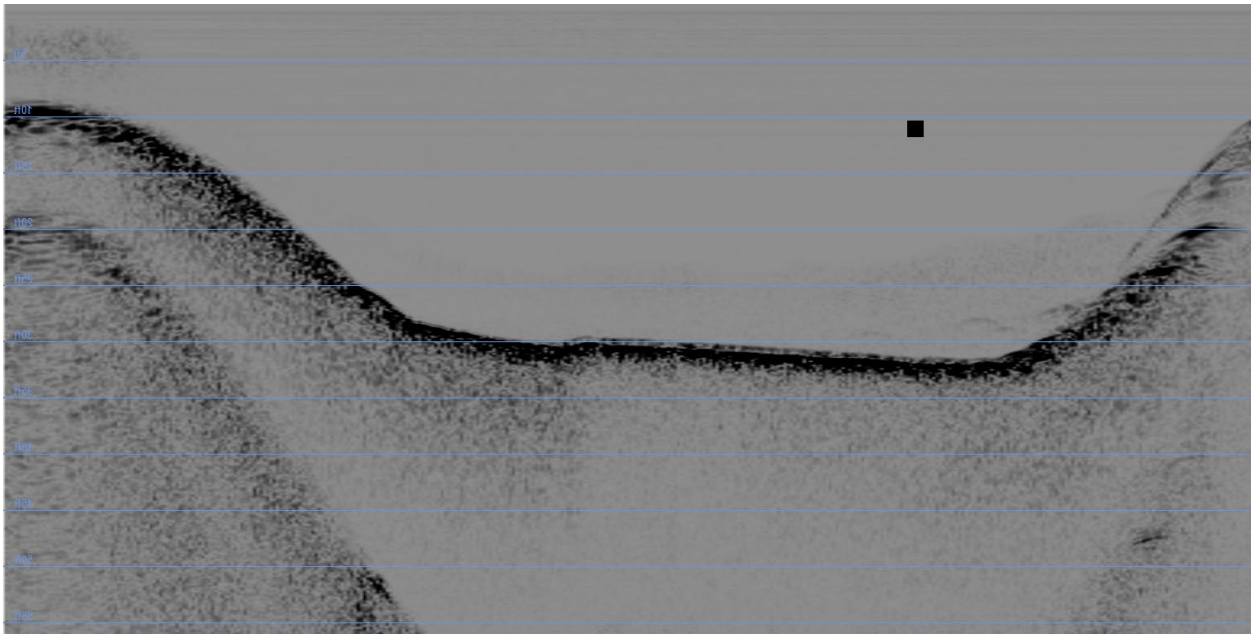

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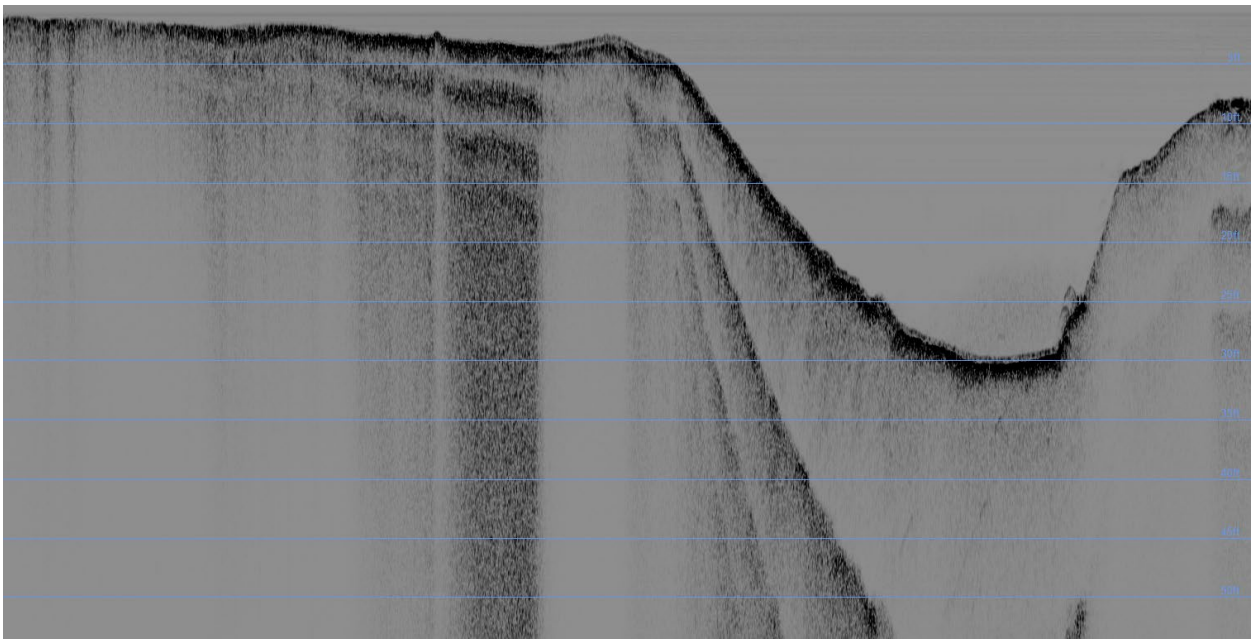
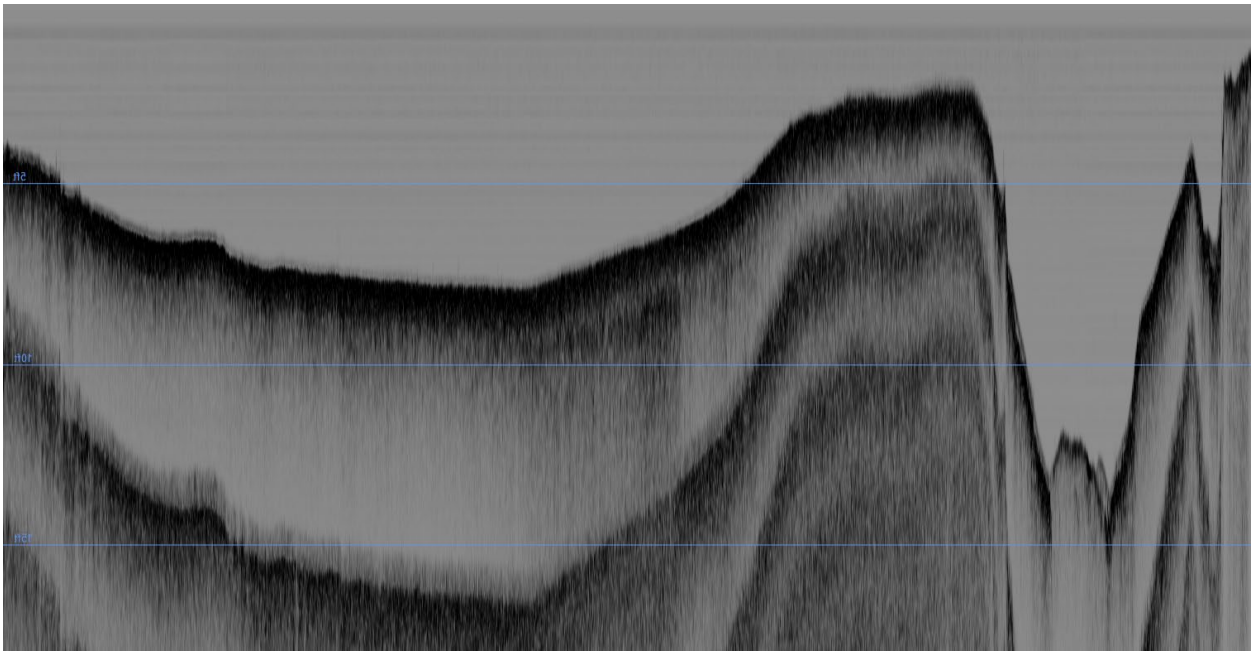
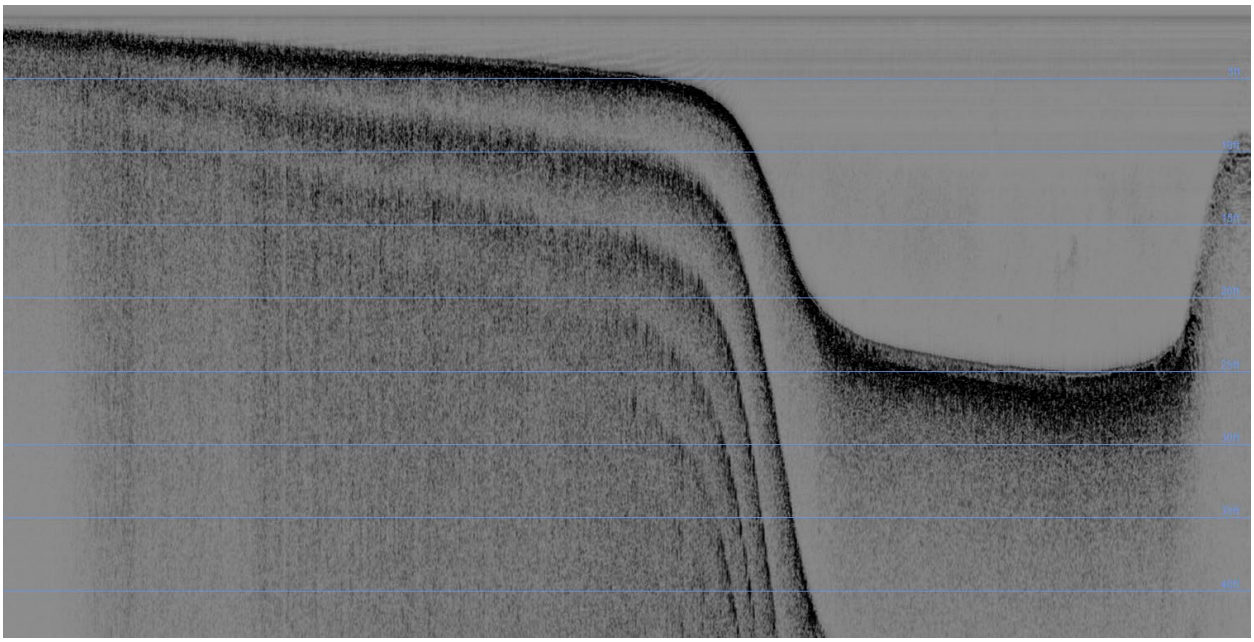


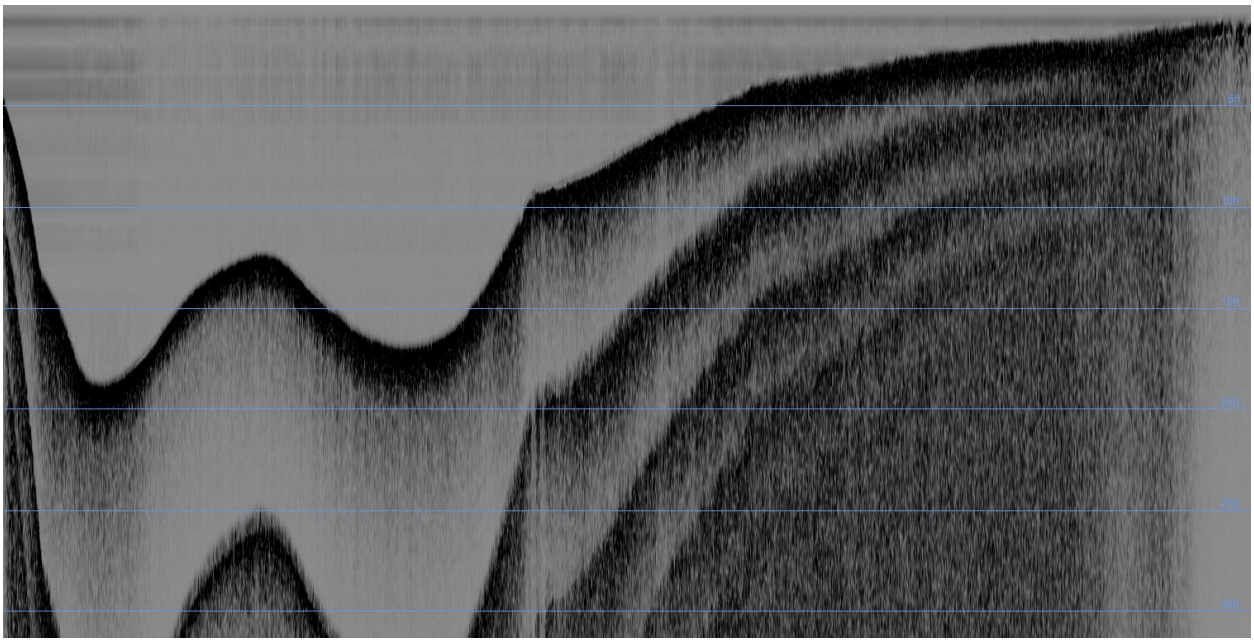
AI.4 Transect 4



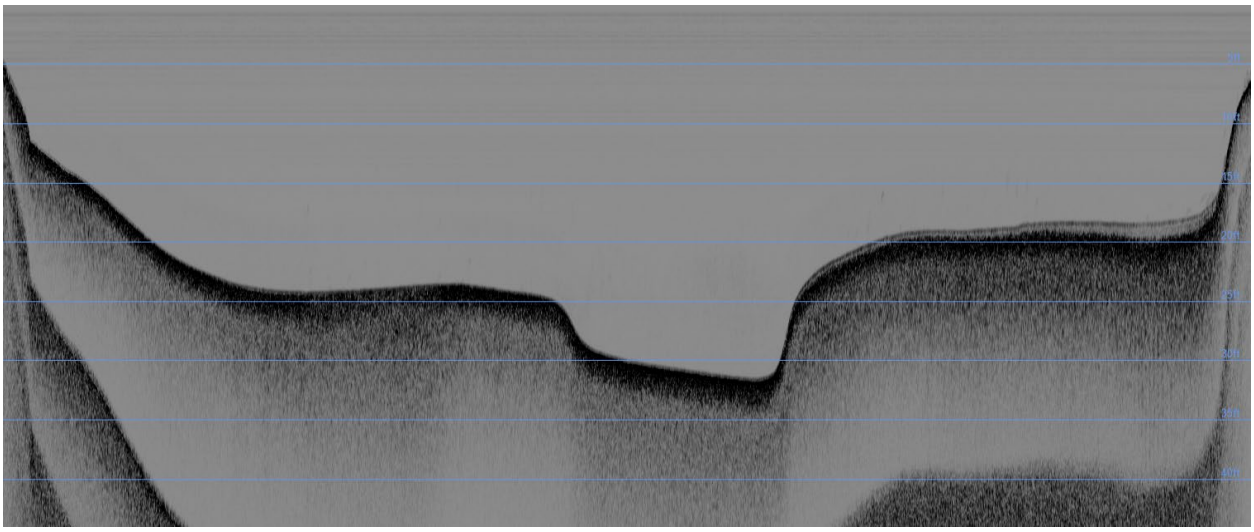
AI.5 Transect 5



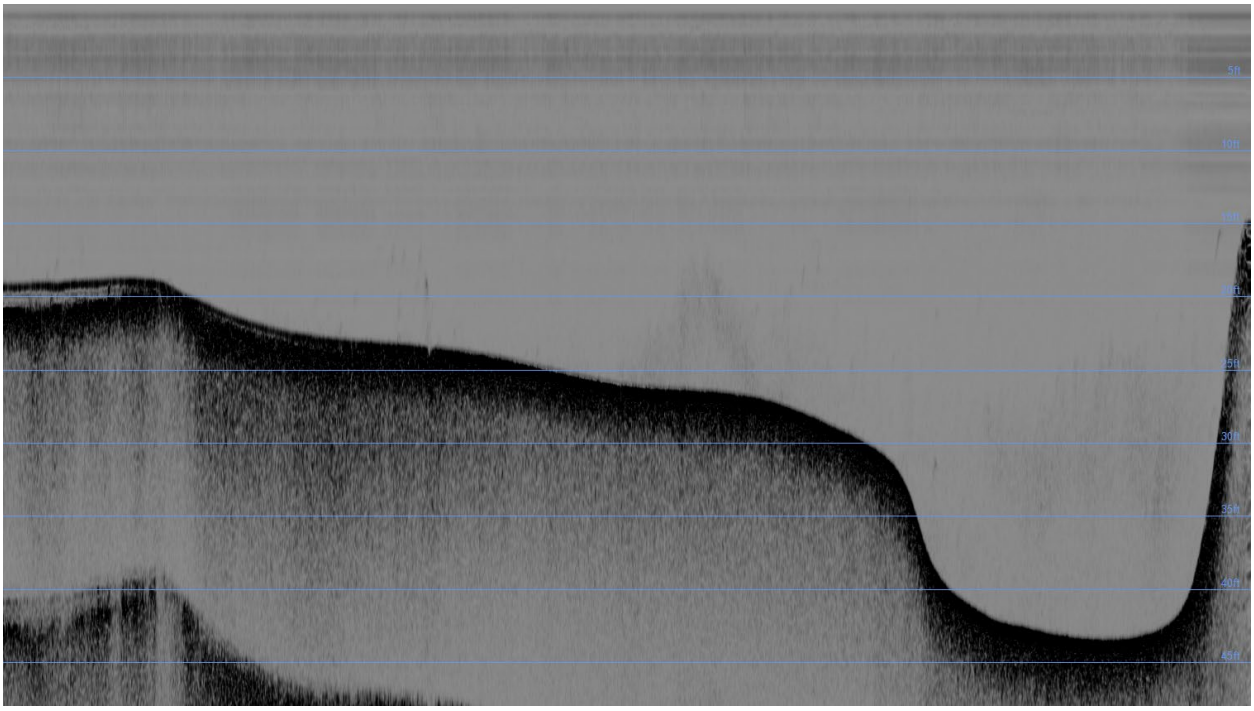
AI.6 Transect 6



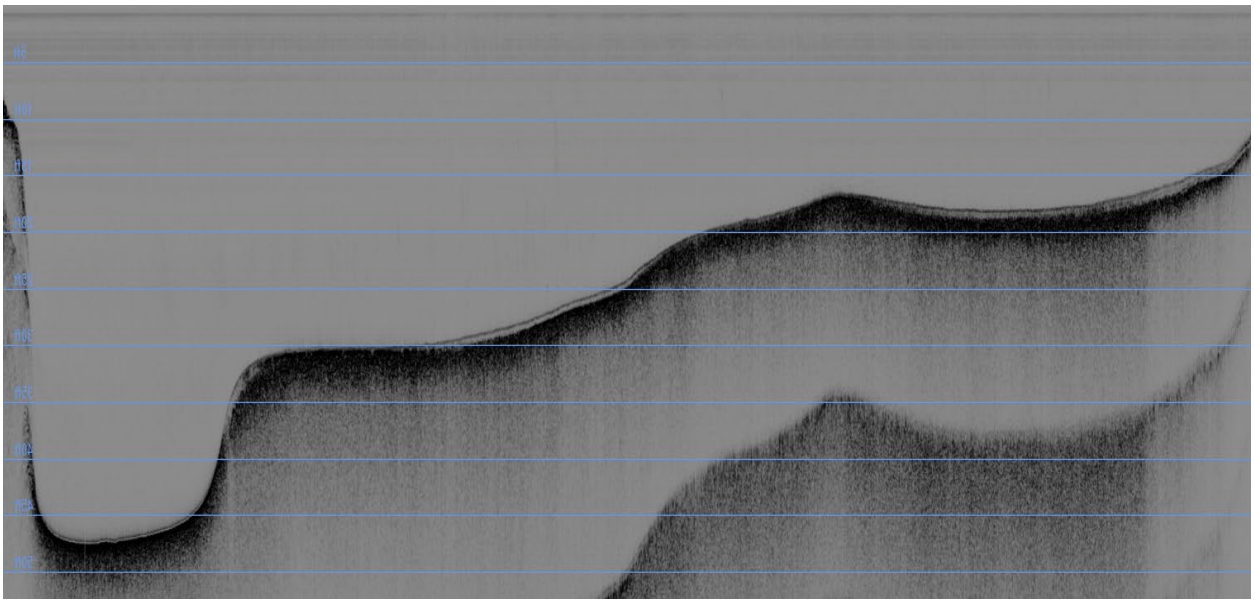
AI.7 Transect 7



AI.8 Transect 8



AI.9 Transect 9



Appendix II
Grain Size Analysis

Soil and Forage Analysis Lab
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Date 4/18/2022
Acct # 559106
Report # 1228

Comments

Soil Texture Analysis

Sample Number	*Sample Name*		*SAND*	*SILT*	*Clay*	*Soil*
	Core	*Depth (in)*	*%*	*%*	*%*	*Type*
1	01.1-1	0-12	9.0	57.0	34	Silty Clay Loam
2		12 to 24	9.0	47.0	44	Silty Clay
3		24-36	17.0	41.0	42	Silty Clay.
4		36-48	17.0	39.0	44	Clay
5	01.1-2	0-12	5.0	59.0	36	Silty Clay Loam
6		12 to 24	9.0	37.0	54	Clay
7		24-36	9.0	49.0	42	Silty Clay
8		36-48	17.0	43.0	40	Silty Clay
9		48-60	8.0	44.0	48	Silty Clay
10		60-63	2.0	44.0	54	Silty Clay
11	02.1-1	0-12	16.0	52.0	32	Silty Clay Loam
12		12 to 24	12.0	50.0	38	Silty Clay Loam
13		24 to 36	14.0	42.0	44	Silty Clay
14		36 - 48	5.0	50.0	42	Silty Clay
15		48 - 60	14.0	42.0	44	Silty Clay
16		60 - 63	20.0	42.0	38	Silty Clay Loam
17	02.1-2	0 - 12	14.0	48.0	38	Silty Clay Loam
18		12 to 24	16.0	42.0	42	Silty Clay
19		24 to 36	18.0	42.0	40	Silty Clay
20		36 - 48	14.0	44.0	42	Silty Clay
21		48 - 60	32.0	30.0	38	Silty Clay Loam
22		60 - 72	18.0	44.0	38	Silty Clay Loam
23	03.1-1	0 - 12	30.0	34.0	36	Silty Clay Loam
24		12 to 24	14.0	48.0	38	Silty Clay Loam
25		12 to 24	18.0	42.0	40	Silty Clay
26		24 - 33	30.0	40.0	30	Clay Loam
27	03.1-2	0 - 12	14.0	52.0	34	Silty Clay Loam
28		24 - 36	16.0	44.0	40	Silty Clay
29	04.1-1	0 - 12	12.0	52.0	36	Silty Clay Loam
30		12 to 24	8.0	56.0	36	Silty Clay Loam
31		24 - 36	6.0	56.0	38	Silty Clay Loam
32		36 - 43	6.0	50.0	44	Silty Clay Loam
33		0 - 12	26.0	54.0	20	Silt Loam

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Date 4/18/2022
Acct # 559106
Report # 1228

Comments

Soil Texture Analysis

Sample Number	*Sample Name*		*SAND*	*SILT*	*Clay*	*Soil*
	Core	*Depth (in)*	*%*	*%*	*%*	*Type*
34	04.2-1	12 to 24	16.0	56.0	28	Silty Clay Loam
35		24 - 36	16.0	52.0	32	Silty Clay Loam
36		36 - 48	12.0	54.0	34	Silty Clay Loam
37		48 - 60	12.0	54.0	34	Silty Clay Loam
38		60 - 72	14.0	50.0	36	Silty Clay Loam
39		72 - 84	8.0	54.0	38	Silty Clay Loam
40		84 - 92	8.0	52.0	40	Silty Clay
41	05.1-2	0 - 12	8.0	58.0	34	Silty Clay Loam
42		12 to 24	8.0	56.0	36	Silty Clay Loam
43		24 - 36	12.0	54.0	34	Silty Clay Loam
44		36 - 48	8.0	58.0	34	Silty Clay Loam
45		48 - 60	9.0	52.0	39	Silty Clay Loam
46		60 - 72	9.0	50.0	41	Silty Clay
47		72 - 84	7.0	50.0	43	Silty Clay
48		84 - 96	13.0	48.0	39	Silty Clay Loam
49		96 - 102	18.8	48.0	33	Silty Clay Loam
50	05.2-2	0 - 12	12.8	50.0	37	Silty Clay Loam
51		12 to 24	28.8	44.0	27	Clay Loam
52		24 - 36	16.8	52.0	31	Silty Clay Loam
53		36 - 48	18.8	50.0	31	Silty Clay Loam
54		48 - 60	10.8	48.0	41	Silty Clay
55		60 - 72	8.8	52.0	39	Silty Clay Loam
56		72 - 84	10.8	56.0	33	Silty Clay Loam
57		84 - 96	12.8	50.0	37	Silty Clay Loam
58		96 - 102	10.8	54.0	35	Silty Clay Loam
59	06.1-1	0 - 12	10.8	52.0	37	Silty Clay Loam
60	06.2-1	0 - 12	14.8	52.0	33	Silty Clay Loam
61		12 to 24	8.8	54.0	37	Silty Clay Loam
62		24 - 36	6.8	56.0	37	Silty Clay Loam
63		36 - 48	4.8	58.0	37	Silty Clay Loam
64		48 - 60	4.8	56.0	39	Silty Clay Loam
65		60 - 72	4.8	52.0	43	Silty Clay Loam
66	06.2-2	0 - 12	6.8	58.0	35	Silty Clay Loam
67		12 to 24	4.8	58.0	37	Silty Clay Loam
68		24 - 36	8.8	56.0	35	Silty Clay Loam
69		36 - 48	6.8	58.0	35	Silty Clay Loam
70		48 - 60	4.8	56.0	39	Silty Clay Loam
71		60 - 72	2.8	58.0	39	Silty Clay Loam

Soil and Forage Analysis Lab
WISCONSIN STATE LABORATORY OF HYGIENE
UNIVERSITY OF WISCONSIN–MADISON

4702 University Ave
Madison, WI 53705
(608) 262-4364
http://uwlab.soils.wisc.edu

Anchor QEA, LLC
30 W Mifflin St, Ste 801
Madison, WI 53713

Date 4/18/2022
Acct # 559106
Report # 1228

Comments

Soil Texture Analysis

Sample Number	*Sample Name*		*SAND*	*SILT*	*Clay*	*Soil*
	Core	*Depth (in)*	*%*	*%*	*%*	*Type*
72		72 - 81	0.8	58.0	41	Silty Clay
73	07.1-1	0 - 12	0.8	56.0	43	Silty Clay
74		12 to 24	0.8	60.0	39	Silty Clay Loam
75		24 - 36	2.8	58.0	39	Silty Clay Loam
76		36 - 48	2.8	54.0	43	Silty Clay
77		48 - 53	18.8	42.0	39	Silty Clay Loam
78	07.2-1	0 - 12	0.8	60.0	39	Silty Clay Loam
79		12 to 24	0.8	58.0	41	Silty Clay
80		24 - 36	0.8	56.0	43	Silty Clay
81		36 - 48	6.8	50.0	43	Silty Clay
82		48 - 60	6.8	48.0	45	Silty Clay
83		60 -72	2.8	46.0	51	Silty Clay
84		72 - 79	2.8	44.0	53	Silty Clay
85	08.1-1	0 - 12	4.8	52.0	43	Silty Clay
86		81 - 93	2.8	40.0	57	Silty Clay
87	08.1-2	0 - 12	10.8	52.0	37	Silty Clay Loam
88		117 - 129	2.8	34.0	63	Clay Loam
89	08.2-1	0 - 12	4.8	44.0	51	Silty Clay
90		12 to 24	6.8	42.0	51	Silty Clay
91	09.1-1	0 - 6	12.8	48.0	39	Silty Clay Loam
92		6 to 18	40.8	40.0	19	Silty Clay
93	09.1-2	0 - 12	42.8	36.0	21	Silty Clay
94	GL1-1	0 - 12	20.8	50.0	29	Clay Loam
95		12 to 24	10.8	54.0	35	Silty Clay Loam
96		24 - 36	8.8	54.0	37	Silty Clay Loam
97		36-48	7.0	52.0	41	Silty Clay
98		48-60	9.0	50.0	41	Silty Clay
99		60-72	8.0	52.0	40	Silty Clay
100		72-84	4.0	50.0	46	Silty Clay
101	GL1-2	0-12	16.0	52.0	32	Silty Clay Loam
102		12 to 24	8.0	56.0	36	Silty Clay Loam
103		24-36	10.0	56.0	34	Silty Clay Loam
104		36-48	8.0	52.0	40	Silty Clay
105		48-60	10.0	50.0	40	Silty Clay
106		60-72	4.0	48.0	48	Silty Clay
107		72-84	6.0	42.0	52	Silty Clay
108		84-90	6.0	38.0	56	Clay

Appendix III
Cesium-137 Analysis Results

TELEDYNE
BROWN ENGINEERING, INC.
A Teledyne Technologies Company
2508 Quality Lane
Knoxville, TN 37931-3133
865-690-6819

Work Order #: L95403

ANCHOR QEA

March 23, 2022

Table of Contents

TELEDYNE
BROWN ENGINEERING, INC.
A Teledyne Technologies Company
2508 Quality Lane
Knoxville, TN 37931-3133

Brent Teske
1201 3rd Ave, Suite 2600
Seattle WA 98101

Case Narrative - L95403
AN003-3EREGBTESKE-22

03/23/2022 14:01

Sample Receipt

The following sample(s) were received on March 10, 2022 in good condition, unless otherwise noted.

Cross Reference Table

Client ID	Laboratory ID	Station ID(if applicable)
1; 5.2-1	L95403-1	0-4 CM
8; 5.2-1	L95403-2	28-32 CM
15; 5.2-1	L95403-3	56-60 CM
22; 5.2-1	L95403-4	84-88 CM
29; 5.2-1	L95403-5	112-116 CM
36; 5.2-1	L95403-6	140-144 CM
43; 5.2-1	L95403-7	168-172 CM
50; 5.2-1	L95403-8	196-200 CM
57; 5.2-1	L95403-9	224-228 CM
63; 5.2-1	L95403-10	248-252 CM
64; 5.1-1	L95403-11	0-4 CM
72; 5.1-1	L95403-12	32-36 CM
80; 5.1-1	L95403-13	64-68 CM
88; 5.1-1	L95403-14	96-100 CM
96; 5.1-1	L95403-15	128-132 CM
104; 5.1-1	L95403-16	160-164 CM
112; 5.1-1	L95403-17	192-196 CM
120; 5.1-1	L95403-18	224-228 CM
128; 5.1-1	L95403-19	256-260 CM
137; 5.1-1	L95403-20	292-296 CM

Sample Analysis

Instrument(s) used for all analyses were in calibration.
Standard solution(s) used in analyses were National Institute of Standards and Technology (NIST) traceable.

Analytical Method Cross Reference Table

Radiological Parameter	TBE Knoxville Method	Reference Method
Gamma Spectrometry	TBE-2007	EPA 901.1

TELEDYNE
BROWN ENGINEERING, INC.
A Teledyne Technologies Company
2508 Quality Lane
Knoxville, TN 37931-3133

Case Narrative - L95403
AN003-3EREGBTESKE-22

03/23/2022 14:01

Special Considerations

Gamma Spectroscopy

Quality Control

Quality control sample(s) analyzed as WG38781, WG38795.

Duplicate Sample

All duplicate result(s) were within acceptance limits, unless otherwise noted. Duplicate(s) were analyzed for the following sample(s).

Client ID	Laboratory ID	QC Sample #
JORDAN COVE W	L95387-1	WG38781-1
SA-GAM-13E3	L95392-1	WG38795-1

Certification

This is to certify that Teledyne Brown Engineering - Environmental Services, located at 2508 Quality Lane, Knoxville, Tennessee, 37931, has analyzed, tested and documented samples as specified in the applicable purchase order.

This also certifies that requirements of applicable codes, standards and specifications have been fully met and that any quality assurance documentation which verified conformance to the purchase order is on file and may be examined upon request.

I hereby certify that the above statements are true and correct.

Keith Jeter
Operations Manager

ANALYTICAL RESULTS

Report of Analysis

03/23/22 14:01

L95403

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Brent Teske

AN003-3EREGBTESKE-22

Sample ID: **1; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 0-4 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 35.53
LIMS Number: L95403-1

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	1.81E-02	3.95E-02	**6.62E-02**	pCi/g Dry		21.4	g dry	02/13/22 13:40	03/17/22	62071	Sec	U		No

Sample ID: **8; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 28-32 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 33.49
LIMS Number: L95403-2

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	3.63E-02	3.00E-02	**5.25E-02**	pCi/g Dry		32.3	g dry	02/13/22 13:40	03/18/22	64800	Sec	U		No

Sample ID: **15; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 56-60 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 35.8
LIMS Number: L95403-3

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	4.54E-02	3.94E-02	**4.20E-02**	pCi/g Dry		35.7	g dry	02/13/22 13:40	03/18/22	64800	Sec	U		Yes

Sample ID: **22; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 84-88 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 36.82
LIMS Number: L95403-4

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	3.26E-02	4.89E-02	**8.32E-02**	pCi/g Dry		26.7	g dry	02/13/22 13:40	03/17/22	62056	Sec	U		No

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 3 sigma
\+ = Activity concentration exceeds MDC and 3 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 3 sigma
High = Activity concentration exceeds customer reporting value
Spec = MDC exceeds customer technical specification
L = Low recovery
H = High recovery

Bolded text indicates reportable value.

No = Peak not identified in gamma spectrum
Yes = Peak identified in gamma spectrum

**** Unless otherwise noted, the analytical results reported are related only to the samples tested in the condition they are received by the laboratory.

MDC - Minimum Detectable Concentration

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L95403

Brent Teske

AN003-3EREGBTESKE-22

Sample ID: **29; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 112-116 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 30.69
LIMS Number: L95403-5

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	2.74E-02	3.08E-02	**5.19E-02**	pCi/g Dry		30.4	g dry	02/13/22 13:40	03/18/22	64800	Sec	U		No

Sample ID: **36; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 140-144 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 41.21
LIMS Number: L95403-6

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	4.68E-02	3.65E-02	**6.43E-02**	pCi/g Dry		24.6	g dry	02/13/22 13:40	03/17/22	62086	Sec	U		No

Sample ID: **43; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 168-172 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 40.14
LIMS Number: L95403-7

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	**9.32E-02**	3.46E-02	4.29E-02	pCi/g Dry		27.4	g dry	02/13/22 13:40	03/18/22	64800	Sec	+		Yes

Sample ID: **50; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 196-200 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 34.07
LIMS Number: L95403-8

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	**1.19E-01**	5.25E-02	6.65E-02	pCi/g Dry		45.9	g dry	02/13/22 13:40	03/18/22	64800	Sec	+		Yes

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 3 sigma
\+ = Activity concentration exceeds MDC and 3 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 3 sigma
High = Activity concentration exceeds customer reporting value
Spec = MDC exceeds customer technical specification
L = Low recovery
H = High recovery

Bolded text indicates reportable value.

No = Peak not identified in gamma spectrum
Yes = Peak identified in gamma spectrum

**** Unless otherwise noted, the analytical results reported are related only to the samples tested in the condition they are received by the laboratory.

MDC - Minimum Detectable Concentration

Report of Analysis

03/23/22 14:01

L95403

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Brent Teske

AN003-3EREGBTESKE-22

Sample ID: **57; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 224-228 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 27.7
LIMS Number: L95403-9

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	4.68E-02	3.56E-02	**6.08E-02**	pCi/g Dry		31.1	g dry	02/13/22 13:40	03/18/22	64800	Sec	U		No

Sample ID: **63; 5.2-1** Collect Start: 02/13/2022 13:34 Matrix: Sediment/Silt (SS)
Station: 248-252 CM Collect Stop: 02/13/2022 13:40 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 34.86
LIMS Number: L95403-10

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	3.53E-02	4.48E-02	**7.55E-02**	pCi/g Dry		24.8	g dry	02/13/22 13:40	03/17/22	62078	Sec	U		No

Sample ID: **64; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 0-4 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 36.13
LIMS Number: L95403-11

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	2.68E-02	3.92E-02	**6.46E-02**	pCi/g Dry		25.5	g dry	02/13/22 13:00	03/17/22	62093	Sec	U		No

Sample ID: **72; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 32-36 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 40.9
LIMS Number: L95403-12

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	-1.16E-02	3.62E-02	**5.91E-02**	pCi/g Dry		26.9	g dry	02/13/22 13:00	03/17/22	62081	Sec	U		No

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 3 sigma
\+ = Activity concentration exceeds MDC and 3 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 3 sigma
High = Activity concentration exceeds customer reporting value
Spec = MDC exceeds customer technical specification
L = Low recovery
H = High recovery

Bolded text indicates reportable value.

No = Peak not identified in gamma spectrum
Yes = Peak identified in gamma spectrum

**** Unless otherwise noted, the analytical results reported are related only to the samples tested in the condition they are received by the laboratory.

MDC - Minimum Detectable Concentration

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L95403

Brent Teske

AN003-3EREGBTESKE-22

Sample ID: **80; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 64-68 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 29.79
LIMS Number: L95403-13

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	3.94E-02	3.16E-02	**5.59E-02**	pCi/g Dry		21.4	g dry	02/13/22 13:00	03/17/22	62106	Sec	U		No

Sample ID: **88; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 96-100 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 35.63
LIMS Number: L95403-14

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	1.83E-02	4.36E-02	**7.35E-02**	pCi/g Dry		41.7	g dry	02/13/22 13:00	03/18/22	64800	Sec	U		No

Sample ID: **96; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 128-132 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 35.73
LIMS Number: L95403-15

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	7.64E-02	4.74E-02	**8.37E-02**	pCi/g Dry		27.3	g dry	02/13/22 13:00	03/17/22	62114	Sec	U		No

Sample ID: **104; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 160-164 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 33.69
LIMS Number: L95403-16

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	5.08E-02	3.81E-02	**4.70E-02**	pCi/g Dry		30	g dry	02/13/22 13:00	03/18/22	64800	Sec	U		Yes

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 3 sigma
\+ = Activity concentration exceeds MDC and 3 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 3 sigma
High = Activity concentration exceeds customer reporting value
Spec = MDC exceeds customer technical specification
L = Low recovery
H = High recovery

Bolded text indicates reportable value.

No = Peak not identified in gamma spectrum
Yes = Peak identified in gamma spectrum

**** Unless otherwise noted, the analytical results reported are related only to the samples tested in the condition they are received by the laboratory.

MDC - Minimum Detectable Concentration

Report of Analysis

03/23/22 14:01

L95403

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Brent Teske

AN003-3EREGBTESKE-22

Sample ID: **112; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 192-196 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 34.13
LIMS Number: L95403-17

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	6.14E-02	3.75E-02	**6.51E-02**	pCi/g Dry		44.1	g dry	02/13/22 13:00	03/18/22	64800	Sec	U		No

Sample ID: **120; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 224-228 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 34.26
LIMS Number: L95403-18

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	**1.48E-01**	5.30E-02	6.01E-02	pCi/g Dry		23.6	g dry	02/13/22 13:00	03/17/22	62133	Sec	+		Yes

Sample ID: **128; 5.1-1** Collect Start: 02/13/2022 12:52 Matrix: Sediment/Silt (SS)
Station: 256-260 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 31.74
LIMS Number: L95403-19

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	**8.09E-02**	5.28E-02	5.56E-02	pCi/g Dry		49.1	g dry	02/13/22 13:00	03/21/22	63387	Sec	+		Yes

Sample ID: **137; 5.1-1** Collect Start: 02/13/2022 13:00 Matrix: Sediment/Silt (SS)
Station: 292-296 CM Collect Stop: 02/13/2022 13:00 Volume:
Description: Receive Date: 03/10/2022 % Moisture: 33.22
LIMS Number: L95403-20

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values		
CS-137	2007	**1.73E-01**	5.35E-02	6.11E-02	pCi/g Dry		53.6	g dry	02/13/22 13:00	03/21/22	63423	Sec	+		Yes

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 3 sigma
\+ = Activity concentration exceeds MDC and 3 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 3 sigma
High = Activity concentration exceeds customer reporting value
Spec = MDC exceeds customer technical specification
L = Low recovery
H = High recovery

Bolded text indicates reportable value.

No = Peak not identified in gamma spectrum
Yes = Peak identified in gamma spectrum

**** Unless otherwise noted, the analytical results reported are related only to the samples tested in the condition they are received by the laboratory.

MDC - Minimum Detectable Concentration

QC RESULTS

QC Summary Report for L95403

AN003-3EREGBTESKE-22

03/23/2022 14:01

TELEDYNE BROWN ENGINEERING
Everywhereyoulook™

GAMMA

Duplicate Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Original Result	DUP Result	Units	RPD	Range	Qualifier	P/F
WG38781-1	K-40	VA	03/10/2022 12:48	6.561E+00	5.754E+00	pCi/g Wet	13.1	<50	+	P
L95387-1										
WG38795-1	K-40	AN	03/11/2022 11:21	3.007E+03	3.013E+03	pCi/kg Wet	0.2	<50	+	P
L95392-1										

GAMMA

Associated Samples for WG38781

Sample #	Client ID
L95403-1	1; 5.2-1
L95403-2	8; 5.2-1
L95403-3	15; 5.2-1
L95403-4	22; 5.2-1
L95403-5	29; 5.2-1
L95403-6	36; 5.2-1
L95403-7	43; 5.2-1
L95403-8	50; 5.2-1
L95403-9	57; 5.2-1
L95403-10	63; 5.2-1

+	Positive Result
U	Compound/analyte was analyzed, peak not identified and/or not detected above MDC
*	< 5 times the MDC are not evaluated
**	Nuclide not detected
***	Spiking level < 5 times activity
P	Pass
F	Fail
NE	Not evaluated

QC Summary Report for L95403

AN003-3EREGBTESKE-22

03/23/2022 14:01

TELEDYNE BROWN ENGINEERING
Everywhereyoulook™

GAMMA

Associated Samples for WG38795

Sample #	Client ID
L95403-11	64; 5.1-1
L95403-12	72; 5.1-1
L95403-13	80; 5.1-1
L95403-14	88; 5.1-1
L95403-15	96; 5.1-1
L95403-16	104; 5.1-1
L95403-17	112; 5.1-1
L95403-18	120; 5.1-1
L95403-19	128; 5.1-1
L95403-20	137; 5.1-1

+	Positive Result
U	Compound/analyte was analyzed, peak not identified and/or not detected above MDC
*	< 5 times the MDC are not evaluated
**	Nuclide not detected
***	Spiking level < 5 times activity
P	Pass
F	Fail
NE	Not evaluated

SAMPLE RECEIPT

TELEDYNE BROWN ENGINEERING
A Teledyne Technologies Company

Analysis Request Chain of Custody

E - Environmental: E
P - 10CFR61, 10CFR50, Other high level:
Turn-around-time 14 days
Purchase order:

Lims# L95403 (for lab use)

Client name: Anchor QEA
Client address: 1201 3rd Ave, Suite 2600
Seattle, WA 98101
Phone Number 608-616-9450
Cell number:
email; bteske@Anchorqea.com
Contact: Brent Teske

T.I. Number (for lab use)	Client Sample ID	Description	Station	Collection Date/Time Start		Collection Date/Time Stop		Volume	Units	Matrix or type	Analysis Request
	1; 5.2-1	0-4 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	8; 5.2-1	28-32 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	15; 5.2-1	56-60 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	22; 5.2-1	84-88 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	29; 5.2-1	112-116 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	36; 5.2-1	140-144 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	43; 5.2-1	168-172 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	50; 5.2-1	196-200 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	57; 5.2-1	224-228 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	63; 5.2-1	248-252 cm		2/13/2022	13:34	2/13/2022	13:40			SS	GELI, Sample Prep
	64; 5.1-1	0-4 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	72; 5.1-1	32-36 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	80; 5.1-1	64-68 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	88; 5.1-1	96-100 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	96; 5.1-1	128-132 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	104; 5.1-1	160-164 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	112; 5.1-1	192-196 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	120; 5.1-1	224-228 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	128; 5.1-1	256-260 cm		2/13/2022	12:52	2/13/2022	13:00			SS	GELI, Sample Prep
	137; 5.1-1	292-296 cm		2/13/2022	13:00	2/13/2022	13:00			SS	GELI, Sample Prep

Special Instructions:

Relinquished by:	Date:	Relinquished by:	Date:	Relinquished by:	Date:
Received by:	Date: 5-10-22	Received by:	Date:	Received by:	Date:

TELEDYNE
BROWN ENGINEERING, INC.
A Teledyne Technologies Company
2508 Quality Lane
Knoxville, TN 37931-3133
865-690-6819

General Information

Quote#: Q685
Quote Date: 02/10/2022
Description: 120 Soil Core samples for Cs-137 dating.
Client: Anchor QEA
Address: 1201 3rd Ave, Suite 2600
Seattle, WA 98101

Contact: Brent Teske
Phone #: (608)616-9450 **Ext.**
Fax #:
Email: bteske@Anchorqea.com

Project Manager: Karli Arterburn
Email: Karli.Arterburn@Teledyne.com
Phone: (865)934-0371
Fax:

Ship samples to:
Teledyne Brown Engineering
2508 Quality Lane
Knoxville, TN 37931
Attention: Sample Receiving

Project Requirements

Data Deliverable: Level 4 - Full 3Sigma
Electronic Deliverable: EQuis,AQ_EZEDD,EDI Anchor QEA
Regulatory Agency:

Estimated Start Date:
Quote Expiration: 12/31/2022
Terms: Net 30

Comments: Standard turn around time may be extended depending on how many sample are sent to be analyzed due the additional step of drying and grinding.

Price per Sample

Matrix	Product Code	30 Day TAT
Sediment/Silt	Gamma *Cs-137 0.1 pCi/g (extended count)*	$126.00
Sediment/Silt	~~Lead-210~~ ~~*Pb-210 0.1 pCi/g*~~	~~$84.00~~
Sediment/Silt	Sample Prep *Drying, grinding, and sieving samples.*	$25.00

Special Considerations

Unless otherwise instructed, batch Laboratory QC will be used and is included in pricing.

Disclaimer

Receipt of samples from the above referenced project shall constitute acceptance of TBE payments terms of and acceptance of the Laboratory Terms and Conditions.

Batch QC is included in pricing.
Client specific QC will be billed at the above rate.

03/23/22 14:09

Teledyne Brown Engineering
Sample Receipt Verification/Variance Report

SR #: SR73957

Client: Anchor QEA, LLC Project #: AN003-3EREGBTESKE-22 LIMS #L95403

Initiated By: KNOXLAB
Init Date: 03/10/22 Receive Date: 03/10/22

Notification of Variance

Person Notified: Contacted By:
Notify Date:
Notify Method:
Notify Comment:

Client Response

Person Responding:
Response Date:
Response Method:
Response Comment:

	Criteria	Yes	No	NA	Comment
1	Shipping container custody seals present and intact.			NA	
2	Sample container custody seals present and intact.			NA	
3	Sample containers received in good condition.	Y			
4	Chain of custody received with samples.	Y			
5	All samples listed on chain of custody received.	Y			
6	Sample container labels present and legible.	Y			
7	Information on container labels correspond with chain of custody.	Y			
8	Sample(s) properly preserved.	Y			
9	Sample(s) appropriate container(s).	Y			
10	Other. (Describe)			NA	
For Hazardous Materials Only:					
11	Paperwork shows TBE and shippers name, address and phone number.			NA	
12	Paperwork shows sample quantity information.			NA	

INTERNAL CHAIN OF CUSTODY

Internal Chain of Custody

****

Sample # L95403-1 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-2 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-3 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-4 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-5 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-6 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-7 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

****

Sample # L95403-8 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-9 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-10 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-11 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-12 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-13 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-14 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Internal Chain of Custody

****

Sample # L95403-15 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-16 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-17 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-18 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-19 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

****

Sample # L95403-20 Containernum 1

Prod	Analyst
GELI	DH

SAMPLE PREP

Relinquish Date	Relinquish By	Received By	
03/10/2022 00:00		099999	Sample Custodian

Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L95403

****

L95403-1 SS 1; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

****

L95403-2 SS 8; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-3 SS 15; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-4 SS 22; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

****

L95403-5 SS 29; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-6 SS 36; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

L95403

****

L95403-7 SS 43; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-8 SS 50; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-9 SS 57; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-10 SS 63; 5.2-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

****

L95403-11 SS 64; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

****

L95403-12 SS 72; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L95403

****

L95403-13 SS 80; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

****

L95403-14 SS 88; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-15 SS 96; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

****

L95403-16 SS 104; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-17 SS 112; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/18/22

****

L95403-18 SS 120; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/17/22

Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L95403

****

L95403-19 SS 128; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/21/22

****

L95403-20 SS 137; 5.1-1

Process step	Prod	Analyst	Date
Login		KARTERBURN	03/10/22
%Moisture		DH	03/10/22
Aliquot	GELI	DH	03/16/22
Aliquot	SAMPLE PREP		
Count Room	GELI	SMC	03/21/22

GAMMA SPECTROSCOPY

Gamma Spectroscopy

Background

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:20:18.81
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 4-MAR-2022 12:08:17.00

LIMS No., Customer Name, Client ID: BKG

Sample ID : 01BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 01FT082219
BKGFILE : NOBKG
Real Time : 2 12:00:21.41
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	63.13	415	3905	1.04	126.70	124	7	1.92E-03	25.2	4.09E+00
2	2	72.70	722	3223	0.95	145.82	136	18	3.34E-03	13.0	3.42E+00
3	2	74.95	1455	3213	0.94	150.30	136	18	6.73E-03	6.8	
4	1	84.62	1018	3868	1.28	169.62	166	8	4.71E-03	11.0	2.47E+00
5	1	87.37	324	2763	1.20	175.11	174	6	1.50E-03	26.2	1.23E+00
6	1	92.63	1891	3426	1.16	185.62	182	8	8.75E-03	5.8	8.00E-01
7	1	139.75	325	2702	1.00	279.71	277	7	1.50E-03	27.1	1.80E+00
8	1	143.61	430	3003	1.36	287.41	284	8	1.99E-03	22.6	8.91E-01
9	1	185.76	1485	3390	1.01	371.59	367	9	6.88E-03	7.5	8.30E-01
10	1	198.23	404	2434	1.05	396.50	393	7	1.87E-03	20.8	3.48E+00
11	1	238.72	696	2898	1.13	477.36	473	9	3.22E-03	14.4	1.40E+00
12	1	295.20	323	2212	1.22	590.15	587	9	1.50E-03	26.8	2.69E+00
13	1	352.17	748	2455	1.62	703.93	698	13	3.46E-03	14.2	3.66E+00
14	1	511.16	5839	2717	2.72	1021.45	1014	18	2.70E-02	2.5	1.65E+00
15	1	569.91	211	1175	1.61	1138.81	1134	10	9.75E-04	31.2	9.53E-01
16	1	583.42	348	1227	1.42	1165.79	1161	11	1.61E-03	20.2	4.58E-01
17	1	609.49	657	1206	1.75	1217.87	1213	10	3.04E-03	10.7	7.81E-01
18	1	803.17	210	635	1.82	1604.75	1600	10	9.71E-04	23.7	1.08E+00
19	1	847.08	640	1123	2.31	1692.46	1683	17	2.96E-03	12.7	2.65E+00
20	1	911.71	212	589	1.84	1821.56	1816	11	9.79E-04	23.3	8.40E-01
21	1	969.33	91	467	1.88	1936.67	1933	9	4.23E-04	44.3	1.61E+00
22	1	1001.51	188	508	2.59	2000.96	1996	11	8.69E-04	24.4	5.49E-01
23	1	1120.56	165	486	2.13	2238.80	2233	12	7.63E-04	28.0	2.45E+00
24	1	1238.84	160	345	2.21	2475.13	2470	11	7.39E-04	24.1	1.24E+00
25	1	1461.58	853	360	2.54	2920.19	2913	16	3.95E-03	6.1	2.07E+00
26	1	1764.95	183	279	2.26	3526.47	3519	17	8.47E-04	22.3	2.01E+00

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:20:27.96
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 4-MAR-2022 12:08:17.80

LIMS No., Customer Name, Client ID: BKG

Sample ID : 02BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 02FT082119
BKGFILE : NOBKG
Real Time : 2 12:00:27.07
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	63.39	658	3038	0.96	111.51	108	13	3.05E-03	13.9	1.86E+00
2	3	66.35	478	3064	1.06	117.47	108	13	2.21E-03	18.9	
3	2	72.91	1228	3413	0.98	130.66	126	16	5.69E-03	8.1	3.87E+00
4	2	74.96	2423	2773	0.88	134.80	126	16	1.12E-02	3.9	
5	2	77.05	365	2156	0.70	139.00	126	16	1.69E-03	18.9	
6	0	84.72	1248	3807	1.31	154.43	151	7	5.78E-03	8.7	
7	0	87.14	400	3166	0.85	159.30	158	6	1.85E-03	22.9	
8	0	92.65	1789	4082	1.09	170.39	167	8	8.28E-03	6.6	
9	0	139.99	341	4092	1.16	265.63	262	8	1.58E-03	32.9	
10	0	143.91	278	3628	0.87	273.54	271	7	1.29E-03	36.4	
11	0	185.90	1384	3956	1.05	358.03	354	9	6.41E-03	8.6	
12	0	238.64	740	2649	0.93	464.15	461	7	3.43E-03	12.1	
13	0	241.42	172	2614	1.57	469.73	468	7	7.97E-04	49.9	
14	0	295.32	459	2381	1.18	578.20	574	9	2.13E-03	19.7	
15	0	338.08	137	1857	0.87	664.24	661	8	6.35E-04	55.1	
16	0	351.98	1012	2014	1.24	692.22	688	10	4.69E-03	8.9	
17	0	511.01	5511	2426	2.55	1012.24	1004	20	2.55E-02	2.6	
18	0	583.44	331	923	1.11	1158.00	1153	9	1.53E-03	17.5	
19	0	609.38	790	1192	1.40	1210.21	1205	11	3.66E-03	9.2	
20	0	802.76	238	533	2.20	1599.40	1595	10	1.10E-03	19.2	
21	0	846.77	508	823	1.67	1687.98	1681	14	2.35E-03	12.8	
22	0	911.27	243	662	1.89	1817.80	1812	13	1.13E-03	22.8	
23	0	1001.15	99	422	1.23	1998.71	1994	10	4.57E-04	40.2	
24	0	1120.55	222	415	1.50	2239.04	2233	11	1.03E-03	19.1	
25	0	1460.60	979	340	2.25	2923.55	2913	19	4.53E-03	5.5	
26	0	1764.71	276	197	2.10	3535.80	3529	16	1.28E-03	13.0	

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:20:47.60
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 4-MAR-2022 12:08:18.51

LIMS No., Customer Name, Client ID: BKG

Sample ID : 06BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 06FT012721
BKGFILE : NOBKG
Real Time : 2 12:00:35.23
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	75.01	742	3487	0.94	150.49	148	6	3.44E-03	13.1	
2	0	84.60	629	3875	1.11	169.64	166	8	2.91E-03	17.6	
3	0	92.64	708	3734	1.10	185.69	182	8	3.28E-03	15.4	
4	0	140.03	319	3416	0.94	280.30	277	8	1.48E-03	32.2	
5	0	185.73	1003	3681	1.14	371.52	368	9	4.64E-03	11.3	
6	0	198.35	359	3248	1.43	396.72	393	8	1.66E-03	28.0	
7	0	238.64	795	2857	1.16	477.14	473	8	3.68E-03	12.2	
8	0	295.36	363	2507	1.12	590.37	587	9	1.68E-03	25.4	
9	0	352.12	660	2282	1.12	703.67	699	10	3.06E-03	14.1	
10	0	511.00	5491	2729	2.52	1020.80	1013	17	2.54E-02	2.6	
11	0	569.88	237	1277	1.26	1138.33	1134	10	1.10E-03	28.9	
12	0	583.40	453	1178	1.21	1165.31	1161	10	2.10E-03	14.9	
13	0	609.48	607	1354	1.48	1217.38	1213	10	2.81E-03	12.1	
14	0	727.50	108	515	1.49	1452.92	1450	6	5.00E-04	34.6	
15	0	803.18	206	757	1.76	1603.96	1600	10	9.55E-04	25.9	
16	0	847.01	236	940	1.97	1691.43	1686	11	1.09E-03	26.0	
17	0	911.29	479	646	1.83	1819.72	1814	12	2.22E-03	11.6	
18	0	969.52	126	648	1.16	1935.93	1930	10	5.82E-04	39.0	
19	0	1120.47	261	555	1.16	2237.17	2233	11	1.21E-03	18.5	
20	0	1238.80	90	395	0.84	2473.29	2469	9	4.15E-04	41.5	
21	0	1461.07	1626	449	1.88	2916.79	2909	17	7.53E-03	3.9	
22	0	1764.87	295	263	2.01	3522.92	3517	13	1.37E-03	12.7	

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:21:11.85
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 4-MAR-2022 12:08:19.02

LIMS No., Customer Name, Client ID: BKG

Sample ID : 07BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 07FT082119
BKGFILE : NOBKG
Real Time : 2 12:00:23.56
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	63.42	482	3069	1.22	126.63	123	14	2.23E-03	19.7	1.49E+00
2	3	66.33	574	3670	1.31	132.45	123	14	2.66E-03	18.6	
3	3	72.80	1584	4219	1.38	145.41	141	18	7.34E-03	7.5	5.84E-01
4	3	74.99	3129	3945	1.31	149.79	141	18	1.45E-02	4.0	
5	3	77.17	455	2809	1.07	154.15	141	18	2.11E-03	20.4	
6	3	84.78	1794	4024	1.57	169.37	162	16	8.30E-03	6.8	5.80E-01
7	3	87.34	530	3003	1.15	174.49	162	16	2.45E-03	18.3	
8	1	92.67	1647	3871	1.30	185.15	181	9	7.63E-03	7.2	2.86E+00
9	1	139.75	329	3405	1.31	279.34	276	8	1.53E-03	31.1	1.11E-01
10	1	143.62	268	3466	1.41	287.09	284	8	1.24E-03	38.5	3.29E-01
11	1	185.74	1207	4104	1.56	371.35	367	10	5.59E-03	10.3	2.41E-01
12	1	198.33	479	3212	1.47	396.54	393	8	2.22E-03	21.0	7.29E-01
13	1	238.49	1156	3370	1.27	476.89	473	9	5.35E-03	9.5	2.50E+00
14	1	295.12	437	2428	0.89	590.18	586	8	2.03E-03	20.1	1.01E+00
15	1	338.75	487	2283	2.14	677.47	673	9	2.25E-03	18.1	5.58E+00
16	1	351.73	935	2937	1.59	703.43	698	12	4.33E-03	12.0	5.71E-01
17	1	510.78	7517	3512	2.98	1021.59	1012	22	3.48E-02	2.3	2.96E+00
18	1	569.60	201	1457	1.81	1139.25	1134	10	9.33E-04	36.0	4.73E-01
19	1	582.98	749	1371	2.31	1166.03	1160	11	3.47E-03	10.2	1.83E+00
20	1	609.23	994	2116	1.84	1218.52	1213	13	4.60E-03	10.1	7.69E-01
21	1	802.54	398	1559	2.94	1605.18	1595	20	1.84E-03	24.9	7.44E-01
22	1	846.38	581	1449	2.08	1692.87	1685	16	2.69E-03	15.2	8.73E-01
23	1	910.84	409	889	2.05	1821.79	1816	12	1.89E-03	15.4	6.34E-01
24	1	968.99	273	699	1.99	1938.08	1933	11	1.27E-03	19.8	5.26E-01
25	1	1120.01	263	613	2.15	2240.11	2235	11	1.22E-03	19.2	7.10E-01
26	1	1460.25	2023	627	2.44	2920.48	2909	22	9.36E-03	3.9	8.75E-01
27	1	1727.69	112	531	6.96	3455.19	3445	27	5.19E-04	57.8	1.77E+00
28	1	1763.58	426	460	3.11	3526.94	3515	24	1.97E-03	14.3	1.26E+00

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:21:29.94
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 4-MAR-2022 12:08:18.05

LIMS No., Customer Name, Client ID: BKG

Sample ID : 08BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 08FT082019
BKGFILE : NOBKG
Real Time : 2 12:01:26.92
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	67.04	394	3094	1.09	140.22	138	6	1.83E-03	22.9	1.60E+00
2	1	75.63	1335	4718	0.82	157.37	154	7	6.18E-03	8.9	2.85E+00
3	1	85.35	1032	3996	1.41	176.76	173	8	4.78E-03	11.0	2.53E+00
4	1	93.30	971	4116	1.21	192.62	188	9	4.49E-03	12.3	5.06E-01
5	1	186.46	914	3785	1.19	378.42	375	9	4.23E-03	12.6	4.12E-01
6	1	199.36	291	3110	1.36	404.13	401	8	1.35E-03	33.8	6.84E-01
7	1	239.27	1199	2908	1.21	483.72	480	8	5.55E-03	8.3	9.13E-01
8	1	242.86	339	2714	1.35	490.89	487	8	1.57E-03	27.3	2.71E+00
9	1	296.01	402	2760	1.75	596.87	592	10	1.86E-03	25.0	4.46E-01
10	1	338.90	201	1980	1.30	682.39	679	8	9.32E-04	38.8	9.19E-01
11	1	352.64	1082	2838	2.21	709.79	704	13	5.01E-03	10.5	6.54E+00
12	1	511.45	5343	2541	2.85	1026.40	1018	17	2.47E-02	2.6	2.10E+00
13	1	583.64	501	1354	1.63	1170.29	1165	11	2.32E-03	14.9	8.17E-01
14	1	609.79	749	1392	1.64	1222.41	1217	11	3.47E-03	10.3	5.03E-01
15	1	846.97	353	1029	1.78	1695.08	1689	14	1.63E-03	20.1	1.77E+00
16	1	911.34	492	820	1.91	1823.34	1817	14	2.28E-03	13.2	9.14E-01
17	1	969.21	198	650	1.48	1938.64	1932	11	9.18E-04	25.8	1.91E+00
18	1	1120.50	205	476	1.73	2240.00	2235	10	9.50E-04	21.1	1.21E+00
19	1	1237.89	170	459	2.47	2473.81	2468	12	7.87E-04	26.5	1.48E+00
20	1	1377.76	84	239	1.64	2752.32	2749	9	3.91E-04	34.7	6.54E-01
21	1	1460.96	1492	435	1.99	2917.97	2910	16	6.91E-03	4.1	7.37E-01
22	1	1764.53	338	237	2.98	3522.24	3515	18	1.57E-03	12.0	1.53E+00

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:21:39.23
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 4-MAR-2022 12:08:19.72

LIMS No., Customer Name, Client ID: BKG

Sample ID : 11BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 4.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 11FT112019
BKGFILE : NOBKG
Real Time : 2 12:01:41.91
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.61	2817	4750	1.13	91.85	87	10	1.30E-02	5.0	
2	0	53.39	277	2723	1.50	105.39	103	6	1.28E-03	30.4	
3	3	63.30	2213	3526	1.19	125.22	121	15	1.02E-02	5.0	1.62E+00
4	3	66.07	426	4705	1.50	130.75	121	15	1.97E-03	30.0	
5	7	71.27	718	5839	2.21	141.15	136	22	3.33E-03	22.4	2.22E+00
6	7	72.95	3478	3686	1.18	144.51	136	22	1.61E-02	3.5	
7	7	75.05	6480	3615	1.21	148.71	136	22	3.00E-02	2.1	
8	7	77.11	484	3044	0.99	152.82	136	22	2.24E-03	20.3	
9	3	84.85	3034	4253	1.45	168.30	163	15	1.40E-02	4.3	1.27E+00
10	3	87.36	769	2885	0.98	173.33	163	15	3.56E-03	11.9	
11	0	92.82	3115	5019	1.35	184.24	179	11	1.44E-02	4.8	
12	0	139.86	254	3096	1.58	278.28	276	7	1.18E-03	36.8	
13	0	143.85	421	3568	1.42	286.26	283	8	1.95E-03	25.1	
14	0	185.97	1331	4281	1.29	370.47	366	10	6.16E-03	9.6	
15	0	198.46	324	3229	1.33	395.45	392	8	1.50E-03	30.8	
16	0	238.88	674	3441	1.36	476.26	472	9	3.12E-03	16.2	
17	0	295.53	340	2219	1.11	589.53	586	8	1.57E-03	24.6	
18	0	352.20	531	2069	1.39	702.83	699	9	2.46E-03	16.1	
19	0	511.41	7452	3541	2.84	1021.15	1012	24	3.45E-02	2.4	
20	0	570.00	175	1182	2.75	1138.30	1135	9	8.11E-04	36.1	
21	0	583.45	491	1513	1.42	1165.20	1159	12	2.27E-03	16.5	
22	0	609.63	736	2046	1.59	1217.54	1210	14	3.41E-03	13.6	
23	0	796.03	82	788	0.93	1590.22	1585	10	3.78E-04	65.5	
24	0	803.26	183	864	1.23	1604.70	1601	10	8.49E-04	30.8	
25	0	846.93	633	1109	1.64	1692.00	1686	13	2.93E-03	11.5	
26	0	911.30	399	827	1.37	1820.71	1814	14	1.84E-03	16.1	
27	0	969.73	122	588	2.06	1937.53	1932	10	5.63E-04	38.5	
28	0	1120.36	249	710	2.33	2238.72	2232	15	1.15E-03	24.2	
29	0	1238.79	183	611	1.21	2475.50	2468	15	8.47E-04	30.4	
30	0	1246.46	103	551	5.67	2490.85	2483	15	4.79E-04	50.5	
31	0	1461.19	1228	659	2.41	2920.19	2910	22	5.68E-03	6.0	
32	0	1556.32	8	232	3.23	3110.41	3107	11	3.73E-05	366.8	
33	0	1765.22	188	338	1.79	3528.09	3519	15	8.71E-04	22.5	

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:21:20.77
TBE13 31-TP10727B HpGe ******* Aquisition Date/Time: 4-MAR-2022 12:08:20.32

LIMS No., Customer Name, Client ID: BKG

Sample ID : 13BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentfied

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 13FT012021
BKGFILE : NOBKG
Real Time : 2 12:00:44.85
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	63.16	313	2283	0.84	126.28	124	6	1.45E-03	24.6	1.48E+00
2	1	66.52	161	2266	0.86	132.98	131	6	7.46E-04	47.4	1.89E+00
3	10	69.87	548	2728	1.64	139.67	136	22	2.54E-03	17.4	6.33E+00
4	10	72.70	1226	2436	1.13	145.31	136	22	5.68E-03	7.4	
5	10	74.79	1922	2135	0.93	149.48	136	22	8.90E-03	4.5	
6	10	76.92	583	2529	1.22	153.73	136	22	2.70E-03	15.6	
7	6	84.59	998	2498	1.14	169.03	165	13	4.62E-03	8.9	1.33E+00
8	6	87.15	458	2063	1.01	174.14	165	13	2.12E-03	16.6	
9	1	92.51	910	2961	1.05	184.84	181	8	4.22E-03	10.8	6.23E+00
10	1	139.94	340	2893	1.15	279.47	276	8	1.57E-03	27.9	2.33E+00
11	1	185.47	880	2796	1.00	370.33	367	8	4.07E-03	10.9	2.12E+00
12	1	198.09	312	2689	0.91	395.51	392	8	1.44E-03	29.3	3.21E-01
13	1	238.43	1067	2975	0.96	476.02	471	10	4.94E-03	10.0	1.82E+00
14	1	294.93	383	1786	1.04	588.78	585	8	1.78E-03	19.7	6.09E-01
15	1	338.34	323	1716	1.52	675.42	671	9	1.50E-03	23.7	1.39E+00
16	1	351.68	827	1763	1.41	702.05	697	10	3.83E-03	10.1	2.45E+00
17	7	510.54	4009	1876	2.45	1019.21	1012	22	1.86E-02	3.0	5.74E+00
18	7	511.58	1345	1338	1.84	1021.29	1012	22	6.23E-03	7.5	
19	1	582.92	438	1003	1.65	1163.75	1158	11	2.03E-03	14.8	7.51E-01
20	1	609.06	592	1054	1.34	1215.95	1211	10	2.74E-03	11.1	7.23E-01
21	1	726.98	106	566	1.07	1451.49	1449	8	4.93E-04	39.5	8.30E-01
22	1	802.69	188	518	1.59	1602.74	1599	9	8.71E-04	22.9	6.26E-01
23	1	846.28	507	899	2.20	1689.85	1681	15	2.35E-03	13.6	3.67E+00
24	1	911.00	374	590	1.71	1819.16	1813	13	1.73E-03	14.4	1.58E+00
25	1	968.60	122	368	1.24	1934.27	1930	8	5.66E-04	28.8	7.85E-01
26	1	1120.42	215	481	2.02	2237.75	2231	14	9.96E-04	22.9	1.84E+00
27	1	1238.59	94	366	2.04	2474.01	2470	10	4.37E-04	39.2	9.19E-01
28	1	1460.58	1176	365	1.99	2918.02	2909	19	5.44E-03	4.9	7.92E-01
29	1	1764.25	230	193	2.91	3525.67	3518	16	1.07E-03	14.9	9.62E-01

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:20:56.91
TBE14 54-TP42603C HpGe ******* Aquisition Date/Time: 4-MAR-2022 12:08:18.70

LIMS No., Customer Name, Client ID: BKG

Sample ID : 14BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 14FT082119
BKGFILE : NOBKG
Real Time : 2 12:00:34.29
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	46.72	247	3283	0.96	90.52	88	7	1.14E-03	39.0	1.96E-01
2	1	63.35	215	2126	0.82	123.83	122	5	9.93E-04	32.9	9.28E-01
3	1	66.31	419	2855	1.20	129.75	127	7	1.94E-03	21.7	4.07E+00
4	2	72.83	749	2222	0.80	142.80	139	13	3.47E-03	10.1	5.25E-01
5	2	74.97	1531	2192	0.76	147.09	139	13	7.09E-03	5.3	
6	4	84.75	1162	2462	1.25	166.68	161	15	5.38E-03	7.7	2.18E+00
7	4	87.42	438	2760	1.25	172.01	161	15	2.03E-03	21.7	
8	1	92.60	787	3197	0.92	182.38	178	9	3.64E-03	13.5	5.64E-01
9	1	139.72	252	2685	1.34	276.73	273	8	1.17E-03	36.1	1.04E+00
10	1	185.77	856	3051	1.32	368.94	364	10	3.96E-03	12.6	8.93E-01
11	1	198.29	217	1497	0.75	394.01	392	5	1.01E-03	27.5	4.94E-01
12	1	238.54	485	2733	1.09	474.58	470	10	2.24E-03	20.6	9.76E-01
13	1	294.99	302	1396	1.58	587.63	584	7	1.40E-03	21.2	3.42E+00
14	1	351.84	493	1267	1.15	701.46	698	8	2.28E-03	13.3	4.31E-01
15	1	510.87	4330	2104	2.74	1019.91	1012	20	2.00E-02	3.0	1.17E+00
16	1	583.34	220	904	1.73	1165.05	1160	10	1.02E-03	26.4	1.63E+00
17	1	609.22	365	976	1.39	1216.87	1212	10	1.69E-03	16.9	6.38E-01
18	1	802.48	105	645	2.52	1603.95	1599	12	4.88E-04	49.4	2.41E+00
19	1	846.63	413	669	1.85	1692.37	1688	13	1.91E-03	13.9	1.74E+00
20	1	910.82	173	397	1.61	1820.95	1817	9	8.00E-04	22.2	1.12E+00
21	1	968.82	107	426	1.97	1937.13	1932	11	4.95E-04	39.3	2.43E+00
22	1	1120.02	125	375	1.83	2240.02	2233	12	5.76E-04	32.3	4.53E-01
23	1	1460.25	805	345	2.11	2921.67	2912	18	3.72E-03	6.5	2.23E+00
24	1	1764.07	129	251	2.78	3530.51	3522	16	5.96E-04	28.9	2.53E+00

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 7-MAR-2022 09:20:36.66
TBE23 11410 HpGe ********** Aquisition Date/Time: 4-MAR-2022 12:08:18.26

LIMS No., Customer Name, Client ID: BKG

Sample ID : 23BG030422MT
Sample Type : PCI
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 1.30890ELibrary Used: LIBD
Peak Evaluation - Identified and Unidentified

Smple Date: 4-MAR-2022 00:00:00.0
Geometry : 23FT121020
BKGFILE : NOBKG
Real Time : 2 12:00:24.00
Live time : 2 12:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.45	1509	4082	0.96	92.95	88	10	6.99E-03	8.3	
2	8	63.36	1691	2598	1.12	126.74	122	15	7.83E-03	5.5	8.72E+00
3	8	66.36	566	3281	1.44	132.72	122	15	2.62E-03	19.0	
4	2	74.89	1011	2466	1.04	149.77	144	15	4.68E-03	8.3	2.73E+00
5	2	77.19	1451	2312	0.99	154.36	144	15	6.72E-03	6.0	
6	0	84.27	511	3045	0.99	168.52	165	8	2.37E-03	19.2	
7	0	87.30	357	2736	1.04	174.57	172	7	1.65E-03	24.9	
8	0	92.83	2476	3220	1.09	185.61	181	8	1.15E-02	4.5	
9	0	112.74	221	2048	0.75	225.39	223	6	1.02E-03	33.1	
10	0	139.66	419	2600	1.08	279.19	276	8	1.94E-03	21.6	
11	0	143.70	405	2282	1.04	287.26	284	7	1.87E-03	20.2	
12	0	185.77	1407	2849	1.00	371.33	367	9	6.51E-03	7.3	
13	0	198.31	339	2603	0.92	396.39	393	8	1.57E-03	26.6	
14	0	204.96	152	1767	0.93	409.67	408	6	7.03E-04	44.5	
15	1	238.67	3300	1597	0.97	477.05	473	13	1.53E-02	2.6	1.62E+00
16	1	241.07	320	1835	1.16	481.84	473	13	1.48E-03	24.9	
17	0	295.40	183	1410	1.30	590.42	587	7	8.49E-04	34.8	
18	0	299.64	256	2322	1.01	598.91	594	11	1.18E-03	37.0	
19	0	351.95	402	1199	1.24	703.48	700	7	1.86E-03	15.1	
20	0	511.02	5670	2073	2.57	1021.51	1014	17	2.63E-02	2.3	
21	0	569.98	468	1161	1.48	1139.42	1134	12	2.17E-03	15.3	
22	0	583.29	958	1054	1.39	1166.04	1161	11	4.44E-03	7.3	
23	0	609.19	324	1147	1.04	1217.83	1214	9	1.50E-03	19.6	
24	0	669.42	101	593	1.34	1338.32	1336	8	4.68E-04	42.8	
25	0	727.59	147	744	1.19	1454.69	1450	10	6.80E-04	35.7	
26	0	803.22	189	653	1.55	1605.99	1601	10	8.73E-04	26.4	
27	0	860.60	145	546	1.43	1720.81	1717	9	6.69E-04	30.3	
28	0	911.19	213	487	1.94	1822.05	1817	11	9.84E-04	21.2	
29	0	962.03	105	634	1.16	1923.80	1917	12	4.84E-04	49.1	
30	0	1001.27	156	437	2.21	2002.34	1997	11	7.21E-04	27.3	
31	0	1063.71	276	486	1.45	2127.34	2121	13	1.28E-03	17.5	
32	0	1120.25	63	403	1.29	2240.55	2237	9	2.92E-04	58.6	
33	0	1460.89	621	258	2.08	2922.81	2915	13	2.87E-03	6.7	
34	0	1764.78	103	219	1.20	3531.86	3524	12	4.77E-04	30.4	

GAMMA SPECTROSCOPY

Initial Calibration

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1006.0	-0.06%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.0	0.14%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	51.1	0.34%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	143.9	-7.78%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	192.6	1.04%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	242.2	-1.55%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	175.4	2.21%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	393.8	-3.06%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	202.8	-0.31%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	207.4	1.84%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	401.6	-0.52%

Eff. Name: **01S25121819**

Analyst: KOJ

Analyst:

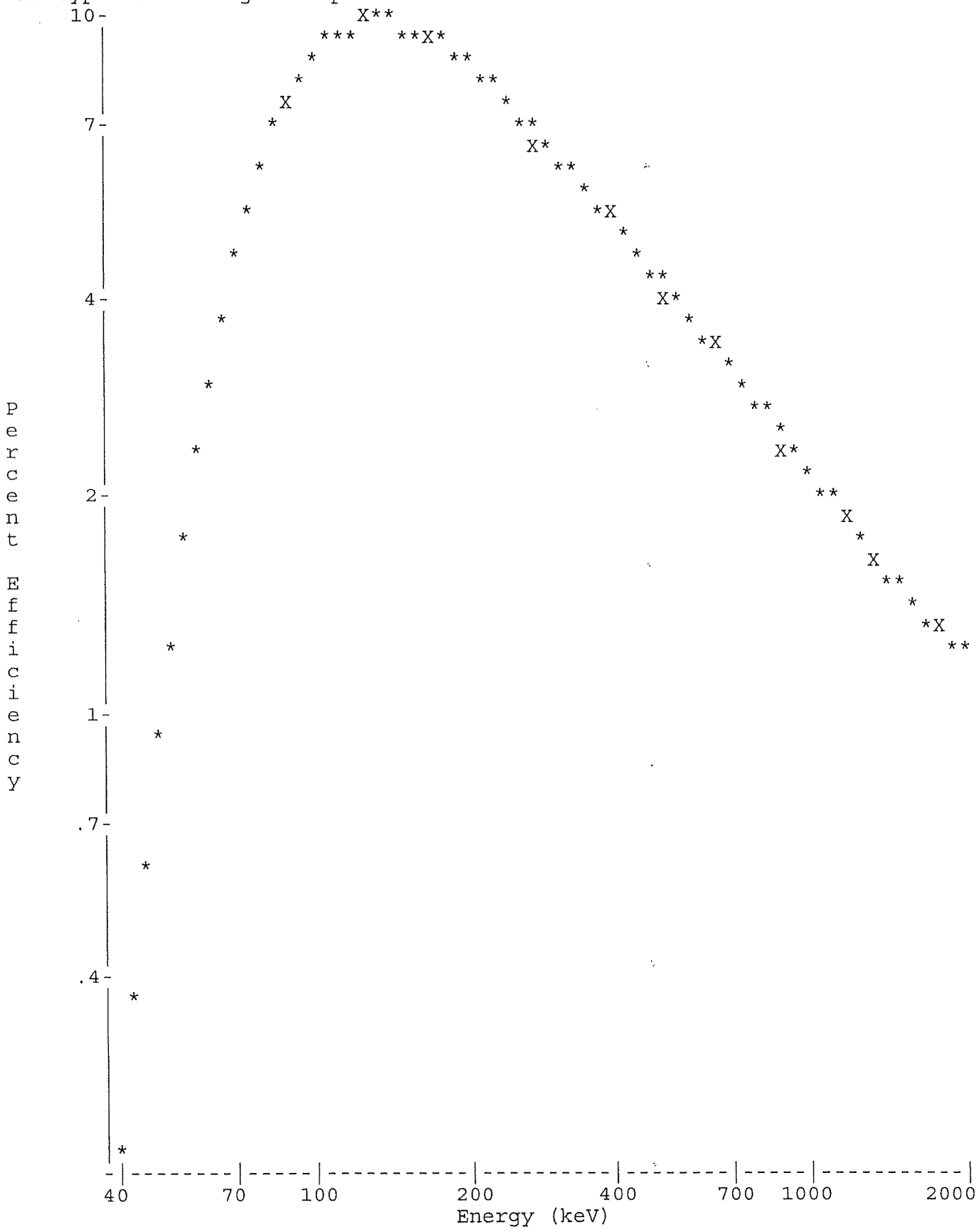
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 12:04:39.66
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 18-DEC-2019 12:47:40.18

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 01S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 01S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 01BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 02:06:53.02
End Channel : 4090 Pk Srch Sens: 7.00000 Live time : 0 02:06:29.39
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.45	873	3808	1.00	93.40	7.53E-01	1.15E-01	12.2	3.75E+00
2	1	88.03	16295	6174	0.91	176.45	7.74E+00	2.15E+00	1.2	9.74E-01
3	1	122.06	15462	5708	0.93	244.42	9.95E+00	2.04E+00	1.3	1.85E+00
4	1	136.46	1848	3995	0.93	273.18	1.00E+01	2.44E-01	6.6	4.08E-01
5	1	165.87	10934	4511	0.98	331.91	9.60E+00	1.44E+00	1.5	2.21E+00
6	1	255.13	773	3303	1.28	510.20	7.43E+00	1.02E-01	13.8	1.74E+00
7	1	279.18	3150	3109	1.14	558.24	6.94E+00	4.15E-01	3.6	2.14E+00
8	1	391.74	14953	3343	1.21	783.06	5.26E+00	1.97E+00	1.1	1.41E+00
9	1	513.99	8925	3061	1.24	1027.27	4.15E+00	1.18E+00	1.6	5.91E-01
10	1	661.59	36880	2841	1.41	1322.13	3.30E+00	4.86E+00	0.6	7.72E-01
11	1	813.93	273	1389	1.86	1626.49	2.71E+00	3.60E-02	26.0	2.58E+00
12	1	898.00	18696	2476	1.63	1794.47	2.46E+00	2.46E+00	0.9	1.34E+00
13	1	1173.24	27075	1426	1.85	2344.43	1.89E+00	3.57E+00	0.7	4.76E+00
14	1	1324.88	289	668	2.56	2647.44	1.68E+00	3.81E-02	19.9	7.84E-01
15	1	1332.54	24528	764	1.96	2662.75	1.67E+00	3.23E+00	0.7	2.70E+00
16	1	1835.98	10624	255	2.33	3668.96	1.29E+00	1.40E+00	1.0	4.72E+00

Spectrum : MCA0:[NDSCOUNT]TBE01$1
Calib Date: 26-DEC-2019 12:04
Detector :
Geometry : 01S25121819
Fit type : 5th Degree Empirical



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 12:05:42.41
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 18-DEC-2019 12:47:40.18

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 01S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 01S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 01BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 02:06:53.02
End Channel : 4090 Pk Srch Sens: 7.00000 Live time : 0 02:06:29.39
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.45	873	3808	1.00	93.40	7.53E-01	1.15E-01	12.2	3.75E+00
2	1	88.03	16295	6174	0.91	176.45	7.74E+00	2.15E+00	1.2	9.74E-01
3	1	122.06	15462	5708	0.93	244.42	9.95E+00	2.04E+00	1.3	1.85E+00
4	1	136.46	1848	3995	0.93	273.18	1.00E+01	2.44E-01	6.6	4.08E-01
5	1	165.87	10934	4511	0.98	331.91	9.60E+00	1.44E+00	1.5	2.21E+00
6	1	255.13	773	3303	1.28	510.20	7.43E+00	1.02E-01	13.8	1.74E+00
7	1	279.18	3150	3109	1.14	558.24	6.94E+00	4.15E-01	3.6	2.14E+00
8	1	391.74	14953	3343	1.21	783.06	5.26E+00	1.97E+00	1.1	1.41E+00
9	1	513.99	8925	3061	1.24	1027.27	4.15E+00	1.18E+00	1.6	5.91E-01
10	1	661.59	36880	2841	1.41	1322.13	3.30E+00	4.86E+00	0.6	7.72E-01
11	1	813.93	273	1389	1.86	1626.49	2.71E+00	3.60E-02	26.0	2.58E+00
12	1	898.00	18696	2476	1.63	1794.47	2.46E+00	2.46E+00	0.9	1.34E+00
13	1	1173.24	27075	1426	1.85	2344.43	1.89E+00	3.57E+00	0.7	4.76E+00
14	1	1324.88	289	668	2.56	2647.44	1.68E+00	3.81E-02	19.9	7.84E-01
15	1	1332.54	24528	764	1.96	2662.75	1.67E+00	3.23E+00	0.7	2.70E+00
16	1	1835.98	10624	255	2.33	3668.96	1.29E+00	1.40E+00	1.0	4.72E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	16295	3.72*	7.738E+00	7.459E+02	1.006E+03	2.45
03-CO57	122.06	15462	85.51*	9.946E+00	2.395E+01	3.997E+01	2.54
04-CE139	165.85	10934	80.35*	9.601E+00	1.867E+01	5.114E+01	3.07
05-HG203	279.20	3150	81.46*	6.936E+00	7.346E+00	1.439E+02	7.30
06-SN113	391.69	14953	64.90*	5.260E+00	5.771E+01	1.926E+02	2.29
07-SR85	513.99	8925	99.27*	4.152E+00	2.853E+01	2.422E+02	3.28
08-CS137	661.65	36880	85.12*	3.296E+00	1.732E+02	1.754E+02	1.22
09-Y88	898.02	18696	93.40*	2.458E+00	1.073E+02	3.938E+02	1.89
10-CO60	1173.22	27075	100.00	1.891E+00	1.887E+02	2.028E+02	1.38
	1332.49	24528	100.00*	1.674E+00	1.930E+02	2.074E+02	1.39
12-Y88	1836.01	10624	99.38*	1.287E+00	1.094E+02	4.016E+02	2.08

Flag: "*" = Keyline

Sample ID : 01S25121819 Acquisition date : 18-DEC-2019 12:47:40

Total number of lines in spectrum	16	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	11	68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.459E+02	1.006E+03	0.025E+03	2.45	
03-CO57	270.90D	1.67	2.395E+01	3.997E+01	0.101E+01	2.54	
04-CE139	137.66D	2.74	1.867E+01	5.114E+01	0.157E+01	3.07	
05-HG203	46.61D	19.6	7.346E+00	1.439E+02	0.105E+02	7.30	
06-SN113	115.10D	3.34	5.771E+01	1.926E+02	0.044E+02	2.29	
07-SR85	64.84D	8.49	2.853E+01	2.422E+02	0.079E+02	3.28	
08-CS137	30.17Y	1.01	1.732E+02	1.754E+02	0.021E+02	1.22	
09-Y88	106.65D	3.67	1.073E+02	3.938E+02	0.074E+02	1.89	
10-CO60	5.27Y	1.07	1.930E+02	2.074E+02	0.029E+02	1.39	
12-Y88	106.65D	3.67	1.094E+02	4.016E+02	0.084E+02	2.08	
			---------	---------			
	Total Activity :		1.465E+03	2.855E+03			
	Grand Total Activity :		1.465E+03	2.855E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 01S25121819 Acquisition date : 18-DEC-2019 12:47:40

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.45	873	3808	1.00	93.40	90	7	1.15E-01	24.3	7.53E-01	
1	136.46	1848	3995	0.93	273.18	269	9	2.44E-01	13.2	1.00E+01	
1	255.13	773	3303	1.28	510.20	506	9	1.02E-01	27.7	7.43E+00	
1	813.93	273	1389	1.86	1626.49	1622	10	3.60E-02	52.1	2.71E+00	
1	1324.88	289	668	2.56	2647.44	2641	14	3.81E-02	39.7	1.68E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	11	68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.459E+02	1.006E+03	0.025E+03	2.45	
03-CO57	270.90D	1.67	2.395E+01	3.997E+01	0.101E+01	2.54	
04-CE139	137.66D	2.74	1.867E+01	5.114E+01	0.157E+01	3.07	
05-HG203	46.61D	19.6	7.346E+00	1.439E+02	0.105E+02	7.30	
06-SN113	115.10D	3.34	5.771E+01	1.926E+02	0.044E+02	2.29	
07-SR85	64.84D	8.49	2.853E+01	2.422E+02	0.079E+02	3.28	
08-CS137	30.17Y	1.01	1.732E+02	1.754E+02	0.021E+02	1.22	
09-Y88	106.65D	3.67	1.073E+02	3.938E+02	0.074E+02	1.89	
10-CO60	5.27Y	1.07	1.908E+02	2.051E+02	0.020E+02	0.98	
12-Y88	106.65D	3.67	1.094E+02	4.016E+02	0.084E+02	2.08	
	Total Activity :		1.463E+03	2.852E+03			

Grand Total Activity : 1.463E+03 2.852E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.006E+03	2.464E+01	1.546E+01	0.000E+00	65.101
03-CO57	3.997E+01	1.014E+00	6.132E-01	0.000E+00	65.179
04-CE139	5.114E+01	1.570E+00	1.070E+00	0.000E+00	47.778
05-HG203	1.439E+02	1.051E+01	1.033E+01	0.000E+00	13.933
06-SN113	1.926E+02	4.407E+00	2.722E+00	0.000E+00	70.732

07-SR85	2.422E+02	7.940E+00	5.671E+00	0.000E+00	42.717
08-CS137	1.754E+02	2.138E+00	8.972E-01	0.000E+00	195.463
09-Y88	3.938E+02	7.444E+00	3.952E+00	0.000E+00	99.670
10-CO60	2.051E+02	2.007E+00	8.230E-01	0.000E+00	249.140
12-Y88	4.016E+02	8.365E+00	2.259E+00	0.000E+00	177.763

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	-5.914E-01		1.827E+00	2.908E+00	0.000E+00	-0.203

```
A,01S25121819     ,12/26/2019 12:05,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,01S25121819     ,CALIBRATION         ,12/26/2019 12:04,01S25121819
C,02-CD109,YES,   1.006E+03,   2.464E+01,   1.546E+01,,   65.101
C,03-CO57 ,YES,   3.997E+01,   1.014E+00,   6.132E-01,,   65.179
C,04-CE139,YES,   5.114E+01,   1.570E+00,   1.070E+00,,   47.778
C,05-HG203,YES,   1.439E+02,   1.051E+01,   1.033E+01,,   13.933
C,06-SN113,YES,   1.926E+02,   4.407E+00,   2.722E+00,,   70.732
C,07-SR85 ,YES,   2.422E+02,   7.940E+00,   5.671E+00,,   42.717
C,08-CS137,YES,   1.754E+02,   2.138E+00,   8.972E-01,,  195.463
C,09-Y88  ,YES,   3.938E+02,   7.444E+00,   3.952E+00,,   99.670
C,10-CO60 ,YES,   2.051E+02,   2.007E+00,   8.230E-01,,  249.140
C,12-Y88  ,YES,   4.016E+02,   8.365E+00,   2.259E+00,,  177.763
C,01-AM241,NO ,  -5.914E-01,   1.827E+00,   2.908E+00,,   -0.203
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1003.0	-0.36%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.5	1.56%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	50.0	-1.83%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	149.2	-4.39%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	192.7	1.09%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	239.1	-2.81%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	175.3	2.15%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	395.1	-2.74%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	206.2	1.37%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	204.0	0.17%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	402.5	-0.30%

Eff. Name: **02S25121819**

Analyst: KOJ

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 15:31:26.63
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 18-DEC-2019 18:27:24.76

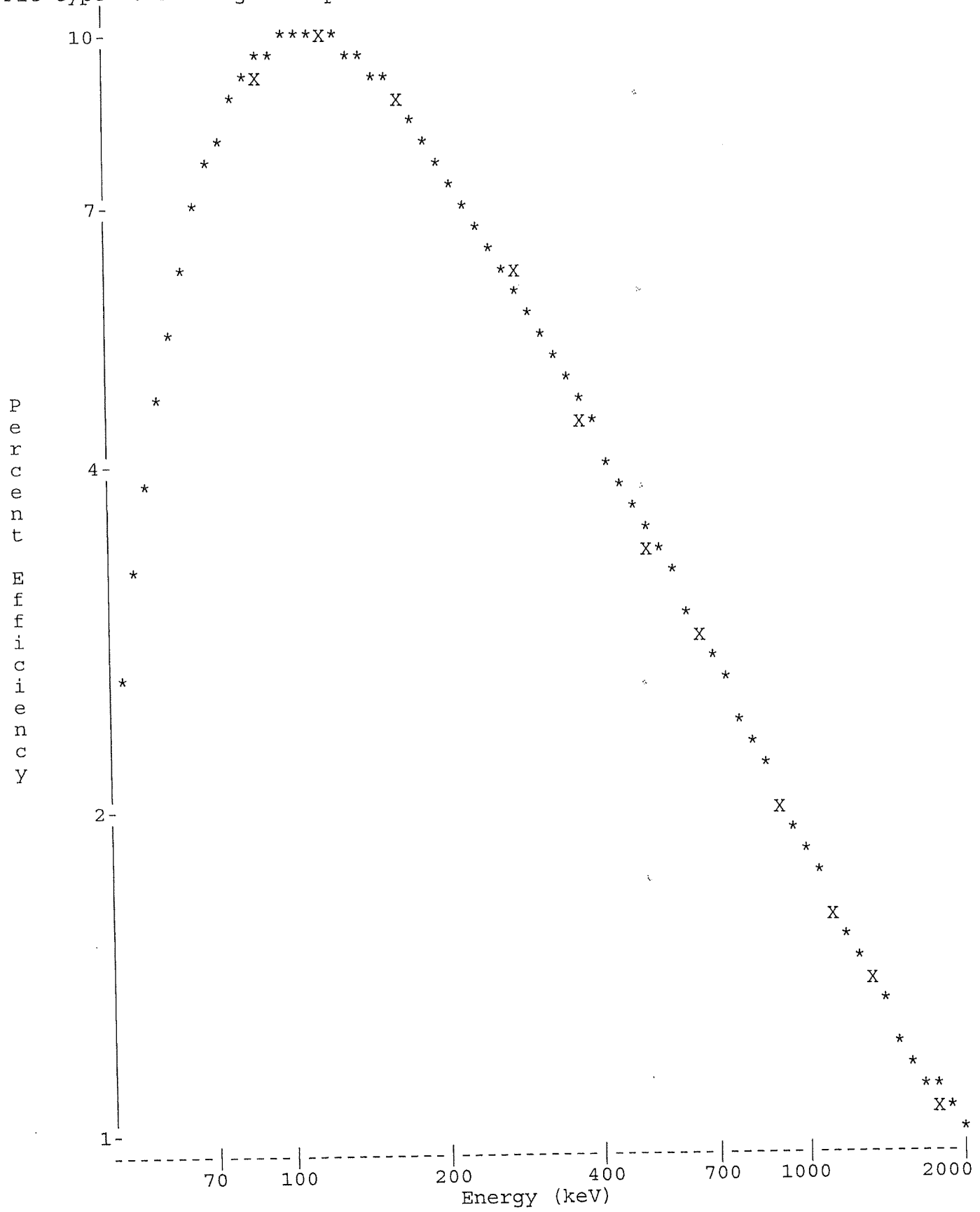
LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 02S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 02S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 02BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 04:00:55.90
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 04:00:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	88.00	37891	11475	0.91	160.79	9.51E+00	2.63E+00	0.8	
2	0	122.02	30362	9762	0.98	229.23	1.02E+01	2.11E+00	0.9	
3	0	136.42	3890	6454	1.03	258.18	9.85E+00	2.70E-01	4.1	
4	0	165.86	18919	7972	1.06	317.42	8.96E+00	1.31E+00	1.2	
5	0	255.18	1383	5277	1.23	497.07	6.55E+00	9.60E-02	9.9	
6	0	279.23	5403	5694	1.14	545.46	6.07E+00	3.75E-01	3.0	
7	0	391.70	24333	5851	1.20	771.69	4.52E+00	1.69E+00	0.9	
8	0	514.06	14116	4868	1.28	1017.85	3.52E+00	9.80E-01	1.3	
9	0	661.65	58552	5074	1.46	1314.80	2.76E+00	4.07E+00	0.5	
10	0	814.01	328	2126	1.39	1621.33	2.25E+00	2.28E-02	25.9	
11	0	898.02	29394	4236	1.63	1790.38	2.03E+00	2.04E+00	0.8	
12	0	1173.19	42934	2084	1.83	2344.08	1.55E+00	2.98E+00	0.5	
13	0	1332.45	37534	1525	1.96	2664.60	1.37E+00	2.61E+00	0.6	
14	0	1836.03	16498	472	2.27	3678.18	1.05E+00	1.15E+00	0.9	

Spectrum : MCA0:[NDSCOUNT]TBE02$1
Calib Date: 26-DEC-2019 15:31
Detector :
Fit type : 5th Degree Empirical

Geometry : 02S25121819



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 15:32:31.22
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 18-DEC-2019 18:27:24.76

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 02S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 02S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 02BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 04:00:55.90
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 04:00:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	88.00*	37869	11475	0.91	160.79	9.51E+00	2.63E+00	0.8	
2	0	122.02	30362	9762	0.98	229.23	1.02E+01	2.11E+00	0.9	
3	0	136.42	3890	6454	1.03	258.18	9.85E+00	2.70E-01	4.1	
4	0	165.86	18919	7972	1.06	317.42	8.96E+00	1.31E+00	1.2	
5	0	255.18	1383	5277	1.23	497.07	6.55E+00	9.60E-02	9.9	
6	0	279.23	5403	5694	1.14	545.46	6.07E+00	3.75E-01	3.0	
7	0	391.70	24333	5851	1.20	771.69	4.52E+00	1.69E+00	0.9	
8	0	514.06	14116	4868	1.28	1017.85	3.52E+00	9.80E-01	1.3	
9	0	661.65	58552	5074	1.46	1314.80	2.76E+00	4.07E+00	0.5	
10	0	814.01	328	2126	1.39	1621.33	2.25E+00	2.28E-02	25.9	
11	0	898.02	29394	4236	1.63	1790.38	2.03E+00	2.04E+00	0.8	
12	0	1173.19	42934	2084	1.83	2344.08	1.55E+00	2.98E+00	0.5	
13	0	1332.45	37534	1525	1.96	2664.60	1.37E+00	2.61E+00	0.6	
14	0	1836.03	16498	472	2.27	3678.18	1.05E+00	1.15E+00	0.9	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	37869	3.72*	9.511E+00	7.433E+02	1.003E+03	1.51
03-CO57	122.06	30362	85.51*	1.015E+01	2.428E+01	4.054E+01	1.74
04-CE139	165.85	18919	80.35*	8.962E+00	1.824E+01	5.003E+01	2.34
05-HG203	279.20	5403	81.46*	6.074E+00	7.583E+00	1.492E+02	5.90
06-SN113	391.69	24333	64.90*	4.516E+00	5.766E+01	1.927E+02	1.82
07-SR85	513.99	14116	99.27*	3.516E+00	2.809E+01	2.391E+02	2.63
08-CS137	661.65	58552	85.12*	2.760E+00	1.731E+02	1.753E+02	0.99
09-Y88	898.02	29394	93.40*	2.034E+00	1.074E+02	3.951E+02	1.53
10-CO60	1173.22	42934	100.00	1.554E+00	1.919E+02	2.062E+02	1.08
	1332.49	37534	100.00*	1.374E+00	1.898E+02	2.040E+02	1.14
12-Y88	1836.01	16498	99.38*	1.053E+00	1.095E+02	4.025E+02	1.70

Flag: "*" = Keyline

Sample ID : 02S25121819 Acquisition date : 18-DEC-2019 18:27:24

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.433E+02	1.003E+03	0.015E+03	1.51	
03-CO57	270.90D	1.67	2.428E+01	4.054E+01	0.070E+01	1.74	
04-CE139	137.66D	2.74	1.824E+01	5.003E+01	0.117E+01	2.34	
05-HG203	46.61D	19.7	7.583E+00	1.492E+02	0.088E+02	5.90	
06-SN113	115.10D	3.34	5.766E+01	1.927E+02	0.035E+02	1.82	
07-SR85	64.84D	8.51	2.809E+01	2.391E+02	0.063E+02	2.63	
08-CS137	30.17Y	1.01	1.731E+02	1.753E+02	0.017E+02	0.99	
09-Y88	106.65D	3.68	1.074E+02	3.951E+02	0.060E+02	1.53	
10-CO60	5.27Y	1.07	1.898E+02	2.040E+02	0.023E+02	1.14	
12-Y88	106.65D	3.68	1.095E+02	4.025E+02	0.069E+02	1.70	
	Total Activity :		1.459E+03	2.852E+03			

Grand Total Activity : 1.459E+03 2.852E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines
Sample ID : 02S25121819 Acquisition date : 18-DEC-2019 18:27:24

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	136.42	3890	6454	1.03	258.18	254	9	2.70E-01	8.1	9.85E+00	
0	255.18	1383	5277	1.23	497.07	493	9	9.60E-02	19.7	6.55E+00	
0	814.01	328	2126	1.39	1621.33	1618	9	2.28E-02	51.8	2.25E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.433E+02	1.003E+03	0.015E+03	1.51	
03-CO57	270.90D	1.67	2.428E+01	4.054E+01	0.070E+01	1.74	
04-CE139	137.66D	2.74	1.824E+01	5.003E+01	0.117E+01	2.34	
05-HG203	46.61D	19.7	7.583E+00	1.492E+02	0.088E+02	5.90	
06-SN113	115.10D	3.34	5.766E+01	1.927E+02	0.035E+02	1.82	
07-SR85	64.84D	8.51	2.809E+01	2.391E+02	0.063E+02	2.63	
08-CS137	30.17Y	1.01	1.731E+02	1.753E+02	0.017E+02	0.99	
09-Y88	106.65D	3.68	1.074E+02	3.951E+02	0.060E+02	1.53	
10-CO60	5.27Y	1.07	1.909E+02	2.051E+02	0.016E+02	0.78	
12-Y88	106.65D	3.68	1.095E+02	4.025E+02	0.069E+02	1.70	
	Total Activity :		1.460E+03	2.853E+03			

Grand Total Activity : 1.460E+03 2.853E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.003E+03	1.518E+01	9.288E+00	0.000E+00	108.029
03-CO57	4.054E+01	7.037E-01	4.185E-01	0.000E+00	96.891
04-CE139	5.003E+01	1.169E+00	8.113E-01	0.000E+00	61.669
05-HG203	1.492E+02	8.804E+00	8.128E+00	0.000E+00	18.357
06-SN113	1.927E+02	3.513E+00	2.198E+00	0.000E+00	87.654
07-SR85	2.391E+02	6.279E+00	4.569E+00	0.000E+00	52.341
08-CS137	1.753E+02	1.735E+00	7.369E-01	0.000E+00	237.891

09-Y88	3.951E+02	6.045E+00	3.245E+00	0.000E+00	121.744
10-CO60	2.051E+02	1.607E+00	8.533E-01	0.000E+00	240.402
12-Y88	4.025E+02	6.851E+00	1.857E+00	0.000E+00	216.801

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	-5.736E-01		7.199E-01	1.117E+00	0.000E+00	-0.513

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A,02S25121819     ,12/26/2019 15:32,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,02S25121819     ,CALIBRATION         ,12/26/2019 15:31,02S25121819
C,02-CD109,YES,   1.003E+03,   1.518E+01,   9.288E+00,,  108.029
C,03-CO57 ,YES,   4.054E+01,   7.037E-01,   4.185E-01,,   96.891
C,04-CE139,YES,   5.003E+01,   1.169E+00,   8.113E-01,,   61.669
C,05-HG203,YES,   1.492E+02,   8.804E+00,   8.128E+00,,   18.357
C,06-SN113,YES,   1.927E+02,   3.513E+00,   2.198E+00,,   87.654
C,07-SR85 ,YES,   2.391E+02,   6.279E+00,   4.569E+00,,   52.341
C,08-CS137,YES,   1.753E+02,   1.735E+00,   7.369E-01,,  237.891
C,09-Y88  ,YES,   3.951E+02,   6.045E+00,   3.245E+00,,  121.744
C,10-CO60 ,YES,   2.051E+02,   1.607E+00,   8.533E-01,,  240.402
C,12-Y88  ,YES,   4.025E+02,   6.851E+00,   1.857E+00,,  216.801
C,01-AM241,NO ,  -5.736E-01,   7.199E-01,   1.117E+00,,   -0.513
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Pb-210	22.26Y	46.6	72.1		4.18%	762.12	31.86		
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1009.0	0.24%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.0	0.29%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	50.8	-0.32%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62		
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	190.1	-0.28%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08		
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	173.6	1.16%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	396.4	-2.42%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	203.4	-0.01%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	205.4	0.86%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	401.9	-0.44%

Eff. Name: **06S25031921**

Analyst: KOJ

Analyst:

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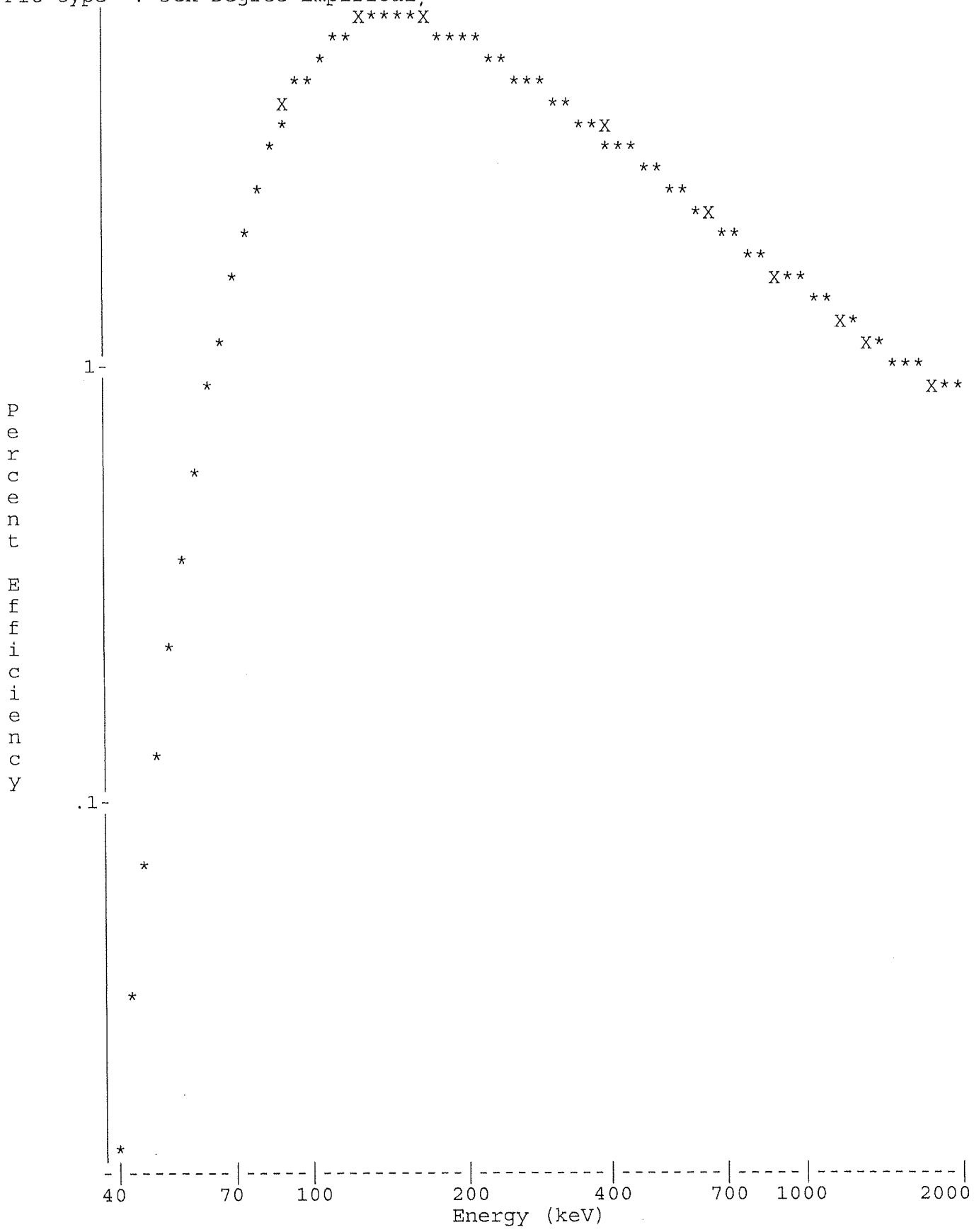
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 22-MAR-2021 07:40:38.83
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 19-MAR-2021 14:45:58.43

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 06S25031921 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 06S25031921
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 80 Energy Tol : 2.00000 Real Time : 2 16:43:37.11
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 2 16:39:12.77
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.49	1952	34584	0.92	93.80	9.94E-02	8.39E-03	14.5	
2	0	74.78	1441	47490	0.94	150.37	2.39E+00	6.19E-03	25.2	
3	0	88.01	128267	68527	0.97	176.82	3.94E+00	5.51E-01	0.5	
4	0	122.05	92059	59957	0.99	244.90	6.23E+00	3.96E-01	0.6	
5	0	136.44	11811	51850	1.00	273.67	6.50E+00	5.07E-02	3.6	
6	0	165.86	22108	55027	1.10	332.52	6.41E+00	9.50E-02	2.1	
7	0	391.75	19042	41769	1.19	784.24	3.50E+00	8.18E-02	2.1	
8	0	510.77	4028	39854	2.05	1022.23	2.78E+00	1.73E-02	9.7	
9	0	609.07	1127	19831	1.79	1218.80	2.38E+00	4.84E-03	21.8	
10	0	661.61	730914	38504	1.41	1323.85	2.21E+00	3.14E+00	0.1	
11	0	898.04	19946	33401	1.55	1796.59	1.67E+00	8.57E-02	2.0	
12	0	1173.20	485697	20164	1.69	2346.73	1.30E+00	2.09E+00	0.2	
13	0	1332.49	437484	6704	1.77	2665.19	1.16E+00	1.88E+00	0.2	
14	0	1460.73	1780	2060	2.03	2921.57	1.07E+00	7.65E-03	5.8	
15	0	1836.01	11866	1676	2.05	3671.75	9.22E-01	5.10E-02	1.2	

Spectrum : MCA0:[NDSCOUNT]TBE06$1
Calib Date: 22-MAR-2021 07:40
Detector :
Geometry : 06S25031921
Fit type : 5th Degree Empirical,



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 22-MAR-2021 07:41:45.73
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 19-MAR-2021 14:45:58.43

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 06S25031921 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 06S25031921
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 80 Energy Tol : 2.00000 Real Time : 2 16:43:37.11
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 2 16:39:12.77
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.49	1952	34584	0.92	93.80	9.94E-02	8.39E-03	14.5	
2	0	74.78	1441	47490	0.94	150.37	2.39E+00	6.19E-03	25.2	
3	0	88.01	128267	68527	0.97	176.82	3.94E+00	5.51E-01	0.5	
4	0	122.05	92059	59957	0.99	244.90	6.23E+00	3.96E-01	0.6	
5	0	136.44	11811	51850	1.00	273.67	6.50E+00	5.07E-02	3.6	
6	0	165.86	22108	55027	1.10	332.52	6.41E+00	9.50E-02	2.1	
7	0	391.75	19042	41769	1.19	784.24	3.50E+00	8.18E-02	2.1	
8	0	510.77	4028	39854	2.05	1022.23	2.78E+00	1.73E-02	9.7	
9	0	609.07	1127	19831	1.79	1218.80	2.38E+00	4.84E-03	21.8	
10	0	661.61	730914	38504	1.41	1323.85	2.21E+00	3.14E+00	0.1	
11	0	898.04	19946	33401	1.55	1796.59	1.67E+00	8.57E-02	2.0	
12	0	1173.20	485697	20164	1.69	2346.73	1.30E+00	2.09E+00	0.2	
13	0	1332.49	437484	6704	1.77	2665.19	1.16E+00	1.88E+00	0.2	
14	0	1460.73	1780	2060	2.03	2921.57	1.07E+00	7.65E-03	5.8	
15	0	1836.01	11866	1676	2.05	3671.75	9.22E-01	5.10E-02	1.2	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	128267	3.72*	3.936E+00	3.764E+02	1.009E+03	0.95
03-CO57	122.06	92059	85.51*	6.230E+00	7.425E+00	4.003E+01	1.19
04-CE139	165.85	22108	80.35*	6.407E+00	1.845E+00	5.080E+01	4.19
06-SN113	391.69	19042	64.90*	3.498E+00	3.604E+00	1.901E+02	4.13
08-CS137	661.65	730914	85.12*	2.215E+00	1.666E+02	1.736E+02	0.26
09-Y88	898.02	19946	93.40*	1.671E+00	5.490E+00	3.964E+02	3.93
10-CO60	1173.22	485697	100.00	1.301E+00	1.604E+02	2.034E+02	0.32
	1332.49	437484	100.00*	1.160E+00	1.620E+02	2.054E+02	0.31
12-Y88	1836.01	11866	99.38*	9.216E-01	5.566E+00	4.019E+02	2.47

Flag: "*" = Keyline

Sample ID : 06S25031921 Acquisition date : 19-MAR-2021 14:45:58

Total number of lines in spectrum 15
Number of unidentified lines 6
Number of lines tentatively identified by NID 9 60.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	2.68	3.764E+02	1.009E+03	0.001E+04	0.95	
03-CO57	270.90D	5.39	7.425E+00	4.003E+01	0.048E+01	1.19	
04-CE139	137.66D	27.5	1.845E+00	5.080E+01	0.213E+01	4.19	
06-SN113	115.10D	52.7	3.604E+00	1.901E+02	0.079E+02	4.13	
08-CS137	30.17Y	1.04	1.666E+02	1.736E+02	0.005E+02	0.26	
09-Y88	106.65D	72.2	5.490E+00	3.964E+02	0.156E+02	3.93	
10-CO60	5.27Y	1.27	1.620E+02	2.054E+02	0.006E+02	0.31	
12-Y88	106.65D	72.2	5.566E+00	4.019E+02	0.099E+02	2.47	
	Total Activity :		7.289E+02	2.467E+03			

Grand Total Activity : 7.289E+02 2.467E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 06S25031921 Acquisition date : 19-MAR-2021 14:45:58

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.49	1952	34584	0.92	93.80	92	5	8.39E-03	29.0	9.94E-02	
0	74.78	1441	47490	0.94	150.37	148	7	6.19E-03	50.4	2.39E+00	
0	136.44	11811	51850	1.00	273.67	270	9	5.07E-02	7.2	6.50E+00	
0	510.77	4028	39854	2.05	1022.23	1017	11	1.73E-02	19.4	2.78E+00	
0	609.07	1127	19831	1.79	1218.80	1216	8	4.84E-03	43.6	2.38E+00	
0	1460.73	1780	2060	2.03	2921.57	2915	13	7.65E-03	11.5	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	9	60.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	2.68	3.764E+02	1.009E+03	0.001E+04	0.95	
03-CO57	270.90D	5.39	7.425E+00	4.003E+01	0.048E+01	1.19	
04-CE139	137.66D	27.5	1.845E+00	5.080E+01	0.213E+01	4.19	
06-SN113	115.10D	52.7	3.604E+00	1.901E+02	0.079E+02	4.13	
08-CS137	30.17Y	1.04	1.666E+02	1.736E+02	0.005E+02	0.26	
09-Y88	106.65D	72.2	5.490E+00	3.964E+02	0.156E+02	3.93	
10-CO60	5.27Y	1.27	1.620E+02	2.054E+02	0.006E+02	0.31	
12-Y88	106.65D	72.2	5.566E+00	4.019E+02	0.099E+02	2.47	
	Total Activity :		7.289E+02	2.467E+03			

Grand Total Activity : 7.289E+02 2.467E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.009E+03	9.567E+00	7.229E+00	0.000E+00	139.569
03-CO57	4.003E+01	4.783E-01	3.829E-01	0.000E+00	104.556
04-CE139	5.080E+01	2.131E+00	1.982E+00	0.000E+00	25.632
06-SN113	1.901E+02	7.858E+00	8.714E+00	0.000E+00	21.813
08-CS137	1.736E+02	4.566E-01	1.586E-01	0.000E+00	1094.419
09-Y88	3.964E+02	1.558E+01	1.503E+01	0.000E+00	26.383

10-CO60	2.054E+02	6.469E-01	1.376E-01	0.000E+00	1492.376
12-Y88	4.019E+02	9.945E+00	5.425E+00	0.000E+00	74.088

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	7.460E-02		7.931E-01	1.344E+00	0.000E+00	0.056
05-HG203	2.768E+02		1.141E+03	1.805E+03	0.000E+00	0.153
07-SR85	4.560E+02		9.668E+01	1.427E+02	0.000E+00	3.195

```
A,06S25031921     ,03/22/2021 07:41,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,06S25031921     ,CALIBRATION         ,03/22/2021 07:40,06S25031921
C,02-CD109,YES,   1.009E+03,   9.567E+00,   7.229E+00,,  139.569
C,03-CO57 ,YES,   4.003E+01,   4.783E-01,   3.829E-01,,  104.556
C,04-CE139,YES,   5.080E+01,   2.131E+00,   1.982E+00,,   25.632
C,06-SN113,YES,   1.901E+02,   7.858E+00,   8.714E+00,,   21.813
C,08-CS137,YES,   1.736E+02,   4.566E-01,   1.586E-01,, 1094.419
C,09-Y88  ,YES,   3.964E+02,   1.558E+01,   1.503E+01,,   26.383
C,10-CO60 ,YES,   2.054E+02,   6.469E-01,   1.376E-01,, 1492.376
C,12-Y88  ,YES,   4.019E+02,   9.945E+00,   5.425E+00,,   74.088
C,01-AM241,NO ,   7.460E-02,   7.931E-01,   1.344E+00,,    0.056
C,05-HG203,NO ,   2.768E+02,   1.141E+03,   1.805E+03,,    0.153
C,07-SR85 ,NO ,   4.560E+02,   9.668E+01,   1.427E+02,,    3.195
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S50 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Pb-210	22.26Y	46.6	72.1		4.18%	762.12	31.86		
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1008.0	0.14%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	39.9	0.01%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	51.0	0.15%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62		
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	188.9	-0.90%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08		
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	174.9	1.92%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	391.6	-3.60%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	204.2	0.38%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	205.1	0.71%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	401.9	-0.44%

Eff. Name: **06S50031621**

Analyst: KOJ

Analyst:

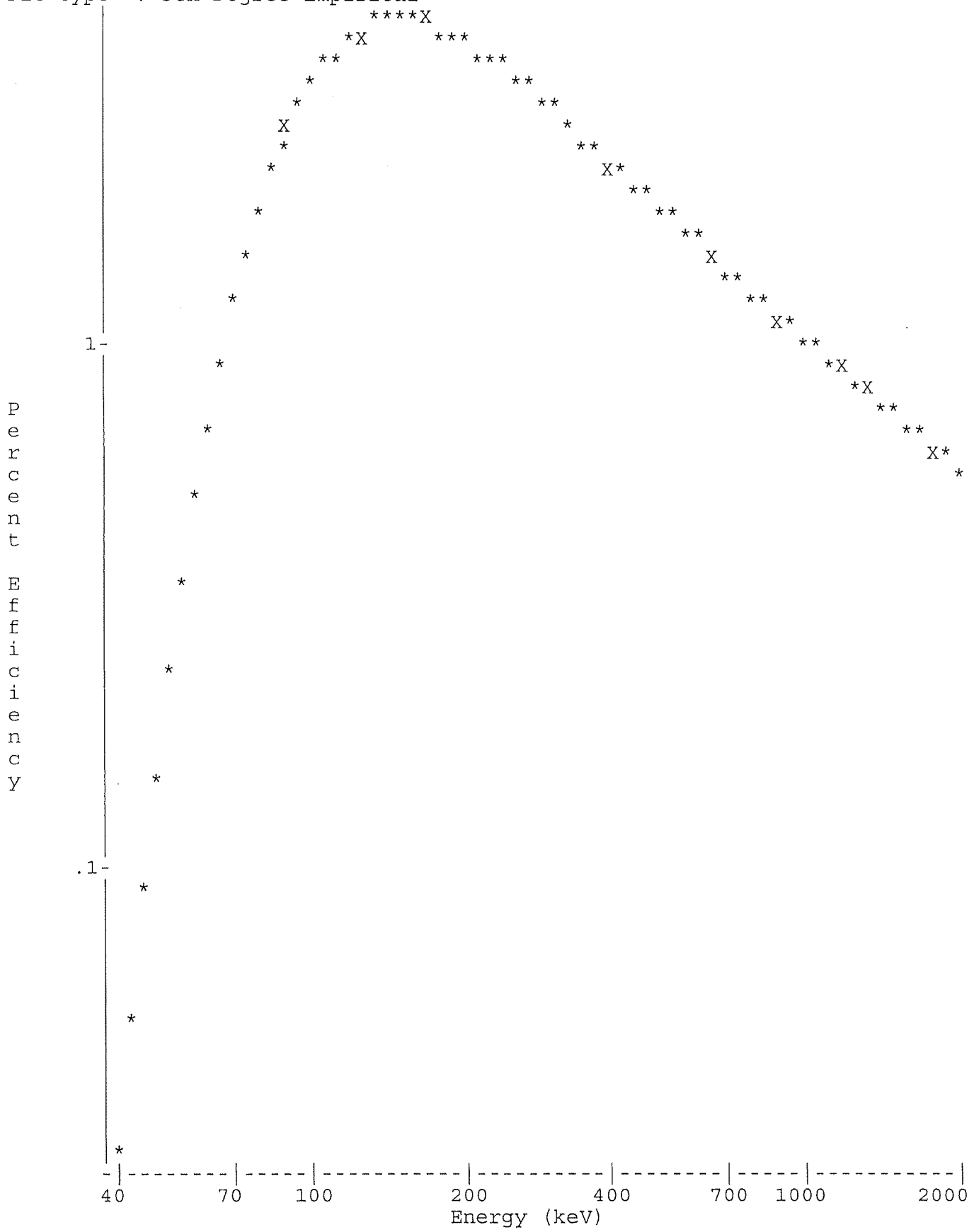
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 22-MAR-2021 09:44:01.72
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 16-MAR-2021 08:49:41.57

LIMS No., Customer Name, Client ID: S50 5ML MIXED GAMMA CALIBRATION

Sample ID : 06S50031621 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 06S50031621
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 80 Energy Tol : 2.00000 Real Time : 3 07:08:03.15
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 3 07:04:03.86
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.48	1992	42775	1.15	93.77	1.26E-01	7.00E-03	17.4	
2	0	74.90	1912	30566	1.00	150.61	1.68E+00	6.72E-03	13.9	
3	10	85.40	6727	89463	2.43	171.60	2.42E+00	2.36E-02	10.8	1.56E+01
4	10	88.01	103303	34137	0.96	176.82	2.58E+00	3.63E-01	0.4	
5	0	122.04	72172	54617	0.98	244.87	3.97E+00	2.54E-01	0.7	
6	0	136.46	9186	41242	1.06	273.70	4.17E+00	3.23E-02	4.0	
7	0	165.87	17944	44649	1.12	332.51	4.17E+00	6.30E-02	2.3	
8	0	185.73	1831	37630	1.36	372.23	4.02E+00	6.43E-03	17.7	
9	0	391.74	15588	36578	1.25	784.15	2.31E+00	5.48E-02	2.4	
10	0	510.95	5205	35452	2.11	1022.50	1.83E+00	1.83E-02	7.1	
11	0	661.63	594880	31745	1.41	1323.77	1.46E+00	2.09E+00	0.1	
12	0	898.00	16557	26885	1.57	1796.35	1.13E+00	5.82E-02	2.1	
13	0	1173.22	412497	19014	1.73	2346.57	8.99E-01	1.45E+00	0.2	
14	0	1332.51	372411	5543	1.78	2665.00	8.08E-01	1.31E+00	0.2	
15	0	1460.90	2381	1616	2.06	2921.67	7.48E-01	8.37E-03	4.0	
16	0	1764.40	424	1111	1.61	3528.32	6.43E-01	1.49E-03	17.4	
17	0	1836.00	10002	1215	2.07	3671.44	6.23E-01	3.51E-02	1.3	

Spectrum : MCA0:[NDSCOUNT]TBE06$1
Calib Date: 22-MAR-2021 09:44
Detector :
Geometry : 06S50031621
Fit type : 5th Degree Empirical



Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 22-MAR-2021 09:48:13.84
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 16-MAR-2021 08:49:41.57

LIMS No., Customer Name, Client ID: S50 5ML MIXED GAMMA CALIBRATION

Sample ID : 06S50031621 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 06S50031621
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 80 Energy Tol : 2.00000 Real Time : 3 07:08:03.15
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 3 07:04:03.86
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.48	1992	42775	1.15	93.77	1.26E-01	7.00E-03	17.4	
2	0	74.90	1912	30566	1.00	150.61	1.68E+00	6.72E-03	13.9	
3	10	85.40	6727	89463	2.43	171.60	2.42E+00	2.36E-02	10.8	1.56E+01
4	10	88.01	103303	34137	0.96	176.82	2.58E+00	3.63E-01	0.4	
5	0	122.04	72172	54617	0.98	244.87	3.97E+00	2.54E-01	0.7	
6	0	136.46	9186	41242	1.06	273.70	4.17E+00	3.23E-02	4.0	
7	0	165.87	17944	44649	1.12	332.51	4.17E+00	6.30E-02	2.3	
8	0	185.73	1831	37630	1.36	372.23	4.02E+00	6.43E-03	17.7	
9	0	391.74	15588	36578	1.25	784.15	2.31E+00	5.48E-02	2.4	
10	0	510.95	5205	35452	2.11	1022.50	1.83E+00	1.83E-02	7.1	
11	0	661.63	594880	31745	1.41	1323.77	1.46E+00	2.09E+00	0.1	
12	0	898.00	16557	26885	1.57	1796.35	1.13E+00	5.82E-02	2.1	
13	0	1173.22	412497	19014	1.73	2346.57	8.99E-01	1.45E+00	0.2	
14	0	1332.51	372411	5543	1.78	2665.00	8.08E-01	1.31E+00	0.2	
15	0	1460.90	2381	1616	2.06	2921.67	7.48E-01	8.37E-03	4.0	
16	0	1764.40	424	1111	1.61	3528.32	6.43E-01	1.49E-03	17.4	
17	0	1836.00	10002	1215	2.07	3671.44	6.23E-01	3.51E-02	1.3	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	103303	3.72*	2.584E+00	3.775E+02	1.008E+03	0.85
03-CO57	122.06	72172	85.51*	3.975E+00	7.460E+00	3.992E+01	1.42
04-CE139	165.85	17944	80.35*	4.170E+00	1.881E+00	5.104E+01	4.50
06-SN113	391.69	15588	64.90*	2.315E+00	3.646E+00	1.889E+02	4.71
08-CS137	661.65	594880	85.12*	1.463E+00	1.679E+02	1.749E+02	0.29
09-Y88	898.02	16557	93.40*	1.127E+00	5.528E+00	3.916E+02	4.14
10-CO60	1173.22	412497	100.00	8.986E-01	1.613E+02	2.042E+02	0.35
	1332.49	372411	100.00*	8.076E-01	1.620E+02	2.051E+02	0.34
12-Y88	1836.01	10002	99.38*	6.232E-01	5.674E+00	4.019E+02	2.54

Flag: "*" = Keyline

Sample ID : 06S50031621 Acquisition date : 16-MAR-2021 08:49:41

Total number of lines in spectrum 17
Number of unidentified lines 8
Number of lines tentatively identified by NID 9 52.94%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	2.67	3.775E+02	1.008E+03	0.009E+03	0.85	
03-CO57	270.90D	5.35	7.460E+00	3.992E+01	0.057E+01	1.42	
04-CE139	137.66D	27.1	1.881E+00	5.104E+01	0.230E+01	4.50	
06-SN113	115.10D	51.8	3.646E+00	1.889E+02	0.089E+02	4.71	
08-CS137	30.17Y	1.04	1.679E+02	1.749E+02	0.005E+02	0.29	
09-Y88	106.65D	70.8	5.528E+00	3.916E+02	0.162E+02	4.14	
10-CO60	5.27Y	1.27	1.620E+02	2.051E+02	0.007E+02	0.34	
12-Y88	106.65D	70.8	5.674E+00	4.019E+02	0.102E+02	2.54	
	Total Activity :		7.316E+02	2.461E+03			
	Grand Total Activity :		7.316E+02	2.461E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 06S50031621 Acquisition date : 16-MAR-2021 08:49:41

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.48	1992	42775	1.15	93.77	91	7	7.00E-03	34.7	1.26E-01	
0	74.90	1912	30566	1.00	150.61	149	5	6.72E-03	27.8	1.68E+00	
10	85.40	6727	89463	2.43	171.60	164	18	2.36E-02	21.6	2.42E+00	
0	136.46	9186	41242	1.06	273.70	270	8	3.23E-02	7.9	4.17E+00	
0	185.73	1831	37630	1.36	372.23	370	7	6.43E-03	35.4	4.02E+00	
0	510.95	5205	35452	2.11	1022.50	1017	11	1.83E-02	14.3	1.83E+00	
0	1460.90	2381	1616	2.06	2921.67	2915	13	8.37E-03	8.1	7.48E-01	
0	1764.40	424	1111	1.61	3528.32	3522	14	1.49E-03	34.7	6.43E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	17	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	9	52.94%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	2.67	3.775E+02	1.008E+03	0.009E+03	0.85	
03-CO57	270.90D	5.35	7.460E+00	3.992E+01	0.057E+01	1.42	
04-CE139	137.66D	27.1	1.881E+00	5.104E+01	0.230E+01	4.50	
06-SN113	115.10D	51.8	3.646E+00	1.889E+02	0.089E+02	4.71	
08-CS137	30.17Y	1.04	1.679E+02	1.749E+02	0.005E+02	0.29	
09-Y88	106.65D	70.8	5.528E+00	3.916E+02	0.162E+02	4.14	
10-CO60	5.27Y	1.27	1.616E+02	2.047E+02	0.005E+02	0.24	
12-Y88	106.65D	70.8	5.674E+00	4.019E+02	0.102E+02	2.54	
	Total Activity :		7.312E+02	2.460E+03			

Grand Total Activity : 7.312E+02 2.460E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.008E+03	8.546E+00	8.191E+00	0.000E+00	123.002
03-CO57	3.992E+01	5.681E-01	4.654E-01	0.000E+00	85.778
04-CE139	5.104E+01	2.299E+00	2.363E+00	0.000E+00	21.597
06-SN113	1.889E+02	8.890E+00	9.893E+00	0.000E+00	19.094

08-CS137	1.749E+02	5.077E-01	1.849E-01	0.000E+00	946.222
09-Y88	3.916E+02	1.620E+01	1.675E+01	0.000E+00	23.380
10-CO60	2.047E+02	5.012E-01	1.475E-01	0.000E+00	1387.846
12-Y88	4.019E+02	1.019E+01	5.711E+00	0.000E+00	70.369

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	-4.434E-01		7.290E-01	1.230E+00	0.000E+00	-0.360
05-HG203	6.524E+02		1.179E+03	2.003E+03	0.000E+00	0.326
07-SR85	5.684E+02		1.104E+02	1.632E+02	0.000E+00	3.483

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A,06S50031621     ,03/22/2021 09:48,06/01/2019 12:00,   1.000E+00,S50 5ML MIXED
B,06S50031621     ,CALIBRATION         ,03/22/2021 09:44,06S50031621
C,02-CD109,YES,   1.008E+03,   8.546E+00,   8.191E+00,,  123.002
C,03-CO57 ,YES,   3.992E+01,   5.681E-01,   4.654E-01,,   85.778
C,04-CE139,YES,   5.104E+01,   2.299E+00,   2.363E+00,,   21.597
C,06-SN113,YES,   1.889E+02,   8.890E+00,   9.893E+00,,   19.094
C,08-CS137,YES,   1.749E+02,   5.077E-01,   1.849E-01,,  946.222
C,09-Y88  ,YES,   3.916E+02,   1.620E+01,   1.675E+01,,   23.380
C,10-CO60 ,YES,   2.047E+02,   5.012E-01,   1.475E-01,, 1387.846
C,12-Y88  ,YES,   4.019E+02,   1.019E+01,   5.711E+00,,   70.369
C,01-AM241,NO ,  -4.434E-01,   7.290E-01,   1.230E+00,,   -0.360
C,05-HG203,NO ,   6.524E+02,   1.179E+03,   2.003E+03,,    0.326
C,07-SR85 ,NO ,   5.684E+02,   1.104E+02,   1.632E+02,,    3.483
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E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1005.0	-0.16%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.0	0.14%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	50.9	-0.05%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	143.3	-8.17%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	191.3	0.35%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	247.8	0.72%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	173.9	1.34%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	390.3	-3.92%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	204.9	0.73%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	207.6	1.94%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	401.3	-0.59%

Eff. Name: **07S25121819**

Analyst: KOJ

Analyst:

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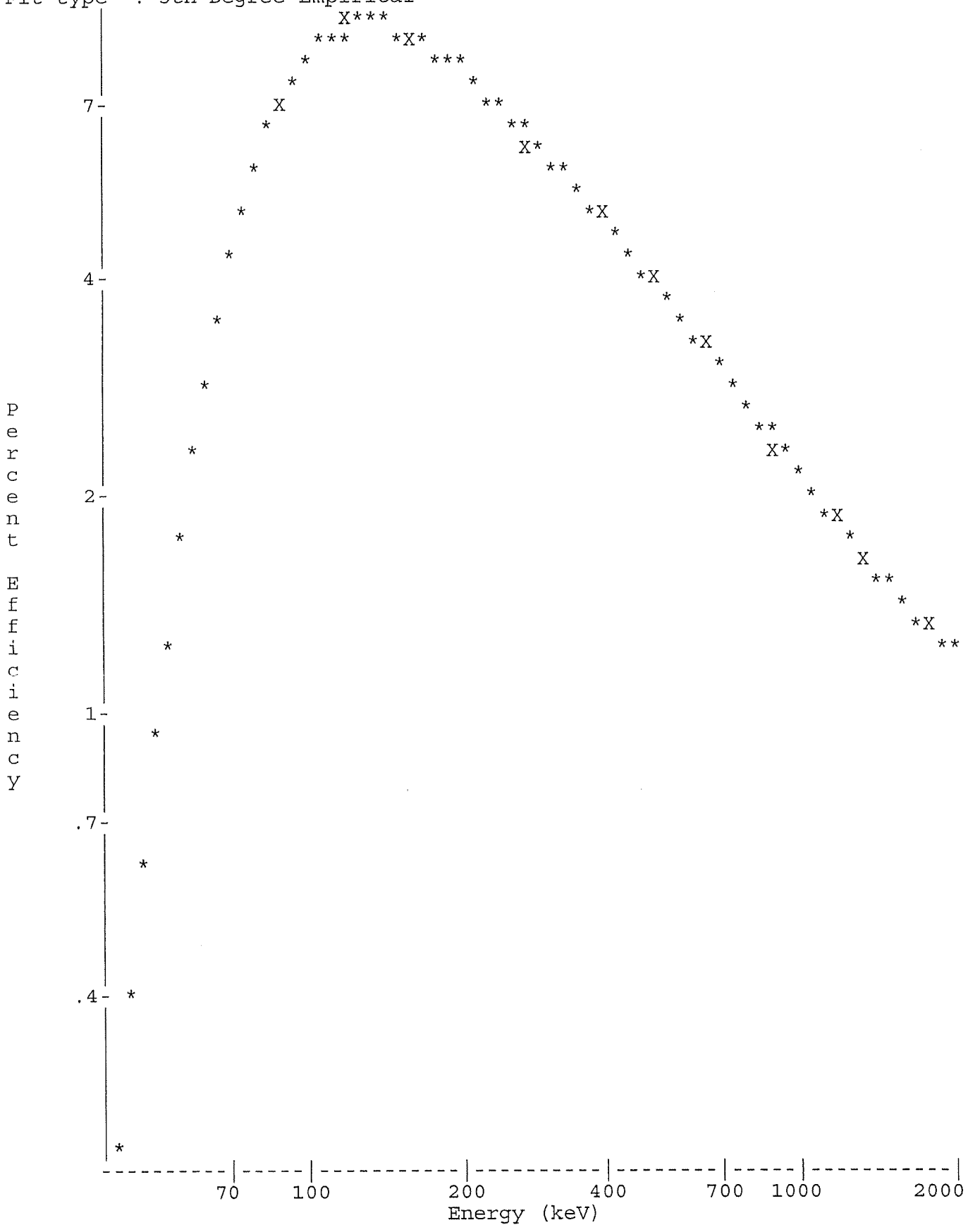
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 10:27:43.64
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 18-DEC-2019 14:56:31.96

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 07S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 07S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 07BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 02:17:08.44
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 02:16:43.01
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.64	773	4715	1.33	92.73	7.18E-01	9.43E-02	16.4	7.52E-01
2	1	88.05	15405	5939	1.26	175.52	6.78E+00	1.88E+00	1.3	5.87E-01
3	1	122.07	14618	4613	1.29	243.53	8.70E+00	1.78E+00	1.2	6.83E-01
4	1	136.44	2070	4130	1.47	272.27	8.80E+00	2.52E-01	6.2	4.05E+00
5	1	165.84	10361	5634	1.38	331.06	8.46E+00	1.26E+00	1.8	1.03E+00
6	1	255.21	771	3174	1.55	509.71	6.63E+00	9.39E-02	13.6	2.09E+00
7	1	279.18	3032	3952	1.44	557.65	6.21E+00	3.70E-01	4.5	4.54E-01
8	1	391.68	14556	3443	1.54	782.53	4.77E+00	1.77E+00	1.2	1.82E+00
9	1	514.00	9029	3517	1.66	1027.05	3.80E+00	1.10E+00	1.8	4.47E+00
10	1	661.65	36547	2915	1.77	1322.19	3.05E+00	4.46E+00	0.6	4.17E+00
11	1	898.04	18756	2766	2.00	1794.67	2.30E+00	2.29E+00	1.0	6.67E+00
12	1	1173.22	28118	1516	2.24	2344.63	1.80E+00	3.43E+00	0.7	5.22E+00
13	1	1332.48	25432	837	2.41	2662.88	1.60E+00	3.10E+00	0.7	1.02E+01
14	1	1836.00	11248	356	2.94	3668.97	1.26E+00	1.37E+00	1.0	1.21E+01

Spectrum : MCA0:[NDSCOUNT]TBE07$1
Calib Date: 26-DEC-2019 10:27
Detector :
Geometry : 07S25121819
Fit type : 5th Degree Empirical



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 10:29:22.88
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 18-DEC-2019 14:56:31.96

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 07S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 07S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 07BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 02:17:08.44
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 02:16:43.01
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.64	773	4715	1.33	92.73	7.18E-01	9.43E-02	16.4	7.52E-01
2	1	88.05	15405	5939	1.26	175.52	6.78E+00	1.88E+00	1.3	5.87E-01
3	1	122.07	14618	4613	1.29	243.53	8.70E+00	1.78E+00	1.2	6.83E-01
4	1	136.44	2070	4130	1.47	272.27	8.80E+00	2.52E-01	6.2	4.05E+00
5	1	165.84	10361	5634	1.38	331.06	8.46E+00	1.26E+00	1.8	1.03E+00
6	1	255.21	771	3174	1.55	509.71	6.63E+00	9.39E-02	13.6	2.09E+00
7	1	279.18	3032	3952	1.44	557.65	6.21E+00	3.70E-01	4.5	4.54E-01
8	1	391.68	14556	3443	1.54	782.53	4.77E+00	1.77E+00	1.2	1.82E+00
9	1	514.00	9029	3517	1.66	1027.05	3.80E+00	1.10E+00	1.8	4.47E+00
10	1	661.65	36547	2915	1.77	1322.19	3.05E+00	4.46E+00	0.6	4.17E+00
11	1	898.04	18756	2766	2.00	1794.67	2.30E+00	2.29E+00	1.0	6.67E+00
12	1	1173.22	28118	1516	2.24	2344.63	1.80E+00	3.43E+00	0.7	5.22E+00
13	1	1332.48	25432	837	2.41	2662.88	1.60E+00	3.10E+00	0.7	1.02E+01
14	1	1836.00	11248	356	2.94	3668.97	1.26E+00	1.37E+00	1.0	1.21E+01

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	15405	3.72*	6.778E+00	7.448E+02	1.005E+03	2.55
03-CO57	122.06	14618	85.51*	8.701E+00	2.395E+01	3.997E+01	2.41
04-CE139	165.85	10361	80.35*	8.456E+00	1.859E+01	5.094E+01	3.65
05-HG203	279.20	3032	81.46*	6.215E+00	7.301E+00	1.433E+02	9.06
06-SN113	391.69	14556	64.90*	4.771E+00	5.731E+01	1.913E+02	2.31
07-SR85	513.99	9029	99.27*	3.802E+00	2.916E+01	2.478E+02	3.62
08-CS137	661.65	36547	85.12*	3.048E+00	1.717E+02	1.739E+02	1.24
09-Y88	898.02	18756	93.40*	2.304E+00	1.063E+02	3.903E+02	1.95
10-CO60	1173.22	28118	100.00	1.798E+00	1.907E+02	2.049E+02	1.37
	1332.49	25432	100.00*	1.605E+00	1.932E+02	2.076E+02	1.39
12-Y88	1836.01	11248	99.38*	1.263E+00	1.093E+02	4.013E+02	2.07

Flag: "*" = Keyline

Sample ID : 07S25121819 Acquisition date : 18-DEC-2019 14:56:31

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.448E+02	1.005E+03	0.026E+03	2.55	
03-CO57	270.90D	1.67	2.395E+01	3.997E+01	0.096E+01	2.41	
04-CE139	137.66D	2.74	1.859E+01	5.094E+01	0.186E+01	3.65	
05-HG203	46.61D	19.6	7.301E+00	1.433E+02	0.130E+02	9.06	
06-SN113	115.10D	3.34	5.731E+01	1.913E+02	0.044E+02	2.31	
07-SR85	64.84D	8.50	2.916E+01	2.478E+02	0.090E+02	3.62	
08-CS137	30.17Y	1.01	1.717E+02	1.739E+02	0.022E+02	1.24	
09-Y88	106.65D	3.67	1.063E+02	3.903E+02	0.076E+02	1.95	
10-CO60	5.27Y	1.07	1.932E+02	2.076E+02	0.029E+02	1.39	
12-Y88	106.65D	3.67	1.093E+02	4.013E+02	0.083E+02	2.07	
			---------	---------			
	Total Activity :		1.462E+03	2.852E+03			

Grand Total Activity :	1.462E+03	2.852E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 07S25121819 Acquisition date : 18-DEC-2019 14:56:31

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.64	773	4715	1.33	92.73	89	9	9.43E-02	32.9	7.18E-01	
1	136.44	2070	4130	1.47	272.27	267	10	2.52E-01	12.4	8.80E+00	
1	255.21	771	3174	1.55	509.71	506	9	9.39E-02	27.3	6.63E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.448E+02	1.005E+03	0.026E+03	2.55	
03-CO57	270.90D	1.67	2.395E+01	3.997E+01	0.096E+01	2.41	
04-CE139	137.66D	2.74	1.859E+01	5.094E+01	0.186E+01	3.65	
05-HG203	46.61D	19.6	7.301E+00	1.433E+02	0.130E+02	9.06	
06-SN113	115.10D	3.34	5.731E+01	1.913E+02	0.044E+02	2.31	
07-SR85	64.84D	8.50	2.916E+01	2.478E+02	0.090E+02	3.62	
08-CS137	30.17Y	1.01	1.717E+02	1.739E+02	0.022E+02	1.24	
09-Y88	106.65D	3.67	1.063E+02	3.903E+02	0.076E+02	1.95	
10-CO60	5.27Y	1.07	1.919E+02	2.062E+02	0.020E+02	0.97	
12-Y88	106.65D	3.67	1.093E+02	4.013E+02	0.083E+02	2.07	
	Total Activity :		1.460E+03	2.850E+03			

Grand Total Activity : 1.460E+03 2.850E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.005E+03	2.559E+01	1.912E+01	0.000E+00	52.567
03-CO57	3.997E+01	9.624E-01	7.562E-01	0.000E+00	52.860
04-CE139	5.094E+01	1.861E+00	1.275E+00	0.000E+00	39.947
05-HG203	1.433E+02	1.298E+01	1.199E+01	0.000E+00	11.946
06-SN113	1.913E+02	4.427E+00	3.216E+00	0.000E+00	59.495
07-SR85	2.478E+02	8.982E+00	6.105E+00	0.000E+00	40.592
08-CS137	1.739E+02	2.157E+00	1.016E+00	0.000E+00	171.218

09-Y88	3.903E+02	7.605E+00	4.371E+00	0.000E+00	89.291
10-CO60	2.062E+02	2.009E+00	1.090E+00	0.000E+00	189.159
12-Y88	4.013E+02	8.294E+00	2.498E+00	0.000E+00	160.653

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	4.223E-01		2.177E+00	3.537E+00	0.000E+00	0.119

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A,07S25121819     ,12/26/2019 10:29,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,07S25121819     ,CALIBRATION         ,12/26/2019 10:27,07S25121819
C,02-CD109,YES,   1.005E+03,   2.559E+01,   1.912E+01,,   52.567
C,03-CO57 ,YES,   3.997E+01,   9.624E-01,   7.562E-01,,   52.860
C,04-CE139,YES,   5.094E+01,   1.861E+00,   1.275E+00,,   39.947
C,05-HG203,YES,   1.433E+02,   1.298E+01,   1.199E+01,,   11.946
C,06-SN113,YES,   1.913E+02,   4.427E+00,   3.216E+00,,   59.495
C,07-SR85 ,YES,   2.478E+02,   8.982E+00,   6.105E+00,,   40.592
C,08-CS137,YES,   1.739E+02,   2.157E+00,   1.016E+00,,  171.218
C,09-Y88  ,YES,   3.903E+02,   7.605E+00,   4.371E+00,,   89.291
C,10-CO60 ,YES,   2.062E+02,   2.009E+00,   1.090E+00,,  189.159
C,12-Y88  ,YES,   4.013E+02,   8.294E+00,   2.498E+00,,  160.653
C,01-AM241,NO ,   4.223E-01,   2.177E+00,   3.537E+00,,    0.119
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E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1008.0	0.14%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.1	0.49%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	50.8	-0.38%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	146.5	-6.12%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	192.2	0.83%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	240.0	-2.45%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	175.4	2.21%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	396.8	-2.32%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	202.8	-0.31%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	206.4	1.35%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	402.2	-0.37%

Eff. Name: **08S25121919**

Analyst: KOJ

Analyst:

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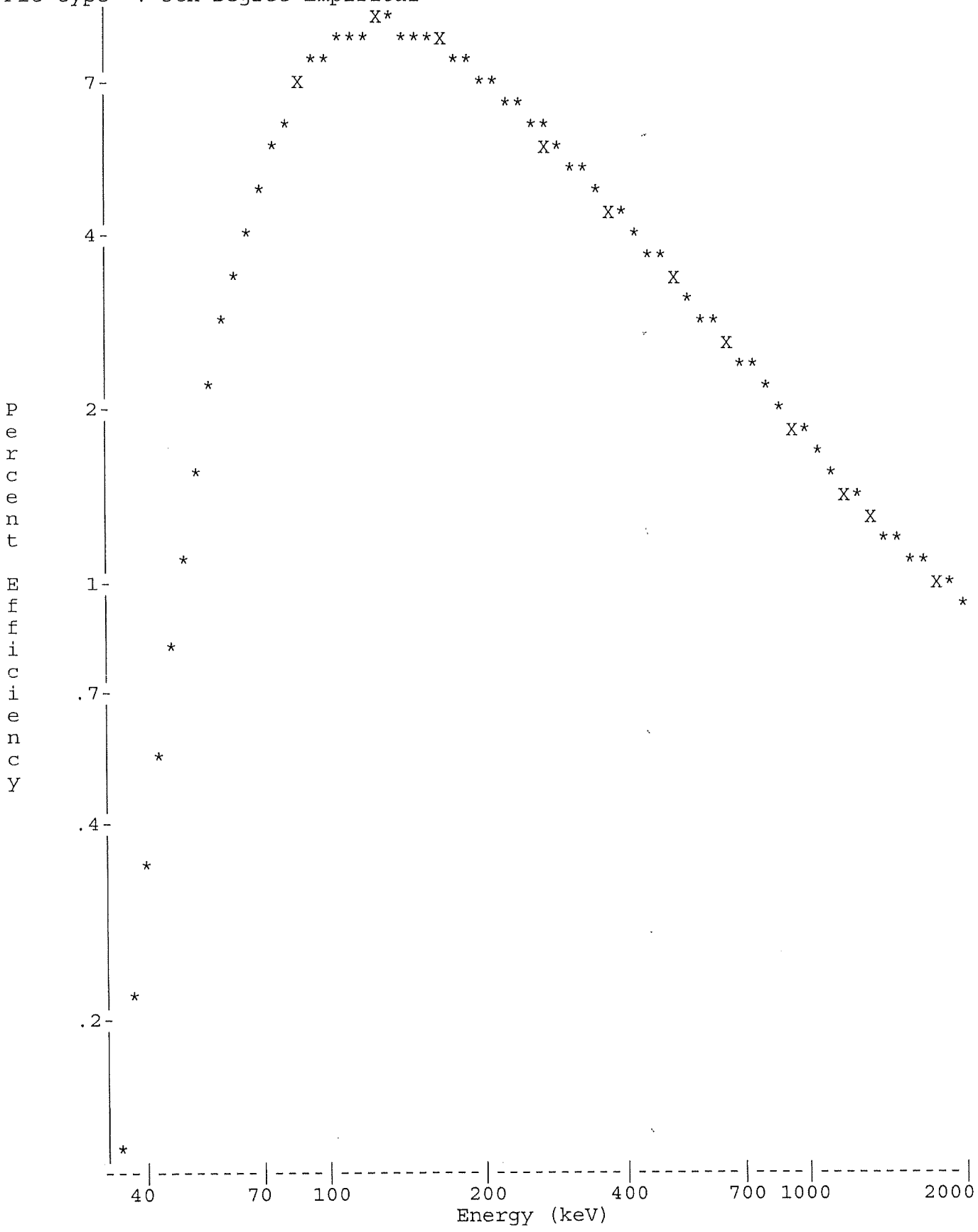
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 11:55:49.52
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 19-DEC-2019 09:30:14.76

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 08S25121919 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 08S25121919
Quantity : 1.00000E+00 TOTAL BKGFILE : 08BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 02:22:09.14
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 02:21:40.56
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.22	968	4222	1.09	100.32	7.97E-01	1.14E-01	12.1	7.72E-01
2	1	87.92	16445	5243	1.23	183.54	6.97E+00	1.93E+00	1.1	2.31E+00
3	1	122.05	15075	5614	1.26	251.65	8.65E+00	1.77E+00	1.3	7.88E-01
4	1	136.49	2140	4042	1.49	280.46	8.65E+00	2.52E-01	6.0	1.70E+00
5	1	165.89	10292	4634	1.34	339.14	8.16E+00	1.21E+00	1.7	9.22E-01
6	1	255.24	566	3634	1.33	517.46	6.16E+00	6.66E-02	20.3	1.29E+00
7	1	279.23	2924	3581	1.40	565.32	5.72E+00	3.44E-01	4.4	1.10E+00
8	1	391.76	13449	3344	1.46	789.87	4.25E+00	1.58E+00	1.2	2.30E+00
9	1	514.04	7815	3136	1.53	1033.88	3.31E+00	9.19E-01	1.9	8.36E-01
10	1	661.65	32506	2608	1.64	1328.41	2.59E+00	3.82E+00	0.7	1.21E+00
11	1	898.01	16369	2548	1.78	1800.01	1.92E+00	1.93E+00	1.0	8.30E-01
12	1	1173.18	23661	1206	1.92	2348.99	1.48E+00	2.78E+00	0.7	5.31E-01
13	1	1332.45	21386	633	2.00	2666.73	1.31E+00	2.52E+00	0.7	6.28E-01
14	1	1836.03	9422	225	2.27	3671.21	1.02E+00	1.11E+00	1.1	1.35E+00

Spectrum : MCA0:[NDSCOUNT]TBE08$1
Calib Date: 26-DEC-2019 11:55
Detector :
Geometry : 08S25121919
Fit type : 5th Degree Empirical



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 11:57:03.65
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 19-DEC-2019 09:30:14.76

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 08S25121919 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 08S25121919
Quantity : 1.00000E+00 TOTAL BKGFILE : 08BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 02:22:09.14
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 02:21:40.56
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.22	968	4222	1.09	100.32	7.97E-01	1.14E-01	12.1	7.72E-01
2	1	87.92	16445	5243	1.23	183.54	6.97E+00	1.93E+00	1.1	2.31E+00
3	1	122.05	15075	5614	1.26	251.65	8.65E+00	1.77E+00	1.3	7.88E-01
4	1	136.49	2140	4042	1.49	280.46	8.65E+00	2.52E-01	6.0	1.70E+00
5	1	165.89	10292	4634	1.34	339.14	8.16E+00	1.21E+00	1.7	9.22E-01
6	1	255.24	566	3634	1.33	517.46	6.16E+00	6.66E-02	20.3	1.29E+00
7	1	279.23	2924	3581	1.40	565.32	5.72E+00	3.44E-01	4.4	1.10E+00
8	1	391.76	13449	3344	1.46	789.87	4.25E+00	1.58E+00	1.2	2.30E+00
9	1	514.04	7815	3136	1.53	1033.88	3.31E+00	9.19E-01	1.9	8.36E-01
10	1	661.65	32506	2608	1.64	1328.41	2.59E+00	3.82E+00	0.7	1.21E+00
11	1	898.01	16369	2548	1.78	1800.01	1.92E+00	1.93E+00	1.0	8.30E-01
12	1	1173.18	23661	1206	1.92	2348.99	1.48E+00	2.78E+00	0.7	5.31E-01
13	1	1332.45	21386	633	2.00	2666.73	1.31E+00	2.52E+00	0.7	6.28E-01
14	1	1836.03	9422	225	2.27	3671.21	1.02E+00	1.11E+00	1.1	1.35E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	16445	3.72*	6.973E+00	7.457E+02	1.008E+03	2.29
03-CO57	122.06	15075	85.51*	8.646E+00	2.399E+01	4.011E+01	2.57
04-CE139	165.85	10292	80.35*	8.164E+00	1.846E+01	5.077E+01	3.30
05-HG203	279.20	2924	81.46*	5.722E+00	7.379E+00	1.465E+02	8.76
06-SN113	391.69	13449	64.90*	4.254E+00	5.731E+01	1.922E+02	2.48
07-SR85	513.99	7815	99.27*	3.306E+00	2.801E+01	2.400E+02	3.83
08-CS137	661.65	32506	85.12*	2.594E+00	1.732E+02	1.754E+02	1.31
09-Y88	898.02	16369	93.40*	1.918E+00	1.075E+02	3.968E+02	2.09
10-CO60	1173.22	23661	100.00	1.475E+00	1.887E+02	2.028E+02	1.47
	1332.49	21386	100.00*	1.311E+00	1.920E+02	2.064E+02	1.47
12-Y88	1836.01	9422	99.38*	1.024E+00	1.090E+02	4.022E+02	2.23

Flag: "*" = Keyline

Sample ID : 08S25121919 Acquisition date : 19-DEC-2019 09:30:14

Total number of lines in spectrum 14
Number of unidentified lines 3
Number of lines tentatively identified by NID 11 78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.457E+02	1.008E+03	0.023E+03	2.29	
03-CO57	270.90D	1.67	2.399E+01	4.011E+01	0.103E+01	2.57	
04-CE139	137.66D	2.75	1.846E+01	5.077E+01	0.168E+01	3.30	
05-HG203	46.61D	19.8	7.379E+00	1.465E+02	0.128E+02	8.76	
06-SN113	115.10D	3.35	5.731E+01	1.922E+02	0.048E+02	2.48	
07-SR85	64.84D	8.57	2.801E+01	2.400E+02	0.092E+02	3.83	
08-CS137	30.17Y	1.01	1.732E+02	1.754E+02	0.023E+02	1.31	
09-Y88	106.65D	3.69	1.075E+02	3.968E+02	0.083E+02	2.09	
10-CO60	5.27Y	1.08	1.920E+02	2.064E+02	0.030E+02	1.47	
12-Y88	106.65D	3.69	1.090E+02	4.022E+02	0.089E+02	2.23	
	Total Activity :		1.462E+03	2.858E+03			

Grand Total Activity : 1.462E+03 2.858E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 08S25121919 Acquisition date : 19-DEC-2019 09:30:14

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.22	968	4222	1.09	100.32	97	8	1.14E-01	24.2	7.97E-01	
1	136.49	2140	4042	1.49	280.46	276	10	2.52E-01	11.9	8.65E+00	
1	255.24	566	3634	1.33	517.46	512	10	6.66E-02	40.6	6.16E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.457E+02	1.008E+03	0.023E+03	2.29	
03-CO57	270.90D	1.67	2.399E+01	4.011E+01	0.103E+01	2.57	
04-CE139	137.66D	2.75	1.846E+01	5.077E+01	0.168E+01	3.30	
05-HG203	46.61D	19.8	7.379E+00	1.465E+02	0.128E+02	8.76	
06-SN113	115.10D	3.35	5.731E+01	1.922E+02	0.048E+02	2.48	
07-SR85	64.84D	8.57	2.801E+01	2.400E+02	0.092E+02	3.83	
08-CS137	30.17Y	1.01	1.732E+02	1.754E+02	0.023E+02	1.31	
09-Y88	106.65D	3.69	1.075E+02	3.968E+02	0.083E+02	2.09	
10-CO60	5.27Y	1.08	1.903E+02	2.046E+02	0.021E+02	1.04	
12-Y88	106.65D	3.69	1.090E+02	4.022E+02	0.089E+02	2.23	
	Total Activity :		1.461E+03	2.856E+03			

Grand Total Activity : 1.461E+03 2.856E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.008E+03	2.311E+01	1.822E+01	0.000E+00	55.299
03-CO57	4.011E+01	1.031E+00	7.340E-01	0.000E+00	54.648
04-CE139	5.077E+01	1.678E+00	1.305E+00	0.000E+00	38.902
05-HG203	1.465E+02	1.282E+01	1.242E+01	0.000E+00	11.794
06-SN113	1.922E+02	4.763E+00	3.294E+00	0.000E+00	58.358
07-SR85	2.400E+02	9.188E+00	6.549E+00	0.000E+00	36.647
08-CS137	1.754E+02	2.292E+00	1.071E+00	0.000E+00	163.721

09-Y88	3.968E+02	8.278E+00	4.619E+00	0.000E+00	85.910
10-CO60	2.046E+02	2.127E+00	1.090E+00	0.000E+00	187.592
12-Y88	4.022E+02	8.950E+00	2.374E+00	0.000E+00	169.424

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	6.813E-02		2.018E+00	3.218E+00	0.000E+00	0.021

```
A,08S25121919     ,12/26/2019 11:57,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,08S25121919     ,CALIBRATION         ,12/26/2019 11:55,08S25121919
C,02-CD109,YES,   1.008E+03,   2.311E+01,   1.822E+01,,   55.299
C,03-CO57 ,YES,   4.011E+01,   1.031E+00,   7.340E-01,,   54.648
C,04-CE139,YES,   5.077E+01,   1.678E+00,   1.305E+00,,   38.902
C,05-HG203,YES,   1.465E+02,   1.282E+01,   1.242E+01,,   11.794
C,06-SN113,YES,   1.922E+02,   4.763E+00,   3.294E+00,,   58.358
C,07-SR85 ,YES,   2.400E+02,   9.188E+00,   6.549E+00,,   36.647
C,08-CS137,YES,   1.754E+02,   2.292E+00,   1.071E+00,,  163.721
C,09-Y88  ,YES,   3.968E+02,   8.278E+00,   4.619E+00,,   85.910
C,10-CO60 ,YES,   2.046E+02,   2.127E+00,   1.090E+00,,  187.592
C,12-Y88  ,YES,   4.022E+02,   8.950E+00,   2.374E+00,,  169.424
C,01-AM241,NO ,   6.813E-02,   2.018E+00,   3.218E+00,,    0.021
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S50 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1011.0	0.44%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	39.7	-0.47%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	51.7	1.35%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	145.0	-7.08%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	188.9	-0.90%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	246.5	0.19%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	174.8	1.86%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	395.5	-2.64%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	203.2	-0.11%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	206.2	1.26%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	402.3	-0.35%

Eff. Name: **08S50121919**

Analyst: KOJ

Analyst:

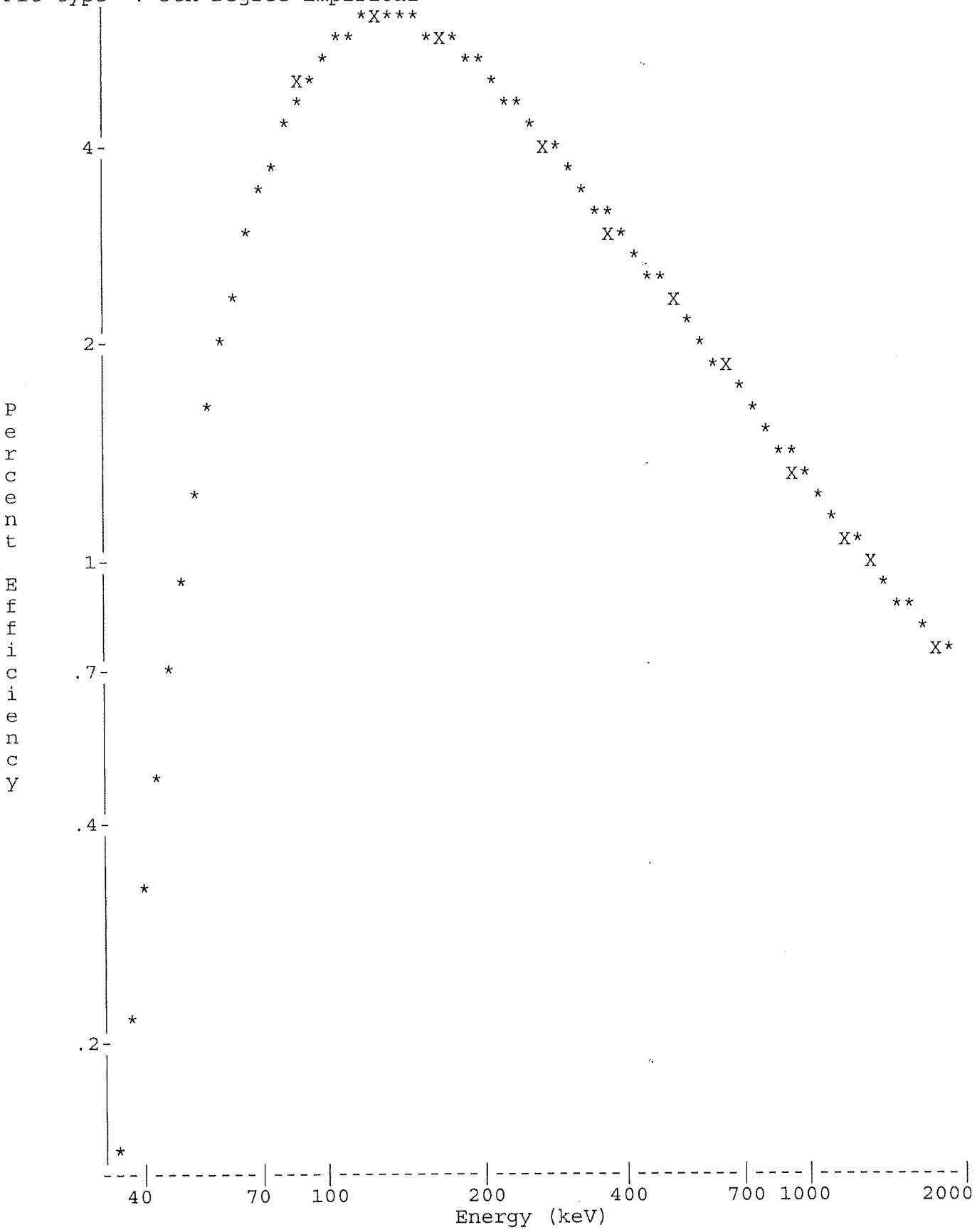
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 11:59:44.02
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 19-DEC-2019 14:24:25.59

LIMS No., Customer Name, Client ID: S50 5ML MIXED GAMMA CALIBRATION

Sample ID : 08S50121919 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 08S50121919
Quantity : 1.00000E+00 TOTAL BKGFILE : 08BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 03:30:31.74
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 03:30:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.22	1277	5281	1.50	100.46	7.01E-01	1.01E-01	10.6	1.75E+00
2	1	87.92	16596	6858	1.24	183.66	4.74E+00	1.32E+00	1.2	2.05E-01
3	1	122.05	15088	5409	1.26	251.78	5.90E+00	1.20E+00	1.2	5.56E-01
4	1	136.46	2057	5308	1.46	280.53	5.94E+00	1.63E-01	7.2	6.20E-01
5	1	165.90	10778	5471	1.35	339.29	5.68E+00	8.55E-01	1.7	7.49E-01
6	1	255.16	647	3704	1.43	517.41	4.35E+00	5.13E-02	17.4	3.53E-01
7	1	279.24	3024	4125	1.37	565.47	4.05E+00	2.40E-01	4.5	9.44E-01
8	1	391.75	13827	4116	1.45	789.97	3.01E+00	1.10E+00	1.3	2.11E+00
9	1	514.02	8393	4272	1.57	1033.96	2.34E+00	6.66E-01	2.1	4.31E+00
10	1	661.65	34173	2764	1.64	1328.51	1.85E+00	2.71E+00	0.6	1.83E+00
11	1	814.11	316	1342	1.40	1632.71	1.52E+00	2.51E-02	21.5	1.13E+00
12	1	898.01	17482	2500	1.78	1800.10	1.39E+00	1.39E+00	1.0	7.35E-01
13	1	1173.18	25897	1364	1.89	2349.07	1.09E+00	2.06E+00	0.7	1.16E+00
14	1	1332.46	23483	689	2.00	2666.79	9.72E-01	1.86E+00	0.7	1.07E+00
15	1	1836.03	10194	166	2.26	3671.21	7.48E-01	8.09E-01	1.0	6.49E-01

Spectrum : MCA0:[NDSCOUNT]TBE08$1
Calib Date: 26-DEC-2019 11:59
Detector :
Geometry : 08S50121919
Fit type : 5th Degree Empirical



Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 12:02:28.82
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 19-DEC-2019 14:24:25.59

LIMS No., Customer Name, Client ID: S50 5ML MIXED GAMMA CALIBRATION

Sample ID : 08S50121919 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 08S50121919
Quantity : 1.00000E+00 TOTAL BKGFILE : 08BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 03:30:31.74
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 03:30:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.22	1277	5281	1.50	100.46	7.01E-01	1.01E-01	10.6	1.75E+00
2	1	87.92	16596	6858	1.24	183.66	4.74E+00	1.32E+00	1.2	2.05E-01
3	1	122.05	15088	5409	1.26	251.78	5.90E+00	1.20E+00	1.2	5.56E-01
4	1	136.46	2057	5308	1.46	280.53	5.94E+00	1.63E-01	7.2	6.20E-01
5	1	165.90	10778	5471	1.35	339.29	5.68E+00	8.55E-01	1.7	7.49E-01
6	1	255.16	647	3704	1.43	517.41	4.35E+00	5.13E-02	17.4	3.53E-01
7	1	279.24	3024	4125	1.37	565.47	4.05E+00	2.40E-01	4.5	9.44E-01
8	1	391.75	13827	4116	1.45	789.97	3.01E+00	1.10E+00	1.3	2.11E+00
9	1	514.02	8393	4272	1.57	1033.96	2.34E+00	6.66E-01	2.1	4.31E+00
10	1	661.65	34173	2764	1.64	1328.51	1.85E+00	2.71E+00	0.6	1.83E+00
11	1	814.11	316	1342	1.40	1632.71	1.52E+00	2.51E-02	21.5	1.13E+00
12	1	898.01	17482	2500	1.78	1800.10	1.39E+00	1.39E+00	1.0	7.35E-01
13	1	1173.18	25897	1364	1.89	2349.07	1.09E+00	2.06E+00	0.7	1.16E+00
14	1	1332.46	23483	689	2.00	2666.79	9.72E-01	1.86E+00	0.7	1.07E+00
15	1	1836.03	10194	166	2.26	3671.21	7.48E-01	8.09E-01	1.0	6.49E-01

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	16596	3.72*	4.736E+00	7.477E+02	1.011E+03	2.49
03-CO57	122.06	15088	85.51*	5.897E+00	2.374E+01	3.973E+01	2.45
04-CE139	165.85	10778	80.35*	5.676E+00	1.876E+01	5.165E+01	3.36
05-HG203	279.20	3024	81.46*	4.047E+00	7.281E+00	1.450E+02	8.99
06-SN113	391.69	13827	64.90*	3.007E+00	5.623E+01	1.889E+02	2.56
07-SR85	513.99	8393	99.27*	2.338E+00	2.869E+01	2.465E+02	4.28
08-CS137	661.65	34173	85.12*	1.846E+00	1.726E+02	1.748E+02	1.28
09-Y88	898.02	17482	93.40*	1.389E+00	1.070E+02	3.955E+02	1.96
10-CO60	1173.22	25897	100.00	1.088E+00	1.890E+02	2.032E+02	1.41
	1332.49	23483	100.00*	9.718E-01	1.918E+02	2.062E+02	1.41
12-Y88	1836.01	10194	99.38*	7.480E-01	1.088E+02	4.023E+02	2.08

Flag: "*" = Keyline

Sample ID : 08S50121919 Acquisition date : 19-DEC-2019 14:24:25

Total number of lines in spectrum	15	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	11	73.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.477E+02	1.011E+03	0.025E+03	2.49	
03-CO57	270.90D	1.67	2.374E+01	3.973E+01	0.097E+01	2.45	
04-CE139	137.66D	2.75	1.876E+01	5.165E+01	0.174E+01	3.36	
05-HG203	46.61D	19.9	7.281E+00	1.450E+02	0.130E+02	8.99	
06-SN113	115.10D	3.36	5.623E+01	1.889E+02	0.048E+02	2.56	
07-SR85	64.84D	8.59	2.869E+01	2.465E+02	0.106E+02	4.28	
08-CS137	30.17Y	1.01	1.726E+02	1.748E+02	0.022E+02	1.28	
09-Y88	106.65D	3.70	1.070E+02	3.955E+02	0.078E+02	1.96	
10-CO60	5.27Y	1.08	1.918E+02	2.062E+02	0.029E+02	1.41	
12-Y88	106.65D	3.70	1.088E+02	4.023E+02	0.084E+02	2.08	
			---------	---------			
	Total Activity :		1.463E+03	2.861E+03			
	Grand Total Activity :		1.463E+03	2.861E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 08S50121919 Acquisition date : 19-DEC-2019 14:24:25

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.22	1277	5281	1.50	100.46	96	9	1.01E-01	21.3	7.01E-01	
1	136.46	2057	5308	1.46	280.53	275	11	1.63E-01	14.4	5.94E+00	
1	255.16	647	3704	1.43	517.41	514	9	5.13E-02	34.9	4.35E+00	
1	814.11	316	1342	1.40	1632.71	1628	9	2.51E-02	43.1	1.52E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	11	73.33%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.477E+02	1.011E+03	0.025E+03	2.49	
03-CO57	270.90D	1.67	2.374E+01	3.973E+01	0.097E+01	2.45	
04-CE139	137.66D	2.75	1.876E+01	5.165E+01	0.174E+01	3.36	
05-HG203	46.61D	19.9	7.281E+00	1.450E+02	0.130E+02	8.99	
06-SN113	115.10D	3.36	5.623E+01	1.889E+02	0.048E+02	2.56	
07-SR85	64.84D	8.59	2.869E+01	2.465E+02	0.106E+02	4.28	
08-CS137	30.17Y	1.01	1.726E+02	1.748E+02	0.022E+02	1.28	
09-Y88	106.65D	3.70	1.070E+02	3.955E+02	0.078E+02	1.96	
10-CO60	5.27Y	1.08	1.904E+02	2.047E+02	0.020E+02	1.00	
12-Y88	106.65D	3.70	1.088E+02	4.023E+02	0.084E+02	2.08	
	Total Activity :		1.461E+03	2.859E+03			

Grand Total Activity : 1.461E+03 2.859E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.011E+03	2.512E+01	1.884E+01	0.000E+00	53.628
03-CO57	3.973E+01	9.733E-01	7.871E-01	0.000E+00	50.475
04-CE139	5.165E+01	1.737E+00	1.332E+00	0.000E+00	38.790
05-HG203	1.450E+02	1.303E+01	1.248E+01	0.000E+00	11.620
06-SN113	1.889E+02	4.831E+00	3.407E+00	0.000E+00	55.431
07-SR85	2.465E+02	1.055E+01	6.386E+00	0.000E+00	38.593

08-CS137	1.748E+02	2.230E+00	1.062E+00	0.000E+00	164.526
09-Y88	3.955E+02	7.764E+00	4.579E+00	0.000E+00	86.362
10-CO60	2.047E+02	2.041E+00	1.007E+00	0.000E+00	203.154
12-Y88	4.023E+02	8.355E+00	2.125E+00	0.000E+00	189.307

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	-1.459E+00		1.968E+00	3.106E+00	0.000E+00	-0.470

```
A,08S50121919     ,12/26/2019 12:02,06/01/2019 12:00,   1.000E+00,S50 5ML MIXED
B,08S50121919     ,CALIBRATION         ,12/26/2019 11:59,08S50121919
C,02-CD109,YES,   1.011E+03,   2.512E+01,   1.884E+01,,   53.628
C,03-CO57 ,YES,   3.973E+01,   9.733E-01,   7.871E-01,,   50.475
C,04-CE139,YES,   5.165E+01,   1.737E+00,   1.332E+00,,   38.790
C,05-HG203,YES,   1.450E+02,   1.303E+01,   1.248E+01,,   11.620
C,06-SN113,YES,   1.889E+02,   4.831E+00,   3.407E+00,,   55.431
C,07-SR85 ,YES,   2.465E+02,   1.055E+01,   6.386E+00,,   38.593
C,08-CS137,YES,   1.748E+02,   2.230E+00,   1.062E+00,,  164.526
C,09-Y88  ,YES,   3.955E+02,   7.764E+00,   4.579E+00,,   86.362
C,10-CO60 ,YES,   2.047E+02,   2.041E+00,   1.007E+00,,  203.154
C,12-Y88  ,YES,   4.023E+02,   8.355E+00,   2.125E+00,,  189.307
C,01-AM241,NO ,  -1.459E+00,   1.968E+00,   3.106E+00,,   -0.470
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	993.6	-1.29%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	42.1	5.37%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	47.8	-6.25%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	156.1	0.04%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	191.6	0.51%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	246.5	0.19%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	172.8	0.69%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	386.9	-4.76%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	204.0	0.28%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	207.4	1.84%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	400.1	-0.89%

Eff. Name: **11S25121819**

Analyst: KOJ

Analyst:

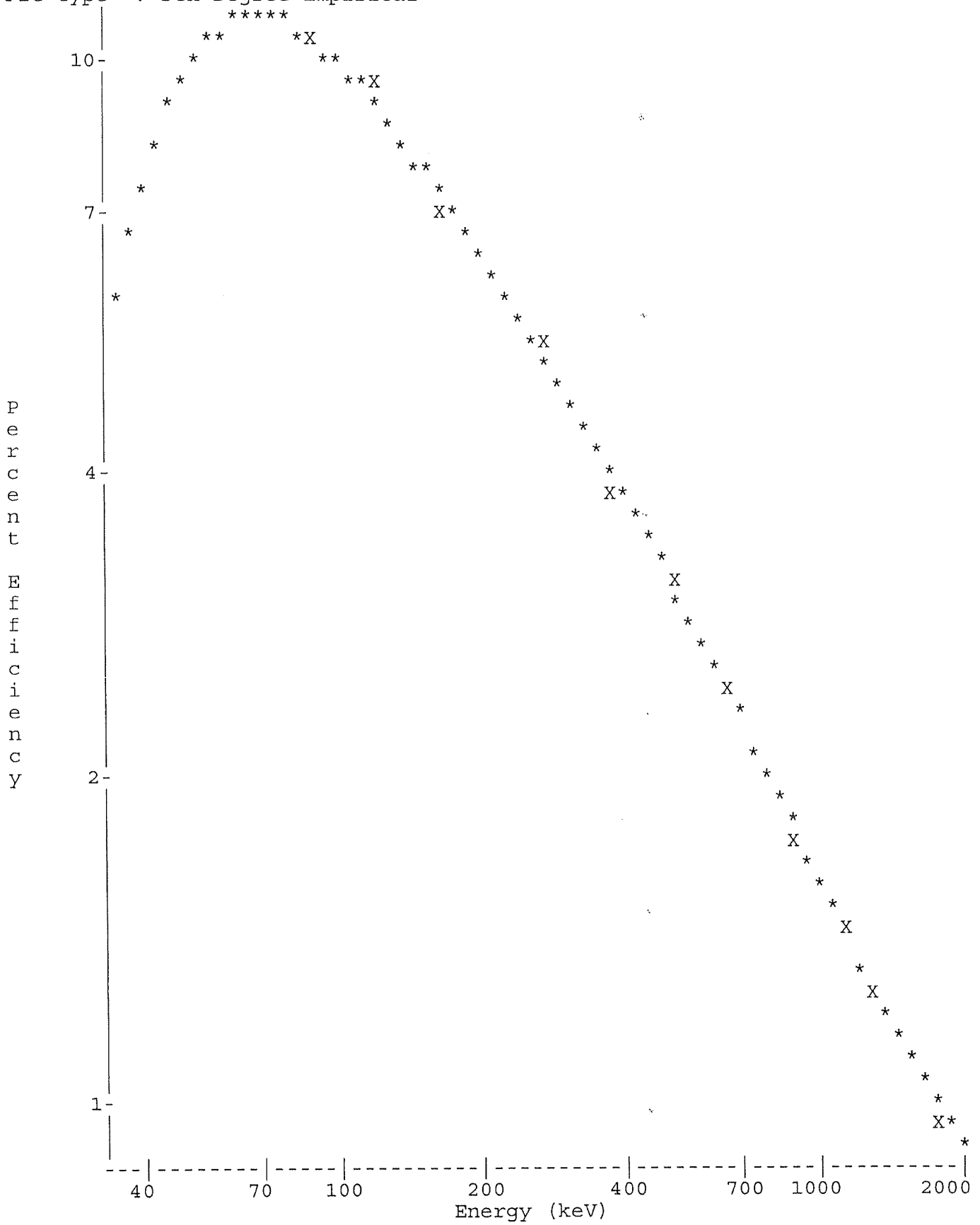
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 12:23:32.17
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 18-DEC-2019 09:33:11.11

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 11S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 11S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 11BG112719MT
Start Channel : 70 Energy Tol : 2.00000 Real Time : 0 03:11:53.14
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 03:11:03.28
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.47	35805	13059	1.40	91.92	9.09E+00	3.12E+00	0.9	
2	0	88.02	33122	7436	1.42	175.07	1.05E+01	2.89E+00	0.8	
3	0	122.04	22326	7271	1.51	243.14	9.03E+00	1.95E+00	1.1	
4	0	136.43	2706	4424	1.36	271.93	8.44E+00	2.36E-01	5.0	
5	0	165.87	11911	5271	1.51	330.83	7.41E+00	1.04E+00	1.5	
6	0	199.04	676	4281	1.71	397.18	6.51E+00	5.90E-02	17.9	
7	0	255.21	882	3762	1.57	509.58	5.41E+00	7.69E-02	13.5	
8	0	279.20	3759	5069	1.56	557.57	5.05E+00	3.28E-01	4.3	
9	0	391.75	16494	4392	1.66	782.76	3.86E+00	1.44E+00	1.2	
10	0	513.92	10151	3822	1.80	1027.19	3.07E+00	8.86E-01	1.7	
11	0	661.66	40746	3429	1.88	1322.79	2.45E+00	3.55E+00	0.6	
12	0	898.01	20678	3829	2.05	1795.69	1.83E+00	1.80E+00	1.0	
13	0	1173.22	31189	1914	2.27	2346.36	1.41E+00	2.72E+00	0.7	
14	0	1332.52	27709	1290	2.33	2665.10	1.25E+00	2.42E+00	0.7	
15	0	1835.99	11913	387	2.75	3672.54	9.59E-01	1.04E+00	1.0	

Spectrum : MCA0:[NDSCOUNT]TBE11$1
Calib Date: 26-DEC-2019 12:23
Detector :
Geometry : 11S25121819
Fit type : 5th Degree Empirical



Analyst:

==========
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 12:24:28.73
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 18-DEC-2019 09:33:11.11

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 11S25121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 11S25121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 11BG112719MT
Start Channel : 70 Energy Tol : 2.00000 Real Time : 0 03:11:53.14
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 03:11:03.28
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.47*	35629	13059	1.40	91.92	9.09E+00	3.11E+00	0.9	
2	0	88.02*	33070	7436	1.42	175.07	1.05E+01	2.88E+00	0.8	
3	0	122.04	22326	7271	1.51	243.14	9.03E+00	1.95E+00	1.1	
4	0	136.43	2706	4424	1.36	271.93	8.44E+00	2.36E-01	5.0	
5	0	165.87	11911	5271	1.51	330.83	7.41E+00	1.04E+00	1.5	
6	0	199.04	676	4281	1.71	397.18	6.51E+00	5.90E-02	17.9	
7	0	255.21	882	3762	1.57	509.58	5.41E+00	7.69E-02	13.5	
8	0	279.20	3759	5069	1.56	557.57	5.05E+00	3.28E-01	4.3	
9	0	391.75	16494	4392	1.66	782.76	3.86E+00	1.44E+00	1.2	
10	0	513.92	10151	3822	1.80	1027.19	3.07E+00	8.86E-01	1.7	
11	0	661.66	40746	3429	1.88	1322.79	2.45E+00	3.55E+00	0.6	
12	0	898.01	20678	3829	2.05	1795.69	1.83E+00	1.80E+00	1.0	
13	0	1173.22	31189	1914	2.27	2346.36	1.41E+00	2.72E+00	0.7	
14	0	1332.52	27709	1290	2.33	2665.10	1.25E+00	2.42E+00	0.7	
15	0	1835.99	11913	387	2.75	3672.54	9.59E-01	1.04E+00	1.0	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	33070	3.72*	1.053E+01	7.365E+02	9.936E+02	1.51
03-CO57	122.06	22326	85.51*	9.032E+00	2.522E+01	4.206E+01	2.13
04-CE139	165.85	11911	80.35*	7.407E+00	1.746E+01	4.778E+01	3.05
05-HG203	279.20	3759	81.46*	5.046E+00	7.978E+00	1.561E+02	8.67
06-SN113	391.69	16494	64.90*	3.858E+00	5.747E+01	1.916E+02	2.34
07-SR85	513.99	10151	99.27*	3.069E+00	2.907E+01	2.465E+02	3.37
08-CS137	661.65	40746	85.12*	2.447E+00	1.707E+02	1.728E+02	1.19
09-Y88	898.02	20678	93.40*	1.831E+00	1.055E+02	3.869E+02	2.02
10-CO60	1173.22	31189	100.00	1.413E+00	1.926E+02	2.070E+02	1.35
	1332.49	27709	100.00*	1.253E+00	1.930E+02	2.074E+02	1.36
12-Y88	1836.01	11913	99.38*	9.586E-01	1.091E+02	4.001E+02	2.07

Flag: "*" = Keyline

Sample ID : 11S25121819 Acquisition date : 18-DEC-2019 09:33:11

Total number of lines in spectrum 15
Number of unidentified lines 4
Number of lines tentatively identified by NID 11 73.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr. BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.365E+02	9.936E+02	0.150E+02	1.51	
03-CO57	270.90D	1.67	2.522E+01	4.206E+01	0.090E+01	2.13	
04-CE139	137.66D	2.74	1.746E+01	4.778E+01	0.146E+01	3.05	
05-HG203	46.61D	19.6	7.978E+00	1.561E+02	0.135E+02	8.67	
06-SN113	115.10D	3.33	5.747E+01	1.916E+02	0.045E+02	2.34	
07-SR85	64.84D	8.48	2.907E+01	2.465E+02	0.083E+02	3.37	
08-CS137	30.17Y	1.01	1.707E+02	1.728E+02	0.021E+02	1.19	
09-Y88	106.65D	3.67	1.055E+02	3.869E+02	0.078E+02	2.02	
10-CO60	5.27Y	1.07	1.930E+02	2.074E+02	0.028E+02	1.36	
12-Y88	106.65D	3.67	1.091E+02	4.001E+02	0.083E+02	2.07	
			---------	---------			
	Total Activity :		1.452E+03	2.845E+03			

Grand Total Activity : 1.452E+03 2.845E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 11S25121819 Acquisition date : 18-DEC-2019 09:33:11

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.47	35629	13059	1.40	91.92	84	16	3.11E+00	1.8	9.09E+00	
0	136.43	2706	4424	1.36	271.93	267	10	2.36E-01	10.0	8.44E+00	
0	199.04	676	4281	1.71	397.18	393	9	5.90E-02	35.8	6.51E+00	
0	255.21	882	3762	1.57	509.58	505	10	7.69E-02	26.9	5.41E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	11	73.33%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.365E+02	9.936E+02	0.150E+02	1.51	
03-CO57	270.90D	1.67	2.522E+01	4.206E+01	0.090E+01	2.13	
04-CE139	137.66D	2.74	1.746E+01	4.778E+01	0.146E+01	3.05	
05-HG203	46.61D	19.6	7.978E+00	1.561E+02	0.135E+02	8.67	
06-SN113	115.10D	3.33	5.747E+01	1.916E+02	0.045E+02	2.34	
07-SR85	64.84D	8.48	2.907E+01	2.465E+02	0.083E+02	3.37	
08-CS137	30.17Y	1.01	1.707E+02	1.728E+02	0.021E+02	1.19	
09-Y88	106.65D	3.67	1.055E+02	3.869E+02	0.078E+02	2.02	
10-CO60	5.27Y	1.07	1.928E+02	2.072E+02	0.020E+02	0.96	
12-Y88	106.65D	3.67	1.091E+02	4.001E+02	0.083E+02	2.07	
	Total Activity :		1.452E+03	2.845E+03			

Grand Total Activity : 1.452E+03 2.845E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	9.936E+02	1.498E+01	1.082E+01	0.000E+00	91.870
03-CO57	4.206E+01	8.978E-01	5.806E-01	0.000E+00	72.446
04-CE139	4.778E+01	1.458E+00	1.184E+00	0.000E+00	40.361
05-HG203	1.561E+02	1.354E+01	1.154E+01	0.000E+00	13.519
06-SN113	1.916E+02	4.489E+00	3.055E+00	0.000E+00	62.714
07-SR85	2.465E+02	8.295E+00	5.803E+00	0.000E+00	42.472

08-CS137	1.728E+02	2.055E+00	9.699E-01	0.000E+00	178.192
09-Y88	3.869E+02	7.819E+00	4.238E+00	0.000E+00	91.296
10-CO60	2.072E+02	1.985E+00	1.064E+00	0.000E+00	194.716
12-Y88	4.001E+02	8.273E+00	2.392E+00	0.000E+00	167.287

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	3.178E-01		4.178E-01	7.052E-01	0.000E+00	0.451

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A,11S25121819     ,12/26/2019 12:24,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,11S25121819     ,CALIBRATION         ,12/26/2019 12:23,11S25121819
C,02-CD109,YES,   9.936E+02,   1.498E+01,   1.082E+01,,   91.870
C,03-CO57 ,YES,   4.206E+01,   8.978E-01,   5.806E-01,,   72.446
C,04-CE139,YES,   4.778E+01,   1.458E+00,   1.184E+00,,   40.361
C,05-HG203,YES,   1.561E+02,   1.354E+01,   1.154E+01,,   13.519
C,06-SN113,YES,   1.916E+02,   4.489E+00,   3.055E+00,,   62.714
C,07-SR85 ,YES,   2.465E+02,   8.295E+00,   5.803E+00,,   42.472
C,08-CS137,YES,   1.728E+02,   2.055E+00,   9.699E-01,,  178.192
C,09-Y88  ,YES,   3.869E+02,   7.819E+00,   4.238E+00,,   91.296
C,10-CO60 ,YES,   2.072E+02,   1.985E+00,   1.064E+00,,  194.716
C,12-Y88  ,YES,   4.001E+02,   8.273E+00,   2.392E+00,,  167.287
C,01-AM241,NO ,   3.178E-01,   4.178E-01,   7.052E-01,,    0.451
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S50 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1006.0	-0.06%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	41.5	3.92%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	48.2	-5.44%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	161.2	3.30%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	195.4	2.51%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	237.4	-3.50%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	177.2	3.26%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	401.1	-1.26%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	205.2	0.87%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	203.0	-0.32%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	403.2	-0.12%

Eff. Name: **11S50121819**

Analyst: KOJ

Analyst:

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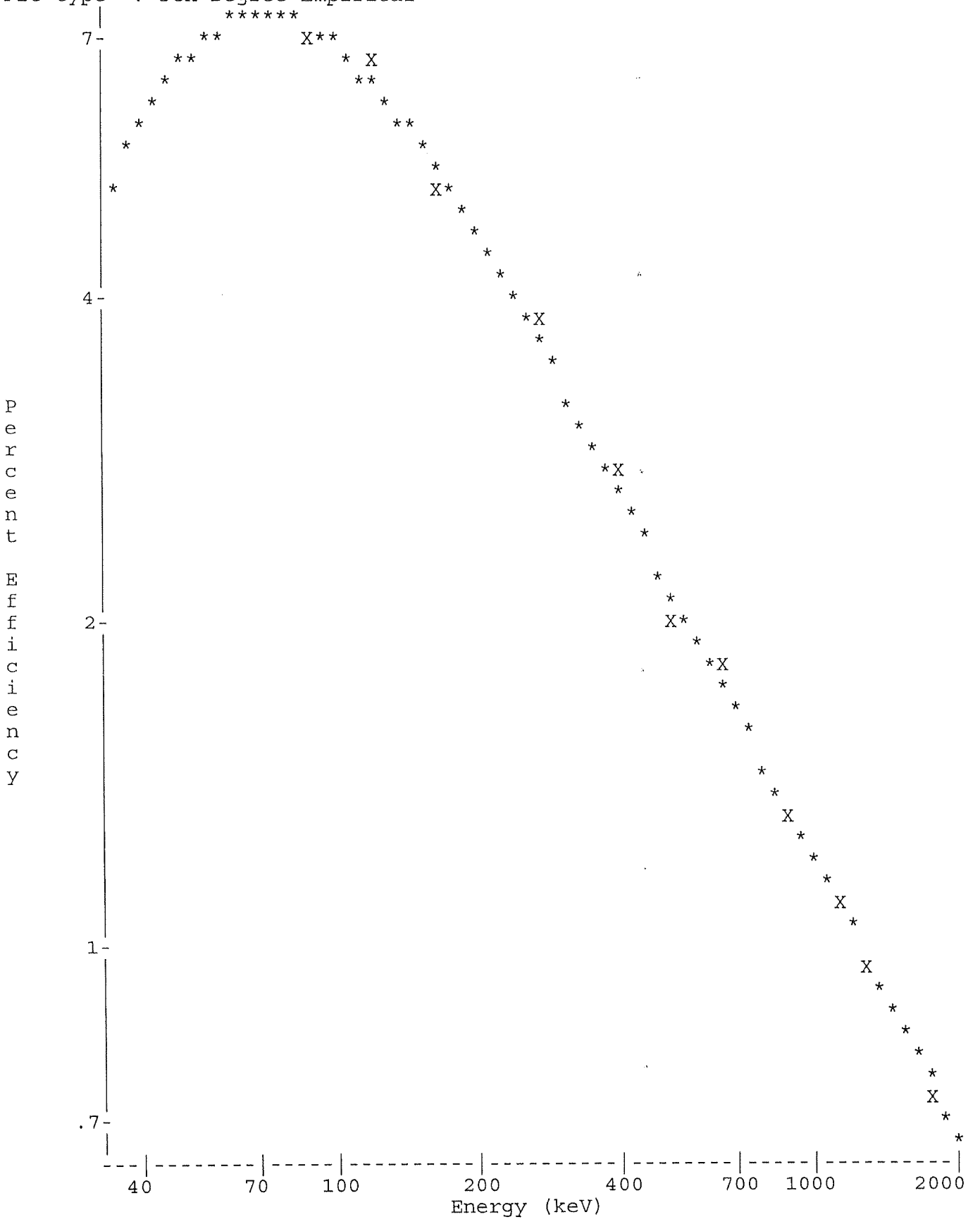
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 12:13:14.79
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 18-DEC-2019 12:47:43.02

LIMS No., Customer Name, Client ID: S50 5ML MIXED GAMMA CALIBRATION

Sample ID : 11S50121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 11S50121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 11BG112719MT
Start Channel : 70 Energy Tol : 2.00000 Real Time : 0 03:46:41.61
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 03:45:57.97
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.49	28911	9660	1.40	92.06	6.56E+00	2.13E+00	0.9	
2	0	75.22	520	6287	0.90	149.55	7.43E+00	3.84E-02	27.0	
3	0	88.03	27395	7771	1.41	175.20	7.27E+00	2.02E+00	0.9	
4	0	122.05	18602	6243	1.46	243.27	6.46E+00	1.37E+00	1.1	
5	0	136.49	2351	4406	1.44	272.17	6.08E+00	1.73E-01	5.7	
6	0	165.86	10336	4773	1.52	330.94	5.39E+00	7.62E-01	1.6	
7	0	199.23	418	3693	1.51	397.70	4.74E+00	3.09E-02	25.6	
8	0	255.31	472	3399	1.11	509.93	3.91E+00	3.48E-02	22.7	
9	0	279.10	3299	4526	1.55	557.54	3.63E+00	2.43E-01	4.7	
10	0	391.72	14071	4008	1.68	782.88	2.73E+00	1.04E+00	1.3	
11	0	514.04	8152	3688	1.71	1027.64	2.17E+00	6.01E-01	2.0	
12	0	661.64	35340	3260	1.87	1322.97	1.75E+00	2.61E+00	0.6	
13	0	898.01	18766	3059	2.00	1795.90	1.36E+00	1.38E+00	1.0	
14	0	1173.19	28107	1699	2.23	2346.47	1.09E+00	2.07E+00	0.7	
15	0	1332.49	24977	1153	2.36	2665.17	9.75E-01	1.84E+00	0.7	
16	0	1836.01	10864	297	2.57	3672.49	7.34E-01	8.01E-01	1.0	

Spectrum : MCA0:[NDSCOUNT]TBE11$1
Calib Date: 26-DEC-2019 12:13
Detector :
Geometry : 11S50121819
Fit type : 5th Degree Empirical



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 12:14:19.85
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 18-DEC-2019 12:47:43.02

LIMS No., Customer Name, Client ID: S50 5ML MIXED GAMMA CALIBRATION

Sample ID : 11S50121819 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 11S50121819
Quantity : 1.00000E+00 TOTAL BKGFILE : 11BG112719MT
Start Channel : 70 Energy Tol : 2.00000 Real Time : 0 03:46:41.61
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 03:45:57.97
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.49*	28703	9660	1.40	92.06	6.56E+00	2.12E+00	0.9	
2	0	75.22*	72	6287	0.90	149.55	7.43E+00	5.31E-03	196.1	
3	0	88.03*	27332	7771	1.41	175.20	7.27E+00	2.02E+00	0.9	
4	0	122.05	18602	6243	1.46	243.27	6.46E+00	1.37E+00	1.1	
5	0	136.49	2351	4406	1.44	272.17	6.08E+00	1.73E-01	5.7	
6	0	165.86	10336	4773	1.52	330.94	5.39E+00	7.62E-01	1.6	
7	0	199.23	418	3693	1.51	397.70	4.74E+00	3.09E-02	25.6	
8	0	255.31	472	3399	1.11	509.93	3.91E+00	3.48E-02	22.7	
9	0	279.10	3299	4526	1.55	557.54	3.63E+00	2.43E-01	4.7	
10	0	391.72	14071	4008	1.68	782.88	2.73E+00	1.04E+00	1.3	
11	0	514.04	8152	3688	1.71	1027.64	2.17E+00	6.01E-01	2.0	
12	0	661.64	35340	3260	1.87	1322.97	1.75E+00	2.61E+00	0.6	
13	0	898.01	18766	3059	2.00	1795.90	1.36E+00	1.38E+00	1.0	
14	0	1173.19	28107	1699	2.23	2346.47	1.09E+00	2.07E+00	0.7	
15	0	1332.49	24977	1153	2.36	2665.17	9.75E-01	1.84E+00	0.7	
16	0	1836.01	10864	297	2.57	3672.49	7.34E-01	8.01E-01	1.0	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	27332	3.72*	7.270E+00	7.455E+02	1.006E+03	1.80
03-CO57	122.06	18602	85.51*	6.455E+00	2.486E+01	4.148E+01	2.29
04-CE139	165.85	10336	80.35*	5.393E+00	1.759E+01	4.819E+01	3.25
05-HG203	279.20	3299	81.46*	3.633E+00	8.224E+00	1.612E+02	9.32
06-SN113	391.69	14071	64.90*	2.731E+00	5.855E+01	1.954E+02	2.55
07-SR85	513.99	8152	99.27*	2.166E+00	2.796E+01	2.374E+02	3.92
08-CS137	661.65	35340	85.12*	1.750E+00	1.750E+02	1.772E+02	1.30
09-Y88	898.02	18766	93.40*	1.357E+00	1.092E+02	4.011E+02	2.03
10-CO60	1173.22	28107	100.00	1.086E+00	1.909E+02	2.052E+02	1.42
	1332.49	24977	100.00*	9.751E-01	1.889E+02	2.030E+02	1.42
12-Y88	1836.01	10864	99.38*	7.343E-01	1.098E+02	4.032E+02	2.09

Flag: "*" = Keyline

Sample ID : 11S50121819 Acquisition date : 18-DEC-2019 12:47:43

Total number of lines in spectrum	16	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	11	68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.455E+02	1.006E+03	0.018E+03	1.80	
03-CO57	270.90D	1.67	2.486E+01	4.148E+01	0.095E+01	2.29	
04-CE139	137.66D	2.74	1.759E+01	4.819E+01	0.157E+01	3.25	
05-HG203	46.61D	19.6	8.224E+00	1.612E+02	0.150E+02	9.32	
06-SN113	115.10D	3.34	5.855E+01	1.954E+02	0.050E+02	2.55	
07-SR85	64.84D	8.49	2.796E+01	2.374E+02	0.093E+02	3.92	
08-CS137	30.17Y	1.01	1.750E+02	1.772E+02	0.023E+02	1.30	
09-Y88	106.65D	3.67	1.092E+02	4.011E+02	0.081E+02	2.03	
10-CO60	5.27Y	1.07	1.889E+02	2.030E+02	0.029E+02	1.42	
12-Y88	106.65D	3.67	1.098E+02	4.032E+02	0.084E+02	2.09	
	Total Activity :		1.466E+03	2.874E+03			

Grand Total Activity : 1.466E+03 2.874E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 11S50121819 Acquisition date : 18-DEC-2019 12:47:43

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.49	28703	9660	1.40	92.06	86	13	2.12E+00	1.9	6.56E+00	
0	75.22	72	6287	0.90	149.55	146	8	5.31E-03	****	7.43E+00	
0	136.49	2351	4406	1.44	272.17	267	10	1.73E-01	11.3	6.08E+00	
0	199.23	418	3693	1.51	397.70	395	8	3.09E-02	51.3	4.74E+00	
0	255.31	472	3399	1.11	509.93	506	9	3.48E-02	45.5	3.91E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	11	68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.455E+02	1.006E+03	0.018E+03	1.80	
03-CO57	270.90D	1.67	2.486E+01	4.148E+01	0.095E+01	2.29	
04-CE139	137.66D	2.74	1.759E+01	4.819E+01	0.157E+01	3.25	
05-HG203	46.61D	19.6	8.224E+00	1.612E+02	0.150E+02	9.32	
06-SN113	115.10D	3.34	5.855E+01	1.954E+02	0.050E+02	2.55	
07-SR85	64.84D	8.49	2.796E+01	2.374E+02	0.093E+02	3.92	
08-CS137	30.17Y	1.01	1.750E+02	1.772E+02	0.023E+02	1.30	
09-Y88	106.65D	3.67	1.092E+02	4.011E+02	0.081E+02	2.03	
10-CO60	5.27Y	1.07	1.899E+02	2.041E+02	0.020E+02	1.00	
12-Y88	106.65D	3.67	1.098E+02	4.032E+02	0.084E+02	2.09	
	Total Activity :		1.467E+03	2.875E+03			

Grand Total Activity : 1.467E+03 2.875E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.006E+03	1.807E+01	1.322E+01	0.000E+00	76.080
03-CO57	4.148E+01	9.485E-01	6.726E-01	0.000E+00	61.665
04-CE139	4.819E+01	1.566E+00	1.358E+00	0.000E+00	35.490
05-HG203	1.612E+02	1.503E+01	1.309E+01	0.000E+00	12.319
06-SN113	1.954E+02	4.977E+00	3.498E+00	0.000E+00	55.856

07-SR85	2.374E+02	9.307E+00	7.023E+00	0.000E+00	33.813
08-CS137	1.772E+02	2.297E+00	1.100E+00	0.000E+00	161.086
09-Y88	4.011E+02	8.140E+00	4.509E+00	0.000E+00	88.957
10-CO60	2.041E+02	2.049E+00	1.112E+00	0.000E+00	183.540
12-Y88	4.032E+02	8.438E+00	2.376E+00	0.000E+00	169.648

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	-4.500E-01		5.041E-01	8.374E-01	0.000E+00	-0.537

```
A,11S50121819     ,12/26/2019 12:14,06/01/2019 12:00,   1.000E+00,S50 5ML MIXED
B,11S50121819     ,CALIBRATION         ,12/26/2019 12:13,11S50121819
C,02-CD109,YES,   1.006E+03,   1.807E+01,   1.322E+01,,   76.080
C,03-CO57 ,YES,   4.148E+01,   9.485E-01,   6.726E-01,,   61.665
C,04-CE139,YES,   4.819E+01,   1.566E+00,   1.358E+00,,   35.490
C,05-HG203,YES,   1.612E+02,   1.503E+01,   1.309E+01,,   12.319
C,06-SN113,YES,   1.954E+02,   4.977E+00,   3.498E+00,,   55.856
C,07-SR85 ,YES,   2.374E+02,   9.307E+00,   7.023E+00,,   33.813
C,08-CS137,YES,   1.772E+02,   2.297E+00,   1.100E+00,,  161.086
C,09-Y88  ,YES,   4.011E+02,   8.140E+00,   4.509E+00,,   88.957
C,10-CO60 ,YES,   2.041E+02,   2.049E+00,   1.112E+00,,  183.540
C,12-Y88  ,YES,   4.032E+02,   8.438E+00,   2.376E+00,,  169.648
C,01-AM241,NO ,  -4.500E-01,   5.041E-01,   8.374E-01,,   -0.537
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E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Pb-210	22.26Y	46.6	72.1		4.18%	762.12	31.86		
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1006.0	-0.06%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.2	0.76%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	50.5	-0.89%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62		
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	190.5	-0.07%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	245.0	-0.41%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	174.3	1.57%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	392.8	-3.30%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	203.4	-0.01%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	206.5	1.40%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	401.3	-0.59%

Eff. Name: **13S25030421**

Analyst: KOJ

Analyst:

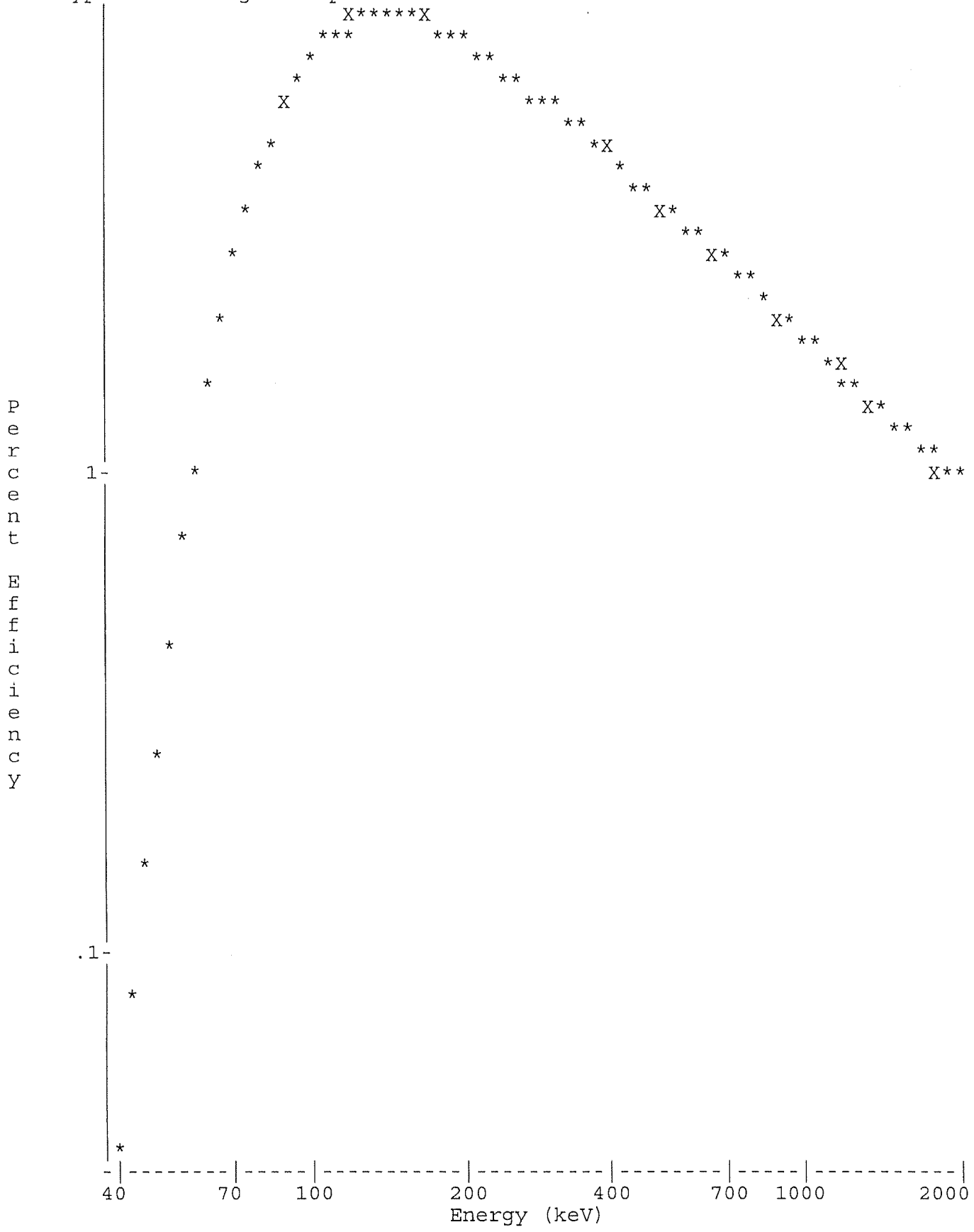
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 10-MAR-2021 08:32:24.00
TBE13 31-TP10727B HpGe ******* Aquisition Date/Time: 4-MAR-2021 08:26:35.99

LIMS No., Customer Name, Client ID: S25 BOTTLE 5ML MIXED GAMMA CALIBRATION

Sample ID : 13S25030421 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : PCI Geometry : 13S25030421
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 80 Energy Tol : 2.00000 Real Time : 2 07:44:10.81
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 2 07:39:05.39
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentfied

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.58	4989	51226	0.71	93.19	2.06E-01	2.49E-02	7.7	1.43E+00
2	1	74.96	2858	35428	0.67	149.83	3.49E+00	1.43E-02	10.1	2.59E+00
3	10	85.57	4415	72939	1.67	171.01	5.06E+00	2.20E-02	12.1	3.44E+01
4	10	88.07	154794	33915	0.76	176.01	5.39E+00	7.73E-01	0.3	
5	1	122.09	105952	56401	0.79	243.91	7.97E+00	5.29E-01	0.5	2.91E+00
6	1	136.48	13314	45983	0.78	272.65	8.21E+00	6.65E-02	2.9	4.73E-01
7	1	165.86	25526	49624	0.83	331.30	8.00E+00	1.27E-01	1.7	6.24E-01
8	1	310.50	1311	28512	0.92	620.13	5.27E+00	6.54E-03	20.6	2.48E+00
9	1	391.71	22323	45189	1.05	782.32	4.33E+00	1.11E-01	1.9	9.26E-01
10	8	510.92	5205	46624	2.32	1020.48	3.44E+00	2.60E-02	8.9	1.27E+00
11	8	513.91	1724	19763	1.08	1026.44	3.42E+00	8.60E-03	13.3	
12	1	661.55	776934	37953	1.32	1321.48	2.72E+00	3.88E+00	0.1	2.25E+01
13	1	897.98	22837	31299	1.57	1794.09	2.03E+00	1.14E-01	1.7	2.35E+00
14	1	1173.32	500545	19886	1.75	2344.81	1.55E+00	2.50E+00	0.2	2.91E+01
15	1	1332.60	447055	7966	1.87	2663.50	1.36E+00	2.23E+00	0.2	3.48E+01
16	1	1460.82	1361	2233	2.07	2920.14	1.25E+00	6.79E-03	7.6	1.11E+00
17	1	1835.93	12509	1930	2.24	3671.32	1.02E+00	6.24E-02	1.2	2.42E+00

Spectrum : MCA0:[NDSCOUNT]TBE13$1
Calib Date: 10-MAR-2021 08:32
Detector :
Geometry : 13S25030421
Fit type : 5th Degree Empirical



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 10-MAR-2021 08:33:36.47
TBE13 31-TP10727B HpGe ******* Aquisition Date/Time: 4-MAR-2021 08:26:35.99

LIMS No., Customer Name, Client ID: S25 BOTTLE 5ML MIXED GAMMA CALIBRATION

Sample ID : 13S25030421 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : PCI Geometry : 13S25030421
Quantity : 1.00000E+00 TOTAL BKGFILE : 13BG030521MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 2 07:44:10.81
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 2 07:39:05.39
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentfied

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.58	4989	51226	0.71	93.19	2.06E-01	2.49E-02	7.7	1.43E+00
2	1	74.96*	1332	35428	0.67	149.83	3.49E+00	6.65E-03	22.2	2.59E+00
3	10	85.57*	3228	72939	1.67	171.01	5.06E+00	1.61E-02	16.7	3.44E+01
4	10	88.07*	154300	33915	0.76	176.01	5.39E+00	7.70E-01	0.3	
5	1	122.09	105952	56401	0.79	243.91	7.97E+00	5.29E-01	0.5	2.91E+00
6	1	136.48	13314	45983	0.78	272.65	8.21E+00	6.65E-02	2.9	4.73E-01
7	1	165.86	25526	49624	0.83	331.30	8.00E+00	1.27E-01	1.7	6.24E-01
8	1	310.50	1311	28512	0.92	620.13	5.27E+00	6.54E-03	20.6	2.48E+00
9	1	391.71	22323	45189	1.05	782.32	4.33E+00	1.11E-01	1.9	9.26E-01
10	8	510.92*	115	46624	2.32	1020.48	3.44E+00	5.75E-04	19.6	1.27E+00
11	8	513.91	1724	19763	1.08	1026.44	3.42E+00	8.60E-03	13.3	
12	1	661.55	776934	37953	1.32	1321.48	2.72E+00	3.88E+00	0.1	2.25E+01
13	1	897.98	22837	31299	1.57	1794.09	2.03E+00	1.14E-01	1.7	2.35E+00
14	1	1173.32	500545	19886	1.75	2344.81	1.55E+00	2.50E+00	0.2	2.91E+01
15	1	1332.60	447055	7966	1.87	2663.50	1.36E+00	2.23E+00	0.2	3.48E+01
16	1	1460.82*	252	2233	2.07	2920.14	1.25E+00	1.26E-03	46.5	1.11E+00
17	1	1835.93	12509	1930	2.24	3671.32	1.02E+00	6.24E-02	1.2	2.42E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	154300	3.72*	5.388E+00	3.842E+02	1.006E+03	0.63
03-CO57	122.06	105952	85.51*	7.969E+00	7.761E+00	4.022E+01	1.02
04-CE139	165.85	25526	80.35*	7.997E+00	1.983E+00	5.051E+01	3.39
06-SN113	391.69	22323	64.90*	4.330E+00	3.965E+00	1.905E+02	3.81
07-SR85	513.99	1724	99.27*	3.420E+00	2.534E-01	2.450E+02	26.51
08-CS137	661.65	776934	85.12*	2.722E+00	1.674E+02	1.743E+02	0.25
09-Y88	898.02	22837	93.40*	2.029E+00	6.014E+00	3.928E+02	3.37
10-CO60	1173.22	500545	100.00	1.549E+00	1.613E+02	2.034E+02	0.31
	1332.49	447055	100.00*	1.362E+00	1.638E+02	2.065E+02	0.31
12-Y88	1836.01	12509	99.38*	1.023E+00	6.144E+00	4.013E+02	2.41

Flag: "*" = Keyline

Sample ID : 13S25030421 Acquisition date : 4-MAR-2021 08:26:35

Total number of lines in spectrum 17
Number of unidentified lines 7
Number of lines tentatively identified by NID 10 58.82%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	2.62	3.842E+02	1.006E+03	0.006E+03	0.63	
03-CO57	270.90D	5.18	7.761E+00	4.022E+01	0.041E+01	1.02	
04-CE139	137.66D	25.5	1.983E+00	5.051E+01	0.171E+01	3.39	
06-SN113	115.10D	48.1	3.965E+00	1.905E+02	0.073E+02	3.81	
07-SR85	64.84D	967.	2.534E-01	2.450E+02	0.649E+02	26.51	
08-CS137	30.17Y	1.04	1.674E+02	1.743E+02	0.004E+02	0.25	
09-Y88	106.65D	65.3	6.014E+00	3.928E+02	0.132E+02	3.37	
10-CO60	5.27Y	1.26	1.638E+02	2.065E+02	0.006E+02	0.31	
12-Y88	106.65D	65.3	6.144E+00	4.013E+02	0.097E+02	2.41	
	Total Activity :		7.415E+02	2.707E+03			

Grand Total Activity : 7.415E+02 2.707E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 13S25030421 Acquisition date : 4-MAR-2021 08:26:35

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.58	4989	51226	0.71	93.19	90	7	2.49E-02	15.3	2.06E-01	
1	74.96	1332	35428	0.67	149.83	148	5	6.65E-03	44.4	3.49E+00	
10	85.57	3228	72939	1.67	171.01	164	20	1.61E-02	33.4	5.06E+00	
1	136.48	13314	45983	0.78	272.65	269	8	6.65E-02	5.8	8.21E+00	
1	310.50	1311	28512	0.92	620.13	618	6	6.54E-03	41.1	5.27E+00	
8	510.92	115	46624	2.32	1020.48	1012	18	5.75E-04	****	3.44E+00	
1	1460.82	252	2233	2.07	2920.14	2914	13	1.26E-03	93.1	1.25E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	17	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	10	58.82%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	2.62	3.842E+02	1.006E+03	0.006E+03	0.63	
03-CO57	270.90D	5.18	7.761E+00	4.022E+01	0.041E+01	1.02	
04-CE139	137.66D	25.5	1.983E+00	5.051E+01	0.171E+01	3.39	
06-SN113	115.10D	48.1	3.965E+00	1.905E+02	0.073E+02	3.81	
07-SR85	64.84D	967.	2.534E-01	2.450E+02	0.649E+02	26.51	
08-CS137	30.17Y	1.04	1.674E+02	1.743E+02	0.004E+02	0.25	
09-Y88	106.65D	65.3	6.014E+00	3.928E+02	0.132E+02	3.37	
10-CO60	5.27Y	1.26	1.638E+02	2.065E+02	0.006E+02	0.31	
12-Y88	106.65D	65.3	6.144E+00	4.013E+02	0.097E+02	2.41	
	Total Activity :		7.415E+02	2.707E+03			
	Grand Total Activity :		7.415E+02	2.707E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.006E+03	6.368E+00	5.037E+00	0.000E+00	199.787
03-CO57	4.022E+01	4.086E-01	2.913E-01	0.000E+00	138.061
04-CE139	5.051E+01	1.712E+00	1.505E+00	0.000E+00	33.569
06-SN113	1.905E+02	7.250E+00	6.868E+00	0.000E+00	27.740
07-SR85	2.450E+02	6.495E+01	1.023E+02	0.000E+00	2.394
08-CS137	1.743E+02	4.422E-01	1.464E-01	0.000E+00	1190.429
09-Y88	3.928E+02	1.324E+01	1.260E+01	0.000E+00	31.174
10-CO60	2.065E+02	6.499E-01	1.422E-01	0.000E+00	1452.522
12-Y88	4.013E+02	9.652E+00	5.648E+00	0.000E+00	71.048

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	-2.898E-01		4.645E-01	7.886E-01	0.000E+00	-0.368
05-HG203	-2.264E+02		7.343E+02	1.213E+03	0.000E+00	-0.187

```
A,13S25030421     ,03/10/2021 08:33,06/01/2019 12:00,   1.000E+00,S25 BOTTLE 5ML
B,13S25030421     ,CALIBRATION         ,03/10/2021 08:32,13S25030421
C,02-CD109,YES,   1.006E+03,   6.368E+00,   5.037E+00,,  199.787
C,03-CO57 ,YES,   4.022E+01,   4.086E-01,   2.913E-01,,  138.061
C,04-CE139,YES,   5.051E+01,   1.712E+00,   1.505E+00,,   33.569
C,06-SN113,YES,   1.905E+02,   7.250E+00,   6.868E+00,,   27.740
C,07-SR85 ,YES,   2.450E+02,   6.495E+01,   1.023E+02,,    2.394
C,08-CS137,YES,   1.743E+02,   4.422E-01,   1.464E-01,, 1190.429
C,09-Y88  ,YES,   3.928E+02,   1.324E+01,   1.260E+01,,   31.174
C,10-CO60 ,YES,   2.065E+02,   6.499E-01,   1.422E-01,, 1452.522
C,12-Y88  ,YES,   4.013E+02,   9.652E+00,   5.648E+00,,   71.048
C,01-AM241,NO ,  -2.898E-01,   4.645E-01,   7.886E-01,,   -0.368
C,05-HG203,NO ,  -2.264E+02,   7.343E+02,   1.213E+03,,   -0.187
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1006.0	-0.06%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	39.9	0.04%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	51.1	0.21%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	146.7	-5.99%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	190.2	-0.22%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	243.7	-0.94%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	175.7	2.38%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	393.7	-3.08%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	203.1	-0.16%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	207.0	1.65%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	401.9	-0.44%

Eff. Name: **14S25121719**

Analyst: KOJ

Analyst:

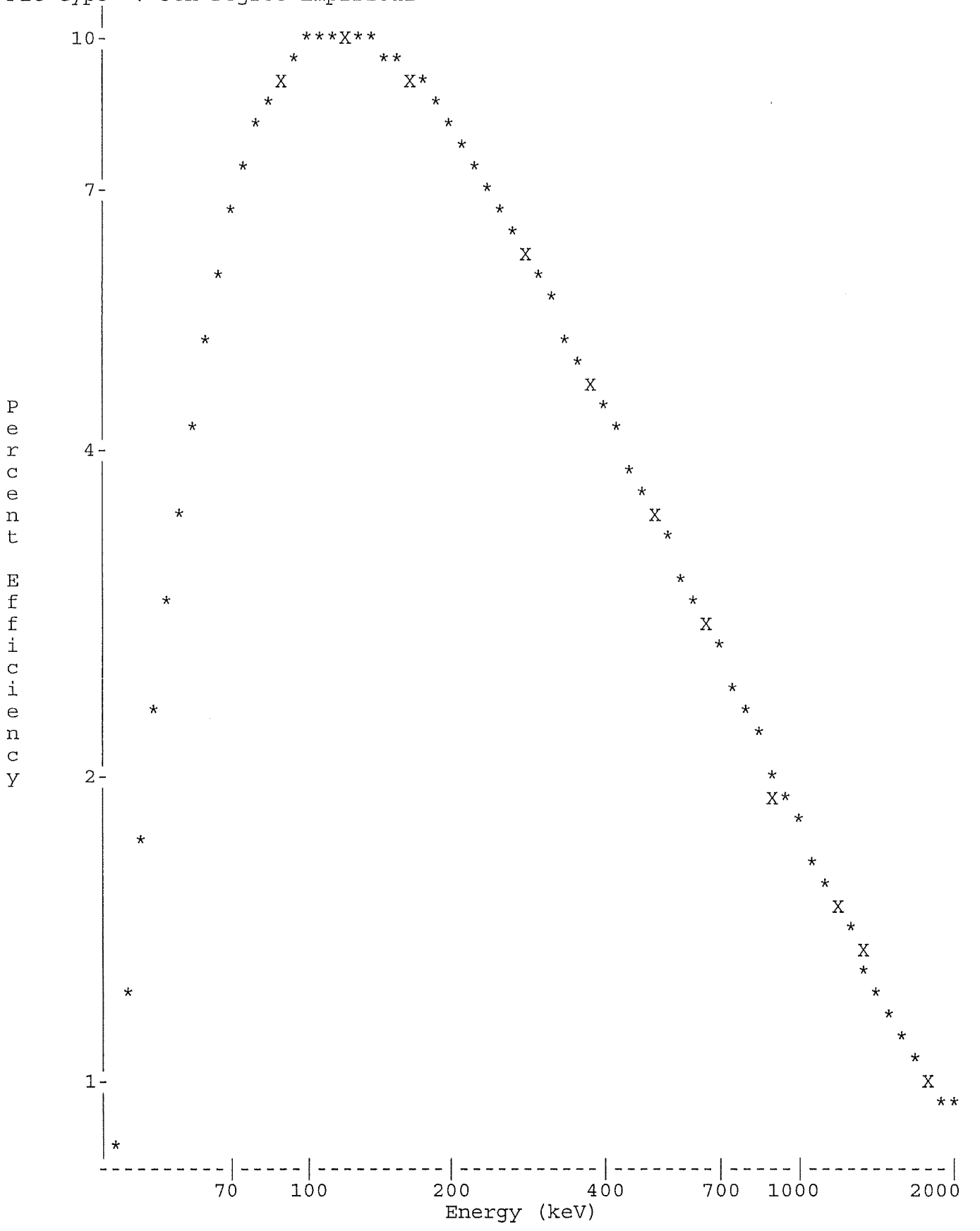
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 10:18:27.43
TBE14 54-TP42603C HpGe ******* Aquisition Date/Time: 17-DEC-2019 17:50:38.86

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 14S25121719 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 14S25121719
Quantity : 1.00000E+00 TOTAL BKGFILE : 14BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 04:01:00.29
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 04:00:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.59	4672	6896	0.82	89.97	1.64E+00	3.24E-01	3.3	4.79E+00
2	1	88.04	35463	10516	0.84	172.85	8.86E+00	2.46E+00	0.8	4.00E+00
3	1	122.05	29780	8564	0.87	240.85	1.01E+01	2.07E+00	0.8	4.38E+00
4	1	136.46	3698	7567	0.89	269.66	9.91E+00	2.57E-01	4.7	1.24E+00
5	1	165.85	19824	6625	0.93	328.42	9.15E+00	1.38E+00	1.0	1.01E+00
6	1	255.11	1157	5861	0.95	506.90	6.71E+00	8.04E-02	12.3	3.79E-01
7	1	279.19	5512	6288	1.08	555.04	6.21E+00	3.83E-01	3.1	3.04E+00
8	1	391.70	24307	6255	1.14	780.03	4.54E+00	1.69E+00	0.9	2.52E+00
9	1	514.00	14414	5472	1.23	1024.59	3.48E+00	1.00E+00	1.4	7.45E+00
10	1	661.64	57433	5272	1.37	1319.86	2.70E+00	3.99E+00	0.5	1.58E+01
11	1	814.11	540	2411	1.47	1624.82	2.18E+00	3.75E-02	17.5	1.46E+00
12	1	898.03	28517	4449	1.54	1792.67	1.97E+00	1.98E+00	0.8	1.01E+01
13	1	1173.22	40660	2487	1.72	2343.16	1.49E+00	2.82E+00	0.6	1.86E+01
14	4	1325.51	582	1036	2.68	2647.85	1.32E+00	4.04E-02	13.1	1.27E+01
15	4	1332.48	36574	668	1.86	2661.80	1.32E+00	2.54E+00	0.5	
16	1	1836.00	15871	453	2.16	3669.35	1.01E+00	1.10E+00	0.9	1.15E+01

Spectrum : MCA0:[NDSCOUNT]TBE14$1
Calib Date: 26-DEC-2019 10:18
Detector :
Geometry : 14S25121719
Fit type : 5th Degree Empirical



Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-DEC-2019 10:19:43.49
TBE14 54-TP42603C HpGe ******* Aquisition Date/Time: 17-DEC-2019 17:50:38.86

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 14S25121719 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 14S25121719
Quantity : 1.00000E+00 TOTAL BKGFILE : 14BG112719MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 04:01:00.29
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 04:00:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.59	4672	6896	0.82	89.97	1.64E+00	3.24E-01	3.3	4.79E+00
2	1	88.04*	35436	10516	0.84	172.85	8.86E+00	2.46E+00	0.8	4.00E+00
3	1	122.05	29780	8564	0.87	240.85	1.01E+01	2.07E+00	0.8	4.38E+00
4	1	136.46	3698	7567	0.89	269.66	9.91E+00	2.57E-01	4.7	1.24E+00
5	1	165.85	19824	6625	0.93	328.42	9.15E+00	1.38E+00	1.0	1.01E+00
6	1	255.11	1157	5861	0.95	506.90	6.71E+00	8.04E-02	12.3	3.79E-01
7	1	279.19	5512	6288	1.08	555.04	6.21E+00	3.83E-01	3.1	3.04E+00
8	1	391.70	24307	6255	1.14	780.03	4.54E+00	1.69E+00	0.9	2.52E+00
9	1	514.00	14414	5472	1.23	1024.59	3.48E+00	1.00E+00	1.4	7.45E+00
10	1	661.64	57433	5272	1.37	1319.86	2.70E+00	3.99E+00	0.5	1.58E+01
11	1	814.11	540	2411	1.47	1624.82	2.18E+00	3.75E-02	17.5	1.46E+00
12	1	898.03	28517	4449	1.54	1792.67	1.97E+00	1.98E+00	0.8	1.01E+01
13	1	1173.22	40660	2487	1.72	2343.16	1.49E+00	2.82E+00	0.6	1.86E+01
14	4	1325.51	582	1036	2.68	2647.85	1.32E+00	4.04E-02	13.1	1.27E+01
15	4	1332.48	36574	668	1.86	2661.80	1.32E+00	2.54E+00	0.5	
16	1	1836.00	15871	453	2.16	3669.35	1.01E+00	1.10E+00	0.9	1.15E+01

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
02-CD109	88.03	35436	3.72*	8.862E+00	7.464E+02	1.006E+03	1.52
03-CO57	122.06	29780	85.51*	1.009E+01	2.398E+01	3.993E+01	1.65
04-CE139	165.85	19824	80.35*	9.153E+00	1.872E+01	5.107E+01	2.06
05-HG203	279.20	5512	81.46*	6.208E+00	7.569E+00	1.467E+02	6.21
06-SN113	391.69	24307	64.90*	4.543E+00	5.725E+01	1.902E+02	1.86
07-SR85	513.99	14414	99.27*	3.485E+00	2.893E+01	2.437E+02	2.75
08-CS137	661.65	57433	85.12*	2.700E+00	1.735E+02	1.757E+02	1.01
09-Y88	898.02	28517	93.40*	1.967E+00	1.078E+02	3.937E+02	1.58
10-CO60	1173.22	40660	100.00	1.494E+00	1.890E+02	2.031E+02	1.14
	1332.49	36574	100.00*	1.318E+00	1.927E+02	2.070E+02	1.08
12-Y88	1836.01	15871	99.38*	1.008E+00	1.100E+02	4.019E+02	1.73

Flag: "*" = Keyline

Sample ID : 14S25121719 Acquisition date : 17-DEC-2019 17:50:38

Total number of lines in spectrum 16
Number of unidentified lines 5
Number of lines tentatively identified by NID 11 68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.464E+02	1.006E+03	0.015E+03	1.52	
03-CO57	270.90D	1.67	2.398E+01	3.993E+01	0.066E+01	1.65	
04-CE139	137.66D	2.73	1.872E+01	5.107E+01	0.105E+01	2.06	
05-HG203	46.61D	19.4	7.569E+00	1.467E+02	0.091E+02	6.21	
06-SN113	115.10D	3.32	5.725E+01	1.902E+02	0.035E+02	1.86	
07-SR85	64.84D	8.42	2.893E+01	2.437E+02	0.067E+02	2.75	
08-CS137	30.17Y	1.01	1.735E+02	1.757E+02	0.018E+02	1.01	
09-Y88	106.65D	3.65	1.078E+02	3.937E+02	0.062E+02	1.58	
10-CO60	5.27Y	1.07	1.927E+02	2.070E+02	0.022E+02	1.08	
12-Y88	106.65D	3.65	1.100E+02	4.019E+02	0.070E+02	1.73	
			---------	---------			
	Total Activity :		1.467E+03	2.856E+03			

Grand Total Activity : 1.467E+03 2.856E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 14S25121719 Acquisition date : 17-DEC-2019 17:50:38

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.59	4672	6896	0.82	89.97	86	7	3.24E-01	6.6	1.64E+00	
1	136.46	3698	7567	0.89	269.66	265	10	2.57E-01	9.4	9.91E+00	
1	255.11	1157	5861	0.95	506.90	503	9	8.04E-02	24.6	6.71E+00	
1	814.11	540	2411	1.47	1624.82	1620	10	3.75E-02	35.0	2.18E+00	
4	1325.51	582	1036	2.68	2647.85	2637	33	4.04E-02	26.2	1.32E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	11	68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
02-CD109	462.90D	1.35	7.464E+02	1.006E+03	0.015E+03	1.52	
03-CO57	270.90D	1.67	2.398E+01	3.993E+01	0.066E+01	1.65	
04-CE139	137.66D	2.73	1.872E+01	5.107E+01	0.105E+01	2.06	
05-HG203	46.61D	19.4	7.569E+00	1.467E+02	0.091E+02	6.21	
06-SN113	115.10D	3.32	5.725E+01	1.902E+02	0.035E+02	1.86	
07-SR85	64.84D	8.42	2.893E+01	2.437E+02	0.067E+02	2.75	
08-CS137	30.17Y	1.01	1.735E+02	1.757E+02	0.018E+02	1.01	
09-Y88	106.65D	3.65	1.078E+02	3.937E+02	0.062E+02	1.58	
10-CO60	5.27Y	1.07	1.909E+02	2.051E+02	0.016E+02	0.79	
12-Y88	106.65D	3.65	1.100E+02	4.019E+02	0.070E+02	1.73	
	Total Activity :		1.465E+03	2.854E+03			

Grand Total Activity : 1.465E+03 2.854E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
02-CD109	1.006E+03	1.533E+01	9.506E+00	0.000E+00	105.834
03-CO57	3.993E+01	6.577E-01	4.039E-01	0.000E+00	98.864
04-CE139	5.107E+01	1.051E+00	7.760E-01	0.000E+00	65.808
05-HG203	1.467E+02	9.105E+00	7.581E+00	0.000E+00	19.347
06-SN113	1.902E+02	3.544E+00	2.145E+00	0.000E+00	88.653

07-SR85	2.437E+02	6.705E+00	4.296E+00	0.000E+00	56.725
08-CS137	1.757E+02	1.777E+00	7.350E-01	0.000E+00	239.076
09-Y88	3.937E+02	6.236E+00	3.279E+00	0.000E+00	120.049
10-CO60	2.051E+02	1.611E+00	6.845E-01	0.000E+00	299.620
12-Y88	4.019E+02	6.973E+00	1.890E+00	0.000E+00	212.590

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	3.895E-01		8.108E-01	1.321E+00	0.000E+00	0.295

```
A,14S25121719     ,12/26/2019 10:19,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,14S25121719     ,CALIBRATION         ,12/26/2019 10:18,14S25121719
C,02-CD109,YES,   1.006E+03,   1.533E+01,   9.506E+00,,  105.834
C,03-CO57 ,YES,   3.993E+01,   6.577E-01,   4.039E-01,,   98.864
C,04-CE139,YES,   5.107E+01,   1.051E+00,   7.760E-01,,   65.808
C,05-HG203,YES,   1.467E+02,   9.105E+00,   7.581E+00,,   19.347
C,06-SN113,YES,   1.902E+02,   3.544E+00,   2.145E+00,,   88.653
C,07-SR85 ,YES,   2.437E+02,   6.705E+00,   4.296E+00,,   56.725
C,08-CS137,YES,   1.757E+02,   1.777E+00,   7.350E-01,,  239.076
C,09-Y88  ,YES,   3.937E+02,   6.236E+00,   3.279E+00,,  120.049
C,10-CO60 ,YES,   2.051E+02,   1.611E+00,   6.845E-01,,  299.620
C,12-Y88  ,YES,   4.019E+02,   6.973E+00,   1.890E+00,,  212.590
C,01-AM241,NO ,   3.895E-01,   8.108E-01,   1.321E+00,,    0.295
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

S25 Bottle

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Pb-210	22.26Y	46.6	72.1		4.18%	762.12	31.86	787.2	3.29%
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1001.0	-0.56%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.7	1.84%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	49.9	-2.05%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62		
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	191.2	0.30%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	262.8	6.82%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	172.9	0.75%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	392.2	-3.45%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	203.5	0.04%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	207.2	1.75%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	400.7	-0.74%

Eff. Name: **23S25122820**

Analyst: KOJ

Analyst:

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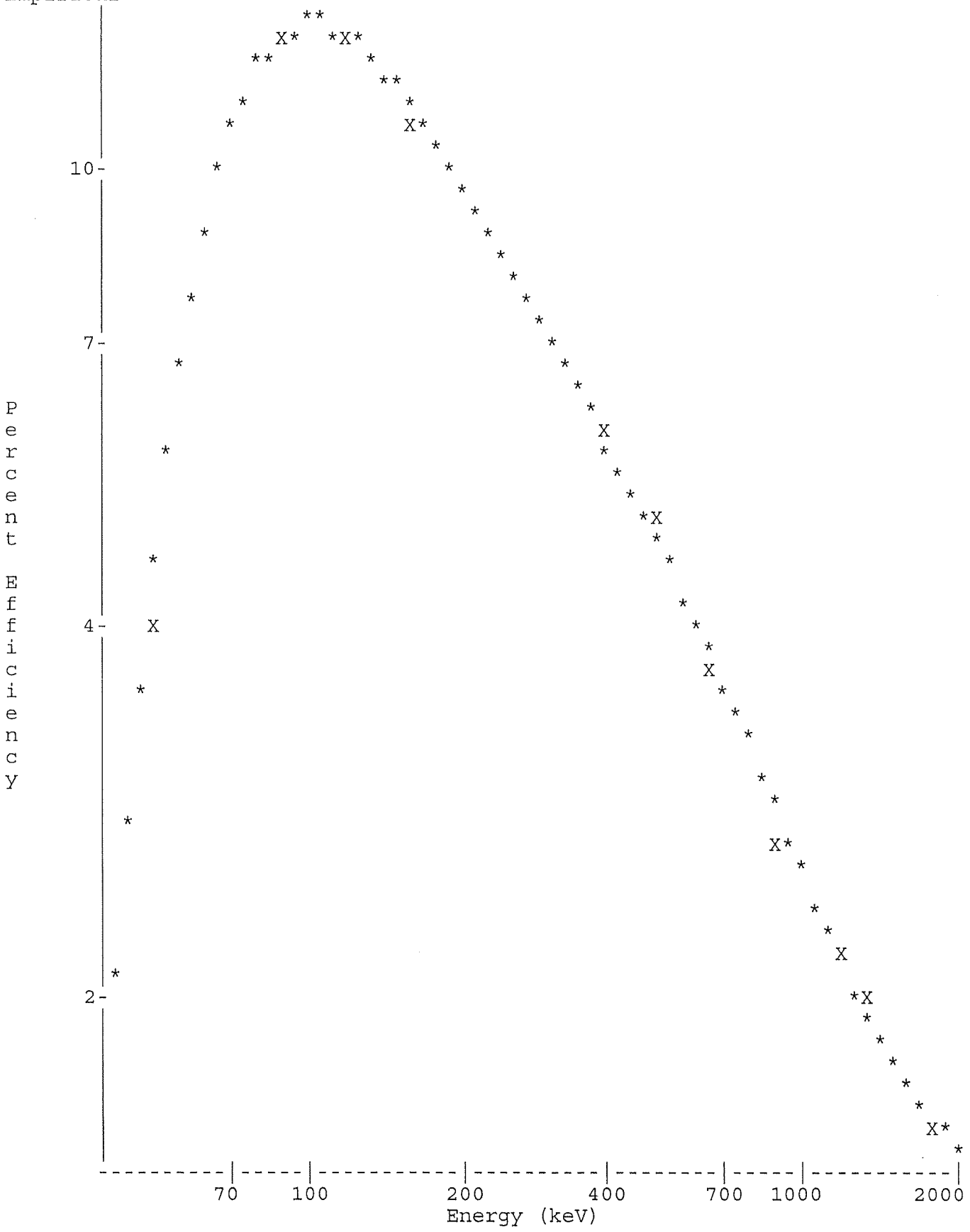
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 29-DEC-2020 13:35:55.26
TBE23 03017322 HpGe ********** Aquisition Date/Time: 28-DEC-2020 18:21:02.51

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 23S25122820 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 23S25122820
Quantity : 1.00000E+00 TOTAL BKGFILE : 23BG121820MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 19:13:29.87
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 19:11:37.83
MDA Multiple : 4.6600 Library Used: CALIBRATION_PB
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.53	86419	50241	0.92	92.99	4.10E+00	1.25E+00	0.6	
2	0	88.12	138391	33792	0.84	176.13	1.27E+01	2.00E+00	0.4	
3	0	122.12	68998	23643	0.85	244.08	1.26E+01	9.99E-01	0.6	
4	0	136.52	8600	18857	0.90	272.86	1.20E+01	1.24E-01	3.1	
5	0	165.87	16442	17766	1.05	331.53	1.08E+01	2.38E-01	1.7	
6	0	238.50	1672	14948	1.01	476.73	8.50E+00	2.42E-02	12.4	
7	0	255.14	919	9890	1.16	509.98	8.10E+00	1.33E-02	16.6	
8	0	391.65	15689	19175	1.13	782.93	5.90E+00	2.27E-01	1.9	
9	8	510.96	2394	16558	2.57	1021.50	4.76E+00	3.46E-02	11.3	4.72E-01
10	8	513.94	1795	8681	1.18	1027.47	4.74E+00	2.60E-02	9.1	
11	0	661.54	371403	14393	1.31	1322.68	3.79E+00	5.38E+00	0.2	
12	0	898.01	16812	13215	1.45	1795.77	2.82E+00	2.43E-01	1.6	
13	0	1173.30	247064	7466	1.63	2346.71	2.16E+00	3.58E+00	0.2	
14	0	1332.58	223705	3266	1.72	2665.57	1.92E+00	3.24E+00	0.2	
15	0	1461.05	254	975	1.45	2922.81	1.78E+00	3.68E-03	24.6	
16	0	1835.94	10026	1055	1.99	3673.69	1.55E+00	1.45E-01	1.3	

Spectrum : MCA0:[NDSCOUNT]TBE23$1
Calib Date: 29-DEC-2020 13:35
Detector : TBE17 Geometry : 23S25122820
Empirical



Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 29-DEC-2020 13:41:19.35
TBE23 03017322 HpGe ********** Aquisition Date/Time: 28-DEC-2020 18:21:02.51

LIMS No., Customer Name, Client ID: S25 5ML MIXED GAMMA CALIBRATION

Sample ID : 23S25122820 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 23S25122820
Quantity : 1.00000E+00 TOTAL BKGFILE : 23BG121820MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 19:13:29.87
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 19:11:37.83
MDA Multiple : 4.6600 Library Used: CALIBRATION_PB
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.53*	85939	50241	0.92	92.99	4.10E+00	1.24E+00	0.6	
2	0	88.12*	138155	33792	0.84	176.13	1.27E+01	2.00E+00	0.4	
3	0	122.12	68998	23643	0.85	244.08	1.26E+01	9.99E-01	0.6	
4	0	136.52	8600	18857	0.90	272.86	1.20E+01	1.24E-01	3.1	
5	0	165.87	16442	17766	1.05	331.53	1.08E+01	2.38E-01	1.7	
6	0	238.50*	202	14948	1.01	476.73	8.50E+00	2.93E-03	103.4	
7	0	255.14	919	9890	1.16	509.98	8.10E+00	1.33E-02	16.6	
8	0	391.65	15689	19175	1.13	782.93	5.90E+00	2.27E-01	1.9	
9	8	510.96*	546	16558	2.57	1021.50	4.76E+00	7.90E-03	50.2	4.72E-01
10	8	513.94	1795	8681	1.18	1027.47	4.74E+00	2.60E-02	9.1	
11	0	661.54	371403	14393	1.31	1322.68	3.79E+00	5.38E+00	0.2	
12	0	898.01	16812	13215	1.45	1795.77	2.82E+00	2.43E-01	1.6	
13	0	1173.30	247064	7466	1.63	2346.71	2.16E+00	3.58E+00	0.2	
14	0	1332.58	223705	3266	1.72	2665.57	1.92E+00	3.24E+00	0.2	
15	0	1461.05*	53	975	1.45	2922.81	1.78E+00	7.63E-04	122.0	
16	0	1835.94	10026	1055	1.99	3673.69	1.55E+00	1.45E-01	1.3	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
03-PB210	46.50	85939	4.05*	4.098E+00	7.495E+02	7.872E+02	1.26
04-CD109	88.03	138155	3.72*	1.273E+01	4.223E+02	1.001E+03	0.74
05-CO57	122.06	68998	85.51*	1.256E+01	9.296E+00	4.065E+01	1.13
06-CE139	165.85	16442	80.35*	1.082E+01	2.737E+00	4.992E+01	3.31
08-SN113	391.69	15689	64.90*	5.897E+00	5.932E+00	1.912E+02	3.77
09-SR85	513.99	1795	99.27*	4.736E+00	5.524E-01	2.628E+02	18.12
10-CS137	661.65	371403	85.12*	3.787E+00	1.667E+02	1.729E+02	0.36
11-Y88	898.02	16812	93.40*	2.818E+00	9.244E+00	3.922E+02	3.14
12-CO60	1173.22	247064	100.00	2.163E+00	1.653E+02	2.035E+02	0.43
	1332.49	223705	100.00*	1.923E+00	1.684E+02	2.072E+02	0.44
14-Y88	1836.01	10026	99.38*	1.546E+00	9.444E+00	4.007E+02	2.55

Flag: "*" = Keyline

Sample ID : 23S25122820 Acquisition date : 28-DEC-2020 18:21:02

Total number of lines in spectrum 16
Number of unidentified lines 5
Number of lines tentatively identified by NID 11 68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
03-PB210	22.26Y	1.05	7.495E+02	7.872E+02	0.099E+02	1.26	
04-CD109	462.90D	2.37	4.223E+02	1.001E+03	0.007E+03	0.74	
05-CO57	270.90D	4.37	9.296E+00	4.065E+01	0.046E+01	1.13	
06-CE139	137.66D	18.2	2.737E+00	4.992E+01	0.165E+01	3.31	
08-SN113	115.10D	32.2	5.932E+00	1.912E+02	0.072E+02	3.77	
09-SR85	64.84D	476.	5.524E-01	2.628E+02	0.476E+02	18.12	
10-CS137	30.17Y	1.04	1.667E+02	1.729E+02	0.006E+02	0.36	
11-Y88	106.65D	42.4	9.244E+00	3.922E+02	0.123E+02	3.14	
12-CO60	5.27Y	1.23	1.684E+02	2.072E+02	0.009E+02	0.44	
14-Y88	106.65D	42.4	9.444E+00	4.007E+02	0.102E+02	2.55	
	Total Activity :		1.544E+03	3.506E+03			
	Grand Total Activity :		1.544E+03	3.506E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 23S25122820 Acquisition date : 28-DEC-2020 18:21:02

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	136.52	8600	18857	0.90	272.86	269	9	1.24E-01	6.2	1.20E+01	
0	238.50	202	14948	1.01	476.73	474	7	2.93E-03	****	8.50E+00	
0	255.14	919	9890	1.16	509.98	508	5	1.33E-02	33.2	8.10E+00	
8	510.96	546	16558	2.57	1021.50	1015	17	7.90E-03	****	4.76E+00	
0	1461.05	53	975	1.45	2922.81	2917	11	7.63E-04	****	1.78E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	11	68.75%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
03-PB210	22.26Y	1.05	7.495E+02	7.872E+02	0.099E+02	1.26	
04-CD109	462.90D	2.37	4.223E+02	1.001E+03	0.007E+03	0.74	
05-CO57	270.90D	4.37	9.296E+00	4.065E+01	0.046E+01	1.13	
06-CE139	137.66D	18.2	2.737E+00	4.992E+01	0.165E+01	3.31	
08-SN113	115.10D	32.2	5.932E+00	1.912E+02	0.072E+02	3.77	
09-SR85	64.84D	476.	5.524E-01	2.628E+02	0.476E+02	18.12	
10-CS137	30.17Y	1.04	1.667E+02	1.729E+02	0.006E+02	0.36	
11-Y88	106.65D	42.4	9.244E+00	3.922E+02	0.123E+02	3.14	
12-CO60	5.27Y	1.23	1.684E+02	2.072E+02	0.009E+02	0.44	
14-Y88	106.65D	42.4	9.444E+00	4.007E+02	0.102E+02	2.55	
			---	---			
	Total Activity :		1.544E+03	3.506E+03			

Grand Total Activity : 1.544E+03 3.506E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
03-PB210	7.872E+02	9.939E+00	6.075E+00	0.000E+00	129.589
04-CD109	1.001E+03	7.361E+00	4.462E+00	0.000E+00	224.459
05-CO57	4.065E+01	4.593E-01	3.123E-01	0.000E+00	130.166
06-CE139	4.992E+01	1.654E+00	1.537E+00	0.000E+00	32.476
08-SN113	1.912E+02	7.215E+00	6.389E+00	0.000E+00	29.923

09-SR85	2.628E+02	4.760E+01	6.769E+01	0.000E+00	3.882
10-CS137	1.729E+02	6.173E-01	1.925E-01	0.000E+00	898.197
11-Y88	3.922E+02	1.232E+01	1.095E+01	0.000E+00	35.833
12-CO60	2.072E+02	9.144E-01	1.834E-01	0.000E+00	1129.809
14-Y88	4.007E+02	1.022E+01	4.758E+00	0.000E+00	84.219

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-CO57	0.000E+00		0.000E+00	1.333E+05	0.000E+00	0.000
02-CE139	-6.502E+01		5.161E+01	8.172E+01	0.000E+00	-0.796
07-HG203	1.778E+02		4.019E+02	6.518E+02	0.000E+00	0.273

```
A,23S25122820     ,12/29/2020 13:41,06/01/2019 12:00,   1.000E+00,S25 5ML MIXED
B,23S25122820     ,CALIBRATION_PB      ,12/29/2020 13:35,23S25122820
C,03-PB210,YES,   7.872E+02,   9.939E+00,   6.075E+00,,  129.589
C,04-CD109,YES,   1.001E+03,   7.361E+00,   4.462E+00,,  224.459
C,05-CO57 ,YES,   4.065E+01,   4.593E-01,   3.123E-01,,  130.166
C,06-CE139,YES,   4.992E+01,   1.654E+00,   1.537E+00,,   32.476
C,08-SN113,YES,   1.912E+02,   7.215E+00,   6.389E+00,,   29.923
C,09-SR85 ,YES,   2.628E+02,   4.760E+01,   6.769E+01,,    3.882
C,10-CS137,YES,   1.729E+02,   6.173E-01,   1.925E-01,,  898.197
C,11-Y88  ,YES,   3.922E+02,   1.232E+01,   1.095E+01,,   35.833
C,12-CO60 ,YES,   2.072E+02,   9.144E-01,   1.834E-01,, 1129.809
C,14-Y88  ,YES,   4.007E+02,   1.022E+01,   4.758E+00,,   84.219
C,02-CE139,NO ,  -6.502E+01,   5.161E+01,   8.172E+01,,   -0.796
C,07-HG203,NO ,   1.778E+02,   4.019E+02,   6.518E+02,,    0.273
```

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

3.5L MARINELLI

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	5.0000	Certificate	Aliquoted	Actual	Percent
	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Pb-210	22.26Y	46.6	72.1		4.18%	762.12	31.86	765.5	0.44%
Cd-109	462.9d	88.0	84.75		3.72%	1006.61	37.45	1001.0	-0.56%
Co-57	271.8d	122.1	77.25		85.51%	39.92	34.13	40.0	0.26%
Ce-139	137.64d	165.9	92.68		80.35%	50.96	40.95	50.1	-1.72%
Hg-203	46.6d	279.2	273		77.30%	156.04	120.62	152.0	-2.59%
Sn-113	115.09d	391.7	280		64.90%	190.62	123.72	195.8	2.72%
Sr-85	64.849	514.0	547.9		98.40%	246.02	242.08	238.1	-3.22%
Cs-137	30.17y	661.6	330.6		85.12%	171.61	146.07	175.2	2.09%
Y-88	106.65d	898.0	858.7		93.40%	406.22	379.41	406.9	0.17%
Co-60	5.27y	1173.2	460.4		100.00%	203.42	203.42	204.5	0.53%
Co-60	5.27y	1332.5	460.9		100.00%	203.64	203.64	202.1	-0.76%
Y-88	106.65d	1836.0	908		99.38%	403.69	401.19	402.6	-0.27%

Eff. Name: **1135L1203.9**

Analyst: KOJ

Sec. Review: Analyst:

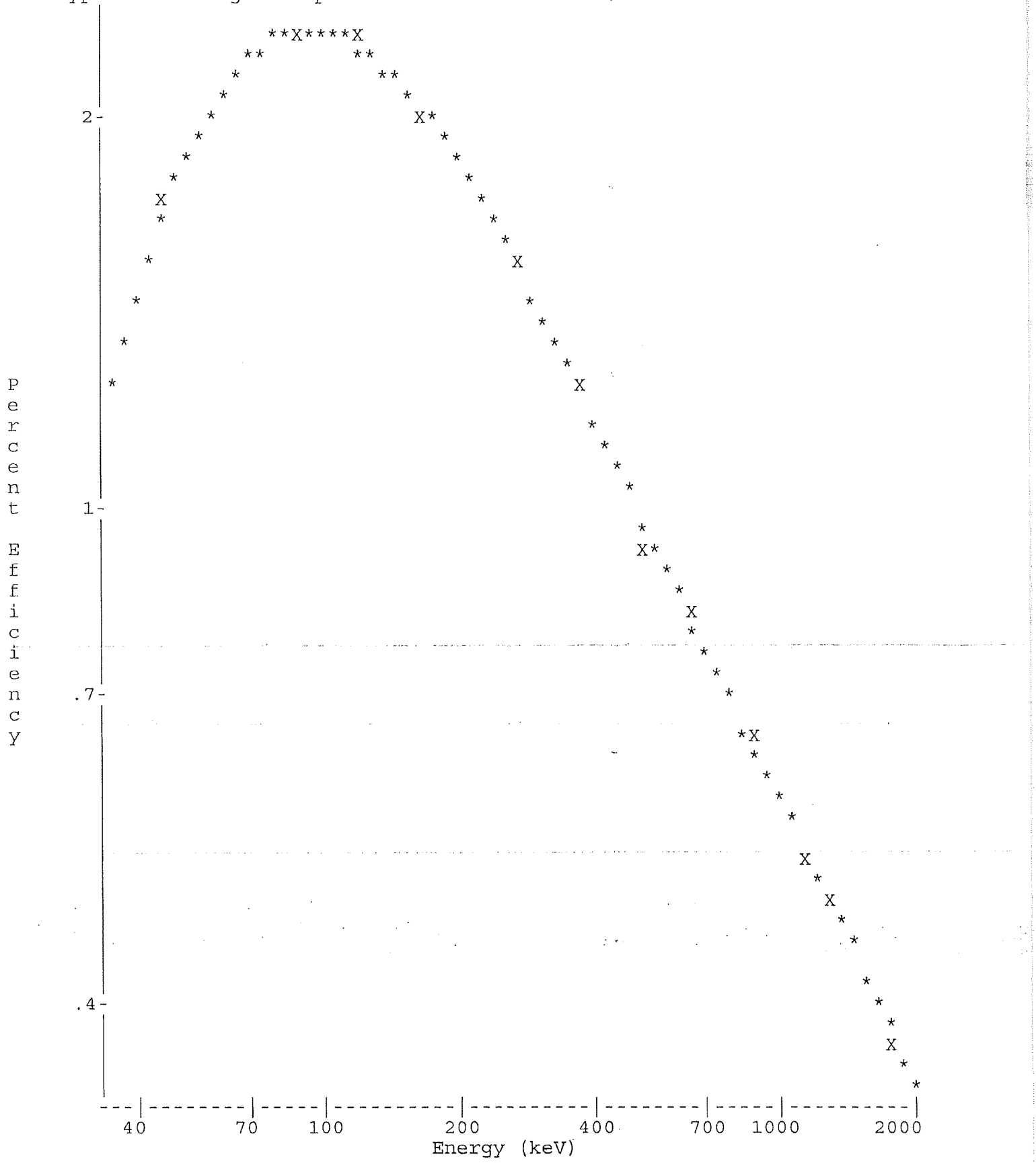
VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 4-DEC-2019 09:55:50.82
TBE11 31-TP20610B HpGe ******* Aquisition Date/Time: 3-DEC-2019 18:03:23.85

LIMS No., Customer Name, Client ID: 3.5L 5ML MIXED GAMMA CALIBRATION

Sample ID : 1135L120319 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 1135L120319
Quantity : 1.00000E+00 TOTAL BKGFILE : 11BG112719MT
Start Channel : 70 Energy Tol : 2.00000 Real Time : 0 12:01:18.85
End Channel : 4090 Pk Srch Sens: 7.00000 Live time : 0 12:00:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.47	23288	21494	1.43	91.94	1.72E+00	5.39E-01	1.4	
2	0	75.04	1490	15930	1.23	149.12	2.30E+00	3.45E-02	13.7	
3	0	88.06	29119	27294	1.39	175.19	2.37E+00	6.74E-01	1.3	
4	0	122.08	21359	20676	1.44	243.27	2.32E+00	4.94E-01	1.5	
5	0	136.54	2384	13793	1.56	272.23	2.25E+00	5.52E-02	8.8	
6	0	165.90	14266	16553	1.51	330.98	2.09E+00	3.30E-01	1.9	
7	0	255.18	1030	9324	1.66	509.68	1.63E+00	2.38E-02	17.2	
8	0	279.20	5197	9831	1.56	557.74	1.53E+00	1.20E-01	3.9	
9	0	391.73	21490	7663	1.62	782.96	1.20E+00	4.97E-01	1.1	
10	0	514.03	13669	7212	1.68	1027.72	9.73E-01	3.16E-01	1.6	
11	0	661.65	51118	5928	1.78	1323.12	8.03E-01	1.18E+00	0.6	
12	0	814.14	464	3039	1.73	1628.27	6.88E-01	1.07E-02	24.2	
13	0	898.00	31453	5022	1.96	1796.07	6.40E-01	7.28E-01	0.8	
14	0	1173.15	43501	2652	2.15	2346.60	5.26E-01	1.01E+00	0.6	
15	2	1325.28	508	896	2.75	2650.95	4.81E-01	1.17E-02	11.8	2.07E+01
16	2	1332.48	39138	949	2.38	2665.36	4.79E-01	9.06E-01	0.5	
17	0	1460.95	307	999	1.89	2922.36	4.47E-01	7.11E-03	23.7	
18	0	1836.04	19366	460	2.67	3672.67	3.74E-01	4.48E-01	0.8	

Spectrum : MCA0:[NDSCOUNT]TBE11$1
Calib Date: 4-DEC-2019 09:55:
Detector :
Geometry : 1135L120319
Fit type : 5th Degree Empirical



Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 4-DEC-2019 10:00:37.78
TBE11 31-TP20610B HpGe ******* Aquisition Date/Time: 3-DEC-2019 18:03:23.85

LIMS No., Customer Name, Client ID: 3.5L 5ML MIXED GAMMA CALIBRATION

Sample ID : 1135L120319 Smple Date: 1-JUN-2019 12:00:00.0
Sample Type : STD Geometry : 1135L120319
Quantity : 1.00000E+00 TOTAL BKGFILE : 11BG112719MT
Start Channel : 70 Energy Tol : 2.00000 Real Time : 0 12:01:18.85
End Channel : 4090 Pk Srch Sens: 7.00000 Live time : 0 12:00:00.00
MDA Multiple : 4.6600 Library Used: CALIBRATION_PB

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.47*	22623	21494	1.43	91.94	1.72E+00	5.24E-01	1.4	
2	0	75.04*	61	15930	1.23	149.12	2.30E+00	1.41E-03	38.5	
3	0	88.06*	28919	27294	1.39	175.19	2.37E+00	6.69E-01	1.3	
4	0	122.08	21359	20676	1.44	243.27	2.32E+00	4.94E-01	1.5	
5	0	136.54	2384	13793	1.56	272.23	2.25E+00	5.52E-02	8.8	
6	0	165.90	14266	16553	1.51	330.98	2.09E+00	3.30E-01	1.9	
7	0	255.18	1030	9324	1.66	509.68	1.63E+00	2.38E-02	17.2	
8	0	279.20	5197	9831	1.56	557.74	1.53E+00	1.20E-01	3.9	
9	0	391.73	21490	7663	1.62	782.96	1.20E+00	4.97E-01	1.1	
10	0	514.03	13669	7212	1.68	1027.72	9.73E-01	3.16E-01	1.6	
11	0	661.65	51118	5928	1.78	1323.12	8.03E-01	1.18E+00	0.6	
12	0	814.14	464	3039	1.73	1628.27	6.88E-01	1.07E-02	24.2	
13	0	898.00	31453	5022	1.96	1796.07	6.40E-01	7.28E-01	0.8	
14	0	1173.15	43501	2652	2.15	2346.60	5.26E-01	1.01E+00	0.6	
15	2	1325.28	508	896	2.75	2650.95	4.81E-01	1.17E-02	11.8	2.07E+01
16	2	1332.48	39138	949	2.38	2665.36	4.79E-01	9.06E-01	0.5	
17	0	1460.95*	58	999	1.89	2922.36	4.47E-01	1.35E-03	126.9	
18	0	1836.04	19366	460	2.67	3672.67	3.74E-01	4.48E-01	0.8	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
03-PB210	46.50	22623	4.05*	1.716E+00	7.535E+02	7.655E+02	2.87
04-CD109	88.03	28919	3.72*	2.374E+00	7.582E+02	1.001E+03	2.52
05-CO57	122.06	21359	85.51*	2.323E+00	2.490E+01	4.002E+01	2.95
06-CE139	165.85	14266	80.35*	2.088E+00	1.968E+01	5.009E+01	3.88
07-HG203	279.20	5197	81.46*	1.533E+00	9.633E+00	1.520E+02	7.89
08-SN113	391.69	21490	64.90*	1.197E+00	6.405E+01	1.958E+02	2.20
09-SR85	513.99	13669	99.27*	9.725E-01	3.277E+01	2.381E+02	3.11
10-CS137	661.65	51118	85.12*	8.027E-01	1.732E+02	1.752E+02	1.12
11-Y88	898.02	31453	93.40*	6.397E-01	1.219E+02	4.069E+02	1.55
12-CO60	1173.22	43501	100.00	5.263E-01	1.913E+02	2.045E+02	1.12
	1332.49	39138	100.00*	4.793E-01	1.890E+02	2.021E+02	1.07
14-Y88	1836.01	19366	99.38*	3.741E-01	1.206E+02	4.026E+02	1.57

Flag: "*" = Keyline

Sample ID : 1135L120319 Acquisition date : 3-DEC-2019 18:03:23

Total number of lines in spectrum	18	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	12	66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
03-PB210	22.26Y	1.02	7.535E+02	7.655E+02	0.220E+02	2.87	
04-CD109	462.90D	1.32	7.582E+02	1.001E+03	0.025E+03	2.52	
05-CO57	270.90D	1.61	2.490E+01	4.002E+01	0.118E+01	2.95	
06-CE139	137.66D	2.54	1.968E+01	5.009E+01	0.194E+01	3.88	
07-HG203	46.61D	15.8	9.633E+00	1.520E+02	0.120E+02	7.89	
08-SN113	115.10D	3.06	6.405E+01	1.958E+02	0.043E+02	2.20	
09-SR85	64.84D	7.26	3.277E+01	2.381E+02	0.074E+02	3.11	
10-CS137	30.17Y	1.01	1.732E+02	1.752E+02	0.020E+02	1.12	
11-Y88	106.65D	3.34	1.219E+02	4.069E+02	0.063E+02	1.55	
12-CO60	5.27Y	1.07	1.890E+02	2.021E+02	0.022E+02	1.07	
14-Y88	106.65D	3.34	1.206E+02	4.026E+02	0.063E+02	1.57	
	Total Activity :		2.267E+03	3.629E+03			

Grand Total Activity : 2.267E+03 3.629E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1135L120319 Acquisition date : 3-DEC-2019 18:03:23

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	75.04	61	15930	1.23	149.12	147	6	1.41E-03	****	2.30E+00	
0	136.54	2384	13793	1.56	272.23	268	8	5.52E-02	17.6	2.25E+00	
0	255.18	1030	9324	1.66	509.68	506	9	2.38E-02	34.4	1.63E+00	
0	814.14	464	3039	1.73	1628.27	1622	12	1.07E-02	48.5	6.88E-01	
2	1325.28	508	896	2.75	2650.95	2646	31	1.17E-02	23.5	4.81E-01	
0	1460.95	58	999	1.89	2922.36	2915	16	1.35E-03	****	4.47E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	12	66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected BQ/TOTAL	Wtd Mean Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
03-PB210	22.26Y	1.02	7.535E+02	7.655E+02	0.220E+02	2.87	
04-CD109	462.90D	1.32	7.582E+02	1.001E+03	0.025E+03	2.52	
05-CO57	270.90D	1.61	2.490E+01	4.002E+01	0.118E+01	2.95	
06-CE139	137.66D	2.54	1.968E+01	5.009E+01	0.194E+01	3.88	
07-HG203	46.61D	15.8	9.633E+00	1.520E+02	0.120E+02	7.89	
08-SN113	115.10D	3.06	6.405E+01	1.958E+02	0.043E+02	2.20	
09-SR85	64.84D	7.26	3.277E+01	2.381E+02	0.074E+02	3.11	
10-CS137	30.17Y	1.01	1.732E+02	1.752E+02	0.020E+02	1.12	
11-Y88	106.65D	3.34	1.219E+02	4.069E+02	0.063E+02	1.55	
12-CO60	5.27Y	1.07	1.901E+02	2.032E+02	0.016E+02	0.77	
14-Y88	106.65D	3.34	1.206E+02	4.026E+02	0.063E+02	1.57	
	Total Activity :		2.268E+03	3.630E+03			
	Grand Total Activity :		2.268E+03	3.630E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
03-PB210	7.655E+02	2.196E+01	1.954E+01	0.000E+00	39.183
04-CD109	1.001E+03	2.527E+01	2.310E+01	0.000E+00	43.332
05-CO57	4.002E+01	1.180E+00	1.105E+00	0.000E+00	36.208

06-CE139	5.009E+01	1.942E+00	1.895E+00	0.000E+00	26.438
07-HG203	1.520E+02	1.199E+01	1.279E+01	0.000E+00	11.879
08-SN113	1.958E+02	4.310E+00	3.265E+00	0.000E+00	59.960
09-SR85	2.381E+02	7.394E+00	6.020E+00	0.000E+00	39.550
10-CS137	1.752E+02	1.965E+00	1.015E+00	0.000E+00	172.707
11-Y88	4.069E+02	6.288E+00	3.608E+00	0.000E+00	112.764
12-CO60	2.032E+02	1.570E+00	7.111E-01	0.000E+00	285.814
14-Y88	4.026E+02	6.308E+00	1.591E+00	0.000E+00	253.009

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-CO57	1.806E+03		7.032E+01	1.295E+02	0.000E+00	13.951
02-CE139	9.777E+00		9.876E+00	1.669E+01	0.000E+00	0.586

```
A,1135L120319      ,12/04/2019 10:00,06/01/2019 12:00,   1.000E+00,3.5L 5ML MIXED
B,1135L120319      ,CALIBRATION_PB      ,12/04/2019 09:55,1135L120319
C,03-PB210,YES,   7.655E+02,   2.196E+01,   1.954E+01,,   39.183
C,04-CD109,YES,   1.001E+03,   2.527E+01,   2.310E+01,,   43.332
C,05-CO57 ,YES,   4.002E+01,   1.180E+00,   1.105E+00,,   36.208
C,06-CE139,YES,   5.009E+01,   1.942E+00,   1.895E+00,,   26.438
C,07-HG203,YES,   1.520E+02,   1.199E+01,   1.279E+01,,   11.879
C,08-SN113,YES,   1.958E+02,   4.310E+00,   3.265E+00,,   59.960
C,09-SR85 ,YES,   2.381E+02,   7.394E+00,   6.020E+00,,   39.550
C,10-CS137,YES,   1.752E+02,   1.965E+00,   1.015E+00,,  172.707
C,11-Y88  ,YES,   4.069E+02,   6.288E+00,   3.608E+00,,  112.764
C,12-CO60 ,YES,   2.032E+02,   1.570E+00,   7.111E-01,,  285.814
C,14-Y88  ,YES,   4.026E+02,   6.308E+00,   1.591E+00,,  253.009
C,01-CO57 ,NO ,   1.806E+03,   7.032E+01,   1.295E+02,,   13.951
C,02-CE139,NO ,   9.777E+00,   9.876E+00,   1.669E+01,,    0.586
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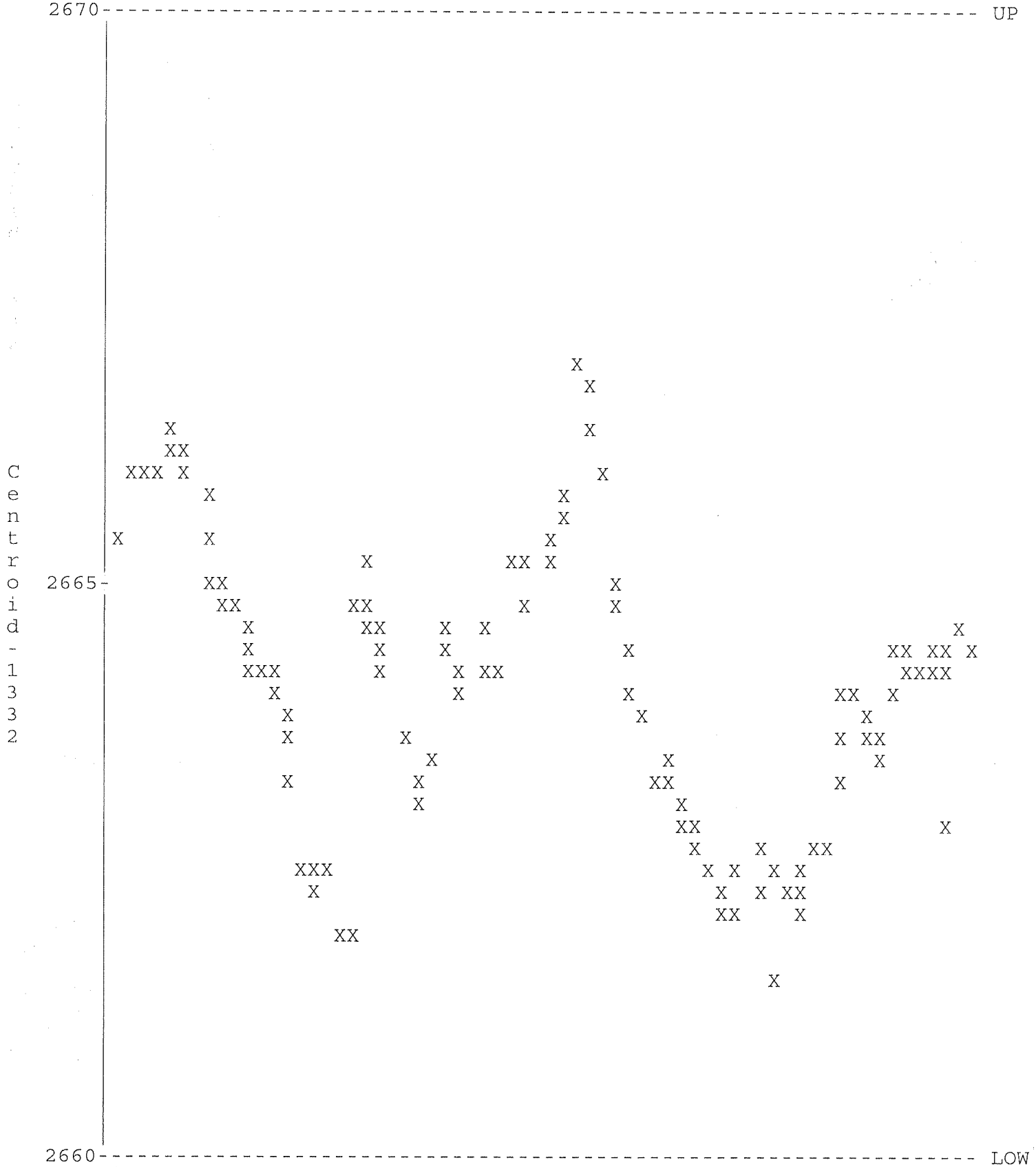
GAMMA SPECTROSCOPY

Daily Source and Background Checks

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
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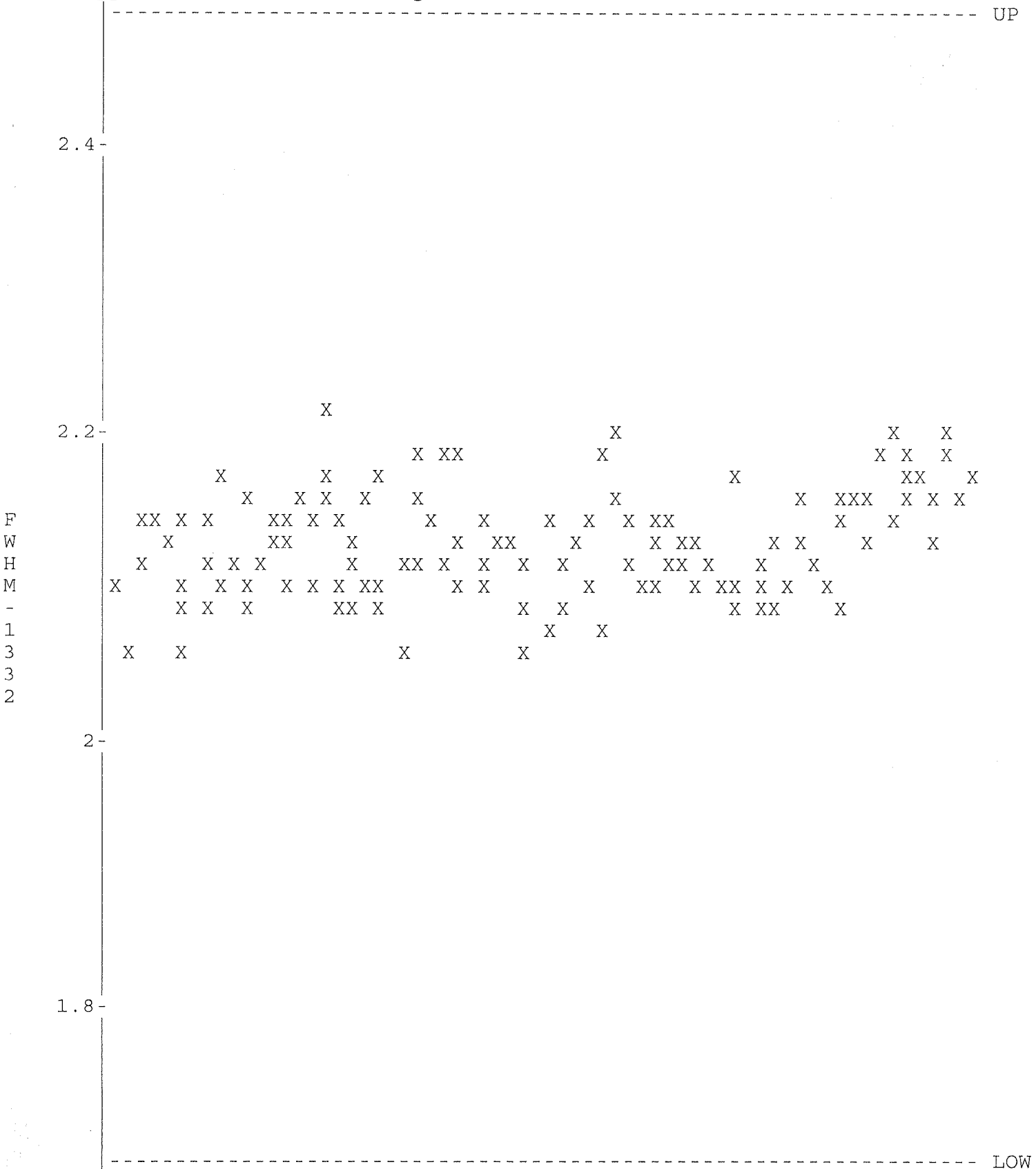
Lower/Upper Lmts: 1.70000 through 2.50000



QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
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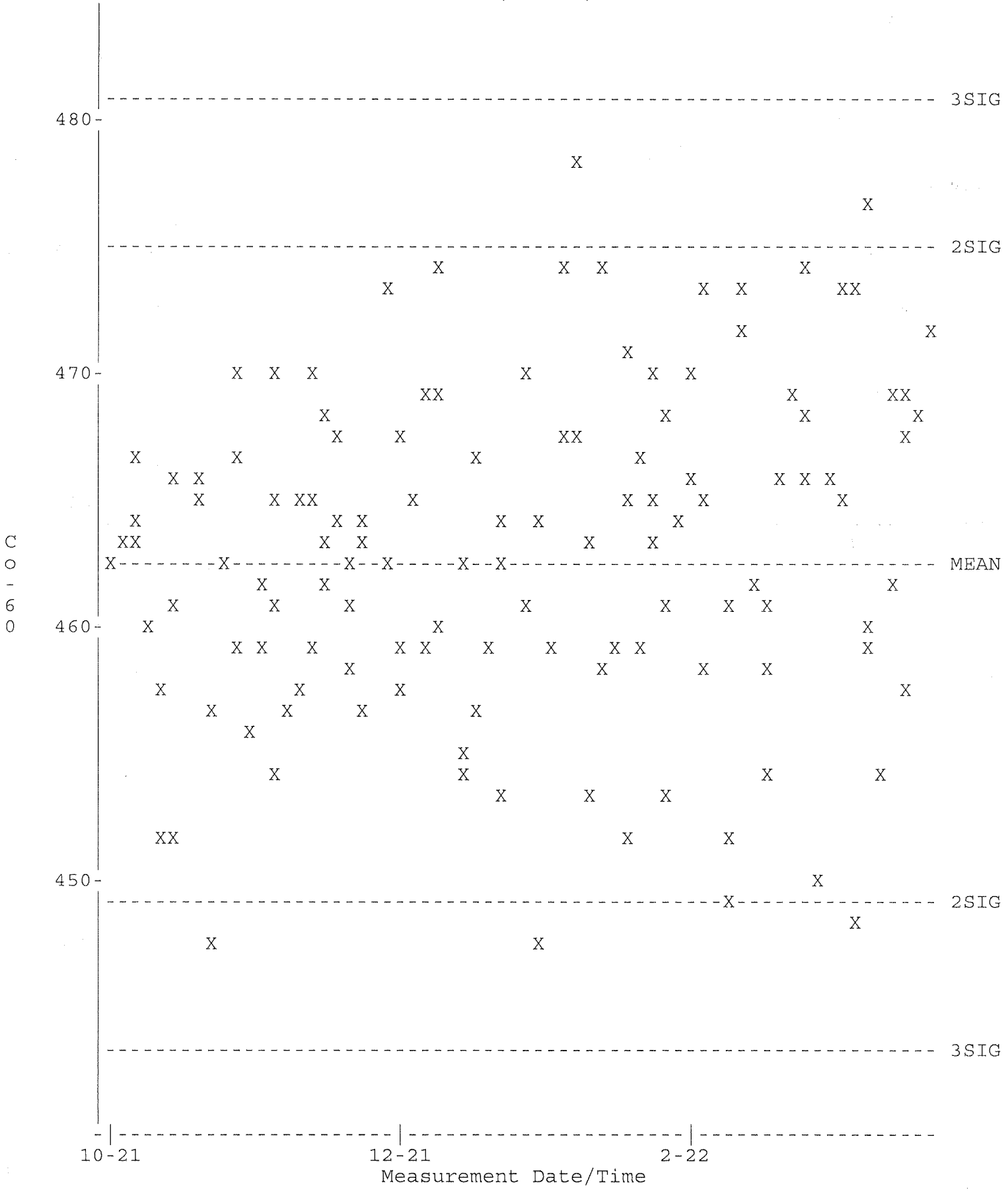
Mean +- Std Dev : 462.666 +- 6.27386 (1.36 %)



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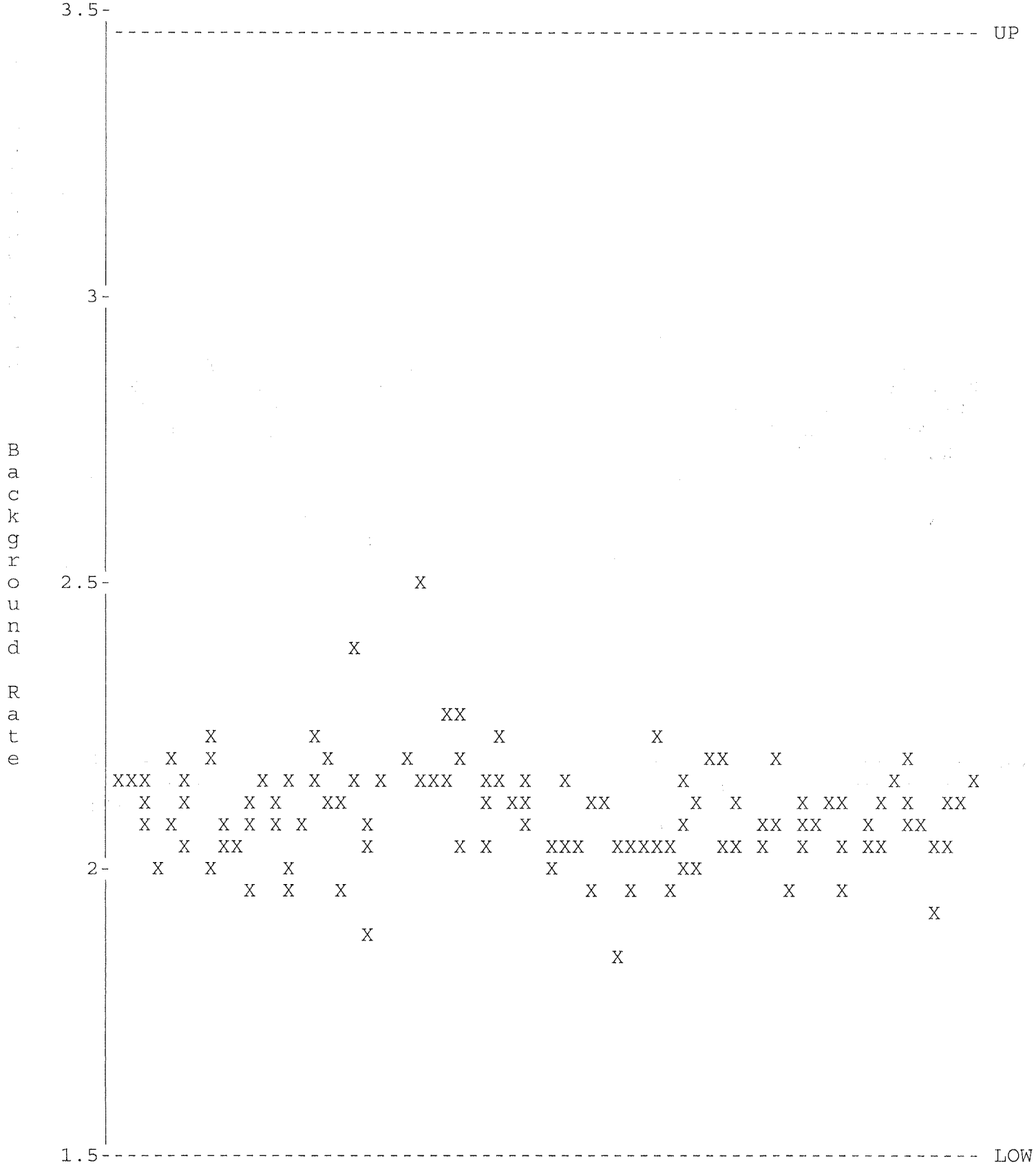
Lower/Upper Lmts: 1.50000 through 3.50000



QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSCENTRD-59 (Centroid-59)
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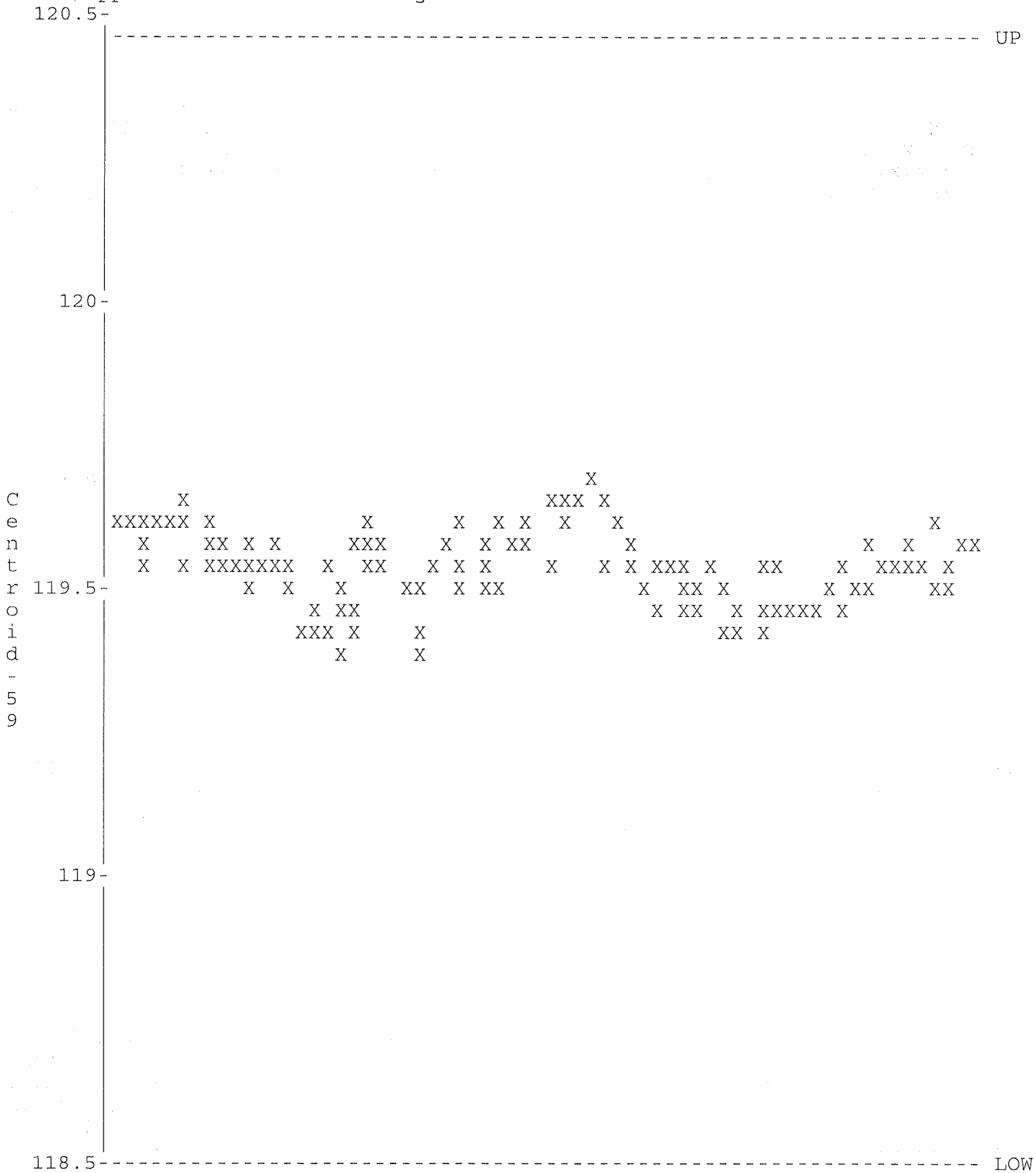
Lower/Upper Lmts: 118.500 through 120.500



QA filename : DKB100:[GAMMA.QUALITY]TBE02_BKG_QC.QAF;1
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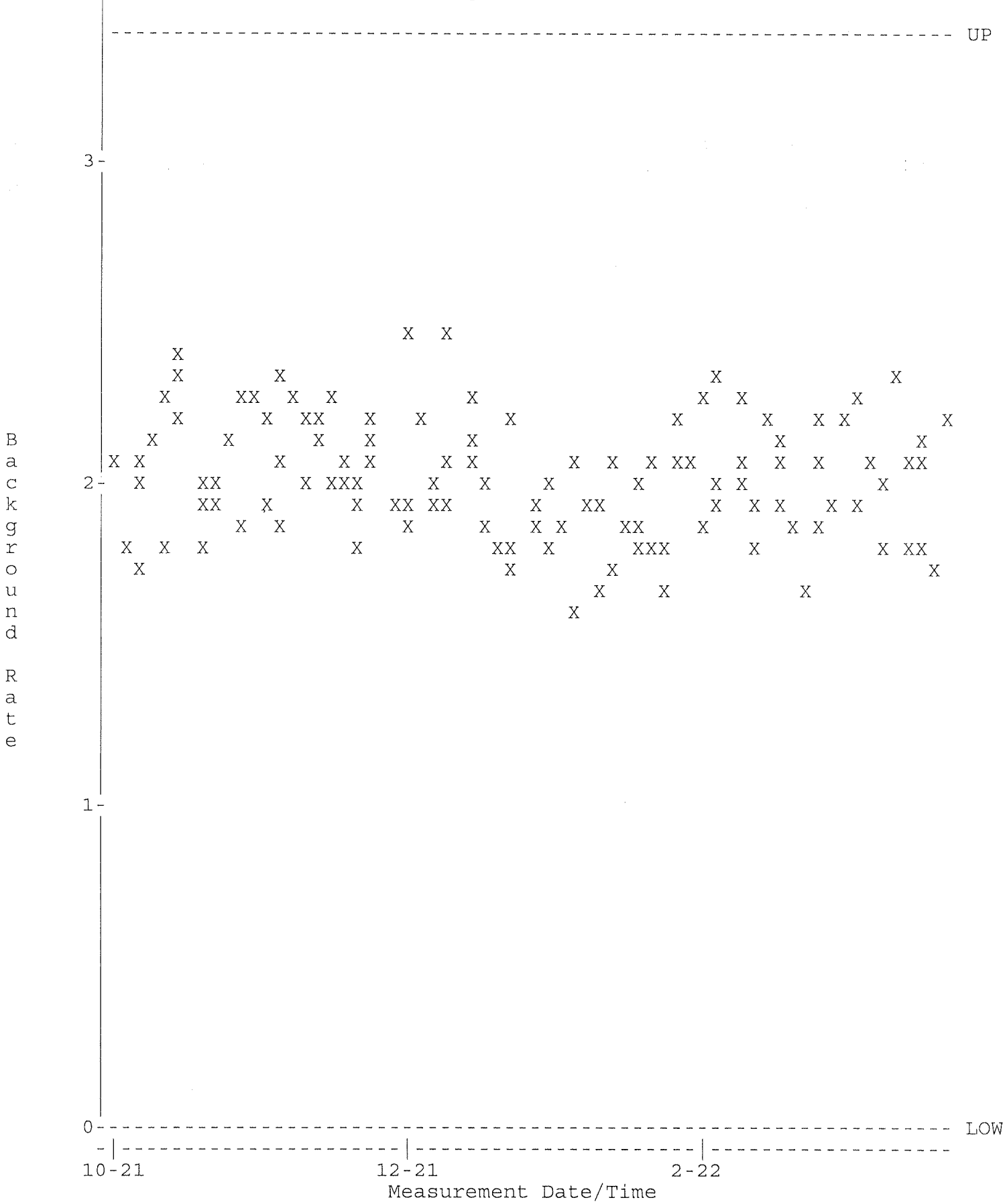

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
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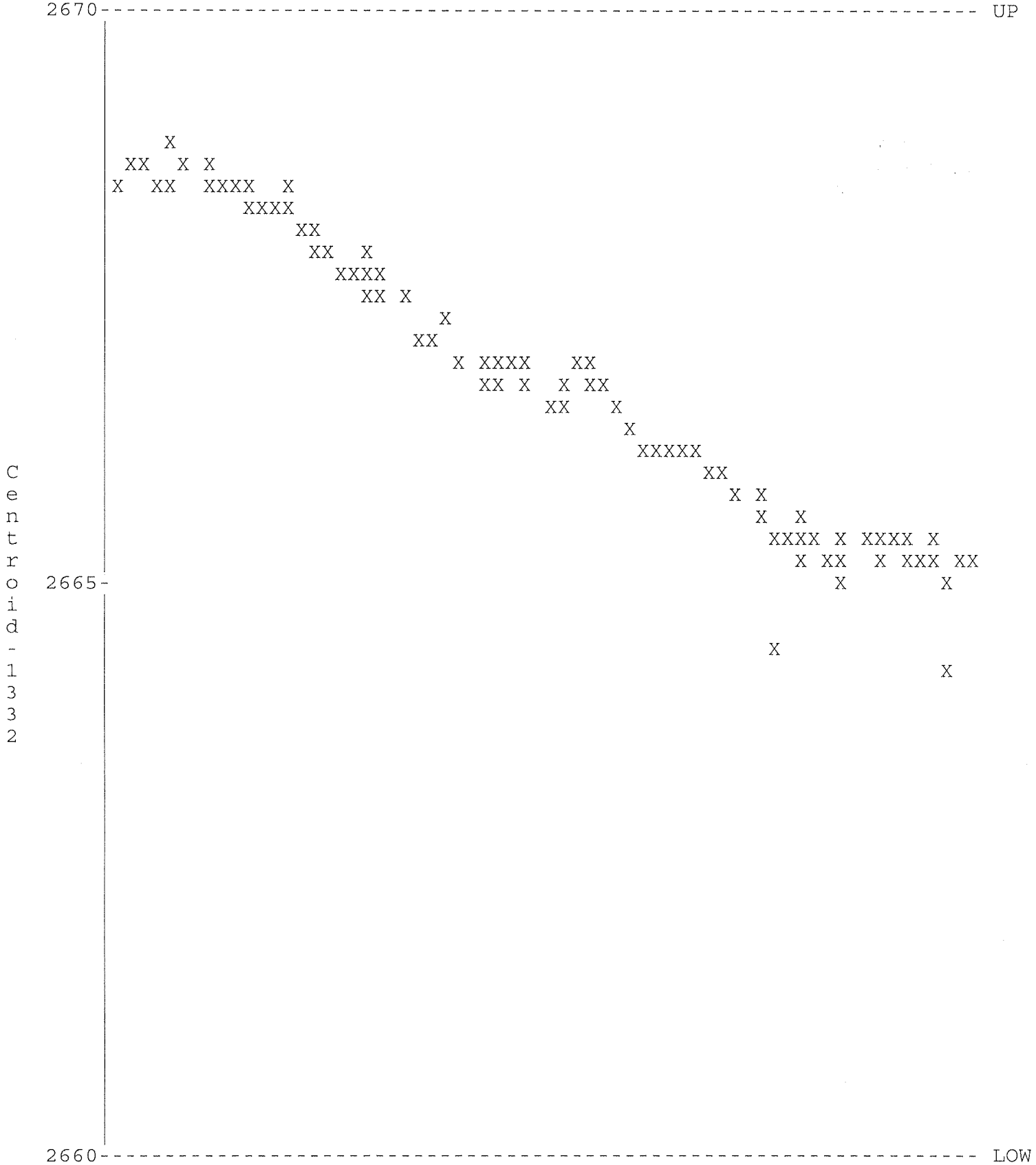
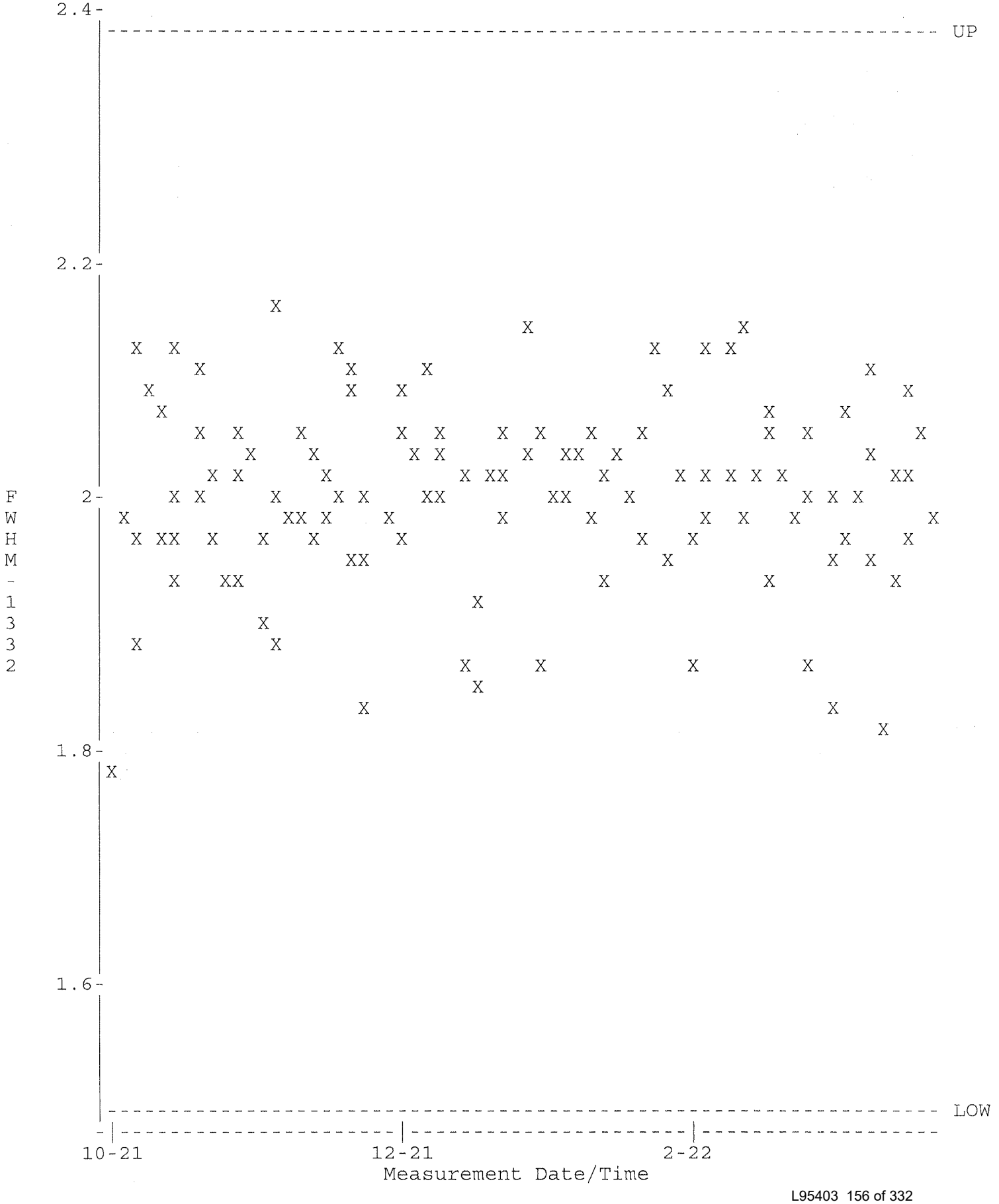


QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.50000 through 2.40000



QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
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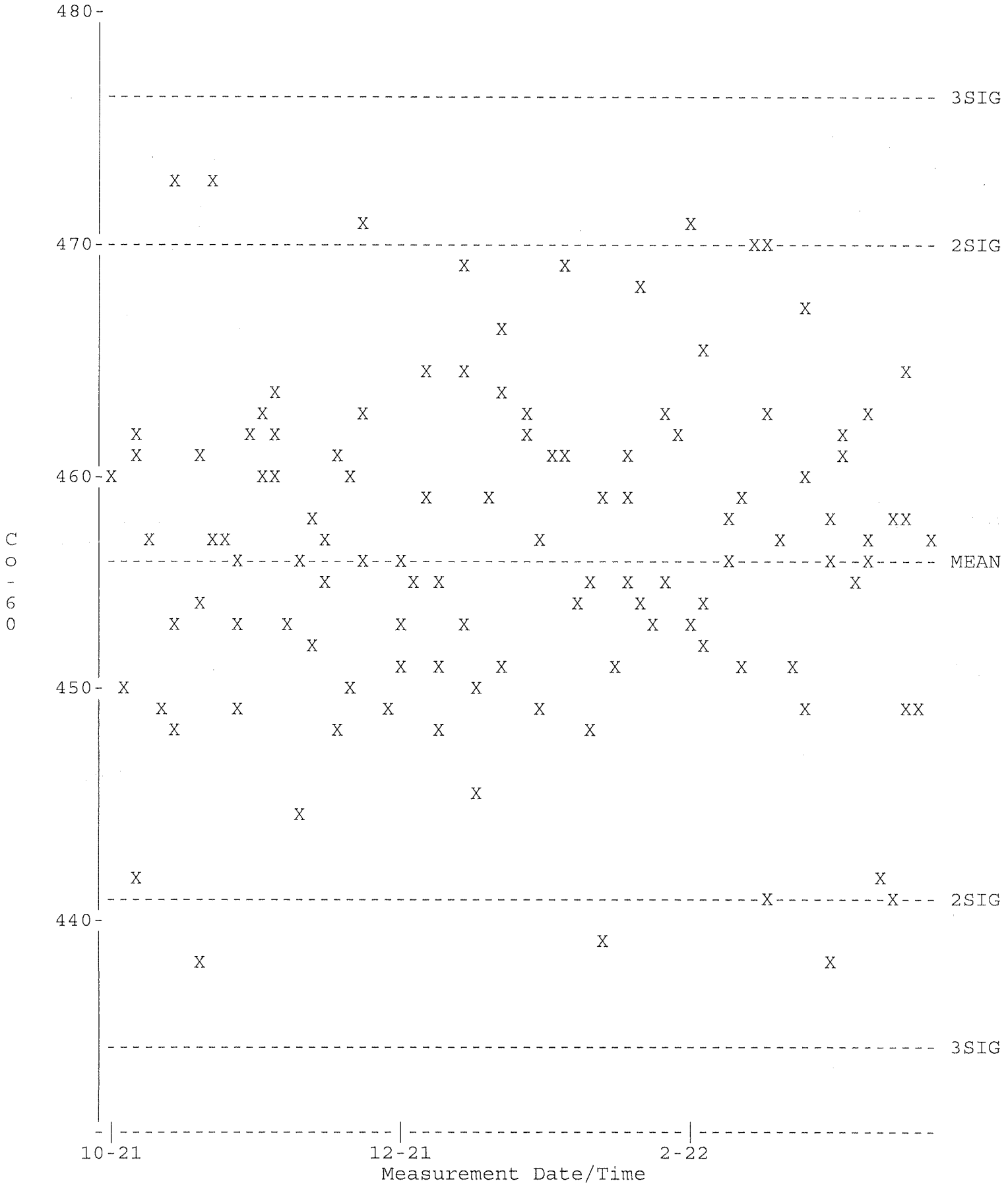

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
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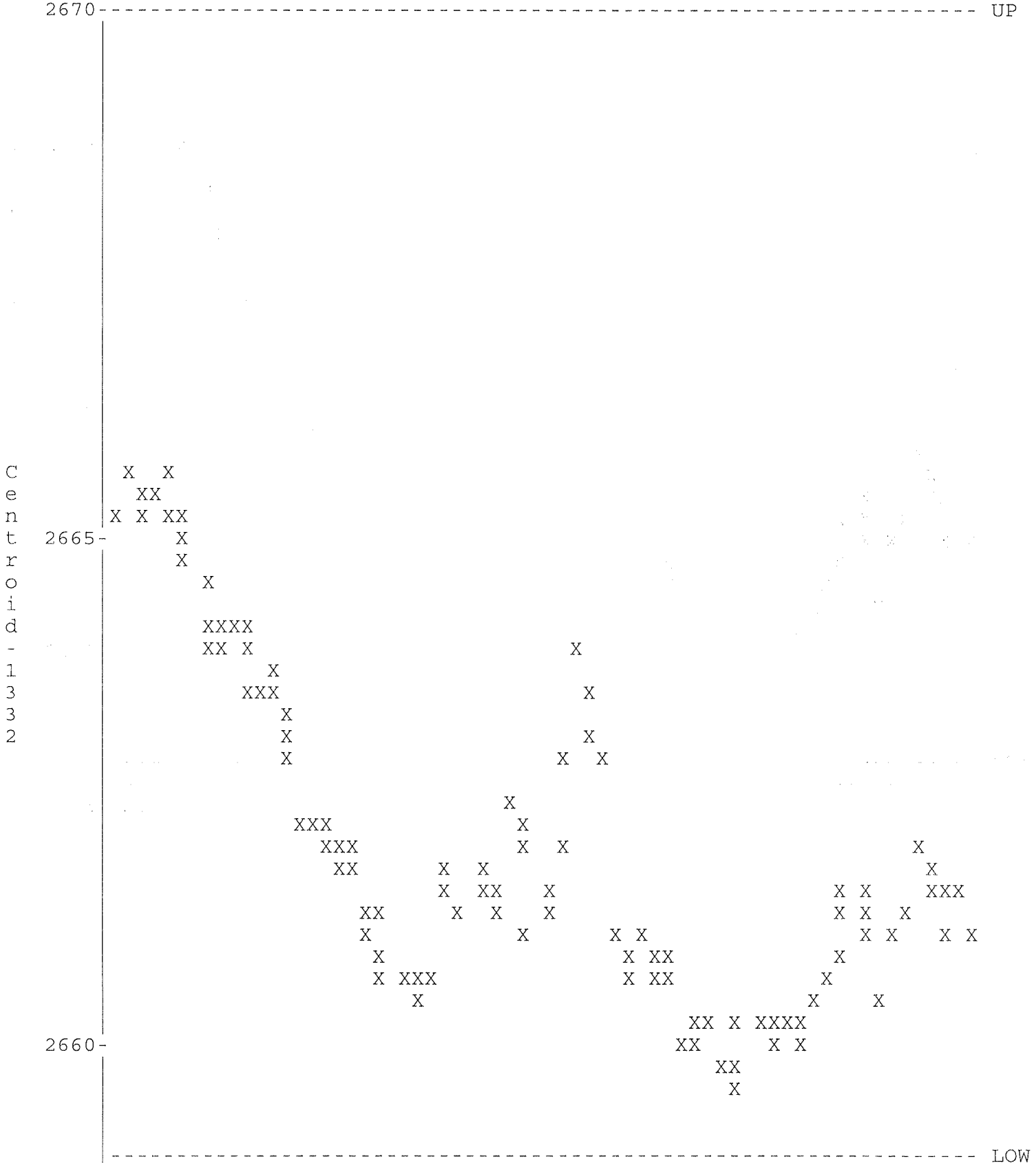
Lower/Upper Lmts: 2659.00 through 2670.00



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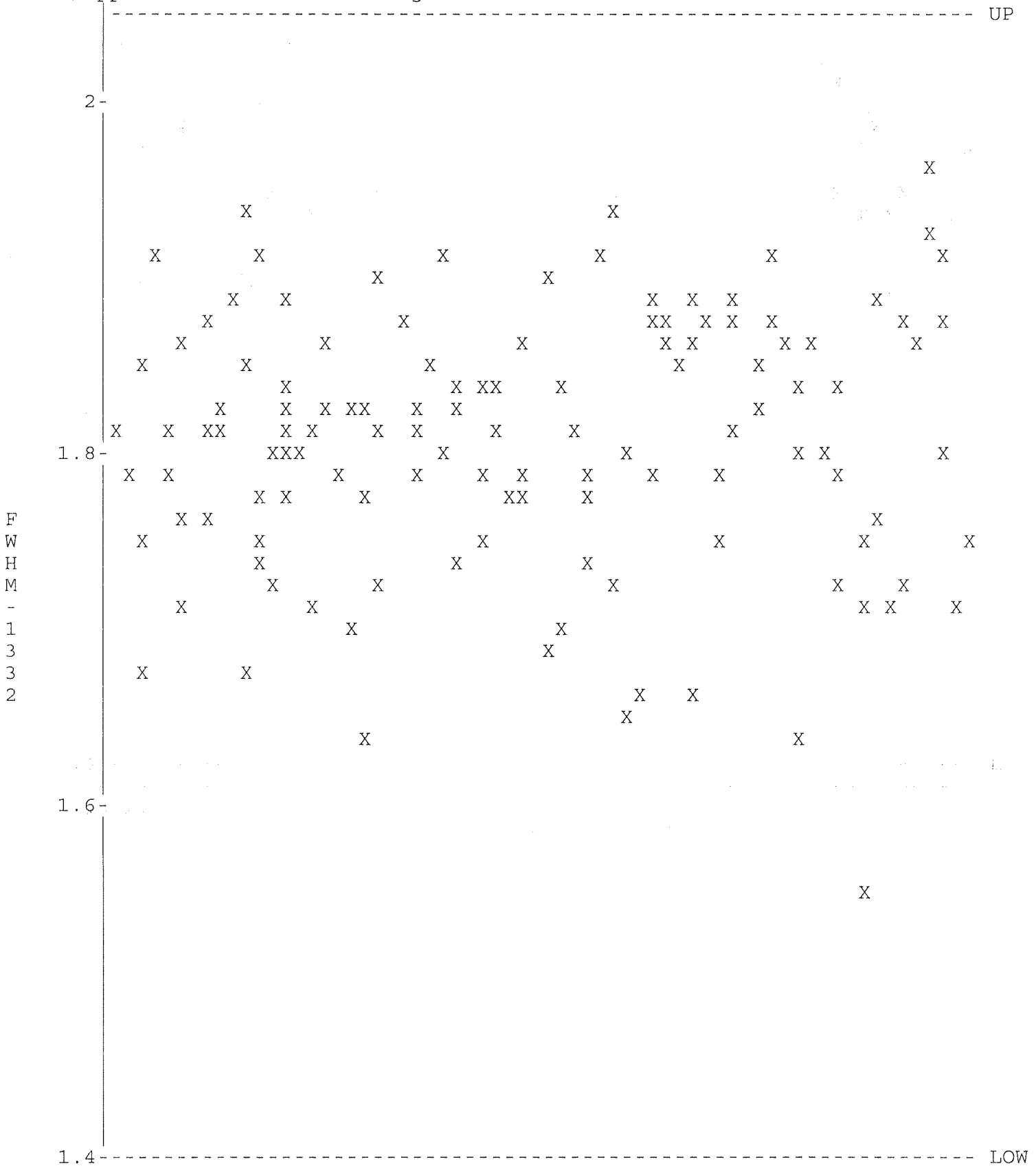
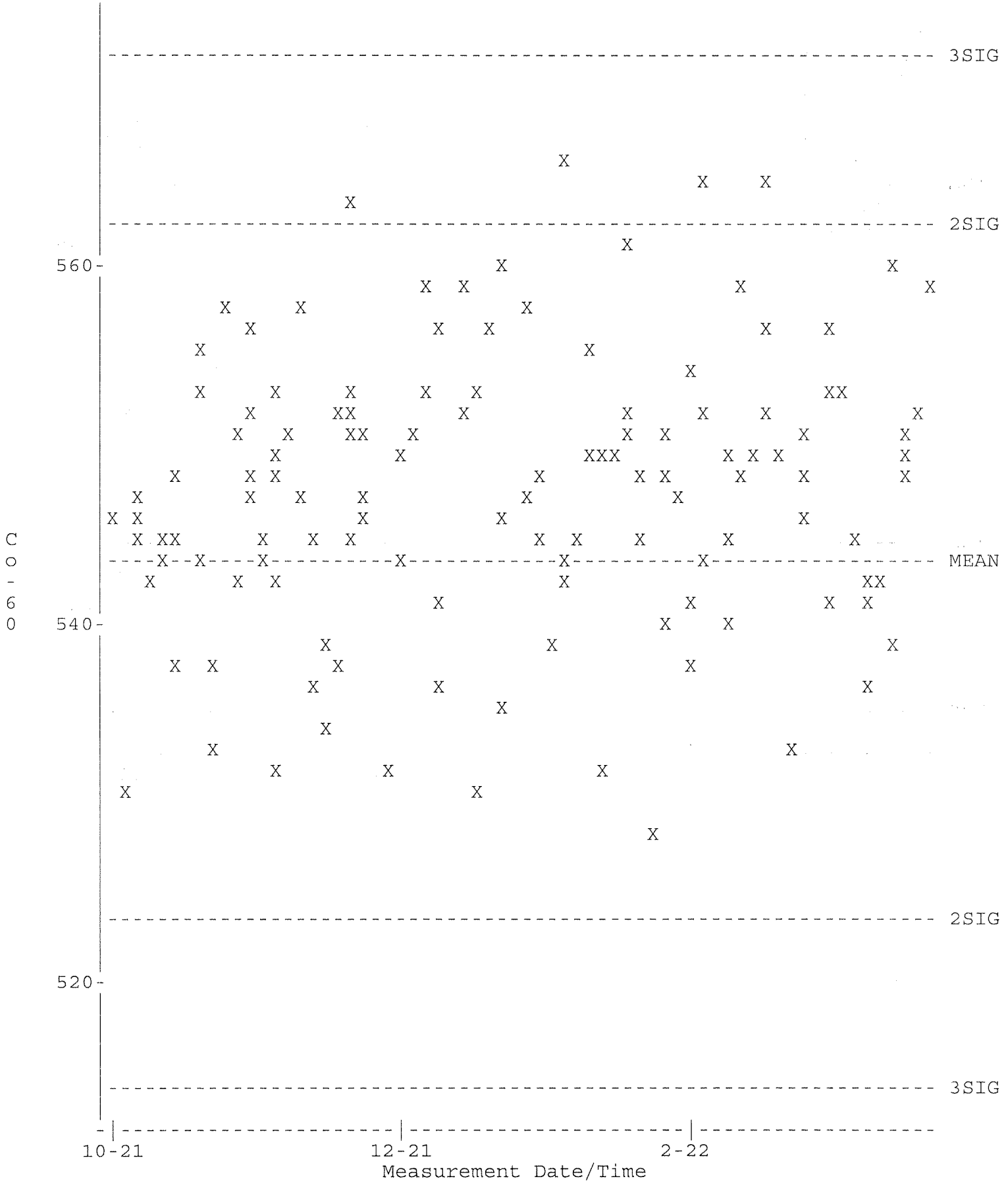
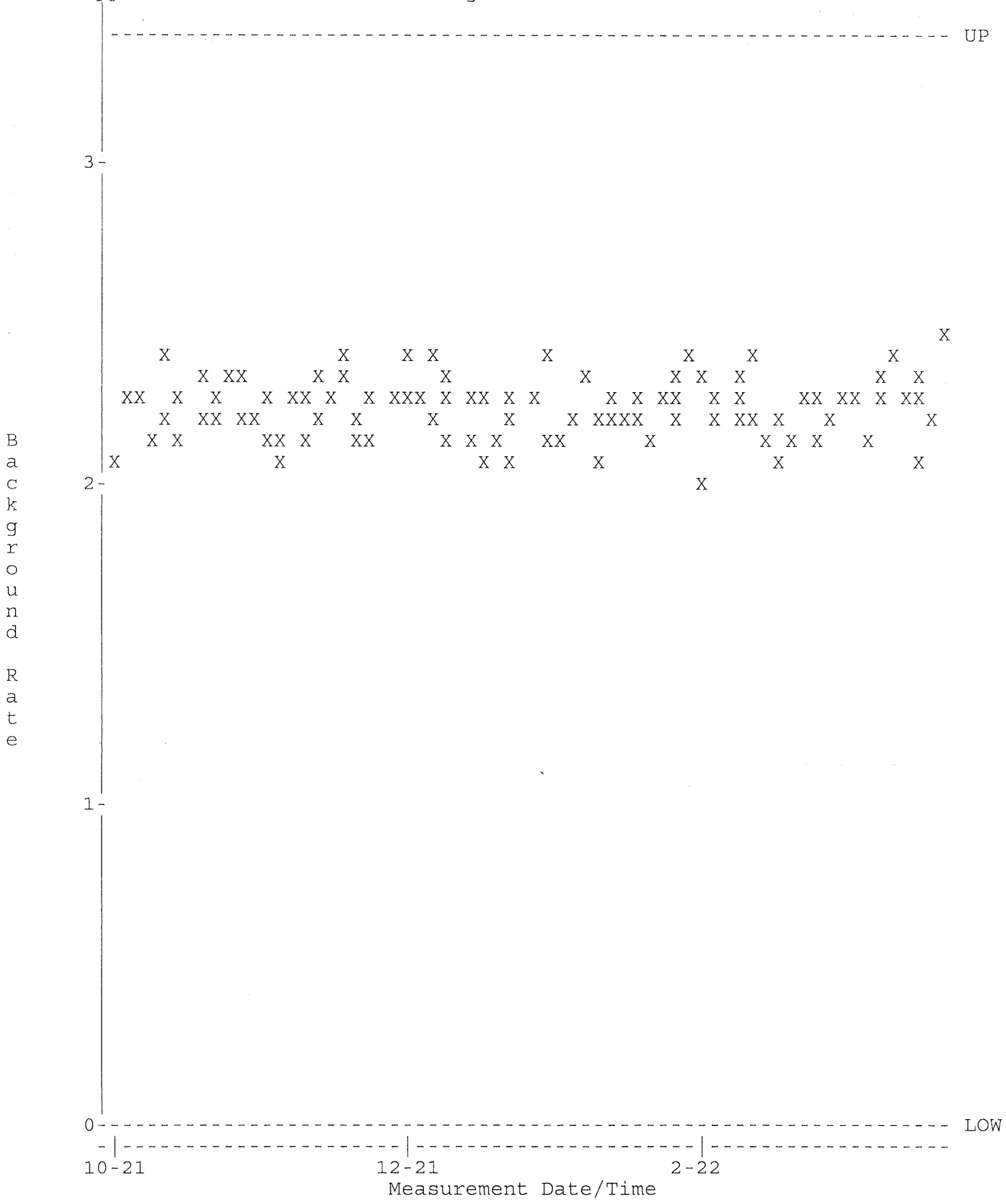
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.40000 through 2.05000



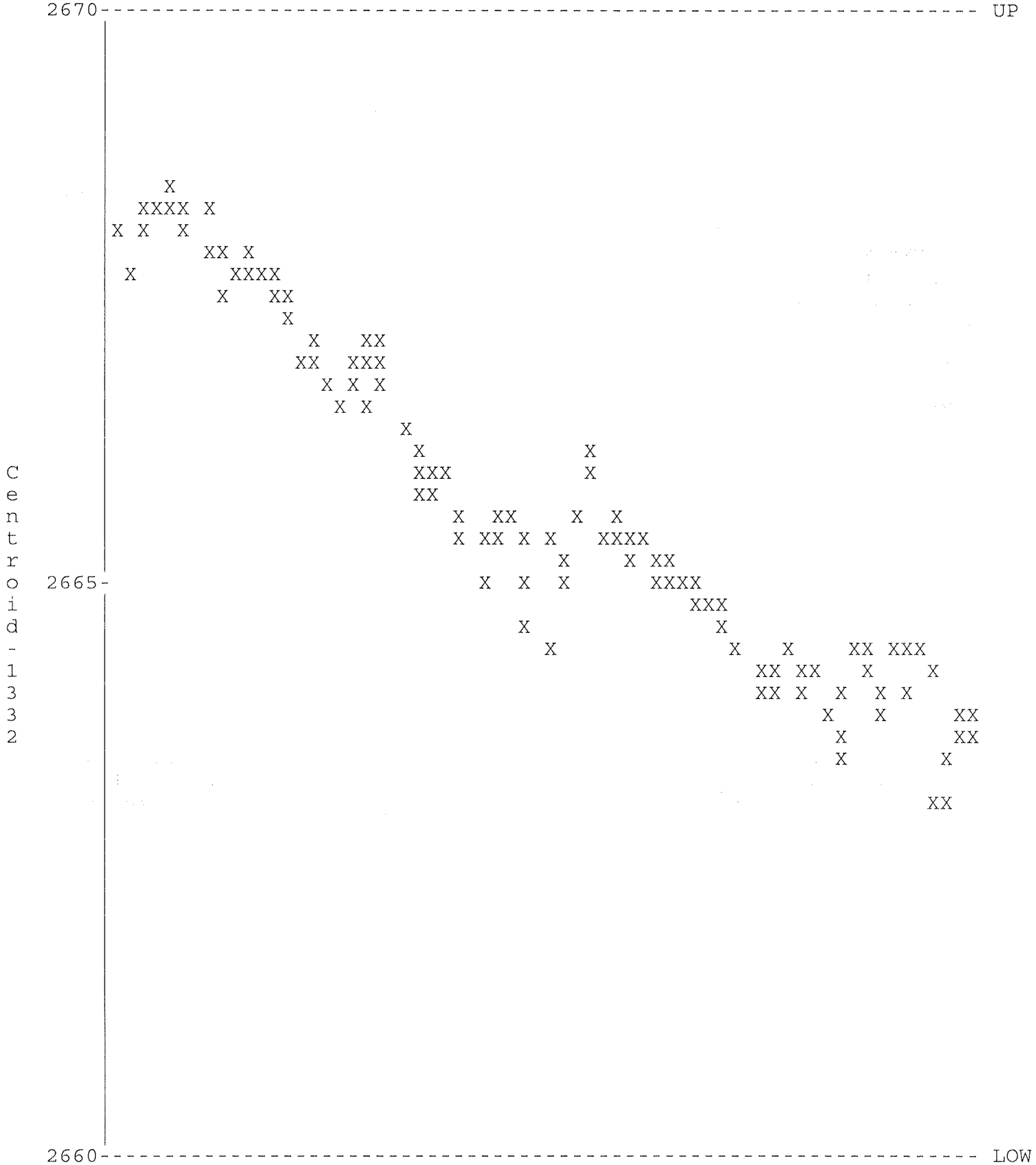
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Mean +- Std Dev : 543.576 +- 9.55063 (1.76 %)



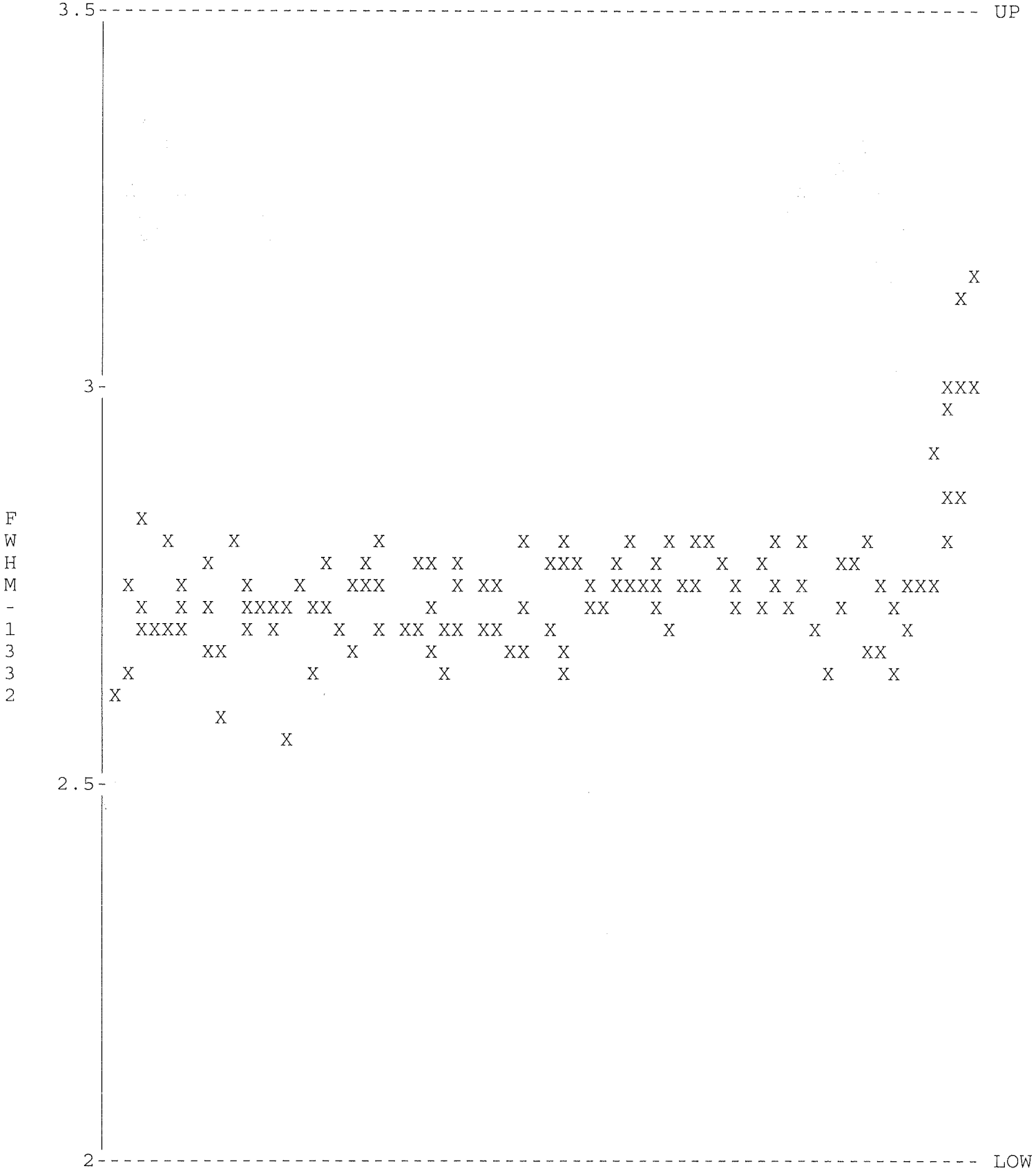
QA filename : DKB100:[GAMMA.QUALITY]TBE06_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



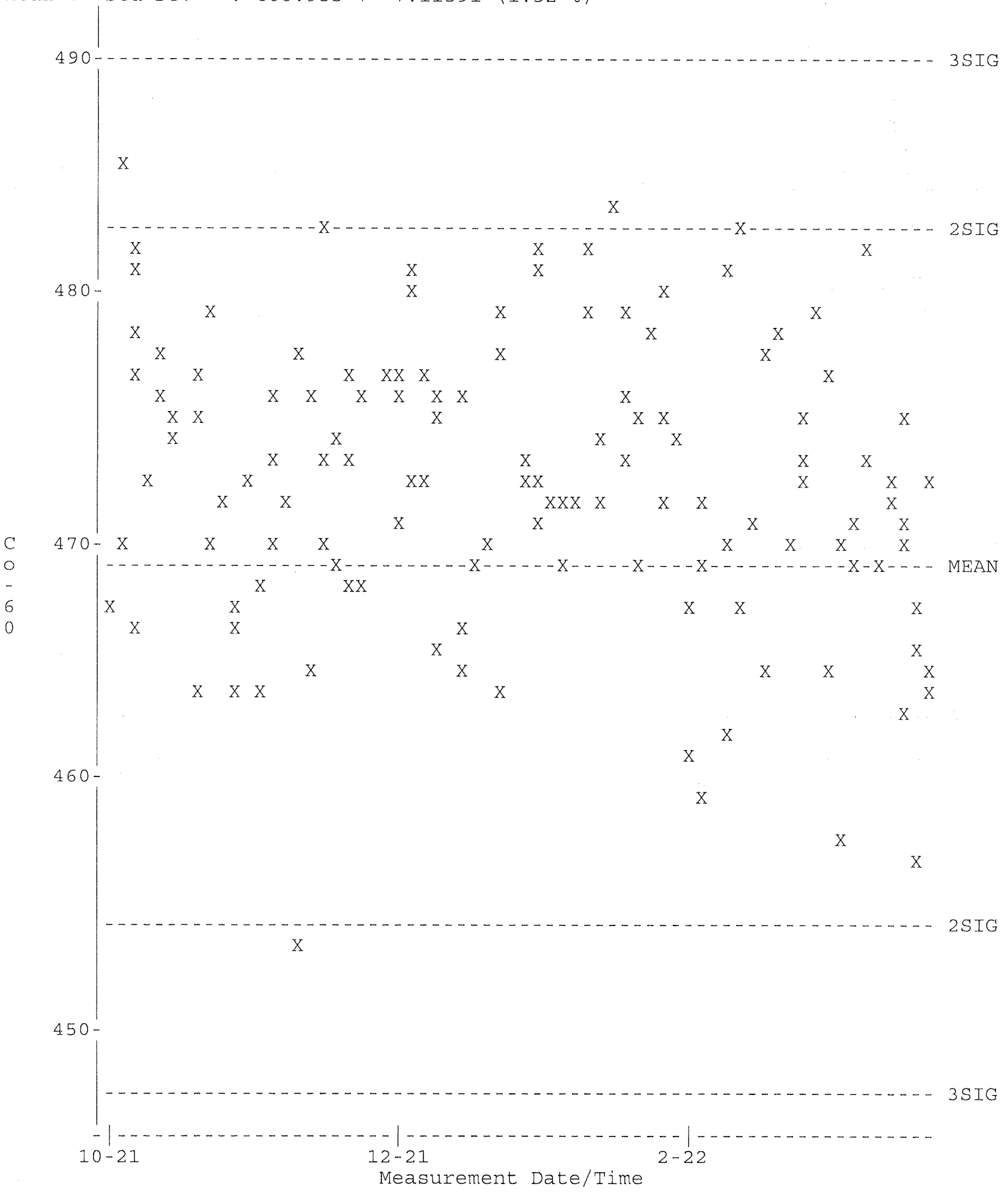
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



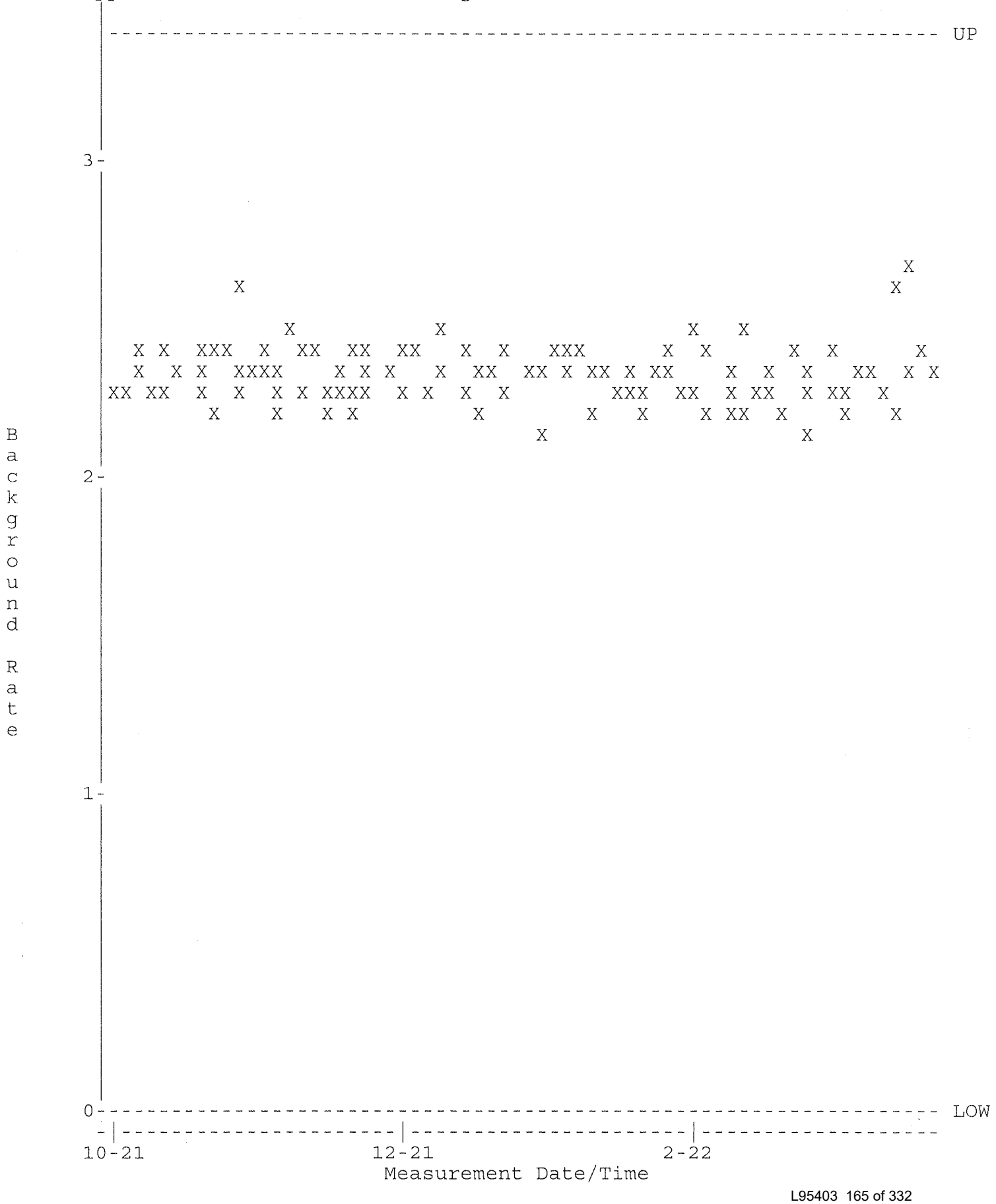
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2.00000 through 3.50000



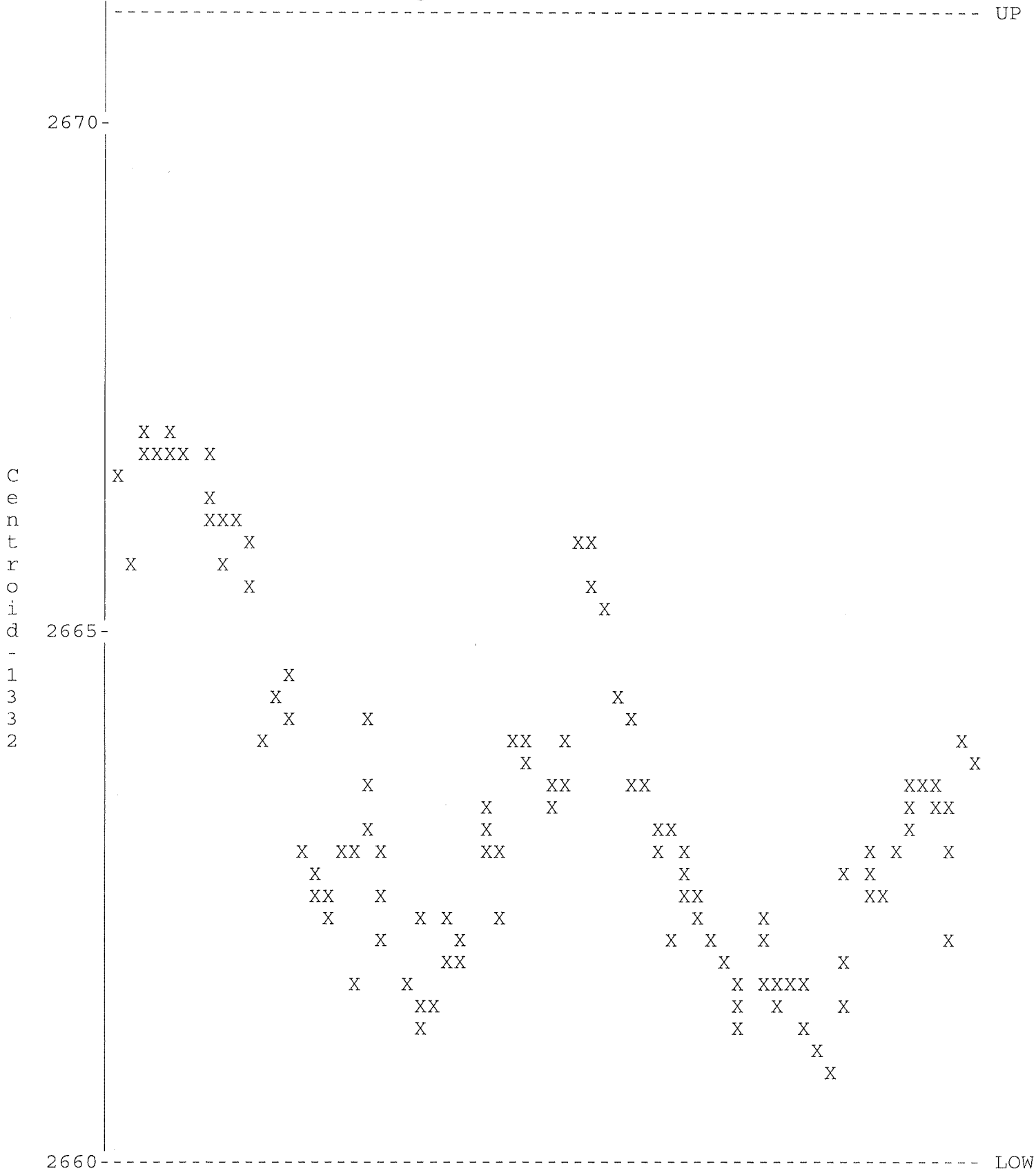
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Mean +- Std Dev : 468.955 +- 7.11591 (1.52 %)



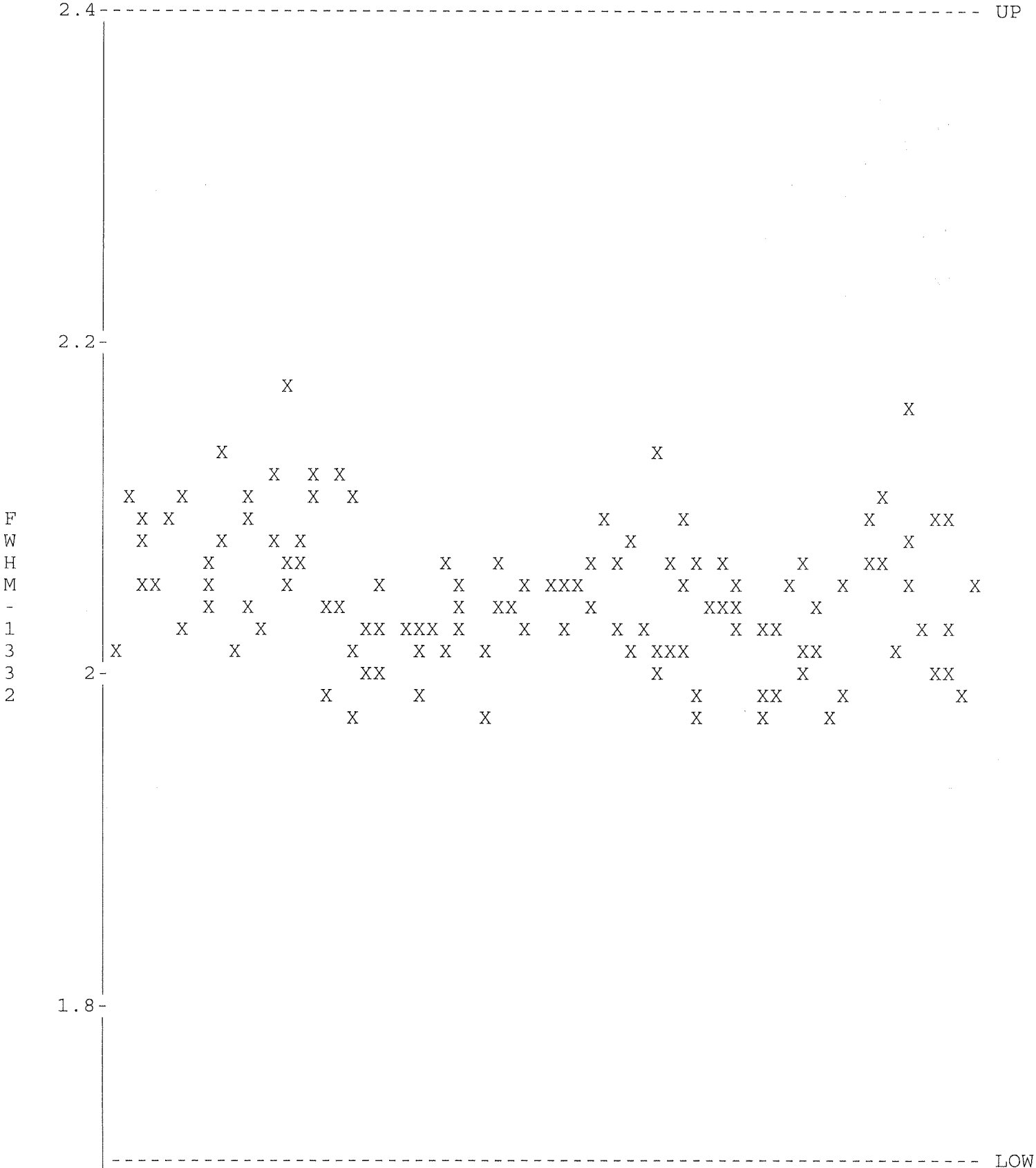
QA filename : DKB100:[GAMMA.QUALITY]TBE07_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000

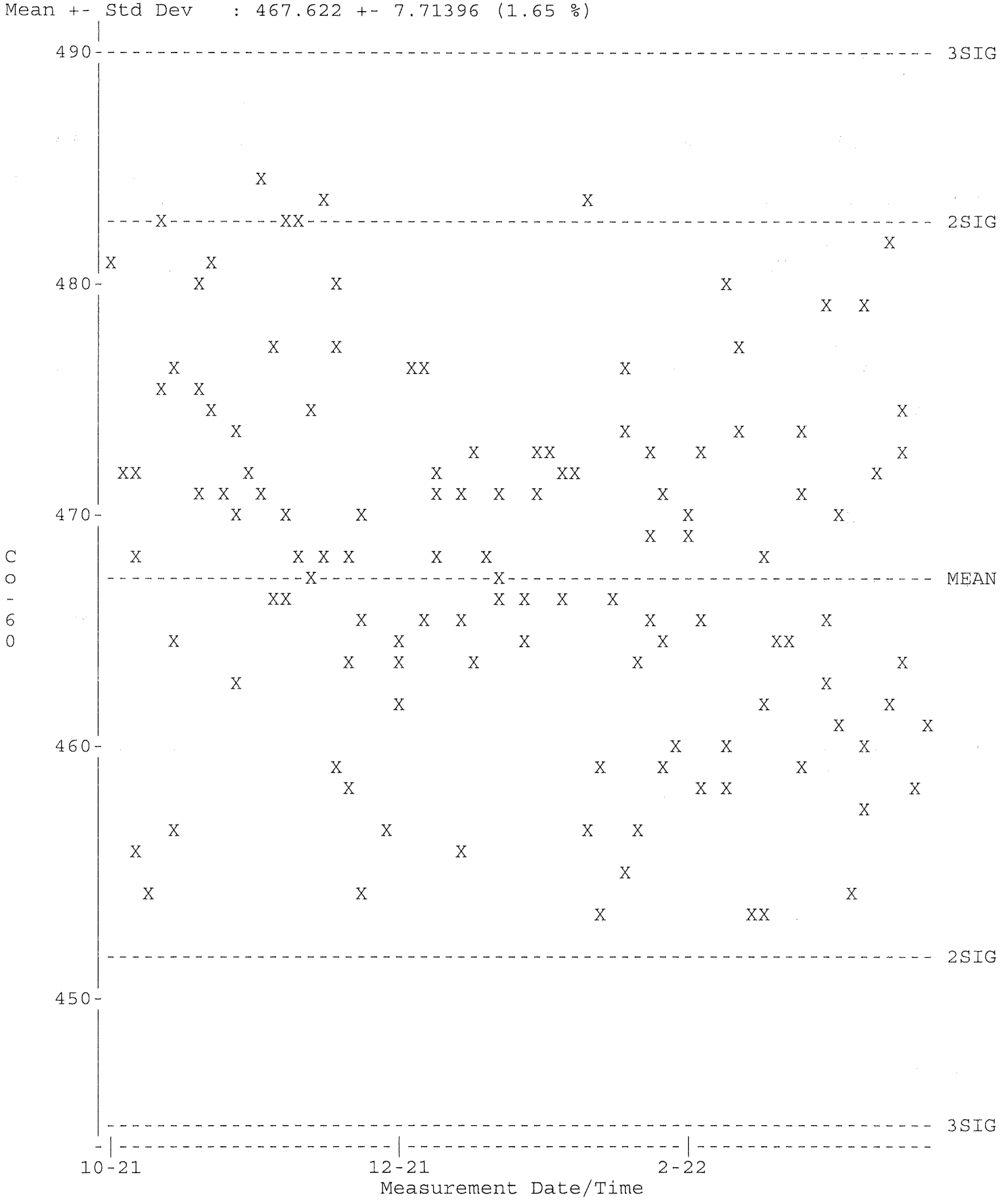


QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2660.00 through 2671.00

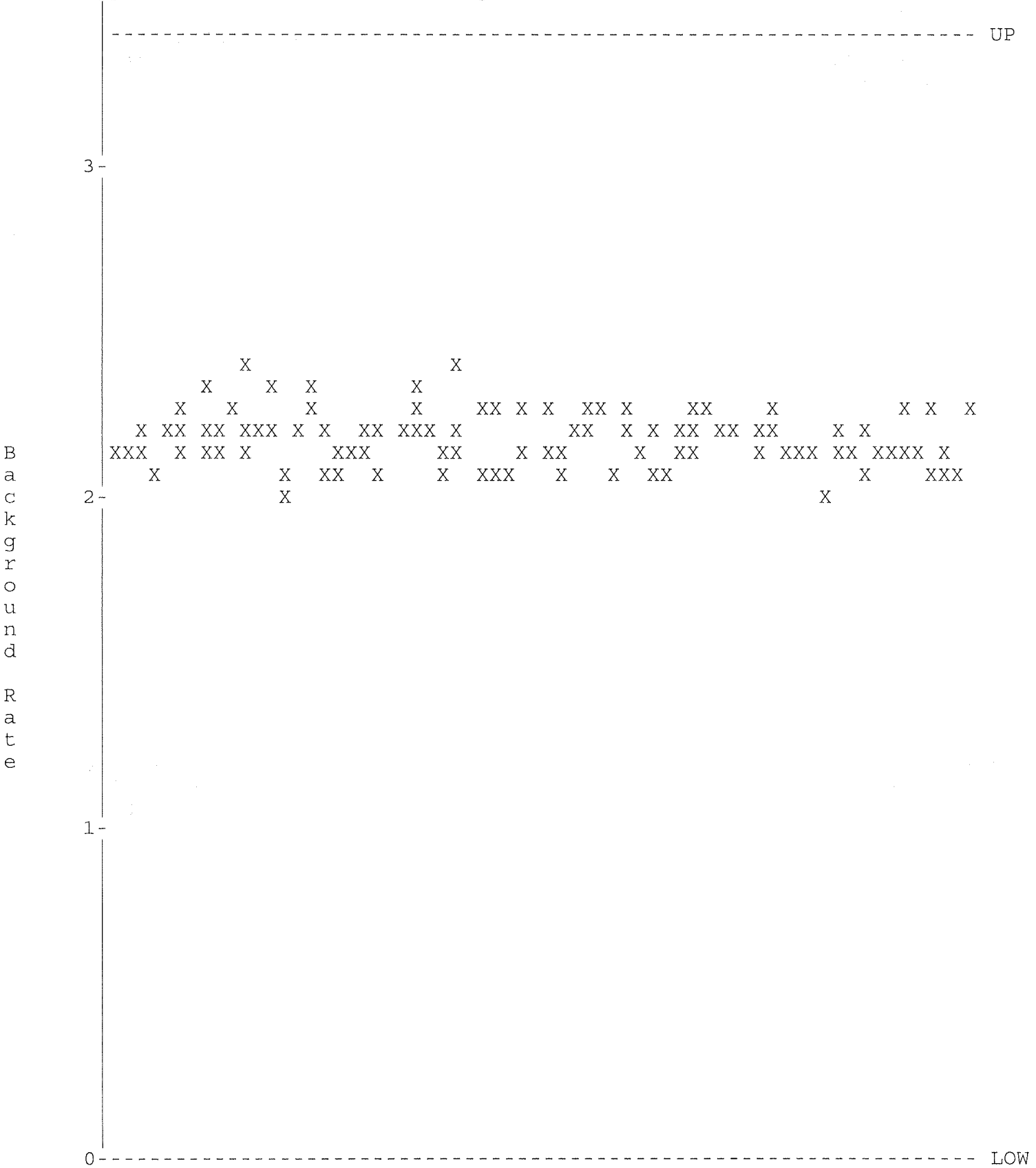


QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.70000 through 2.40000

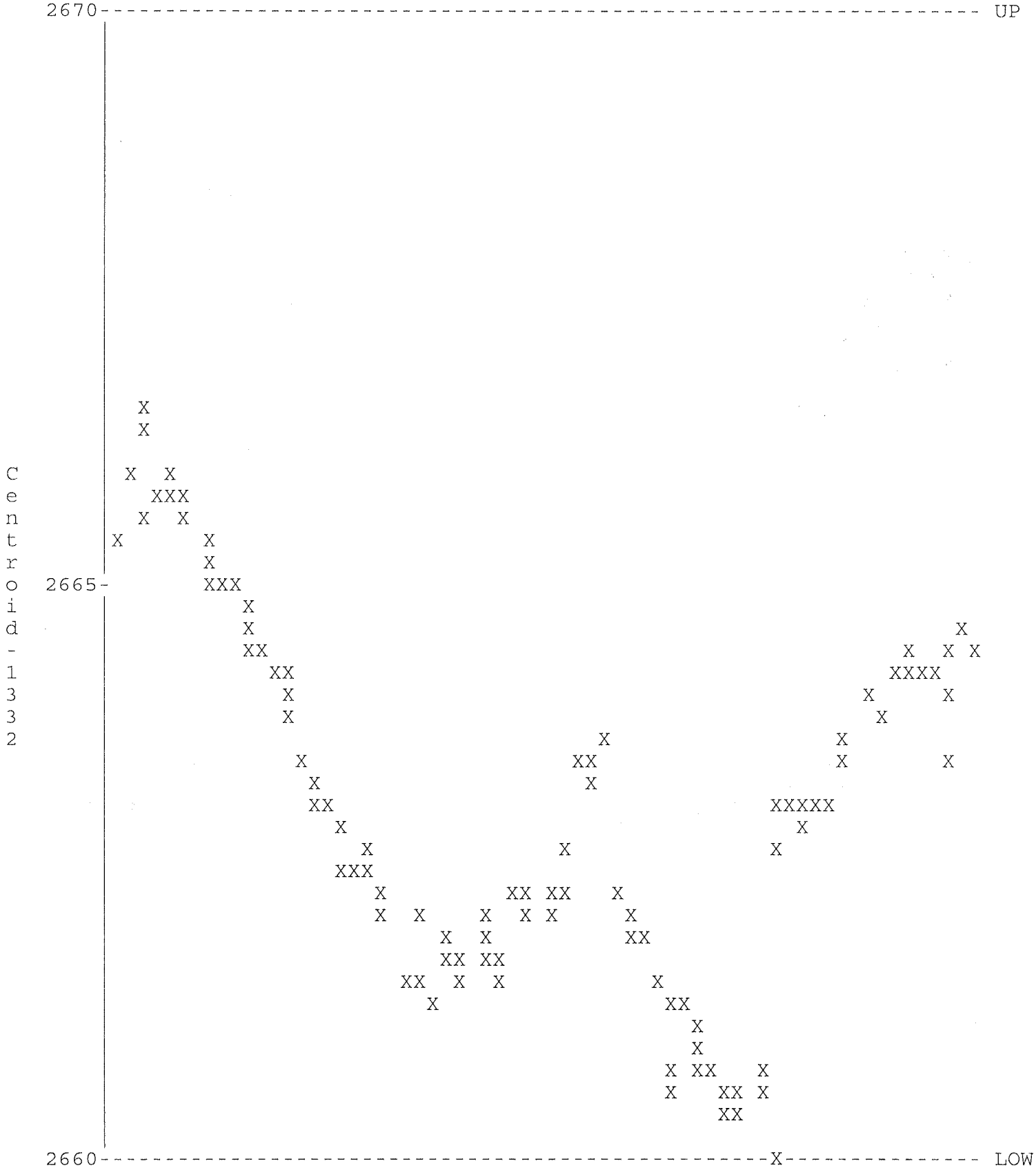



QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Mean +- Std Dev : 467.622 +- 7.71396 (1.65 %)
490
480
470
460
450
3SIG
2SIG
MEAN
2SIG
3SIG
Co-60
10-21
12-21
2-22
Measurement Date/Time

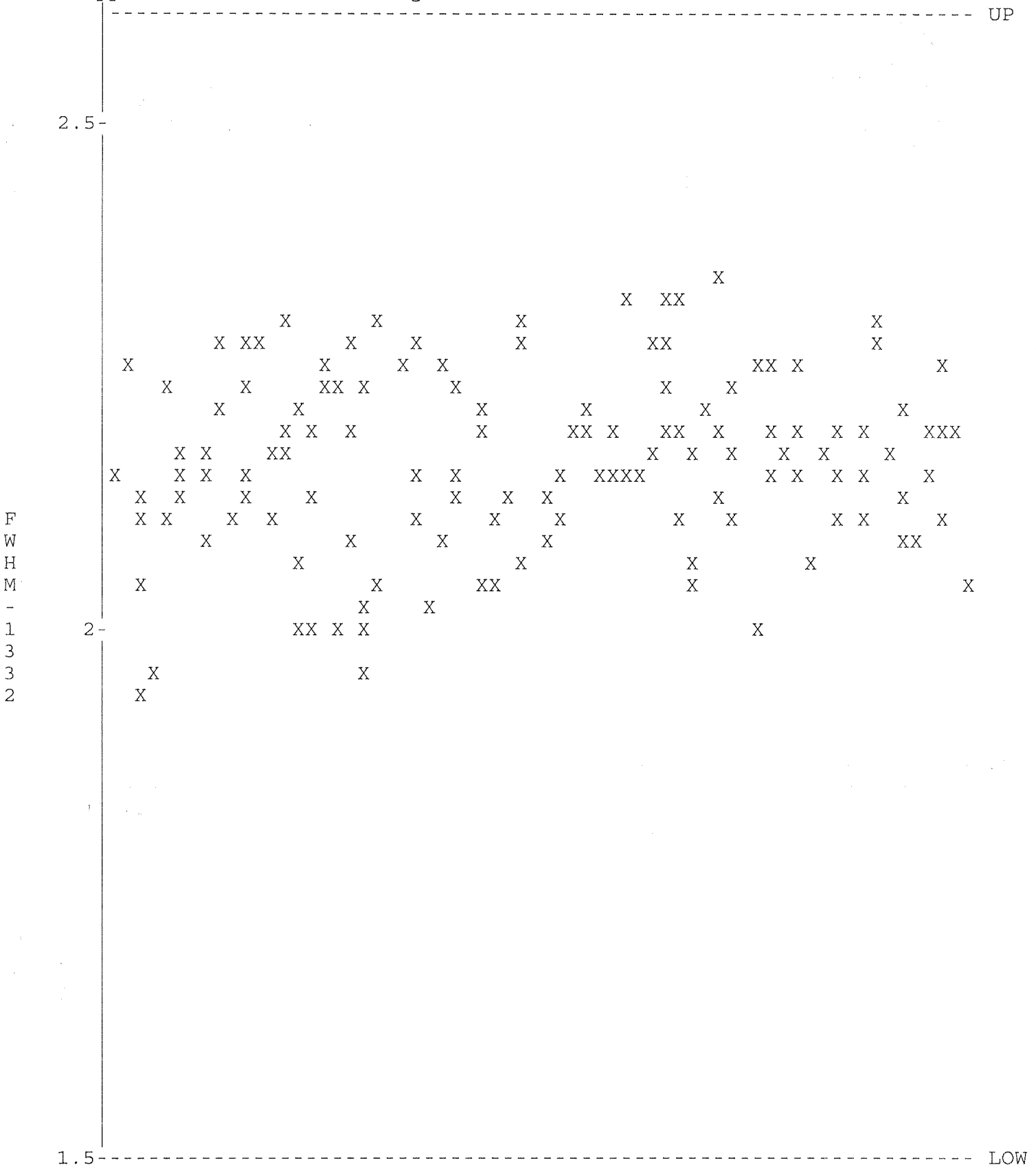
QA filename : DKB100:[GAMMA.QUALITY]TBE08_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



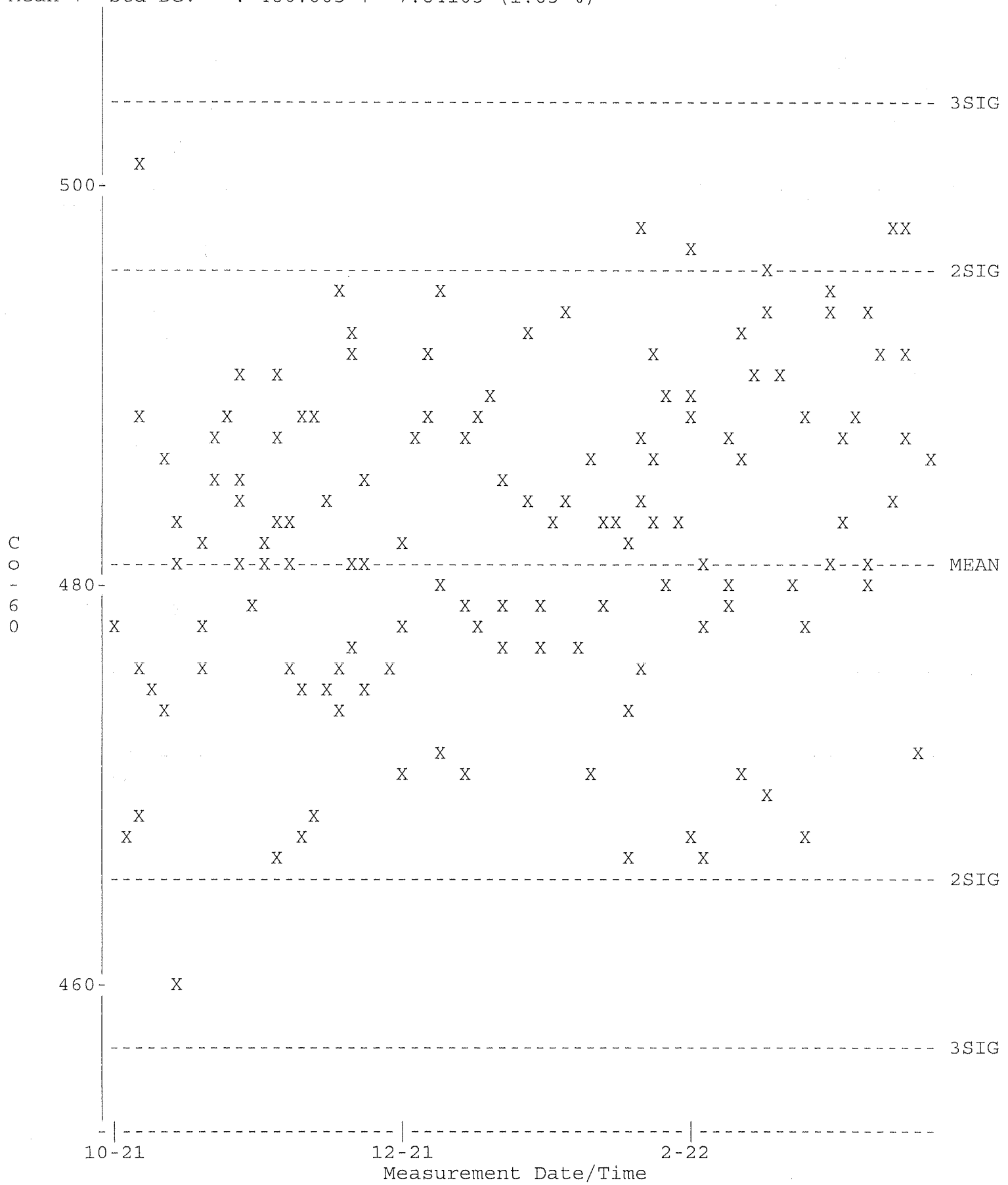
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



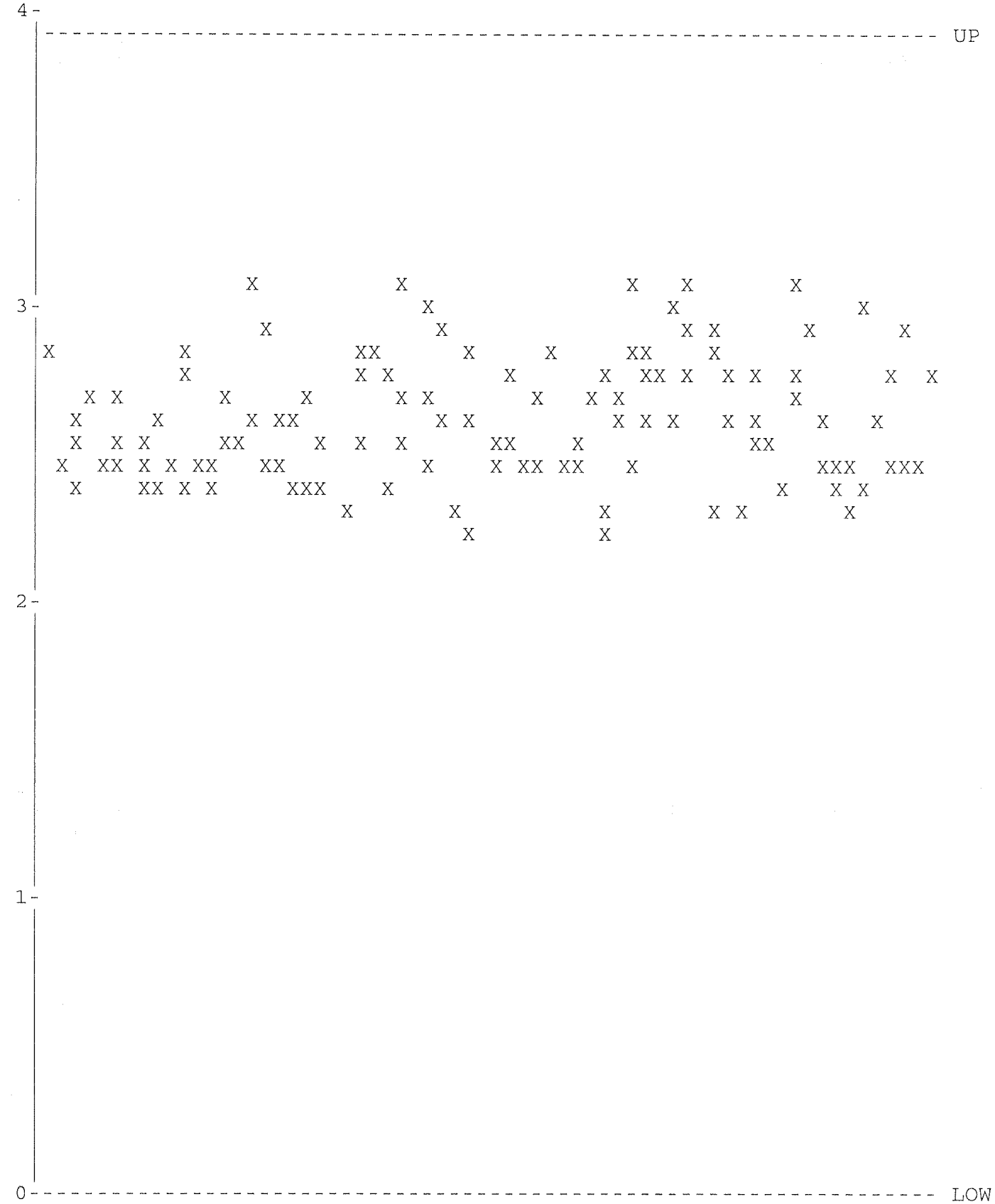
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.50000 through 2.60000



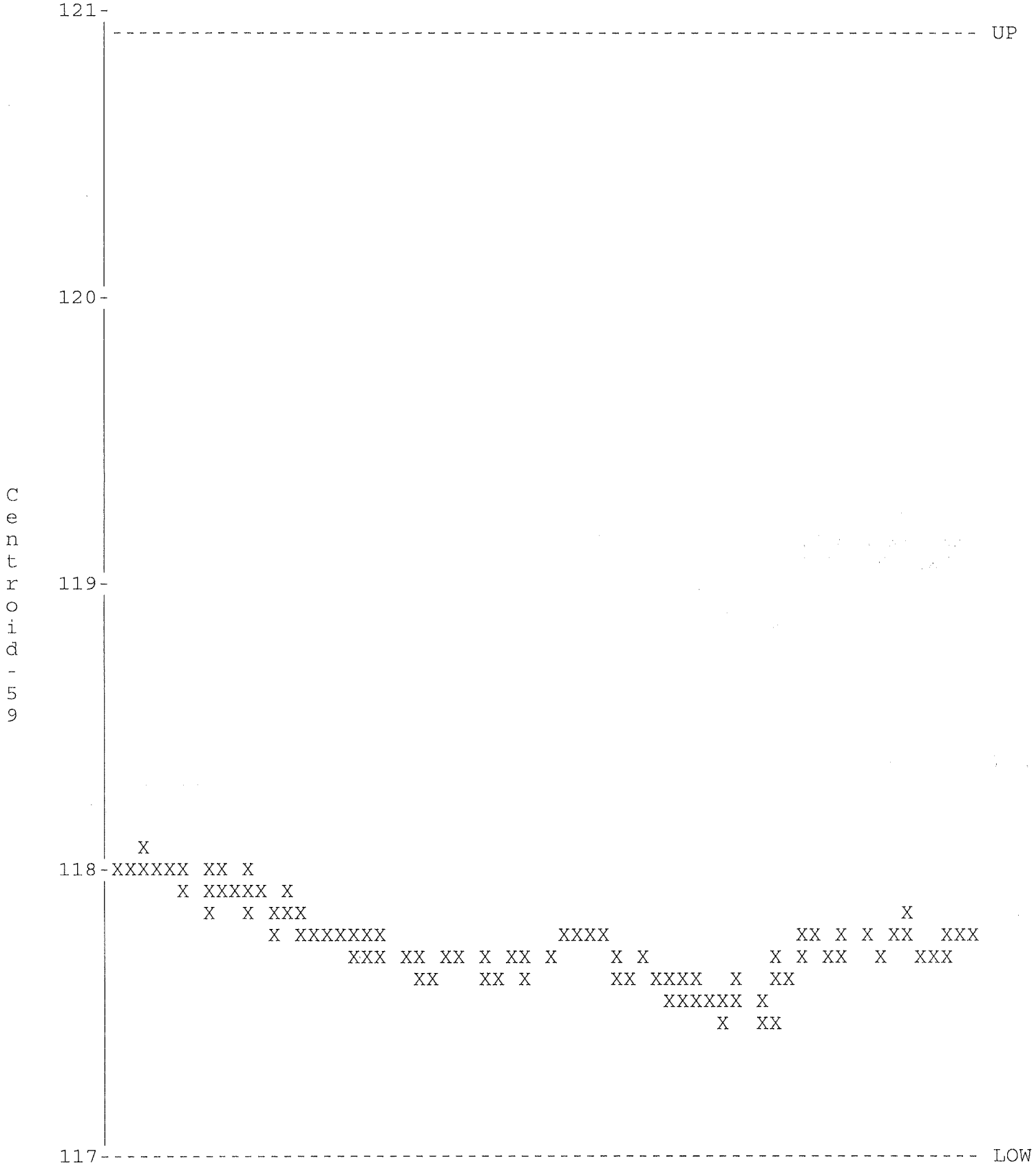
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Mean +- Std Dev : 480.605 +- 7.84103 (1.63 %)



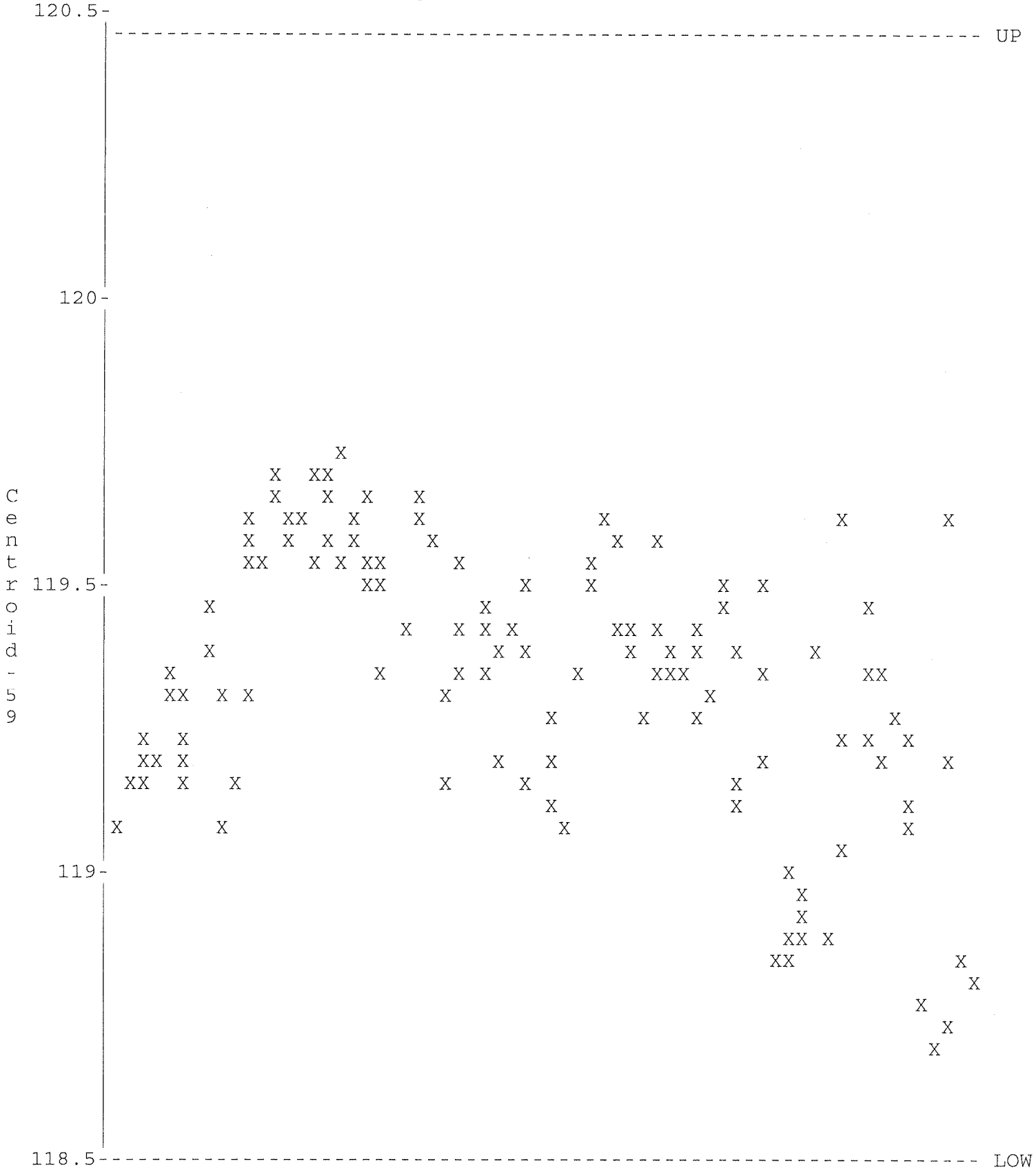
QA filename : DKB100:[GAMMA.QUALITY]TBE11_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 0.000000E+00 through 4.00000



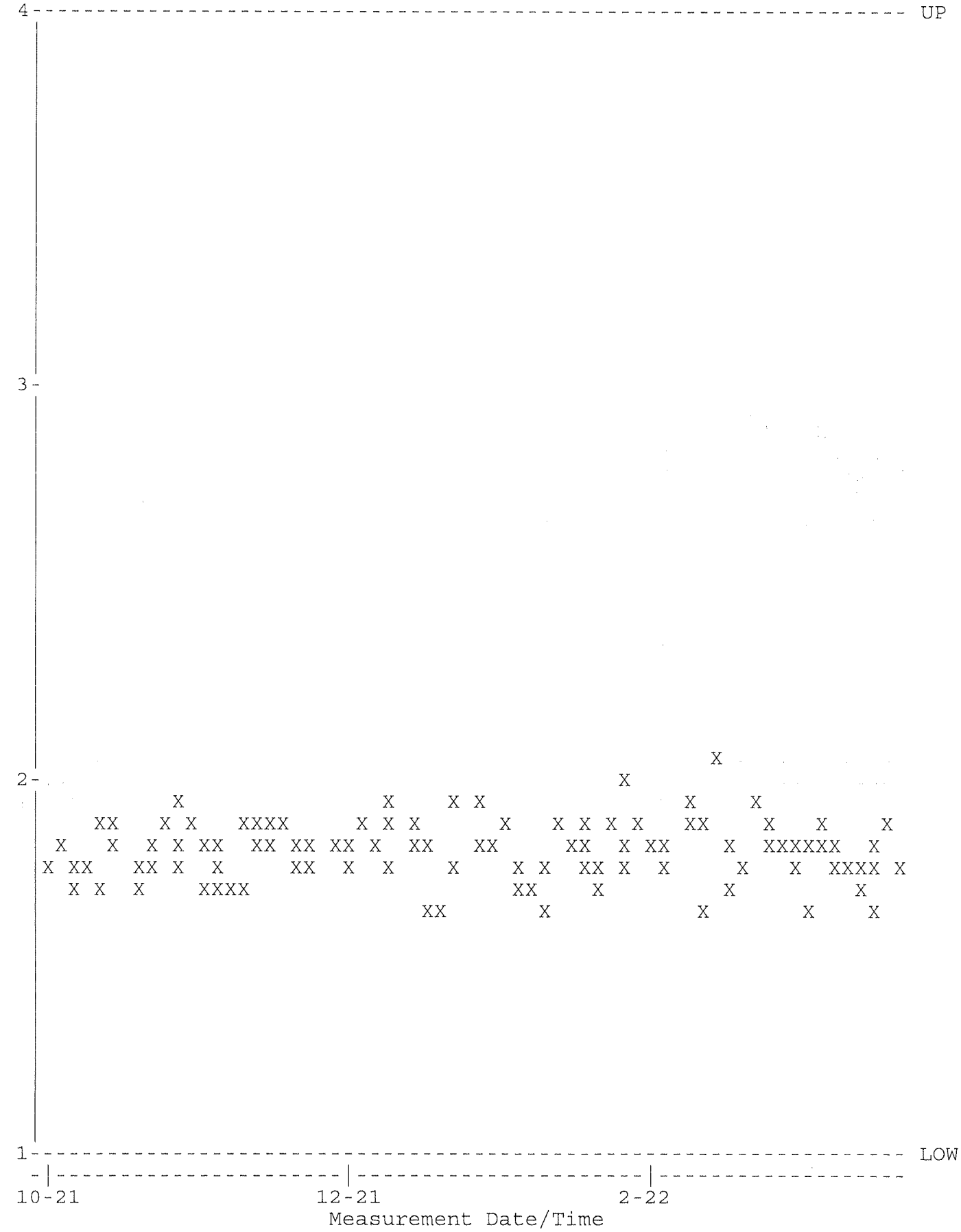
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : PSCENTRD-59 (Centroid-59)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 117.000 through 121.000

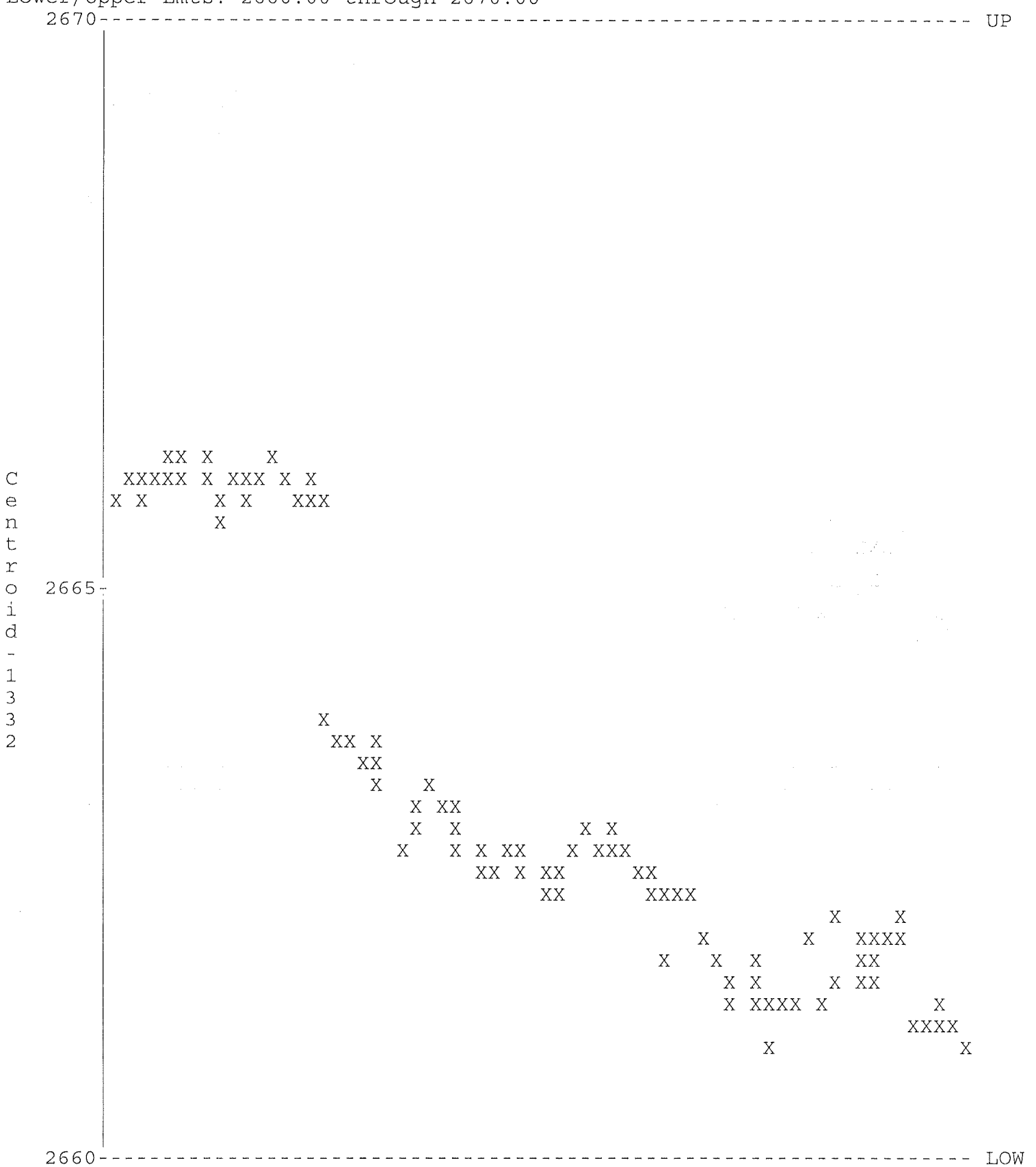


QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE13_QC.QAF;1
Parameter Name : PSCENTRD-59 (Centroid-59)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 118.500 through 120.500

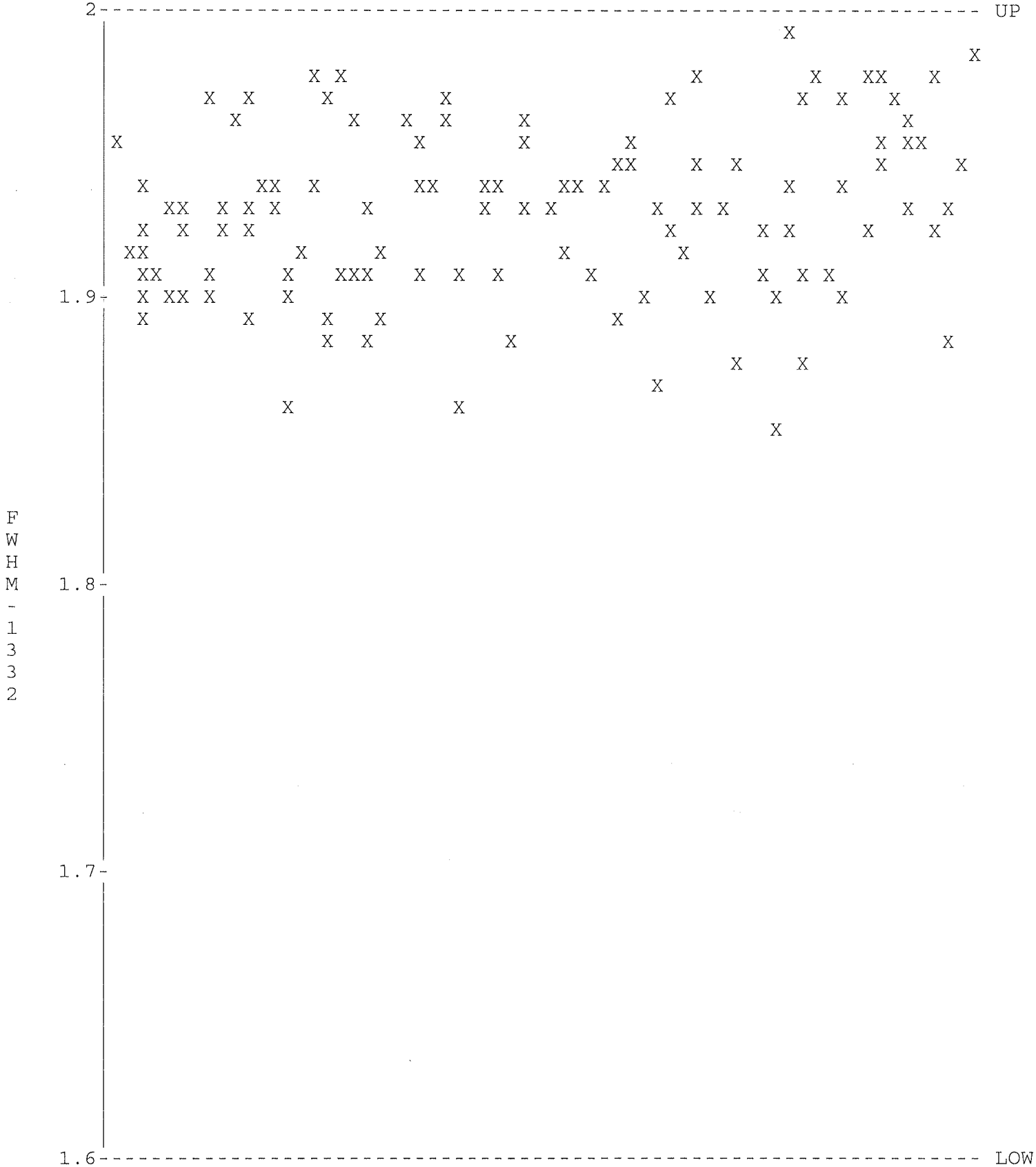


QA filename : DKB100:[GAMMA.QUALITY]TBE13_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.00000 through 4.00000

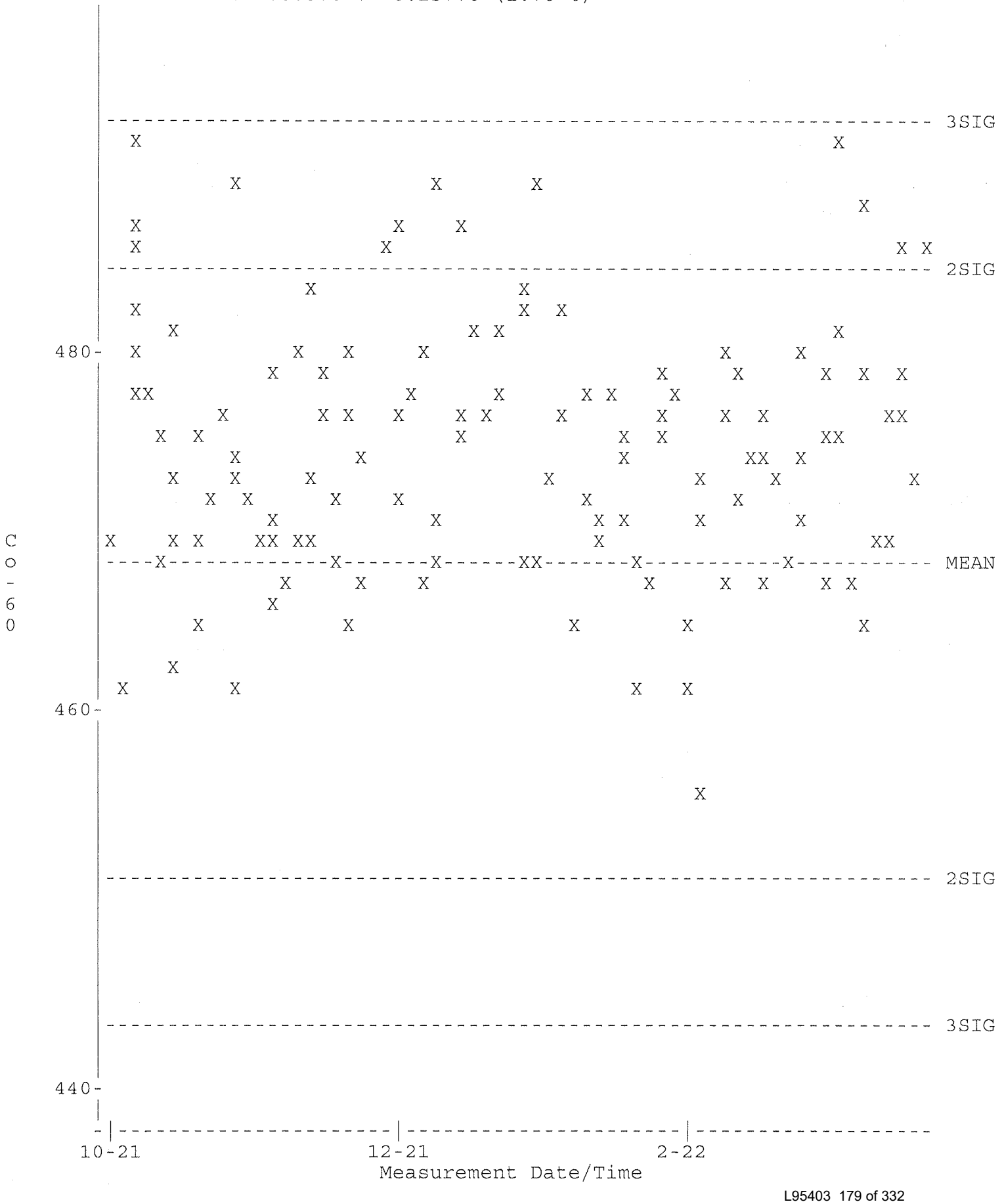



QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE13_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2660.00 through 2670.00
2670 UP
2665
2660 LOW
Centroid-1332
10-21
12-21
2-22
Measurement Date/Time

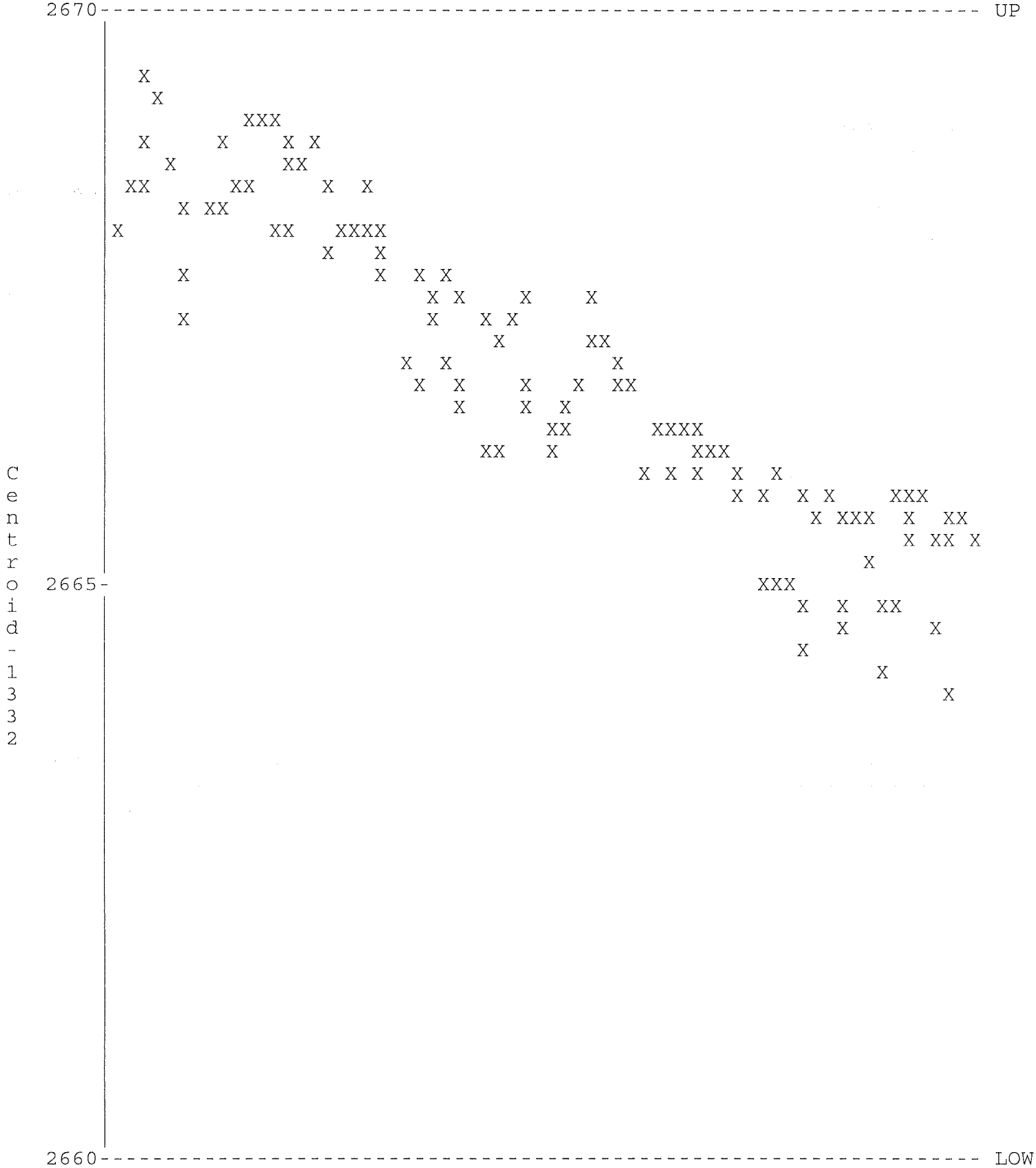
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE13_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.60000 through 2.00000



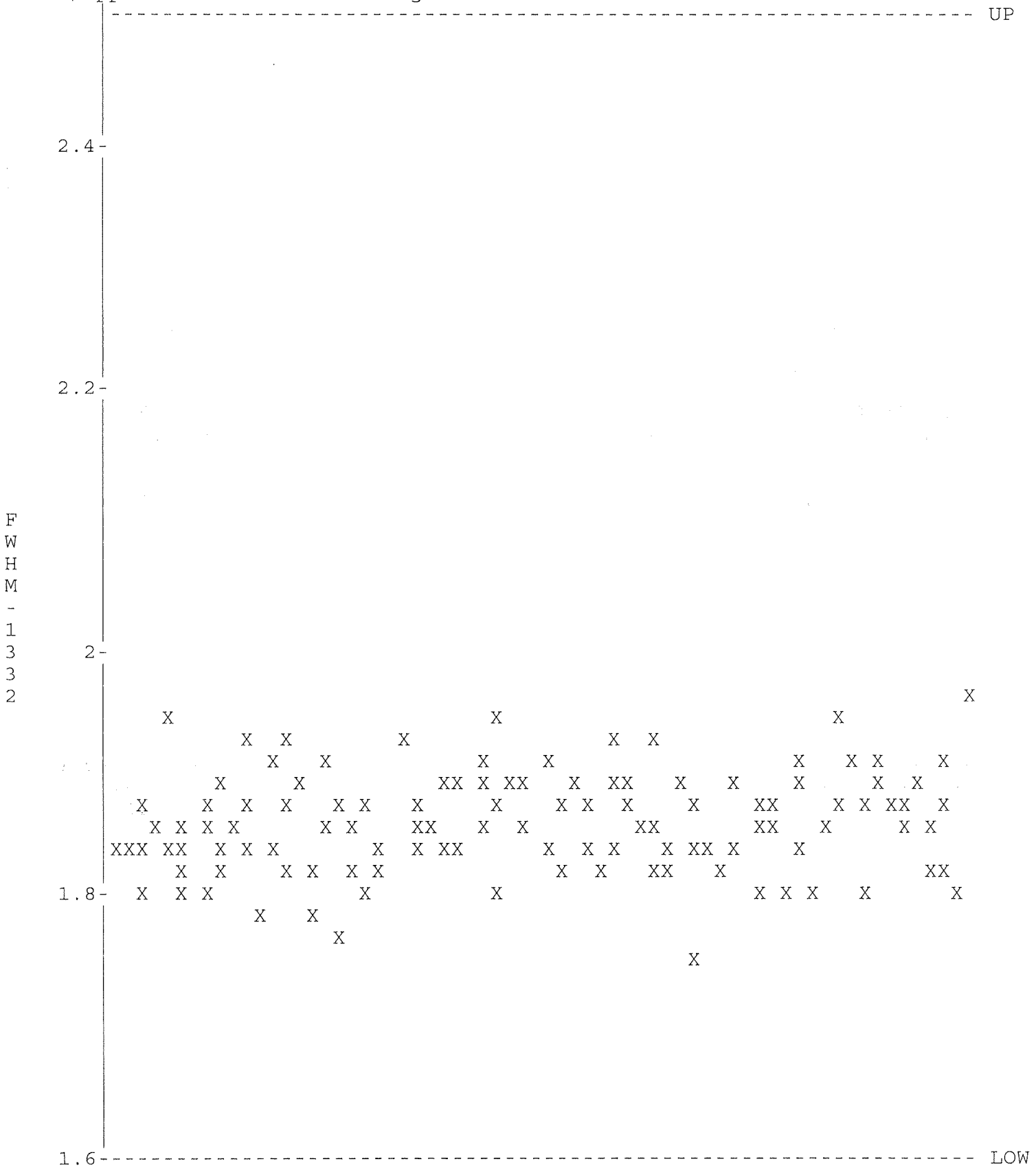
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE13_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Mean +- Std Dev : 468.570 +- 8.25776 (1.76 %)



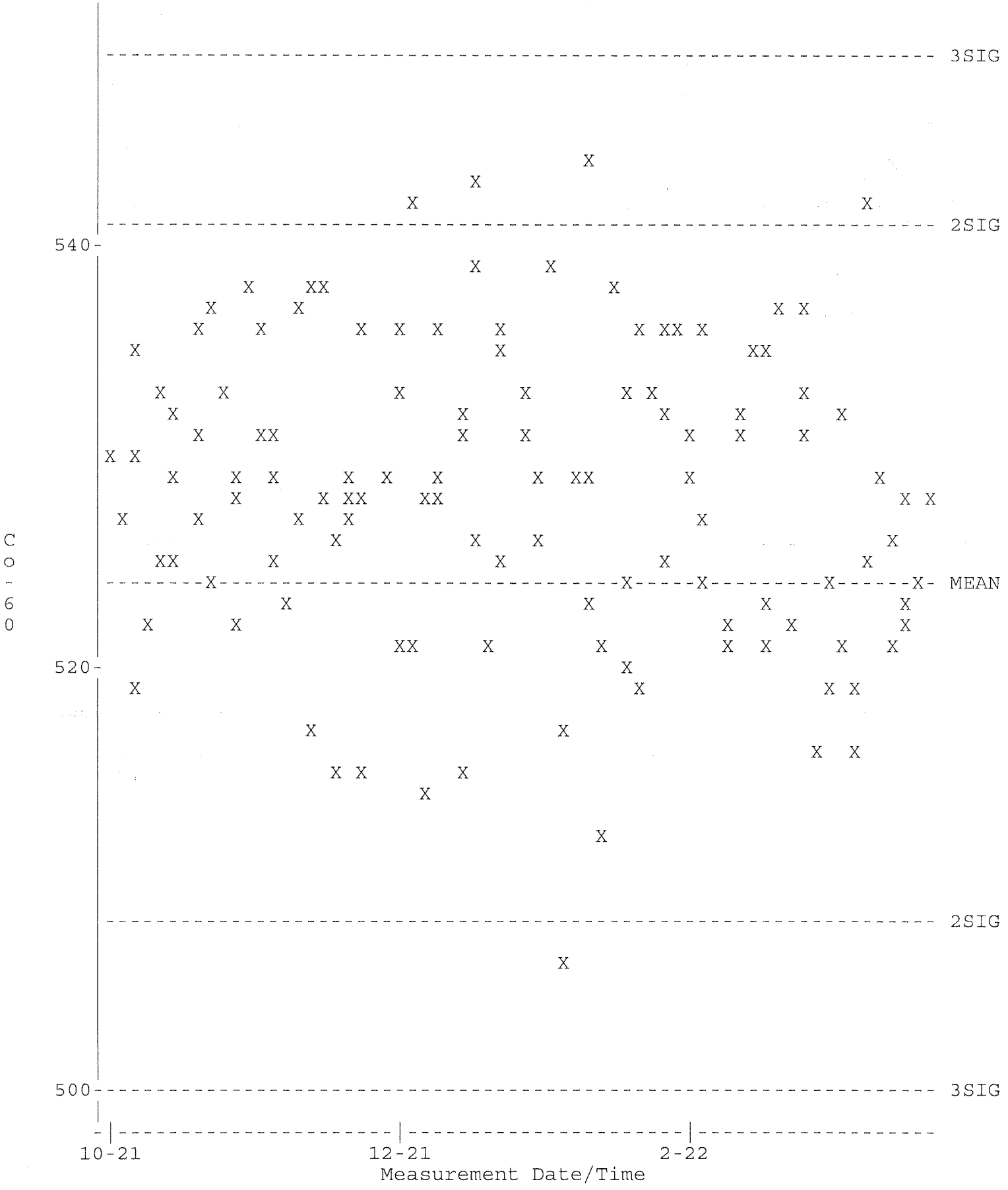
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



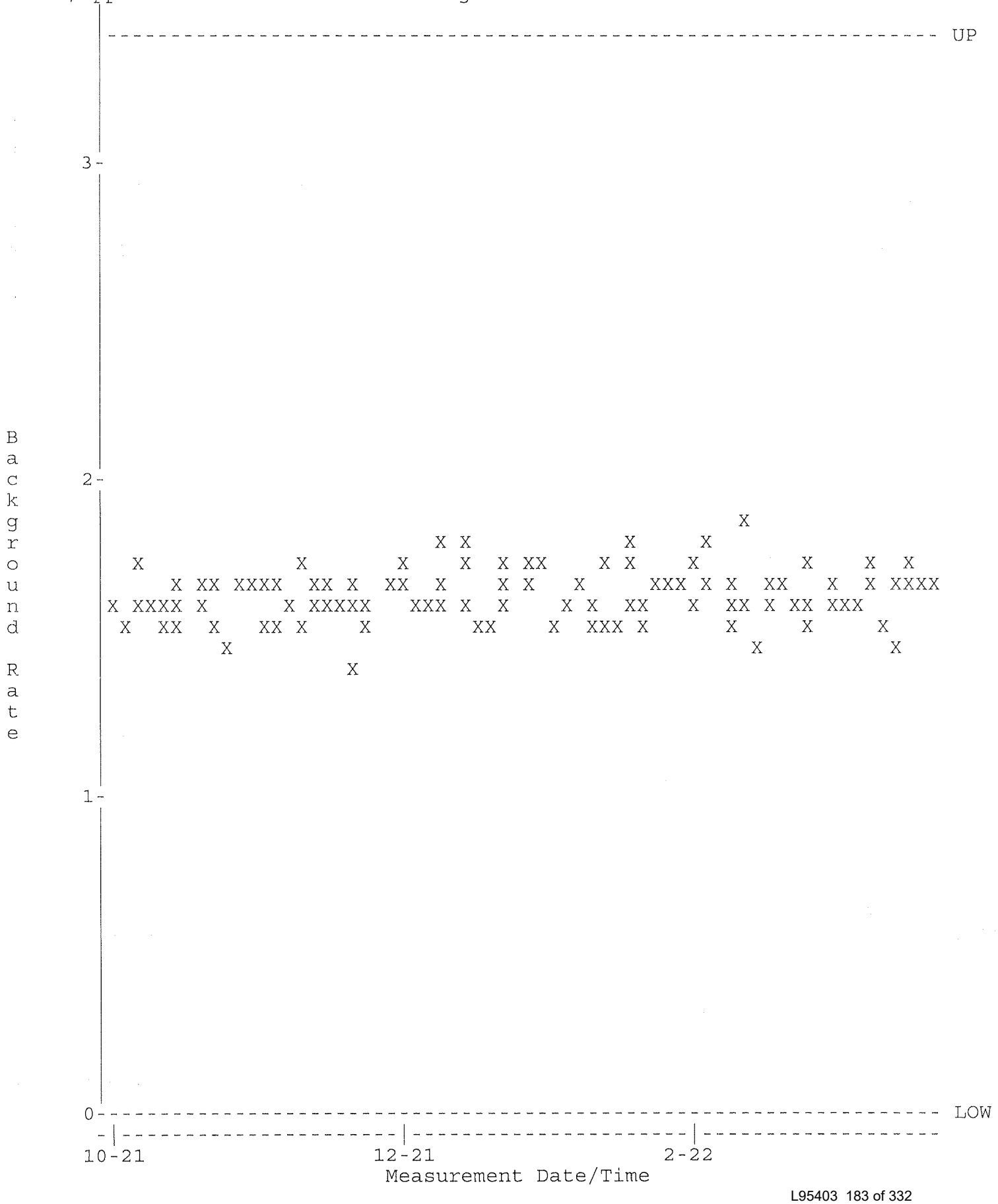
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.60000 through 2.50000



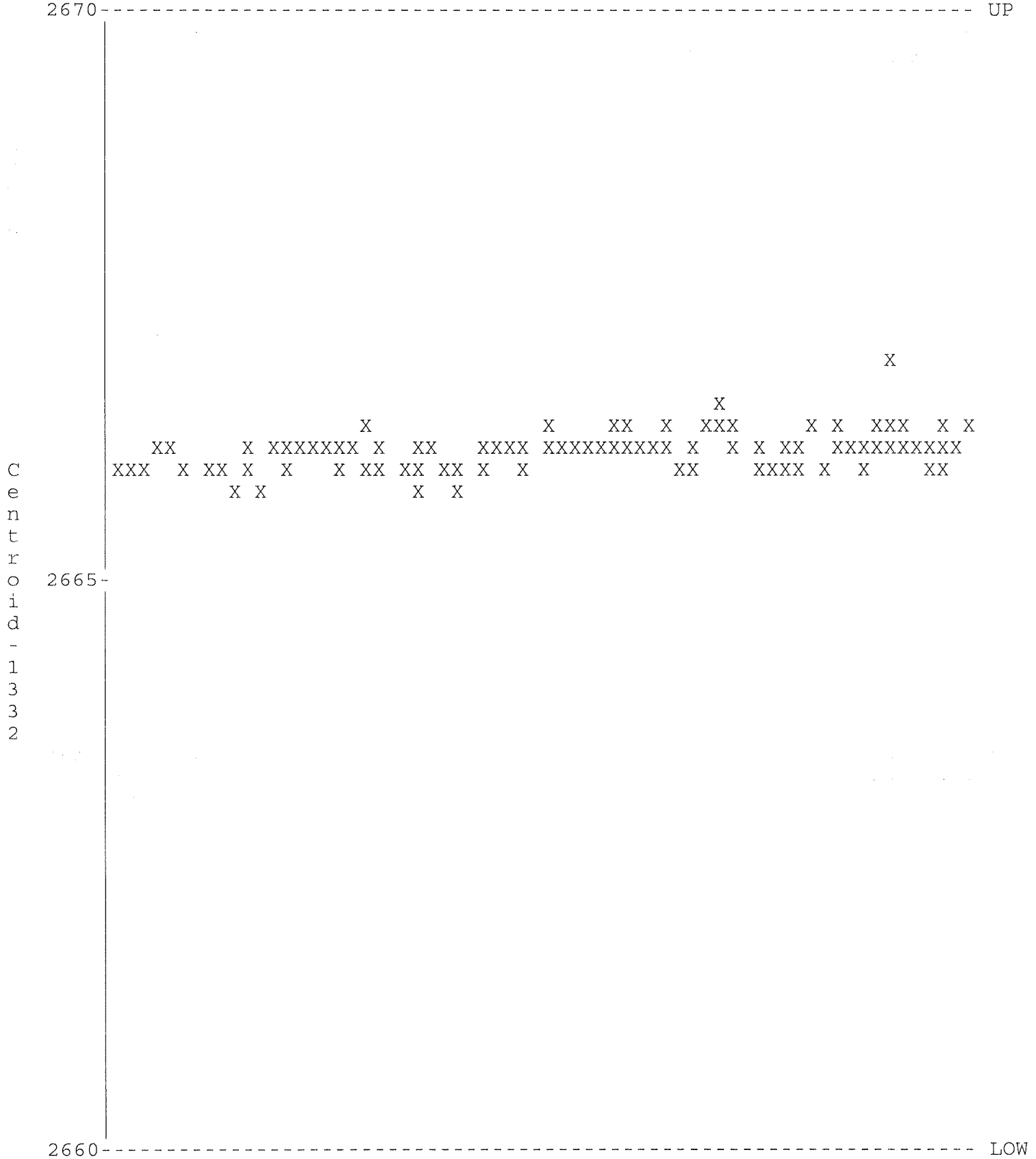
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Mean +- Std Dev : 524.852 +- 8.11129 (1.55 %)



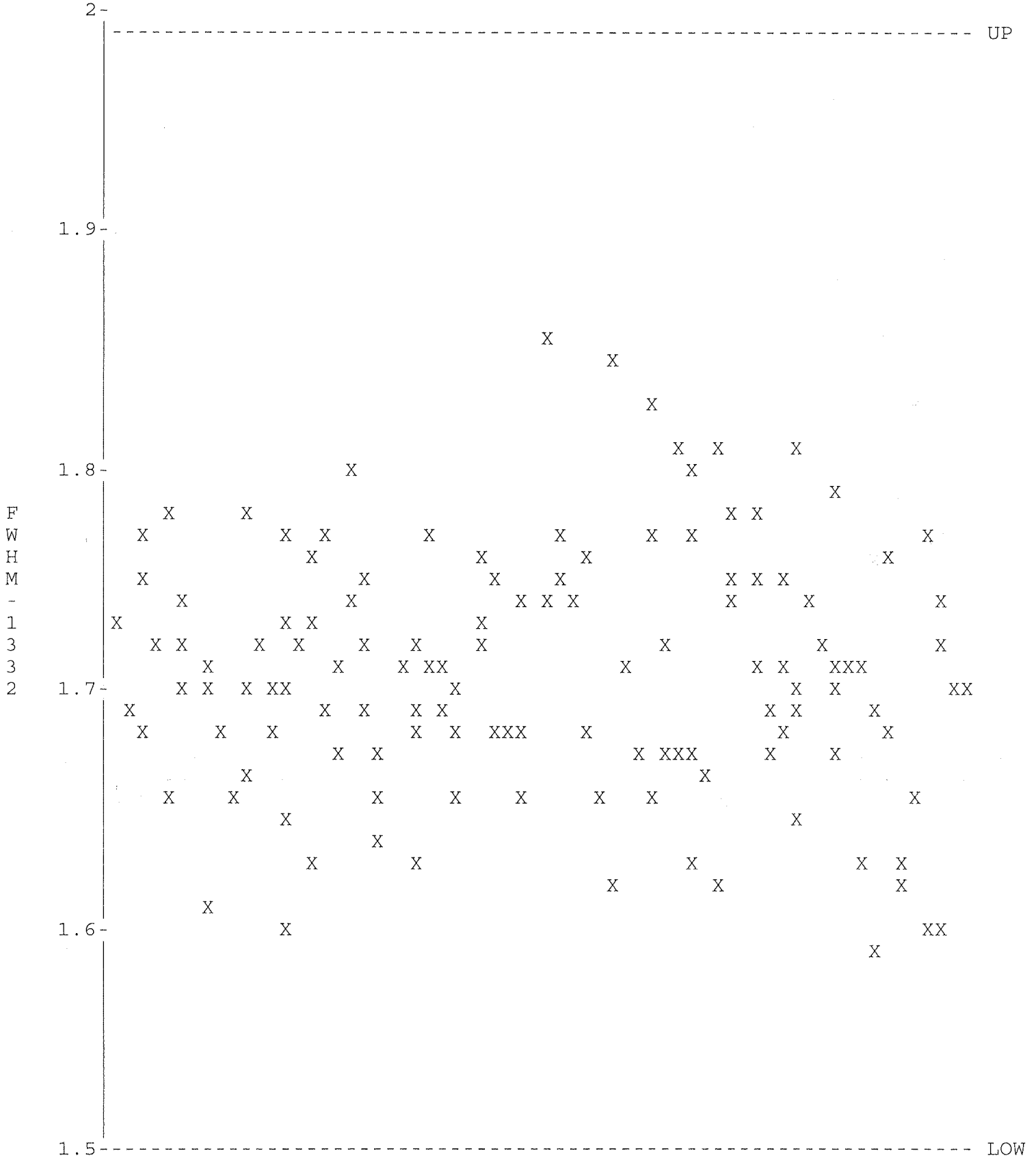
QA filename : DKB100:[GAMMA.QUALITY]TBE14_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



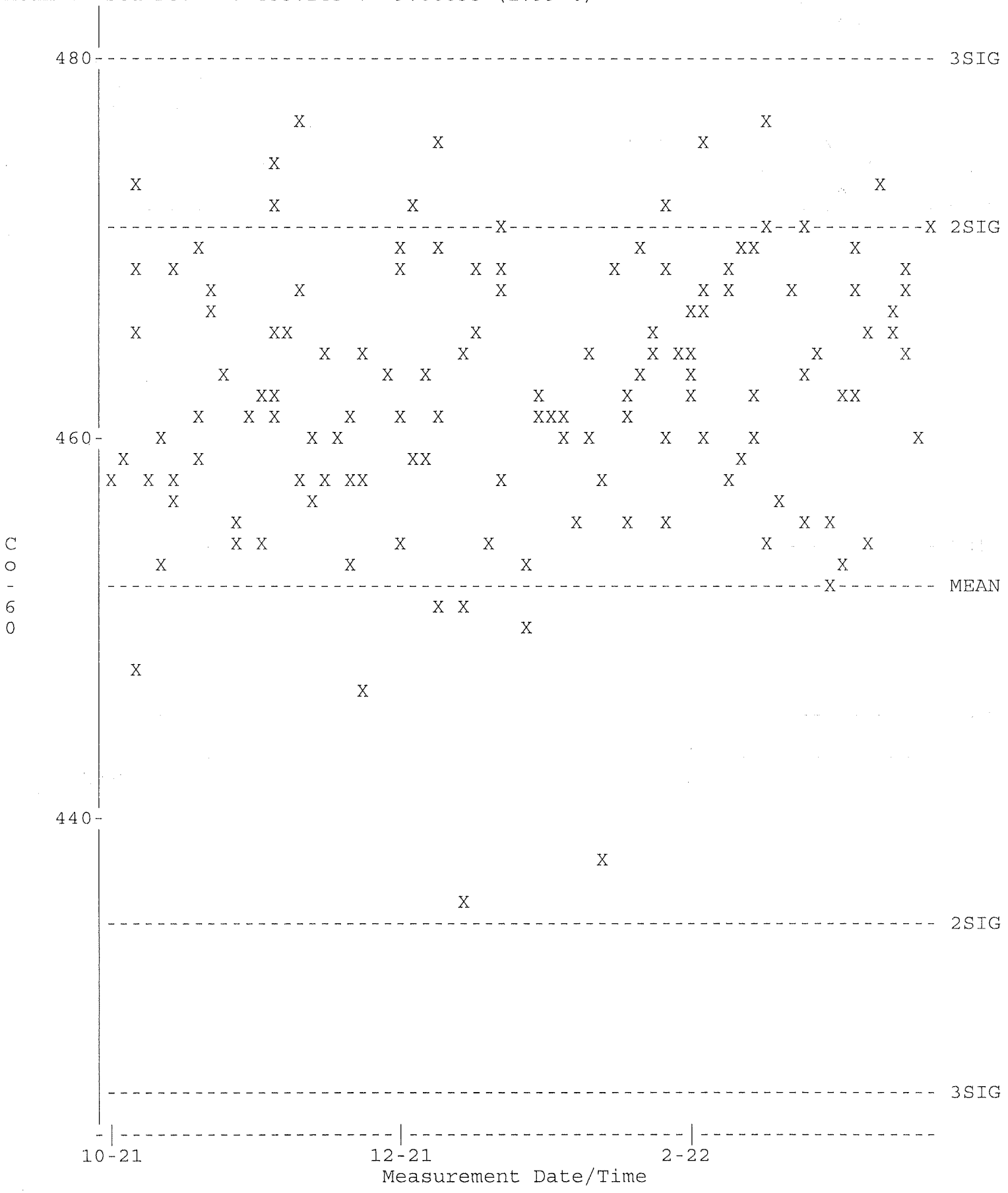
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



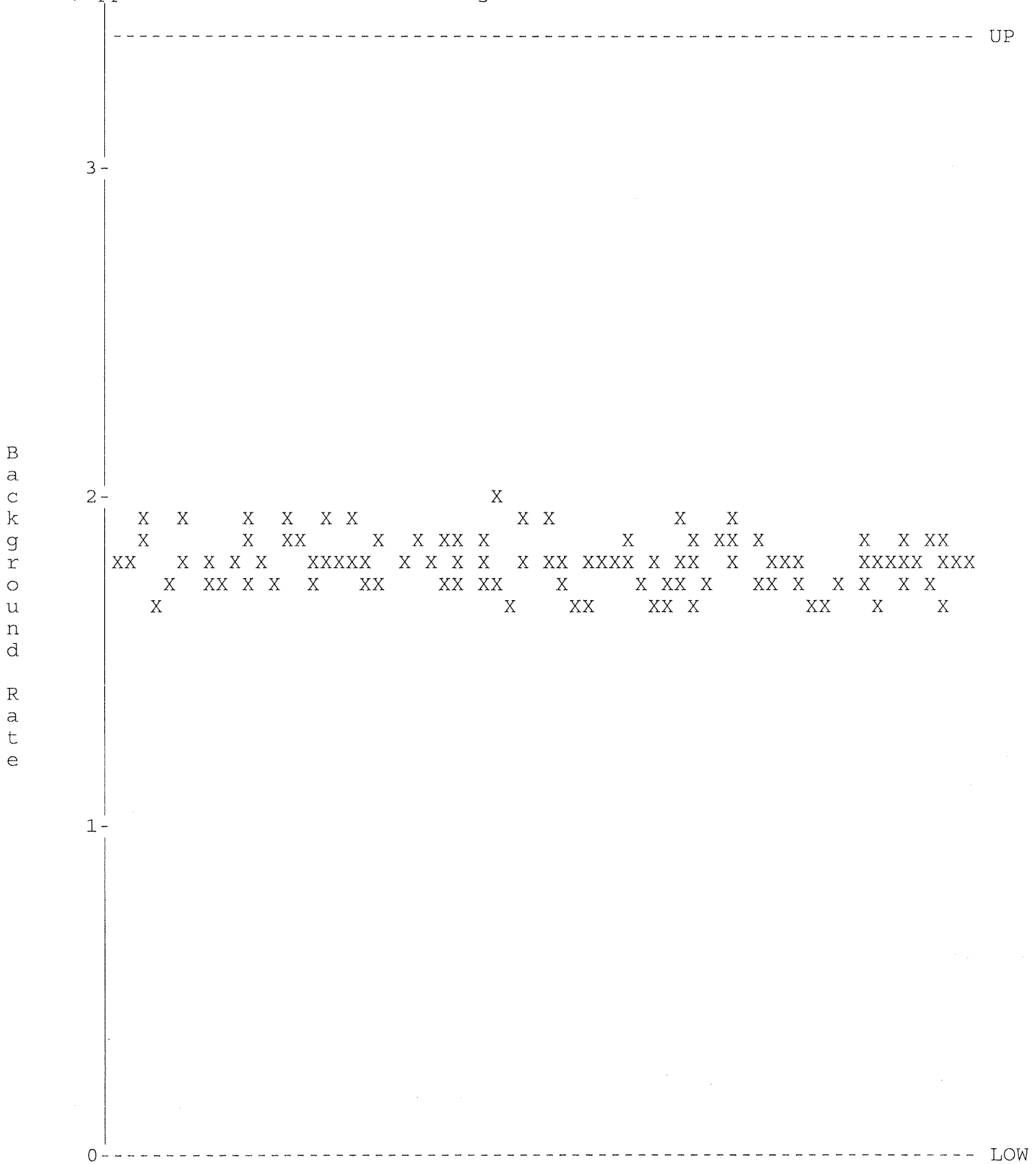
QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Lower/Upper Lmts: 1.50000 through 2.00000



QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-OCT-2021 08:41 through 23-MAR-2022 00:00
Mean +- Std Dev : 453.245 +- 9.00635 (1.99 %)



QA filename : DKB100:[GAMMA.QUALITY]TBE23_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-OCT-2021 08:57 through 23-MAR-2022 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



GAMMA SPECTROSCOPY

Sample and QC Raw Data

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:06:57.99
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 17-MAR-2022 14:52:09.25

LIMS No., Customer Name, Client ID: L95403-1 SS ANCHOR QEA

Sample ID : 01L95403-1
Sample Type : SS
Quantity : 2.14000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 01S25121819
BKGFILE : 01BG030422MT
Real Time : 0 17:14:38.71
Live time : 0 17:14:30.86

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	74.88*	211	1427	0.77	150.30	5.72E+00	3.39E-03	31.4	9.12E+00
2	3	77.11	575	1303	0.82	154.75	6.11E+00	9.27E-03	10.2	
3	1	87.32*	263	1190	1.12	175.15	7.65E+00	4.24E-03	24.0	9.79E-01
4	1	92.81*	477	1876	1.62	186.13	8.29E+00	7.69E-03	19.4	7.74E+00
5	1	185.83*	398	1411	1.38	372.03	9.12E+00	6.41E-03	20.7	1.43E+00
6	4	238.61*	1904	774	1.13	477.52	7.80E+00	3.07E-02	3.8	1.93E+00
7	4	241.56	677	1146	1.86	483.41	7.73E+00	1.09E-02	11.7	
8	1	295.13*	737	834	1.24	590.49	6.64E+00	1.19E-02	8.7	1.00E+00
9	1	338.21	466	869	1.55	676.59	5.95E+00	7.51E-03	13.1	5.31E-01
10	1	351.90*	1167	1076	1.40	703.94	5.76E+00	1.88E-02	7.4	1.77E+00
11	1	510.80*	273	925	2.66	1021.56	4.18E+00	4.40E-03	35.4	1.53E+00
12	1	583.02*	577	534	1.46	1165.93	3.71E+00	9.30E-03	10.0	9.72E-01
13	1	609.10*	828	613	1.47	1218.05	3.56E+00	1.33E-02	7.5	9.67E-01
14	1	910.89*	402	366	1.73	1821.39	2.42E+00	6.48E-03	12.4	7.36E-01
15	1	968.88*	275	180	1.92	1937.32	2.28E+00	4.43E-03	11.8	2.11E+00
16	1	1120.33*	185	215	1.98	2240.15	1.98E+00	2.97E-03	19.3	2.00E+00
17	1	1460.59*	1097	257	2.27	2920.55	1.54E+00	1.77E-02	5.0	1.30E+00
18	1	1764.45*	157	67	2.89	3528.27	1.32E+00	2.53E-03	16.5	1.38E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1097	10.67*	1.540E+00	1.358E+01	1.358E+01	10.02
BI-214	609.31	828	46.30	3.560E+00	1.022E+00	1.022E+00	15.01
	1120.29	185	15.10*	1.978E+00	1.258E+00	1.258E+00	38.62
	1764.49	157	15.80	1.323E+00	1.531E+00	1.531E+00	32.92
RA-226	186.21	398	3.28*	9.116E+00	2.706E+00	2.706E+00	41.32
RA-228	93.35	477	3.50	8.292E+00	3.344E+00	3.380E+00	38.78
	969.11	275	16.60*	2.281E+00	1.476E+00	1.492E+00	23.69
TH-234	63.29	------	3.80*	3.510E+00	------ Line Not Found		------
	92.60	477	5.41	8.292E+00	2.164E+00	2.164E+00	38.78
U-235	143.76	------	10.50*	9.986E+00	------ Line Not Found		------

163.35	------	4.70	9.656E+00	------ Line Not Found		------
185.71	398	54.00	9.116E+00	1.644E-01	1.644E-01	41.32
205.31	------	4.70	8.614E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	577	30.25*	3.705E+00	1.048E+00	1.082E+00	20.07
PB-212	238.63	1904	44.60*	7.796E+00	1.114E+00	1.151E+00	7.50
PB-214	295.21	737	19.20	6.641E+00	1.175E+00	1.176E+00	17.45
	351.92	1167	37.20*	5.756E+00	1.109E+00	1.109E+00	14.76
TH-232	911.21	402	27.70*	2.424E+00	1.219E+00	1.219E+00	24.84

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.638E+00	------ Line Not Found		------
	911.07	402	27.70*	2.424E+00	1.219E+00	1.232E+00	24.84

Flag: "*" = Keyline

Sample ID : 01L95403-1 Acquisition date : 17-MAR-2022 14:52:09

Total number of lines in spectrum 18
Number of unidentified lines 6
Number of lines tentatively identified by NID 12 66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.358E+01	1.358E+01	0.136E+01	10.02	
BI-214	1600.00Y	1.00	1.258E+00	1.258E+00	0.486E+00	38.62	
RA-226	1600.00Y	1.00	2.706E+00	2.706E+00	1.118E+00	41.32	
RA-228	5.75Y	1.01	1.476E+00	1.492E+00	0.354E+00	23.69	
TH-234	4.47E+09Y	1.00	2.164E+00	2.164E+00	0.839E+00	38.78	K
U-235	7.04E+08Y	1.00	1.644E-01	1.644E-01	0.679E-01	41.32	K
			---	---			
	Total Activity :		2.135E+01	2.136E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.048E+00	1.082E+00	0.217E+00	20.07	
PB-212	1.91Y	1.03	1.114E+00	1.151E+00	0.086E+00	7.50	
PB-214	1600.00Y	1.00	1.109E+00	1.109E+00	0.164E+00	14.76	
TH-232	1.41E+10Y	1.00	1.219E+00	1.219E+00	0.303E+00	24.84	
			---	---			
	Total Activity :		4.490E+00	4.561E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.219E+00	1.232E+00	0.306E+00	24.84	
			---	---			
	Total Activity :		1.219E+00	1.232E+00			

Grand Total Activity : 2.706E+01 2.715E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	74.88	211	1427	0.77	150.30	147	11	3.39E-03	62.7	5.72E+00	
3	77.11	575	1303	0.82	154.75	147	11	9.27E-03	20.4	6.11E+00	
1	87.32	263	1190	1.12	175.15	173	6	4.24E-03	47.9	7.65E+00	
4	241.56	677	1146	1.86	483.41	470	20	1.09E-02	23.3	7.73E+00	
1	338.21	466	869	1.55	676.59	671	11	7.51E-03	26.1	5.95E+00	
1	510.80	273	925	2.66	1021.56	1013	20	4.40E-03	70.9	4.18E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	12	66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.358E+01	1.358E+01	0.136E+01	10.02	
BI-214	1600.00Y	1.00	1.081E+00	1.081E+00	0.140E+00	12.99	
RA-226	1600.00Y	1.00	2.706E+00	2.706E+00	1.118E+00	41.32	
RA-228	5.75Y	1.01	1.476E+00	1.492E+00	0.354E+00	23.69	
Total Activity :			1.884E+01	1.886E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.048E+00	1.082E+00	0.217E+00	20.07	
PB-212	1.91Y	1.03	1.114E+00	1.151E+00	0.086E+00	7.50	
PB-214	1600.00Y	1.00	1.135E+00	1.135E+00	0.128E+00	11.27	
TH-232	1.41E+10Y	1.00	1.219E+00	1.219E+00	0.303E+00	24.84	
Total Activity :			4.516E+00	4.587E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.219E+00	1.232E+00	0.306E+00	24.84	
Total Activity :			1.219E+00	1.232E+00			

Grand Total Activity :	2.458E+01	2.468E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.358E+01	1.360E+00	6.965E-01	0.000E+00	19.493
TL-208	1.082E+00	2.172E-01	1.791E-01	0.000E+00	6.043
PB-212	1.151E+00	8.629E-02	8.237E-02	0.000E+00	13.967
BI-214	1.081E+00	1.405E-01	4.700E-01	0.000E+00	2.301
PB-214	1.135E+00	1.280E-01	1.114E-01	0.000E+00	10.190
RA-226	2.706E+00	1.118E+00	1.017E+00	0.000E+00	2.661
AC-228	1.232E+00	3.061E-01	2.313E-01	0.000E+00	5.327
RA-228	1.492E+00	3.535E-01	4.220E-01	0.000E+00	3.536
TH-232	1.219E+00	3.028E-01	2.289E-01	0.000E+00	5.326

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	2.373E-02		4.376E-02	7.376E-02	0.000E+00	0.322
CS-137	1.809E-02		3.945E-02	6.620E-02	0.000E+00	0.273
LA-138	-1.311E-02		6.369E-02	1.021E-01	0.000E+00	-0.128
BI-212	1.532E+00		5.193E-01	9.377E-01	0.000E+00	1.634
PA-234M	-2.786E+00		5.066E+00	7.426E+00	0.000E+00	-0.375
TH-234	3.169E-01		1.833E+00	2.692E+00	0.000E+00	0.118
U-235	6.268E-02		2.156E-01	3.086E-01	0.000E+00	0.203
U-238	-2.786E+00		5.066E+00	7.426E+00	0.000E+00	-0.375

```
A,01L95403-1      ,03/18/2022 08:06,02/13/2022 13:37,   2.140E+01,L95403-1 SS AN
B,01L95403-1      ,NORMK                ,11/17/2021 15:33,01S25121819
C,K-40     ,YES,   1.358E+01,   1.360E+00,   6.965E-01,,   19.493
C,TL-208   ,YES,   1.082E+00,   2.172E-01,   1.791E-01,,    6.043
C,PB-212   ,YES,   1.151E+00,   8.629E-02,   8.237E-02,,   13.967
C,BI-214   ,YES,   1.081E+00,   1.405E-01,   4.700E-01,,    2.301
C,PB-214   ,YES,   1.135E+00,   1.280E-01,   1.114E-01,,   10.190
C,RA-226   ,YES,   2.706E+00,   1.118E+00,   1.017E+00,,    2.661
C,AC-228   ,YES,   1.232E+00,   3.061E-01,   2.313E-01,,    5.327
C,RA-228   ,YES,   1.492E+00,   3.535E-01,   4.220E-01,,    3.536
C,TH-232   ,YES,   1.219E+00,   3.028E-01,   2.289E-01,,    5.326
C,CO-60    ,NO ,   2.373E-02,   4.376E-02,   7.376E-02,,    0.322
C,CS-137   ,NO ,   1.809E-02,   3.945E-02,   6.620E-02,,    0.273
C,LA-138   ,NO ,  -1.311E-02,   6.369E-02,   1.021E-01,,   -0.128
C,BI-212   ,NO ,   1.532E+00,   5.193E-01,   9.377E-01,,    1.634
C,PA-234M  ,NO ,  -2.786E+00,   5.066E+00,   7.426E+00,,   -0.375
C,TH-234   ,NO ,   3.169E-01,   1.833E+00,   2.692E+00,,    0.118
C,U-235    ,NO ,   6.268E-02,   2.156E-01,   3.086E-01,,    0.203
C,U-238    ,NO ,  -2.786E+00,   5.066E+00,   7.426E+00,,   -0.375
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:31:28.83
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 18-MAR-2022 11:31:04.83

LIMS No., Customer Name, Client ID: L95403-2 SS ANCHOR QEA

Sample ID : 02L95403-2
Sample Type : SS
Quantity : 3.23000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 02S25121819
BKGFILE : 02BG030422MT
Real Time : 0 18:00:10.93
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	63.14*	192	2312	1.04	111.02	6.08E+00	2.96E-03	48.5	
2	0	77.11*	1313	1760	0.91	139.12	8.44E+00	2.03E-02	6.1	
3	5	87.14*	821	1801	1.34	159.30	9.45E+00	1.27E-02	10.3	1.92E+01
4	5	89.80	547	1511	1.23	164.65	9.63E+00	8.44E-03	12.6	
5	5	92.78*	728	1650	1.38	170.64	9.81E+00	1.12E-02	12.2	
6	0	185.87*	512	1786	1.01	357.95	8.34E+00	7.91E-03	18.0	
7	0	209.21	329	1246	0.85	404.92	7.66E+00	5.07E-03	19.4	
8	5	238.60*	2652	959	1.02	464.07	6.92E+00	4.09E-02	2.9	2.70E+00
9	5	241.60*	582	1326	1.51	470.11	6.85E+00	8.99E-03	13.2	
10	0	295.07*	770	1200	1.14	577.70	5.79E+00	1.19E-02	10.4	
11	0	338.33*	524	776	0.96	664.75	5.15E+00	8.08E-03	11.2	
12	0	351.86*	1260	875	1.19	691.97	4.97E+00	1.94E-02	6.0	
13	0	463.02	212	460	1.25	915.68	3.88E+00	3.27E-03	19.6	
14	0	510.88*	373	859	2.20	1011.99	3.54E+00	5.75E-03	24.8	
15	0	583.03*	787	493	1.30	1157.19	3.12E+00	1.22E-02	7.4	
16	0	609.14*	897	681	1.38	1209.74	2.99E+00	1.38E-02	7.9	
17	0	727.15	227	252	2.04	1447.24	2.51E+00	3.50E-03	14.8	
18	0	911.06*	545	363	1.65	1817.39	2.00E+00	8.41E-03	9.6	
19	0	968.83	334	170	1.71	1933.64	1.88E+00	5.16E-03	9.2	
20	0	1120.05*	202	261	1.99	2238.04	1.63E+00	3.12E-03	21.3	
21	0	1460.37*	1549	116	2.20	2923.10	1.26E+00	2.39E-02	3.3	
22	0	1764.20*	132	55	2.07	3534.78	1.08E+00	2.03E-03	17.6	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1549	10.67*	1.263E+00	1.484E+01	1.484E+01	6.69
BI-214	609.31	897	46.30	2.991E+00	8.362E-01	8.362E-01	15.79
	1120.29	202	15.10*	1.627E+00	1.064E+00	1.064E+00	42.69
	1764.49	132	15.80	1.083E+00	9.930E-01	9.931E-01	35.26
RA-226	186.21	512	3.28*	8.336E+00	2.420E+00	2.420E+00	35.95
RA-228	93.35	728	3.50	9.805E+00	2.739E+00	2.769E+00	24.34

	969.11	334	16.60*	1.883E+00	1.381E+00	1.396E+00	18.36
TH-234	63.29	192	3.80*	6.076E+00	1.073E+00	1.073E+00	96.91
	92.60	728	5.41	9.805E+00	1.772E+00	1.772E+00	24.34
U-235	143.76	------	10.50*	9.647E+00	------	Line Not Found	------
	163.35	------	4.70	9.042E+00	------	Line Not Found	------
	185.71	512	54.00	8.336E+00	1.470E-01	1.470E-01	35.95
	205.31	------	4.70	7.767E+00	------	Line Not Found	------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	787	30.25*	3.120E+00	1.077E+00	1.114E+00	14.83
BI-212	727.17	227	7.56*	2.514E+00	1.539E+00	1.590E+00	29.59
PB-212	238.63	2652	44.60*	6.915E+00	1.110E+00	1.147E+00	5.82
PB-214	295.21	770	19.20	5.795E+00	8.941E-01	8.942E-01	20.84
	351.92	1260	37.20*	4.970E+00	8.797E-01	8.797E-01	12.09
TH-232	911.21	545	27.70*	2.005E+00	1.267E+00	1.267E+00	19.12

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.188E+00	------	Line Not Found	------
	911.07	545	27.70*	2.005E+00	1.267E+00	1.281E+00	19.12

Flag: "*" = Keyline

Sample ID : 02L95403-2 Acquisition date : 18-MAR-2022 11:31:04

Total number of lines in spectrum 22
Number of unidentified lines 8
Number of lines tentatively identified by NID 14 63.64%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.484E+01	1.484E+01	0.099E+01	6.69	
BI-214	1600.00Y	1.00	1.064E+00	1.064E+00	0.454E+00	42.69	
RA-226	1600.00Y	1.00	2.420E+00	2.420E+00	0.870E+00	35.95	
RA-228	5.75Y	1.01	1.381E+00	1.396E+00	0.256E+00	18.36	
TH-234	4.47E+09Y	1.00	1.073E+00	1.073E+00	1.039E+00	96.91	
U-235	7.04E+08Y	1.00	1.470E-01	1.470E-01	0.528E-01	35.95	K
Total Activity :			2.093E+01	2.094E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.077E+00	1.114E+00	0.165E+00	14.83	
BI-212	1.91Y	1.03	1.539E+00	1.590E+00	0.471E+00	29.59	
PB-212	1.91Y	1.03	1.110E+00	1.147E+00	0.067E+00	5.82	
PB-214	1600.00Y	1.00	8.797E-01	8.797E-01	1.063E-01	12.09	
TH-232	1.41E+10Y	1.00	1.267E+00	1.267E+00	0.242E+00	19.12	
Total Activity :			5.874E+00	5.999E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.267E+00	1.281E+00	0.245E+00	19.12	
Total Activity :			1.267E+00	1.281E+00			

Grand Total Activity : 2.807E+01 2.822E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	77.11	1313	1760	0.91	139.12	137	6	2.03E-02	12.2	8.44E+00	
5	87.14	821	1801	1.34	159.30	149	29	1.27E-02	20.7	9.45E+00	
5	89.80	547	1511	1.23	164.65	149	29	8.44E-03	25.3	9.63E+00	
0	209.21	329	1246	0.85	404.92	402	8	5.07E-03	38.7	7.66E+00	
5	241.60	582	1326	1.51	470.11	459	16	8.99E-03	26.3	6.85E+00	
0	338.33	524	776	0.96	664.75	661	8	8.08E-03	22.3	5.15E+00	
0	463.02	212	460	1.25	915.68	912	9	3.27E-03	39.1	3.88E+00	
0	510.88	373	859	2.20	1011.99	1003	18	5.75E-03	49.7	3.54E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	22	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	14	63.64%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.484E+01	1.484E+01	0.099E+01	6.69	
BI-214	1600.00Y	1.00	8.700E-01	8.701E-01	1.192E-01	13.70	
RA-226	1600.00Y	1.00	2.420E+00	2.420E+00	0.870E+00	35.95	
RA-228	5.75Y	1.01	1.381E+00	1.396E+00	0.256E+00	18.36	
TH-234	4.47E+09Y	1.00	1.073E+00	1.073E+00	1.039E+00	96.91	
			---------	---------			
	Total Activity :		2.059E+01	2.060E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.077E+00	1.114E+00	0.165E+00	14.83	
BI-212	1.91Y	1.03	1.539E+00	1.590E+00	0.471E+00	29.59	
PB-212	1.91Y	1.03	1.110E+00	1.147E+00	0.067E+00	5.82	
PB-214	1600.00Y	1.00	8.832E-01	8.833E-01	0.924E-01	10.46	
TH-232	1.41E+10Y	1.00	1.267E+00	1.267E+00	0.242E+00	19.12	
			---------	---------			
	Total Activity :		5.877E+00	6.002E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.267E+00	1.281E+00	0.245E+00	19.12	
			---------	---------			
	Total Activity :		1.267E+00	1.281E+00			

Grand Total Activity :	2.773E+01	2.789E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.484E+01	9.933E-01	4.345E-01	0.000E+00	34.167
TL-208	1.114E+00	1.652E-01	1.200E-01	0.000E+00	9.277
BI-212	1.590E+00	4.705E-01	5.317E-01	0.000E+00	2.991
PB-212	1.147E+00	6.672E-02	6.172E-02	0.000E+00	18.590
BI-214	8.701E-01	1.192E-01	3.223E-01	0.000E+00	2.699
PB-214	8.833E-01	9.235E-02	7.771E-02	0.000E+00	11.366
RA-226	2.420E+00	8.700E-01	7.375E-01	0.000E+00	3.281
AC-228	1.281E+00	2.450E-01	1.565E-01	0.000E+00	8.189
RA-228	1.396E+00	2.563E-01	3.292E-01	0.000E+00	4.241
TH-232	1.267E+00	2.423E-01	1.548E-01	0.000E+00	8.188
TH-234	1.073E+00	1.039E+00	9.231E-01	0.000E+00	1.162

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	9.394E-03		3.120E-02	5.256E-02	0.000E+00	0.179
CS-137	3.628E-02		2.996E-02	5.245E-02	0.000E+00	0.692
LA-138	2.455E-02		4.447E-02	7.582E-02	0.000E+00	0.324
PA-234M	-6.569E-01		3.770E+00	5.480E+00	0.000E+00	-0.120
U-235	1.716E-01		1.494E-01	2.211E-01	0.000E+00	0.776
U-238	-6.569E-01		3.770E+00	5.480E+00	0.000E+00	-0.120

```
A,02L95403-2      ,03/19/2022 05:31,02/13/2022 13:37,   3.230E+01,L95403-2 SS AN
B,02L95403-2      ,NORMK                ,08/20/2021 05:25,02S25121819
C,K-40     ,YES,   1.484E+01,   9.933E-01,   4.345E-01,,   34.167
C,TL-208   ,YES,   1.114E+00,   1.652E-01,   1.200E-01,,    9.277
C,BI-212   ,YES,   1.590E+00,   4.705E-01,   5.317E-01,,    2.991
C,PB-212   ,YES,   1.147E+00,   6.672E-02,   6.172E-02,,   18.590
C,BI-214   ,YES,   8.701E-01,   1.192E-01,   3.223E-01,,    2.699
C,PB-214   ,YES,   8.833E-01,   9.235E-02,   7.771E-02,,   11.366
C,RA-226   ,YES,   2.420E+00,   8.700E-01,   7.375E-01,,    3.281
C,AC-228   ,YES,   1.281E+00,   2.450E-01,   1.565E-01,,    8.189
C,RA-228   ,YES,   1.396E+00,   2.563E-01,   3.292E-01,,    4.241
C,TH-232   ,YES,   1.267E+00,   2.423E-01,   1.548E-01,,    8.188
C,TH-234   ,YES,   1.073E+00,   1.039E+00,   9.231E-01,,    1.162
C,CO-60    ,NO ,   9.394E-03,   3.120E-02,   5.256E-02,,    0.179
C,CS-137   ,NO ,   3.628E-02,   2.996E-02,   5.245E-02,,    0.692
C,LA-138   ,NO ,   2.455E-02,   4.447E-02,   7.582E-02,,    0.324
C,PA-234M  ,NO ,  -6.569E-01,   3.770E+00,   5.480E+00,,   -0.120
C,U-235    ,NO ,   1.716E-01,   1.494E-01,   2.211E-01,,    0.776
C,U-238    ,NO ,  -6.569E-01,   3.770E+00,   5.480E+00,,   -0.120
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:14:14.64
TBE14 54-TP42603C HpGe ******* Aquisition Date/Time: 18-MAR-2022 11:13:46.19

LIMS No., Customer Name, Client ID: L95403-3 SS ANCHOR QEA

Sample ID : 14L95403-3
Sample Type : SS
Quantity : 3.57000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 14S25121719
BKGFILE : 14BG030422MT
Real Time : 0 18:00:12.89
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	4	74.94*	514	1425	0.77	147.04	7.23E+00	7.93E-03	13.1	8.30E+00
2	4	77.16	1220	1116	0.81	151.49	7.57E+00	1.88E-02	5.2	
3	6	84.40*	86	1467	1.20	165.98	8.49E+00	1.33E-03	83.9	4.47E+00
4	6	87.22*	351	1067	0.84	171.63	8.78E+00	5.41E-03	17.3	
5	5	89.95	405	660	0.96	177.08	9.03E+00	6.26E-03	10.2	2.67E+00
6	5	92.89*	633	1312	1.40	182.98	9.26E+00	9.77E-03	12.1	
7	1	185.97*	515	1260	1.21	369.32	8.55E+00	7.94E-03	15.4	1.40E+00
8	1	209.31	303	1062	1.13	416.06	7.87E+00	4.68E-03	20.2	1.41E+00
9	6	238.65*	2289	709	0.99	474.81	7.10E+00	3.53E-02	3.1	2.12E+00
10	6	241.46	580	1021	1.64	480.43	7.03E+00	8.95E-03	12.0	
11	1	295.22*	637	671	1.05	588.08	5.91E+00	9.83E-03	8.7	6.43E-01
12	1	338.32	497	692	0.97	674.39	5.22E+00	7.66E-03	10.5	8.49E-01
13	1	351.92*	1000	669	1.21	701.63	5.03E+00	1.54E-02	6.2	9.22E-01
14	1	510.90*	159	724	2.55	1019.97	3.51E+00	2.45E-03	52.0	1.16E+00
15	1	583.16*	604	381	1.27	1164.68	3.07E+00	9.31E-03	7.9	2.15E+00
16	1	609.27*	749	483	1.44	1216.97	2.94E+00	1.16E-02	7.6	1.84E+00
17	1	661.51	89	376	1.07	1321.59	2.70E+00	1.38E-03	43.4	1.13E+00
18	1	727.61	110	336	1.79	1454.00	2.45E+00	1.70E-03	35.0	2.16E+00
19	1	911.10*	464	245	1.81	1821.50	1.94E+00	7.15E-03	9.3	6.72E-01
20	1	968.94*	190	363	1.57	1937.38	1.82E+00	2.93E-03	22.3	4.07E+00
21	1	1120.28*	77	209	1.41	2240.54	1.57E+00	1.19E-03	41.1	2.34E+00
22	1	1460.65*	1273	168	1.92	2922.47	1.21E+00	1.97E-02	4.0	1.71E+00
23	1	1764.31*	140	67	2.36	3530.99	1.04E+00	2.16E-03	18.1	6.67E-01

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1273	10.67*	1.210E+00	1.152E+01	1.152E+01	8.00
CS-137	661.66	89	85.12*	2.701E+00	4.535E-02	4.544E-02	86.79
BI-214	609.31	749	46.30	2.937E+00	6.436E-01	6.436E-01	15.21
	1120.29	77	15.10*	1.565E+00	3.816E-01	3.816E-01	82.12
	1764.49	140	15.80	1.037E+00	9.986E-01	9.986E-01	36.28

RA-226	186.21	515	3.28*	8.546E+00	2.145E+00	2.146E+00	30.70
RA-228	93.35	633	3.50	9.263E+00	2.281E+00	2.306E+00	24.21
	969.11	190	16.60*	1.818E+00	7.363E-01	7.444E-01	44.67
TH-234	63.29	------	3.80*	5.083E+00	------ Line Not Found		------
	92.60	633	5.41	9.263E+00	1.476E+00	1.476E+00	24.21
U-235	143.76	------	10.50*	9.757E+00	------ Line Not Found		------
	163.35	------	4.70	9.227E+00	------ Line Not Found		------
	185.71	515	54.00	8.546E+00	1.303E-01	1.303E-01	30.70
	205.31	------	4.70	7.978E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	604	30.25*	3.071E+00	7.591E-01	7.846E-01	15.85
BI-212	727.17	110	7.56*	2.448E+00	6.959E-01	7.193E-01	69.95
PB-212	238.63	2289	44.60*	7.096E+00	8.448E-01	8.732E-01	6.21
PB-214	295.21	637	19.20	5.908E+00	6.561E-01	6.561E-01	17.47
	351.92	1000	37.20*	5.027E+00	6.246E-01	6.246E-01	12.43
TH-232	911.21	464	27.70*	1.938E+00	1.009E+00	1.009E+00	18.63

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.121E+00	------ Line Not Found		------
	911.07	464	27.70*	1.938E+00	1.009E+00	1.020E+00	18.63

Flag: "*" = Keyline

Sample ID : 14L95403-3 Acquisition date : 18-MAR-2022 11:13:46

Total number of lines in spectrum 23
Number of unidentified lines 9
Number of lines tentatively identified by NID 14 60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.152E+01	1.152E+01	0.092E+01	8.00	
CS-137	30.07Y	1.00	4.535E-02	4.544E-02	3.944E-02	86.79	
BI-214	1600.00Y	1.00	3.816E-01	3.816E-01	3.134E-01	82.12	
RA-226	1600.00Y	1.00	2.145E+00	2.146E+00	0.659E+00	30.70	
RA-228	5.75Y	1.01	7.363E-01	7.444E-01	3.326E-01	44.67	
TH-234	4.47E+09Y	1.00	1.476E+00	1.476E+00	0.357E+00	24.21	K
U-235	7.04E+08Y	1.00	1.303E-01	1.303E-01	0.400E-01	30.70	K
			---------	---------			
	Total Activity :		1.643E+01	1.644E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	7.591E-01	7.846E-01	1.244E-01	15.85	
BI-212	1.91Y	1.03	6.959E-01	7.193E-01	5.031E-01	69.95	
PB-212	1.91Y	1.03	8.448E-01	8.732E-01	0.542E-01	6.21	
PB-214	1600.00Y	1.00	6.246E-01	6.246E-01	0.777E-01	12.43	
TH-232	1.41E+10Y	1.00	1.009E+00	1.009E+00	0.188E+00	18.63	
			---------	---------			
	Total Activity :		3.933E+00	4.011E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.009E+00	1.020E+00	0.190E+00	18.63	
			---------	---------			
	Total Activity :		1.009E+00	1.020E+00			

Grand Total Activity : 2.138E+01 2.147E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 14L95403-3 Acquisition date : 18-MAR-2022 11:13:46

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	74.94	514	1425	0.77	147.04	144	11	7.93E-03	26.2	7.23E+00	
4	77.16	1220	1116	0.81	151.49	144	11	1.88E-02	10.3	7.57E+00	
6	84.40	86	1467	1.20	165.98	161	15	1.33E-03	****	8.49E+00	
6	87.22	351	1067	0.84	171.63	161	15	5.41E-03	34.5	8.78E+00	
5	89.95	405	660	0.96	177.08	175	15	6.26E-03	20.4	9.03E+00	
1	209.31	303	1062	1.13	416.06	412	9	4.68E-03	40.4	7.87E+00	
6	241.46	580	1021	1.64	480.43	470	21	8.95E-03	24.1	7.03E+00	
1	338.32	497	692	0.97	674.39	670	9	7.66E-03	21.0	5.22E+00	
1	510.90	159	724	2.55	1019.97	1012	17	2.45E-03	****	3.51E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	23	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	14	60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.152E+01	1.152E+01	0.092E+01	8.00	
CS-137	30.07Y	1.00	4.535E-02	4.544E-02	3.944E-02	86.79	
BI-214	1600.00Y	1.00	6.439E-01	6.439E-01	0.905E-01	14.05	
RA-226	1600.00Y	1.00	2.145E+00	2.146E+00	0.659E+00	30.70	
RA-228	5.75Y	1.01	7.363E-01	7.444E-01	3.326E-01	44.67	
			---------	---------			
	Total Activity :		1.509E+01	1.510E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	7.591E-01	7.846E-01	1.244E-01	15.85	
BI-212	1.91Y	1.03	6.959E-01	7.193E-01	5.031E-01	69.95	
PB-212	1.91Y	1.03	8.448E-01	8.732E-01	0.542E-01	6.21	
PB-214	1600.00Y	1.00	6.345E-01	6.345E-01	0.643E-01	10.13	
TH-232	1.41E+10Y	1.00	1.009E+00	1.009E+00	0.188E+00	18.63	
			---------	---------			
	Total Activity :		3.943E+00	4.020E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.009E+00	1.020E+00	0.190E+00	18.63	
			---------	---------			
	Total Activity :		1.009E+00	1.020E+00			

Grand Total Activity : 2.004E+01 2.014E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.152E+01	9.220E-01	4.250E-01	0.000E+00	27.108
CS-137	4.544E-02	3.944E-02	4.199E-02	0.000E+00	1.082
TL-208	7.846E-01	1.244E-01	1.120E-01	0.000E+00	7.003
BI-212	7.193E-01	5.031E-01	4.996E-01	0.000E+00	1.440
PB-212	8.732E-01	5.424E-02	4.816E-02	0.000E+00	18.133
BI-214	6.439E-01	9.046E-02	3.255E-01	0.000E+00	1.978
PB-214	6.345E-01	6.430E-02	6.623E-02	0.000E+00	9.581
RA-226	2.146E+00	6.587E-01	5.670E-01	0.000E+00	3.784
AC-228	1.020E+00	1.901E-01	1.412E-01	0.000E+00	7.225
RA-228	7.444E-01	3.326E-01	2.472E-01	0.000E+00	3.012
TH-232	1.009E+00	1.880E-01	1.397E-01	0.000E+00	7.224

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	-9.852E-03		2.792E-02	4.553E-02	0.000E+00	-0.216
LA-138	2.089E-02		3.731E-02	6.434E-02	0.000E+00	0.325
PA-234M	2.587E+00		2.831E+00	4.845E+00	0.000E+00	0.534
TH-234	3.381E-01		6.488E-01	9.629E-01	0.000E+00	0.351
U-235	9.583E-02		9.860E-02	1.676E-01	0.000E+00	0.572
U-238	2.587E+00		2.831E+00	4.845E+00	0.000E+00	0.534

```
A,14L95403-3      ,03/19/2022 05:14,02/13/2022 13:37,   3.570E+01,L95403-3 SS AN
B,14L95403-3      ,NORMK                ,08/11/2021 12:59,14S25121719
C,K-40     ,YES,   1.152E+01,   9.220E-01,   4.250E-01,,   27.108
C,CS-137   ,YES,   4.544E-02,   3.944E-02,   4.199E-02,,    1.082
C,TL-208   ,YES,   7.846E-01,   1.244E-01,   1.120E-01,,    7.003
C,BI-212   ,YES,   7.193E-01,   5.031E-01,   4.996E-01,,    1.440
C,PB-212   ,YES,   8.732E-01,   5.424E-02,   4.816E-02,,   18.133
C,BI-214   ,YES,   6.439E-01,   9.046E-02,   3.255E-01,,    1.978
C,PB-214   ,YES,   6.345E-01,   6.430E-02,   6.623E-02,,    9.581
C,RA-226   ,YES,   2.146E+00,   6.587E-01,   5.670E-01,,    3.784
C,AC-228   ,YES,   1.020E+00,   1.901E-01,   1.412E-01,,    7.225
C,RA-228   ,YES,   7.444E-01,   3.326E-01,   2.472E-01,,    3.012
C,TH-232   ,YES,   1.009E+00,   1.880E-01,   1.397E-01,,    7.224
C,CO-60    ,NO ,  -9.852E-03,   2.792E-02,   4.553E-02,,   -0.216
C,LA-138   ,NO ,   2.089E-02,   3.731E-02,   6.434E-02,,    0.325
C,PA-234M  ,NO ,   2.587E+00,   2.831E+00,   4.845E+00,,    0.534
C,TH-234   ,NO ,   3.381E-01,   6.488E-01,   9.629E-01,,    0.351
C,U-235    ,NO ,   9.583E-02,   9.860E-02,   1.676E-01,,    0.572
C,U-238    ,NO ,   2.587E+00,   2.831E+00,   4.845E+00,,    0.534
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:07:09.71
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 17-MAR-2022 14:52:09.62

LIMS No., Customer Name, Client ID: L95403-4 SS ANCHOR QEA

Sample ID : 11L95403-4
Sample Type : SS
Quantity : 2.67000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 11S25121819
BKGFILE : 11BG030422MT
Real Time : 0 17:14:46.96
Live time : 0 17:14:15.60

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.48*	483	2243	1.10	91.59	9.09E+00	7.78E-03	22.0	
2	0	63.39*	207	2438	1.09	125.39	1.09E+01	3.33E-03	47.7	
3	0	77.39*	1096	2306	1.00	153.39	1.09E+01	1.77E-02	8.3	
4	2	84.71*	283	1987	1.41	168.02	1.07E+01	4.55E-03	32.9	2.18E+00
5	2	87.29*	487	1529	1.08	173.17	1.06E+01	7.85E-03	15.0	
6	2	90.16	356	1218	1.13	178.91	1.04E+01	5.73E-03	15.2	4.19E+00
7	2	92.88*	556	1910	1.43	184.35	1.03E+01	8.96E-03	17.8	
8	0	186.12*	293	1817	1.33	370.78	6.83E+00	4.72E-03	31.3	
9	4	238.87*	1875	1050	1.41	476.24	5.68E+00	3.02E-02	4.2	1.77E+00
10	4	241.82	644	1445	1.79	482.15	5.63E+00	1.04E-02	12.9	
11	0	295.37*	699	1105	1.42	589.22	4.83E+00	1.13E-02	10.3	
12	0	338.34	426	1036	1.42	675.13	4.34E+00	6.87E-03	15.4	
13	0	352.26*	1403	1048	1.43	702.95	4.20E+00	2.26E-02	5.8	
14	0	511.35*	383	1107	2.59	1021.04	3.08E+00	6.17E-03	29.2	
15	0	583.60*	507	652	1.60	1165.49	2.74E+00	8.16E-03	12.5	
16	0	609.66*	1052	728	1.54	1217.60	2.64E+00	1.69E-02	7.2	
17	0	911.62*	425	316	1.92	1821.36	1.80E+00	6.86E-03	11.5	
18	0	969.56*	252	245	2.00	1937.18	1.70E+00	4.06E-03	14.8	
19	0	1120.74*	219	334	2.67	2239.48	1.48E+00	3.53E-03	22.5	
20	0	1461.39*	1265	209	1.96	2920.59	1.15E+00	2.04E-02	4.6	
21	0	1765.21*	214	133	2.21	3528.07	9.86E-01	3.45E-03	16.9	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1265	10.67*	1.152E+00	1.678E+01	1.678E+01	9.26
BI-214	609.31	1052	46.30	2.637E+00	1.405E+00	1.405E+00	14.43
	1120.29	219	15.10*	1.476E+00	1.601E+00	1.601E+00	44.98
	1764.49	214	15.80	9.865E-01	2.239E+00	2.239E+00	33.82
RA-226	186.21	293	3.28*	6.828E+00	2.132E+00	2.132E+00	62.56
RA-228	93.35	556	3.50	1.033E+01	2.508E+00	2.535E+00	35.59
	969.11	252	16.60*	1.700E+00	1.458E+00	1.473E+00	29.61

TH-234	63.29	207	3.80*	1.086E+01	8.176E-01	8.176E-01	95.47
	92.60	556	5.41	1.033E+01	1.623E+00	1.623E+00	35.59

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	507	30.25*	2.743E+00	9.958E-01	1.028E+00	24.92
PB-212	238.63	1875	44.60*	5.683E+00	1.207E+00	1.246E+00	8.43
PB-214	295.21	699	19.20	4.831E+00	1.229E+00	1.229E+00	20.66
	351.92	1403	37.20*	4.204E+00	1.464E+00	1.464E+00	11.63
TH-232	911.21	425	27.70*	1.804E+00	1.389E+00	1.389E+00	22.92

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	1.963E+00	------ Line Not Found		------
	911.07	425	27.70*	1.804E+00	1.389E+00	1.403E+00	22.92

Flag: "*" = Keyline

Sample ID : 11L95403-4 Acquisition date : 17-MAR-2022 14:52:09

Total number of lines in spectrum 21
Number of unidentified lines 8
Number of lines tentatively identified by NID 13 61.90%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.678E+01	1.678E+01	0.155E+01	9.26	
BI-214	1600.00Y	1.00	1.601E+00	1.601E+00	0.720E+00	44.98	
RA-226	1600.00Y	1.00	2.132E+00	2.132E+00	1.334E+00	62.56	
RA-228	5.75Y	1.01	1.458E+00	1.473E+00	0.436E+00	29.61	
TH-234	4.47E+09Y	1.00	8.176E-01	8.176E-01	7.805E-01	95.47	
Total Activity :			2.279E+01	2.281E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.958E-01	1.028E+00	0.256E+00	24.92	
PB-212	1.91Y	1.03	1.207E+00	1.246E+00	0.105E+00	8.43	
PB-214	1600.00Y	1.00	1.464E+00	1.464E+00	0.170E+00	11.63	
TH-232	1.41E+10Y	1.00	1.389E+00	1.389E+00	0.318E+00	22.92	
Total Activity :			5.055E+00	5.127E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.389E+00	1.403E+00	0.322E+00	22.92	
Total Activity :			1.389E+00	1.403E+00			

Grand Total Activity : 2.923E+01 2.934E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.48	483	2243	1.10	91.59	86	11	7.78E-03	44.1	9.09E+00	
0	77.39	1096	2306	1.00	153.39	151	6	1.77E-02	16.5	1.09E+01	
2	84.71	283	1987	1.41	168.02	163	14	4.55E-03	65.9	1.07E+01	
2	87.29	487	1529	1.08	173.17	163	14	7.85E-03	29.9	1.06E+01	
2	90.16	356	1218	1.13	178.91	177	14	5.73E-03	30.5	1.04E+01	
4	241.82	644	1445	1.79	482.15	468	21	1.04E-02	25.8	5.63E+00	
0	338.34	426	1036	1.42	675.13	670	11	6.87E-03	30.7	4.34E+00	
0	511.35	383	1107	2.59	1021.04	1012	22	6.17E-03	58.5	3.08E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	21	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	13	61.90%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.678E+01	1.678E+01	0.155E+01	9.26	
BI-214	1600.00Y	1.00	1.470E+00	1.470E+00	0.189E+00	12.85	
RA-226	1600.00Y	1.00	2.132E+00	2.132E+00	1.334E+00	62.56	
RA-228	5.75Y	1.01	1.458E+00	1.473E+00	0.436E+00	29.61	
TH-234	4.47E+09Y	1.00	8.176E-01	8.176E-01	7.805E-01	95.47	
Total Activity :			2.266E+01	2.268E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.958E-01	1.028E+00	0.256E+00	24.92	
PB-212	1.91Y	1.03	1.207E+00	1.246E+00	0.105E+00	8.43	
PB-214	1600.00Y	1.00	1.391E+00	1.391E+00	0.141E+00	10.16	
TH-232	1.41E+10Y	1.00	1.389E+00	1.389E+00	0.318E+00	22.92	
Total Activity :			4.982E+00	5.054E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.389E+00	1.403E+00	0.322E+00	22.92	
Total Activity :			1.389E+00	1.403E+00			

Grand Total Activity :	2.903E+01	2.913E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.678E+01	1.555E+00	7.497E-01	0.000E+00	22.385
TL-208	1.028E+00	2.563E-01	2.157E-01	0.000E+00	4.768
PB-212	1.246E+00	1.050E-01	1.043E-01	0.000E+00	11.943
BI-214	1.470E+00	1.890E-01	5.569E-01	0.000E+00	2.640
PB-214	1.391E+00	1.414E-01	1.444E-01	0.000E+00	9.635
RA-226	2.132E+00	1.334E+00	1.296E+00	0.000E+00	1.644
AC-228	1.403E+00	3.216E-01	2.754E-01	0.000E+00	5.096
RA-228	1.473E+00	4.363E-01	5.049E-01	0.000E+00	2.918
TH-232	1.389E+00	3.182E-01	2.725E-01	0.000E+00	5.095
TH-234	8.176E-01	7.805E-01	7.981E-01	0.000E+00	1.024

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	6.016E-02		5.007E-02	8.966E-02	0.000E+00	0.671
CS-137	3.262E-02		4.891E-02	8.317E-02	0.000E+00	0.392
LA-138	1.077E-02		6.984E-02	1.232E-01	0.000E+00	0.087
BI-212	1.629E+00		6.298E-01	1.127E+00	0.000E+00	1.445
PA-234M	8.169E+00		5.190E+00	9.382E+00	0.000E+00	0.871
U-235	-1.355E-01		2.442E-01	3.662E-01	0.000E+00	-0.370
U-238	8.169E+00		5.190E+00	9.382E+00	0.000E+00	0.871

```
A,11L95403-4       ,03/18/2022 08:07,02/13/2022 13:37,   2.670E+01,L95403-4 SS AN
B,11L95403-4       ,NORMK                ,02/10/2022 09:58,11S25121819
C,K-40     ,YES,   1.678E+01,   1.555E+00,   7.497E-01,,   22.385
C,TL-208   ,YES,   1.028E+00,   2.563E-01,   2.157E-01,,    4.768
C,PB-212   ,YES,   1.246E+00,   1.050E-01,   1.043E-01,,   11.943
C,BI-214   ,YES,   1.470E+00,   1.890E-01,   5.569E-01,,    2.640
C,PB-214   ,YES,   1.391E+00,   1.414E-01,   1.444E-01,,    9.635
C,RA-226   ,YES,   2.132E+00,   1.334E+00,   1.296E+00,,    1.644
C,AC-228   ,YES,   1.403E+00,   3.216E-01,   2.754E-01,,    5.096
C,RA-228   ,YES,   1.473E+00,   4.363E-01,   5.049E-01,,    2.918
C,TH-232   ,YES,   1.389E+00,   3.182E-01,   2.725E-01,,    5.095
C,TH-234   ,YES,   8.176E-01,   7.805E-01,   7.981E-01,,    1.024
C,CO-60    ,NO ,   6.016E-02,   5.007E-02,   8.966E-02,,    0.671
C,CS-137   ,NO ,   3.262E-02,   4.891E-02,   8.317E-02,,    0.392
C,LA-138   ,NO ,   1.077E-02,   6.984E-02,   1.232E-01,,    0.087
C,BI-212   ,NO ,   1.629E+00,   6.298E-01,   1.127E+00,,    1.445
C,PA-234M  ,NO ,   8.169E+00,   5.190E+00,   9.382E+00,,    0.871
C,U-235    ,NO , -1.355E-01,   2.442E-01,   3.662E-01,,   -0.370
C,U-238    ,NO ,   8.169E+00,   5.190E+00,   9.382E+00,,    0.871
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:14:38.90
TBE13 31-TP10727B HpGe ******* Aquisition Date/Time: 18-MAR-2022 11:13:56.06

LIMS No., Customer Name, Client ID: L95403-5 SS ANCHOR QEA

Sample ID : 13L95403-5
Sample Type : SS
Quantity : 3.04000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentfied

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 13S25030421
BKGFILE : 13BG030422MT
Real Time : 0 18:00:15.23
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.95*	168	1533	0.71	149.81	3.49E+00	2.59E-03	42.9	8.98E+00
2	1	77.15*	482	1120	0.84	154.19	3.83E+00	7.43E-03	13.5	3.92E+00
3	1	84.51*	162	1375	1.36	168.88	4.91E+00	2.51E-03	44.6	4.02E+00
4	1	87.30*	285	1007	0.90	174.44	5.29E+00	4.40E-03	20.5	3.30E+00
5	1	92.71*	430	1292	1.18	185.24	5.95E+00	6.63E-03	17.1	6.73E-01
6	1	185.74*	446	1395	1.29	370.86	7.62E+00	6.89E-03	17.9	2.76E+00
7	1	209.10	242	1084	1.02	417.49	7.11E+00	3.73E-03	24.4	6.71E-01
8	6	238.51*	2079	669	0.97	476.18	6.49E+00	3.21E-02	3.4	9.37E-01
9	6	241.47	614	1108	1.68	482.07	6.43E+00	9.48E-03	11.9	
10	1	295.06*	663	880	1.10	589.04	5.49E+00	1.02E-02	10.0	1.48E+00
11	1	299.84	206	673	1.12	598.57	5.42E+00	3.18E-03	22.8	1.26E+00
12	1	338.19*	489	785	1.32	675.12	4.91E+00	7.55E-03	13.0	1.55E+00
13	1	351.72*	1065	730	1.10	702.14	4.75E+00	1.64E-02	6.3	9.47E-01
14	1	510.66*	575	887	2.59	1019.47	3.44E+00	8.87E-03	15.7	1.83E+00
15	1	582.96*	634	326	1.38	1163.84	3.06E+00	9.79E-03	7.5	1.37E+00
16	1	609.03*	804	497	1.42	1215.89	2.94E+00	1.24E-02	7.2	4.52E-01
17	1	727.16*	113	297	1.29	1451.85	2.49E+00	1.74E-03	32.2	6.32E+00
18	1	910.89*	466	323	1.72	1818.95	2.00E+00	7.19E-03	10.9	1.16E+00
19	1	968.80*	272	270	2.12	1934.68	1.88E+00	4.19E-03	14.9	1.54E+00
20	1	1120.29*	139	166	1.92	2237.48	1.62E+00	2.14E-03	23.3	8.96E-01
21	1	1460.47*	1242	142	1.97	2917.78	1.25E+00	1.92E-02	4.2	9.22E-01
22	1	1763.91*	149	63	2.14	3524.99	1.05E+00	2.29E-03	16.7	1.38E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1242	10.67*	1.246E+00	1.282E+01	1.282E+01	8.31
BI-214	609.31	804	46.30	2.937E+00	8.115E-01	8.116E-01	14.41
	1120.29	139	15.10*	1.623E+00	7.773E-01	7.773E-01	46.62
	1764.49	149	15.80	1.054E+00	1.224E+00	1.224E+00	33.33
RA-226	186.21	446	3.28*	7.616E+00	2.451E+00	2.451E+00	35.88
RA-228	93.35	430	3.50	5.952E+00	2.832E+00	2.863E+00	34.29

	969.11	272	16.60*	1.881E+00	1.193E+00	1.206E+00	29.88
TH-234	63.29	------	3.80*	1.737E+00	------ Line Not Found		------
	92.60	430	5.41	5.952E+00	1.832E+00	1.832E+00	34.29
U-235	143.76	------	10.50*	8.228E+00	------ Line Not Found		------
	163.35	------	4.70	8.037E+00	------ Line Not Found		------
	185.71	446	54.00	7.616E+00	1.489E-01	1.489E-01	35.88
	205.31	------	4.70	7.191E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	634	30.25*	3.056E+00	9.416E-01	9.732E-01	15.04
BI-212	727.17	113	7.56*	2.491E+00	8.203E-01	8.479E-01	64.48
PB-212	238.63	2079	44.60*	6.489E+00	9.854E-01	1.019E+00	6.88
PB-214	295.21	663	19.20	5.494E+00	8.620E-01	8.621E-01	20.00
	351.92	1065	37.20*	4.746E+00	8.279E-01	8.279E-01	12.58
TH-232	911.21	466	27.70*	2.001E+00	1.154E+00	1.154E+00	21.81

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.179E+00	------ Line Not Found		------
	911.07	466	27.70*	2.001E+00	1.154E+00	1.166E+00	21.81

Flag: "*" = Keyline

Sample ID : 13L95403-5 Acquisition date : 18-MAR-2022 11:13:56

Total number of lines in spectrum 22
Number of unidentified lines 9
Number of lines tentatively identified by NID 13 59.09%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.282E+01	1.282E+01	0.106E+01	8.31	
BI-214	1600.00Y	1.00	7.773E-01	7.773E-01	3.624E-01	46.62	
RA-226	1600.00Y	1.00	2.451E+00	2.451E+00	0.879E+00	35.88	
RA-228	5.75Y	1.01	1.193E+00	1.206E+00	0.360E+00	29.88	
TH-234	4.47E+09Y	1.00	1.832E+00	1.832E+00	0.628E+00	34.29	K
U-235	7.04E+08Y	1.00	1.489E-01	1.489E-01	0.534E-01	35.88	K
Total Activity :			1.922E+01	1.923E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.416E-01	9.732E-01	1.463E-01	15.04	
BI-212	1.91Y	1.03	8.203E-01	8.479E-01	5.467E-01	64.48	
PB-212	1.91Y	1.03	9.854E-01	1.019E+00	0.070E+00	6.88	
PB-214	1600.00Y	1.00	8.279E-01	8.279E-01	1.042E-01	12.58	
TH-232	1.41E+10Y	1.00	1.154E+00	1.154E+00	0.252E+00	21.81	
Total Activity :			4.729E+00	4.821E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.154E+00	1.166E+00	0.254E+00	21.81	
Total Activity :			1.154E+00	1.166E+00			

Grand Total Activity : 2.510E+01 2.522E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 13L95403-5 Acquisition date : 18-MAR-2022 11:13:56

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.95	168	1533	0.71	149.81	147	6	2.59E-03	85.7	3.49E+00	
1	77.15	482	1120	0.84	154.19	153	6	7.43E-03	27.0	3.83E+00	
1	84.51	162	1375	1.36	168.88	165	8	2.51E-03	89.1	4.91E+00	
1	87.30	285	1007	0.90	174.44	172	6	4.40E-03	41.0	5.29E+00	
1	209.10	242	1084	1.02	417.49	414	8	3.73E-03	48.7	7.11E+00	
6	241.47	614	1108	1.68	482.07	470	18	9.48E-03	23.7	6.43E+00	
1	299.84	206	673	1.12	598.57	595	8	3.18E-03	45.6	5.42E+00	
1	338.19	489	785	1.32	675.12	670	11	7.55E-03	26.1	4.91E+00	
1	510.66	575	887	2.59	1019.47	1012	19	8.87E-03	31.5	3.44E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	22	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	13	59.09%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.282E+01	1.282E+01	0.106E+01	8.31	
BI-214	1600.00Y	1.00	8.371E-01	8.371E-01	1.074E-01	12.83	
RA-226	1600.00Y	1.00	2.451E+00	2.451E+00	0.879E+00	35.88	
RA-228	5.75Y	1.01	1.193E+00	1.206E+00	0.360E+00	29.88	
			---------	---------			
	Total Activity :		1.730E+01	1.731E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.416E-01	9.732E-01	1.463E-01	15.04	
BI-212	1.91Y	1.03	8.203E-01	8.479E-01	5.467E-01	64.48	
PB-212	1.91Y	1.03	9.854E-01	1.019E+00	0.070E+00	6.88	
PB-214	1600.00Y	1.00	8.370E-01	8.370E-01	0.891E-01	10.65	
TH-232	1.41E+10Y	1.00	1.154E+00	1.154E+00	0.252E+00	21.81	
			---------	---------			
	Total Activity :		4.738E+00	4.830E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.154E+00	1.166E+00	0.254E+00	21.81	
			---------	---------			
	Total Activity :		1.154E+00	1.166E+00			

Grand Total Activity : 2.319E+01 2.331E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.282E+01	1.065E+00	4.820E-01	0.000E+00	26.597
TL-208	9.732E-01	1.463E-01	1.243E-01	0.000E+00	7.829
BI-212	8.479E-01	5.467E-01	5.457E-01	0.000E+00	1.554
PB-212	1.019E+00	7.004E-02	5.823E-02	0.000E+00	17.492
BI-214	8.371E-01	1.074E-01	3.417E-01	0.000E+00	2.450
PB-214	8.370E-01	8.915E-02	8.110E-02	0.000E+00	10.321
RA-226	2.451E+00	8.794E-01	7.004E-01	0.000E+00	3.499
AC-228	1.166E+00	2.543E-01	1.692E-01	0.000E+00	6.892
RA-228	1.206E+00	3.605E-01	3.356E-01	0.000E+00	3.595
TH-232	1.154E+00	2.515E-01	1.674E-01	0.000E+00	6.891

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	-5.218E-03		3.143E-02	5.206E-02	0.000E+00	-0.100
CS-137	2.739E-02		3.084E-02	5.192E-02	0.000E+00	0.528
LA-138	-6.998E-04		4.726E-02	7.836E-02	0.000E+00	-0.009
PA-234M	2.694E+00		3.267E+00	5.601E+00	0.000E+00	0.481
TH-234	-2.048E-02		1.816E+00	2.663E+00	0.000E+00	-0.008
U-235	1.177E-01		1.302E-01	2.101E-01	0.000E+00	0.560
U-238	2.694E+00		3.267E+00	5.601E+00	0.000E+00	0.481

```
A,13L95403-5      ,03/19/2022 05:14,02/13/2022 13:37,   3.040E+01,L95403-5 SS AN
B,13L95403-5      ,NORMK                ,03/22/2021 07:43,13S25030421
C,K-40    ,YES,   1.282E+01,   1.065E+00,   4.820E-01,,   26.597
C,TL-208  ,YES,   9.732E-01,   1.463E-01,   1.243E-01,,    7.829
C,BI-212  ,YES,   8.479E-01,   5.467E-01,   5.457E-01,,    1.554
C,PB-212  ,YES,   1.019E+00,   7.004E-02,   5.823E-02,,   17.492
C,BI-214  ,YES,   8.371E-01,   1.074E-01,   3.417E-01,,    2.450
C,PB-214  ,YES,   8.370E-01,   8.915E-02,   8.110E-02,,   10.321
C,RA-226  ,YES,   2.451E+00,   8.794E-01,   7.004E-01,,    3.499
C,AC-228  ,YES,   1.166E+00,   2.543E-01,   1.692E-01,,    6.892
C,RA-228  ,YES,   1.206E+00,   3.605E-01,   3.356E-01,,    3.595
C,TH-232  ,YES,   1.154E+00,   2.515E-01,   1.674E-01,,    6.891
C,CO-60   ,NO ,  -5.218E-03,   3.143E-02,   5.206E-02,,   -0.100
C,CS-137  ,NO ,   2.739E-02,   3.084E-02,   5.192E-02,,    0.528
C,LA-138  ,NO ,  -6.998E-04,   4.726E-02,   7.836E-02,,   -0.009
C,PA-234M ,NO ,   2.694E+00,   3.267E+00,   5.601E+00,,    0.481
C,TH-234  ,NO ,  -2.048E-02,   1.816E+00,   2.663E+00,,   -0.008
C,U-235   ,NO ,   1.177E-01,   1.302E-01,   2.101E-01,,    0.560
C,U-238   ,NO ,   2.694E+00,   3.267E+00,   5.601E+00,,    0.481
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:07:05.12
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 17-MAR-2022 14:52:09.95

LIMS No., Customer Name, Client ID: L95403-6 SS ANCHOR QEA

Sample ID : 02L95403-6
Sample Type : SS
Quantity : 2.46000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 02S25121819
BKGFILE : 02BG030422MT
Real Time : 0 17:14:54.85
Live time : 0 17:14:45.89

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	74.83*	135	1788	0.90	134.52	8.13E+00	2.18E-03	57.3	
2	0	77.17*	821	1377	0.79	139.23	8.44E+00	1.32E-02	8.5	
3	5	87.18*	311	1193	0.95	159.38	9.45E+00	5.01E-03	20.4	3.50E+00
4	0	92.93*	387	1470	1.37	170.95	9.81E+00	6.24E-03	21.4	
5	0	185.90*	358	1442	1.10	358.02	8.33E+00	5.77E-03	23.9	
6	0	209.36	273	1023	1.03	405.22	7.66E+00	4.40E-03	22.0	
7	5	238.61*	1891	616	1.00	464.09	6.92E+00	3.05E-02	3.5	1.17E+00
8	5	241.71*	574	1004	1.76	470.32	6.84E+00	9.24E-03	13.4	
9	0	269.95	201	751	1.15	527.14	6.25E+00	3.24E-03	25.5	
10	0	295.08*	591	903	1.07	577.71	5.79E+00	9.52E-03	11.7	
11	0	338.19*	388	659	1.22	664.47	5.15E+00	6.24E-03	14.2	
12	0	351.88*	916	903	1.17	692.02	4.97E+00	1.47E-02	8.3	
13	0	583.21*	491	442	1.45	1157.54	3.12E+00	7.91E-03	10.7	
14	0	609.21*	758	432	1.43	1209.87	2.99E+00	1.22E-02	7.5	
15	0	727.26	161	276	1.51	1447.45	2.51E+00	2.59E-03	22.1	
16	0	911.13*	406	166	1.62	1817.52	2.00E+00	6.54E-03	9.4	
17	0	968.88	238	201	1.34	1933.74	1.88E+00	3.84E-03	13.2	
18	0	1120.28*	149	187	1.79	2238.50	1.63E+00	2.41E-03	22.4	
19	0	1460.44*	1037	128	2.10	2923.24	1.26E+00	1.67E-02	4.5	
20	0	1764.31*	115	93	2.13	3535.00	1.08E+00	1.85E-03	25.0	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1037	10.67*	1.263E+00	1.362E+01	1.362E+01	9.07
BI-214	609.31	758	46.30	2.990E+00	9.685E-01	9.685E-01	15.09
	1120.29	149	15.10*	1.627E+00	1.076E+00	1.076E+00	44.71
	1764.49	115	15.80	1.083E+00	1.186E+00	1.186E+00	50.01
RA-226	186.21	358	3.28*	8.335E+00	2.320E+00	2.320E+00	47.88
RA-228	93.35	387	3.50	9.813E+00	1.995E+00	2.016E+00	42.89
	969.11	238	16.60*	1.883E+00	1.349E+00	1.363E+00	26.42
TH-234	63.29	------	3.80*	6.106E+00	------ Line Not Found		------

	92.60	387	5.41	9.813E+00	1.291E+00	1.291E+00	42.89
U-235	143.76	------	10.50*	9.647E+00	------	Line Not Found	------
	163.35	------	4.70	9.042E+00	------	Line Not Found	------
	185.71	358	54.00	8.335E+00	1.409E-01	1.409E-01	47.88
	205.31	------	4.70	7.767E+00	------	Line Not Found	------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	491	30.25*	3.119E+00	9.211E-01	9.512E-01	21.45
BI-212	727.17	161	7.56*	2.514E+00	1.499E+00	1.548E+00	44.18
PB-212	238.63	1891	44.60*	6.915E+00	1.085E+00	1.121E+00	6.94
PB-214	295.21	591	19.20	5.795E+00	9.400E-01	9.401E-01	23.41
	351.92	916	37.20*	4.970E+00	8.763E-01	8.763E-01	16.53
TH-232	911.21	406	27.70*	2.004E+00	1.294E+00	1.294E+00	18.73

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.188E+00	------	Line Not Found	------
	911.07	406	27.70*	2.004E+00	1.294E+00	1.308E+00	18.73

Flag: "*" = Keyline

Sample ID : 02L95403-6 Acquisition date : 17-MAR-2022 14:52:09

Total number of lines in spectrum	20	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	13	65.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.362E+01	1.362E+01	0.124E+01	9.07	
BI-214	1600.00Y	1.00	1.076E+00	1.076E+00	0.481E+00	44.71	
RA-226	1600.00Y	1.00	2.320E+00	2.320E+00	1.111E+00	47.88	
RA-228	5.75Y	1.01	1.349E+00	1.363E+00	0.360E+00	26.42	
TH-234	4.47E+09Y	1.00	1.291E+00	1.291E+00	0.554E+00	42.89	K
U-235	7.04E+08Y	1.00	1.409E-01	1.409E-01	0.675E-01	47.88	K
Total Activity :			1.979E+01	1.981E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.211E-01	9.512E-01	2.040E-01	21.45	
BI-212	1.91Y	1.03	1.499E+00	1.548E+00	0.684E+00	44.18	
PB-212	1.91Y	1.03	1.085E+00	1.121E+00	0.078E+00	6.94	
PB-214	1600.00Y	1.00	8.763E-01	8.763E-01	1.448E-01	16.53	
TH-232	1.41E+10Y	1.00	1.294E+00	1.294E+00	0.242E+00	18.73	
Total Activity :			5.676E+00	5.790E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.294E+00	1.308E+00	0.245E+00	18.73	
Total Activity :			1.294E+00	1.308E+00			

Grand Total Activity : 2.676E+01 2.691E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 02L95403-6 Acquisition date : 17-MAR-2022 14:52:09

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	74.83	135	1788	0.90	134.52	132	6	2.18E-03	****	8.13E+00	
0	77.17	821	1377	0.79	139.23	137	6	1.32E-02	17.0	8.44E+00	
5	87.18	311	1193	0.95	159.38	150	14	5.01E-03	40.8	9.45E+00	
0	209.36	273	1023	1.03	405.22	401	9	4.40E-03	44.1	7.66E+00	
5	241.71	574	1004	1.76	470.32	458	18	9.24E-03	26.8	6.84E+00	
0	269.95	201	751	1.15	527.14	523	9	3.24E-03	51.0	6.25E+00	
0	338.19	388	659	1.22	664.47	661	9	6.24E-03	28.4	5.15E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	20	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	13	65.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.362E+01	1.362E+01	0.124E+01	9.07	
BI-214	1600.00Y	1.00	9.885E-01	9.886E-01	1.361E-01	13.77	
RA-226	1600.00Y	1.00	2.320E+00	2.320E+00	1.111E+00	47.88	
RA-228	5.75Y	1.01	1.349E+00	1.363E+00	0.360E+00	26.42	
			---	---			
	Total Activity :		1.828E+01	1.829E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.211E-01	9.512E-01	2.040E-01	21.45	
BI-212	1.91Y	1.03	1.499E+00	1.548E+00	0.684E+00	44.18	
PB-212	1.91Y	1.03	1.085E+00	1.121E+00	0.078E+00	6.94	
PB-214	1600.00Y	1.00	8.956E-01	8.956E-01	1.210E-01	13.51	
TH-232	1.41E+10Y	1.00	1.294E+00	1.294E+00	0.242E+00	18.73	
			---	---			
	Total Activity :		5.695E+00	5.809E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.294E+00	1.308E+00	0.245E+00	18.73	
			---	---			
	Total Activity :		1.294E+00	1.308E+00			

Grand Total Activity :	2.526E+01	2.541E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.362E+01	1.235E+00	6.431E-01	0.000E+00	21.176
TL-208	9.512E-01	2.040E-01	1.581E-01	0.000E+00	6.017
BI-212	1.548E+00	6.840E-01	6.866E-01	0.000E+00	2.255
PB-212	1.121E+00	7.772E-02	7.368E-02	0.000E+00	15.210
BI-214	9.886E-01	1.361E-01	4.472E-01	0.000E+00	2.210
PB-214	8.956E-01	1.210E-01	1.017E-01	0.000E+00	8.809
RA-226	2.320E+00	1.111E+00	8.559E-01	0.000E+00	2.711
AC-228	1.308E+00	2.449E-01	1.978E-01	0.000E+00	6.611
RA-228	1.363E+00	3.602E-01	3.263E-01	0.000E+00	4.178
TH-232	1.294E+00	2.423E-01	1.957E-01	0.000E+00	6.610

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	1.763E-02		3.839E-02	6.545E-02	0.000E+00	0.269
CS-137	4.681E-02		3.647E-02	6.431E-02	0.000E+00	0.728
LA-138	-3.180E-03		5.866E-02	9.605E-02	0.000E+00	-0.033
PA-234M	-1.989E-01		4.702E+00	6.806E+00	0.000E+00	-0.029
TH-234	8.234E-01		8.431E-01	1.250E+00	0.000E+00	0.659
U-235	6.684E-02		1.804E-01	2.553E-01	0.000E+00	0.262
U-238	-1.989E-01		4.702E+00	6.806E+00	0.000E+00	-0.029

```
A,02L95403-6       ,03/18/2022 08:07,02/13/2022 13:37,   2.460E+01,L95403-6 SS AN
B,02L95403-6       ,NORMK                ,08/20/2021 05:25,02S25121819
C,K-40     ,YES,   1.362E+01,   1.235E+00,   6.431E-01,,   21.176
C,TL-208   ,YES,   9.512E-01,   2.040E-01,   1.581E-01,,    6.017
C,BI-212   ,YES,   1.548E+00,   6.840E-01,   6.866E-01,,    2.255
C,PB-212   ,YES,   1.121E+00,   7.772E-02,   7.368E-02,,   15.210
C,BI-214   ,YES,   9.886E-01,   1.361E-01,   4.472E-01,,    2.210
C,PB-214   ,YES,   8.956E-01,   1.210E-01,   1.017E-01,,    8.809
C,RA-226   ,YES,   2.320E+00,   1.111E+00,   8.559E-01,,    2.711
C,AC-228   ,YES,   1.308E+00,   2.449E-01,   1.978E-01,,    6.611
C,RA-228   ,YES,   1.363E+00,   3.602E-01,   3.263E-01,,    4.178
C,TH-232   ,YES,   1.294E+00,   2.423E-01,   1.957E-01,,    6.610
C,CO-60    ,NO ,   1.763E-02,   3.839E-02,   6.545E-02,,    0.269
C,CS-137   ,NO ,   4.681E-02,   3.647E-02,   6.431E-02,,    0.728
C,LA-138   ,NO ,  -3.180E-03,   5.866E-02,   9.605E-02,,   -0.033
C,PA-234M  ,NO ,  -1.989E-01,   4.702E+00,   6.806E+00,,   -0.029
C,TH-234   ,NO ,   8.234E-01,   8.431E-01,   1.250E+00,,    0.659
C,U-235    ,NO ,   6.684E-02,   1.804E-01,   2.553E-01,,    0.262
C,U-238    ,NO ,  -1.989E-01,   4.702E+00,   6.806E+00,,   -0.029
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:14:14.39
TBE23 11410 HpGe ********** Aquisition Date/Time: 18-MAR-2022 11:13:49.13

LIMS No., Customer Name, Client ID: L95403-7 SS ANCHOR QEA

Sample ID : 23L95403-7
Sample Type : SS
Quantity : 2.74000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 23S25122820
BKGFILE : 23BG030422MT
Real Time : 0 18:00:09.18
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.42*	42	1950	0.94	93.11	4.06E+00	6.53E-04	216.6	
2	0	63.08*	277	1786	0.93	126.41	9.27E+00	4.28E-03	30.0	
3	3	74.76*	1237	1305	0.84	149.75	1.15E+01	1.91E-02	5.8	2.31E+00
4	3	77.07*	1909	1241	0.83	154.37	1.18E+01	2.95E-02	4.0	
5	3	84.08*	403	1332	1.24	168.38	1.25E+01	6.23E-03	17.6	4.83E+00
6	3	87.18*	933	1294	1.25	174.58	1.27E+01	1.44E-02	7.7	
7	3	89.81	667	1253	1.10	179.84	1.28E+01	1.03E-02	9.7	
8	3	92.68*	912	1382	1.26	185.58	1.29E+01	1.41E-02	9.3	
9	0	128.88	238	962	0.77	257.94	1.23E+01	3.68E-03	21.6	
10	0	185.83*	666	1666	1.14	371.79	1.01E+01	1.03E-02	14.0	
11	0	209.18	287	1050	1.07	418.46	9.31E+00	4.43E-03	20.4	
12	4	238.48*	3023	703	0.98	477.05	8.50E+00	4.67E-02	2.6	1.07E+00
13	4	241.36*	697	983	1.55	482.79	8.43E+00	1.08E-02	10.9	
14	0	270.16	314	823	1.23	540.39	7.78E+00	4.85E-03	17.4	
15	0	295.09*	771	885	0.93	590.24	7.29E+00	1.19E-02	8.3	
16	0	299.57*	96	732	0.96	599.19	7.21E+00	1.49E-03	58.4	
17	0	327.72	158	601	1.00	655.50	6.75E+00	2.44E-03	27.0	
18	0	338.27	740	841	1.05	676.59	6.59E+00	1.14E-02	8.4	
19	0	351.69*	1521	723	1.14	703.44	6.40E+00	2.35E-02	4.4	
20	0	462.66	221	392	1.24	925.39	5.17E+00	3.41E-03	16.9	
21	0	510.59*	315	850	2.12	1021.28	4.76E+00	4.86E-03	28.7	
22	0	582.91*	880	351	1.38	1165.98	4.25E+00	1.36E-02	6.0	
23	0	608.96*	1084	668	1.11	1218.10	4.08E+00	1.67E-02	6.2	
24	0	661.23	197	352	0.84	1322.72	3.79E+00	3.04E-03	18.6	
25	0	726.92*	209	319	1.56	1454.19	3.47E+00	3.23E-03	19.7	
26	0	859.91*	137	315	0.75	1720.44	2.94E+00	2.11E-03	30.8	
27	0	910.70*	681	218	1.70	1822.15	2.78E+00	1.05E-02	6.0	
28	0	968.60	447	187	1.45	1938.09	2.61E+00	6.90E-03	7.4	
29	0	1119.66*	240	304	1.88	2240.68	2.26E+00	3.70E-03	17.8	
30	0	1459.97*	1952	135	1.75	2922.75	1.78E+00	3.01E-02	2.8	
31	0	1763.28*	168	74	1.73	3531.11	1.57E+00	2.59E-03	14.2	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1952	10.67*	1.781E+00	1.564E+01	1.564E+01	5.59
CS-137	661.66	197	85.12*	3.789E+00	9.297E-02	9.317E-02	37.15
BI-214	609.31	1084	46.30	4.085E+00	8.727E-01	8.728E-01	12.44
	1120.29	240	15.10*	2.263E+00	1.069E+00	1.069E+00	35.60
	1764.49	168	15.80	1.574E+00	1.028E+00	1.028E+00	28.32
RA-226	186.21	666	3.28*	1.008E+01	3.068E+00	3.068E+00	28.07
RA-228	93.35	912	3.50	1.290E+01	3.077E+00	3.111E+00	18.52
	969.11	447	16.60*	2.613E+00	1.570E+00	1.587E+00	14.89
TH-234	63.29	277	3.80*	9.271E+00	1.198E+00	1.198E+00	60.06
	92.60	912	5.41	1.290E+01	1.990E+00	1.990E+00	18.52

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	880	30.25*	4.247E+00	1.043E+00	1.078E+00	12.09
BI-212	727.17	209	7.56*	3.466E+00	1.217E+00	1.257E+00	39.44
PB-212	238.63	3023	44.60*	8.500E+00	1.214E+00	1.255E+00	5.30
PB-214	295.21	771	19.20	7.294E+00	8.384E-01	8.384E-01	16.56
	351.92	1521	37.20*	6.403E+00	9.717E-01	9.717E-01	8.83
TH-232	911.21	681	27.70*	2.779E+00	1.346E+00	1.346E+00	12.03

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	3.027E+00	------ Line Not Found		------
	911.07	681	27.70*	2.779E+00	1.346E+00	1.361E+00	12.03

Flag: "*" = Keyline

Sample ID : 23L95403-7 Acquisition date : 18-MAR-2022 11:13:49

Total number of lines in spectrum 31
Number of unidentified lines 16
Number of lines tentatively identified by NID 15 48.39%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.564E+01	1.564E+01	0.087E+01	5.59	
CS-137	30.07Y	1.00	9.297E-02	9.317E-02	3.461E-02	37.15	
BI-214	1600.00Y	1.00	1.069E+00	1.069E+00	0.381E+00	35.60	
RA-226	1600.00Y	1.00	3.068E+00	3.068E+00	0.861E+00	28.07	
RA-228	5.75Y	1.01	1.570E+00	1.587E+00	0.236E+00	14.89	
TH-234	4.47E+09Y	1.00	1.198E+00	1.198E+00	0.720E+00	60.06	
			---------	---------			
	Total Activity :		2.263E+01	2.265E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.043E+00	1.078E+00	0.130E+00	12.09	
BI-212	1.91Y	1.03	1.217E+00	1.257E+00	0.496E+00	39.44	
PB-212	1.91Y	1.03	1.214E+00	1.255E+00	0.066E+00	5.30	
PB-214	1600.00Y	1.00	9.717E-01	9.717E-01	0.858E-01	8.83	
TH-232	1.41E+10Y	1.00	1.346E+00	1.346E+00	0.162E+00	12.03	
			---------	---------			
	Total Activity :		5.791E+00	5.907E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.346E+00	1.361E+00	0.164E+00	12.03	
			---------	---------			
	Total Activity :		1.346E+00	1.361E+00			

Grand Total Activity : 2.977E+01 2.992E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.42	42	1950	0.94	93.11	90	9	6.53E-04	****	4.06E+00	
3	74.76	1237	1305	0.84	149.75	143	16	1.91E-02	11.6	1.15E+01	
3	77.07	1909	1241	0.83	154.37	143	16	2.95E-02	8.0	1.18E+01	
3	84.08	403	1332	1.24	168.38	165	27	6.23E-03	35.2	1.25E+01	
3	87.18	933	1294	1.25	174.58	165	27	1.44E-02	15.5	1.27E+01	
3	89.81	667	1253	1.10	179.84	165	27	1.03E-02	19.4	1.28E+01	
0	128.88	238	962	0.77	257.94	255	6	3.68E-03	43.2	1.23E+01	
0	209.18	287	1050	1.07	418.46	415	8	4.43E-03	40.9	9.31E+00	
4	241.36	697	983	1.55	482.79	470	22	1.08E-02	21.9	8.43E+00	
0	270.16	314	823	1.23	540.39	536	9	4.85E-03	34.7	7.78E+00	
0	299.57	96	732	0.96	599.19	596	8	1.49E-03	****	7.21E+00	
0	327.72	158	601	1.00	655.50	652	7	2.44E-03	54.0	6.75E+00	
0	338.27	740	841	1.05	676.59	672	11	1.14E-02	16.9	6.59E+00	
0	462.66	221	392	1.24	925.39	921	8	3.41E-03	33.9	5.17E+00	
0	510.59	315	850	2.12	1021.28	1014	18	4.86E-03	57.4	4.76E+00	
0	859.91	137	315	0.75	1720.44	1714	14	2.11E-03	61.6	2.94E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	31	
Number of unidentified lines	16	
Number of lines tentatively identified by NID	15	48.39%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.564E+01	1.564E+01	0.087E+01	5.59	
CS-137	30.07Y	1.00	9.297E-02	9.317E-02	3.461E-02	37.15	
BI-214	1600.00Y	1.00	9.035E-01	9.035E-01	0.983E-01	10.88	
RA-226	1600.00Y	1.00	3.068E+00	3.068E+00	0.861E+00	28.07	
RA-228	5.75Y	1.01	1.570E+00	1.587E+00	0.236E+00	14.89	
TH-234	4.47E+09Y	1.00	1.198E+00	1.198E+00	0.720E+00	60.06	
Total Activity :			2.247E+01	2.249E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.043E+00	1.078E+00	0.130E+00	12.09	
BI-212	1.91Y	1.03	1.217E+00	1.257E+00	0.496E+00	39.44	
PB-212	1.91Y	1.03	1.214E+00	1.255E+00	0.066E+00	5.30	
PB-214	1600.00Y	1.00	9.349E-01	9.349E-01	0.730E-01	7.81	
TH-232	1.41E+10Y	1.00	1.346E+00	1.346E+00	0.162E+00	12.03	
Total Activity :			5.754E+00	5.871E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.346E+00	1.361E+00	0.164E+00	12.03	

Total Activity :	1.346E+00	1.361E+00
Grand Total Activity :	2.957E+01	2.972E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.564E+01	8.734E-01	4.145E-01	0.000E+00	37.724
CS-137	9.317E-02	3.461E-02	4.288E-02	0.000E+00	2.173
TL-208	1.078E+00	1.303E-01	1.048E-01	0.000E+00	10.282
BI-212	1.257E+00	4.959E-01	4.693E-01	0.000E+00	2.680
PB-212	1.255E+00	6.645E-02	5.560E-02	0.000E+00	22.565
BI-214	9.035E-01	9.831E-02	2.985E-01	0.000E+00	3.027
PB-214	9.349E-01	7.297E-02	7.113E-02	0.000E+00	13.143
RA-226	3.068E+00	8.611E-01	6.701E-01	0.000E+00	4.578
AC-228	1.361E+00	1.637E-01	1.403E-01	0.000E+00	9.700
RA-228	1.587E+00	2.363E-01	2.383E-01	0.000E+00	6.661
TH-232	1.346E+00	1.619E-01	1.422E-01	0.000E+00	9.462
TH-234	1.198E+00	7.196E-01	7.470E-01	0.000E+00	1.604

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	1.861E-02		2.722E-02	4.885E-02	0.000E+00	0.381
LA-138	1.714E-02		3.851E-02	6.854E-02	0.000E+00	0.250
PA-234M	1.181E+00		3.132E+00	4.945E+00	0.000E+00	0.239
U-235	-8.097E-03		1.265E-01	1.908E-01	0.000E+00	-0.042
U-238	1.181E+00		3.132E+00	4.945E+00	0.000E+00	0.239

```
A,23L95403-7       ,03/19/2022 05:14,02/13/2022 13:37,   2.740E+01,L95403-7 SS AN
B,23L95403-7       ,NORMK                ,03/07/2022 09:36,23S25122820
C,K-40     ,YES,   1.564E+01,   8.734E-01,   4.145E-01,,   37.724
C,CS-137   ,YES,   9.317E-02,   3.461E-02,   4.288E-02,,    2.173
C,TL-208   ,YES,   1.078E+00,   1.303E-01,   1.048E-01,,   10.282
C,BI-212   ,YES,   1.257E+00,   4.959E-01,   4.693E-01,,    2.680
C,PB-212   ,YES,   1.255E+00,   6.645E-02,   5.560E-02,,   22.565
C,BI-214   ,YES,   9.035E-01,   9.831E-02,   2.985E-01,,    3.027
C,PB-214   ,YES,   9.349E-01,   7.297E-02,   7.113E-02,,   13.143
C,RA-226   ,YES,   3.068E+00,   8.611E-01,   6.701E-01,,    4.578
C,AC-228   ,YES,   1.361E+00,   1.637E-01,   1.403E-01,,    9.700
C,RA-228   ,YES,   1.587E+00,   2.363E-01,   2.383E-01,,    6.661
C,TH-232   ,YES,   1.346E+00,   1.619E-01,   1.422E-01,,    9.462
C,TH-234   ,YES,   1.198E+00,   7.196E-01,   7.470E-01,,    1.604
C,CO-60    ,NO ,   1.861E-02,   2.722E-02,   4.885E-02,,    0.381
C,LA-138   ,NO ,   1.714E-02,   3.851E-02,   6.854E-02,,    0.250
C,PA-234M  ,NO ,   1.181E+00,   3.132E+00,   4.945E+00,,    0.239
C,U-235    ,NO ,  -8.097E-03,   1.265E-01,   1.908E-01,,   -0.042
C,U-238    ,NO ,   1.181E+00,   3.132E+00,   4.945E+00,,    0.239
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:14:26.27
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 18-MAR-2022 11:13:49.45

LIMS No., Customer Name, Client ID: L95403-8 SS ANCHOR QEA

Sample ID : 06L95403-8
Sample Type : SS
Quantity : 4.59000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 06S50031621
BKGFILE : 06BG030422MT
Real Time : 0 18:00:12.15
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	74.92*	454	1273	1.06	150.31	1.68E+00	7.01E-03	15.2	5.11E+00
2	3	77.10	625	1236	1.00	154.66	1.84E+00	9.64E-03	9.9	
3	0	87.11	210	1268	0.87	174.65	2.53E+00	3.25E-03	27.7	
4	0	93.31*	187	2211	1.46	187.03	2.90E+00	2.89E-03	51.4	
5	0	186.07*	396	1545	1.27	372.19	4.02E+00	6.11E-03	21.0	
6	4	238.76*	2290	962	1.15	477.39	3.48E+00	3.53E-02	3.4	2.25E+00
7	4	241.80	604	1482	1.77	483.45	3.45E+00	9.32E-03	14.2	
8	0	295.34*	646	1167	1.10	590.32	2.95E+00	9.97E-03	11.9	
9	0	338.41	535	975	1.18	676.30	2.63E+00	8.26E-03	11.7	
10	0	351.99*	1086	990	1.15	703.42	2.54E+00	1.68E-02	7.1	
11	0	511.11*	352	908	2.31	1021.03	1.83E+00	5.44E-03	26.2	
12	0	583.21*	817	662	1.39	1164.93	1.63E+00	1.26E-02	8.4	
13	0	609.49*	765	672	1.31	1217.38	1.57E+00	1.18E-02	8.4	
14	0	661.98	162	347	0.98	1322.15	1.46E+00	2.50E-03	22.2	
15	0	727.60*	131	329	1.33	1453.11	1.35E+00	2.02E-03	28.3	
16	0	911.63*	388	457	1.51	1820.40	1.11E+00	5.99E-03	13.9	
17	0	969.98*	193	419	1.50	1936.85	1.06E+00	2.97E-03	24.6	
18	0	1120.59*	220	258	1.55	2237.40	9.34E-01	3.39E-03	18.9	
19	0	1461.35*	1298	127	1.90	2917.36	7.48E-01	2.00E-02	4.0	
20	0	1765.29*	120	89	2.15	3523.76	6.42E-01	1.86E-03	23.1	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1298	10.67*	7.481E-01	1.478E+01	1.478E+01	7.95
CS-137	661.66	162	85.12*	1.462E+00	1.183E-01	1.186E-01	44.30
BI-214	609.31	765	46.30	1.570E+00	9.557E-01	9.558E-01	16.82
	1120.29	220	15.10*	9.340E-01	1.417E+00	1.417E+00	37.74
	1764.49	120	15.80	6.424E-01	1.078E+00	1.078E+00	46.30
RA-226	186.21	396	3.28*	4.017E+00	2.731E+00	2.731E+00	41.91
RA-228	93.35	187	3.50	2.901E+00	1.676E+00	1.695E+00	102.80
	969.11	193	16.60*	1.055E+00	9.986E-01	1.010E+00	49.26

TH-234	63.29	------	3.80*	8.696E-01	------ Line Not Found		------
	92.60	187	5.41	2.901E+00	1.084E+00	1.084E+00	102.80
U-235	143.76	------	10.50*	4.209E+00	------ Line Not Found		------
	163.35	------	4.70	4.183E+00	------ Line Not Found		------
	185.71	396	54.00	4.017E+00	1.659E-01	1.659E-01	41.91
	205.31	------	4.70	3.827E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	817	30.25*	1.632E+00	1.504E+00	1.555E+00	16.75
BI-212	727.17	131	7.56*	1.348E+00	1.169E+00	1.209E+00	56.52
PB-212	238.63	2290	44.60*	3.477E+00	1.342E+00	1.387E+00	6.78
PB-214	295.21	646	19.20	2.951E+00	1.036E+00	1.036E+00	23.78
	351.92	1086	37.20*	2.542E+00	1.044E+00	1.044E+00	14.29
TH-232	911.21	388	27.70*	1.112E+00	1.144E+00	1.144E+00	27.74

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	1.198E+00	------ Line Not Found		------
	911.07	388	27.70*	1.112E+00	1.144E+00	1.157E+00	27.74

Flag: "*" = Keyline

Sample ID : 06L95403-8 Acquisition date : 18-MAR-2022 11:13:49

Total number of lines in spectrum	20	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	14	70.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.478E+01	1.478E+01	0.117E+01	7.95	
CS-137	30.07Y	1.00	1.183E-01	1.186E-01	0.525E-01	44.30	
BI-214	1600.00Y	1.00	1.417E+00	1.417E+00	0.535E+00	37.74	
RA-226	1600.00Y	1.00	2.731E+00	2.731E+00	1.144E+00	41.91	
RA-228	5.75Y	1.01	9.986E-01	1.010E+00	0.497E+00	49.26	
TH-234	4.47E+09Y	1.00	1.084E+00	1.084E+00	1.115E+00	102.80	K
U-235	7.04E+08Y	1.00	1.659E-01	1.659E-01	0.695E-01	41.91	K
			---------	---------			
	Total Activity :		2.129E+01	2.130E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.504E+00	1.555E+00	0.260E+00	16.75	
BI-212	1.91Y	1.03	1.169E+00	1.209E+00	0.683E+00	56.52	
PB-212	1.91Y	1.03	1.342E+00	1.387E+00	0.094E+00	6.78	
PB-214	1600.00Y	1.00	1.044E+00	1.044E+00	0.149E+00	14.29	
TH-232	1.41E+10Y	1.00	1.144E+00	1.144E+00	0.317E+00	27.74	
			---------	---------			
	Total Activity :		6.204E+00	6.338E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.144E+00	1.157E+00	0.321E+00	27.74	
			---------	---------			
	Total Activity :		1.144E+00	1.157E+00			

Grand Total Activity :	2.864E+01	2.880E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	74.92	454	1273	1.06	150.31	143	16	7.01E-03	30.4	1.68E+00	
3	77.10	625	1236	1.00	154.66	143	16	9.64E-03	19.7	1.84E+00	
0	87.11	210	1268	0.87	174.65	173	6	3.25E-03	55.4	2.53E+00	
4	241.80	604	1482	1.77	483.45	470	19	9.32E-03	28.4	3.45E+00	
0	338.41	535	975	1.18	676.30	672	10	8.26E-03	23.4	2.63E+00	
0	511.11	352	908	2.31	1021.03	1013	17	5.44E-03	52.4	1.83E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	20	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	14	70.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.478E+01	1.478E+01	0.117E+01	7.95	
CS-137	30.07Y	1.00	1.183E-01	1.186E-01	0.525E-01	44.30	
BI-214	1600.00Y	1.00	1.001E+00	1.001E+00	0.147E+00	14.69	
RA-226	1600.00Y	1.00	2.731E+00	2.731E+00	1.144E+00	41.91	
RA-228	5.75Y	1.01	9.986E-01	1.010E+00	0.497E+00	49.26	
	Total Activity :		1.962E+01	1.964E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.504E+00	1.555E+00	0.260E+00	16.75	
BI-212	1.91Y	1.03	1.169E+00	1.209E+00	0.683E+00	56.52	
PB-212	1.91Y	1.03	1.342E+00	1.387E+00	0.094E+00	6.78	
PB-214	1600.00Y	1.00	1.042E+00	1.042E+00	0.128E+00	12.25	
TH-232	1.41E+10Y	1.00	1.144E+00	1.144E+00	0.317E+00	27.74	
	Total Activity :		6.202E+00	6.336E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.144E+00	1.157E+00	0.321E+00	27.74	
	Total Activity :		1.144E+00	1.157E+00			

Grand Total Activity : 2.697E+01 2.713E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.478E+01	1.174E+00	6.392E-01	0.000E+00	23.114
CS-137	1.186E-01	5.253E-02	6.648E-02	0.000E+00	1.784
TL-208	1.555E+00	2.604E-01	1.831E-01	0.000E+00	8.494
BI-212	1.209E+00	6.830E-01	8.377E-01	0.000E+00	1.443
PB-212	1.387E+00	9.398E-02	8.960E-02	0.000E+00	15.480
BI-214	1.001E+00	1.471E-01	4.066E-01	0.000E+00	2.463
PB-214	1.042E+00	1.276E-01	1.197E-01	0.000E+00	8.704
RA-226	2.731E+00	1.144E+00	1.113E+00	0.000E+00	2.454
AC-228	1.157E+00	3.208E-01	2.349E-01	0.000E+00	4.925
RA-228	1.010E+00	4.974E-01	4.351E-01	0.000E+00	2.321
TH-232	1.144E+00	3.173E-01	2.324E-01	0.000E+00	4.924

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	4.897E-02		4.137E-02	7.332E-02	0.000E+00	0.668
LA-138	2.065E-03		5.691E-02	9.494E-02	0.000E+00	0.022
PA-234M	2.378E+00		4.473E+00	7.478E+00	0.000E+00	0.318
TH-234	-9.429E-02		2.785E+00	4.609E+00	0.000E+00	-0.020
U-235	1.180E-01		2.077E-01	3.376E-01	0.000E+00	0.349
U-238	2.378E+00		4.473E+00	7.478E+00	0.000E+00	0.318

```
A,06L95403-8      ,03/19/2022 05:14,02/13/2022 13:37,   4.590E+01,L95403-8 SS AN
B,06L95403-8      ,NORMK               ,10/29/2021 09:14,06S50031621
C,K-40    ,YES,   1.478E+01,   1.174E+00,   6.392E-01,,   23.114
C,CS-137  ,YES,   1.186E-01,   5.253E-02,   6.648E-02,,    1.784
C,TL-208  ,YES,   1.555E+00,   2.604E-01,   1.831E-01,,    8.494
C,BI-212  ,YES,   1.209E+00,   6.830E-01,   8.377E-01,,    1.443
C,PB-212  ,YES,   1.387E+00,   9.398E-02,   8.960E-02,,   15.480
C,BI-214  ,YES,   1.001E+00,   1.471E-01,   4.066E-01,,    2.463
C,PB-214  ,YES,   1.042E+00,   1.276E-01,   1.197E-01,,    8.704
C,RA-226  ,YES,   2.731E+00,   1.144E+00,   1.113E+00,,    2.454
C,AC-228  ,YES,   1.157E+00,   3.208E-01,   2.349E-01,,    4.925
C,RA-228  ,YES,   1.010E+00,   4.974E-01,   4.351E-01,,    2.321
C,TH-232  ,YES,   1.144E+00,   3.173E-01,   2.324E-01,,    4.924
C,CO-60   ,NO ,   4.897E-02,   4.137E-02,   7.332E-02,,    0.668
C,LA-138  ,NO ,   2.065E-03,   5.691E-02,   9.494E-02,,    0.022
C,PA-234M ,NO ,   2.378E+00,   4.473E+00,   7.478E+00,,    0.318
C,TH-234  ,NO ,  -9.429E-02,   2.785E+00,   4.609E+00,,   -0.020
C,U-235   ,NO ,   1.180E-01,   2.077E-01,   3.376E-01,,    0.349
C,U-238   ,NO ,   2.378E+00,   4.473E+00,   7.478E+00,,    0.318
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:14:44.84
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 18-MAR-2022 11:13:49.76

LIMS No., Customer Name, Client ID: L95403-9 SS ANCHOR QEA

Sample ID : 07L95403-9
Sample Type : SS
Quantity : 3.11000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 07S25121819
BKGFILE : 07BG030422MT
Real Time : 0 18:00:26.81
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	93.05*	320	2700	1.89	185.91	7.28E+00	4.93E-03	34.7	2.51E+00
2	1	185.76*	574	1962	2.10	371.39	8.06E+00	8.86E-03	17.5	3.28E+00
3	3	238.53*	2464	1502	1.83	476.97	6.95E+00	3.80E-02	4.0	2.47E+00
4	3	241.55	622	1583	1.99	483.02	6.89E+00	9.60E-03	15.1	
5	1	295.09*	750	1487	1.89	590.13	5.96E+00	1.16E-02	11.8	7.19E-01
6	1	338.11*	445	1355	1.82	676.19	5.37E+00	6.87E-03	19.4	3.46E+00
7	1	351.80*	1276	1377	2.00	703.58	5.20E+00	1.97E-02	7.5	1.44E+00
8	1	510.78*	301	1349	3.28	1021.59	3.82E+00	4.64E-03	40.0	2.05E+00
9	1	582.94*	749	778	2.54	1165.93	3.41E+00	1.16E-02	9.8	3.71E+00
10	1	609.11*	931	1021	2.34	1218.29	3.28E+00	1.44E-02	9.7	3.12E+00
11	1	910.55*	493	525	2.24	1821.20	2.27E+00	7.60E-03	12.9	8.50E-01
12	1	968.71*	249	446	2.38	1937.52	2.15E+00	3.84E-03	21.7	1.34E+00
13	1	1459.84*	1589	307	3.10	2919.65	1.49E+00	2.45E-02	4.5	2.60E+00
14	1	1763.15*	198	98	3.39	3526.08	1.29E+00	3.06E-03	18.6	2.13E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1589	10.67*	1.486E+00	1.344E+01	1.344E+01	9.02
BI-214	609.31	931	46.30	3.281E+00	8.219E-01	8.220E-01	19.34
	1120.29	------	15.10*	1.875E+00	------ Line Not Found		------
	1764.49	198	15.80	1.294E+00	1.299E+00	1.299E+00	37.24
RA-226	186.21	574	3.28*	8.057E+00	2.913E+00	2.913E+00	34.98
RA-228	93.35	320	3.50	7.276E+00	1.684E+00	1.702E+00	69.46
	969.11	249	16.60*	2.147E+00	9.357E-01	9.460E-01	43.45

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	749	30.25*	3.410E+00	9.733E-01	1.006E+00	19.61
PB-212	238.63	2464	44.60*	6.948E+00	1.066E+00	1.102E+00	7.95

PB-214	295.21	750	19.20	5.962E+00	8.789E-01	8.789E-01	23.68
	351.92	1276	37.20*	5.201E+00	8.845E-01	8.845E-01	15.08
TH-232	911.21	493	27.70*	2.274E+00	1.049E+00	1.049E+00	25.77

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.464E+00	------ Line Not Found		------
	911.07	493	27.70*	2.274E+00	1.049E+00	1.060E+00	25.77

Flag: "*" = Keyline

Sample ID : 07L95403-9 Acquisition date : 18-MAR-2022 11:13:49

Total number of lines in spectrum 14
Number of unidentified lines 3
Number of lines tentatively identified by NID 11 78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.344E+01	1.344E+01	0.121E+01	9.02	
BI-214	1600.00Y	1.00	8.219E-01	8.220E-01	1.589E-01	19.34	K
RA-226	1600.00Y	1.00	2.913E+00	2.913E+00	1.019E+00	34.98	
RA-228	5.75Y	1.01	9.357E-01	9.460E-01	4.111E-01	43.45	
	Total Activity :		1.811E+01	1.813E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.733E-01	1.006E+00	0.197E+00	19.61	
PB-212	1.91Y	1.03	1.066E+00	1.102E+00	0.088E+00	7.95	
PB-214	1600.00Y	1.00	8.845E-01	8.845E-01	1.334E-01	15.08	
TH-232	1.41E+10Y	1.00	1.049E+00	1.049E+00	0.270E+00	25.77	
	Total Activity :		3.973E+00	4.041E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.049E+00	1.060E+00	0.273E+00	25.77	
	Total Activity :		1.049E+00	1.060E+00			

Grand Total Activity : 2.314E+01 2.323E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	241.55	622	1583	1.99	483.02	469	21	9.60E-03	30.3	6.89E+00	
1	338.11	445	1355	1.82	676.19	670	14	6.87E-03	38.7	5.37E+00	
1	510.78	301	1349	3.28	1021.59	1011	23	4.64E-03	79.9	3.82E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.344E+01	1.344E+01	0.121E+01	9.02	
BI-214	1600.00Y	1.00	8.684E-01	8.684E-01	1.510E-01	17.39	
RA-226	1600.00Y	1.00	2.913E+00	2.913E+00	1.019E+00	34.98	
RA-228	5.75Y	1.01	1.016E+00	1.028E+00	0.388E+00	37.79	
Total Activity :			1.824E+01	1.825E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.733E-01	1.006E+00	0.197E+00	19.61	
PB-212	1.91Y	1.03	1.066E+00	1.102E+00	0.088E+00	7.95	
PB-214	1600.00Y	1.00	8.829E-01	8.829E-01	1.123E-01	12.72	
TH-232	1.41E+10Y	1.00	1.049E+00	1.049E+00	0.270E+00	25.77	
Total Activity :			3.971E+00	4.040E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.049E+00	1.060E+00	0.273E+00	25.77	
Total Activity :			1.049E+00	1.060E+00			

Grand Total Activity :	2.326E+01	2.335E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.344E+01	1.212E+00	5.273E-01	0.000E+00	25.496
TL-208	1.006E+00	1.973E-01	1.581E-01	0.000E+00	6.363
PB-212	1.102E+00	8.760E-02	7.159E-02	0.000E+00	15.394
BI-214	8.684E-01	1.510E-01	5.283E-01	0.000E+00	1.644
PB-214	8.829E-01	1.123E-01	9.748E-02	0.000E+00	9.057
RA-226	2.913E+00	1.019E+00	8.913E-01	0.000E+00	3.268
AC-228	1.060E+00	2.732E-01	1.865E-01	0.000E+00	5.685
RA-228	1.028E+00	3.883E-01	3.753E-01	0.000E+00	2.738
TH-232	1.049E+00	2.702E-01	1.845E-01	0.000E+00	5.684

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	1.882E-02		3.556E-02	5.902E-02	0.000E+00	0.319
CS-137	4.678E-02		3.557E-02	6.081E-02	0.000E+00	0.769
LA-138	1.692E-02		5.040E-02	8.515E-02	0.000E+00	0.199
BI-212	1.094E+00		4.479E-01	7.845E-01	0.000E+00	1.395
PA-234M	3.917E+00		3.722E+00	6.399E+00	0.000E+00	0.612
TH-234	5.189E-01		1.512E+00	2.242E+00	0.000E+00	0.231
U-235	-1.392E-01		1.947E-01	2.834E-01	0.000E+00	-0.491
U-238	3.917E+00		3.722E+00	6.399E+00	0.000E+00	0.612

```
A,07L95403-9      ,03/19/2022 05:14,02/13/2022 13:37,   3.110E+01,L95403-9 SS AN
B,07L95403-9      ,NORMK                ,08/12/2021 14:20,07S25121819
C,K-40     ,YES,   1.344E+01,   1.212E+00,   5.273E-01,,   25.496
C,TL-208   ,YES,   1.006E+00,   1.973E-01,   1.581E-01,,    6.363
C,PB-212   ,YES,   1.102E+00,   8.760E-02,   7.159E-02,,   15.394
C,BI-214   ,YES,   8.684E-01,   1.510E-01,   5.283E-01,,    1.644
C,PB-214   ,YES,   8.829E-01,   1.123E-01,   9.748E-02,,    9.057
C,RA-226   ,YES,   2.913E+00,   1.019E+00,   8.913E-01,,    3.268
C,AC-228   ,YES,   1.060E+00,   2.732E-01,   1.865E-01,,    5.685
C,RA-228   ,YES,   1.028E+00,   3.883E-01,   3.753E-01,,    2.738
C,TH-232   ,YES,   1.049E+00,   2.702E-01,   1.845E-01,,    5.684
C,CO-60    ,NO ,   1.882E-02,   3.556E-02,   5.902E-02,,    0.319
C,CS-137   ,NO ,   4.678E-02,   3.557E-02,   6.081E-02,,    0.769
C,LA-138   ,NO ,   1.692E-02,   5.040E-02,   8.515E-02,,    0.199
C,BI-212   ,NO ,   1.094E+00,   4.479E-01,   7.845E-01,,    1.395
C,PA-234M  ,NO ,   3.917E+00,   3.722E+00,   6.399E+00,,    0.612
C,TH-234   ,NO ,   5.189E-01,   1.512E+00,   2.242E+00,,    0.231
C,U-235    ,NO ,  -1.392E-01,   1.947E-01,   2.834E-01,,   -0.491
C,U-238    ,NO ,   3.917E+00,   3.722E+00,   6.399E+00,,    0.612
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:07:13.85
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 17-MAR-2022 14:52:10.17

LIMS No., Customer Name, Client ID: L95403-10 SS ANCHOR QEA

Sample ID : 07L95403-10
Sample Type : SS
Quantity : 2.48000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:37:00.
Geometry : 07S25121819
BKGFILE : 07BG030422MT
Real Time : 0 17:14:57.54
Live time : 0 17:14:38.09

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	74.94*	334	1726	1.41	149.69	5.05E+00	5.37E-03	27.3	1.07E+01
2	2	77.17*	742	1857	1.42	154.15	5.39E+00	1.20E-02	12.5	
3	1	185.81*	442	2050	2.10	371.49	8.06E+00	7.12E-03	24.1	9.47E-01
4	1	238.51*	1395	2061	1.44	476.92	6.95E+00	2.25E-02	7.3	1.72E+00
5	1	295.15*	575	1221	1.73	590.24	5.96E+00	9.27E-03	13.7	2.15E+00
6	1	338.09*	381	1275	1.99	676.14	5.37E+00	6.13E-03	21.8	1.09E+00
7	1	351.74*	1141	1486	1.94	703.46	5.20E+00	1.84E-02	9.0	2.41E+00
8	1	582.82*	638	736	2.50	1165.69	3.41E+00	1.03E-02	11.3	2.38E+00
9	1	608.94*	958	693	2.14	1217.95	3.28E+00	1.54E-02	7.5	1.36E+00
10	1	910.69*	420	430	2.11	1821.49	2.27E+00	6.76E-03	12.9	9.00E-01
11	1	968.53*	183	532	2.17	1937.17	2.15E+00	2.95E-03	32.4	1.02E+00
12	1	1459.91*	1084	347	2.81	2919.80	1.49E+00	1.75E-02	6.0	1.68E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1084	10.67*	1.486E+00	1.201E+01	1.201E+01	12.05
RA-226	186.21	442	3.28*	8.056E+00	2.935E+00	2.935E+00	48.13
RA-228	93.35	------	3.50	7.303E+00	------ Line Not Found		------
	969.11	183	16.60*	2.147E+00	9.021E-01	9.118E-01	64.89

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	638	30.25*	3.410E+00	1.085E+00	1.121E+00	22.56
PB-212	238.63	1395	44.60*	6.949E+00	7.900E-01	8.159E-01	14.65
PB-214	295.21	575	19.20	5.962E+00	8.826E-01	8.827E-01	27.41
	351.92	1141	37.20*	5.202E+00	1.035E+00	1.035E+00	18.09
TH-232	911.21	420	27.70*	2.274E+00	1.169E+00	1.169E+00	25.71

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.464E+00	------ Line Not Found		------
	911.07	420	27.70*	2.274E+00	1.169E+00	1.182E+00	25.71

Flag: "*" = Keyline

Sample ID : 07L95403-10 Acquisition date : 17-MAR-2022 14:52:10

Total number of lines in spectrum 12
Number of unidentified lines 3
Number of lines tentatively identified by NID 9 75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.201E+01	1.201E+01	0.145E+01	12.05	
RA-226	1600.00Y	1.00	2.935E+00	2.935E+00	1.413E+00	48.13	
RA-228	5.75Y	1.01	9.021E-01	9.118E-01	5.917E-01	64.89	
	Total Activity :		1.584E+01	1.585E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.085E+00	1.121E+00	0.253E+00	22.56	
PB-212	1.91Y	1.03	7.900E-01	8.159E-01	1.195E-01	14.65	
PB-214	1600.00Y	1.00	1.035E+00	1.035E+00	0.187E+00	18.09	
TH-232	1.41E+10Y	1.00	1.169E+00	1.169E+00	0.301E+00	25.71	
	Total Activity :		4.080E+00	4.141E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.169E+00	1.182E+00	0.304E+00	25.71	
	Total Activity :		1.169E+00	1.182E+00			

Grand Total Activity : 2.109E+01 2.118E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 07L95403-10 Acquisition date : 17-MAR-2022 14:52:10

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	74.94	334	1726	1.41	149.69	142	22	5.37E-03	54.5	5.05E+00	
2	77.17	742	1857	1.42	154.15	142	22	1.20E-02	25.0	5.39E+00	
1	338.09	381	1275	1.99	676.14	669	14	6.13E-03	43.6	5.37E+00	
1	608.94	958	693	2.14	1217.95	1211	14	1.54E-02	15.0	3.28E+00	T

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	9	75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.201E+01	1.201E+01	0.145E+01	12.05	
RA-226	1600.00Y	1.00	2.935E+00	2.935E+00	1.413E+00	48.13	
RA-228	5.75Y	1.01	9.021E-01	9.118E-01	5.917E-01	64.89	
Total Activity :			1.584E+01	1.585E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.085E+00	1.121E+00	0.253E+00	22.56	
PB-212	1.91Y	1.03	7.900E-01	8.159E-01	1.195E-01	14.65	
PB-214	1600.00Y	1.00	9.780E-01	9.780E-01	1.481E-01	15.14	
TH-232	1.41E+10Y	1.00	1.169E+00	1.169E+00	0.301E+00	25.71	
Total Activity :			4.023E+00	4.084E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.169E+00	1.182E+00	0.304E+00	25.71	
Total Activity :			1.169E+00	1.182E+00			

Grand Total Activity :	2.104E+01	2.112E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.201E+01	1.446E+00	6.847E-01	0.000E+00	17.536
TL-208	1.121E+00	2.528E-01	1.909E-01	0.000E+00	5.870
PB-212	8.159E-01	1.195E-01	1.214E-01	0.000E+00	6.722
PB-214	9.780E-01	1.481E-01	1.225E-01	0.000E+00	7.986
RA-226	2.935E+00	1.413E+00	1.110E+00	0.000E+00	2.644
AC-228	1.182E+00	3.039E-01	2.316E-01	0.000E+00	5.105
RA-228	9.118E-01	5.917E-01	4.541E-01	0.000E+00	2.008
TH-232	1.169E+00	3.007E-01	2.291E-01	0.000E+00	5.104

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	-3.353E-02		4.306E-02	6.657E-02	0.000E+00	-0.504
CS-137	3.526E-02		4.476E-02	7.550E-02	0.000E+00	0.467
LA-138	1.229E-02		6.669E-02	1.118E-01	0.000E+00	0.110
BI-212	1.268E+00		5.593E-01	9.779E-01	0.000E+00	1.297
BI-214	1.221E+00		4.013E-01	6.781E-01	0.000E+00	1.800
PA-234M	6.341E+00		4.587E+00	7.997E+00	0.000E+00	0.793
TH-234	-4.950E-01		1.878E+00	2.749E+00	0.000E+00	-0.180
U-235	-1.388E-03		2.391E-01	3.511E-01	0.000E+00	-0.004
U-238	6.341E+00		4.587E+00	7.997E+00	0.000E+00	0.793

```
A,07L95403-10     ,03/18/2022 08:07,02/13/2022 13:37,   2.480E+01,L95403-10 SS A
B,07L95403-10     ,NORMK                ,08/12/2021 14:20,07S25121819
C,K-40    ,YES,   1.201E+01,   1.446E+00,   6.847E-01,,   17.536
C,TL-208  ,YES,   1.121E+00,   2.528E-01,   1.909E-01,,    5.870
C,PB-212  ,YES,   8.159E-01,   1.195E-01,   1.214E-01,,    6.722
C,PB-214  ,YES,   9.780E-01,   1.481E-01,   1.225E-01,,    7.986
C,RA-226  ,YES,   2.935E+00,   1.413E+00,   1.110E+00,,    2.644
C,AC-228  ,YES,   1.182E+00,   3.039E-01,   2.316E-01,,    5.105
C,RA-228  ,YES,   9.118E-01,   5.917E-01,   4.541E-01,,    2.008
C,TH-232  ,YES,   1.169E+00,   3.007E-01,   2.291E-01,,    5.104
C,CO-60   ,NO ,  -3.353E-02,   4.306E-02,   6.657E-02,,   -0.504
C,CS-137  ,NO ,   3.526E-02,   4.476E-02,   7.550E-02,,    0.467
C,LA-138  ,NO ,   1.229E-02,   6.669E-02,   1.118E-01,,    0.110
C,BI-212  ,NO ,   1.268E+00,   5.593E-01,   9.779E-01,,    1.297
C,BI-214  ,NO ,   1.221E+00,   4.013E-01,   6.781E-01,,    1.800
C,PA-234M ,NO ,   6.341E+00,   4.587E+00,   7.997E+00,,    0.793
C,TH-234  ,NO ,  -4.950E-01,   1.878E+00,   2.749E+00,,   -0.180
C,U-235   ,NO ,  -1.388E-03,   2.391E-01,   3.511E-01,,   -0.004
C,U-238   ,NO ,   6.341E+00,   4.587E+00,   7.997E+00,,    0.793
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Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:07:27.64
TBE14 54-TP42603C HpGe ******* Aquisition Date/Time: 17-MAR-2022 14:52:10.82

LIMS No., Customer Name, Client ID: L95403-11 SS ANCHOR QEA

Sample ID : 14L95403-11
Sample Type : SS
Quantity : 2.55000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 14S25121719
BKGFILE : 14BG030422MT
Real Time : 0 17:15:04.54
Live time : 0 17:14:52.79

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.90*	369	1557	0.74	146.95	7.22E+00	5.94E-03	19.4	1.06E+01
2	1	77.18	911	1328	0.84	151.52	7.57E+00	1.47E-02	7.1	1.49E+01
3	4	84.52*	33	1210	1.25	166.21	8.51E+00	5.29E-04	202.9	1.98E+00
4	4	87.19*	310	913	0.89	171.55	8.78E+00	4.99E-03	18.3	
5	1	92.95*	627	1687	1.77	183.08	9.27E+00	1.01E-02	14.7	4.47E+00
6	1	185.84*	377	1366	1.15	369.07	8.55E+00	6.07E-03	22.4	2.73E+00
7	7	238.61*	1770	595	1.05	474.74	7.10E+00	2.85E-02	3.7	2.87E+00
8	7	241.66	607	1004	1.90	480.83	7.02E+00	9.78E-03	12.4	
9	1	295.19*	574	856	0.98	588.03	5.91E+00	9.25E-03	11.7	1.37E+00
10	1	338.26	387	581	1.16	674.27	5.22E+00	6.23E-03	12.3	1.74E+00
11	1	351.98*	1002	667	1.17	701.73	5.03E+00	1.61E-02	6.3	1.20E+00
12	1	510.90*	81	736	2.47	1019.98	3.51E+00	1.31E-03	101.9	1.46E+00
13	1	583.03*	465	413	1.37	1164.42	3.07E+00	7.48E-03	10.9	1.06E+00
14	1	609.24*	766	365	1.32	1216.92	2.94E+00	1.23E-02	6.9	9.42E-01
15	1	911.05*	313	214	1.70	1821.40	1.94E+00	5.05E-03	11.6	5.51E-01
16	1	969.00*	206	177	1.81	1937.49	1.82E+00	3.32E-03	15.7	1.30E+00
17	1	1120.00*	217	120	2.71	2239.98	1.57E+00	3.49E-03	13.8	1.34E+00
18	1	1460.58*	1000	72	2.02	2922.33	1.21E+00	1.61E-02	4.3	1.45E+00
19	1	1764.08*	79	87	2.07	3530.53	1.04E+00	1.27E-03	32.4	1.30E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1000	10.67*	1.211E+00	1.321E+01	1.321E+01	8.55
BI-214	609.31	766	46.30	2.937E+00	9.608E-01	9.609E-01	13.72
	1120.29	217	15.10*	1.566E+00	1.564E+00	1.564E+00	27.70
	1764.49	79	15.80	1.037E+00	8.218E-01	8.219E-01	64.79
RA-226	186.21	377	3.28*	8.550E+00	2.292E+00	2.292E+00	44.80
RA-228	93.35	627	3.50	9.267E+00	3.299E+00	3.335E+00	29.39
	969.11	206	16.60*	1.817E+00	1.166E+00	1.179E+00	31.43
TH-234	63.29	------	3.80*	5.083E+00	------ Line Not Found		------
	92.60	627	5.41	9.267E+00	2.134E+00	2.134E+00	29.39

U-235	143.76	------	10.50*	9.757E+00	------	Line Not Found	------
	163.35	------	4.70	9.227E+00	------	Line Not Found	------
	185.71	377	54.00	8.550E+00	1.392E-01	1.392E-01	44.80
	205.31	------	4.70	7.978E+00	------	Line Not Found	------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	465	30.25*	3.071E+00	8.539E-01	8.818E-01	21.82
PB-212	238.63	1770	44.60*	7.097E+00	9.548E-01	9.860E-01	7.32
PB-214	295.21	574	19.20	5.908E+00	8.642E-01	8.642E-01	23.31
	351.92	1002	37.20*	5.027E+00	9.150E-01	9.150E-01	12.67
TH-232	911.21	313	27.70*	1.938E+00	9.964E-01	9.964E-01	23.28

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.121E+00	------	Line Not Found	------
	911.07	313	27.70*	1.938E+00	9.964E-01	1.007E+00	23.28

Flag: "*" = Keyline

Total number of lines in spectrum 19
Number of unidentified lines 7
Number of lines tentatively identified by NID 12 63.16%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.321E+01	1.321E+01	0.113E+01	8.55	
BI-214	1600.00Y	1.00	1.564E+00	1.564E+00	0.433E+00	27.70	
RA-226	1600.00Y	1.00	2.292E+00	2.292E+00	1.027E+00	44.80	
RA-228	5.75Y	1.01	1.166E+00	1.179E+00	0.371E+00	31.43	
TH-234	4.47E+09Y	1.00	2.134E+00	2.134E+00	0.627E+00	29.39	K
U-235	7.04E+08Y	1.00	1.392E-01	1.392E-01	0.624E-01	44.80	K
			---	---			
	Total Activity :		2.051E+01	2.052E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	8.539E-01	8.818E-01	1.925E-01	21.82	
PB-212	1.91Y	1.03	9.548E-01	9.860E-01	0.722E-01	7.32	
PB-214	1600.00Y	1.00	9.150E-01	9.150E-01	1.159E-01	12.67	
TH-232	1.41E+10Y	1.00	9.964E-01	9.964E-01	2.320E-01	23.28	
			---	---			
	Total Activity :		3.720E+00	3.779E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	9.964E-01	1.007E+00	0.235E+00	23.28	
			---	---			
	Total Activity :		9.964E-01	1.007E+00			

Grand Total Activity : 2.522E+01 2.531E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.90	369	1557	0.74	146.95	144	6	5.94E-03	38.9	7.22E+00	
1	77.18	911	1328	0.84	151.52	149	6	1.47E-02	14.3	7.57E+00	
4	84.52	33	1210	1.25	166.21	162	14	5.29E-04	****	8.51E+00	
4	87.19	310	913	0.89	171.55	162	14	4.99E-03	36.5	8.78E+00	
7	241.66	607	1004	1.90	480.83	470	17	9.78E-03	24.8	7.02E+00	
1	338.26	387	581	1.16	674.27	669	9	6.23E-03	24.6	5.22E+00	
1	510.90	81	736	2.47	1019.98	1013	18	1.31E-03	****	3.51E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	19	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	12	63.16%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.321E+01	1.321E+01	0.113E+01	8.55	
BI-214	1600.00Y	1.00	1.002E+00	1.002E+00	0.123E+00	12.25	
RA-226	1600.00Y	1.00	2.292E+00	2.292E+00	1.027E+00	44.80	
RA-228	5.75Y	1.01	1.166E+00	1.179E+00	0.371E+00	31.43	
Total Activity :			1.767E+01	1.768E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	8.539E-01	8.818E-01	1.925E-01	21.82	
PB-212	1.91Y	1.03	9.548E-01	9.860E-01	0.722E-01	7.32	
PB-214	1600.00Y	1.00	9.024E-01	9.024E-01	1.005E-01	11.14	
TH-232	1.41E+10Y	1.00	9.964E-01	9.964E-01	2.320E-01	23.28	
Total Activity :			3.707E+00	3.767E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	9.964E-01	1.007E+00	0.235E+00	23.28	
Total Activity :			9.964E-01	1.007E+00			

Grand Total Activity :	2.237E+01	2.246E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.321E+01	1.129E+00	5.472E-01	0.000E+00	24.143
TL-208	8.818E-01	1.925E-01	1.457E-01	0.000E+00	6.054
PB-212	9.860E-01	7.222E-02	6.547E-02	0.000E+00	15.060
BI-214	1.002E+00	1.227E-01	4.151E-01	0.000E+00	2.414
PB-214	9.024E-01	1.005E-01	9.283E-02	0.000E+00	9.721
RA-226	2.292E+00	1.027E+00	7.700E-01	0.000E+00	2.977
AC-228	1.007E+00	2.345E-01	1.956E-01	0.000E+00	5.149
RA-228	1.179E+00	3.705E-01	3.937E-01	0.000E+00	2.994
TH-232	9.964E-01	2.320E-01	1.936E-01	0.000E+00	5.148

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	-3.210E-03		3.552E-02	5.883E-02	0.000E+00	-0.055
CS-137	2.678E-02		3.921E-02	6.457E-02	0.000E+00	0.415
LA-138	4.274E-03		5.562E-02	9.262E-02	0.000E+00	0.046
BI-212	7.248E-01		4.450E-01	7.943E-01	0.000E+00	0.913
PA-234M	4.230E+00		3.951E+00	6.830E+00	0.000E+00	0.619
TH-234	1.237E+00		8.768E-01	1.328E+00	0.000E+00	0.932
U-235	2.024E-01		1.314E-01	2.267E-01	0.000E+00	0.893
U-238	4.230E+00		3.951E+00	6.830E+00	0.000E+00	0.619

```
A,14L95403-11      ,03/18/2022 08:07,02/13/2022 12:56,   2.550E+01,L95403-11 SS A
B,14L95403-11      ,NORMK                ,08/11/2021 12:59,14S25121719
C,K-40     ,YES,   1.321E+01,   1.129E+00,   5.472E-01,,   24.143
C,TL-208   ,YES,   8.818E-01,   1.925E-01,   1.457E-01,,    6.054
C,PB-212   ,YES,   9.860E-01,   7.222E-02,   6.547E-02,,   15.060
C,BI-214   ,YES,   1.002E+00,   1.227E-01,   4.151E-01,,    2.414
C,PB-214   ,YES,   9.024E-01,   1.005E-01,   9.283E-02,,    9.721
C,RA-226   ,YES,   2.292E+00,   1.027E+00,   7.700E-01,,    2.977
C,AC-228   ,YES,   1.007E+00,   2.345E-01,   1.956E-01,,    5.149
C,RA-228   ,YES,   1.179E+00,   3.705E-01,   3.937E-01,,    2.994
C,TH-232   ,YES,   9.964E-01,   2.320E-01,   1.936E-01,,    5.148
C,CO-60    ,NO ,  -3.210E-03,   3.552E-02,   5.883E-02,,   -0.055
C,CS-137   ,NO ,   2.678E-02,   3.921E-02,   6.457E-02,,    0.415
C,LA-138   ,NO ,   4.274E-03,   5.562E-02,   9.262E-02,,    0.046
C,BI-212   ,NO ,   7.248E-01,   4.450E-01,   7.943E-01,,    0.913
C,PA-234M  ,NO ,   4.230E+00,   3.951E+00,   6.830E+00,,    0.619
C,TH-234   ,NO ,   1.237E+00,   8.768E-01,   1.328E+00,,    0.932
C,U-235    ,NO ,   2.024E-01,   1.314E-01,   2.267E-01,,    0.893
C,U-238    ,NO ,   4.230E+00,   3.951E+00,   6.830E+00,,    0.619
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:07:27.82
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 17-MAR-2022 14:52:11.25

LIMS No., Customer Name, Client ID: L95403-12 SS ANCHOR QEA

Sample ID : 08L95403-12
Sample Type : SS
Quantity : 2.69000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 08S25121919
BKGFILE : 08BG030422MT
Real Time : 0 17:15:07.49
Live time : 0 17:14:41.40

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	75.30*	0	1522	0.94	156.70	5.38E+00	3.25E-06	*****	1.70E+00
2	1	85.00*	26	1059	1.20	176.06	6.66E+00	4.21E-04	249.7	1.89E+00
3	1	93.28*	144	1413	1.76	192.58	7.47E+00	2.33E-03	55.9	3.71E+00
4	1	186.23*	25	1589	1.23	377.95	7.69E+00	3.97E-04	356.9	6.92E-01
5	1	239.09*	216	1213	1.27	483.37	6.48E+00	3.48E-03	34.5	9.91E-01
6	1	295.70*	240	866	1.43	596.25	5.45E+00	3.87E-03	27.0	8.37E-01
7	1	352.39*	323	716	1.71	709.30	4.68E+00	5.20E-03	20.5	1.42E+00
8	1	511.35*	33	825	2.77	1026.20	3.32E+00	5.39E-04	265.1	1.77E+00
9	1	583.77*	113	404	1.92	1170.55	2.93E+00	1.83E-03	42.8	1.42E+00
10	1	609.73*	348	623	1.96	1222.30	2.81E+00	5.61E-03	19.0	2.14E+00
11	1	911.27*	30	219	2.03	1823.20	1.89E+00	4.87E-04	126.8	1.45E+00
12	1	1120.18*	104	159	2.86	2239.36	1.54E+00	1.67E-03	31.3	1.97E+00
13	1	1461.06*	181	118	2.33	2918.17	1.21E+00	2.91E-03	22.3	1.51E+00
14	1	1765.09*	96	32	2.63	3523.35	1.05E+00	1.54E-03	23.4	1.23E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	181	10.67*	1.209E+00	2.266E+00	2.266E+00	44.52
BI-214	609.31	348	46.30	2.808E+00	4.337E-01	4.337E-01	38.08
	1120.29	104	15.10*	1.542E+00	7.201E-01	7.201E-01	62.58
	1764.49	96	15.80	1.049E+00	9.355E-01	9.355E-01	46.79
RA-226	186.21	25	3.28*	7.690E+00	1.581E-01	1.582E-01	713.77

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	113	30.25*	2.929E+00	2.070E-01	2.138E-01	85.66
PB-212	238.63	216	44.60*	6.480E+00	1.210E-01	1.250E-01	69.07
PB-214	295.21	240	19.20	5.452E+00	3.714E-01	3.714E-01	53.91
	351.92	323	37.20*	4.679E+00	3.001E-01	3.001E-01	40.92

TH-232	911.21	30	27.70*	1.890E+00	9.349E-02	9.349E-02	253.55

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.061E+00	------	Line Not Found	------
	911.07	30	27.70*	1.890E+00	9.349E-02	9.450E-02	253.55

Flag: "*" = Keyline

Sample ID : 08L95403-12 Acquisition date : 17-MAR-2022 14:52:11

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	2.266E+00	2.266E+00	1.009E+00	44.52	
BI-214	1600.00Y	1.00	7.201E-01	7.201E-01	4.507E-01	62.58	
RA-226	1600.00Y	1.00	1.581E-01	1.582E-01	11.29E-01	713.77	
	Total Activity :		3.144E+00	3.144E+00			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	2.070E-01	2.138E-01	1.831E-01	85.66	
PB-212	1.91Y	1.03	1.210E-01	1.250E-01	0.863E-01	69.07	
PB-214	1600.00Y	1.00	3.001E-01	3.001E-01	1.228E-01	40.92	
TH-232	1.41E+10Y	1.00	9.349E-02	9.349E-02	23.70E-02	253.55	
	Total Activity :		7.216E-01	7.324E-01			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	9.349E-02	9.450E-02	23.96E-02	253.55	
	Total Activity :		9.349E-02	9.450E-02			

Grand Total Activity :	3.959E+00	3.971E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 08L95403-12 Acquisition date : 17-MAR-2022 14:52:11

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	75.30	0	1522	0.94	156.70	153	7	3.25E-06	****	5.38E+00	
1	85.00	26	1059	1.20	176.06	173	7	4.21E-04	****	6.66E+00	
1	93.28	144	1413	1.76	192.58	188	10	2.33E-03	****	7.47E+00	T
1	511.35	33	825	2.77	1026.20	1017	19	5.39E-04	****	3.32E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	14	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	11	78.57%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	2.266E+00	2.266E+00	1.009E+00	44.52	
BI-214	1600.00Y	1.00	5.197E-01	5.197E-01	1.462E-01	28.12	
RA-226	1600.00Y	1.00	1.581E-01	1.582E-01	11.29E-01	713.77	
	Total Activity :		2.944E+00	2.944E+00			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	2.070E-01	2.138E-01	1.831E-01	85.66	
PB-212	1.91Y	1.03	1.210E-01	1.250E-01	0.863E-01	69.07	
PB-214	1600.00Y	1.00	3.196E-01	3.196E-01	1.047E-01	32.75	
TH-232	1.41E+10Y	1.00	9.349E-02	9.349E-02	23.70E-02	253.55	
	Total Activity :		7.411E-01	7.519E-01			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	9.349E-02	9.450E-02	23.96E-02	253.55	
	Total Activity :		9.349E-02	9.450E-02			

Grand Total Activity : 3.778E+00 3.790E+00

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	2.266E+00	1.009E+00	5.480E-01	0.000E+00	4.135
TL-208	2.138E-01	1.831E-01	1.656E-01	0.000E+00	1.291
PB-212	1.250E-01	8.633E-02	7.932E-02	0.000E+00	1.576
BI-214	5.197E-01	1.462E-01	4.251E-01	0.000E+00	1.223
PB-214	3.196E-01	1.047E-01	1.076E-01	0.000E+00	2.971
RA-226	1.582E-01	1.129E+00	9.285E-01	0.000E+00	0.170
AC-228	9.450E-02	2.396E-01	1.974E-01	0.000E+00	0.479
TH-232	9.349E-02	2.370E-01	1.963E-01	0.000E+00	0.476

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	3.182E-02		3.506E-02	6.168E-02	0.000E+00	0.516
CS-137	-1.163E-02		3.622E-02	5.912E-02	0.000E+00	-0.197
LA-138	1.051E-02		5.619E-02	9.391E-02	0.000E+00	0.112
BI-212	2.862E-01		4.534E-01	7.651E-01	0.000E+00	0.374
RA-228	-2.899E-02		2.950E-01	4.197E-01	0.000E+00	-0.069
PA-234M	3.390E+00		3.971E+00	6.704E+00	0.000E+00	0.506
TH-234	-2.814E-01		1.237E+00	1.962E+00	0.000E+00	-0.143
U-235	1.243E-03		1.636E-01	2.739E-01	0.000E+00	0.005
U-238	3.390E+00		3.971E+00	6.704E+00	0.000E+00	0.506

```
A,08L95403-12      ,03/18/2022 08:07,02/13/2022 12:56,   2.690E+01,L95403-12 SS A
B,08L95403-12      ,NORMK                ,11/17/2021 15:23,08S25121919
C,K-40     ,YES,   2.266E+00,   1.009E+00,   5.480E-01,,    4.135
C,TL-208   ,YES,   2.138E-01,   1.831E-01,   1.656E-01,,    1.291
C,PB-212   ,YES,   1.250E-01,   8.633E-02,   7.932E-02,,    1.576
C,BI-214   ,YES,   5.197E-01,   1.462E-01,   4.251E-01,,    1.223
C,PB-214   ,YES,   3.196E-01,   1.047E-01,   1.076E-01,,    2.971
C,RA-226   ,YES,   1.582E-01,   1.129E+00,   9.285E-01,,    0.170
C,AC-228   ,YES,   9.450E-02,   2.396E-01,   1.974E-01,,    0.479
C,TH-232   ,YES,   9.349E-02,   2.370E-01,   1.963E-01,,    0.476
C,CO-60    ,NO ,   3.182E-02,   3.506E-02,   6.168E-02,,    0.516
C,CS-137   ,NO ,  -1.163E-02,   3.622E-02,   5.912E-02,,   -0.197
C,LA-138   ,NO ,   1.051E-02,   5.619E-02,   9.391E-02,,    0.112
C,BI-212   ,NO ,   2.862E-01,   4.534E-01,   7.651E-01,,    0.374
C,RA-228   ,NO ,  -2.899E-02,   2.950E-01,   4.197E-01,,   -0.069
C,PA-234M  ,NO ,   3.390E+00,   3.971E+00,   6.704E+00,,    0.506
C,TH-234   ,NO ,  -2.814E-01,   1.237E+00,   1.962E+00,,   -0.143
C,U-235    ,NO ,   1.243E-03,   1.636E-01,   2.739E-01,,    0.005
C,U-238    ,NO ,   3.390E+00,   3.971E+00,   6.704E+00,,    0.506
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:07:41.69
TBE23 11410 HpGe ********** Aquisition Date/Time: 17-MAR-2022 14:52:11.98

LIMS No., Customer Name, Client ID: L95403-13 SS ANCHOR QEA

Sample ID : 23L95403-13
Sample Type : SS
Quantity : 2.14000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 23S25122820
BKGFILE : 23BG030422MT
Real Time : 0 17:15:14.38
Live time : 0 17:15:06.03

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.13*	334	1859	0.95	92.54	3.97E+00	5.37E-03	28.5	
2	0	63.27*	58	1627	0.92	126.80	9.32E+00	9.27E-04	135.9	
3	2	74.78*	1054	1050	0.89	149.79	1.15E+01	1.70E-02	6.2	2.89E+00
4	2	77.04*	1551	941	0.86	154.31	1.18E+01	2.50E-02	4.5	
5	0	84.11*	202	1061	1.09	168.45	1.25E+01	3.26E-03	30.4	
6	0	86.94*	444	1414	1.07	174.10	1.27E+01	7.15E-03	16.0	
7	0	92.72*	538	1446	1.25	185.65	1.29E+01	8.66E-03	15.1	
8	0	185.76*	559	1309	1.19	371.64	1.01E+01	9.00E-03	14.7	
9	0	209.11	303	734	1.12	418.33	9.31E+00	4.88E-03	16.0	
10	6	238.48*	2220	666	0.99	477.04	8.50E+00	3.57E-02	3.3	1.71E+00
11	6	241.49*	619	957	1.67	483.07	8.42E+00	9.97E-03	12.2	
12	0	270.19	224	888	1.47	540.45	7.78E+00	3.61E-03	25.8	
13	0	295.04*	778	777	1.10	590.15	7.29E+00	1.25E-02	8.0	
14	0	338.11	536	784	1.00	676.27	6.60E+00	8.64E-03	11.0	
15	0	351.70*	1265	606	1.18	703.45	6.40E+00	2.04E-02	4.9	
16	0	462.59	134	383	1.09	925.26	5.17E+00	2.15E-03	26.8	
17	0	510.83*	411	733	1.95	1021.76	4.76E+00	6.62E-03	21.4	
18	0	582.92*	614	453	1.17	1166.00	4.25E+00	9.89E-03	9.1	
19	0	608.94*	1010	479	1.26	1218.06	4.08E+00	1.63E-02	5.5	
20	0	727.08*	213	338	1.20	1454.52	3.47E+00	3.44E-03	20.6	
21	0	860.33*	91	194	1.40	1721.27	2.94E+00	1.47E-03	34.3	
22	0	910.82*	388	231	1.51	1822.37	2.78E+00	6.25E-03	9.9	
23	0	968.43	306	209	1.60	1937.75	2.61E+00	4.93E-03	10.8	
24	0	1119.94*	170	174	1.37	2241.24	2.26E+00	2.74E-03	18.0	
25	0	1459.93*	1420	115	1.94	2922.68	1.78E+00	2.29E-02	3.3	
26	0	1763.21*	224	54	2.32	3530.96	1.57E+00	3.61E-03	10.7	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1420	10.67*	1.781E+00	1.520E+01	1.520E+01	6.68
BI-214	609.31	1010	46.30	4.085E+00	1.086E+00	1.086E+00	11.05

	1120.29	170	15.10*	2.263E+00	1.014E+00	1.014E+00	35.92
	1764.49	224	15.80	1.574E+00	1.834E+00	1.834E+00	21.33
RA-226	186.21	559	3.28*	1.008E+01	3.437E+00	3.438E+00	29.43
RA-228	93.35	538	3.50	1.290E+01	2.422E+00	2.448E+00	30.24
	969.11	306	16.60*	2.613E+00	1.434E+00	1.450E+00	21.58
TH-234	63.29	58	3.80*	9.319E+00	3.308E-01	3.308E-01	271.77
	92.60	538	5.41	1.290E+01	1.567E+00	1.567E+00	30.24

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	614	30.25*	4.247E+00	9.719E-01	1.004E+00	18.24
BI-212	727.17	213	7.56*	3.465E+00	1.657E+00	1.711E+00	41.17
PB-212	238.63	2220	44.60*	8.500E+00	1.191E+00	1.230E+00	6.60
PB-214	295.21	778	19.20	7.295E+00	1.129E+00	1.129E+00	16.03
	351.92	1265	37.20*	6.403E+00	1.080E+00	1.080E+00	9.75
TH-232	911.21	388	27.70*	2.779E+00	1.025E+00	1.025E+00	19.84

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	3.027E+00	------ Line Not Found		------
	911.07	388	27.70*	2.779E+00	1.025E+00	1.037E+00	19.84

Flag: "*" = Keyline

Sample ID : 23L95403-13 Acquisition date : 17-MAR-2022 14:52:11

Total number of lines in spectrum	26	
Number of unidentified lines	12	
Number of lines tentatively identified by NID	14	53.85%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.520E+01	1.520E+01	0.101E+01	6.68	
BI-214	1600.00Y	1.00	1.014E+00	1.014E+00	0.364E+00	35.92	
RA-226	1600.00Y	1.00	3.437E+00	3.438E+00	1.012E+00	29.43	
RA-228	5.75Y	1.01	1.434E+00	1.450E+00	0.313E+00	21.58	
TH-234	4.47E+09Y	1.00	3.308E-01	3.308E-01	8.989E-01	271.77	
	Total Activity :		2.142E+01	2.143E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.719E-01	1.004E+00	0.183E+00	18.24	
BI-212	1.91Y	1.03	1.657E+00	1.711E+00	0.704E+00	41.17	
PB-212	1.91Y	1.03	1.191E+00	1.230E+00	0.081E+00	6.60	
PB-214	1600.00Y	1.00	1.080E+00	1.080E+00	0.105E+00	9.75	
TH-232	1.41E+10Y	1.00	1.025E+00	1.025E+00	0.203E+00	19.84	
	Total Activity :		5.925E+00	6.050E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.025E+00	1.037E+00	0.206E+00	19.84	
	Total Activity :		1.025E+00	1.037E+00			

Grand Total Activity : 2.837E+01 2.852E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.13	334	1859	0.95	92.54	87	11	5.37E-03	57.1	3.97E+00	
2	74.78	1054	1050	0.89	149.79	144	21	1.70E-02	12.3	1.15E+01	
2	77.04	1551	941	0.86	154.31	144	21	2.50E-02	8.9	1.18E+01	
0	84.11	202	1061	1.09	168.45	166	6	3.26E-03	60.9	1.25E+01	
0	86.94	444	1414	1.07	174.10	172	7	7.15E-03	32.0	1.27E+01	
0	209.11	303	734	1.12	418.33	415	7	4.88E-03	31.9	9.31E+00	
6	241.49	619	957	1.67	483.07	472	17	9.97E-03	24.5	8.42E+00	
0	270.19	224	888	1.47	540.45	535	10	3.61E-03	51.6	7.78E+00	
0	338.11	536	784	1.00	676.27	671	11	8.64E-03	22.0	6.60E+00	
0	462.59	134	383	1.09	925.26	922	8	2.15E-03	53.6	5.17E+00	
0	510.83	411	733	1.95	1021.76	1014	19	6.62E-03	42.7	4.76E+00	
0	860.33	91	194	1.40	1721.27	1717	10	1.47E-03	68.5	2.94E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	26	
Number of unidentified lines	12	
Number of lines tentatively identified by NID	14	53.85%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.520E+01	1.520E+01	0.101E+01	6.68	
BI-214	1600.00Y	1.00	1.079E+00	1.079E+00	0.114E+00	10.57	
RA-226	1600.00Y	1.00	3.437E+00	3.438E+00	1.012E+00	29.43	
RA-228	5.75Y	1.01	1.434E+00	1.450E+00	0.313E+00	21.58	
TH-234	4.47E+09Y	1.00	3.308E-01	3.308E-01	8.989E-01	271.77	
Total Activity :			2.148E+01	2.150E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.719E-01	1.004E+00	0.183E+00	18.24	
BI-212	1.91Y	1.03	1.657E+00	1.711E+00	0.704E+00	41.17	
PB-212	1.91Y	1.03	1.191E+00	1.230E+00	0.081E+00	6.60	
PB-214	1600.00Y	1.00	1.093E+00	1.093E+00	0.091E+00	8.33	
TH-232	1.41E+10Y	1.00	1.025E+00	1.025E+00	0.203E+00	19.84	
Total Activity :			5.938E+00	6.063E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.025E+00	1.037E+00	0.206E+00	19.84	
Total Activity :			1.025E+00	1.037E+00			

Grand Total Activity :	2.844E+01	2.860E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.520E+01	1.015E+00	4.903E-01	0.000E+00	31.003
TL-208	1.004E+00	1.830E-01	1.441E-01	0.000E+00	6.966
BI-212	1.711E+00	7.044E-01	5.815E-01	0.000E+00	2.942
PB-212	1.230E+00	8.120E-02	7.032E-02	0.000E+00	17.491
BI-214	1.079E+00	1.140E-01	3.550E-01	0.000E+00	3.039
PB-214	1.093E+00	9.105E-02	9.142E-02	0.000E+00	11.951
RA-226	3.438E+00	1.012E+00	8.055E-01	0.000E+00	4.267
AC-228	1.037E+00	2.057E-01	1.835E-01	0.000E+00	5.649
RA-228	1.450E+00	3.128E-01	2.869E-01	0.000E+00	5.054
TH-232	1.025E+00	2.035E-01	1.723E-01	0.000E+00	5.951
TH-234	3.308E-01	8.989E-01	9.145E-01	0.000E+00	0.362

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	1.518E-02		3.319E-02	5.925E-02	0.000E+00	0.256
CS-137	3.936E-02		3.155E-02	5.589E-02	0.000E+00	0.704
LA-138	1.418E-02		4.498E-02	8.022E-02	0.000E+00	0.177
PA-234M	-1.230E+00		3.940E+00	6.019E+00	0.000E+00	-0.204
U-235	-9.843E-02		1.595E-01	2.368E-01	0.000E+00	-0.416
U-238	-1.230E+00		3.940E+00	6.019E+00	0.000E+00	-0.204

```
A,23L95403-13     ,03/18/2022 08:07,02/13/2022 12:56,   2.140E+01,L95403-13 SS A
B,23L95403-13     ,NORMK                ,03/07/2022 09:36,23S25122820
C,K-40    ,YES,   1.520E+01,   1.015E+00,   4.903E-01,,   31.003
C,TL-208  ,YES,   1.004E+00,   1.830E-01,   1.441E-01,,    6.966
C,BI-212  ,YES,   1.711E+00,   7.044E-01,   5.815E-01,,    2.942
C,PB-212  ,YES,   1.230E+00,   8.120E-02,   7.032E-02,,   17.491
C,BI-214  ,YES,   1.079E+00,   1.140E-01,   3.550E-01,,    3.039
C,PB-214  ,YES,   1.093E+00,   9.105E-02,   9.142E-02,,   11.951
C,RA-226  ,YES,   3.438E+00,   1.012E+00,   8.055E-01,,    4.267
C,AC-228  ,YES,   1.037E+00,   2.057E-01,   1.835E-01,,    5.649
C,RA-228  ,YES,   1.450E+00,   3.128E-01,   2.869E-01,,    5.054
C,TH-232  ,YES,   1.025E+00,   2.035E-01,   1.723E-01,,    5.951
C,TH-234  ,YES,   3.308E-01,   8.989E-01,   9.145E-01,,    0.362
C,CO-60   ,NO ,   1.518E-02,   3.319E-02,   5.925E-02,,    0.256
C,CS-137  ,NO ,   3.936E-02,   3.155E-02,   5.589E-02,,    0.704
C,LA-138  ,NO ,   1.418E-02,   4.498E-02,   8.022E-02,,    0.177
C,PA-234M ,NO ,  -1.230E+00,   3.940E+00,   6.019E+00,,   -0.204
C,U-235   ,NO ,  -9.843E-02,   1.595E-01,   2.368E-01,,   -0.416
C,U-238   ,NO ,  -1.230E+00,   3.940E+00,   6.019E+00,,   -0.204
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:14:47.09
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 18-MAR-2022 11:13:52.41

LIMS No., Customer Name, Client ID: L95403-14 SS ANCHOR QEA

Sample ID : 11L95403-14
Sample Type : SS
Quantity : 4.17000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 11S50121819
BKGFILE : 11BG030422MT
Real Time : 0 18:00:32.57
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.49*	680	2219	1.14	91.61	6.56E+00	1.05E-02	15.9	
2	0	63.36*	275	2084	1.33	125.34	7.37E+00	4.25E-03	33.0	
3	0	77.36*	1294	2679	1.07	153.33	7.42E+00	2.00E-02	7.9	
4	3	84.68*	329	1666	1.55	167.97	7.33E+00	5.07E-03	26.2	1.67E+00
5	3	87.36*	507	1494	1.05	173.31	7.28E+00	7.82E-03	14.4	
6	0	92.95*	645	2202	1.42	184.50	7.17E+00	9.95E-03	16.6	
7	0	185.96*	405	2097	1.46	370.45	4.98E+00	6.25E-03	25.5	
8	0	209.46	219	1285	1.42	417.44	4.56E+00	3.38E-03	29.1	
9	3	238.86*	2671	1055	1.35	476.22	4.12E+00	4.12E-02	3.2	1.97E+00
10	3	241.79	735	1432	1.84	482.08	4.08E+00	1.13E-02	11.6	
11	0	295.32*	722	1271	1.44	589.12	3.47E+00	1.11E-02	11.2	
12	0	338.60	509	1047	1.16	675.65	3.09E+00	7.86E-03	12.7	
13	0	352.13*	1402	1159	1.54	702.69	2.99E+00	2.16E-02	6.3	
14	0	511.27*	350	1045	2.56	1020.88	2.18E+00	5.40E-03	31.1	
15	0	583.49*	664	548	1.56	1165.29	1.95E+00	1.02E-02	9.0	
16	0	609.72*	842	823	1.50	1217.72	1.87E+00	1.30E-02	9.1	
17	0	727.75	198	459	1.51	1453.72	1.62E+00	3.05E-03	23.5	
18	0	846.88*	98	409	1.80	1691.90	1.42E+00	1.52E-03	53.2	
19	0	911.39*	490	359	2.04	1820.89	1.34E+00	7.57E-03	10.6	
20	0	969.61*	295	412	1.56	1937.29	1.27E+00	4.55E-03	17.0	
21	0	1121.43*	137	352	2.04	2240.85	1.13E+00	2.12E-03	34.3	
22	0	1461.37*	1456	293	2.27	2920.56	9.01E-01	2.25E-02	4.5	
23	0	1765.80*	134	108	1.61	3529.25	7.61E-01	2.07E-03	22.8	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1456	10.67*	9.006E-01	1.515E+01	1.515E+01	9.01
BI-214	609.31	842	46.30	1.875E+00	9.706E-01	9.706E-01	18.20
	1120.29	137	15.10*	1.128E+00	8.076E-01	8.076E-01	68.63
	1764.49	134	15.80	7.611E-01	1.113E+00	1.113E+00	45.55
RA-226	186.21	405	3.28*	4.982E+00	2.480E+00	2.480E+00	50.95

RA-228	93.35	645	3.50	7.173E+00	2.568E+00	2.597E+00	33.16
	969.11	295	16.60*	1.273E+00	1.396E+00	1.411E+00	34.01
TH-234	63.29	275	3.80*	7.368E+00	9.842E-01	9.842E-01	66.05
	92.60	645	5.41	7.173E+00	1.662E+00	1.662E+00	33.16

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	664	30.25*	1.946E+00	1.128E+00	1.166E+00	18.06
BI-212	727.17	198	7.56*	1.616E+00	1.617E+00	1.671E+00	47.03
PB-212	238.63	2671	44.60*	4.120E+00	1.454E+00	1.503E+00	6.34
PB-214	295.21	722	19.20	3.467E+00	1.085E+00	1.085E+00	22.36
	351.92	1402	37.20*	2.990E+00	1.261E+00	1.261E+00	12.53
TH-232	911.21	490	27.70*	1.340E+00	1.321E+00	1.321E+00	21.15

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	1.440E+00	------ Line Not Found		------
	911.07	490	27.70*	1.340E+00	1.321E+00	1.336E+00	21.15

Flag: "*" = Keyline

Sample ID : 11L95403-14 Acquisition date : 18-MAR-2022 11:13:52

Total number of lines in spectrum 23
Number of unidentified lines 9
Number of lines tentatively identified by NID 14 60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.515E+01	1.515E+01	0.136E+01	9.01	
BI-214	1600.00Y	1.00	8.076E-01	8.076E-01	5.542E-01	68.63	
RA-226	1600.00Y	1.00	2.480E+00	2.480E+00	1.263E+00	50.95	
RA-228	5.75Y	1.01	1.396E+00	1.411E+00	0.480E+00	34.01	
TH-234	4.47E+09Y	1.00	9.842E-01	9.842E-01	6.501E-01	66.05	
Total Activity :			2.082E+01	2.084E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.128E+00	1.166E+00	0.211E+00	18.06	
BI-212	1.91Y	1.03	1.617E+00	1.671E+00	0.786E+00	47.03	
PB-212	1.91Y	1.03	1.454E+00	1.503E+00	0.095E+00	6.34	
PB-214	1600.00Y	1.00	1.261E+00	1.261E+00	0.158E+00	12.53	
TH-232	1.41E+10Y	1.00	1.321E+00	1.321E+00	0.280E+00	21.15	
Total Activity :			6.782E+00	6.923E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.321E+00	1.336E+00	0.283E+00	21.15	
Total Activity :			1.321E+00	1.336E+00			

Grand Total Activity : 2.892E+01 2.909E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 11L95403-14 Acquisition date : 18-MAR-2022 11:13:52

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	46.49	680	2219	1.14	91.61	87	11	1.05E-02	31.7	6.56E+00	
0	77.36	1294	2679	1.07	153.33	151	7	2.00E-02	15.8	7.42E+00	
3	84.68	329	1666	1.55	167.97	164	13	5.07E-03	52.4	7.33E+00	
3	87.36	507	1494	1.05	173.31	164	13	7.82E-03	28.8	7.28E+00	
0	209.46	219	1285	1.42	417.44	414	8	3.38E-03	58.3	4.56E+00	
3	241.79	735	1432	1.84	482.08	469	19	1.13E-02	23.1	4.08E+00	
0	338.60	509	1047	1.16	675.65	671	10	7.86E-03	25.4	3.09E+00	
0	511.27	350	1045	2.56	1020.88	1012	20	5.40E-03	62.1	2.18E+00	
0	846.88	98	409	1.80	1691.90	1684	15	1.52E-03	****	1.42E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	23	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	14	60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.515E+01	1.515E+01	0.136E+01	9.01	
BI-214	1600.00Y	1.00	9.712E-01	9.712E-01	1.597E-01	16.45	
RA-226	1600.00Y	1.00	2.480E+00	2.480E+00	1.263E+00	50.95	
RA-228	5.75Y	1.01	1.396E+00	1.411E+00	0.480E+00	34.01	
TH-234	4.47E+09Y	1.00	9.842E-01	9.842E-01	6.501E-01	66.05	
Total Activity :			2.098E+01	2.100E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.128E+00	1.166E+00	0.211E+00	18.06	
BI-212	1.91Y	1.03	1.617E+00	1.671E+00	0.786E+00	47.03	
PB-212	1.91Y	1.03	1.454E+00	1.503E+00	0.095E+00	6.34	
PB-214	1600.00Y	1.00	1.208E+00	1.208E+00	0.132E+00	10.96	
TH-232	1.41E+10Y	1.00	1.321E+00	1.321E+00	0.280E+00	21.15	
Total Activity :			6.729E+00	6.870E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.321E+00	1.336E+00	0.283E+00	21.15	
Total Activity :			1.321E+00	1.336E+00			

Grand Total Activity :	2.903E+01	2.921E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.515E+01	1.365E+00	5.901E-01	0.000E+00	25.680
TL-208	1.166E+00	2.106E-01	1.934E-01	0.000E+00	6.030
BI-212	1.671E+00	7.860E-01	8.171E-01	0.000E+00	2.046
PB-212	1.503E+00	9.526E-02	8.974E-02	0.000E+00	16.747
BI-214	9.712E-01	1.597E-01	4.827E-01	0.000E+00	2.012
PB-214	1.208E+00	1.324E-01	1.236E-01	0.000E+00	9.777
RA-226	2.480E+00	1.263E+00	1.063E+00	0.000E+00	2.332
AC-228	1.336E+00	2.826E-01	2.405E-01	0.000E+00	5.555
RA-228	1.411E+00	4.801E-01	4.568E-01	0.000E+00	3.090
TH-232	1.321E+00	2.795E-01	2.379E-01	0.000E+00	5.554
TH-234	9.842E-01	6.501E-01	7.594E-01	0.000E+00	1.296

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	5.008E-03		3.931E-02	6.667E-02	0.000E+00	0.075
CS-137	1.830E-02		4.361E-02	7.346E-02	0.000E+00	0.249
LA-138	-2.932E-04		5.592E-02	9.768E-02	0.000E+00	-0.003
PA-234M	4.433E+00		4.301E+00	7.617E+00	0.000E+00	0.582
U-235	-2.692E-01		2.017E-01	2.921E-01	0.000E+00	-0.922
U-238	4.433E+00		4.301E+00	7.617E+00	0.000E+00	0.582

```
A,11L95403-14      ,03/19/2022 05:14,02/13/2022 12:56,   4.170E+01,L95403-14 SS A
B,11L95403-14      ,NORMK                ,02/10/2022 09:58,11S50121819
C,K-40     ,YES,   1.515E+01,   1.365E+00,   5.901E-01,,   25.680
C,TL-208   ,YES,   1.166E+00,   2.106E-01,   1.934E-01,,    6.030
C,BI-212   ,YES,   1.671E+00,   7.860E-01,   8.171E-01,,    2.046
C,PB-212   ,YES,   1.503E+00,   9.526E-02,   8.974E-02,,   16.747
C,BI-214   ,YES,   9.712E-01,   1.597E-01,   4.827E-01,,    2.012
C,PB-214   ,YES,   1.208E+00,   1.324E-01,   1.236E-01,,    9.777
C,RA-226   ,YES,   2.480E+00,   1.263E+00,   1.063E+00,,    2.332
C,AC-228   ,YES,   1.336E+00,   2.826E-01,   2.405E-01,,    5.555
C,RA-228   ,YES,   1.411E+00,   4.801E-01,   4.568E-01,,    3.090
C,TH-232   ,YES,   1.321E+00,   2.795E-01,   2.379E-01,,    5.554
C,TH-234   ,YES,   9.842E-01,   6.501E-01,   7.594E-01,,    1.296
C,CO-60    ,NO ,   5.008E-03,   3.931E-02,   6.667E-02,,    0.075
C,CS-137   ,NO ,   1.830E-02,   4.361E-02,   7.346E-02,,    0.249
C,LA-138   ,NO ,  -2.932E-04,   5.592E-02,   9.768E-02,,   -0.003
C,PA-234M  ,NO ,   4.433E+00,   4.301E+00,   7.617E+00,,    0.582
C,U-235    ,NO ,  -2.692E-01,   2.017E-01,   2.921E-01,,   -0.922
C,U-238    ,NO ,   4.433E+00,   4.301E+00,   7.617E+00,,    0.582
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:07:48.56
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 17-MAR-2022 14:52:13.44

LIMS No., Customer Name, Client ID: L95403-15 SS ANCHOR QEA

Sample ID : 06L95403-15
Sample Type : SS
Quantity : 2.73000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 06S25031921
BKGFILE : 06BG030422MT
Real Time : 0 17:15:25.24
Live time : 0 17:15:14.02

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	77.22	365	1158	0.85	154.90	2.68E+00	5.88E-03	15.7	
2	0	92.95*	313	1500	1.71	186.30	4.44E+00	5.05E-03	25.5	
3	0	185.64*	276	1672	0.93	371.33	6.13E+00	4.45E-03	32.1	
4	4	238.73*	1535	878	1.10	477.32	5.23E+00	2.47E-02	4.6	1.02E+00
5	4	242.02	483	1056	1.77	483.90	5.18E+00	7.78E-03	13.2	
6	0	295.50*	501	1130	1.19	590.64	4.43E+00	8.07E-03	14.9	
7	0	338.40	439	804	1.18	676.28	3.96E+00	7.06E-03	12.6	
8	0	352.12*	1078	761	1.22	703.67	3.83E+00	1.74E-02	6.5	
9	0	583.24*	416	517	1.37	1164.99	2.48E+00	6.69E-03	12.9	
10	0	609.40*	742	604	1.23	1217.21	2.38E+00	1.20E-02	8.4	
11	0	911.59*	334	332	1.78	1820.33	1.65E+00	5.38E-03	14.7	
12	0	969.40*	214	316	1.69	1935.69	1.56E+00	3.45E-03	20.4	
13	0	1120.55*	112	290	1.39	2237.33	1.36E+00	1.80E-03	35.8	
14	0	1461.16*	935	58	1.67	2916.98	1.07E+00	1.50E-02	4.8	
15	0	1765.00*	133	96	1.90	3523.18	9.41E-01	2.14E-03	21.2	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	935	10.67*	1.074E+00	1.300E+01	1.300E+01	9.61
BI-214	609.31	742	46.30	2.384E+00	1.072E+00	1.072E+00	16.87
	1120.29	112	15.10*	1.357E+00	8.709E-01	8.709E-01	71.67
	1764.49	133	15.80	9.412E-01	1.425E+00	1.425E+00	42.45
RA-226	186.21	276	3.28*	6.127E+00	2.192E+00	2.192E+00	64.30
RA-228	93.35	313	3.50	4.441E+00	3.214E+00	3.249E+00	51.09
	969.11	214	16.60*	1.555E+00	1.322E+00	1.337E+00	40.74
TH-234	63.29	------	3.80*	1.100E+00	------ Line Not Found		------
	92.60	313	5.41	4.441E+00	2.080E+00	2.080E+00	51.09
U-235	143.76	------	10.50*	6.538E+00	------ Line Not Found		------
	163.35	------	4.70	6.435E+00	------ Line Not Found		------
	185.71	276	54.00	6.127E+00	1.332E-01	1.332E-01	64.30
	205.31	------	4.70	5.795E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	416	30.25*	2.478E+00	8.836E-01	9.125E-01	25.72
PB-212	238.63	1535	44.60*	5.234E+00	1.048E+00	1.082E+00	9.14
PB-214	295.21	501	19.20	4.431E+00	9.393E-01	9.393E-01	29.72
	351.92	1078	37.20*	3.829E+00	1.207E+00	1.207E+00	12.92
TH-232	911.21	334	27.70*	1.648E+00	1.167E+00	1.167E+00	29.33

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	1.788E+00	------ Line Not Found		------
	911.07	334	27.70*	1.648E+00	1.167E+00	1.179E+00	29.33

Flag: "*" = Keyline

Sample ID : 06L95403-15 Acquisition date : 17-MAR-2022 14:52:13

Total number of lines in spectrum	15	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	12	80.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.300E+01	1.300E+01	0.125E+01	9.61	
BI-214	1600.00Y	1.00	8.709E-01	8.709E-01	6.242E-01	71.67	
RA-226	1600.00Y	1.00	2.192E+00	2.192E+00	1.410E+00	64.30	
RA-228	5.75Y	1.01	1.322E+00	1.337E+00	0.545E+00	40.74	
TH-234	4.47E+09Y	1.00	2.080E+00	2.080E+00	1.063E+00	51.09	K
U-235	7.04E+08Y	1.00	1.332E-01	1.332E-01	0.856E-01	64.30	K
			---	---			
	Total Activity :		1.960E+01	1.961E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	8.836E-01	9.125E-01	2.347E-01	25.72	
PB-212	1.91Y	1.03	1.048E+00	1.082E+00	0.099E+00	9.14	
PB-214	1600.00Y	1.00	1.207E+00	1.207E+00	0.156E+00	12.92	
TH-232	1.41E+10Y	1.00	1.167E+00	1.167E+00	0.342E+00	29.33	
			---	---			
	Total Activity :		4.305E+00	4.368E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.167E+00	1.179E+00	0.346E+00	29.33	
			---	---			
	Total Activity :		1.167E+00	1.179E+00			

Grand Total Activity :	2.507E+01	2.516E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 06L95403-15 Acquisition date : 17-MAR-2022 14:52:13

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	77.22	365	1158	0.85	154.90	153	6	5.88E-03	31.5	2.68E+00	
4	242.02	483	1056	1.77	483.90	472	17	7.78E-03	26.3	5.18E+00	
0	338.40	439	804	1.18	676.28	672	9	7.06E-03	25.2	3.96E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	3	
Number of lines tentatively identified by NID	12	80.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.300E+01	1.300E+01	0.125E+01	9.61	
BI-214	1600.00Y	1.00	1.085E+00	1.085E+00	0.167E+00	15.39	
RA-226	1600.00Y	1.00	2.192E+00	2.192E+00	1.410E+00	64.30	
RA-228	5.75Y	1.01	1.322E+00	1.337E+00	0.545E+00	40.74	
	Total Activity :		1.760E+01	1.761E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	8.836E-01	9.125E-01	2.347E-01	25.72	
PB-212	1.91Y	1.03	1.048E+00	1.082E+00	0.099E+00	9.14	
PB-214	1600.00Y	1.00	1.143E+00	1.143E+00	0.136E+00	11.91	
TH-232	1.41E+10Y	1.00	1.167E+00	1.167E+00	0.342E+00	29.33	
	Total Activity :		4.241E+00	4.305E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.167E+00	1.179E+00	0.346E+00	29.33	
	Total Activity :		1.167E+00	1.179E+00			

Grand Total Activity :	2.301E+01	2.310E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

```
A,06L95403-15     ,03/18/2022 08:07,02/13/2022 12:56,   2.730E+01,L95403-15 SS A
B,06L95403-15     ,NORMK                ,10/29/2021 09:14,06S25031921
C,K-40    ,YES,   1.300E+01,   1.249E+00,   6.662E-01,,   19.510
C,TL-208  ,YES,   9.125E-01,   2.347E-01,   2.057E-01,,    4.437
C,PB-212  ,YES,   1.082E+00,   9.896E-02,   9.928E-02,,   10.901
C,BI-214  ,YES,   1.085E+00,   1.670E-01,   5.182E-01,,    2.093
C,PB-214  ,YES,   1.143E+00,   1.361E-01,   1.323E-01,,    8.641
C,RA-226  ,YES,   2.192E+00,   1.410E+00,   1.229E+00,,    1.783
C,AC-228  ,YES,   1.179E+00,   3.459E-01,   2.543E-01,,    4.637
C,RA-228  ,YES,   1.337E+00,   5.446E-01,   5.559E-01,,    2.404
C,TH-232  ,YES,   1.167E+00,   3.423E-01,   2.517E-01,,    4.636
C,CO-60   ,NO ,   8.179E-02,   4.951E-02,   8.972E-02,,    0.912
C,CS-137  ,NO ,   7.635E-02,   4.737E-02,   8.369E-02,,    0.912
C,LA-138  ,NO ,  -1.622E-03,   6.178E-02,   1.026E-01,,   -0.016
C,BI-212  ,NO ,   4.119E-01,   6.205E-01,   1.005E+00,,    0.410
C,PA-234M ,NO ,   7.441E+00,   5.008E+00,   8.736E+00,,    0.852
C,TH-234  ,NO ,   1.282E+00,   3.628E+00,   6.052E+00,,    0.212
C,U-235   ,NO ,   1.491E-02,   2.197E-01,   3.533E-01,,    0.042
C,U-238   ,NO ,   7.441E+00,   5.008E+00,   8.736E+00,,    0.852
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:14:35.81
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 18-MAR-2022 11:13:54.25

LIMS No., Customer Name, Client ID: L95403-16 SS ANCHOR QEA

Sample ID : 01L95403-16
Sample Type : SS
Quantity : 3.00000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 01S25121819
BKGFILE : 01BG030422MT
Real Time : 0 18:00:08.67
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	74.79*	642	1734	1.22	150.12	5.71E+00	9.91E-03	12.8	6.88E+00
2	2	77.04	1005	1336	0.94	154.61	6.10E+00	1.55E-02	6.7	
3	1	87.35*	214	2424	0.93	175.21	7.65E+00	3.31E-03	44.0	3.72E+00
4	1	92.86*	570	2067	1.64	186.22	8.30E+00	8.80E-03	17.5	4.02E+00
5	1	185.81*	601	1727	1.47	371.98	9.12E+00	9.27E-03	15.4	1.20E+00
6	1	209.36	321	1163	1.10	419.06	8.51E+00	4.96E-03	19.2	1.87E+00
7	3	238.61*	2690	897	1.13	477.51	7.80E+00	4.15E-02	2.9	1.67E+00
8	3	241.58	690	1172	1.52	483.45	7.73E+00	1.06E-02	10.1	
9	1	270.36	390	923	1.69	540.96	7.11E+00	6.02E-03	14.9	1.25E+00
10	1	295.19*	744	997	1.16	590.61	6.64E+00	1.15E-02	9.5	6.46E-01
11	1	338.31	708	934	1.31	676.78	5.95E+00	1.09E-02	9.2	2.23E+00
12	1	351.91*	1300	1132	1.29	703.96	5.76E+00	2.01E-02	6.8	1.15E+00
13	1	462.96	261	716	1.85	925.93	4.55E+00	4.03E-03	22.8	1.35E+00
14	1	510.85*	307	921	2.79	1021.65	4.17E+00	4.74E-03	31.5	2.30E+00
15	1	583.06*	804	456	1.67	1166.00	3.71E+00	1.24E-02	6.9	3.63E+00
16	1	609.16*	878	440	1.55	1218.19	3.56E+00	1.36E-02	6.1	5.21E+00
17	1	661.68	102	387	1.31	1323.17	3.30E+00	1.58E-03	37.5	7.54E-01
18	1	727.11	316	405	3.03	1453.97	3.02E+00	4.88E-03	15.0	3.02E+00
19	1	911.05*	581	472	1.68	1821.71	2.42E+00	8.97E-03	9.9	3.23E+00
20	1	968.99*	301	297	1.85	1937.55	2.28E+00	4.64E-03	13.7	2.22E+00
21	1	1120.42*	130	284	1.99	2240.33	1.98E+00	2.00E-03	30.8	1.61E+00
22	1	1460.71*	1670	123	2.38	2920.80	1.54E+00	2.58E-02	3.2	2.57E+00
23	1	1764.34*	153	74	2.44	3528.06	1.32E+00	2.36E-03	17.7	2.37E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1670	10.67*	1.540E+00	1.413E+01	1.413E+01	6.39
CS-137	661.66	102	85.12*	3.296E+00	5.072E-02	5.083E-02	74.99
BI-214	609.31	878	46.30	3.559E+00	7.411E-01	7.411E-01	12.28
	1120.29	130	15.10*	1.977E+00	6.047E-01	6.047E-01	61.55
	1764.49	153	15.80	1.323E+00	1.015E+00	1.016E+00	35.33

RA-226	186.21	601	3.28*	9.117E+00	2.794E+00	2.794E+00	30.87
RA-228	93.35	570	3.50	8.297E+00	2.729E+00	2.759E+00	35.07
	969.11	301	16.60*	2.281E+00	1.105E+00	1.117E+00	27.39
TH-234	63.29	------	3.80*	3.510E+00	------ Line Not Found		------
	92.60	570	5.41	8.297E+00	1.765E+00	1.765E+00	35.07
U-235	143.76	------	10.50*	9.986E+00	------ Line Not Found		------
	163.35	------	4.70	9.656E+00	------ Line Not Found		------
	185.71	601	54.00	9.117E+00	1.697E-01	1.697E-01	30.87
	205.31	------	4.70	8.614E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	804	30.25*	3.705E+00	9.968E-01	1.030E+00	13.73
BI-212	727.17	316	7.56*	3.015E+00	1.928E+00	1.993E+00	29.96
PB-212	238.63	2690	44.60*	7.796E+00	1.076E+00	1.112E+00	5.90
PB-214	295.21	744	19.20	6.640E+00	8.117E-01	8.117E-01	19.02
	351.92	1300	37.20*	5.756E+00	8.442E-01	8.442E-01	13.51
TH-232	911.21	581	27.70*	2.424E+00	1.204E+00	1.204E+00	19.75

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.638E+00	------ Line Not Found		------
	911.07	581	27.70*	2.424E+00	1.204E+00	1.217E+00	19.75

Flag: "*" = Keyline

Sample ID : 01L95403-16 Acquisition date : 18-MAR-2022 11:13:54

Total number of lines in spectrum	23	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	14	60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.413E+01	1.413E+01	0.090E+01	6.39	
CS-137	30.07Y	1.00	5.072E-02	5.083E-02	3.811E-02	74.99	
BI-214	1600.00Y	1.00	6.047E-01	6.047E-01	3.722E-01	61.55	
RA-226	1600.00Y	1.00	2.794E+00	2.794E+00	0.863E+00	30.87	
RA-228	5.75Y	1.01	1.105E+00	1.117E+00	0.306E+00	27.39	
TH-234	4.47E+09Y	1.00	1.765E+00	1.765E+00	0.619E+00	35.07	K
U-235	7.04E+08Y	1.00	1.697E-01	1.697E-01	0.524E-01	30.87	K
			---------	---------			
	Total Activity :		2.062E+01	2.063E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.968E-01	1.030E+00	0.141E+00	13.73	
BI-212	1.91Y	1.03	1.928E+00	1.993E+00	0.597E+00	29.96	
PB-212	1.91Y	1.03	1.076E+00	1.112E+00	0.066E+00	5.90	
PB-214	1600.00Y	1.00	8.442E-01	8.442E-01	1.140E-01	13.51	
TH-232	1.41E+10Y	1.00	1.204E+00	1.204E+00	0.238E+00	19.75	
			---------	---------			
	Total Activity :		6.049E+00	6.183E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.204E+00	1.217E+00	0.240E+00	19.75	
			---------	---------			
	Total Activity :		1.204E+00	1.217E+00			

Grand Total Activity :	2.787E+01	2.803E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 01L95403-16 Acquisition date : 18-MAR-2022 11:13:54

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	74.79	642	1734	1.22	150.12	144	14	9.91E-03	25.6	5.71E+00	
2	77.04	1005	1336	0.94	154.61	144	14	1.55E-02	13.5	6.10E+00	
1	87.35	214	2424	0.93	175.21	170	9	3.31E-03	88.0	7.65E+00	
1	209.36	321	1163	1.10	419.06	415	8	4.96E-03	38.3	8.51E+00	
3	241.58	690	1172	1.52	483.45	470	19	1.06E-02	20.2	7.73E+00	
1	270.36	390	923	1.69	540.96	537	9	6.02E-03	29.8	7.11E+00	
1	338.31	708	934	1.31	676.78	671	11	1.09E-02	18.4	5.95E+00	
1	462.96	261	716	1.85	925.93	919	14	4.03E-03	45.6	4.55E+00	
1	510.85	307	921	2.79	1021.65	1013	19	4.74E-03	62.9	4.17E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	23	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	14	60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.413E+01	1.413E+01	0.090E+01	6.39	
CS-137	30.07Y	1.00	5.072E-02	5.083E-02	3.811E-02	74.99	
BI-214	1600.00Y	1.00	7.495E-01	7.496E-01	0.859E-01	11.45	
RA-226	1600.00Y	1.00	2.794E+00	2.794E+00	0.863E+00	30.87	
RA-228	5.75Y	1.01	1.105E+00	1.117E+00	0.306E+00	27.39	
			---------	---------			
	Total Activity :		1.883E+01	1.884E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	9.968E-01	1.030E+00	0.141E+00	13.73	
BI-212	1.91Y	1.03	1.928E+00	1.993E+00	0.597E+00	29.96	
PB-212	1.91Y	1.03	1.076E+00	1.112E+00	0.066E+00	5.90	
PB-214	1600.00Y	1.00	8.327E-01	8.327E-01	0.917E-01	11.01	
TH-232	1.41E+10Y	1.00	1.204E+00	1.204E+00	0.238E+00	19.75	
			---------	---------			
	Total Activity :		6.037E+00	6.172E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.204E+00	1.217E+00	0.240E+00	19.75	
			---------	---------			
	Total Activity :		1.204E+00	1.217E+00			

Grand Total Activity :	2.607E+01	2.623E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.413E+01	9.021E-01	4.186E-01	0.000E+00	33.745
CS-137	5.083E-02	3.811E-02	4.702E-02	0.000E+00	1.081
TL-208	1.030E+00	1.415E-01	1.276E-01	0.000E+00	8.074
BI-212	1.993E+00	5.971E-01	5.521E-01	0.000E+00	3.610
PB-212	1.112E+00	6.556E-02	6.110E-02	0.000E+00	18.197
BI-214	7.496E-01	8.586E-02	3.184E-01	0.000E+00	2.354
PB-214	8.327E-01	9.171E-02	8.104E-02	0.000E+00	10.276
RA-226	2.794E+00	8.625E-01	7.439E-01	0.000E+00	3.756
AC-228	1.217E+00	2.404E-01	1.597E-01	0.000E+00	7.620
RA-228	1.117E+00	3.059E-01	3.209E-01	0.000E+00	3.480
TH-232	1.204E+00	2.377E-01	1.580E-01	0.000E+00	7.618

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	2.590E-02		3.103E-02	5.304E-02	0.000E+00	0.488
LA-138	-1.497E-02		4.241E-02	6.723E-02	0.000E+00	-0.223
PA-234M	1.675E+00		3.619E+00	5.544E+00	0.000E+00	0.302
TH-234	-1.911E-01		1.304E+00	1.899E+00	0.000E+00	-0.101
U-235	-9.953E-02		1.562E-01	2.190E-01	0.000E+00	-0.454
U-238	1.675E+00		3.619E+00	5.544E+00	0.000E+00	0.302

```
A,01L95403-16      ,03/19/2022 05:14,02/13/2022 12:56,   3.000E+01,L95403-16 SS A
B,01L95403-16      ,NORMK                ,11/17/2021 15:33,01S25121819
C,K-40     ,YES,   1.413E+01,   9.021E-01,   4.186E-01,,   33.745
C,CS-137   ,YES,   5.083E-02,   3.811E-02,   4.702E-02,,    1.081
C,TL-208   ,YES,   1.030E+00,   1.415E-01,   1.276E-01,,    8.074
C,BI-212   ,YES,   1.993E+00,   5.971E-01,   5.521E-01,,    3.610
C,PB-212   ,YES,   1.112E+00,   6.556E-02,   6.110E-02,,   18.197
C,BI-214   ,YES,   7.496E-01,   8.586E-02,   3.184E-01,,    2.354
C,PB-214   ,YES,   8.327E-01,   9.171E-02,   8.104E-02,,   10.276
C,RA-226   ,YES,   2.794E+00,   8.625E-01,   7.439E-01,,    3.756
C,AC-228   ,YES,   1.217E+00,   2.404E-01,   1.597E-01,,    7.620
C,RA-228   ,YES,   1.117E+00,   3.059E-01,   3.209E-01,,    3.480
C,TH-232   ,YES,   1.204E+00,   2.377E-01,   1.580E-01,,    7.618
C,CO-60    ,NO ,   2.590E-02,   3.103E-02,   5.304E-02,,    0.488
C,LA-138   ,NO ,  -1.497E-02,   4.241E-02,   6.723E-02,,   -0.223
C,PA-234M  ,NO ,   1.675E+00,   3.619E+00,   5.544E+00,,    0.302
C,TH-234   ,NO ,  -1.911E-01,   1.304E+00,   1.899E+00,,   -0.101
C,U-235    ,NO ,  -9.953E-02,   1.562E-01,   2.190E-01,,   -0.454
C,U-238    ,NO ,   1.675E+00,   3.619E+00,   5.544E+00,,    0.302
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 19-MAR-2022 05:19:13.81
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 18-MAR-2022 11:18:21.75

LIMS No., Customer Name, Client ID: L95403-17 SS ANCHOR QEA

Sample ID : 08L95403-17
Sample Type : SS
Quantity : 4.41000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 08S50121919
BKGFILE : 08BG030422MT
Real Time : 0 18:00:31.65
Live time : 0 18:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	4	75.26*	914	2487	1.70	156.63	3.71E+00	1.41E-02	12.1	6.17E+00
2	4	77.50*	820	1870	1.29	161.10	3.92E+00	1.27E-02	11.6	
3	2	87.73	430	1485	1.27	181.49	4.72E+00	6.64E-03	14.6	4.52E+00
4	2	90.30	354	2056	1.43	186.63	4.89E+00	5.46E-03	23.8	
5	2	93.17*	362	1419	1.25	192.36	5.05E+00	5.58E-03	21.8	
6	1	186.47*	543	2117	1.61	378.43	5.38E+00	8.37E-03	19.4	1.88E+00
7	1	209.84	365	1335	1.55	425.04	5.01E+00	5.63E-03	18.8	9.23E-01
8	5	239.22*	2770	1174	1.44	483.62	4.57E+00	4.28E-02	3.2	9.76E-01
9	5	242.16*	624	1424	2.01	489.48	4.53E+00	9.62E-03	16.2	
10	1	295.77*	754	951	1.51	596.39	3.86E+00	1.16E-02	9.2	2.27E+00
11	1	338.98*	670	1200	1.63	682.55	3.43E+00	1.03E-02	11.6	2.59E+00
12	1	352.43*	1137	1211	1.62	709.37	3.31E+00	1.75E-02	7.9	2.12E+00
13	1	463.55	183	622	1.75	930.91	2.57E+00	2.83E-03	26.7	1.27E+00
14	1	511.40*	263	1159	3.15	1026.29	2.35E+00	4.06E-03	40.3	1.39E+00
15	1	583.63*	801	631	1.60	1170.27	2.08E+00	1.24E-02	8.2	1.63E+00
16	1	609.63*	868	1052	1.74	1222.11	1.99E+00	1.34E-02	10.0	2.01E+00
17	1	727.31	214	441	1.93	1456.63	1.69E+00	3.30E-03	20.7	1.66E+00
18	1	911.28*	547	256	2.48	1823.21	1.37E+00	8.45E-03	8.8	4.86E+00
19	1	969.38*	335	270	2.11	1938.98	1.29E+00	5.18E-03	12.2	1.23E+00
20	1	1120.48*	223	310	2.36	2239.97	1.13E+00	3.44E-03	20.6	8.50E-01
21	1	1461.21*	1489	185	2.13	2918.48	8.98E-01	2.30E-02	3.9	5.21E-01
22	1	1765.13*	144	73	2.53	3523.42	7.71E-01	2.23E-03	19.3	1.43E+00

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1489	10.67*	8.978E-01	1.470E+01	1.470E+01	7.76
BI-214	609.31	868	46.30	1.993E+00	8.898E-01	8.898E-01	20.09
	1120.29	223	15.10*	1.134E+00	1.231E+00	1.231E+00	41.22
	1764.49	144	15.80	7.706E-01	1.121E+00	1.121E+00	38.60
RA-226	186.21	543	3.28*	5.376E+00	2.910E+00	2.910E+00	38.72
RA-228	93.35	362	3.50	5.054E+00	1.934E+00	1.955E+00	43.66

	969.11	335	16.60*	1.294E+00	1.477E+00	1.493E+00	24.32

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	801	30.25*	2.076E+00	1.205E+00	1.246E+00	16.41
BI-212	727.17	214	7.56*	1.690E+00	1.585E+00	1.638E+00	41.43
PB-212	238.63	2770	44.60*	4.572E+00	1.285E+00	1.328E+00	6.41
PB-214	295.21	754	19.20	3.857E+00	9.632E-01	9.633E-01	18.45
	351.92	1137	37.20*	3.309E+00	8.735E-01	8.735E-01	15.82
TH-232	911.21	547	27.70*	1.370E+00	1.364E+00	1.364E+00	17.61

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	1.485E+00	------ Line Not Found		------
	911.07	547	27.70*	1.370E+00	1.364E+00	1.379E+00	17.61

Flag: "*" = Keyline

Sample ID : 08L95403-17 Acquisition date : 18-MAR-2022 11:18:21

Total number of lines in spectrum	22	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	13	59.09%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.470E+01	1.470E+01	0.114E+01	7.76	
BI-214	1600.00Y	1.00	1.231E+00	1.231E+00	0.507E+00	41.22	
RA-226	1600.00Y	1.00	2.910E+00	2.910E+00	1.127E+00	38.72	
RA-228	5.75Y	1.01	1.477E+00	1.493E+00	0.363E+00	24.32	
Total Activity :			2.031E+01	2.033E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.205E+00	1.246E+00	0.204E+00	16.41	
BI-212	1.91Y	1.03	1.585E+00	1.638E+00	0.679E+00	41.43	
PB-212	1.91Y	1.03	1.285E+00	1.328E+00	0.085E+00	6.41	
PB-214	1600.00Y	1.00	8.735E-01	8.735E-01	1.382E-01	15.82	
TH-232	1.41E+10Y	1.00	1.364E+00	1.364E+00	0.240E+00	17.61	
Total Activity :			6.312E+00	6.449E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.364E+00	1.379E+00	0.243E+00	17.61	
Total Activity :			1.364E+00	1.379E+00			

Grand Total Activity :	2.799E+01	2.816E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 08L95403-17 Acquisition date : 18-MAR-2022 11:18:21

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	75.26	914	2487	1.70	156.63	149	17	1.41E-02	24.2	3.71E+00	
4	77.50	820	1870	1.29	161.10	149	17	1.27E-02	23.2	3.92E+00	
2	87.73	430	1485	1.27	181.49	179	20	6.64E-03	29.1	4.72E+00	
2	90.30	354	2056	1.43	186.63	179	20	5.46E-03	47.5	4.89E+00	
1	209.84	365	1335	1.55	425.04	421	9	5.63E-03	37.6	5.01E+00	
5	242.16	624	1424	2.01	489.48	476	19	9.62E-03	32.3	4.53E+00	
1	338.98	670	1200	1.63	682.55	676	12	1.03E-02	23.2	3.43E+00	
1	463.55	183	622	1.75	930.91	926	10	2.83E-03	53.4	2.57E+00	
1	511.40	263	1159	3.15	1026.29	1018	22	4.06E-03	80.7	2.35E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	22	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	13	59.09%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.470E+01	1.470E+01	0.114E+01	7.76	
BI-214	1600.00Y	1.00	9.530E-01	9.530E-01	1.571E-01	16.49	
RA-226	1600.00Y	1.00	2.910E+00	2.910E+00	1.127E+00	38.72	
RA-228	5.75Y	1.01	1.547E+00	1.564E+00	0.334E+00	21.37	
Total Activity :			2.011E+01	2.012E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.205E+00	1.246E+00	0.204E+00	16.41	
BI-212	1.91Y	1.03	1.585E+00	1.638E+00	0.679E+00	41.43	
PB-212	1.91Y	1.03	1.285E+00	1.328E+00	0.085E+00	6.41	
PB-214	1600.00Y	1.00	9.073E-01	9.074E-01	1.091E-01	12.02	
TH-232	1.41E+10Y	1.00	1.364E+00	1.364E+00	0.240E+00	17.61	
Total Activity :			6.346E+00	6.483E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.364E+00	1.379E+00	0.243E+00	17.61	
Total Activity :			1.364E+00	1.379E+00			

Grand Total Activity :	2.782E+01	2.798E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.470E+01	1.140E+00	4.844E-01	0.000E+00	30.336
TL-208	1.246E+00	2.045E-01	1.597E-01	0.000E+00	7.800
BI-212	1.638E+00	6.786E-01	7.183E-01	0.000E+00	2.280
PB-212	1.328E+00	8.515E-02	7.475E-02	0.000E+00	17.767
BI-214	9.530E-01	1.571E-01	3.643E-01	0.000E+00	2.616
PB-214	9.074E-01	1.091E-01	9.955E-02	0.000E+00	9.115
RA-226	2.910E+00	1.127E+00	9.135E-01	0.000E+00	3.186
AC-228	1.379E+00	2.429E-01	1.870E-01	0.000E+00	7.375
RA-228	1.564E+00	3.341E-01	4.057E-01	0.000E+00	3.855
TH-232	1.364E+00	2.402E-01	1.850E-01	0.000E+00	7.374

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	2.719E-02		3.567E-02	6.152E-02	0.000E+00	0.442
CS-137	6.139E-02		3.749E-02	6.514E-02	0.000E+00	0.942
LA-138	-1.650E-02		4.947E-02	7.987E-02	0.000E+00	-0.207
PA-234M	3.558E+00		3.697E+00	6.234E+00	0.000E+00	0.571
TH-234	1.751E+00		1.207E+00	1.978E+00	0.000E+00	0.885
U-235	1.195E-01		1.628E-01	2.761E-01	0.000E+00	0.433
U-238	3.558E+00		3.697E+00	6.234E+00	0.000E+00	0.571

```
A,08L95403-17     ,03/19/2022 05:19,02/13/2022 12:56,   4.410E+01,L95403-17 SS A
B,08L95403-17     ,NORMK               ,11/17/2021 15:23,08S50121919
C,K-40    ,YES,   1.470E+01,   1.140E+00,   4.844E-01,,   30.336
C,TL-208  ,YES,   1.246E+00,   2.045E-01,   1.597E-01,,    7.800
C,BI-212  ,YES,   1.638E+00,   6.786E-01,   7.183E-01,,    2.280
C,PB-212  ,YES,   1.328E+00,   8.515E-02,   7.475E-02,,   17.767
C,BI-214  ,YES,   9.530E-01,   1.571E-01,   3.643E-01,,    2.616
C,PB-214  ,YES,   9.074E-01,   1.091E-01,   9.955E-02,,    9.115
C,RA-226  ,YES,   2.910E+00,   1.127E+00,   9.135E-01,,    3.186
C,AC-228  ,YES,   1.379E+00,   2.429E-01,   1.870E-01,,    7.375
C,RA-228  ,YES,   1.564E+00,   3.341E-01,   4.057E-01,,    3.855
C,TH-232  ,YES,   1.364E+00,   2.402E-01,   1.850E-01,,    7.374
C,CO-60   ,NO ,   2.719E-02,   3.567E-02,   6.152E-02,,    0.442
C,CS-137  ,NO ,   6.139E-02,   3.749E-02,   6.514E-02,,    0.942
C,LA-138  ,NO ,  -1.650E-02,   4.947E-02,   7.987E-02,,   -0.207
C,PA-234M ,NO ,   3.558E+00,   3.697E+00,   6.234E+00,,    0.571
C,TH-234  ,NO ,   1.751E+00,   1.207E+00,   1.978E+00,,    0.885
C,U-235   ,NO ,   1.195E-01,   1.628E-01,   2.761E-01,,    0.433
C,U-238   ,NO ,   3.558E+00,   3.697E+00,   6.234E+00,,    0.571
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 18-MAR-2022 08:08:11.83
TBE13 31-TP10727B HpGe ******* Aquisition Date/Time: 17-MAR-2022 14:52:14.24

LIMS No., Customer Name, Client ID: L95403-18 SS ANCHOR QEA

Sample ID : 13L95403-18
Sample Type : SS
Quantity : 2.36000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentfied

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 13S25030421
BKGFILE : 13BG030422MT
Real Time : 0 17:15:47.79
Live time : 0 17:15:33.44

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.93*	160	1516	0.70	149.77	3.49E+00	2.58E-03	43.3	1.95E+01
2	1	77.16*	338	927	0.69	154.21	3.83E+00	5.43E-03	15.7	4.61E+01
3	8	84.63*	182	1231	1.28	169.11	4.93E+00	2.93E-03	37.9	1.48E+00
4	8	87.18*	348	1017	1.10	174.20	5.27E+00	5.60E-03	17.8	
5	1	92.78*	366	1123	1.13	185.37	5.96E+00	5.90E-03	18.3	5.19E+00
6	1	185.74*	327	1279	1.06	370.86	7.62E+00	5.26E-03	22.6	1.78E+00
7	1	208.79	316	932	1.36	416.86	7.12E+00	5.09E-03	17.4	5.76E+00
8	5	238.47*	1991	650	0.94	476.10	6.49E+00	3.20E-02	3.5	5.76E+00
9	5	241.36	659	857	1.53	481.87	6.43E+00	1.06E-02	10.0	
10	1	295.01*	684	987	1.20	588.94	5.49E+00	1.10E-02	10.6	1.05E+00
11	1	338.13*	428	669	1.05	675.01	4.91E+00	6.90E-03	13.1	1.15E+00
12	1	351.70*	997	809	1.12	702.09	4.75E+00	1.60E-02	7.2	1.59E+00
13	1	463.01	157	477	1.46	924.32	3.75E+00	2.53E-03	27.3	3.58E+00
14	1	510.70*	436	856	2.38	1019.53	3.44E+00	7.01E-03	19.3	1.16E+00
15	1	582.90*	516	469	1.30	1163.72	3.06E+00	8.31E-03	10.2	6.49E-01
16	1	608.97*	784	463	1.26	1215.79	2.94E+00	1.26E-02	7.3	2.00E+00
17	1	661.33	186	254	1.96	1320.36	2.72E+00	2.99E-03	17.9	2.32E+00
18	1	726.93*	122	392	1.53	1451.39	2.49E+00	1.96E-03	36.3	9.36E-01
19	1	910.82*	436	189	2.03	1818.80	2.00E+00	7.02E-03	9.4	3.59E+00
20	1	968.83*	218	183	1.76	1934.73	1.88E+00	3.51E-03	14.6	2.49E+00
21	1	1120.24*	148	234	2.21	2237.39	1.62E+00	2.38E-03	27.4	8.74E-01
22	1	1460.38*	1182	77	2.15	2917.62	1.25E+00	1.90E-02	3.9	2.22E+00
23	1	1764.09*	102	84	2.15	3525.35	1.05E+00	1.65E-03	27.0	8.73E-01

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1182	10.67*	1.246E+00	1.639E+01	1.639E+01	7.86
CS-137	661.66	186	85.12*	2.723E+00	1.477E-01	1.480E-01	35.79
BI-214	609.31	784	46.30	2.937E+00	1.062E+00	1.062E+00	14.69
	1120.29	148	15.10*	1.623E+00	1.114E+00	1.114E+00	54.78
	1764.49	102	15.80	1.054E+00	1.134E+00	1.134E+00	54.01

RA-226	186.21	327	3.28*	7.616E+00	2.413E+00	2.413E+00	45.13
RA-228	93.35	366	3.50	5.959E+00	3.238E+00	3.273E+00	36.56
	969.11	218	16.60*	1.881E+00	1.287E+00	1.301E+00	29.28
TH-234	63.29	------	3.80*	1.737E+00	------ Line Not Found		------
	92.60	366	5.41	5.959E+00	2.095E+00	2.095E+00	36.56
U-235	143.76	------	10.50*	8.228E+00	------ Line Not Found		------
	163.35	------	4.70	8.037E+00	------ Line Not Found		------
	185.71	327	54.00	7.616E+00	1.466E-01	1.466E-01	45.13
	205.31	------	4.70	7.191E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	516	30.25*	3.056E+00	1.030E+00	1.063E+00	20.35
BI-212	727.17	122	7.56*	2.492E+00	1.194E+00	1.233E+00	72.64
PB-212	238.63	1991	44.60*	6.490E+00	1.268E+00	1.310E+00	6.97
PB-214	295.21	684	19.20	5.495E+00	1.195E+00	1.195E+00	21.13
	351.92	997	37.20*	4.746E+00	1.041E+00	1.041E+00	14.32
TH-232	911.21	436	27.70*	2.001E+00	1.451E+00	1.451E+00	18.81

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	2.179E+00	------ Line Not Found		------
	911.07	436	27.70*	2.001E+00	1.451E+00	1.466E+00	18.81

Flag: "*" = Keyline

Sample ID : 13L95403-18 Acquisition date : 17-MAR-2022 14:52:14

Total number of lines in spectrum	23	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	14	60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.639E+01	1.639E+01	0.129E+01	7.86	
CS-137	30.07Y	1.00	1.477E-01	1.480E-01	0.530E-01	35.79	
BI-214	1600.00Y	1.00	1.114E+00	1.114E+00	0.610E+00	54.78	
RA-226	1600.00Y	1.00	2.413E+00	2.413E+00	1.089E+00	45.13	
RA-228	5.75Y	1.01	1.287E+00	1.301E+00	0.381E+00	29.28	
TH-234	4.47E+09Y	1.00	2.095E+00	2.095E+00	0.766E+00	36.56	K
U-235	7.04E+08Y	1.00	1.466E-01	1.466E-01	0.662E-01	45.13	K
			---------	---------			
	Total Activity :		2.360E+01	2.361E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.030E+00	1.063E+00	0.216E+00	20.35	
BI-212	1.91Y	1.03	1.194E+00	1.233E+00	0.896E+00	72.64	
PB-212	1.91Y	1.03	1.268E+00	1.310E+00	0.091E+00	6.97	
PB-214	1600.00Y	1.00	1.041E+00	1.041E+00	0.149E+00	14.32	
TH-232	1.41E+10Y	1.00	1.451E+00	1.451E+00	0.273E+00	18.81	
			---------	---------			
	Total Activity :		5.983E+00	6.097E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.451E+00	1.466E+00	0.276E+00	18.81	
			---------	---------			
	Total Activity :		1.451E+00	1.466E+00			

Grand Total Activity :	3.103E+01	3.117E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 13L95403-18 Acquisition date : 17-MAR-2022 14:52:14

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.93	160	1516	0.70	149.77	147	6	2.58E-03	86.6	3.49E+00	
1	77.16	338	927	0.69	154.21	153	4	5.43E-03	31.5	3.83E+00	
8	84.63	182	1231	1.28	169.11	165	13	2.93E-03	75.9	4.93E+00	
8	87.18	348	1017	1.10	174.20	165	13	5.60E-03	35.6	5.27E+00	
1	208.79	316	932	1.36	416.86	413	8	5.09E-03	34.9	7.12E+00	
5	241.36	659	857	1.53	481.87	472	14	1.06E-02	19.9	6.43E+00	
1	338.13	428	669	1.05	675.01	671	9	6.90E-03	26.2	4.91E+00	
1	463.01	157	477	1.46	924.32	920	10	2.53E-03	54.6	3.75E+00	
1	510.70	436	856	2.38	1019.53	1013	16	7.01E-03	38.5	3.44E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	23	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	14	60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.639E+01	1.639E+01	0.129E+01	7.86	
CS-137	30.07Y	1.00	1.477E-01	1.480E-01	0.530E-01	35.79	
BI-214	1600.00Y	1.00	1.069E+00	1.069E+00	0.147E+00	13.73	
RA-226	1600.00Y	1.00	2.413E+00	2.413E+00	1.089E+00	45.13	
RA-228	5.75Y	1.01	1.287E+00	1.301E+00	0.381E+00	29.28	
Total Activity :			2.131E+01	2.132E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.03	1.030E+00	1.063E+00	0.216E+00	20.35	
BI-212	1.91Y	1.03	1.194E+00	1.233E+00	0.896E+00	72.64	
PB-212	1.91Y	1.03	1.268E+00	1.310E+00	0.091E+00	6.97	
PB-214	1600.00Y	1.00	1.081E+00	1.081E+00	0.128E+00	11.88	
TH-232	1.41E+10Y	1.00	1.451E+00	1.451E+00	0.273E+00	18.81	
Total Activity :			6.023E+00	6.137E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.451E+00	1.466E+00	0.276E+00	18.81	
Total Activity :			1.451E+00	1.466E+00			

Grand Total Activity :	2.878E+01	2.893E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.639E+01	1.289E+00	6.188E-01	0.000E+00	26.492
CS-137	1.480E-01	5.297E-02	6.012E-02	0.000E+00	2.462
TL-208	1.063E+00	2.164E-01	1.671E-01	0.000E+00	6.361
BI-212	1.233E+00	8.959E-01	7.092E-01	0.000E+00	1.739
PB-212	1.310E+00	9.121E-02	7.900E-02	0.000E+00	16.576
BI-214	1.069E+00	1.468E-01	4.646E-01	0.000E+00	2.302
PB-214	1.081E+00	1.284E-01	1.014E-01	0.000E+00	10.659
RA-226	2.413E+00	1.089E+00	9.201E-01	0.000E+00	2.623
AC-228	1.466E+00	2.758E-01	2.018E-01	0.000E+00	7.266
RA-228	1.301E+00	3.809E-01	4.371E-01	0.000E+00	2.975
TH-232	1.451E+00	2.728E-01	1.997E-01	0.000E+00	7.265

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	-7.143E-03		4.221E-02	6.988E-02	0.000E+00	-0.102
LA-138	-8.849E-03		5.964E-02	9.794E-02	0.000E+00	-0.090
PA-234M	2.807E+00		4.029E+00	6.886E+00	0.000E+00	0.408
TH-234	6.827E-01		2.341E+00	3.468E+00	0.000E+00	0.197
U-235	4.240E-02		1.709E-01	2.707E-01	0.000E+00	0.157
U-238	2.807E+00		4.029E+00	6.886E+00	0.000E+00	0.408

```
A,13L95403-18      ,03/18/2022 08:08,02/13/2022 12:56,   2.360E+01,L95403-18 SS A
B,13L95403-18      ,NORMK                ,03/22/2021 07:43,13S25030421
C,K-40     ,YES,   1.639E+01,   1.289E+00,   6.188E-01,,   26.492
C,CS-137   ,YES,   1.480E-01,   5.297E-02,   6.012E-02,,    2.462
C,TL-208   ,YES,   1.063E+00,   2.164E-01,   1.671E-01,,    6.361
C,BI-212   ,YES,   1.233E+00,   8.959E-01,   7.092E-01,,    1.739
C,PB-212   ,YES,   1.310E+00,   9.121E-02,   7.900E-02,,   16.576
C,BI-214   ,YES,   1.069E+00,   1.468E-01,   4.646E-01,,    2.302
C,PB-214   ,YES,   1.081E+00,   1.284E-01,   1.014E-01,,   10.659
C,RA-226   ,YES,   2.413E+00,   1.089E+00,   9.201E-01,,    2.623
C,AC-228   ,YES,   1.466E+00,   2.758E-01,   2.018E-01,,    7.266
C,RA-228   ,YES,   1.301E+00,   3.809E-01,   4.371E-01,,    2.975
C,TH-232   ,YES,   1.451E+00,   2.728E-01,   1.997E-01,,    7.265
C,CO-60    ,NO ,  -7.143E-03,   4.221E-02,   6.988E-02,,   -0.102
C,LA-138   ,NO ,  -8.849E-03,   5.964E-02,   9.794E-02,,   -0.090
C,PA-234M  ,NO ,   2.807E+00,   4.029E+00,   6.886E+00,,    0.408
C,TH-234   ,NO ,   6.827E-01,   2.341E+00,   3.468E+00,,    0.197
C,U-235    ,NO ,   4.240E-02,   1.709E-01,   2.707E-01,,    0.157
C,U-238    ,NO ,   2.807E+00,   4.029E+00,   6.886E+00,,    0.408
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 22-MAR-2022 07:26:21.60
TBE08 31-TP20610B HpGe ******** Aquisition Date/Time: 21-MAR-2022 13:49:14.08

LIMS No., Customer Name, Client ID: L95403-19 SS ANCHOR QEA

Sample ID : 08L95403-19
Sample Type : SS
Quantity : 4.91000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 12:56:00.
Geometry : 08S50121919
BKGFILE : 08BG030422MT
Real Time : 0 17:36:58.83
Live time : 0 17:36:27.25

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	73.36	461	1741	1.54	152.83	3.53E+00	7.27E-03	15.8	1.51E+00
2	3	75.58*	975	1974	1.26	157.26	3.74E+00	1.54E-02	9.7	
3	3	77.72	1319	1709	1.19	161.54	3.94E+00	2.08E-02	6.1	
4	6	85.22*	443	1860	1.89	176.49	4.55E+00	6.99E-03	19.9	2.78E+00
5	6	88.00	599	1411	1.22	182.04	4.74E+00	9.45E-03	11.4	
6	6	90.59	452	1764	1.44	187.21	4.91E+00	7.13E-03	17.8	
7	6	93.43*	600	1720	1.49	192.87	5.07E+00	9.46E-03	15.0	
8	1	186.78*	529	1955	1.47	379.05	5.37E+00	8.35E-03	18.2	1.18E+00
9	1	210.01	290	1681	1.37	425.37	5.01E+00	4.57E-03	27.0	1.89E+00
10	1	239.46*	2563	1800	1.22	484.10	4.57E+00	4.04E-02	3.8	1.94E+00
11	1	242.58*	454	1088	1.44	490.33	4.52E+00	7.17E-03	14.7	3.79E-01
12	1	296.03*	1003	1321	1.43	596.90	3.85E+00	1.58E-02	8.5	4.96E-01
13	1	339.16*	649	918	1.44	682.90	3.42E+00	1.02E-02	10.3	6.11E-01
14	1	352.71*	1557	962	1.47	709.93	3.31E+00	2.46E-02	5.2	1.00E+00
15	1	511.54*	453	1006	2.87	1026.58	2.35E+00	7.15E-03	21.4	2.09E+00
16	1	583.89*	816	631	1.57	1170.79	2.08E+00	1.29E-02	7.8	3.07E-01
17	1	609.95*	1167	612	1.67	1222.74	1.99E+00	1.84E-02	5.8	8.70E-01
18	1	662.38	146	531	1.43	1327.23	1.84E+00	2.30E-03	32.6	8.81E-01
19	1	727.77	235	317	1.66	1457.56	1.69E+00	3.71E-03	15.2	4.92E+00
20	1	768.74	242	375	2.83	1539.21	1.60E+00	3.83E-03	17.7	1.55E+00
21	1	911.81*	549	356	1.76	1824.28	1.37E+00	8.66E-03	9.2	6.68E-01
22	1	969.90*	391	304	2.20	1940.00	1.29E+00	6.17E-03	11.9	3.48E+00
23	1	1120.87*	242	247	2.34	2240.73	1.13E+00	3.83E-03	16.1	5.38E-01
24	1	1461.59*	1659	122	2.19	2919.24	8.98E-01	2.62E-02	3.3	1.21E+00
25	1	1765.70*	234	79	2.27	3524.56	7.70E-01	3.70E-03	12.8	9.21E-01

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1659	10.67*	8.976E-01	1.505E+01	1.505E+01	6.69
CS-137	661.66	146	85.12*	1.844E+00	8.068E-02	8.087E-02	65.27
BI-214	609.31	1167	46.30	1.992E+00	1.099E+00	1.099E+00	11.52

	1120.29	242	15.10*	1.133E+00	1.230E+00	1.231E+00	32.18
	1764.49	234	15.80	7.704E-01	1.672E+00	1.673E+00	25.64
RA-226	186.21	529	3.28*	5.371E+00	2.610E+00	2.610E+00	36.32
RA-228	93.35	600	3.50	5.068E+00	2.937E+00	2.973E+00	30.05
	969.11	391	16.60*	1.293E+00	1.582E+00	1.601E+00	23.86

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	816	30.25*	2.076E+00	1.129E+00	1.170E+00	15.70
BI-212	727.17	235	7.56*	1.689E+00	1.598E+00	1.657E+00	30.36
PB-212	238.63	2563	44.60*	4.569E+00	1.092E+00	1.132E+00	7.65
PB-214	295.21	1003	19.20	3.854E+00	1.178E+00	1.178E+00	16.99
	351.92	1557	37.20*	3.307E+00	1.099E+00	1.099E+00	10.42
TH-232	911.21	549	27.70*	1.369E+00	1.257E+00	1.257E+00	18.44

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	1.485E+00	------ Line Not Found		------
	911.07	549	27.70*	1.369E+00	1.257E+00	1.272E+00	18.44

Flag: "*" = Keyline

Sample ID : 08L95403-19 Acquisition date : 21-MAR-2022 13:49:14

Total number of lines in spectrum	25	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	14	56.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.505E+01	1.505E+01	0.101E+01	6.69	
CS-137	30.07Y	1.00	8.068E-02	8.087E-02	5.278E-02	65.27	
BI-214	1600.00Y	1.00	1.230E+00	1.231E+00	0.396E+00	32.18	
RA-226	1600.00Y	1.00	2.610E+00	2.610E+00	0.948E+00	36.32	
RA-228	5.75Y	1.01	1.582E+00	1.601E+00	0.382E+00	23.86	
	Total Activity :		2.055E+01	2.057E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.04	1.129E+00	1.170E+00	0.184E+00	15.70	
BI-212	1.91Y	1.04	1.598E+00	1.657E+00	0.503E+00	30.36	
PB-212	1.91Y	1.04	1.092E+00	1.132E+00	0.087E+00	7.65	
PB-214	1600.00Y	1.00	1.099E+00	1.099E+00	0.115E+00	10.42	
TH-232	1.41E+10Y	1.00	1.257E+00	1.257E+00	0.232E+00	18.44	
	Total Activity :		6.176E+00	6.316E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.257E+00	1.272E+00	0.235E+00	18.44	
	Total Activity :		1.257E+00	1.272E+00			

Grand Total Activity :	2.798E+01	2.816E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	73.36	461	1741	1.54	152.83	149	17	7.27E-03	31.6	3.53E+00	
3	75.58	975	1974	1.26	157.26	149	17	1.54E-02	19.4	3.74E+00	
3	77.72	1319	1709	1.19	161.54	149	17	2.08E-02	12.3	3.94E+00	
6	85.22	443	1860	1.89	176.49	172	28	6.99E-03	39.7	4.55E+00	
6	88.00	599	1411	1.22	182.04	172	28	9.45E-03	22.8	4.74E+00	
6	90.59	452	1764	1.44	187.21	172	28	7.13E-03	35.7	4.91E+00	
1	210.01	290	1681	1.37	425.37	421	10	4.57E-03	53.9	5.01E+00	
1	242.58	454	1088	1.44	490.33	488	7	7.17E-03	29.5	4.52E+00	
1	339.16	649	918	1.44	682.90	678	10	1.02E-02	20.5	3.42E+00	
1	511.54	453	1006	2.87	1026.58	1019	19	7.15E-03	42.7	2.35E+00	
1	768.74	242	375	2.83	1539.21	1533	13	3.83E-03	35.5	1.60E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	25	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	14	56.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.505E+01	1.505E+01	0.101E+01	6.69	
CS-137	30.07Y	1.00	8.068E-02	8.087E-02	5.278E-02	65.27	
BI-214	1600.00Y	1.00	1.152E+00	1.152E+00	0.116E+00	10.07	
RA-226	1600.00Y	1.00	2.610E+00	2.610E+00	0.948E+00	36.32	
RA-228	5.75Y	1.01	1.791E+00	1.813E+00	0.351E+00	19.37	
Total Activity :			2.068E+01	2.070E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.04	1.129E+00	1.170E+00	0.184E+00	15.70	
BI-212	1.91Y	1.04	1.598E+00	1.657E+00	0.503E+00	30.36	
PB-212	1.91Y	1.04	1.092E+00	1.132E+00	0.087E+00	7.65	
PB-214	1600.00Y	1.00	1.119E+00	1.119E+00	0.099E+00	8.89	
TH-232	1.41E+10Y	1.00	1.257E+00	1.257E+00	0.232E+00	18.44	
Total Activity :			6.195E+00	6.335E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.257E+00	1.272E+00	0.235E+00	18.44	
Total Activity :			1.257E+00	1.272E+00			

Grand Total Activity :	2.813E+01	2.831E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.505E+01	1.007E+00	4.644E-01	0.000E+00	32.397
CS-137	8.087E-02	5.278E-02	5.564E-02	0.000E+00	1.454
TL-208	1.170E+00	1.837E-01	1.391E-01	0.000E+00	8.417
BI-212	1.657E+00	5.030E-01	6.480E-01	0.000E+00	2.557
PB-212	1.132E+00	8.669E-02	7.357E-02	0.000E+00	15.392
BI-214	1.152E+00	1.161E-01	3.670E-01	0.000E+00	3.139
PB-214	1.119E+00	9.945E-02	9.115E-02	0.000E+00	12.274
RA-226	2.610E+00	9.479E-01	8.758E-01	0.000E+00	2.980
AC-228	1.272E+00	2.347E-01	1.936E-01	0.000E+00	6.571
RA-228	1.813E+00	3.512E-01	3.933E-01	0.000E+00	4.609
TH-232	1.257E+00	2.319E-01	1.858E-01	0.000E+00	6.766

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	3.305E-03		3.066E-02	5.114E-02	0.000E+00	0.065
LA-138	2.527E-03		4.490E-02	7.435E-02	0.000E+00	0.034
PA-234M	3.023E+00		3.568E+00	5.974E+00	0.000E+00	0.506
TH-234	3.321E-02		1.124E+00	1.793E+00	0.000E+00	0.019
U-235	-5.777E-02		1.509E-01	2.508E-01	0.000E+00	-0.230
U-238	3.023E+00		3.568E+00	5.974E+00	0.000E+00	0.506

```
A,08L95403-19      ,03/22/2022 07:26,02/13/2022 12:56,   4.910E+01,L95403-19 SS A
B,08L95403-19      ,NORMK                ,11/17/2021 15:23,08S50121919
C,K-40     ,YES,   1.505E+01,   1.007E+00,   4.644E-01,,   32.397
C,CS-137   ,YES,   8.087E-02,   5.278E-02,   5.564E-02,,    1.454
C,TL-208   ,YES,   1.170E+00,   1.837E-01,   1.391E-01,,    8.417
C,BI-212   ,YES,   1.657E+00,   5.030E-01,   6.480E-01,,    2.557
C,PB-212   ,YES,   1.132E+00,   8.669E-02,   7.357E-02,,   15.392
C,BI-214   ,YES,   1.152E+00,   1.161E-01,   3.670E-01,,    3.139
C,PB-214   ,YES,   1.119E+00,   9.945E-02,   9.115E-02,,   12.274
C,RA-226   ,YES,   2.610E+00,   9.479E-01,   8.758E-01,,    2.980
C,AC-228   ,YES,   1.272E+00,   2.347E-01,   1.936E-01,,    6.571
C,RA-228   ,YES,   1.813E+00,   3.512E-01,   3.933E-01,,    4.609
C,TH-232   ,YES,   1.257E+00,   2.319E-01,   1.858E-01,,    6.766
C,CO-60    ,NO ,   3.305E-03,   3.066E-02,   5.114E-02,,    0.065
C,LA-138   ,NO ,   2.527E-03,   4.490E-02,   7.435E-02,,    0.034
C,PA-234M  ,NO ,   3.023E+00,   3.568E+00,   5.974E+00,,    0.506
C,TH-234   ,NO ,   3.321E-02,   1.124E+00,   1.793E+00,,    0.019
C,U-235    ,NO ,  -5.777E-02,   1.509E-01,   2.508E-01,,   -0.230
C,U-238    ,NO ,   3.023E+00,   3.568E+00,   5.974E+00,,    0.506
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 22-MAR-2022 07:26:34.51
TBE06 33-TP10933A HpGe ******* Aquisition Date/Time: 21-MAR-2022 13:49:13.85

LIMS No., Customer Name, Client ID: L95403-20 SS ANCHOR QEA

Sample ID : 06L95403-20
Sample Type : SS
Quantity : 5.36000E+01 g Dry
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: NORMK
Peak Evaluation - Identified and Unidentified

Smple Date: 13-FEB-2022 13:00:00.
Geometry : 06S50031621
BKGFILE : 06BG030422MT
Real Time : 0 17:37:14.99
Live time : 0 17:37:02.96

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	74.90*	407	1332	0.85	150.27	1.68E+00	6.42E-03	16.1	1.44E+00
2	3	77.14	573	1215	0.82	154.74	1.84E+00	9.04E-03	10.1	
3	0	87.24	376	1309	1.19	174.90	2.53E+00	5.93E-03	16.0	
4	0	92.84*	383	1504	1.32	186.09	2.87E+00	6.04E-03	19.8	
5	0	185.91*	437	1412	1.21	371.89	4.02E+00	6.88E-03	17.9	
6	0	209.33	250	1136	0.79	418.63	3.79E+00	3.94E-03	23.2	
7	4	238.78*	2518	947	1.08	477.41	3.48E+00	3.97E-02	3.0	1.82E+00
8	4	241.75	812	1507	1.77	483.35	3.45E+00	1.28E-02	11.1	
9	0	295.39*	862	1477	1.21	590.42	2.95E+00	1.36E-02	10.1	
10	0	338.56	596	1168	1.25	676.60	2.63E+00	9.39E-03	11.8	
11	0	352.11*	1795	1155	1.18	703.66	2.54E+00	2.83E-02	4.9	
12	0	511.16*	339	1140	2.20	1021.12	1.83E+00	5.34E-03	30.6	
13	0	583.26*	840	724	1.45	1165.03	1.63E+00	1.32E-02	8.1	
14	0	609.41*	1364	701	1.41	1217.23	1.57E+00	2.15E-02	5.3	
15	0	661.61	271	422	1.62	1321.42	1.46E+00	4.27E-03	15.4	
16	0	727.55*	221	410	1.51	1453.02	1.35E+00	3.48E-03	20.9	
17	0	911.49*	510	269	1.69	1820.12	1.11E+00	8.04E-03	8.6	
18	0	969.68*	254	397	1.31	1936.25	1.06E+00	4.01E-03	18.4	
19	0	1120.69*	300	256	1.77	2237.61	9.34E-01	4.73E-03	13.8	
20	0	1238.39*	113	236	1.29	2472.48	8.59E-01	1.79E-03	29.7	
21	0	1461.35*	1539	136	2.00	2917.36	7.48E-01	2.43E-02	3.6	
22	0	1765.31*	225	120	2.03	3523.80	6.42E-01	3.55E-03	15.1	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
K-40	1460.81	1539	10.67*	7.481E-01	1.532E+01	1.532E+01	7.17
CS-137	661.66	271	85.12*	1.463E+00	1.730E-01	1.734E-01	30.87
BI-214	609.31	1364	46.30	1.570E+00	1.491E+00	1.491E+00	10.53
	1120.29	300	15.10*	9.340E-01	1.691E+00	1.691E+00	27.62
	1764.49	225	15.80	6.424E-01	1.765E+00	1.765E+00	30.14
RA-226	186.21	437	3.28*	4.018E+00	2.633E+00	2.633E+00	35.74

RA-228	93.35	383	3.50	2.875E+00	3.027E+00	3.064E+00	39.60
	969.11	254	16.60*	1.056E+00	1.154E+00	1.168E+00	36.83
TH-234	63.29	------	3.80*	8.696E-01	------ Line Not Found		------
	92.60	383	5.41	2.875E+00	1.958E+00	1.958E+00	39.60
U-235	143.76	------	10.50*	4.209E+00	------ Line Not Found		------
	163.35	------	4.70	4.183E+00	------ Line Not Found		------
	185.71	437	54.00	4.018E+00	1.599E-01	1.599E-01	35.74
	205.31	------	4.70	3.827E+00	------ Line Not Found		------

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
TL-208	583.17	840	30.25*	1.631E+00	1.353E+00	1.403E+00	16.20
BI-212	727.17	221	7.56*	1.348E+00	1.723E+00	1.786E+00	41.74
PB-212	238.63	2518	44.60*	3.477E+00	1.291E+00	1.339E+00	6.07
PB-214	295.21	862	19.20	2.950E+00	1.210E+00	1.210E+00	20.25
	351.92	1795	37.20*	2.541E+00	1.510E+00	1.510E+00	9.75
TH-232	911.21	510	27.70*	1.112E+00	1.316E+00	1.316E+00	17.20

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	835.50	------	1.75	1.198E+00	------ Line Not Found		------
	911.07	510	27.70*	1.112E+00	1.316E+00	1.332E+00	17.20

Flag: "*" = Keyline

Sample ID : 06L95403-20 Acquisition date : 21-MAR-2022 13:49:13

Total number of lines in spectrum	22	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	14	63.64%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.532E+01	1.532E+01	0.110E+01	7.17	
CS-137	30.07Y	1.00	1.730E-01	1.734E-01	0.535E-01	30.87	
BI-214	1600.00Y	1.00	1.691E+00	1.691E+00	0.467E+00	27.62	
RA-226	1600.00Y	1.00	2.633E+00	2.633E+00	0.941E+00	35.74	
RA-228	5.75Y	1.01	1.154E+00	1.168E+00	0.430E+00	36.83	
TH-234	4.47E+09Y	1.00	1.958E+00	1.958E+00	0.775E+00	39.60	K
U-235	7.04E+08Y	1.00	1.599E-01	1.599E-01	0.572E-01	35.74	K
Total Activity :			2.309E+01	2.311E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.04	1.353E+00	1.403E+00	0.227E+00	16.20	
BI-212	1.91Y	1.04	1.723E+00	1.786E+00	0.746E+00	41.74	
PB-212	1.91Y	1.04	1.291E+00	1.339E+00	0.081E+00	6.07	
PB-214	1600.00Y	1.00	1.510E+00	1.510E+00	0.147E+00	9.75	
TH-232	1.41E+10Y	1.00	1.316E+00	1.316E+00	0.226E+00	17.20	
Total Activity :			7.193E+00	7.354E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.316E+00	1.332E+00	0.229E+00	17.20	
Total Activity :			1.316E+00	1.332E+00			

Grand Total Activity :	3.160E+01	3.180E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 06L95403-20 Acquisition date : 21-MAR-2022 13:49:13

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	74.90	407	1332	0.85	150.27	147	19	6.42E-03	32.2	1.68E+00	
3	77.14	573	1215	0.82	154.74	147	19	9.04E-03	20.2	1.84E+00	
0	87.24	376	1309	1.19	174.90	173	6	5.93E-03	32.0	2.53E+00	
0	209.33	250	1136	0.79	418.63	415	7	3.94E-03	46.5	3.79E+00	
4	241.75	812	1507	1.77	483.35	473	17	1.28E-02	22.2	3.45E+00	
0	338.56	596	1168	1.25	676.60	672	11	9.39E-03	23.7	2.63E+00	
0	511.16	339	1140	2.20	1021.12	1012	21	5.34E-03	61.3	1.83E+00	
0	1238.39	113	236	1.29	2472.48	2468	11	1.79E-03	59.5	8.59E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	22	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	14	63.64%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	1.532E+01	1.532E+01	0.110E+01	7.17	
CS-137	30.07Y	1.00	1.730E-01	1.734E-01	0.535E-01	30.87	
BI-214	1600.00Y	1.00	1.530E+00	1.530E+00	0.143E+00	9.37	
RA-226	1600.00Y	1.00	2.633E+00	2.633E+00	0.941E+00	35.74	
RA-228	5.75Y	1.01	1.154E+00	1.168E+00	0.430E+00	36.83	
			---------	---------			
	Total Activity :		2.082E+01	2.083E+01			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TL-208	1.91Y	1.04	1.353E+00	1.403E+00	0.227E+00	16.20	
BI-212	1.91Y	1.04	1.723E+00	1.786E+00	0.746E+00	41.74	
PB-212	1.91Y	1.04	1.291E+00	1.339E+00	0.081E+00	6.07	
PB-214	1600.00Y	1.00	1.430E+00	1.430E+00	0.126E+00	8.82	
TH-232	1.41E+10Y	1.00	1.316E+00	1.316E+00	0.226E+00	17.20	
			---------	---------			
	Total Activity :		7.114E+00	7.275E+00			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Dry	Wtd Mean Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
AC-228	5.75Y	1.01	1.316E+00	1.332E+00	0.229E+00	17.20	
			---------	---------			
	Total Activity :		1.316E+00	1.332E+00			

Grand Total Activity :	2.925E+01	2.944E+01

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
K-40	1.532E+01	1.098E+00	4.834E-01	0.000E+00	31.699
CS-137	1.734E-01	5.354E-02	6.114E-02	0.000E+00	2.836
TL-208	1.403E+00	2.272E-01	1.637E-01	0.000E+00	8.568
BI-212	1.786E+00	7.457E-01	7.206E-01	0.000E+00	2.479
PB-212	1.339E+00	8.121E-02	8.068E-02	0.000E+00	16.591
BI-214	1.530E+00	1.434E-01	3.973E-01	0.000E+00	3.852
PB-214	1.430E+00	1.261E-01	1.057E-01	0.000E+00	13.530
RA-226	2.633E+00	9.411E-01	1.004E+00	0.000E+00	2.623
AC-228	1.332E+00	2.292E-01	1.973E-01	0.000E+00	6.751
RA-228	1.168E+00	4.302E-01	4.328E-01	0.000E+00	2.699
TH-232	1.316E+00	2.264E-01	1.975E-01	0.000E+00	6.667

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CO-60	4.112E-02		3.663E-02	6.470E-02	0.000E+00	0.636
LA-138	-8.255E-03		4.780E-02	7.869E-02	0.000E+00	-0.105
PA-234M	3.466E+00		3.837E+00	6.520E+00	0.000E+00	0.532
TH-234	1.674E+00		2.469E+00	4.141E+00	0.000E+00	0.404
U-235	4.466E-02		1.898E-01	3.063E-01	0.000E+00	0.146
U-238	3.466E+00		3.837E+00	6.520E+00	0.000E+00	0.532

```
A,06L95403-20      ,03/22/2022 07:26,02/13/2022 13:00,   5.360E+01,L95403-20 SS A
B,06L95403-20      ,NORMK               ,10/29/2021 09:14,06S50031621
C,K-40     ,YES,   1.532E+01,   1.098E+00,   4.834E-01,,   31.699
C,CS-137   ,YES,   1.734E-01,   5.354E-02,   6.114E-02,,    2.836
C,TL-208   ,YES,   1.403E+00,   2.272E-01,   1.637E-01,,    8.568
C,BI-212   ,YES,   1.786E+00,   7.457E-01,   7.206E-01,,    2.479
C,PB-212   ,YES,   1.339E+00,   8.121E-02,   8.068E-02,,   16.591
C,BI-214   ,YES,   1.530E+00,   1.434E-01,   3.973E-01,,    3.852
C,PB-214   ,YES,   1.430E+00,   1.261E-01,   1.057E-01,,   13.530
C,RA-226   ,YES,   2.633E+00,   9.411E-01,   1.004E+00,,    2.623
C,AC-228   ,YES,   1.332E+00,   2.292E-01,   1.973E-01,,    6.751
C,RA-228   ,YES,   1.168E+00,   4.302E-01,   4.328E-01,,    2.699
C,TH-232   ,YES,   1.316E+00,   2.264E-01,   1.975E-01,,    6.667
C,CO-60    ,NO ,   4.112E-02,   3.663E-02,   6.470E-02,,    0.636
C,LA-138   ,NO ,  -8.255E-03,   4.780E-02,   7.869E-02,,   -0.105
C,PA-234M  ,NO ,   3.466E+00,   3.837E+00,   6.520E+00,,    0.532
C,TH-234   ,NO ,   1.674E+00,   2.469E+00,   4.141E+00,,    0.404
C,U-235    ,NO ,   4.466E-02,   1.898E-01,   3.063E-01,,    0.146
C,U-238    ,NO ,   3.466E+00,   3.837E+00,   6.520E+00,,    0.532
```

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 11-MAR-2022 12:49:49.47
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 11-MAR-2022 11:21:02.87

LIMS No., Customer Name, Client ID: WG38795-1 AN PSEG -SALEM/HC

Sample ID : 11WG38795-1 Smple Date: 7-MAR-2022 12:00:00.0
Sample Type : AN Geometry : 1135L120319
Quantity : 2.48010E+00 Kg Wet BKGFILE : 11BG030422MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 01:28:36.82
End Channel : 4090 Pk Srch Sens: 9.00000 Live time : 0 01:28:33.85
MDA Multiple : 4.6600 Library Used: LIBD
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	1461.17*	701	8	2.35	2920.16	4.47E-01	1.32E-01	4.0	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/Kg Wet	Decay Corr pCi/Kg Wet	2-Sigma %Error
K-40	1460.81	701	10.67*	4.474E-01	3.013E+03	3.013E+03	7.92

Flag: "*" = Keyline

Sample ID : 11WG38795-1 Acquisition date : 11-MAR-2022 11:21:02

Total number of lines in spectrum	1	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	1	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/Kg Wet	Decay Corr pCi/Kg Wet	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	3.013E+03	3.013E+03	0.239E+03	7.92	
	Total Activity :		3.013E+03	3.013E+03			
	Grand Total Activity :		3.013E+03	3.013E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	1	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	1	100.00%

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/Kg Wet	Wtd Mean Decay Corr pCi/Kg Wet	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	3.013E+03	3.013E+03	0.239E+03	7.92	
	Total Activity :		3.013E+03	3.013E+03			
	Grand Total Activity :		3.013E+03	3.013E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/Kg Wet)	Act error	MDA (pCi/Kg Wet)	MDA error	Act/MDA
K-40	3.013E+03	2.385E+02	9.648E+01	0.000E+00	31.230

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/Kg Wet)	K.L. Ided	Act error	MDA (pCi/Kg Wet)	MDA error	Act/MDA
BE-7	-1.223E+00		4.457E+01	7.903E+01	0.000E+00	-0.015
NA-22	-5.402E-01		6.323E+00	1.124E+01	0.000E+00	-0.048
NA-24	-1.034E+02		3.900E+02	7.212E+02	0.000E+00	-0.143
CR-51	-1.599E+01		4.417E+01	7.304E+01	0.000E+00	-0.219
MN-54	-9.385E-01		5.571E+00	9.966E+00	0.000E+00	-0.094
CO-56	2.315E+00		6.231E+00	1.220E+01	0.000E+00	0.190
CO-57	3.046E+00		3.874E+00	7.027E+00	0.000E+00	0.433
CO-58	5.002E+00		5.717E+00	1.122E+01	0.000E+00	0.446
FE-59	3.696E+00		1.261E+01	2.320E+01	0.000E+00	0.159
CO-60	-1.905E+00		5.441E+00	9.398E+00	0.000E+00	-0.203
ZN-65	-1.521E+01		1.328E+01	2.066E+01	0.000E+00	-0.736
SE-75	-1.224E+00		6.845E+00	1.154E+01	0.000E+00	-0.106

Y-88	2.210E+00	4.273E+00	9.435E+00	0.000E+00	0.234
NB-94	-4.073E+00	5.725E+00	9.645E+00	0.000E+00	-0.422
NB-95	7.055E+00	5.152E+00	1.064E+01	0.000E+00	0.663
ZR-95	-8.294E+00	8.748E+00	1.358E+01	0.000E+00	-0.611
ZRNB-95	7.054E+00	5.152E+00	1.064E+01	0.000E+00	0.663
MO-99	8.811E+01	1.055E+02	2.024E+02	0.000E+00	0.435
RU-103	-2.934E+00	5.266E+00	8.904E+00	0.000E+00	-0.329
RU-106	-3.857E+00	4.636E+01	8.152E+01	0.000E+00	-0.047
AG-110m	-2.055E+00	5.100E+00	8.621E+00	0.000E+00	-0.238
SN-113	-3.922E+00	5.876E+00	9.991E+00	0.000E+00	-0.393
SB-124	-3.638E+00	4.849E+00	7.925E+00	0.000E+00	-0.459
SB-125	-1.749E+00	1.450E+01	2.560E+01	0.000E+00	-0.068
TE-129M	-3.901E+01	5.843E+01	9.829E+01	0.000E+00	-0.397
I-131	4.583E+00	7.012E+00	1.310E+01	0.000E+00	0.350
TE-132	8.088E+00	1.035E+01	1.852E+01	0.000E+00	0.437
BA-133	-9.175E+00	7.215E+00	1.178E+01	0.000E+00	-0.779
CS-134	2.368E+00	5.674E+00	1.088E+01	0.000E+00	0.218
CS-136	-2.543E+00	5.997E+00	1.053E+01	0.000E+00	-0.242
CS-137	4.715E+00	6.151E+00	1.154E+01	0.000E+00	0.409
CE-139	-1.216E+00	4.435E+00	7.569E+00	0.000E+00	-0.161
BA-140	3.626E+00	2.271E+01	4.081E+01	0.000E+00	0.089
BALA140	3.975E+00	6.451E+00	1.359E+01	0.000E+00	0.292
LA-140	3.975E+00	6.451E+00	1.359E+01	0.000E+00	0.292
CE-141	-9.139E-01	7.993E+00	1.386E+01	0.000E+00	-0.066
CE-144	-1.571E+01	3.135E+01	5.333E+01	0.000E+00	-0.295
EU-152	-1.006E+01	1.515E+01	2.591E+01	0.000E+00	-0.388
EU-154	-9.827E-01	8.353E+00	1.452E+01	0.000E+00	-0.068
RA-226	7.227E+00	1.145E+02	2.042E+02	0.000E+00	0.035
AC-228	1.504E+01	2.328E+01	4.541E+01	0.000E+00	0.331
TH-228	7.433E+00	9.813E+00	1.761E+01	0.000E+00	0.422
TH-232	1.502E+01	2.325E+01	4.535E+01	0.000E+00	0.331

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/Kg Wet)	K.L. Ided	Act error	MDA (pCi/Kg Wet)	MDA error	Act/MDA
U-235	-1.460E+01		3.493E+01	5.963E+01	0.000E+00	-0.245
U-238	4.322E+02		6.508E+02	1.254E+03	0.000E+00	0.345
NP-239	-2.862E+01		4.828E+01	8.247E+01	0.000E+00	-0.347
AM-241	1.549E+00		1.158E+01	1.941E+01	0.000E+00	0.080

A,11WG38795-1 ,03/11/2022 12:49,03/07/2022 12:00, 2.480E+00,WG38795-1 AN P
B,11WG38795-1 ,LIBD ,02/10/2022 09:58,1135L120319

C,K-40	,YES,	3.013E+03,	2.385E+02,	9.648E+01,,	31.230
C,BE-7	,NO ,	-1.223E+00,	4.457E+01,	7.903E+01,,	-0.015
C,NA-22	,NO ,	-5.402E-01,	6.323E+00,	1.124E+01,,	-0.048
C,NA-24	,NO ,	-1.034E+02,	3.900E+02,	7.212E+02,,	-0.143
C,CR-51	,NO ,	-1.599E+01,	4.417E+01,	7.304E+01,,	-0.219
C,MN-54	,NO ,	-9.385E-01,	5.571E+00,	9.966E+00,,	-0.094
C,CO-56	,NO ,	2.315E+00,	6.231E+00,	1.220E+01,,	0.190
C,CO-57	,NO ,	3.046E+00,	3.874E+00,	7.027E+00,,	0.433
C,CO-58	,NO ,	5.002E+00,	5.717E+00,	1.122E+01,,	0.446
C,FE-59	,NO ,	3.696E+00,	1.261E+01,	2.320E+01,,	0.159
C,CO-60	,NO ,	-1.905E+00,	5.441E+00,	9.398E+00,,	-0.203
C,ZN-65	,NO ,	-1.521E+01,	1.328E+01,	2.066E+01,,	-0.736
C,SE-75	,NO ,	-1.224E+00,	6.845E+00,	1.154E+01,,	-0.106
C,Y-88	,NO ,	2.210E+00,	4.273E+00,	9.435E+00,,	0.234
C,NB-94	,NO ,	-4.073E+00,	5.725E+00,	9.645E+00,,	-0.422
C,NB-95	,NO ,	7.055E+00,	5.152E+00,	1.064E+01,,	0.663
C,ZR-95	,NO ,	-8.294E+00,	8.748E+00,	1.358E+01,,	-0.611
C,ZRNB-95	,NO ,	7.054E+00,	5.152E+00,	1.064E+01,,	0.663
C,MO-99	,NO ,	8.811E+01,	1.055E+02,	2.024E+02,,	0.435
C,RU-103	,NO ,	-2.934E+00,	5.266E+00,	8.904E+00,,	-0.329
C,RU-106	,NO ,	-3.857E+00,	4.636E+01,	8.152E+01,,	-0.047
C,AG-110m	,NO ,	-2.055E+00,	5.100E+00,	8.621E+00,,	-0.238
C,SN-113	,NO ,	-3.922E+00,	5.876E+00,	9.991E+00,,	-0.393
C,SB-124	,NO ,	-3.638E+00,	4.849E+00,	7.925E+00,,	-0.459
C,SB-125	,NO ,	-1.749E+00,	1.450E+01,	2.560E+01,,	-0.068
C,TE-129M	,NO ,	-3.901E+01,	5.843E+01,	9.829E+01,,	-0.397
C,I-131	,NO ,	4.583E+00,	7.012E+00,	1.310E+01,,	0.350
C,TE-132	,NO ,	8.088E+00,	1.035E+01,	1.852E+01,,	0.437
C,BA-133	,NO ,	-9.175E+00,	7.215E+00,	1.178E+01,,	-0.779
C,CS-134	,NO ,	2.368E+00,	5.674E+00,	1.088E+01,,	0.218
C,CS-136	,NO ,	-2.543E+00,	5.997E+00,	1.053E+01,,	-0.242
C,CS-137	,NO ,	4.715E+00,	6.151E+00,	1.154E+01,,	0.409
C,CE-139	,NO ,	-1.216E+00,	4.435E+00,	7.569E+00,,	-0.161
C,BA-140	,NO ,	3.626E+00,	2.271E+01,	4.081E+01,,	0.089
C,BALA140	,NO ,	3.975E+00,	6.451E+00,	1.359E+01,,	0.292
C,LA-140	,NO ,	3.975E+00,	6.451E+00,	1.359E+01,,	0.292
C,CE-141	,NO ,	-9.139E-01,	7.993E+00,	1.386E+01,,	-0.066
C,CE-144	,NO ,	-1.571E+01,	3.135E+01,	5.333E+01,,	-0.295
C,EU-152	,NO ,	-1.006E+01,	1.515E+01,	2.591E+01,,	-0.388
C,EU-154	,NO ,	-9.827E-01,	8.353E+00,	1.452E+01,,	-0.068
C,RA-226	,NO ,	7.227E+00,	1.145E+02,	2.042E+02,,	0.035
C,AC-228	,NO ,	1.504E+01,	2.328E+01,	4.541E+01,,	0.331
C,TH-228	,NO ,	7.433E+00,	9.813E+00,	1.761E+01,,	0.422
C,TH-232	,NO ,	1.502E+01,	2.325E+01,	4.535E+01,,	0.331
C,U-235	,NO ,	-1.460E+01,	3.493E+01,	5.963E+01,,	-0.245
C,U-238	,NO ,	4.322E+02,	6.508E+02,	1.254E+03,,	0.345
C,NP-239	,NO ,	-2.862E+01,	4.828E+01,	8.247E+01,,	-0.347
C,AM-241	,NO ,	1.549E+00,	1.158E+01,	1.941E+01,,	0.080

Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 10-MAR-2022 13:48:57.49
TBE11 59-TN51806A HpGe ******* Aquisition Date/Time: 10-MAR-2022 12:48:40.89

LIMS No., Customer Name, Client ID: WG38781-1 VA DOMINION - MILLSTONE REMP

Sample ID : 11WG38781-1
Sample Type : VA
Quantity : 1.37640E+03 g Wet
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 9.00000
MDA Multiple : 4.6600 Library Used: LIBD
Smple Date: 7-MAR-2022 08:55:00.0
Geometry : 1135L120319
BKGFILE : 11BG030422MT
Real Time : 0 01:00:01.96
Live time : 0 01:00:00.00
Peak Evaluation - Identified and Unidentified

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	239.51*	80	102	1.39	477.53	1.70E+00	2.23E-02	28.5	
2	0	478.29	39	33	0.68	954.93	1.03E+00	1.07E-02	34.6	
3	0	1461.36*	504	0	2.38	2920.52	4.47E-01	1.40E-01	4.6	

Flag: "*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type: activation

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Wet	Decay Corr pCi/g Wet	2-Sigma %Error
BE-7	477.59	39	10.42*	1.028E+00	1.964E-01	2.047E-01	69.25

Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Wet	Decay Corr pCi/g Wet	2-Sigma %Error
K-40	1460.81	504	10.67*	4.473E-01	5.754E+00	5.754E+00	9.11
TH-228	238.63	80	44.60*	1.700E+00	5.779E-02	5.797E-02	57.05
	240.98	80	3.95	1.700E+00	6.525E-01	6.545E-01	57.05

Flag: "*" = Keyline

Sample ID : 11WG38781-1 Acquisition date : 10-MAR-2022 12:48:40

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : activation

Nuclide	Hlife	Decay	Uncorrected pCi/g Wet	Decay Corr pCi/g Wet	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.44D	1.04	1.964E-01	2.047E-01	1.418E-01	69.25	
	Total Activity :		1.964E-01	2.047E-01			

Nuclide Type : natural

Nuclide	Hlife	Decay	Uncorrected pCi/g Wet	Decay Corr pCi/g Wet	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	5.754E+00	5.754E+00	0.524E+00	9.11	
TH-228	1.91Y	1.00	5.779E-02	5.797E-02	3.307E-02	57.05	
	Total Activity :		5.812E+00	5.812E+00			
	Grand Total Activity :		6.009E+00	6.017E+00			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

None

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	3	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	3	100.00%

Nuclide Type : activation

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Wet	Wtd Mean Decay Corr pCi/g Wet	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BE-7	53.44D	1.04	1.964E-01	2.047E-01	1.418E-01	69.25	
	Total Activity :		1.964E-01	2.047E-01			

Nuclide Type : natural

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/g Wet	Wtd Mean Decay Corr pCi/g Wet	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.28E+09Y	1.00	5.754E+00	5.754E+00	0.524E+00	9.11	
TH-228	1.91Y	1.00	5.779E-02	5.797E-02	3.307E-02	57.05	
	Total Activity :		5.812E+00	5.812E+00			
Grand Total Activity :			6.009E+00	6.017E+00			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Wet)	Act error	MDA (pCi/g Wet)	MDA error	Act/MDA
BE-7	2.047E-01	1.418E-01	1.582E-01	0.000E+00	1.294
K-40	5.754E+00	5.240E-01	1.862E-01	0.000E+00	30.900
TH-228	5.797E-02	3.307E-02	3.095E-02	0.000E+00	1.873

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Wet)	K.L. Ided	Act error	MDA (pCi/g Wet)	MDA error	Act/MDA
NA-22	-4.033E-03		1.475E-02	2.580E-02	0.000E+00	-0.156

NA-24	9.854E-02	3.254E-01	6.877E-01	0.000E+00	0.143
CR-51	8.129E-03	1.013E-01	1.751E-01	0.000E+00	0.046
MN-54	-8.210E-03	1.290E-02	2.204E-02	0.000E+00	-0.372
CO-56	-2.661E-03	1.284E-02	2.468E-02	0.000E+00	-0.108
CO-57	-1.934E-03	8.011E-03	1.397E-02	0.000E+00	-0.138
CO-58	1.671E-04	1.125E-02	2.108E-02	0.000E+00	0.008
FE-59	-1.338E-02	2.655E-02	4.523E-02	0.000E+00	-0.296
CO-60	-4.402E-04	1.398E-02	2.551E-02	0.000E+00	-0.017
ZN-65	-2.706E-02	2.818E-02	4.458E-02	0.000E+00	-0.607
SE-75	1.072E-03	1.437E-02	2.498E-02	0.000E+00	0.043
Y-88	-1.622E-03	9.112E-03	1.803E-02	0.000E+00	-0.090
NB-94	-5.926E-03	1.161E-02	2.019E-02	0.000E+00	-0.293
NB-95	1.162E-03	1.100E-02	2.085E-02	0.000E+00	0.056
ZR-95	2.782E-02	2.115E-02	4.375E-02	0.000E+00	0.636
ZRNB-95	1.162E-03	1.100E-02	2.085E-02	0.000E+00	0.056
MO-99	1.017E-01	1.998E-01	3.784E-01	0.000E+00	0.269
RU-103	1.023E-02	1.191E-02	2.315E-02	0.000E+00	0.442
RU-106	-2.488E-02	1.067E-01	1.863E-01	0.000E+00	-0.134
AG-110m	2.894E-03	1.162E-02	2.139E-02	0.000E+00	0.135
SN-113	-4.192E-03	1.364E-02	2.409E-02	0.000E+00	-0.174
SB-124	3.361E-03	1.123E-02	2.080E-02	0.000E+00	0.162
SB-125	1.549E-02	2.969E-02	5.664E-02	0.000E+00	0.274
TE-129M	-1.145E-01	1.369E-01	2.264E-01	0.000E+00	-0.506
I-131	2.224E-02	1.593E-02	3.151E-02	0.000E+00	0.706
TE-132	-7.551E-03	1.836E-02	3.083E-02	0.000E+00	-0.245
BA-133	-8.112E-03	1.518E-02	2.627E-02	0.000E+00	-0.309
CS-134	9.141E-03	1.336E-02	2.682E-02	0.000E+00	0.341
CS-136	-1.734E-03	1.217E-02	2.248E-02	0.000E+00	-0.077
CS-137	-9.355E-03	1.345E-02	2.197E-02	0.000E+00	-0.426
CE-139	2.000E-03	9.336E-03	1.658E-02	0.000E+00	0.121
BA-140	2.215E-02	4.280E-02	8.232E-02	0.000E+00	0.269
BALA140	-3.950E-04	1.094E-02	2.228E-02	0.000E+00	-0.018
LA-140	-3.950E-04	1.094E-02	2.228E-02	0.000E+00	-0.018
CE-141	-2.846E-04	1.632E-02	2.884E-02	0.000E+00	-0.010
CE-144	-3.393E-02	6.718E-02	1.147E-01	0.000E+00	-0.296
EU-152	1.714E-02	3.575E-02	6.674E-02	0.000E+00	0.257
EU-154	-9.943E-03	1.726E-02	2.944E-02	0.000E+00	-0.338
RA-226	2.668E-01	2.668E-01	5.032E-01	0.000E+00	0.530
AC-228	5.458E-02	5.441E-02	1.110E-01	0.000E+00	0.492
TH-232	5.452E-02	5.435E-02	1.109E-01	0.000E+00	0.492

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/g Wet)	K.L. Ided	Act error	MDA (pCi/g Wet)	MDA error	Act/MDA
U-235	-3.331E-02		7.320E-02	1.258E-01	0.000E+00	-0.265
U-238	3.423E-01		1.535E+00	2.873E+00	0.000E+00	0.119
NP-239	-9.673E-03		7.295E-02	1.289E-01	0.000E+00	-0.075
AM-241	1.040E-02		2.512E-02	4.325E-02	0.000E+00	0.240

A,11WG38781-1 ,03/10/2022 13:48,03/07/2022 08:55, 1.376E+03,WG38781-1 VA D
B,11WG38781-1 ,LIBD ,02/10/2022 09:58,1135L120319

C,BE-7	,YES,	2.047E-01,	1.418E-01,	1.582E-01,,	1.294
C,K-40	,YES,	5.754E+00,	5.240E-01,	1.862E-01,,	30.900
C,TH-228	,YES,	5.797E-02,	3.307E-02,	3.095E-02,,	1.873
C,NA-22	,NO ,	-4.033E-03,	1.475E-02,	2.580E-02,,	-0.156
C,NA-24	,NO ,	9.854E-02,	3.254E-01,	6.877E-01,,	0.143
C,CR-51	,NO ,	8.129E-03,	1.013E-01,	1.751E-01,,	0.046
C,MN-54	,NO ,	-8.210E-03,	1.290E-02,	2.204E-02,,	-0.372
C,CO-56	,NO ,	-2.661E-03,	1.284E-02,	2.468E-02,,	-0.108
C,CO-57	,NO ,	-1.934E-03,	8.011E-03,	1.397E-02,,	-0.138
C,CO-58	,NO ,	1.671E-04,	1.125E-02,	2.108E-02,,	0.008
C,FE-59	,NO ,	-1.338E-02,	2.655E-02,	4.523E-02,,	-0.296
C,CO-60	,NO ,	-4.402E-04,	1.398E-02,	2.551E-02,,	-0.017
C,ZN-65	,NO ,	-2.706E-02,	2.818E-02,	4.458E-02,,	-0.607
C,SE-75	,NO ,	1.072E-03,	1.437E-02,	2.498E-02,,	0.043
C,Y-88	,NO ,	-1.622E-03,	9.112E-03,	1.803E-02,,	-0.090
C,NB-94	,NO ,	-5.926E-03,	1.161E-02,	2.019E-02,,	-0.293
C,NB-95	,NO ,	1.162E-03,	1.100E-02,	2.085E-02,,	0.056
C,ZR-95	,NO ,	2.782E-02,	2.115E-02,	4.375E-02,,	0.636
C,ZRNB-95	,NO ,	1.162E-03,	1.100E-02,	2.085E-02,,	0.056
C,MO-99	,NO ,	1.017E-01,	1.998E-01,	3.784E-01,,	0.269
C,RU-103	,NO ,	1.023E-02,	1.191E-02,	2.315E-02,,	0.442
C,RU-106	,NO ,	-2.488E-02,	1.067E-01,	1.863E-01,,	-0.134
C,AG-110m	,NO ,	2.894E-03,	1.162E-02,	2.139E-02,,	0.135
C,SN-113	,NO ,	-4.192E-03,	1.364E-02,	2.409E-02,,	-0.174
C,SB-124	,NO ,	3.361E-03,	1.123E-02,	2.080E-02,,	0.162
C,SB-125	,NO ,	1.549E-02,	2.969E-02,	5.664E-02,,	0.274
C,TE-129M	,NO ,	-1.145E-01,	1.369E-01,	2.264E-01,,	-0.506
C,I-131	,NO ,	2.224E-02,	1.593E-02,	3.151E-02,,	0.706
C,TE-132	,NO ,	-7.551E-03,	1.836E-02,	3.083E-02,,	-0.245
C,BA-133	,NO ,	-8.112E-03,	1.518E-02,	2.627E-02,,	-0.309
C,CS-134	,NO ,	9.141E-03,	1.336E-02,	2.682E-02,,	0.341
C,CS-136	,NO ,	-1.734E-03,	1.217E-02,	2.248E-02,,	-0.077
C,CS-137	,NO ,	-9.355E-03,	1.345E-02,	2.197E-02,,	-0.426
C,CE-139	,NO ,	2.000E-03,	9.336E-03,	1.658E-02,,	0.121
C,BA-140	,NO ,	2.215E-02,	4.280E-02,	8.232E-02,,	0.269
C,BALA140	,NO ,	-3.950E-04,	1.094E-02,	2.228E-02,,	-0.018
C,LA-140	,NO ,	-3.950E-04,	1.094E-02,	2.228E-02,,	-0.018
C,CE-141	,NO ,	-2.846E-04,	1.632E-02,	2.884E-02,,	-0.010
C,CE-144	,NO ,	-3.393E-02,	6.718E-02,	1.147E-01,,	-0.296
C,EU-152	,NO ,	1.714E-02,	3.575E-02,	6.674E-02,,	0.257
C,EU-154	,NO ,	-9.943E-03,	1.726E-02,	2.944E-02,,	-0.338
C,RA-226	,NO ,	2.668E-01,	2.668E-01,	5.032E-01,,	0.530
C,AC-228	,NO ,	5.458E-02,	5.441E-02,	1.110E-01,,	0.492
C,TH-232	,NO ,	5.452E-02,	5.435E-02,	1.109E-01,,	0.492
C,U-235	,NO ,	-3.331E-02,	7.320E-02,	1.258E-01,,	-0.265
C,U-238	,NO ,	3.423E-01,	1.535E+00,	2.873E+00,,	0.119
C,NP-239	,NO ,	-9.673E-03,	7.295E-02,	1.289E-01,,	-0.075
C,AM-241	,NO ,	1.040E-02,	2.512E-02,	4.325E-02,,	0.240

GAMMA SPECTROSCOPY

Prep and Run Logs

GELI

Sample#	Matrix	QC	Analysis	Aliquot Volume / Units	Aliquot Date	Analyst	Aliquot Instrument	Tare Weight	Tare Balance	Final Weight	Final Balance	Mount Weight	Mount Date	Workgroup
WG38781-1	VA	DUP	GELI	1376.4 g wet	03/10/22	DH	BALANCE 15							WG38781
WG38795-1	AN	DUP	GELI	2480.1 g wet	03/10/22	DH	BALANCE 15							WG38795
L95403-1	SS		GELI	21.4 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-2	SS		GELI	32.3 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-3	SS		GELI	35.7 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-4	SS		GELI	26.7 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-5	SS		GELI	30.4 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-6	SS		GELI	24.6 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-7	SS		GELI	27.4 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-8	SS		GELI	45.9 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-9	SS		GELI	31.1 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-10	SS		GELI	24.8 g dry	03/16/22	DH	BALANCE 15							WG38781
L95403-11	SS		GELI	25.5 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-12	SS		GELI	26.9 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-13	SS		GELI	21.4 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-14	SS		GELI	41.7 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-15	SS		GELI	27.3 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-16	SS		GELI	30 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-17	SS		GELI	44.1 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-18	SS		GELI	23.6 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-19	SS		GELI	49.1 g dry	03/16/22	DH	BALANCE 15							WG38795
L95403-20	SS		GELI	53.6 g dry	03/16/22	DH	BALANCE 15							WG38795

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

TELEDYNE BROWN ENGINEERING
Gamma Worksheet/Run log (gammaws_L)
Mar 23 2022, 02:04 pm
L95403 - Origin: E
Due Date: 03/21/22

GELI

Det.	ID/Date	Sample ID / ID Verification	Client ID	Reference Date/Time	Mat	Product	Reporting Units	Nuclide	MDC

Anchor QEA, LLC
AN003-3EREGBTESKE-22 ANCHOR QEA
Report Format: Level 4 - Full 3Sigma
LLD Formula None
Countroom Library: NORMK
Project Manager: K.ARTERBURN

Technical Notes/Instructions

MS/MSD recovery 70 - 130, RPD < 30%
Uncertainty Less than 30%.

Due Date: 03/21/22

Det.	CountDate	Verify									
01	031722	☑	L95403-1 S25	1; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	2.1400E+01 Dry	pCi/g Dry	SS	CS-137	1.000E-01
02	031822	☑	L95403-2 S25	8; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	3.2300E+01 Dry	pCi/g Dry			
14	↓	☑	L95403-3 S25	15; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	3.5700E+01 Dry	pCi/g Dry			
11	031722	☑	L95403-4 S25	22; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	2.6700E+01 Dry	pCi/g Dry			
13	031822	☑	L95403-5 S25	29; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	3.0400E+01 Dry	pCi/g Dry			
02	031722	☑	L95403-6 S25	36; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	2.4600E+01 Dry	pCi/g Dry			
23	031822	☑	L95403-7 S25	43; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	2.7400E+01 Dry	pCi/g Dry			
06	↓	☑	L95403-8 S50	50; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	4.5900E+01 Dry	pCi/g Dry			
07	↓	☑	L95403-9 S25	57; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	3.1100E+01 Dry	pCi/g Dry			
07	031722	☑	L95403-10 S25	63; 5.21	02/13/2022 13:37 (P/M)	SS	GELI	2.4800E+01 Dry	pCi/g Dry			
14	↓	☑	L95403-11 S25	64; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	2.5500E+01 Dry	pCi/g Dry			
08	↓	☑	L95403-12 S25	72; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	2.6900E+01 Dry	pCi/g Dry			
23	↓	☑	L95403-13 S25	80; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	2.1400E+01 Dry	pCi/g Dry			
11	031822	☑	L95403-14 S50	88; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	4.1700E+01 Dry	pCi/g Dry			
06	031722	☑	L95403-15 S25	96; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	2.7300E+01 Dry	pCi/g Dry			
01	031822	☑	L95403-16 S25	104; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	3.0000E+01 Dry	pCi/g Dry			
08	↓	☑	L95403-17 S50	112; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	4.4100E+01 Dry	pCi/g Dry			
13	031722	☑	L95403-18 S25	120; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	2.3600E+01 Dry	pCi/g Dry			
08	032122	☑	L95403-19 S50	128; 5.11	02/13/2022 12:56 (P/M)	SS	GELI	4.9100E+01 Dry	pCi/g Dry			
06	↓	☑	L95403-20 S50	137; 5.11	02/13/2022 13:00 (P/M)	SS	GELI	5.3600E+01 Dry	pCi/g Dry			

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

TELEDYNE BROWN ENGINEERING
Gamma Worksheet/Run log (gammaws_wg)

Mar 23 2022, 02:05 pm

WG38781 - Origin: E

GELI

Due Date: 03/21/22

Det.	ID Verification ID/Date	Sample ID	Client ID	Reference Date/Time	Mat	Product	Reporting Units	Nuclide	MDC

Teledyne Brown Engineering
TE511-LABQC Internal Lab QC (Bla
Report Format: Level 1 - Full 3Sigma
LLD Formula None
Countroom Library: LIBD
Project Manager: S.NORTHCUTT

Technical Notes/Instructions

Due Date: 04/04/22

Det.	CountDate	Verify								
11	03/22	☑	WG38781-1 (L95387-1)	JORDAN COVE W	03/07/2022 08:55	(F/M)	VA	GELI	1.3764E+03 Wet	pCi/g Wet

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

TELEDYNE BROWN ENGINEERING
Gamma Worksheet/Run log (gammaws_wg)

Mar 23 2022, 02:04 pm

WG38795 - Origin: E

GELI

Due Date: 03/21/22

Det.	ID/Date	ID Verification Sample ID	Client ID	Reference Date/Time	Mat	Product	Reporting Units	Nuclide	MDC

Teledyne Brown Engineering
TE511-LABQC Internal Lab QC (Bla
Report Format: Level 1 - Full 3Sigma
LLD Formula None
Countroom Library: LIBD
Project Manager: S.NORTHCUTT

Technical Notes/Instructions

Due Date: 04/04/22

Det.	CountDate	Verify								
11	031022	☐	WG38795-1 (L95392-1)	SAGAM13E3	03/07/2022 12:00 (F/E)	AN	GELI	2.4801E+00 Wet	pCi/Kg Wet	

GAMMA SPECTROSCOPY

Balance and Pipette Check

Daily Balance Tolerance Check Reports

for : L95403

Instrument: BALANCE 15

Model: A&D GX-6001A

Serial Number: T2008157

Description: A&D 6100 g capacity top loading balance.

Known Weight: Initial calibration by PCS 06/17/21

Check Date: 10-MAR-22

Analyst: DH

WTSET 3

1%

N

Weight Set Used:

Tolerance:

Out of Range:

	Result Weight
1.0000	1.0000
100.0000	100.0000
1000.0000	1000.0000

Prod

NONE BALANCE 15 10-MAR-22

Daily Balance Tolerance Check Reports

for : L95403

Instrument: BALANCE 15

Model: A&D GX-6001A

Serial Number: T2008157

Description: A&D 6100 g capacity top loading balance.

Known Weight: Initial calibration by PCS 06/17/21

Check Date: 16-MAR-22

Analyst: DH

Weight Set Used: WTSET 3

Tolerance: 1%

Out of Range: N

Known Weight	Result Weight
1.0000	1.0000
100.0000	100.0000
1000.0000	1000.0000

Prod		
GELI	BALANCE 15	16-MAR-22
NONE	BALANCE 15	16-MAR-22

Gamma Standard

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661·309·1010
Fax 661·257·8303

CERTIFICATE OF CALIBRATION
MULTINUCLIDE STANDARD SOLUTION

Customer: TELEDYNE BROWN ENGINEERING, INC.
P.O. No.: PO00149995
Catalog No.: 7602

Source No.: 2088-10-1
Reference Date: 1-Jun-19 12:00 PST
Contained Radioactivity: 1.026 µCi 37.96 kBq

Physical Description:

A. Mass of solution: 5.16168 grams in 5 mL flame-sealed ampoule
B. Chemical form: Multinuclide in 2M HCl
C. Carrier content: See attached sheet
D. Density: 1.033 g/mL @ 20°C

Total wt. 8.7382
tare wt. 8.0137
Final wt. = 0.7245 g
Empty wt 3.5953
4.4189 g

Gamma-Ray Energy (keV)	Nuclide	Half-life	Branching Ratio (%)	Conc. (nCi/g)	Gammas per second per gram	Total Uncert.
47	Pb-210	22.3 ± 0.2 years	4.18	46.62	72.10	4.1 %
88	Cd-109	462.6 ± 0.7 days	3.63	63.10	84.75	3.0 %
122	Co-57	271.79 ± 0.09 days	85.6	2.439	77.25	3.1 %
166	Ce-139	137.640 ± 0.023 days	79.9	3.135	92.68	3.1 %
279	Hg-203	46.595 ± 0.013 days	81.5	9.054	273.0	3.1 %
392	Sn-113	115.09 ± 0.04 days	64.9	11.66	280.0	3.0 %
514	Sr-85	64.849 ± 0.004 days	98.4	15.05	547.9	3.0 %
662	Cs-137	30.17 ± 0.16 years	85.1	10.50	330.6	3.0 %
898	Y-88	106.630 ± 0.025 days	94.0	24.69	858.7	3.0 %
1173	Co-60	5.272 ± 0.001 years	99.86	12.46	460.4	3.0 %
1333	Co-60	5.272 ± 0.001 years	99.98	12.46	460.9	3.0 %
1836	Y-88	106.630 ± 0.025 days	99.4	24.69	908.0	3.0 %

Method of Calibration:

This source was prepared from weighed aliquots of solutions whose concentrations in µCi/g were determined by gamma spectrometry. Undiluted STD

0.7245 g in Filter Petri Dish

Diluted STD
4.4189 g (85.6%)
50ml

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA-TECDOC-619, 1991.
- Overall uncertainty is calculated at the 99% confidence level.
- This source has a recommended working life of 1 year.

Dilution by: Keith Jote 6/17/19

Daniel James VanOlson
Quality Control

27-May-19
Date

EZIP Ref. No.: 2088-10

E & Z 2088-10-1 Mixed Gamma
6/1/19 12:00 PM

FULL 20 ML LSC VIAL

		Orig. Wt	5.1617	Volume	50				
		Wt Used	4.4184	Aliquot	2.0000	Certificate	Aliquoted	Actual	Percent
Nuclide	Half-Life	Energy(KeV)	ate G/s/	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Cd-109	462.9d	88.0	84.75		3.72%	402.64	14.98		
Co-57	271.8d	122.1	77.25		85.51%	15.97	13.65		
Ce-139	137.64d	165.9	92.68		80.35%	20.39	16.38		
Hg-203	46.6d	279.2	273		77.30%	62.42	48.25		
Sn-113	115.09d	391.7	280		64.90%	76.25	49.49		
Sr-85	64.849	514.0	547.9		98.40%	98.41	96.83		
Cs-137	30.17y	661.6	330.6		85.12%	68.64	58.43		
Y-88	106.65d	898.0	858.7		93.40%	162.49	151.76		
Co-60	5.27y	1173.2	460.4		100.00%	81.37	81.37		
Co-60	5.27y	1332.5	460.9		100.00%	81.46	81.46		
Y-88	106.65d	1836.0	908		99.38%	161.48	160.48		

Eff. Name:

Analyst: KOJ

PERCENT MOISTURE

Run Date: 03/23/2022

Percent Moisture Report

L95403

Sample#	Client ID	Tare Wt	Wet Wt	Dry Wt	Tare Balance/Date		Dry Balance/Date		Analyst	% Moist
L95403-1	1; 5.2-1	124.5	159.4	147	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	35.53
L95403-2	8; 5.2-1	124.6	211.5	182.4	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	33.49
L95403-3	15; 5.2-1	124.5	200.2	173.1	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	35.8
L95403-4	22; 5.2-1	124.2	175.8	156.8	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	36.82
L95403-5	29; 5.2-1	124.2	176	160.1	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	30.69
L95403-6	36; 5.2-1	123.8	173.3	152.9	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	41.21
L95403-7	43; 5.2-1	123.8	181.1	158.1	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	40.14
L95403-8	50; 5.2-1	123.8	196.6	171.8	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	34.07
L95403-9	57; 5.2-1	123.3	177.1	162.2	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	27.7
L95403-10	63; 5.2-1	123.3	166.9	151.7	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	34.86
L95403-11	64; 5.1-1	123.3	166.2	150.7	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	36.13
L95403-12	72; 5.1-1	124	175.1	154.2	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	40.9
L95403-13	80; 5.1-1	123.7	156.6	146.8	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	29.79
L95403-14	88; 5.1-1	124.1	192.3	168	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	35.63
L95403-15	96; 5.1-1	123.4	169.3	152.9	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	35.73
L95403-16	104; 5.1-1	123.7	180.4	161.3	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	33.69
L95403-17	112; 5.1-1	123.8	194.7	170.5	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	34.13
L95403-18	120; 5.1-1	123	162.4	148.9	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	34.26
L95403-19	128; 5.1-1	124.2	199.5	175.6	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	31.74
L95403-20	137; 5.1-1	123	208.2	179.9	BALANCE 15	03/10/22	BALANCE 15	03/16/22	DH	33.22

Appendix IV
Field Notes

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**08.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/10/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	619980 ft	Long/Easting:	2915758 ft

A. Water Depth

DTM Depth Sounder:	23 ft
DTM Lead Line:	

B. Water Level Measurements

Time:	14:09
Height:	743.5 ft

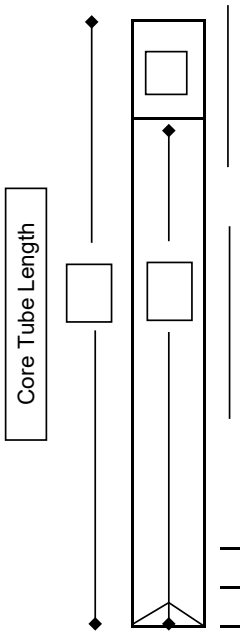
C. Mudline Elevation

723.5 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	9.5-10 ft
Headspace Measurement:	3 in
Recovery Measurement:	93 in
Recovery Percentage:	82%
Total Length of Core To Process:	93 in (7.75 ft)

Recovery Measurements (prior to cuts)



Drive Notes:

Soft sediment

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Gray w/ brownish streaks, silt-clay, firmer in deeper part of core

Notes:

Took grain size sample from top & bottom 1 ft of core

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**08.1-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/10/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	619980 ft	Long/Easting:	2915758 ft

A. Water Depth

DTM Depth Sounder:	23 ft
DTM Lead Line:	

B. Water Level Measurements

Time:	14:30
Height:	743.5 ft

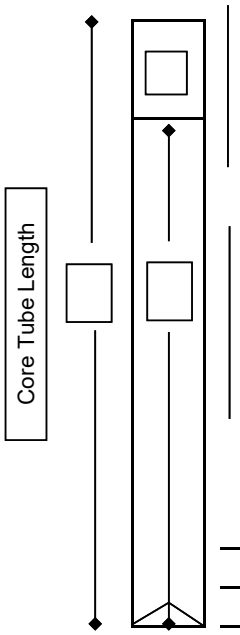
C. Mudline Elevation

723.5 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	11 ft
Drive Penetration:	144 in
Headspace Measurement:	3 in
Recovery Measurement:	129 in
Recovery Percentage:	90%
Total Length of Core To Process:	129 in

Recovery Measurements (prior to cuts)



Drive Notes:

Soft sediment; drive to refusal at ~12 ft

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Gray w/ brownish streaks, silt-clay, firmer in deeper part of core; no visible layering

Notes:

Took grain size sample from top & bottom 1 ft of core

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**01.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/11/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	669690 ft	Long/Easting:	2905562 ft

A. Water Depth

DTM Depth Sounder: 18 ft

DTM Lead Line:

B. Water Level Measurements

Time: 13:30

Height: 744.3 ft

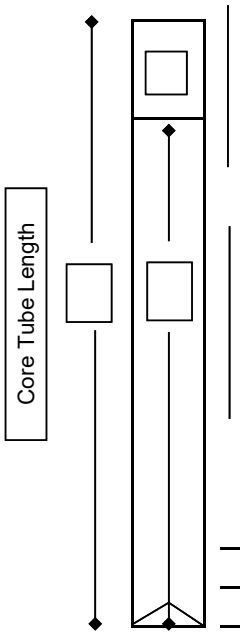
C. Mudline Elevation

726.3 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	4.5 ft
Headspace Measurement:	2 in
Recovery Measurement:	48 in
Recovery Percentage:	89%
Total Length of Core To Process:	48 in

Recovery Measurements (prior to cuts)



Drive Notes:

Drove to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

No visible layers, grayish clay throughout core

Firmer material at bottom of core tube

Notes:

Grain size samples @ 1 ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**01.1-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/11/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

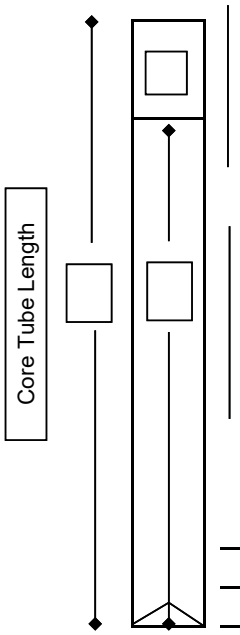
Lat/Northing:	669690 ft	Long/Easting:	2905562 ft

A. Water Depth		**B. Water Level Measurements**		**C. Mudline Elevation**
DTM Depth Sounder:	18 ft	Time:	13:45	726.3 ft
DTM Lead Line:		Height:	744.3 ft	

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	8 ft
Drive Penetration:	6 ft
Headspace Measurement:	3in
Recovery Measurement:	5 ft 3 in = 63 in
Recovery Percentage:	66%
Total Length of Core To Process:	63 in

Recovery Measurements (prior to cuts)



Drive Notes:

Drive went to refusal

Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

No visible layers, grayish clay throughout core

Firmer near bottom, no significant difference in texture otherwise

Notes:

Grain size samples @ 1 ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**02.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/11/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	669340 ft	Long/Easting:	2911790 ft

A. Water Depth

DTM Depth Sounder: 14 ft

DTM Lead Line:

B. Water Level Measurements

Time: 14:30

Height: 744.0 ft

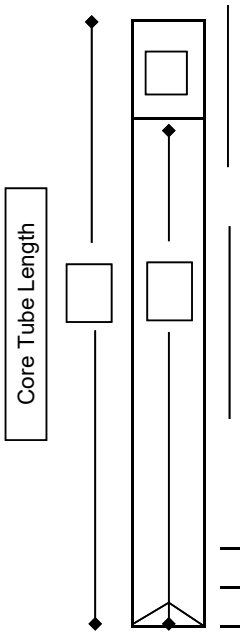
C. Mudline Elevation

730.0 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	6 ft
Headspace Measurement:	1 in
Recovery Measurement:	5' 3" = 63 in
Recovery Percentage:	88%
Total Length of Core To Process:	63 in

Recovery Measurements (prior to cuts)



Drive Notes:

Drove to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

No visible layers in core, grayish clay throughout

Softer near surface

Notes:

Grain size samples @ 1 ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**02.1-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/11/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	669340 ft	Long/Easting:	2911790 ft

A. Water Depth

DTM Depth Sounder: 14 ft

DTM Lead Line:

B. Water Level Measurements

Time: 14:45

Height: 744.0 ft

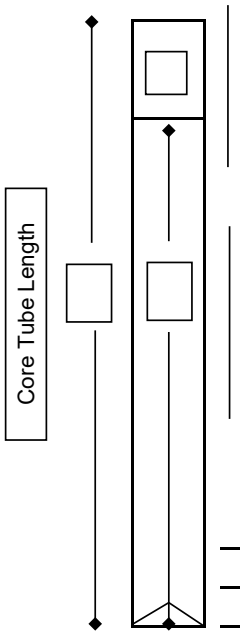
C. Mudline Elevation

730.0 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	8 ft
Drive Penetration:	7 ft
Headspace Measurement:	1 in
Recovery Measurement:	6 ft = 72 in
Recovery Percentage:	86%
Total Length of Core To Process:	72 in

Recovery Measurements (prior to cuts)



Drive Notes:

Drove to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

No visible layers, grayish clay throughout core

Notes:

Grain size samples @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**03.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/11/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plan N

Field Collection Coordinates:

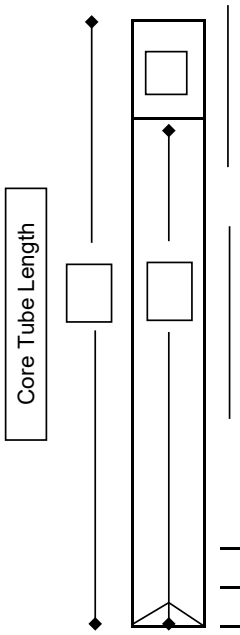
Lat/Northing:	660811 ft	Long/Easting:	2910646 ft

A. Water Depth		**B. Water Level Measurements**		**C. Mudline Elevation**
DTM Depth Sounder:	1.5 ft	Time:	15:30	742.7 ft
DTM Lead Line:		Height:	744.2 ft	

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	11 ft
Drive Penetration:	36 in
Headspace Measurement:	3 in
Recovery Measurement:	2 ft 9 in = 33 in
Recovery Percentage:	92%
Total Length of Core To Process:	33 in

Recovery Measurements (prior to cuts)



Drive Notes:

Drove to refusal

Thick clay

Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Appears to be clay, no visible layers

Very firm, limited penetration

Notes:

Grain size samples @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**03.1-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/11/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plan N

Field Collection Coordinates:

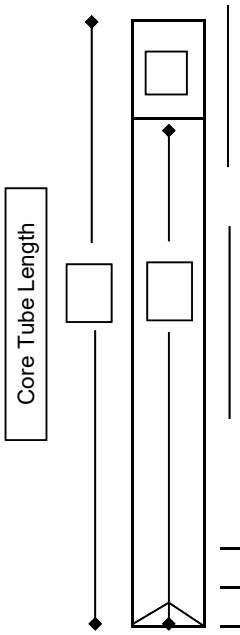
Lat/Northing:	660811 ft	Long/Easting:	2910646 ft

A. Water Depth		**B. Water Level Measurements**		**C. Mudline Elevation**
DTM Depth Sounder:	1.5 ft	Time:	15:45	742.7 ft
DTM Lead Line:		Height:	744.2 ft	

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	8 ft
Drive Penetration:	3.0 ft
Headspace Measurement:	1 in
Recovery Measurement:	35 in
Recovery Percentage:	97%
Total Length of Core To Process:	35 in

Recovery Measurements (prior to cuts)



Drive Notes:

Drove to refusal

Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Some air bubbles in top foot; limited elsewhere

Thick, hard clay material

Notes:

Grain size samples @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**9.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/12/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

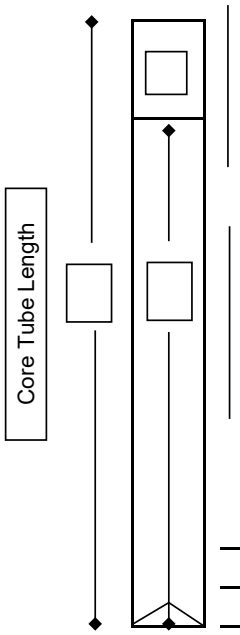
Lat/Northing:	612772 ft	Long/Easting:	2912054 ft

A. Water Depth		**B. Water Level Measurements**		**C. Mudline Elevation**
DTM Depth Sounder:	14.5 ft	Time:	12:55	730.0 ft
DTM Lead Line:		Height:	744.5 ft	

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	2 ft
Headspace Measurement:	3 in
Recovery Measurement:	18 in
Recovery Percentage:	75%
Total Length of Core To Process:	18 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Soft to ~6 in, firmer below

Gray silt/clay with no apparent layering

Notes:

Collected grain size samples @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore	**Station ID:** 9.1-2
Job No: 212451-01.01	**Attempt No.** 2
Field Staff: RC, TK, BT	**Date:** 2/12/2022
Contractor: N/A	**Logged By:** BT
Vertical Datum: NAVD88	**Horizontal Datum:** OK State Plane N

Field Collection Coordinates:

Lat/Northing: 612772 ft Long/Easting: 2912054 ft

A. Water Depth

DTM Depth Sounder: 14.5 ft

DTM Lead Line:

B. Water Level Measurements

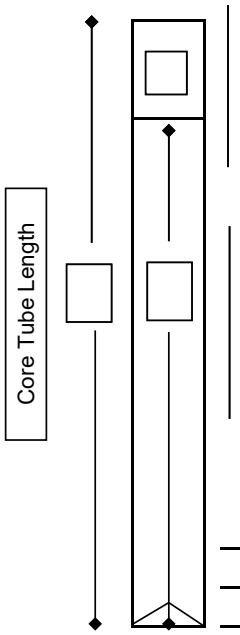
Time: 12:55

Height: 744.5 ft

C. Mudline Elevation

730.0 ft

Recovery Measurements (prior to cuts)



Core Collection Recovery Details:

Core Accepted: Yes

Core Tube Length: 8 ft

Drive Penetration: 2 ft

Headspace Measurement: 8 in

Recovery Measurement: 12 in

Recovery Percentage: 50%

Total Length of Core To Process: 12 in

Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Soft material in top ~6 in, firmer below

Gray silt/clay with no visible layers

Notes:

Grain size sampling @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**8.2-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/12/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	619613 ft	Long/Easting:	2917399 ft

A. Water Depth

DTM Depth Sounder: 17.5 ft

DTM Lead Line:

B. Water Level Measurements

Time: 13:55

Height: 744.5 ft

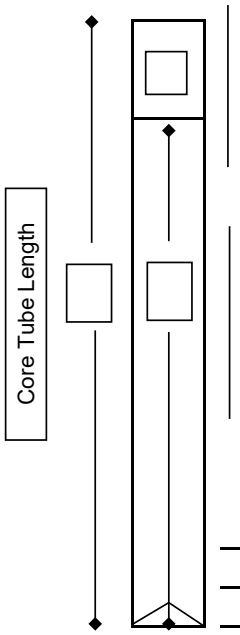
C. Mudline Elevation

727.0 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	3 ft
Headspace Measurement:	2 in
Recovery Measurement:	24 in
Recovery Percentage:	67%
Total Length of Core To Process:	24 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Softer, water-logged clay in first ~12 in, firmer ~12-24 in

Notes:

Grain size sampling @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore	**Station ID:** 6.1-1
Job No: 212451-01.01	**Attempt No.** 1
Field Staff: RC, TK, BT	**Date:** 2/12/2022
Contractor: N/A	**Logged By:** BT
Vertical Datum: NAVD88	**Horizontal Datum:** OK State Plane N

Field Collection Coordinates:

Lat/Northing: 636016 ft Long/Easting: 2923350 ft

A. Water Depth

DTM Depth Sounder: 7.5 ft

DTM Lead Line:

B. Water Level Measurements

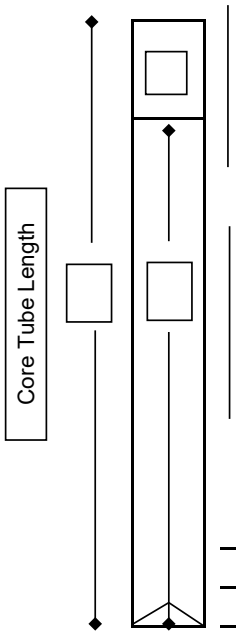
Time: 14:45

Height: 744.4 ft

C. Mudline Elevation

726.9 ft

Recovery Measurements (prior to cuts)



Core Collection Recovery Details:

Core Accepted: Yes

Core Tube Length: 16 ft

Drive Penetration: 1.5 ft

Headspace Measurement: 6 in

Recovery Measurement: 12 in

Recovery Percentage: 67%

Total Length of Core To Process: 12 in

Drive Notes:

Driven to refusal

Possibly hung up on underwater debris or buried log/rock

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Soft, grayish silt/clay - suggests caught on buried material or would have driven further

Notes:

Grain size samples collected @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**06.2-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/12/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	636017 ft	Long/Easting:	2923048 ft

A. Water Depth

DTM Depth Sounder: 4.5 ft

DTM Lead Line:

B. Water Level Measurements

Time: 15:00

Height: 744.2 ft

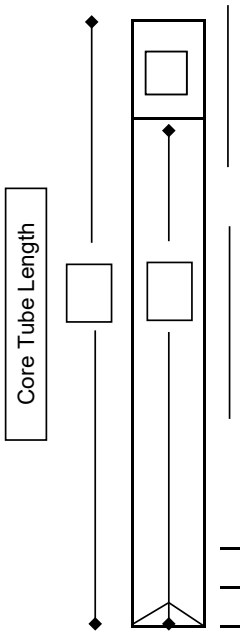
C. Mudline Elevation

739.7 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	7 ft
Headspace Measurement:	4 in
Recovery Measurement:	76 in
Recovery Percentage:	90%
Total Length of Core To Process:	76 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Grayish silt/clay throughout, no obvious layers

Firmer clay near bottom

Notes:

Grain size samples @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**06.2-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/12/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

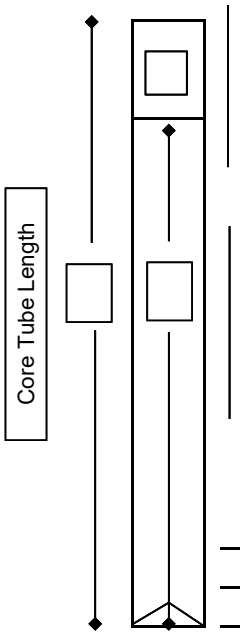
Lat/Northing:	636017 ft	Long/Easting:	2923048 ft

A. Water Depth		**B. Water Level Measurements**		**C. Mudline Elevation**
DTM Depth Sounder:	4.5 ft	Time:	15:20	739.7 ft
DTM Lead Line:		Height:	744.2 ft	

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	10 ft
Drive Penetration:	7 ft
Headspace Measurement:	2 in
Recovery Measurement:	81 in
Recovery Percentage:	96%
Total Length of Core To Process:	81 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal

Core Field Observations and Description: Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Grayish silt/clay throughout, no obvious layers

Firm, especially near bottom of core

Notes:

Grain size sampling @ 1 ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**07.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/12/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	626482 ft	Long/Easting:	2914670 ft

A. Water Depth

DTM Depth Sounder: 6 ft

DTM Lead Line:

B. Water Level Measurements

Time: 16:00

Height: 744.5 ft

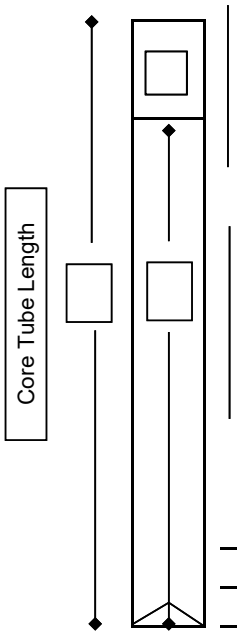
C. Mudline Elevation

738.5 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	5.5 ft
Headspace Measurement:	5 in
Recovery Measurement:	57 in
Recovery Percentage:	86%
Total Length of Core To Process:	57 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Worm @ ~6 in from surface, signs of biotic activity

Gray silt/clay, no visible layers

Notes:

Grain size samples @ 1 ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**7.2-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/12/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	626591 ft	Long/Easting:	2914380 ft

A. Water Depth

DTM Depth Sounder: 17.5 ft

DTM Lead Line:

B. Water Level Measurements

Time: 16:15

Height: 744.3 ft

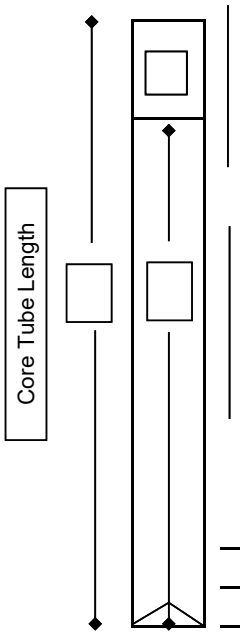
C. Mudline Elevation

726.8 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	7 ft
Headspace Measurement:	2 in
Recovery Measurement:	79 in
Recovery Percentage:	94%
Total Length of Core To Process:	79 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Significant texture change @ ~12 in, softer above, visibly similar clay/silt

Notes:

Grain size samples @ 1-ft interval

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**4.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	649883 ft	Long/Easting:	2925261 ft

A. Water Depth

DTM Depth Sounder: 6 ft

DTM Lead Line:

B. Water Level Measurements

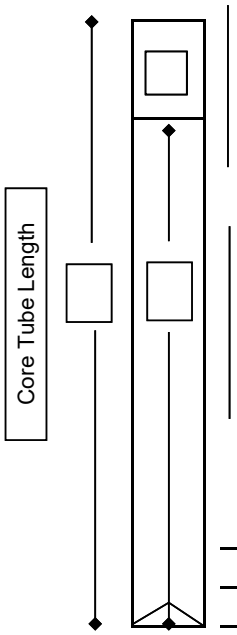
Time: 10:50

Height: 744.5 ft

C. Mudline Elevation

738.5 ft

Recovery Measurements (prior to cuts)



Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	11 ft
Drive Penetration:	5 ft
Headspace Measurement:	3 in
Recovery Measurement:	49 in
Recovery Percentage:	82%
Total Length of Core To Process:	49 in

Drive Notes:

Possibly caught on buried tree branch or other debris

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Core catcher shoved into core tube suggests it wasn't caught on debris; thick clay layer stopping drive more likely

Firm clay near bottom, soft silty/clayey layers above; gradual transition with no distinct layering

Notes:

Grain size sampling @ 1-ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**4.2-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	650123 ft	Long/Easting:	2926237 ft

A. Water Depth

DTM Depth Sounder: 2 ft

DTM Lead Line:

B. Water Level Measurements

Time: 11:20

Height: 744.5 ft

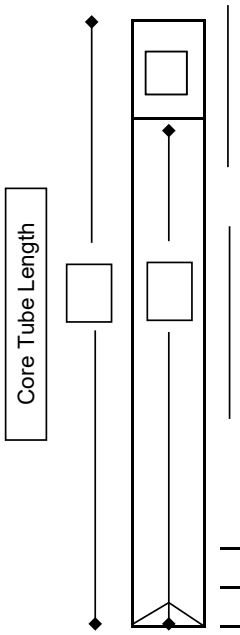
C. Mudline Elevation

742.5 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	12 ft
Drive Penetration:	8 ft
Headspace Measurement:	2 in
Recovery Measurement:	92 in
Recovery Percentage:	96%
Total Length of Core To Process:	92 in

Recovery Measurements (prior to cuts)



Drive Notes:

Significantly deeper penetration here than nearby Site 4.1

Drove to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Organic debris on surface of core (~1-2 inches) - sticks & leaves

Softer material @ surface, firmer in deeper parts of core

Notes:

Grain size samples @ 1-ft interval

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**GL1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	647148 ft	Long/Easting:	2915104 ft

A. Water Depth

DTM Depth Sounder: 2 ft

DTM Lead Line:

B. Water Level Measurements

Time: 12:05

Height: 744.4 ft

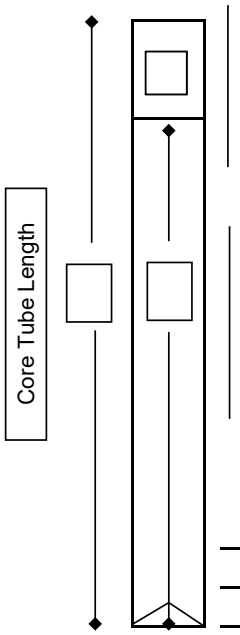
C. Mudline Elevation

742.4 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	14 ft
Drive Penetration:	8 ft
Headspace Measurement:	3 in
Recovery Measurement:	90 in
Recovery Percentage:	94%
Total Length of Core To Process:	90 in

Recovery Measurements (prior to cuts)



Drive Notes:

Drove to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt and clay, no clear layering

Notes:

Grain size sampling @ 1 ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**GL1-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	647148 ft	Long/Easting:	2915104 ft

A. Water Depth

DTM Depth Sounder: 2 ft

DTM Lead Line:

B. Water Level Measurements

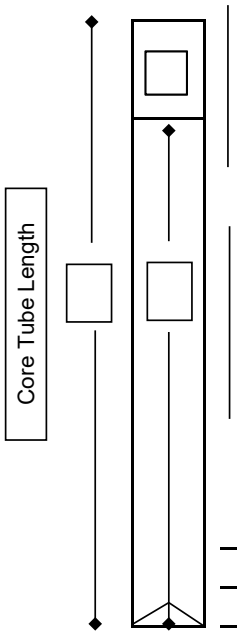
Time: 12:22

Height: 744.4 ft

C. Mudline Elevation

742.4 ft

Recovery Measurements (prior to cuts)



Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	14 ft
Drive Penetration:	8 ft
Headspace Measurement:	5 in
Recovery Measurement:	84 in
Recovery Percentage:	88%
Total Length of Core To Process:	84 in

Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Sticks and organic debris in top ~12 in of core

Notes:

Grain size samples @ 1-ft interval

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**05.1-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	644108 ft	Long/Easting:	2913784 ft

A. Water Depth

DTM Depth Sounder: 2 ft

DTM Lead Line:

B. Water Level Measurements

Time: 13:00

Height: 744.5 ft

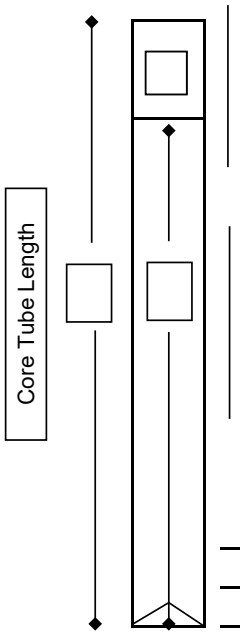
C. Mudline Elevation

742.5 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	12 ft
Drive Penetration:	11 ft
Headspace Measurement:	1 in
Recovery Measurement:	117 in (9'9")
Recovery Percentage:	89%
Total Length of Core To Process:	117 in (9'9")

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal, firmer material near bottom of drive

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Air bubbles in top ~18 in

Relatively soft silt/clay material throughout, no visible layers; grayish sediment

Notes:

Divided into 4 cm samples for Cs-137 testing

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**05.1-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	644108 ft	Long/Easting:	2913784 ft

A. Water Depth

DTM Depth Sounder: 2 ft

DTM Lead Line:

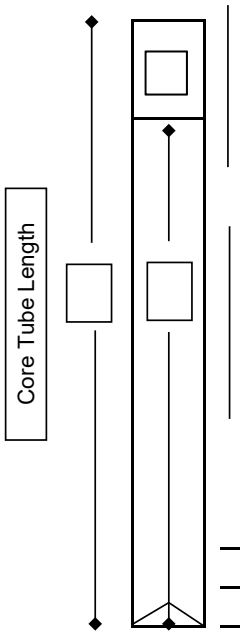
B. Water Level Measurements

Time: 13:00

Height: 744.5 ft

C. Mudline Elevation

Recovery Measurements (prior to cuts)



Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	12 ft
Drive Penetration:	9.5 ft
Headspace Measurement:	2 in
Recovery Measurement:	102 in
Recovery Percentage:	89%
Total Length of Core To Process:	102 in

Drive Notes:

Driven to refusal, similar to core 05.1-1

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

Silt/clay misture throughout core, no obvious layers

Grayish material, firmer at bottom

Notes:

Grain size samples @ 1 ft intervals

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**05.2-1**
Job No: 212451-01.01		**Attempt No.**	1
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	644002 ft	Long/Easting:	2913396 ft

A. Water Depth

DTM Depth Sounder: 5.5 ft

DTM Lead Line:

B. Water Level Measurements

Time: 13:22

Height: 744.4 ft

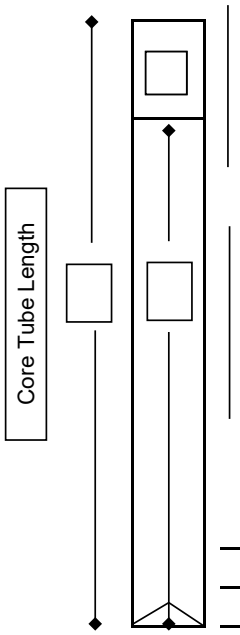
C. Mudline Elevation

738.9 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16 ft
Drive Penetration:	10 ft
Headspace Measurement:	1 in
Recovery Measurement:	107 in
Recovery Percentage:	89%
Total Length of Core To Process:	107 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal; Similar to Site 05.1

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

No visible layers; grayish silt/clay throughout core, softer near surface, but all was malleable

Notes:

Collected samples for cesium-137 analysis every 4 cm

Sediment Core Collection Log

Job: Grand Lake Vibracore		**Station ID:**	**05.2-2**
Job No: 212451-01.01		**Attempt No.**	2
Field Staff: RC, TK, BT		**Date:**	2/13/2022
Contractor: N/A		**Logged By:**	**BT**
Vertical Datum: NAVD88		**Horizontal Datum:**	OK State Plane N

Field Collection Coordinates:

Lat/Northing:	644002 ft	Long/Easting:	2913396 ft

A. Water Depth

DTM Depth Sounder: 5.5 ft

DTM Lead Line:

B. Water Level Measurements

Time: 13:40

Height: 744.4 ft

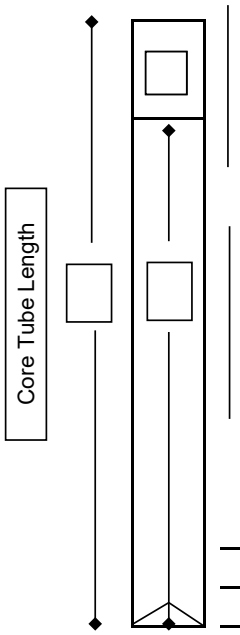
C. Mudline Elevation

738.9 ft

Core Collection Recovery Details:

Core Accepted:	Yes
Core Tube Length:	16ft
Drive Penetration:	10 ft
Headspace Measurement:	2 in
Recovery Measurement:	102 in
Recovery Percentage:	85%
Total Length of Core To Process:	102 in

Recovery Measurements (prior to cuts)



Drive Notes:

Driven to refusal

Core Field Observations and Description:

Sediment type, moisture, color, minor modifier, MAJOR modifier, other constituents, odor, sheen, layering, anoxic layer, debris, plant matter, shells, biota

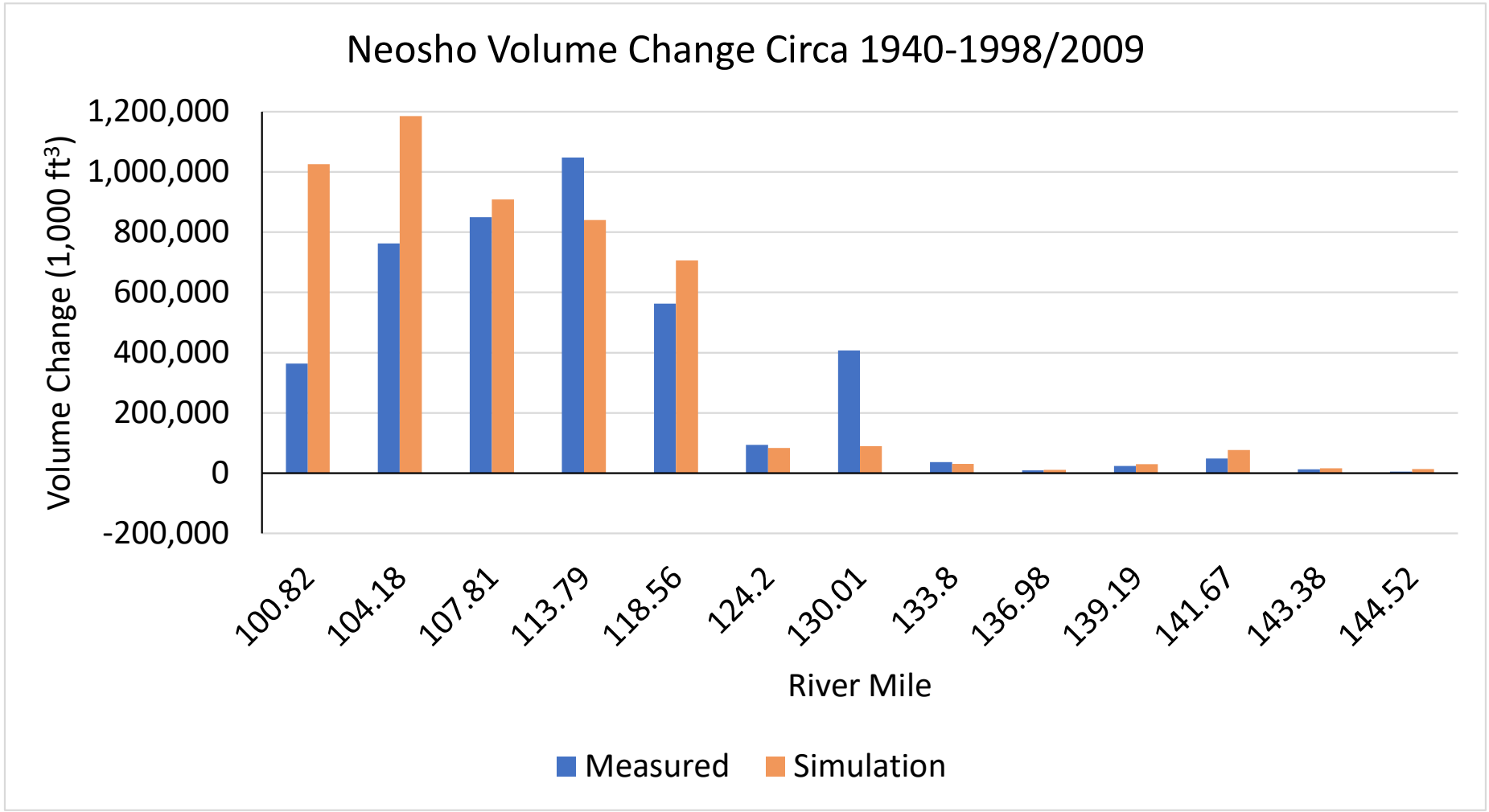
Grayish silt/clay throughout, very malleable; softer at surface, no visible layers

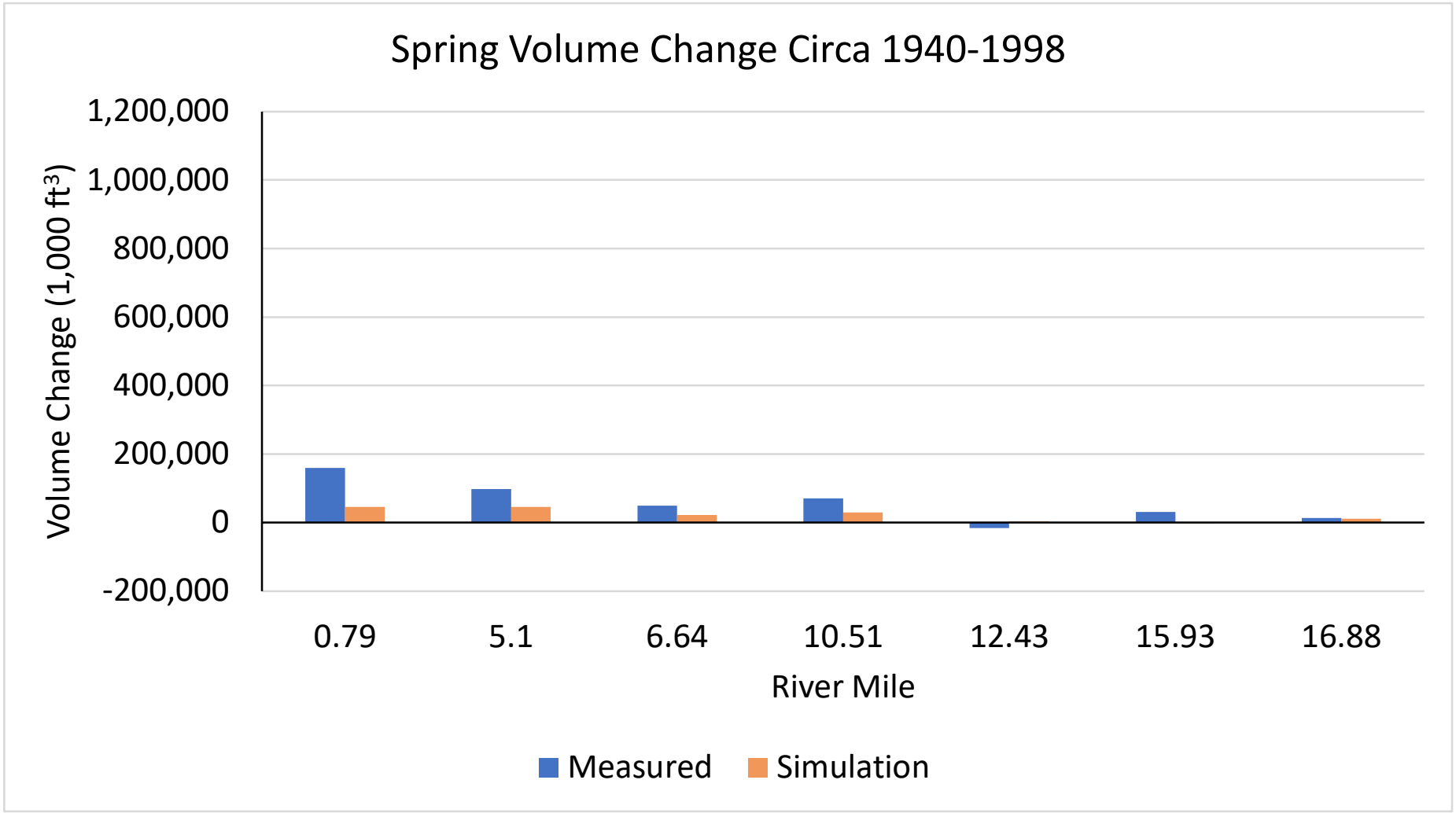
Notes:

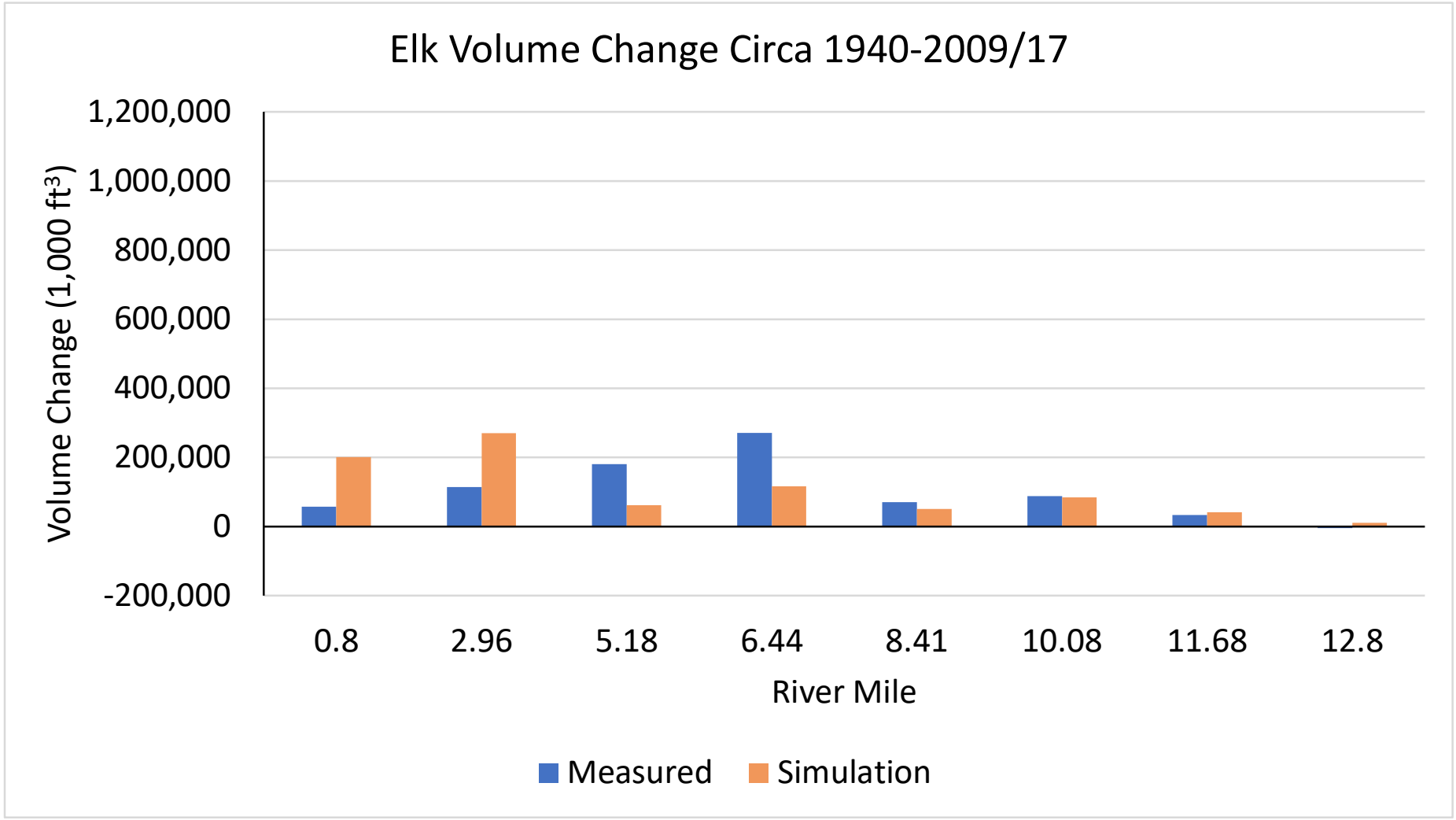
Collected grain size samples @ 1 ft intervals

Appendix F
STM Results

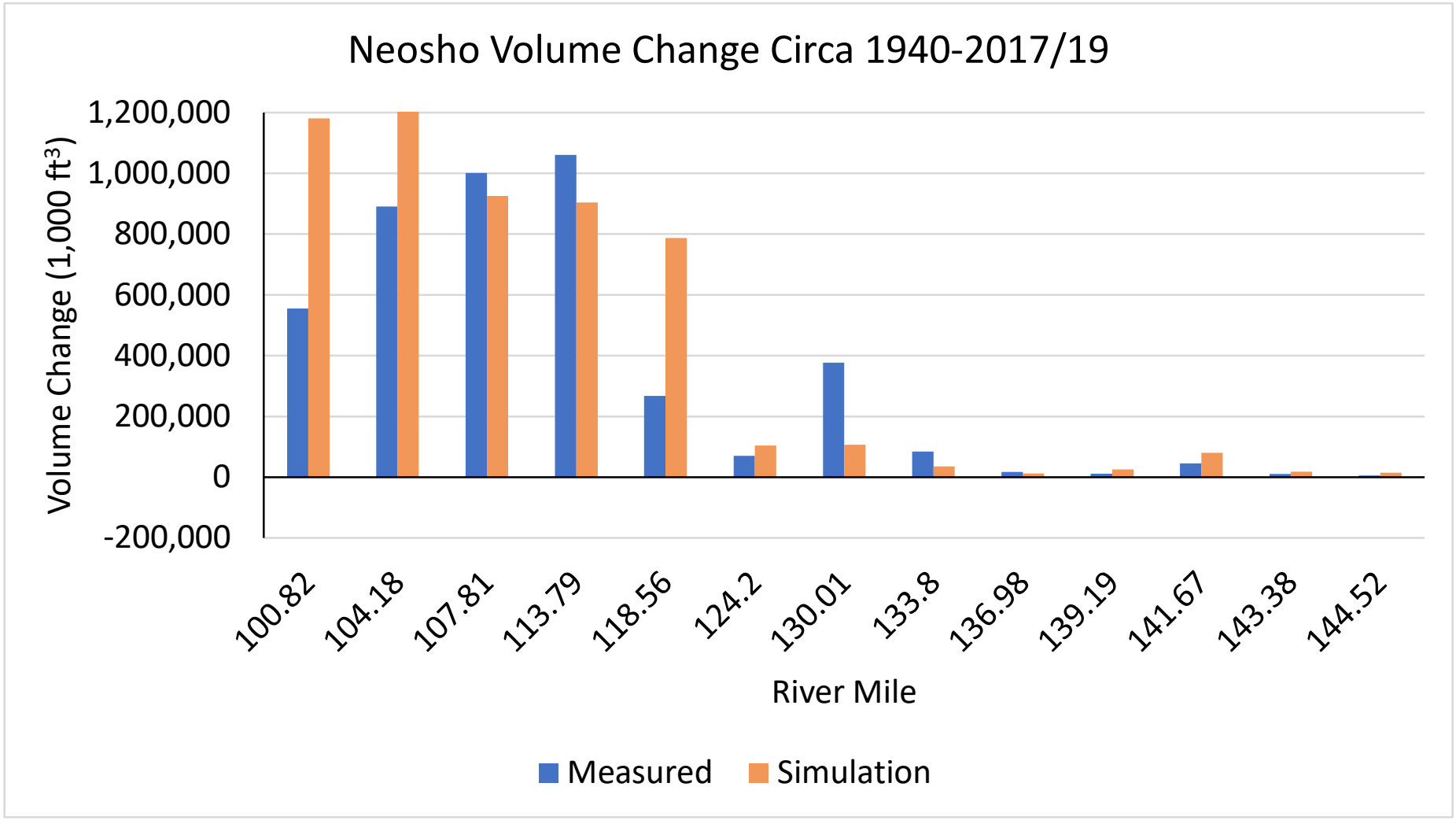
Calibration Plots

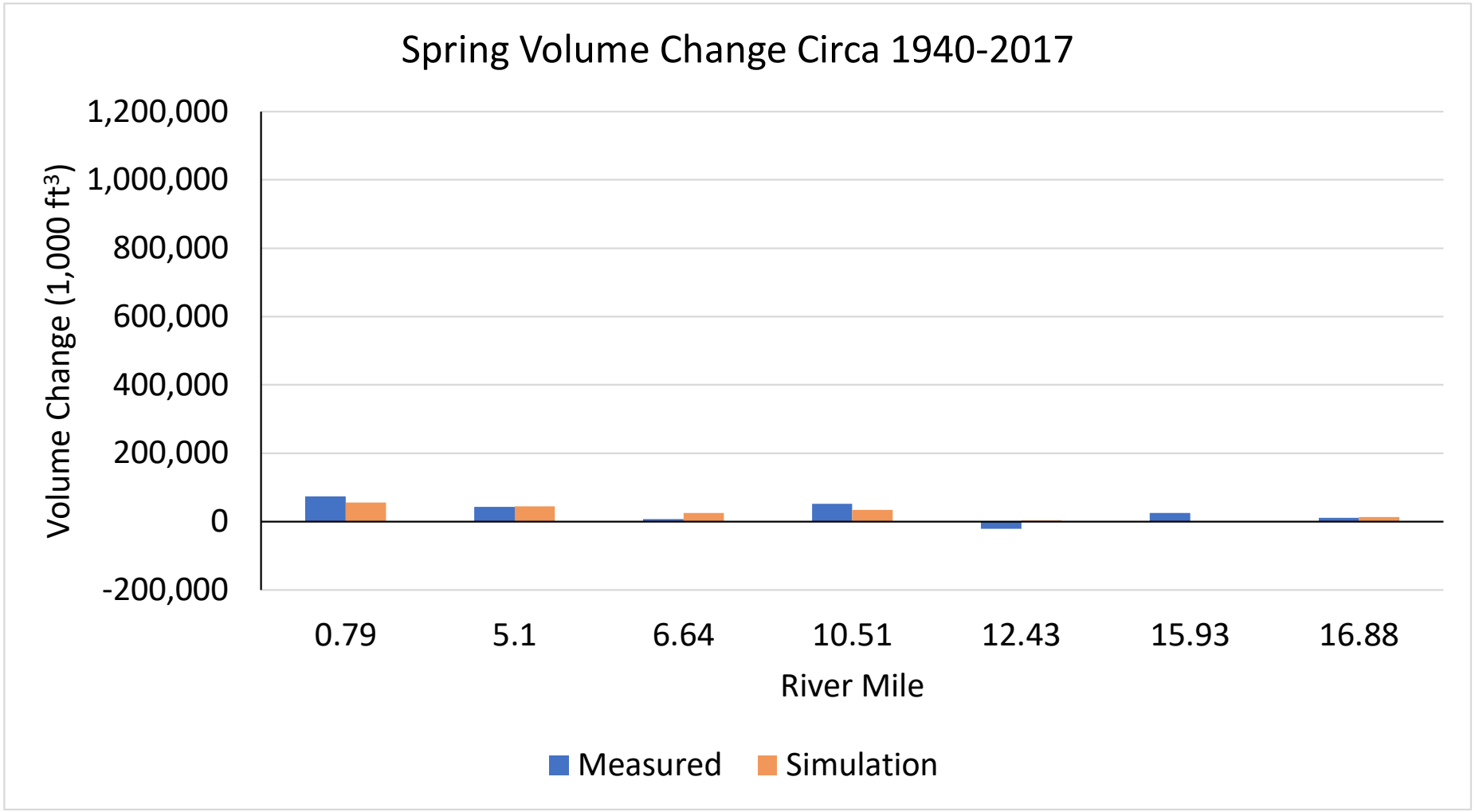

Neosho Volume Change Circa 1940-1998/2009
Volume Change (1,000 ft³)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
100.82
104.18
107.81
113.79
118.56
124.2
130.01
133.8
136.98
139.19
141.67
143.38
144.52
River Mile
Measured
Simulation

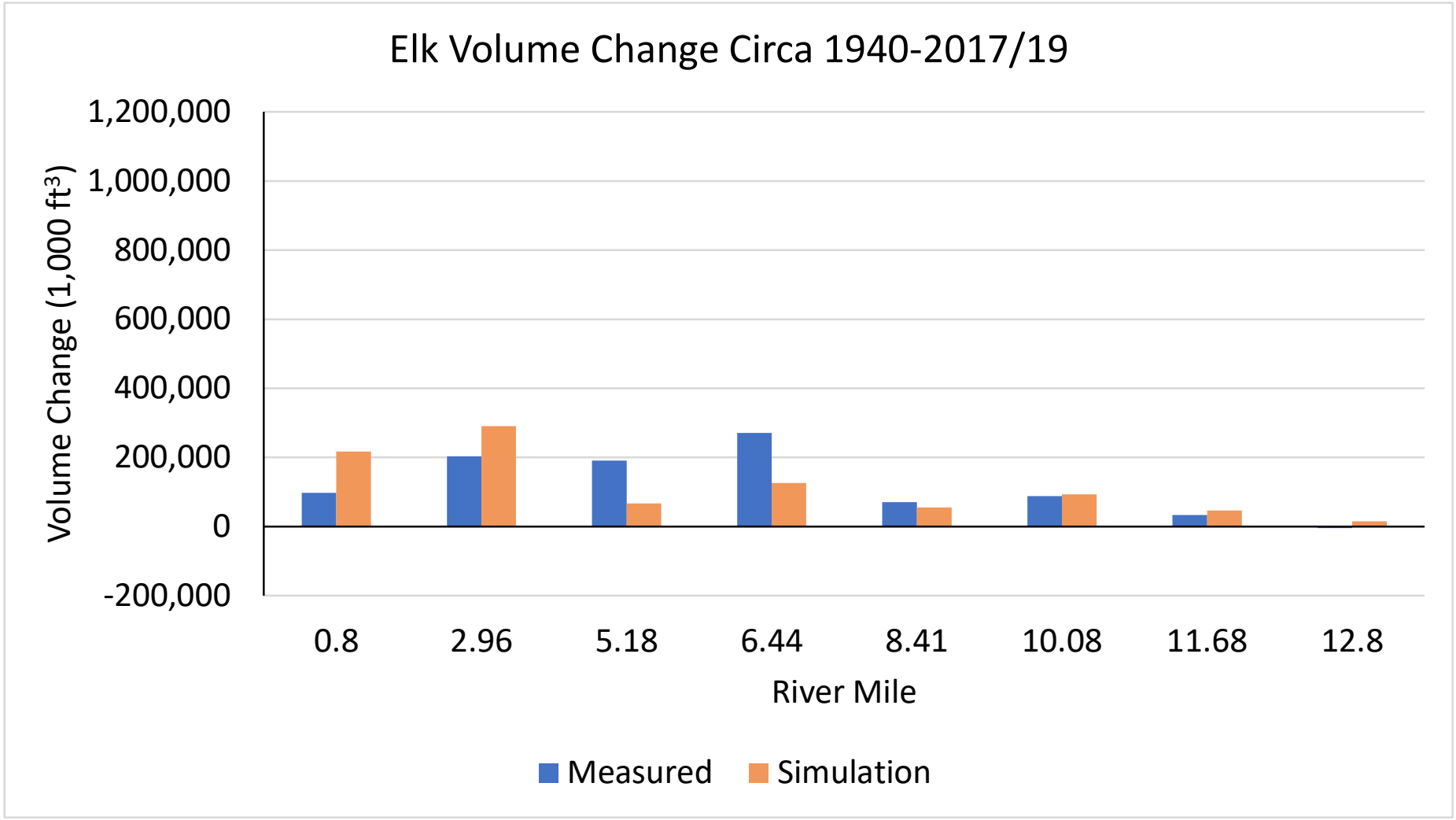

Spring Volume Change Circa 1940-1998
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
Volume Change (1,000 ft³)
0.79
5.1
6.64
10.51
12.43
15.93
16.88
River Mile
Measured
Simulation


Elk Volume Change Circa 1940-2009/17
Volume Change (1,000 ft³)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
0.8
2.96
5.18
6.44
8.41
10.08
11.68
12.8
River Mile
Measured
Simulation

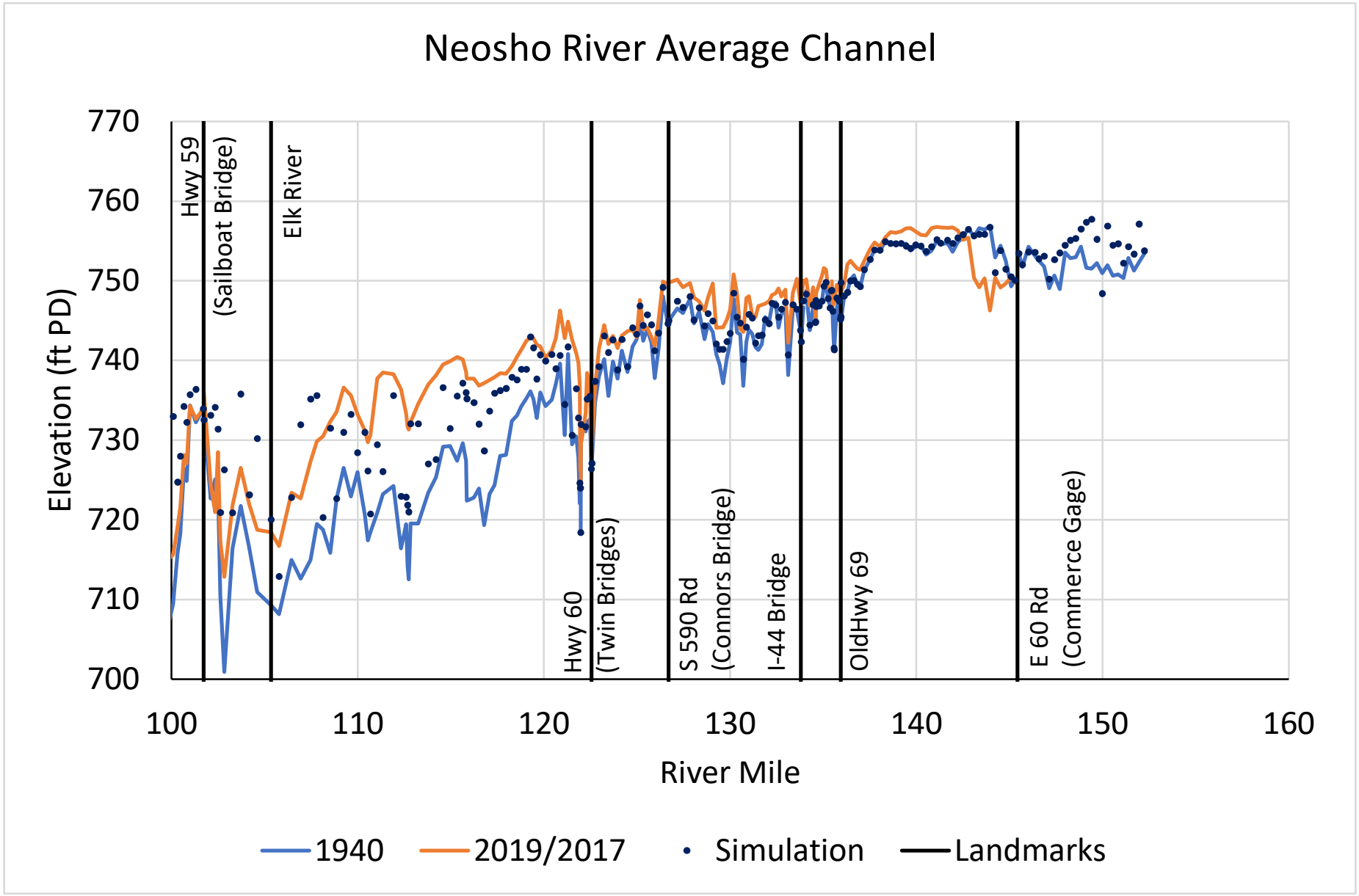
Validation Plots

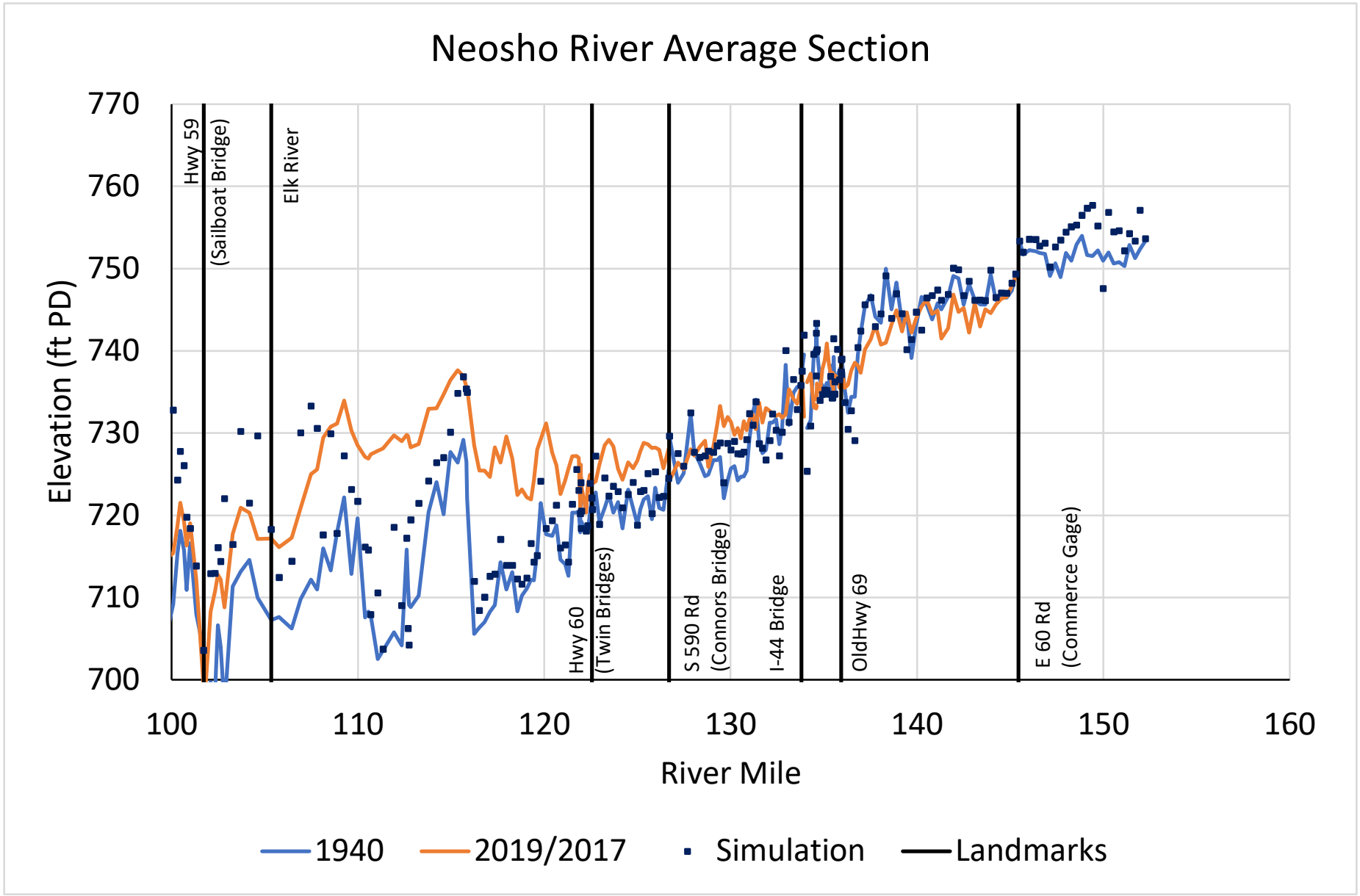

Neosho Volume Change Circa 1940-2017/19
Volume Change (1,000 ft³)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
100.82
104.18
107.81
113.79
118.56
124.2
130.01
133.8
136.98
139.19
141.67
143.38
144.52
River Mile
Measured
Simulation

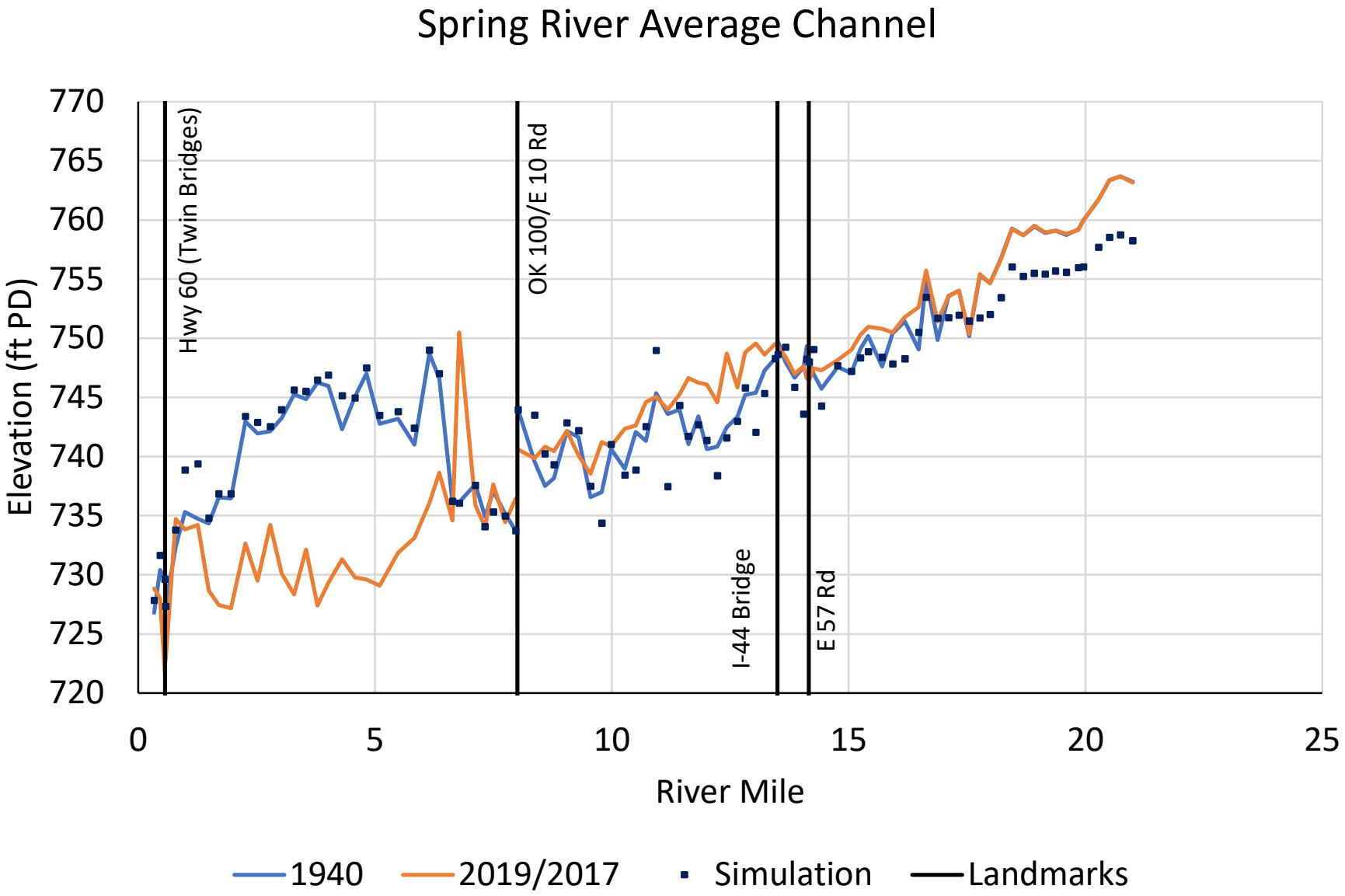

Spring Volume Change Circa 1940-2017
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
Volume Change (1,000 ft3)
0.79
5.1
6.64
10.51
12.43
15.93
16.88
River Mile
Measured
Simulation

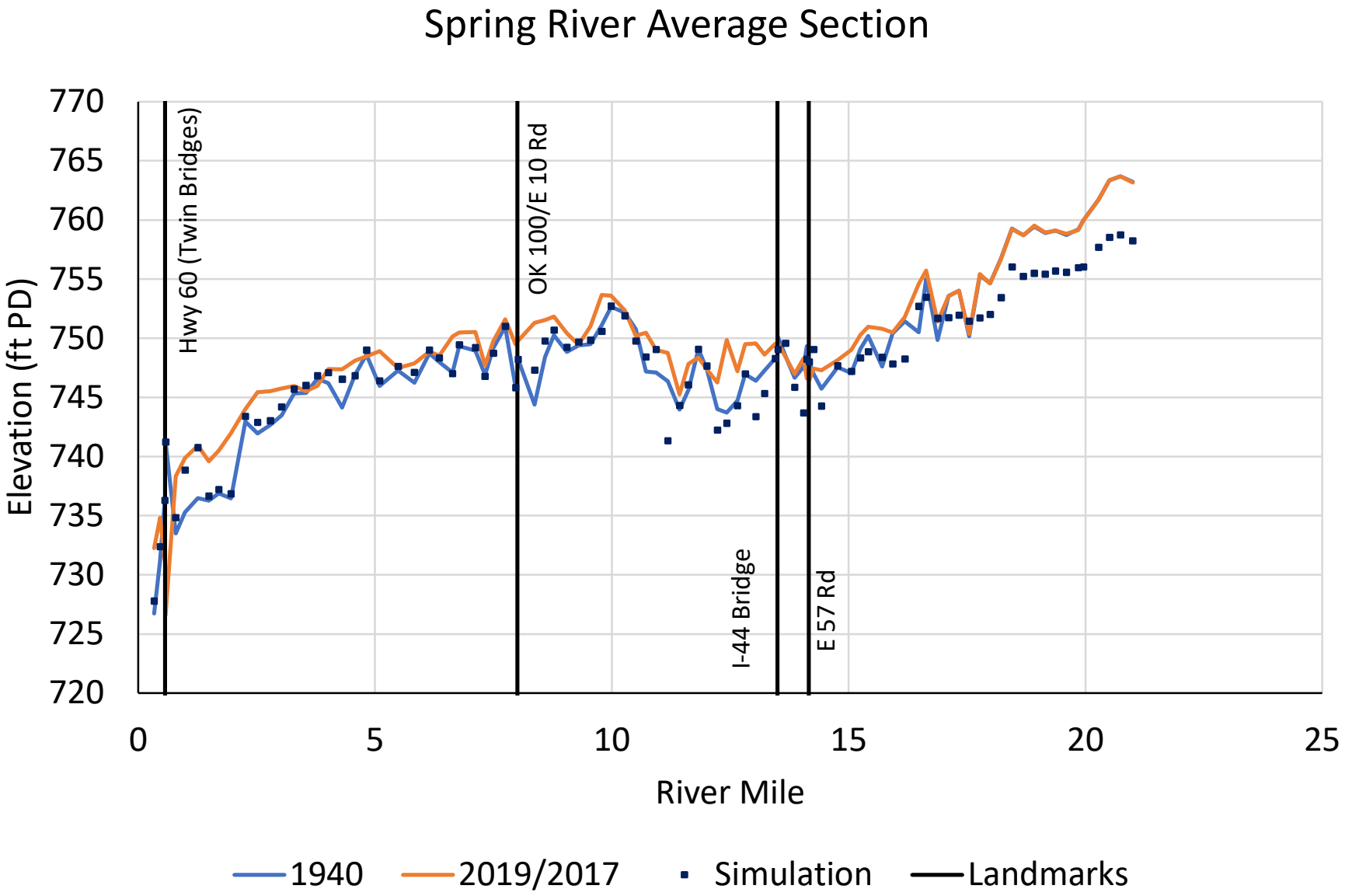

Elk Volume Change Circa 1940-2017/19
Volume Change (1,000 ft³)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
0.8
2.96
5.18
6.44
8.41
10.08
11.68
12.8
River Mile
Measured
Simulation

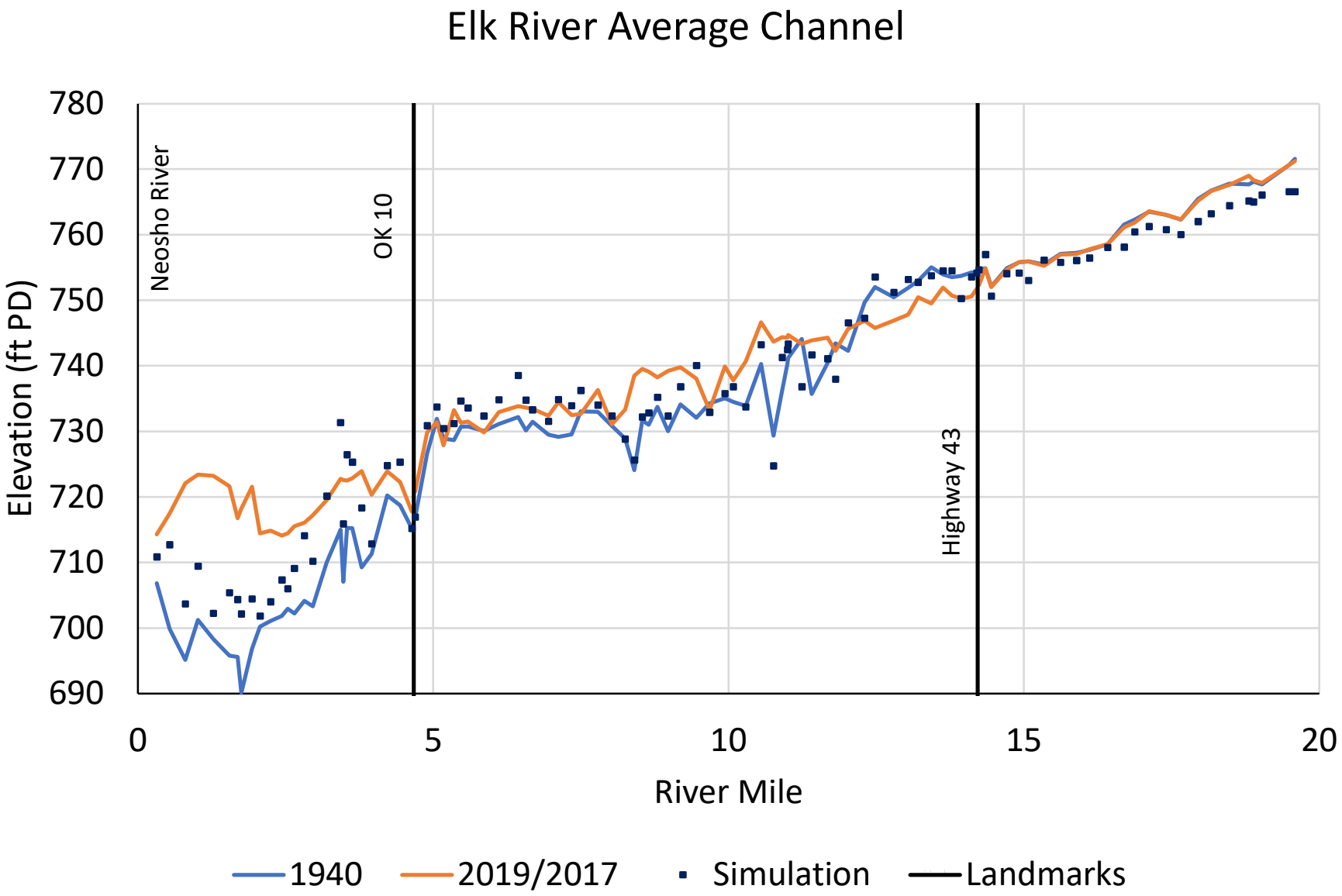
Simulated 2019 Average Channel and Average Section Plots

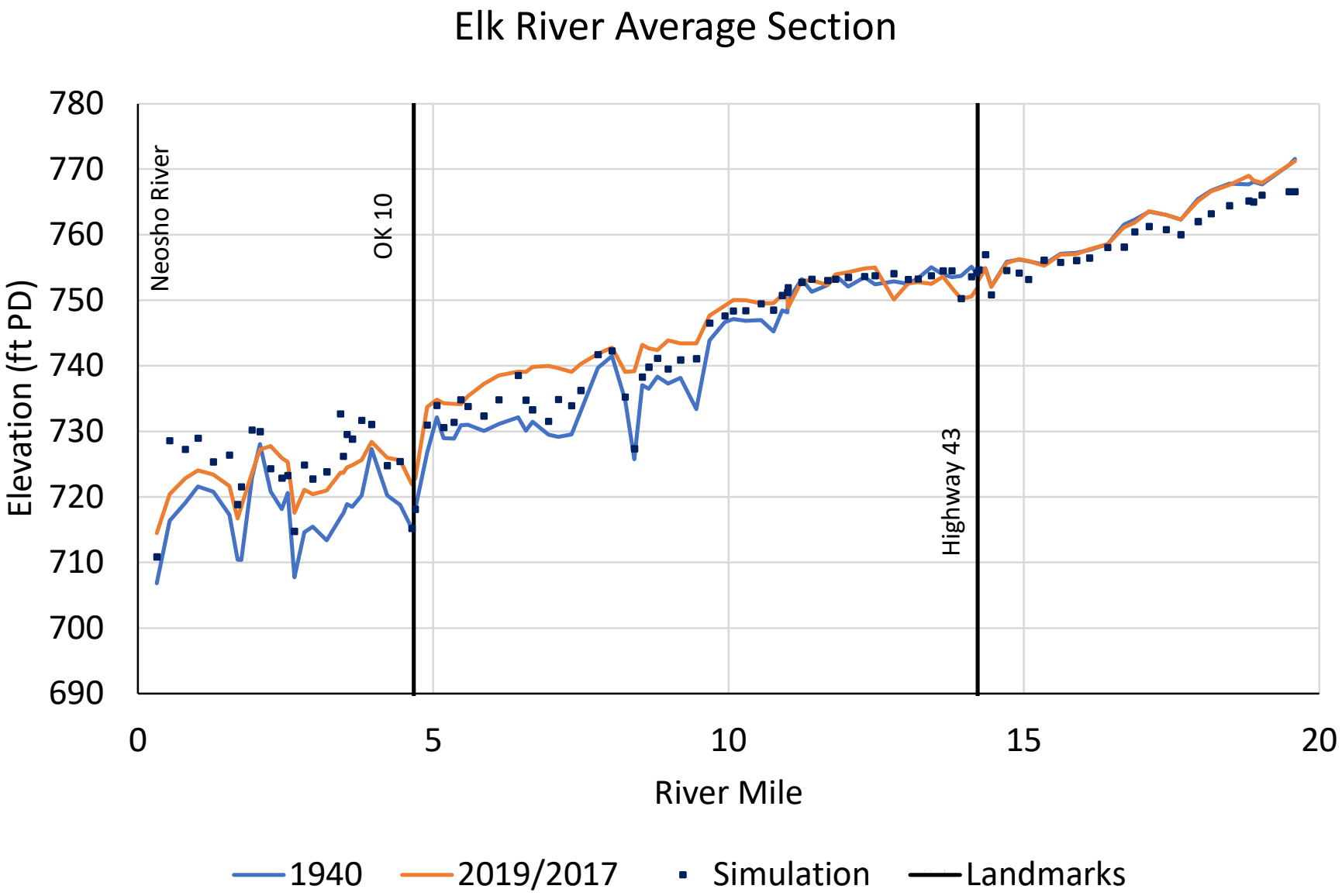

Neosho River Average Channel
770
760
750
740
730
720
710
700
Elevation (ft PD)
100
110
120
130
140
150
160
River Mile
Hwy 59
(Sailboat Bridge)
Elk River
Hwy 60
(Twin Bridges)
S 590 Rd
(Connors Bridge)
I-44 Bridge
OldHwy 69
E 60 Rd
(Commerce Gage)
1940
2019/2017
Simulation
Landmarks

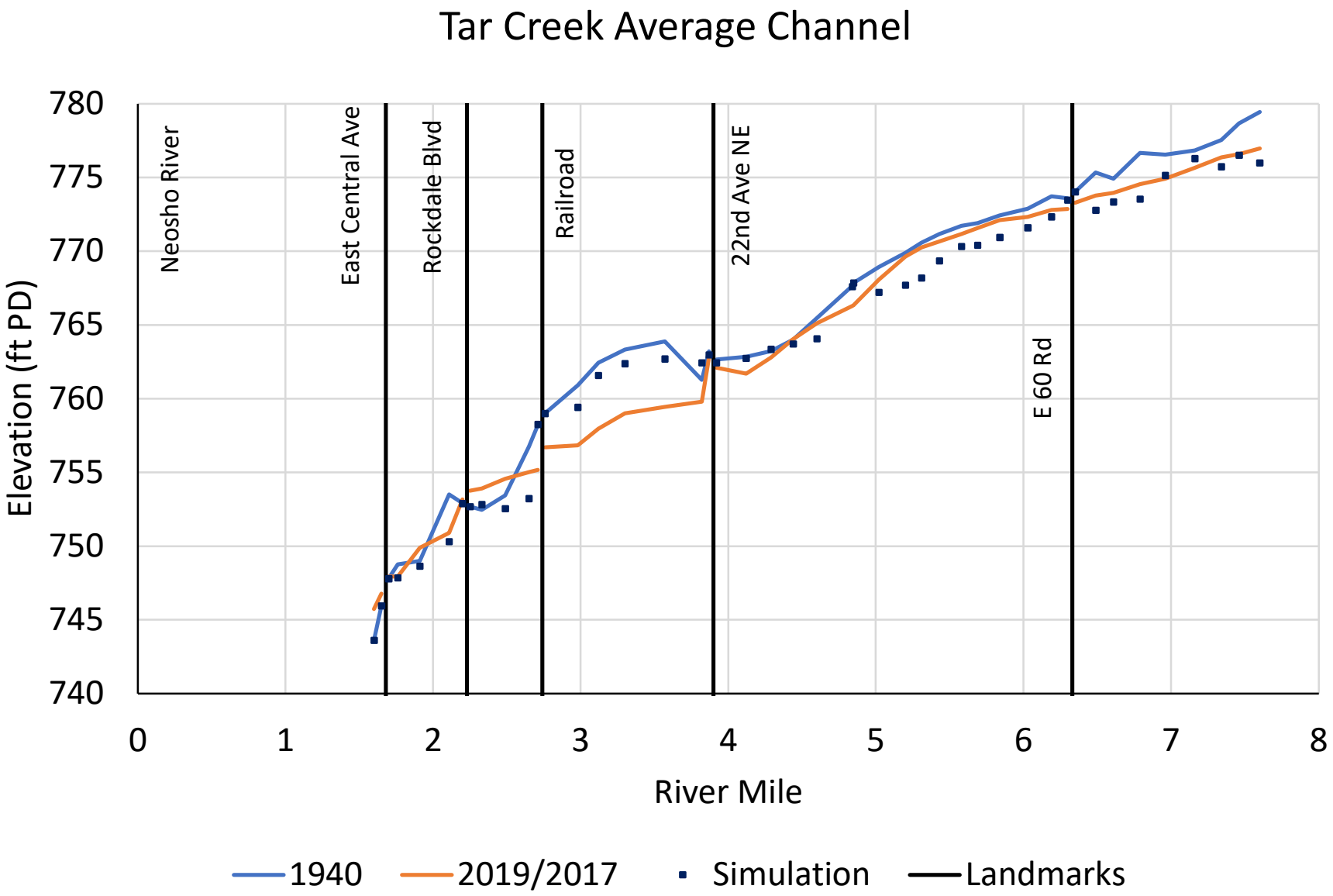

Neosho River Average Section
Elevation (ft PD)
770
760
750
740
730
720
710
700
100
110
120
130
140
150
160
River Mile
Hwy 59
(Sailboat Bridge)
Elk River
Hwy 60
(Twin Bridges)
S 590 Rd
(Connors Bridge)
I-44 Bridge
OldHwy 69
E 60 Rd
(Commerce Gage)
1940
2019/2017
Simulation
Landmarks

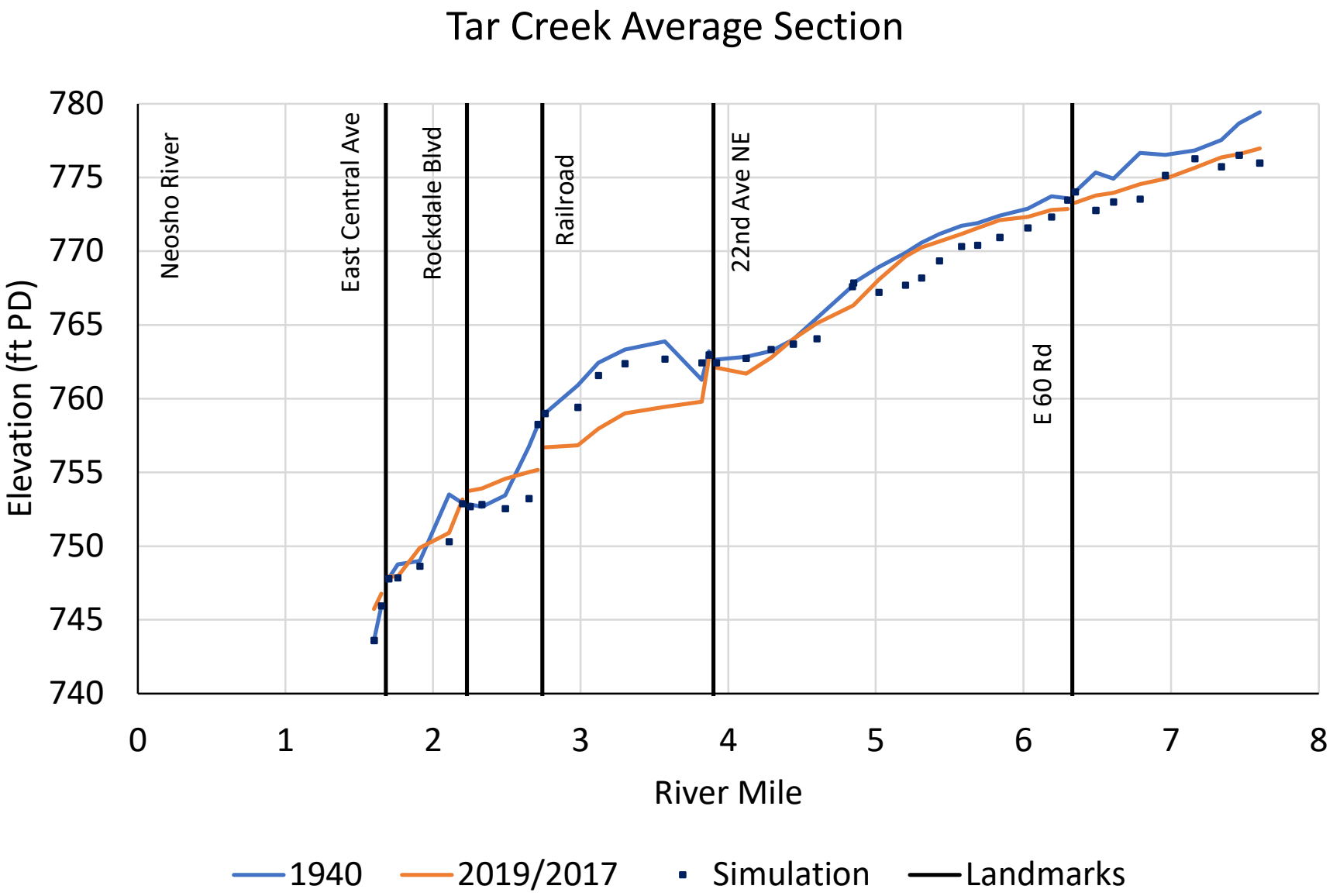

Spring River Average Channel
Elevation (ft PD)
770
765
760
755
750
745
740
735
730
725
720
0
5
10
15
20
25
River Mile
Hwy 60 (Twin Bridges)
OK 100/E 10 Rd
I-44 Bridge
E 57 Rd
1940
2019/2017
Simulation
Landmarks


Spring River Average Section
Elevation (ft PD)
770
765
760
755
750
745
740
735
730
725
720
0
5
10
15
20
25
River Mile
Hwy 60 (Twin Bridges)
OK 100/E 10 Rd
I-44 Bridge
E 57 Rd
1940
2019/2017
Simulation
Landmarks

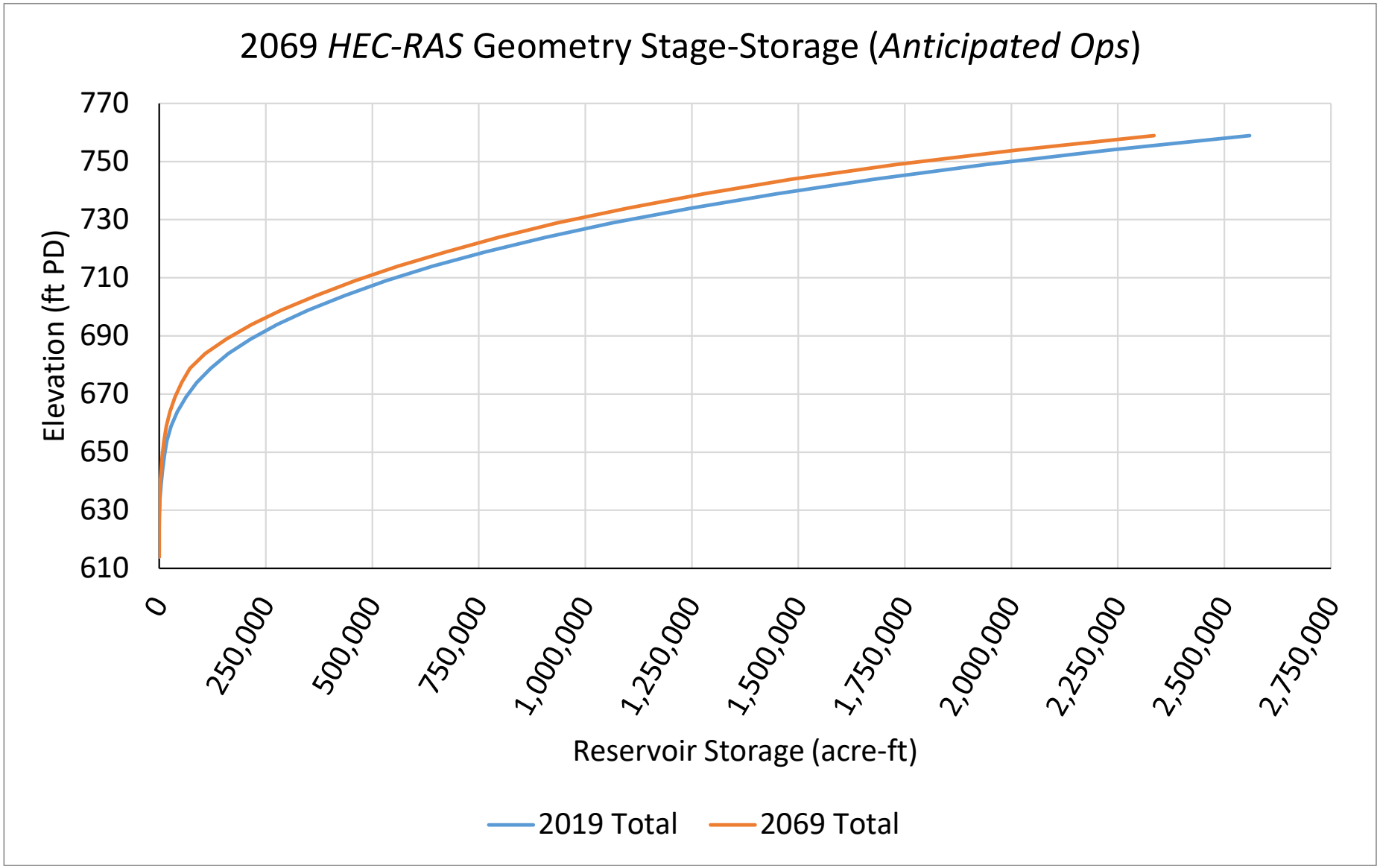

Elk River Average Channel
780
770
760
750
740
730
720
710
700
690
Elevation (ft PD)
Neosho River
OK 10
Highway 43
0
5
10
15
20
River Mile
1940
2019/2017
Simulation
Landmarks

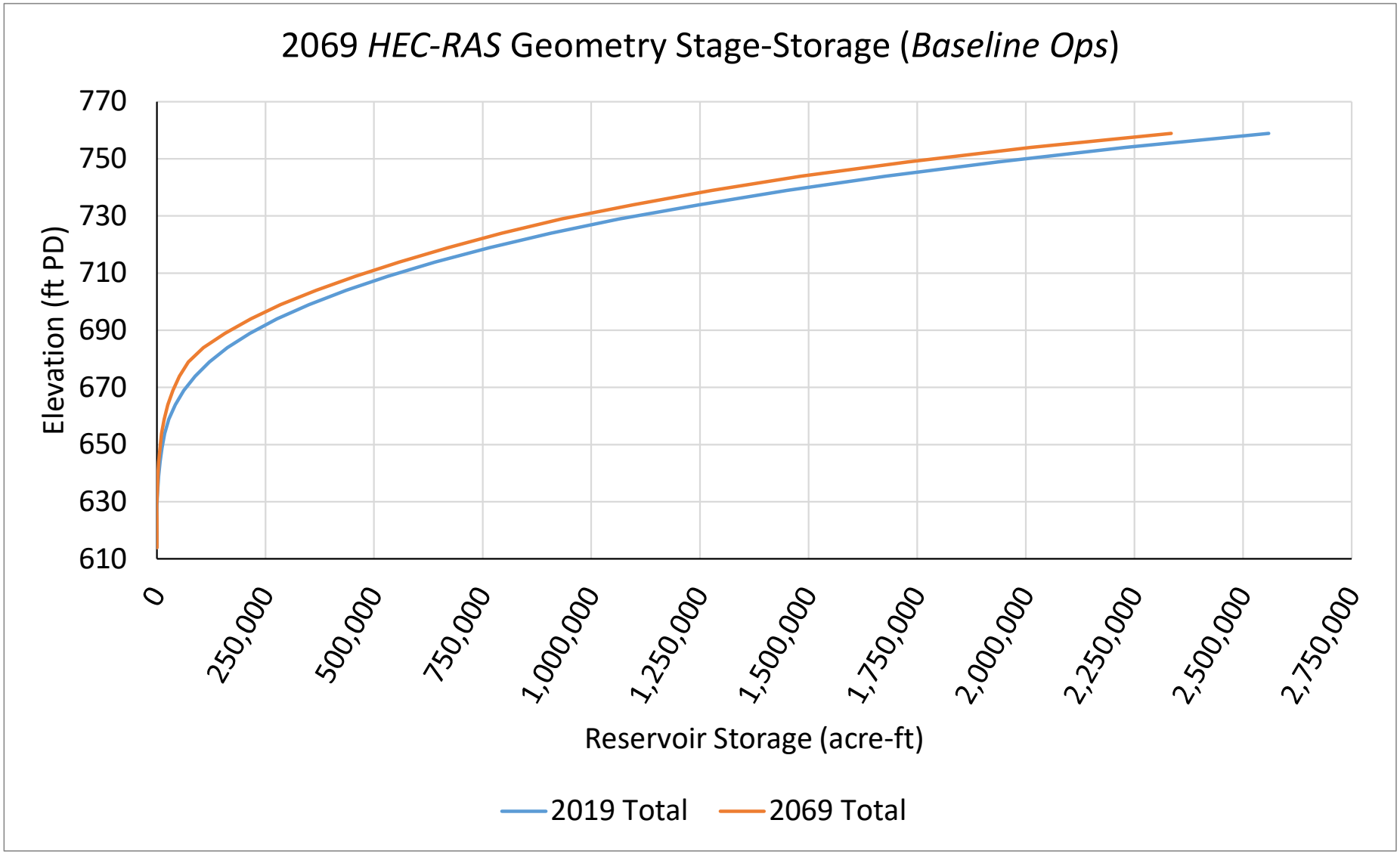

Elk River Average Section
780
770
760
750
740
730
720
710
700
690
Elevation (ft PD)
Neosho River
OK 10
Highway 43
0
5
10
15
20
River Mile
1940
2019/2017
Simulation
Landmarks

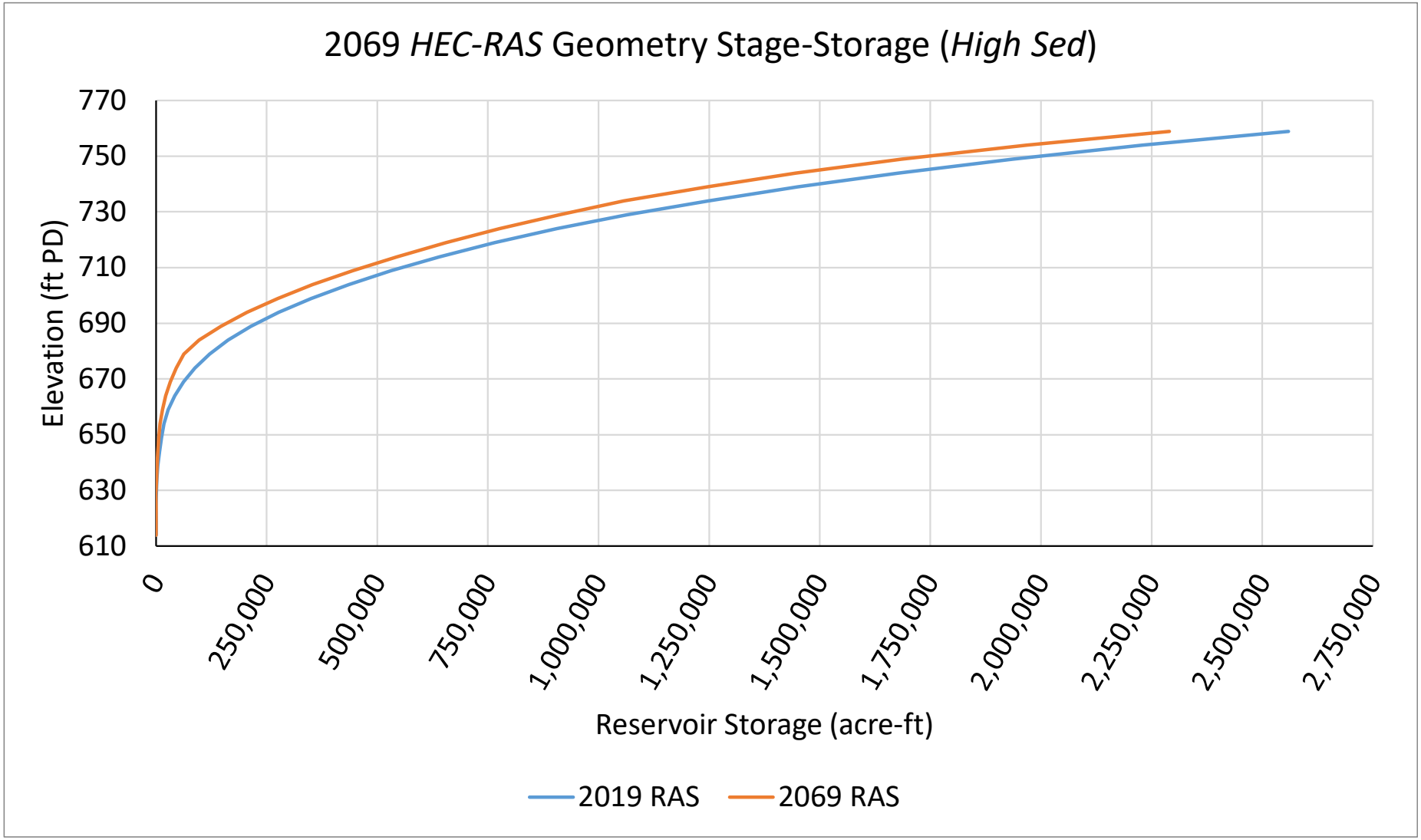

Tar Creek Average Channel
780
775
770
765
760
755
750
745
740
Elevation (ft PD)
0
1
2
3
4
5
6
7
8
River Mile
Neosho River
East Central Ave
Rockdale Blvd
Railroad
22nd Ave NE
E 60 Rd
1940
2019/2017
Simulation
Landmarks

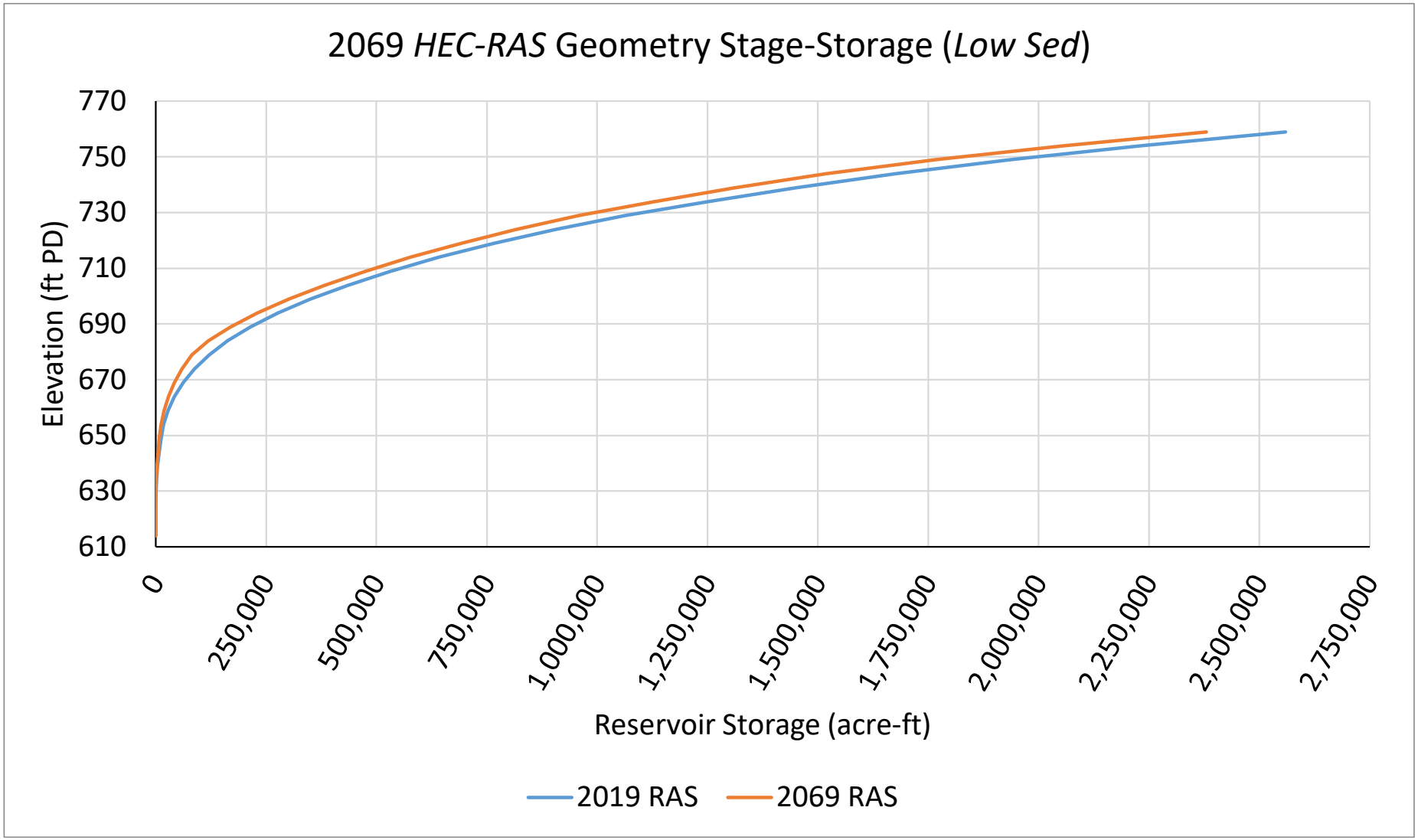

Tar Creek Average Section
Elevation (ft PD)
780
775
770
765
760
755
750
745
740
0
1
2
3
4
5
6
7
8
River Mile
Neosho River
East Central Ave
Rockdale Blvd
Railroad
22nd Ave NE
E 60 Rd
1940
2019/2017
Simulation
Landmarks

Simulated HEC-RAS Stage-Storage Curves

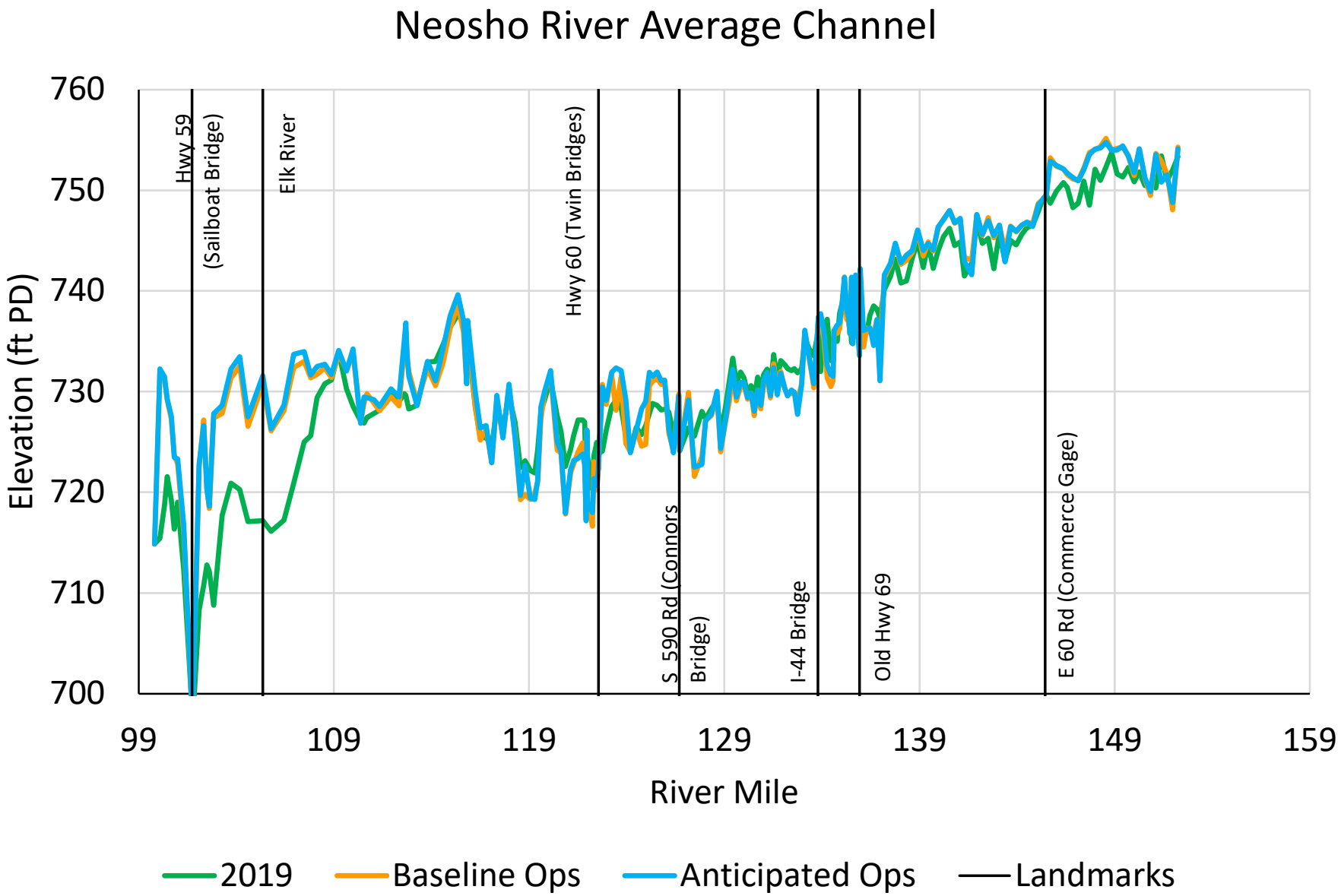

2069 *HEC-RAS* Geometry Stage-Storage (*Anticipated Ops*)
Elevation (ft PD)
770
750
730
710
690
670
650
630
610
0
250,000
500,000
750,000
1,000,000
1,250,000
1,500,000
1,750,000
2,000,000
2,250,000
2,500,000
2,750,000
Reservoir Storage (acre-ft)
2019 Total
2069 Total

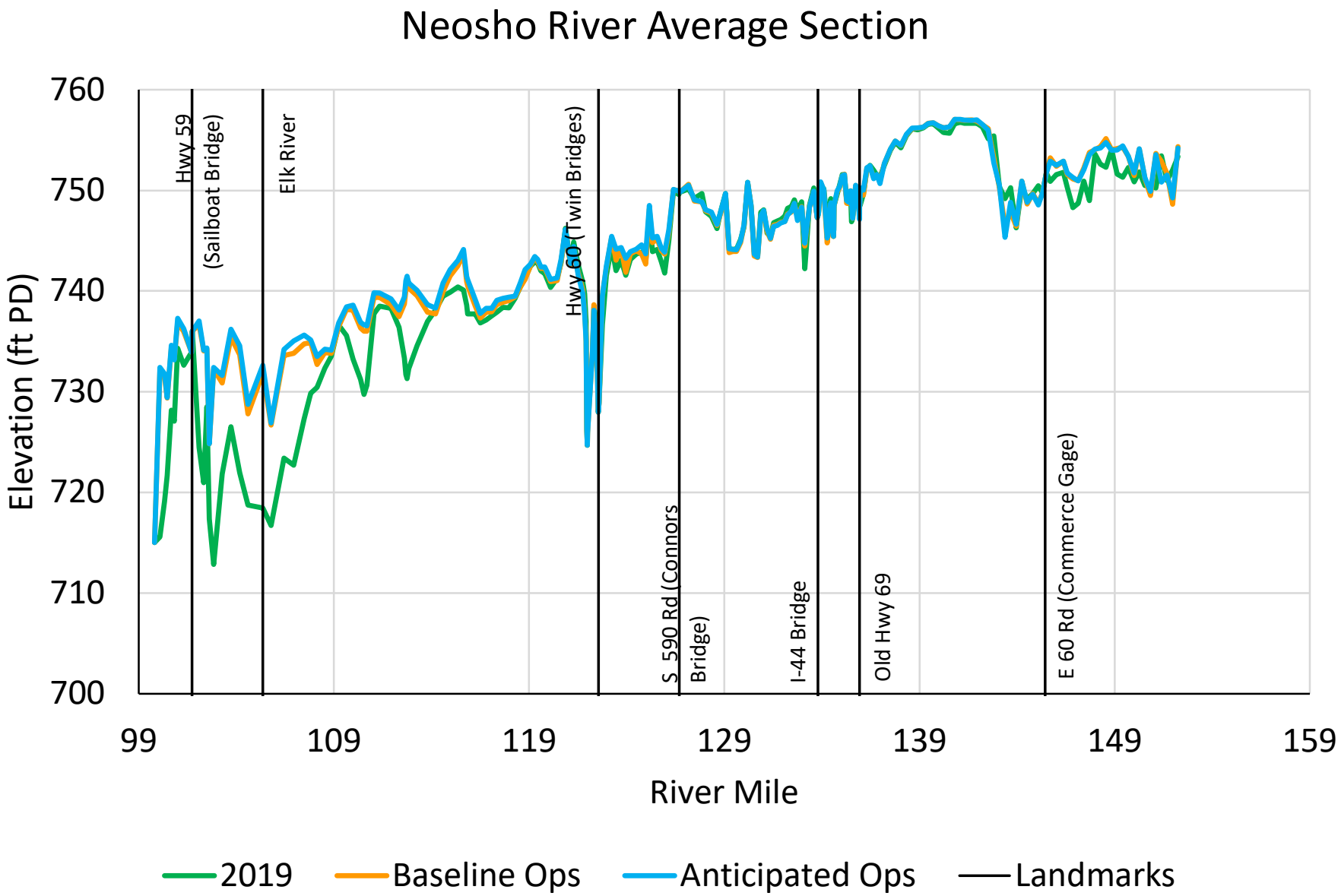

2069 *HEC-RAS* Geometry Stage-Storage (*Baseline Ops*)
Elevation (ft PD)
770
750
730
710
690
670
650
630
610
0
250,000
500,000
750,000
1,000,000
1,250,000
1,500,000
1,750,000
2,000,000
2,250,000
2,500,000
2,750,000
Reservoir Storage (acre-ft)
2019 Total
2069 Total

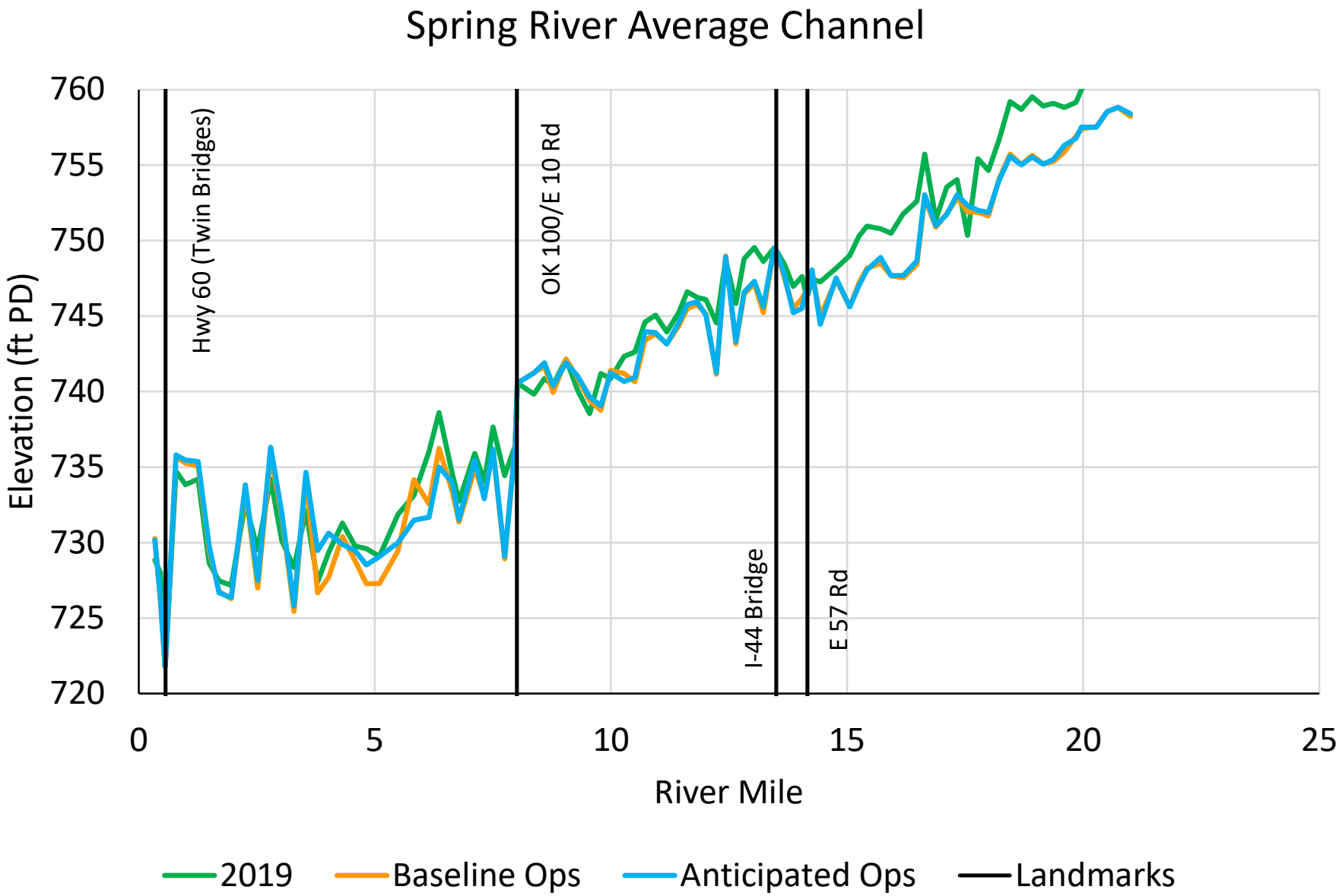

2069 *HEC-RAS* Geometry Stage-Storage (*High Sed*)
Elevation (ft PD)
770
750
730
710
690
670
650
630
610
0
250,000
500,000
750,000
1,000,000
1,250,000
1,500,000
1,750,000
2,000,000
2,250,000
2,500,000
2,750,000
Reservoir Storage (acre-ft)
2019 RAS
2069 RAS

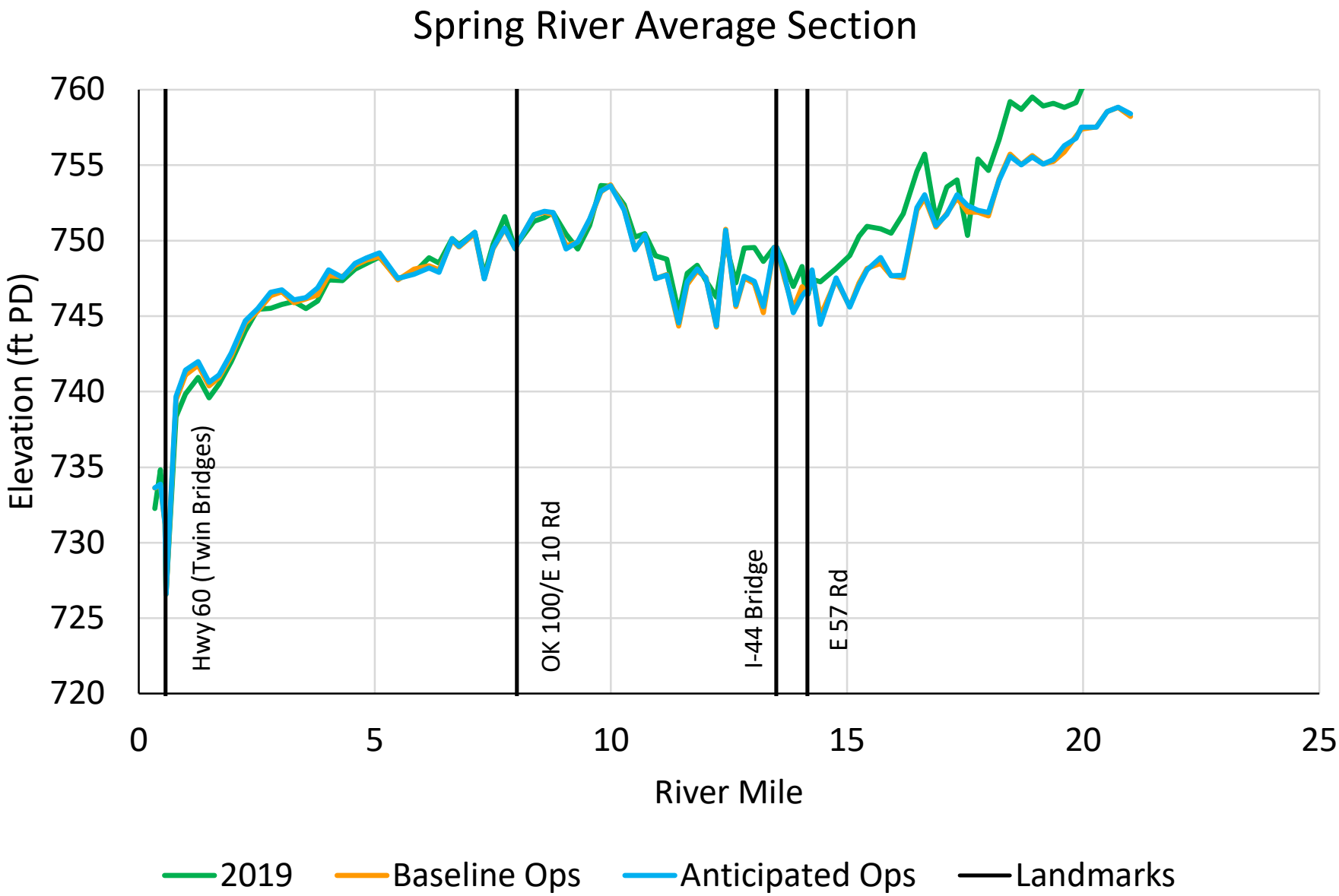

2069 *HEC-RAS* Geometry Stage-Storage (*Low Sed*)
Elevation (ft PD)
770
750
730
710
690
670
650
630
610
0
250,000
500,000
750,000
1,000,000
1,250,000
1,500,000
1,750,000
2,000,000
2,250,000
2,500,000
2,750,000
Reservoir Storage (acre-ft)
2019 RAS
2069 RAS

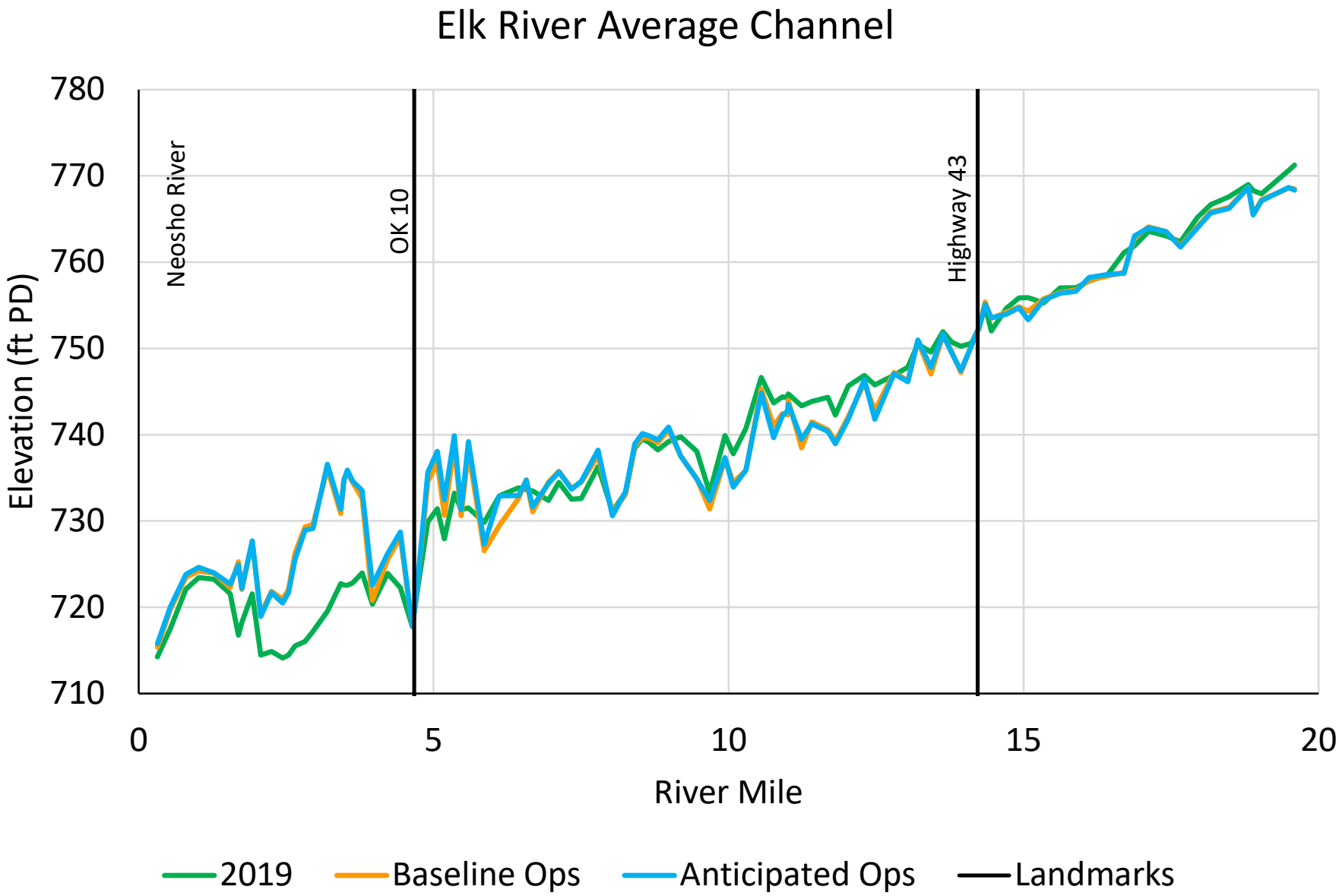
Simulated Future Average Channel and Average Section Plots – Operations Comparison

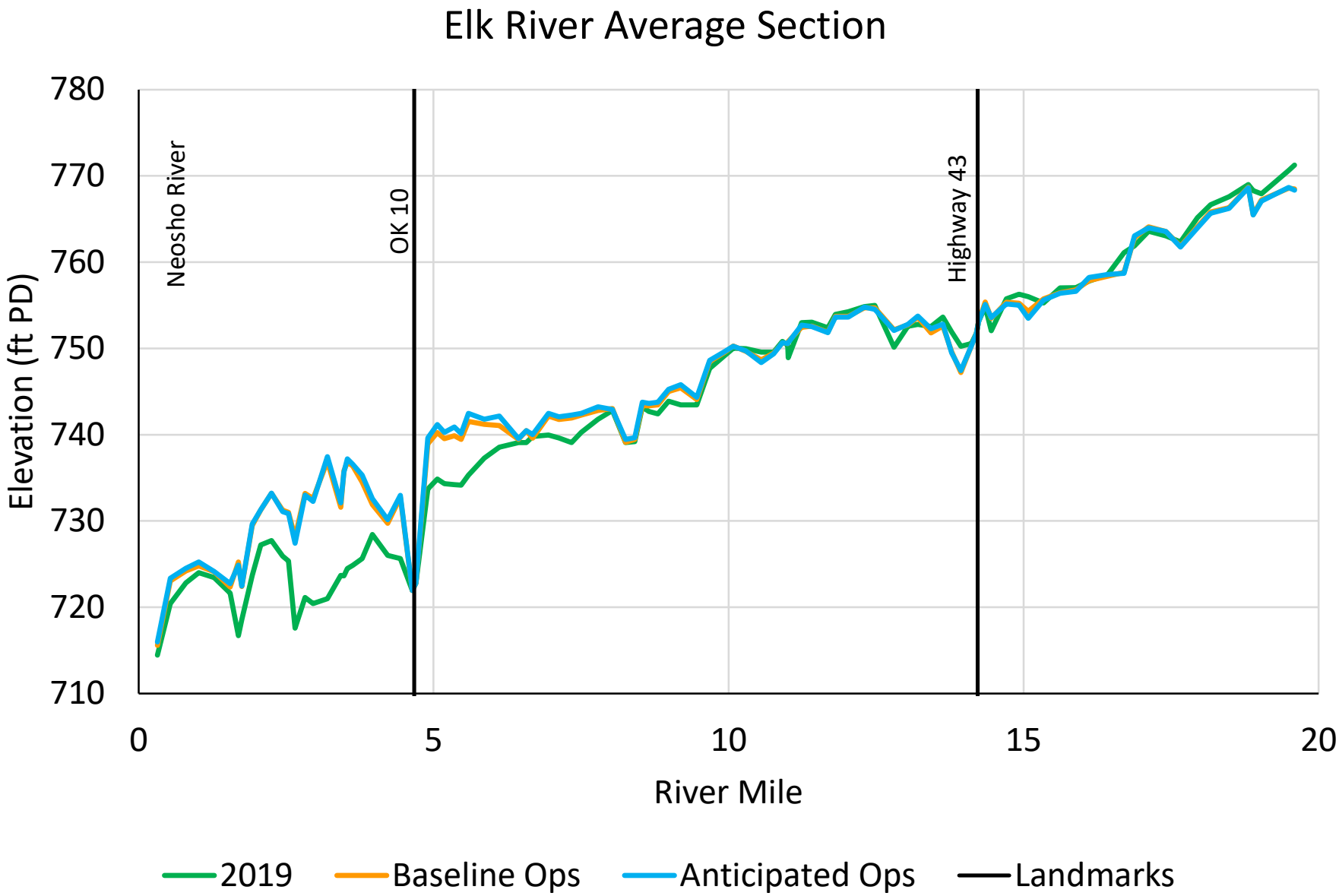

Neosho River Average Channel
760
750
740
730
720
710
700
Elevation (ft PD)
99
109
119
129
139
149
159
River Mile
Hwy 59
(Sailboat Bridge)
Elk River
Hwy 60 (Twin Bridges)
S 590 Rd (Connors Bridge)
I-44 Bridge
Old Hwy 69
E 60 Rd (Commerce Gage)
2019
Baseline Ops
Anticipated Ops
Landmarks

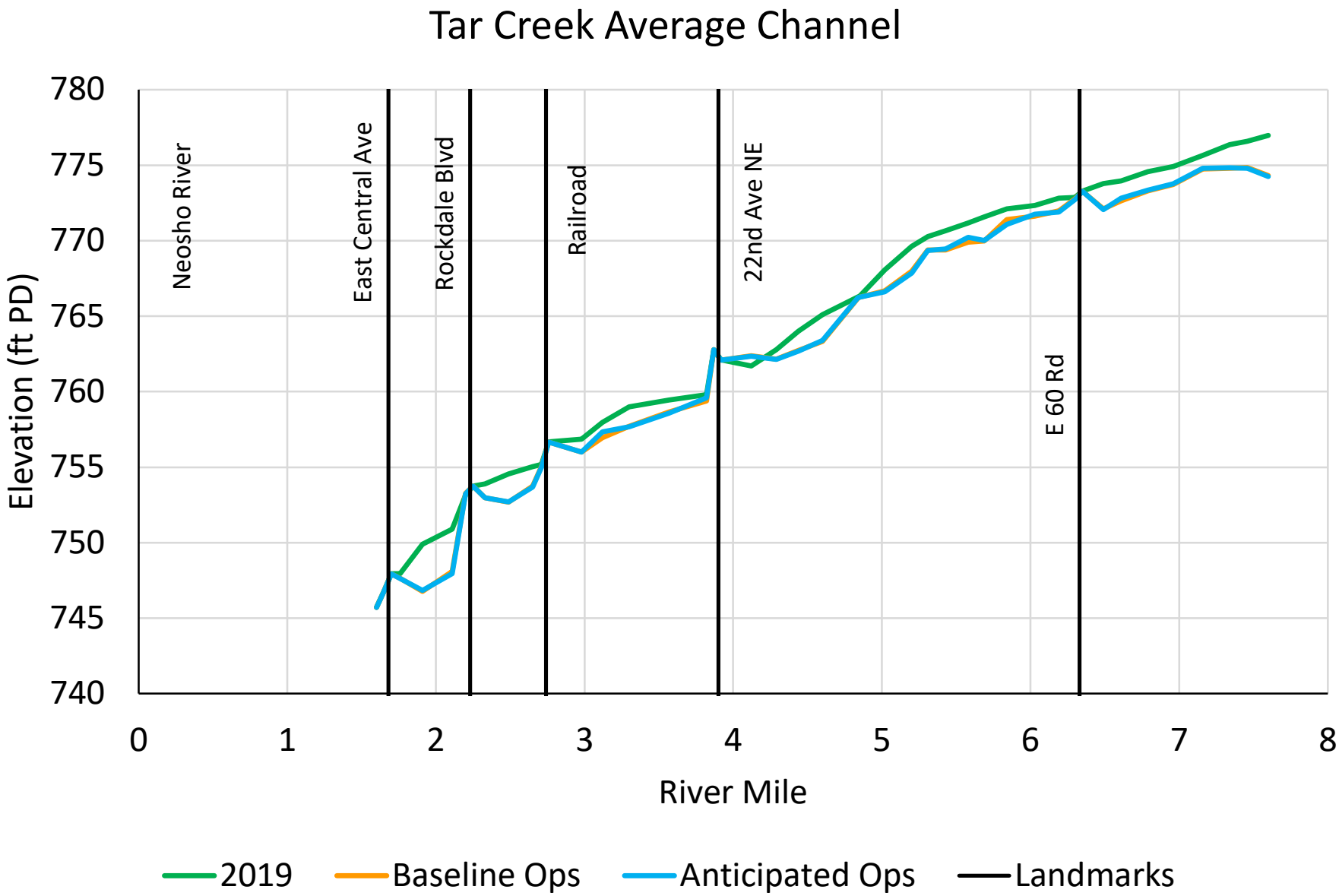

Neosho River Average Section
760
750
740
730
720
710
700
Elevation (ft PD)
99
109
119
129
139
149
159
River Mile
Hwy 59
(Sailboat Bridge)
Elk River
Hwy 60 (Twin Bridges)
S 590 Rd (Connors Bridge)
I-44 Bridge
Old Hwy 69
E 60 Rd (Commerce Gage)
2019
Baseline Ops
Anticipated Ops
Landmarks

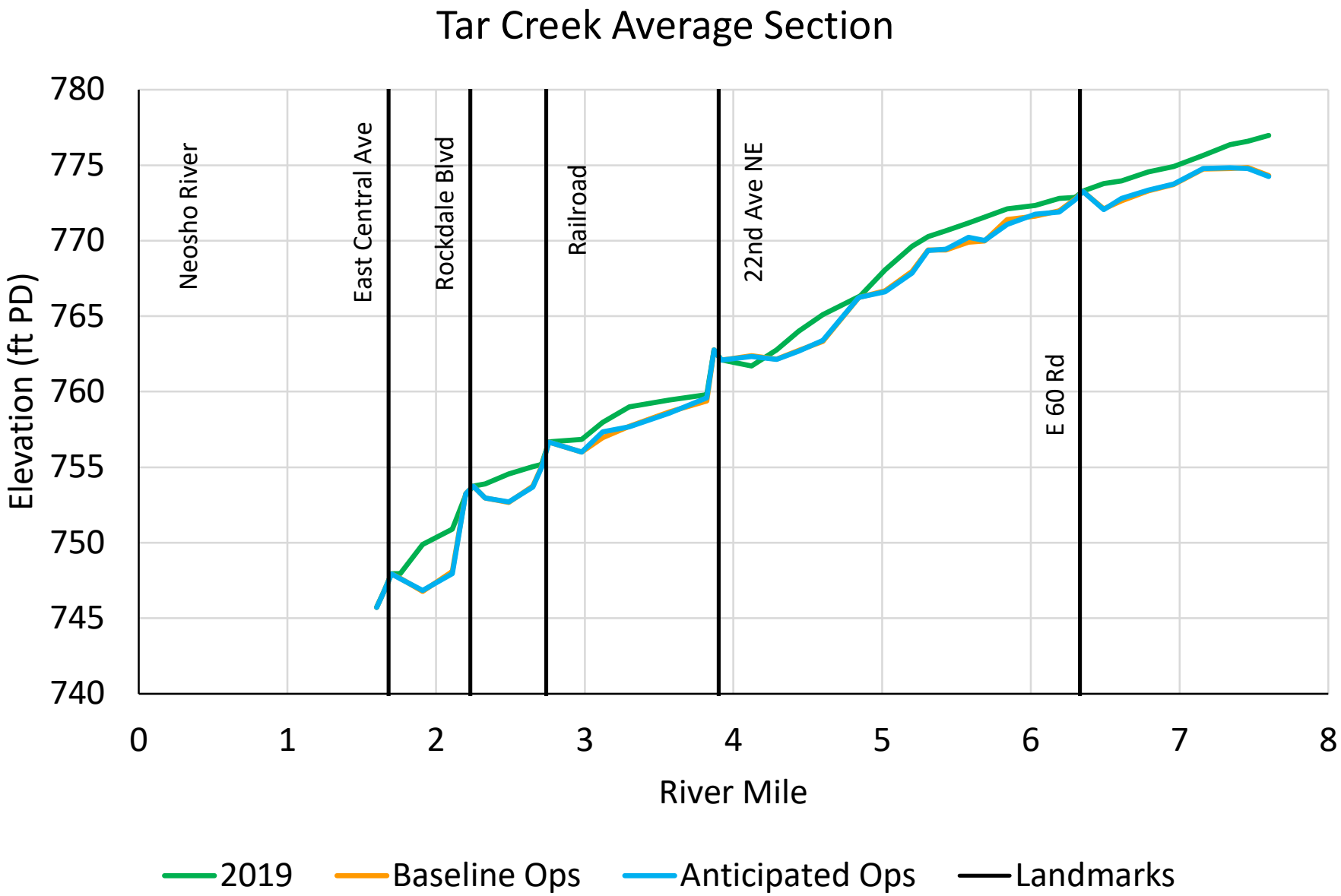

Spring River Average Channel
760
755
750
745
740
735
730
725
720
Elevation (ft PD)
Hwy 60 (Twin Bridges)
OK 100/E 10 Rd
I-44 Bridge
E 57 Rd
0
5
10
15
20
25
River Mile
2019
Baseline Ops
Anticipated Ops
Landmarks


Spring River Average Section
760
755
750
745
740
735
730
725
720
Elevation (ft PD)
Hwy 60 (Twin Bridges)
OK 100/E 10 Rd
I-44 Bridge
E 57 Rd
0
5
10
15
20
25
River Mile
2019
Baseline Ops
Anticipated Ops
Landmarks

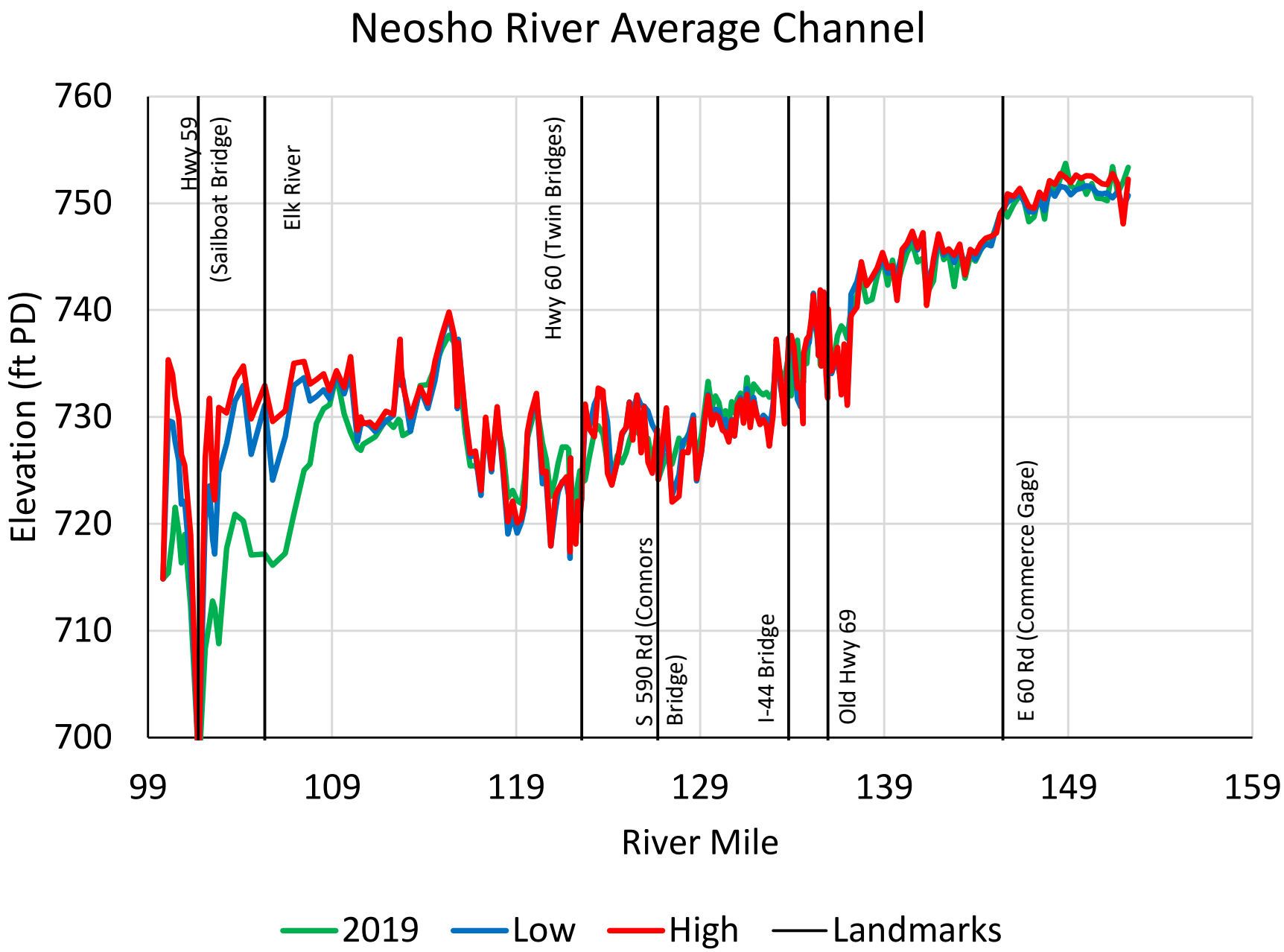

Elk River Average Channel
780
770
760
750
740
730
720
710
Elevation (ft PD)
Neosho River
OK 10
Highway 43
0
5
10
15
20
River Mile
2019
Baseline Ops
Anticipated Ops
Landmarks

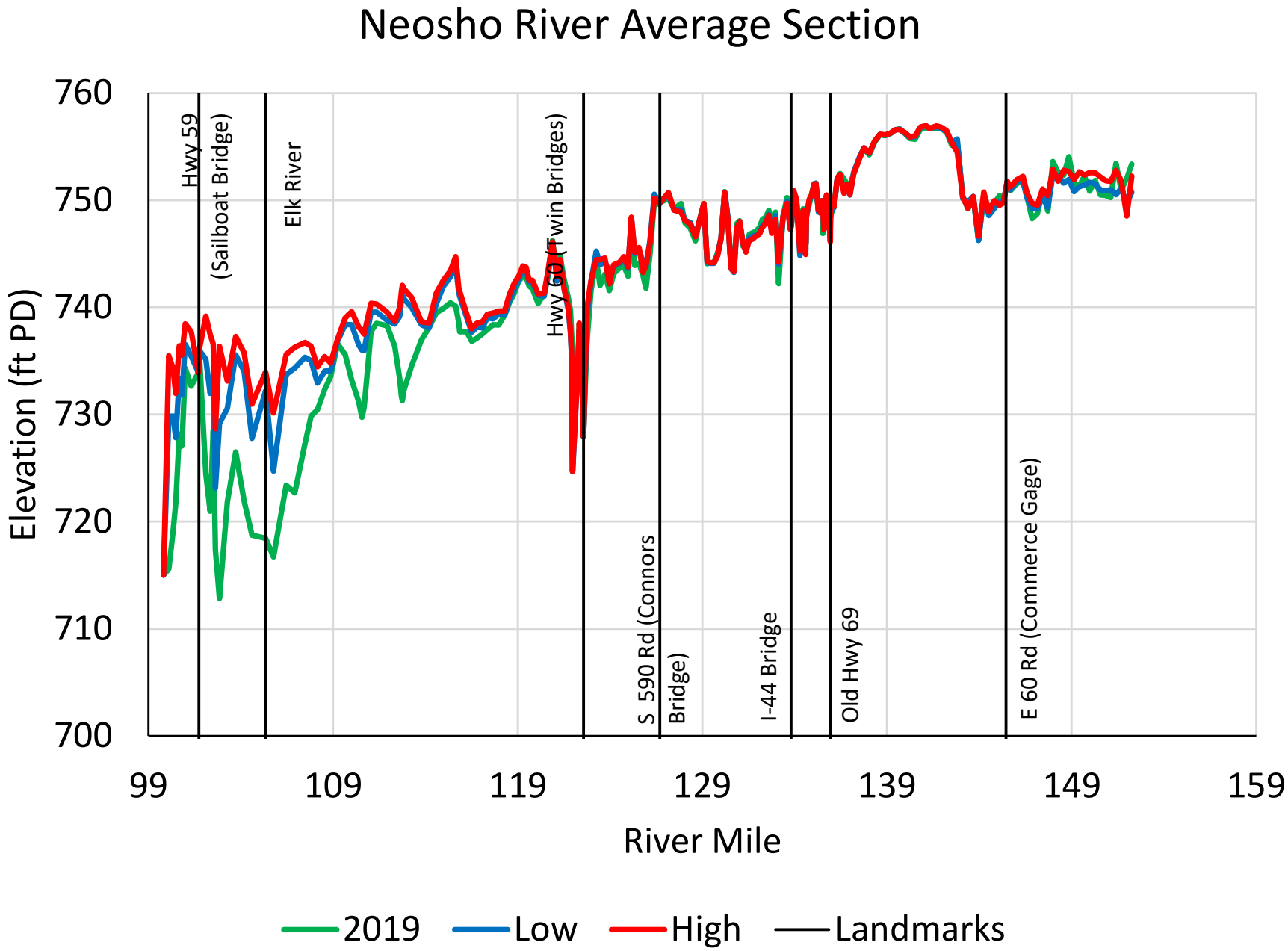

Elk River Average Section
780
770
760
750
740
730
720
710
Elevation (ft PD)
Neosho River
OK 10
Highway 43
0
5
10
15
20
River Mile
2019
Baseline Ops
Anticipated Ops
Landmarks

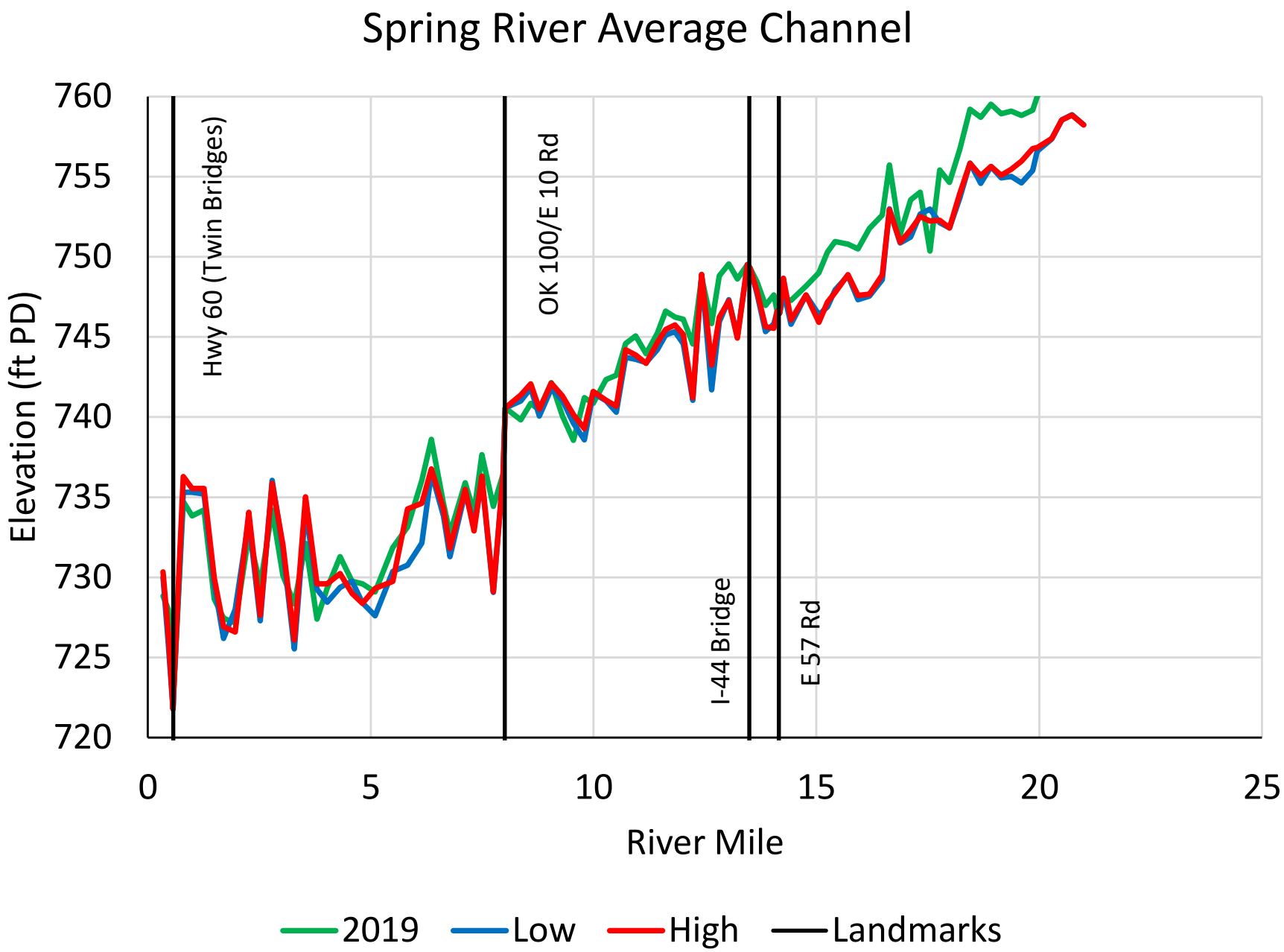

Tar Creek Average Channel
780
775
770
765
760
755
750
745
740
Elevation (ft PD)
Neosho River
East Central Ave
Rockdale Blvd
Railroad
22nd Ave NE
E 60 Rd
0
1
2
3
4
5
6
7
8
River Mile
2019
Baseline Ops
Anticipated Ops
Landmarks

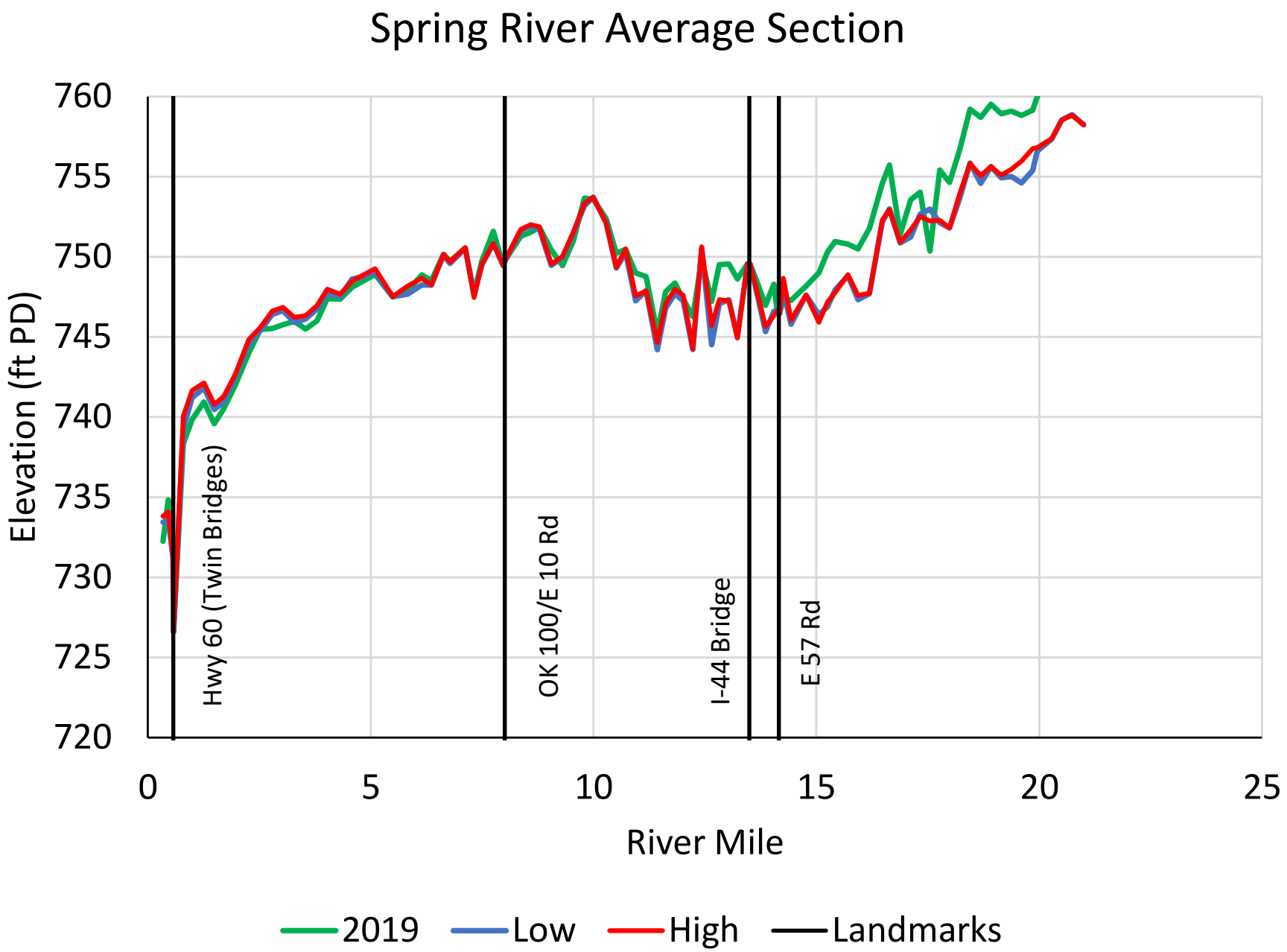

Tar Creek Average Section
780
775
770
765
760
755
750
745
740
Elevation (ft PD)
Neosho River
East Central Ave
Rockdale Blvd
Railroad
22nd Ave NE
E 60 Rd
0
1
2
3
4
5
6
7
8
River Mile
2019
Baseline Ops
Anticipated Ops
Landmarks

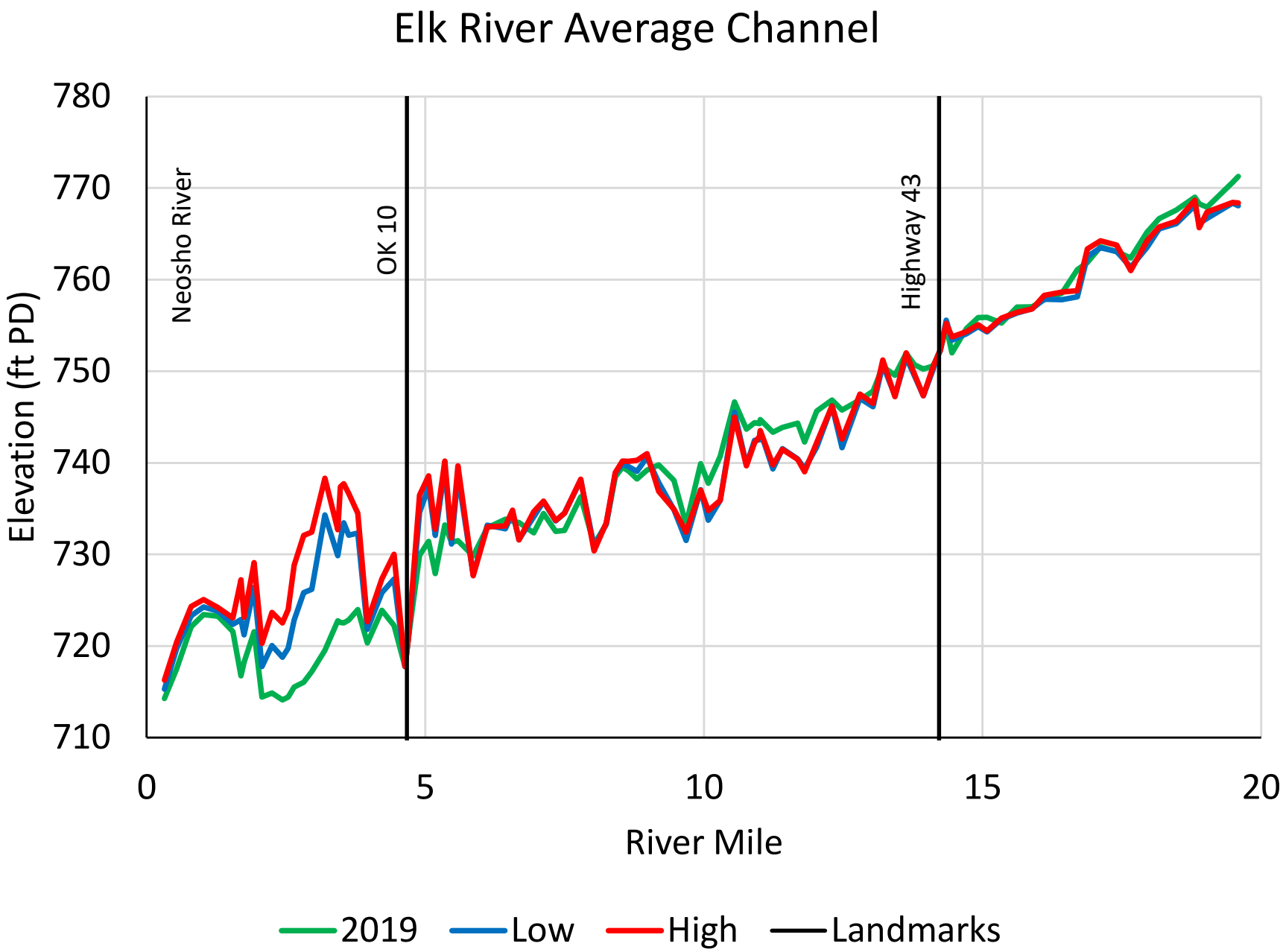
Simulated Future Average Channel and Average Section Plots – Sediment Loading Comparison

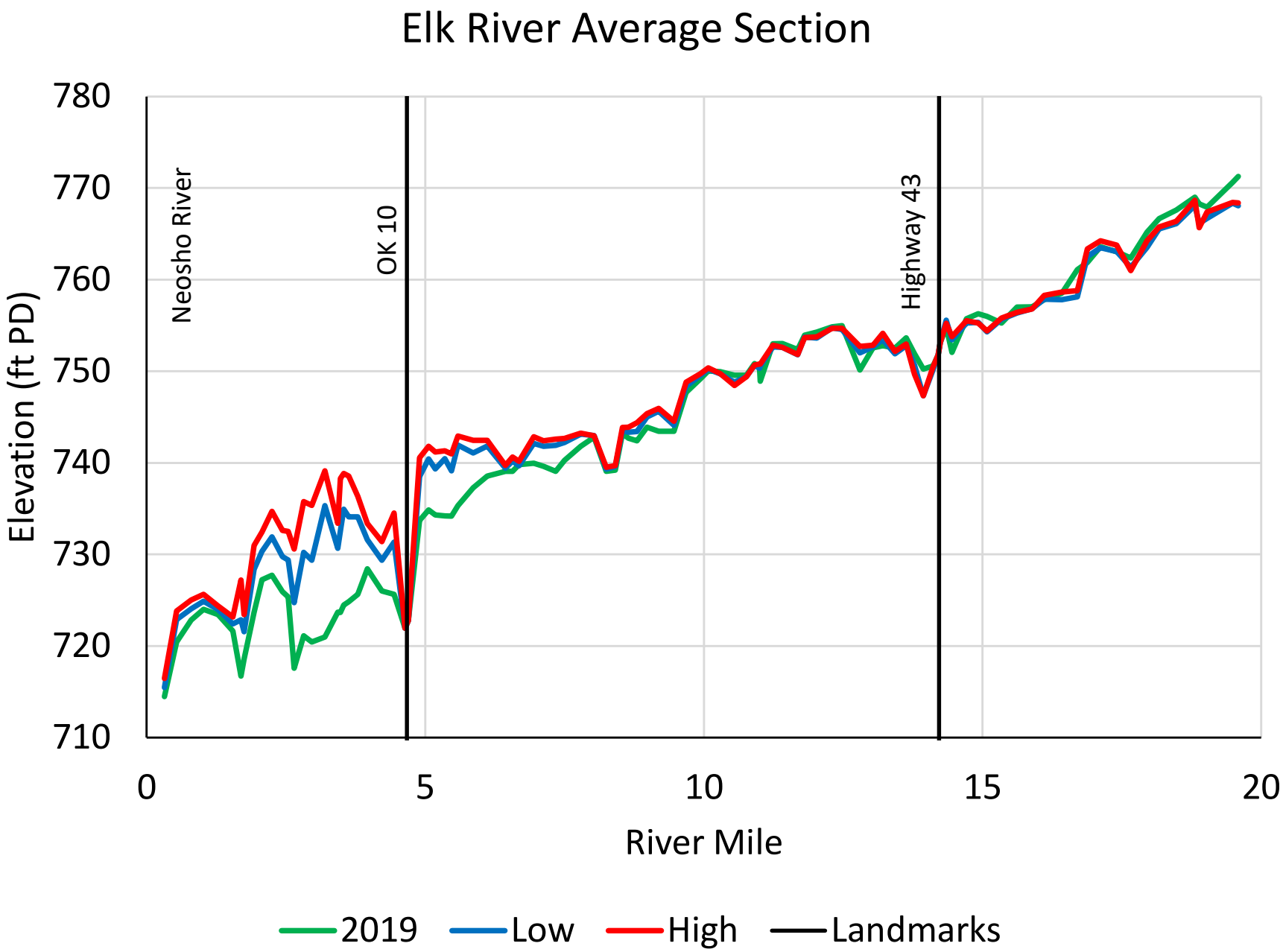

Neosho River Average Channel
760
750
740
730
720
710
700
Elevation (ft PD)
99
109
119
129
139
149
159
River Mile
Hwy 59
(Sailboat Bridge)
Elk River
Hwy 60 (Twin Bridges)
S 590 Rd (Connors Bridge)
I-44 Bridge
Old Hwy 69
E 60 Rd (Commerce Gage)
2019
Low
High
Landmarks

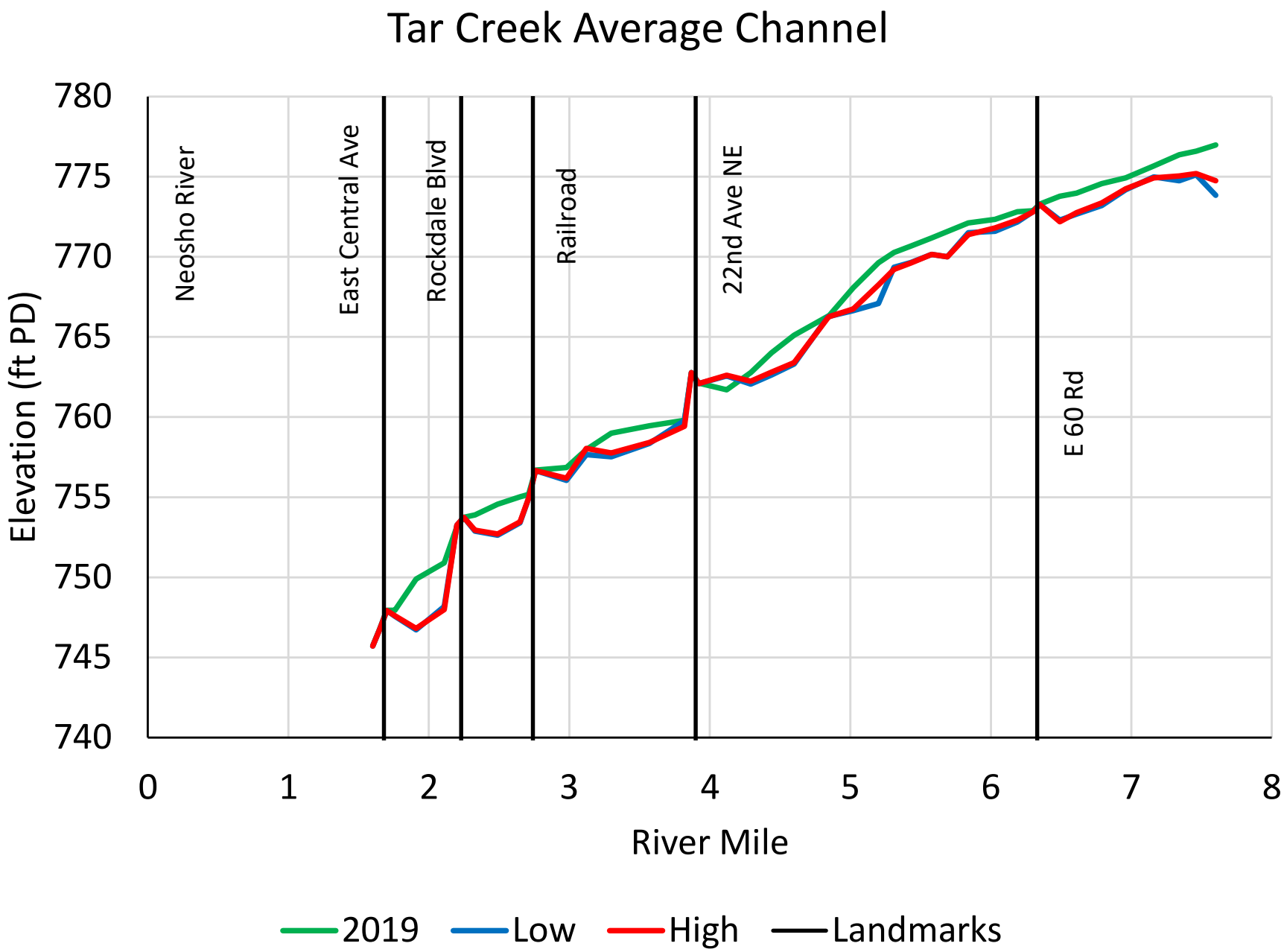

Neosho River Average Section
760
750
740
730
720
710
700
Elevation (ft PD)
99
109
119
129
139
149
159
River Mile
Hwy 59
(Sailboat Bridge)
Elk River
Hwy 60 (Twin Bridges)
S 590 Rd (Connors Bridge)
I-44 Bridge
Old Hwy 69
E 60 Rd (Commerce Gage)
2019
Low
High
Landmarks

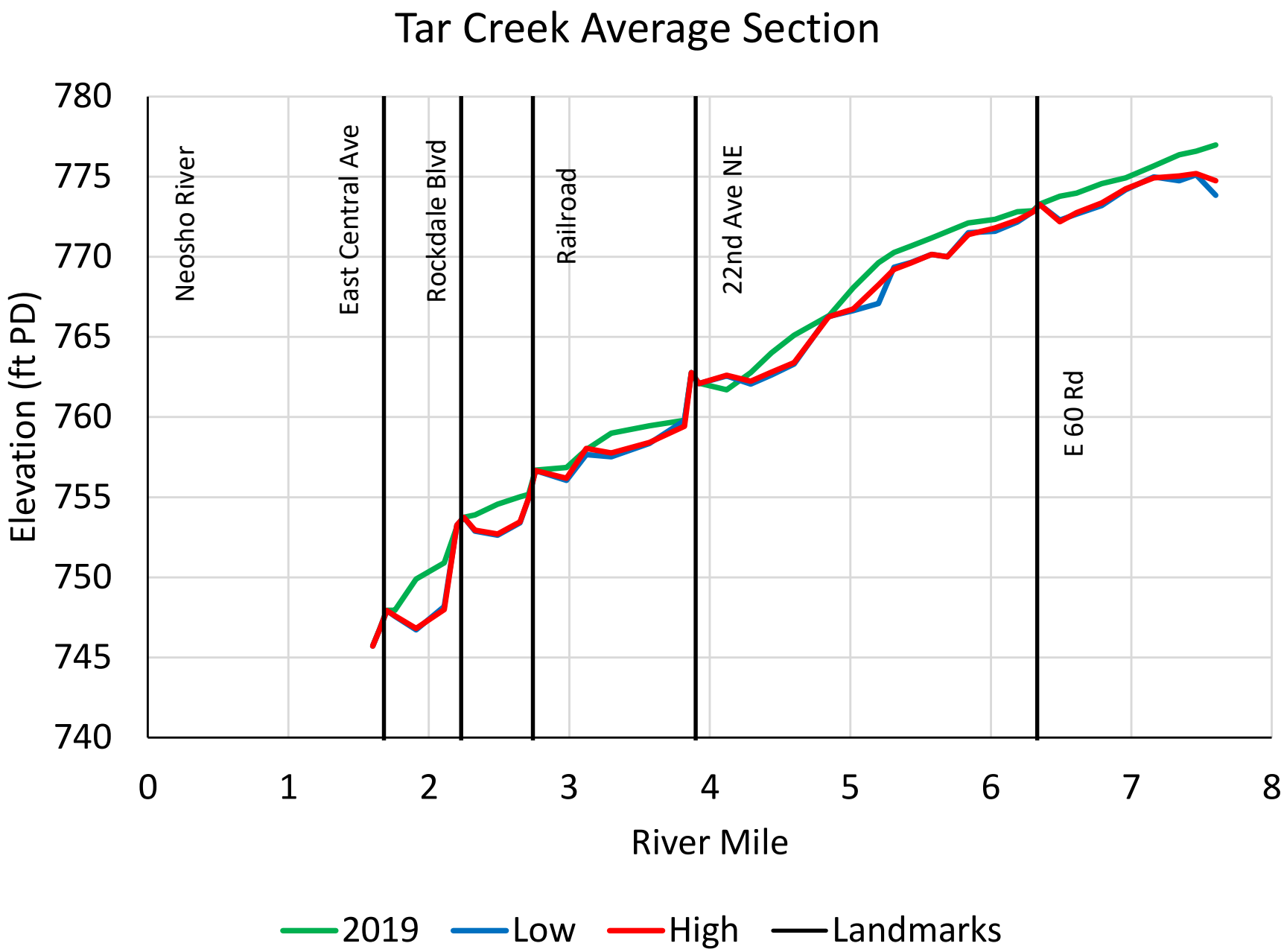

Spring River Average Channel
760
755
750
745
740
735
730
725
720
Elevation (ft PD)
Hwy 60 (Twin Bridges)
OK 100/E 10 Rd
I-44 Bridge
E 57 Rd
0
5
10
15
20
25
River Mile
2019
Low
High
Landmarks


Spring River Average Section
760
755
750
745
740
735
730
725
720
Elevation (ft PD)
Hwy 60 (Twin Bridges)
OK 100/E 10 Rd
I-44 Bridge
E 57 Rd
0
5
10
15
20
25
River Mile
2019
Low
High
Landmarks


Elk River Average Channel
780
770
760
750
740
730
720
710
Elevation (ft PD)
Neosho River
OK 10
Highway 43
0
5
10
15
20
River Mile
2019
Low
High
Landmarks


Elk River Average Section
780
770
760
750
740
730
720
710
Elevation (ft PD)
Neosho River
OK 10
Highway 43
0
5
10
15
20
River Mile
2019
Low
High
Landmarks

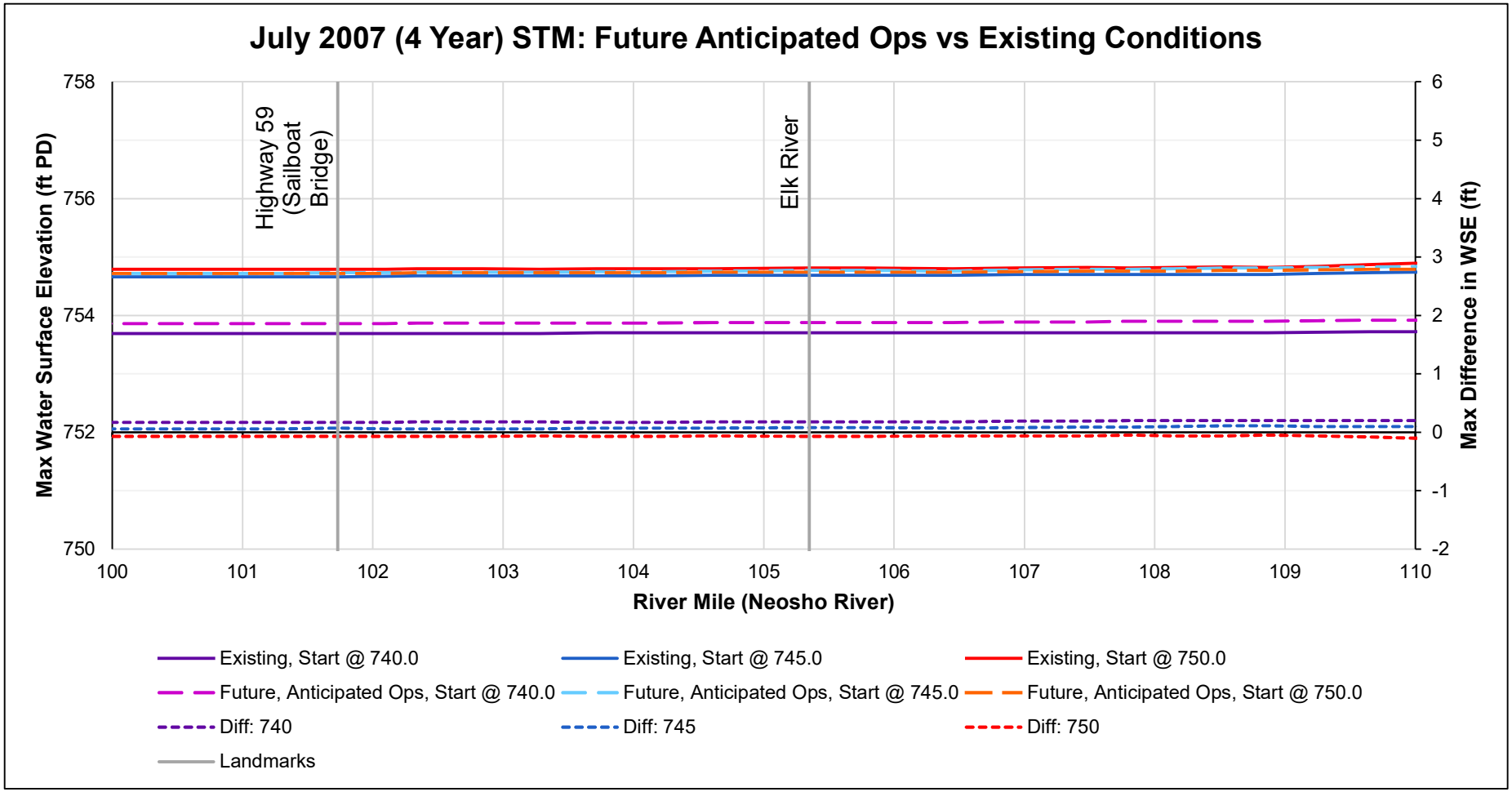

Tar Creek Average Channel
780
775
770
765
760
755
750
745
740
Elevation (ft PD)
Neosho River
East Central Ave
Rockdale Blvd
Railroad
22nd Ave NE
E 60 Rd
0
1
2
3
4
5
6
7
8
River Mile
2019
Low
High
Landmarks

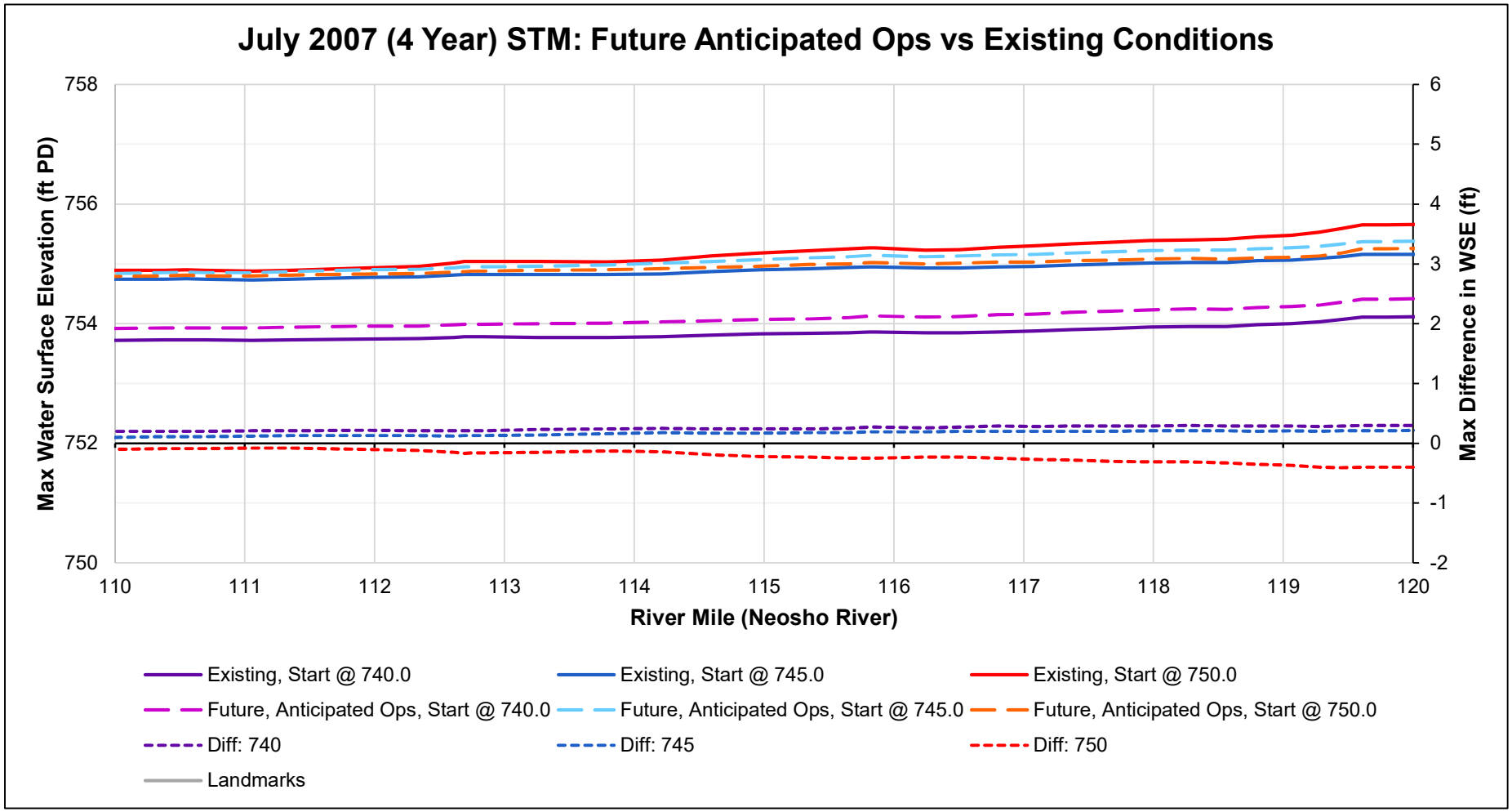

Tar Creek Average Section
780
775
770
765
760
755
750
745
740
Elevation (ft PD)
Neosho River
East Central Ave
Rockdale Blvd
Railroad
22nd Ave NE
E 60 Rd
0
1
2
3
4
5
6
7
8
River Mile
2019
Low
High
Landmarks

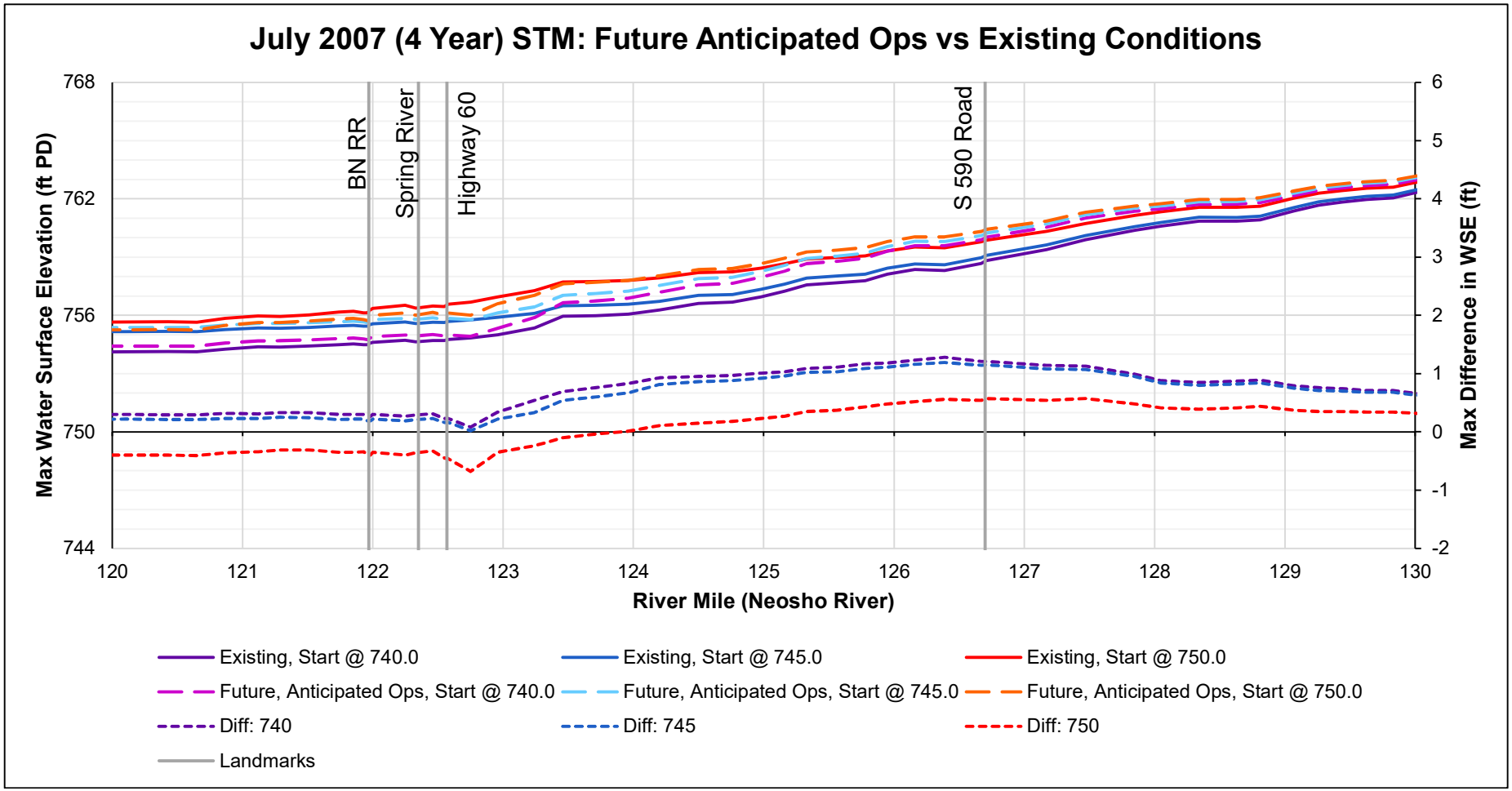
Please see following spreadsheets for cross section analyses:

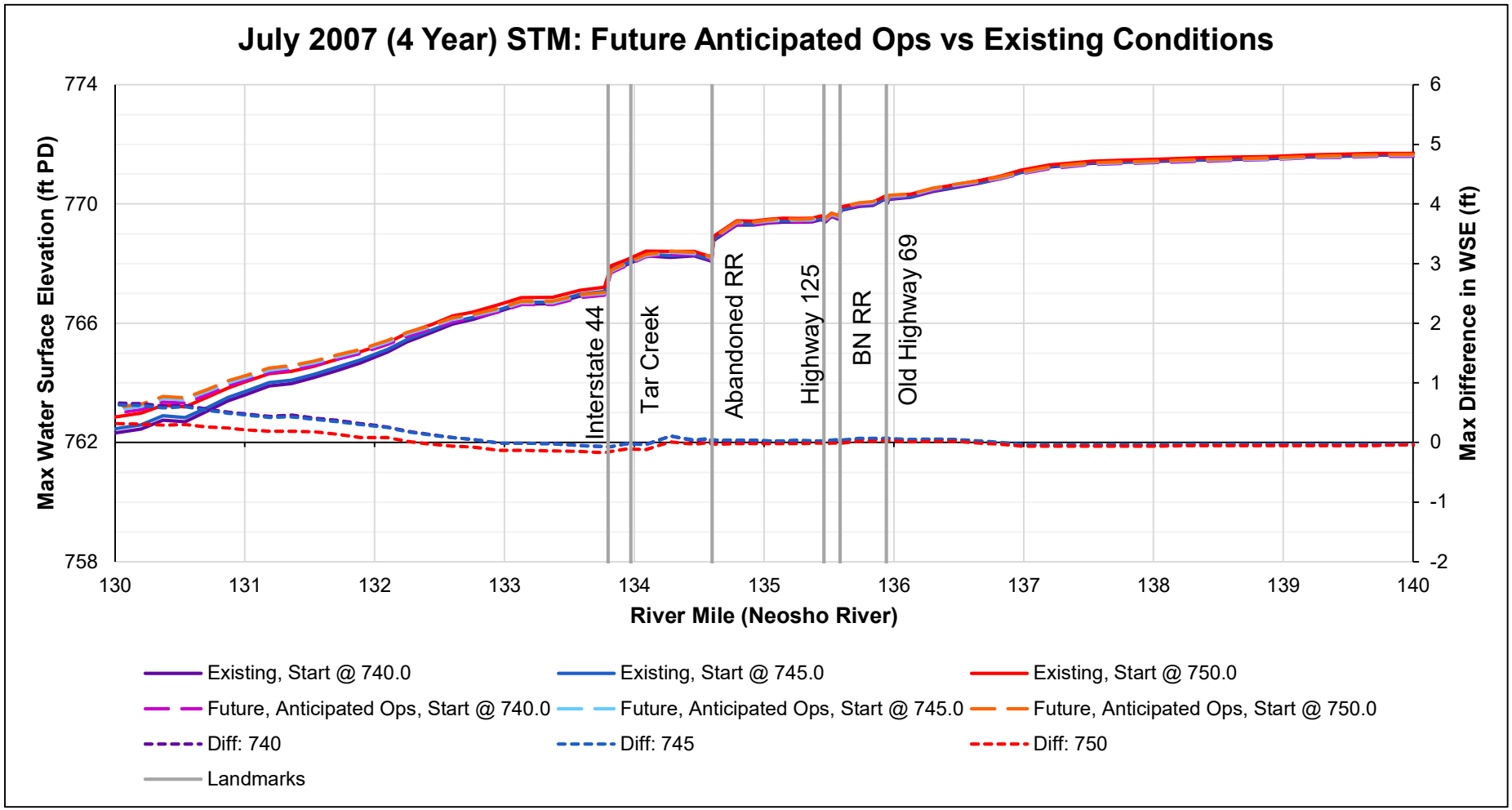
- ElkRiver-XS_Analysis
- NeoshoRiver-XS_Analysis-01
- NeoshoRiver-XS_Analysis-02
- NeoshoRiver-XS_Analysis-03
- SpringRiver-XS_Analysis

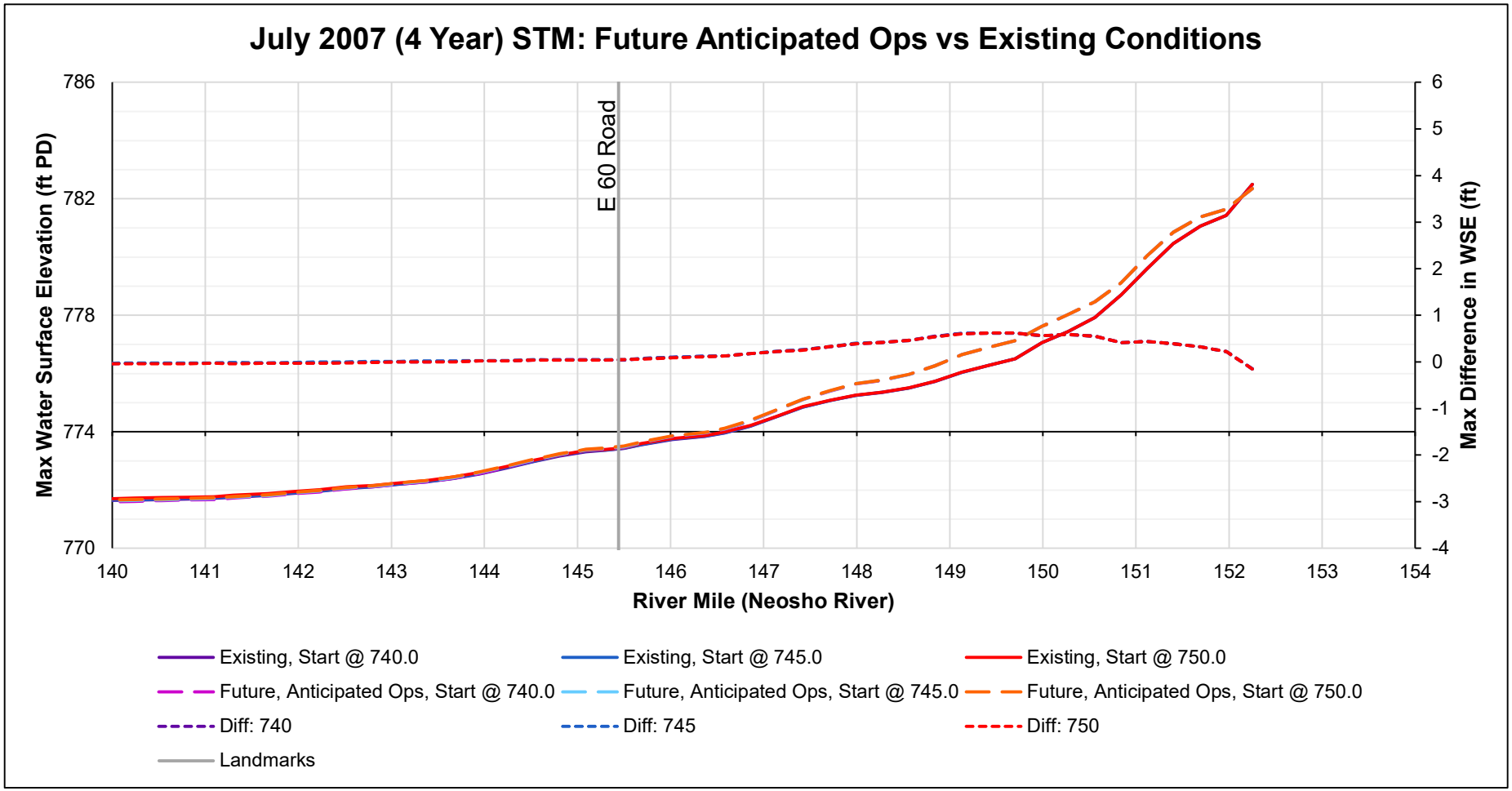
Appendix G
1D UHM Results

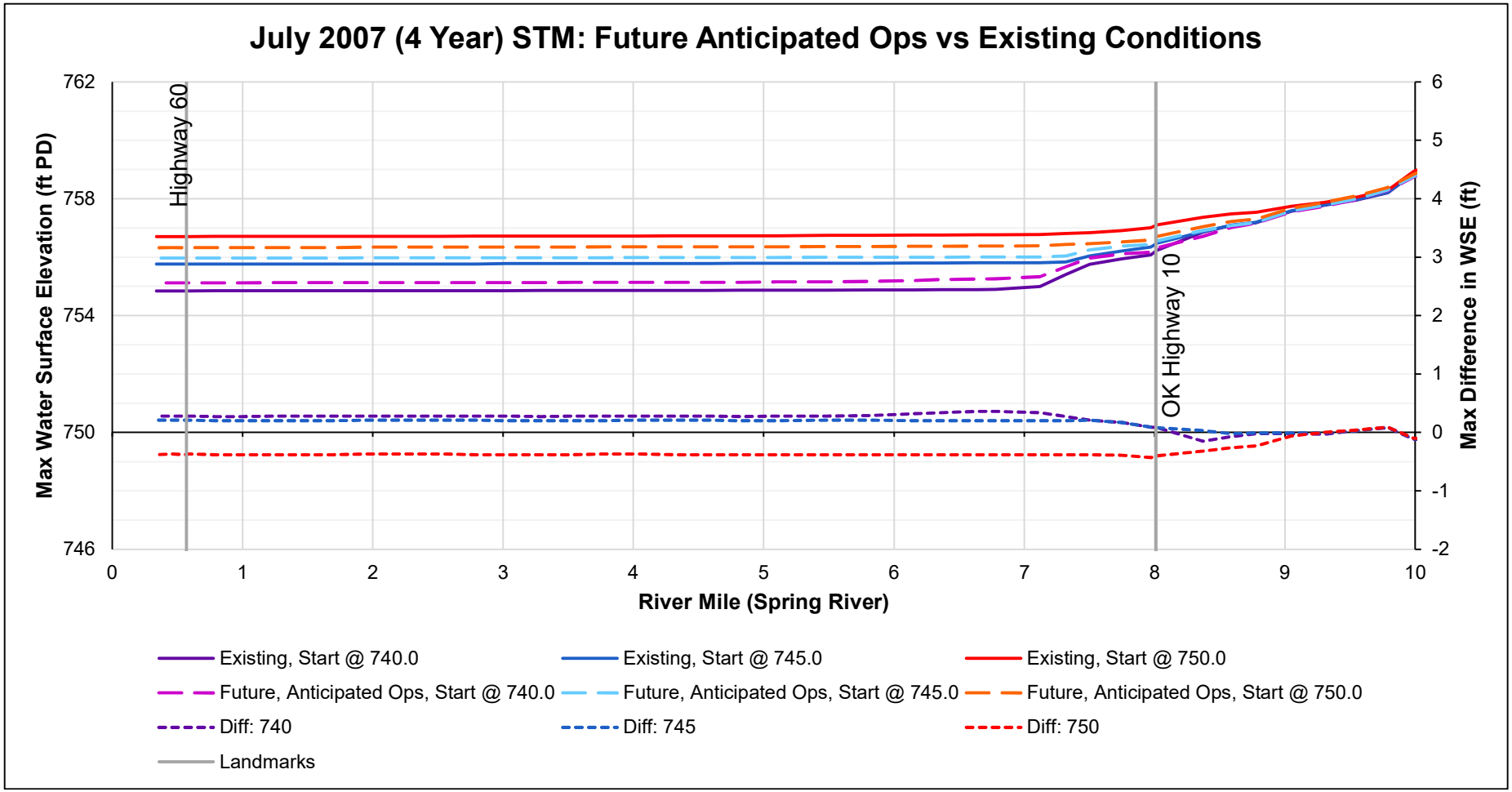

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
Highway 59 (Sailboat Bridge)
Elk River
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
100
101
102
103
104
105
106
107
108
109
110
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

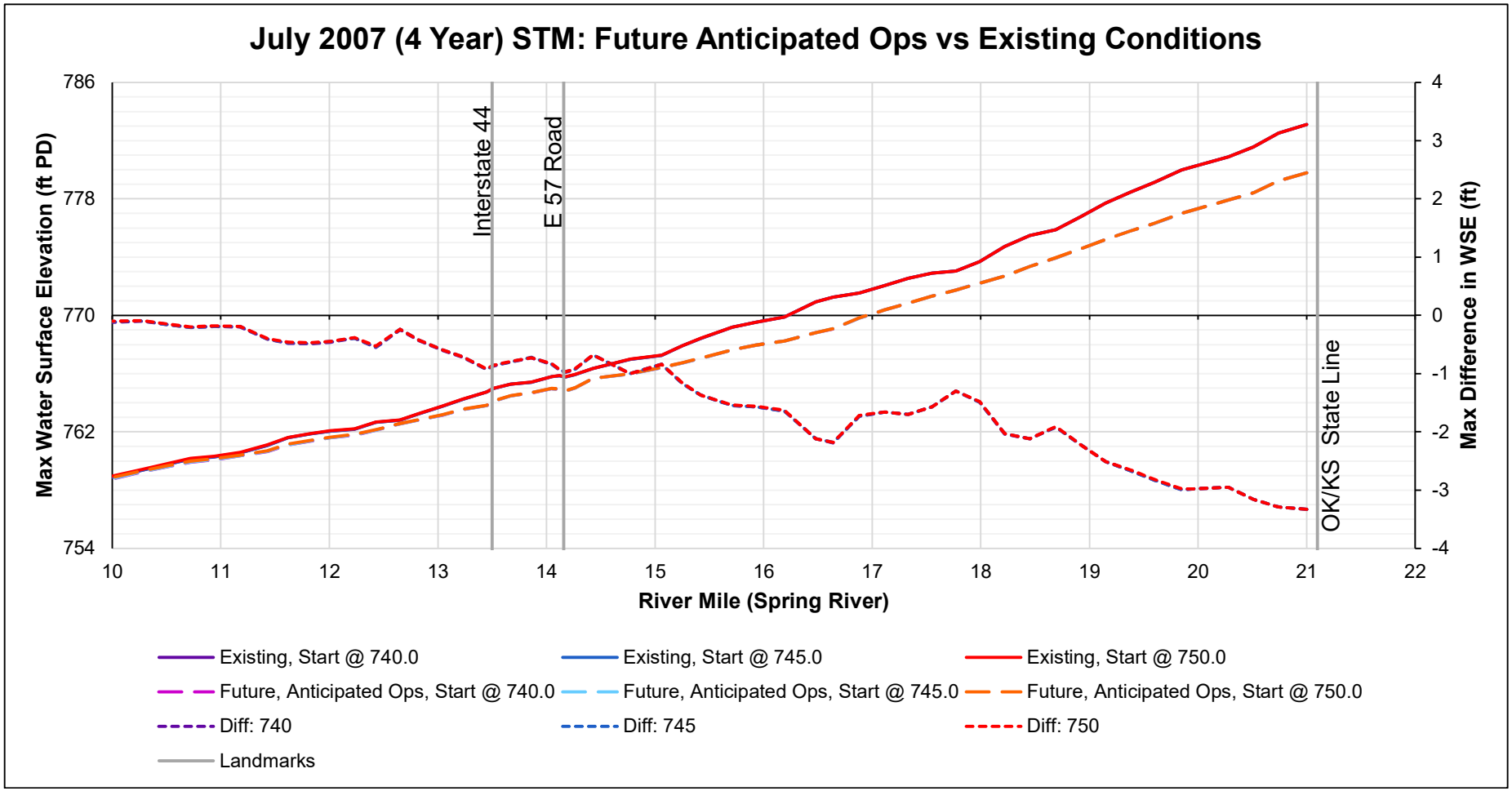

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
110
111
112
113
114
115
116
117
118
119
120
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

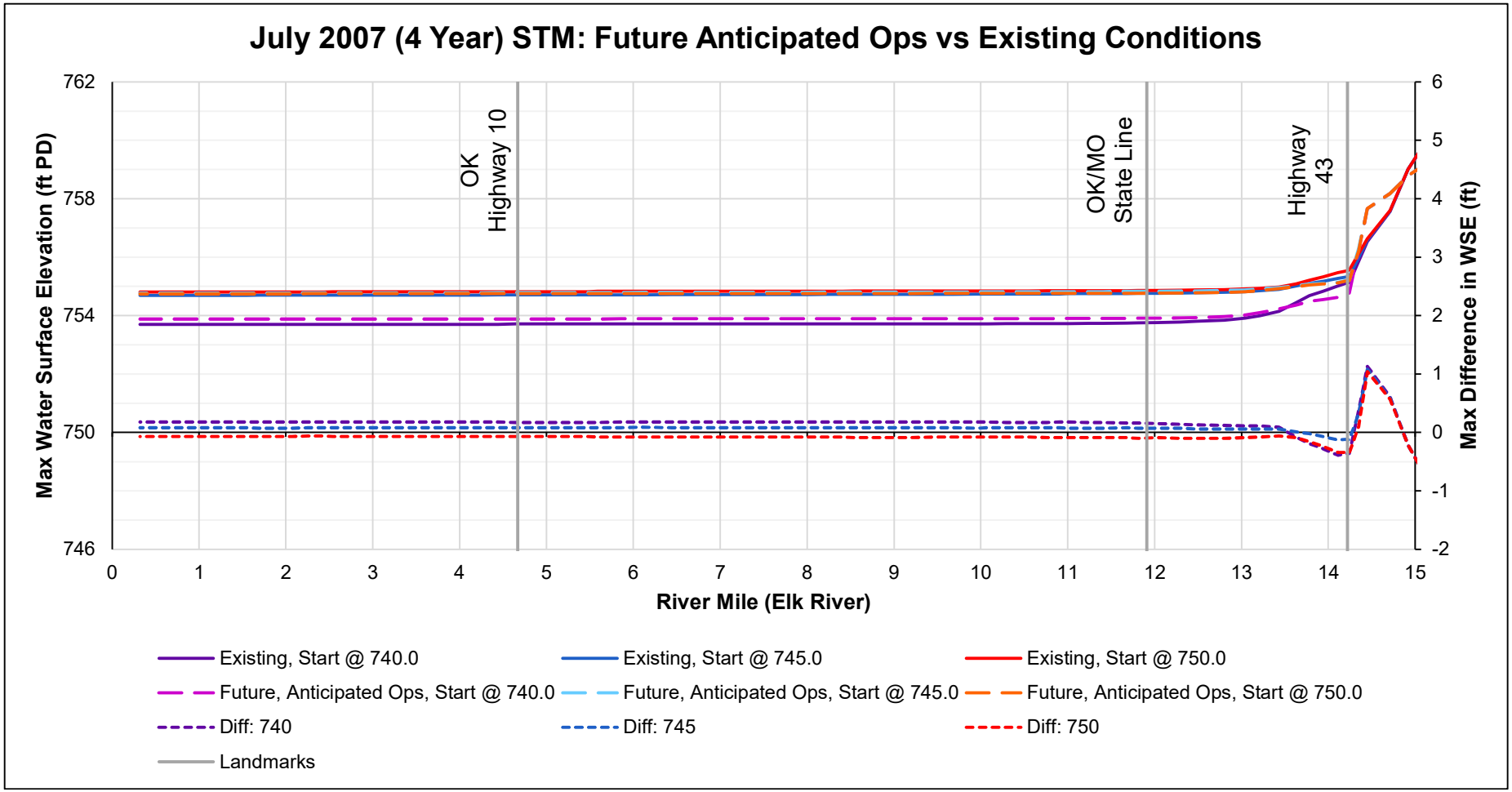

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
BN RR
Spring River
Highway 60
S 590 Road
768
762
756
750
744
6
5
4
3
2
1
0
-1
-2
120
121
122
123
124
125
126
127
128
129
130
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

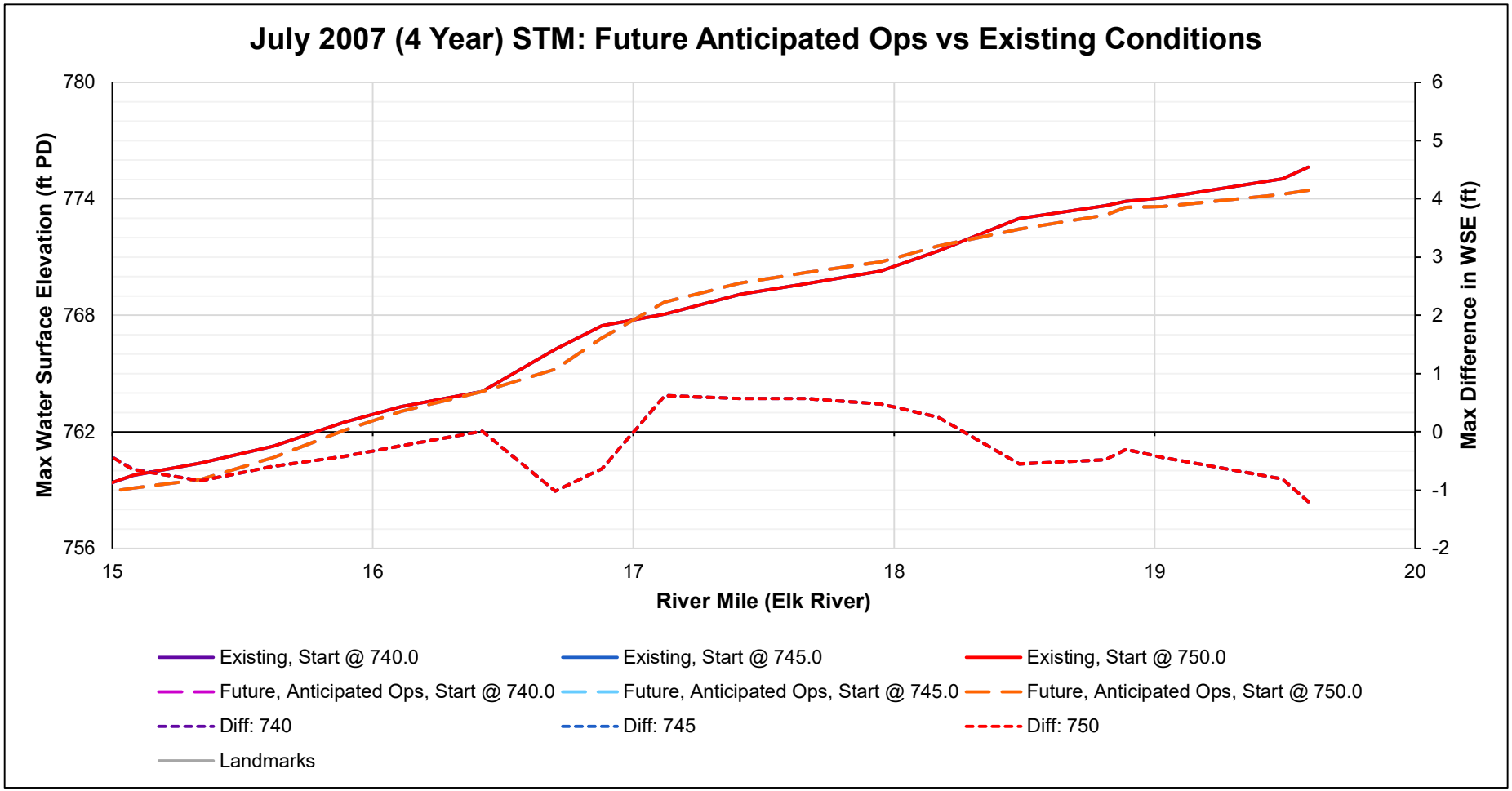

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
774
770
766
762
758
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
130
131
132
133
134
135
136
137
138
139
140
River Mile (Neosho River)
Interstate 44
Tar Creek
Abandoned RR
Highway 125
BN RR
Old Highway 69
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

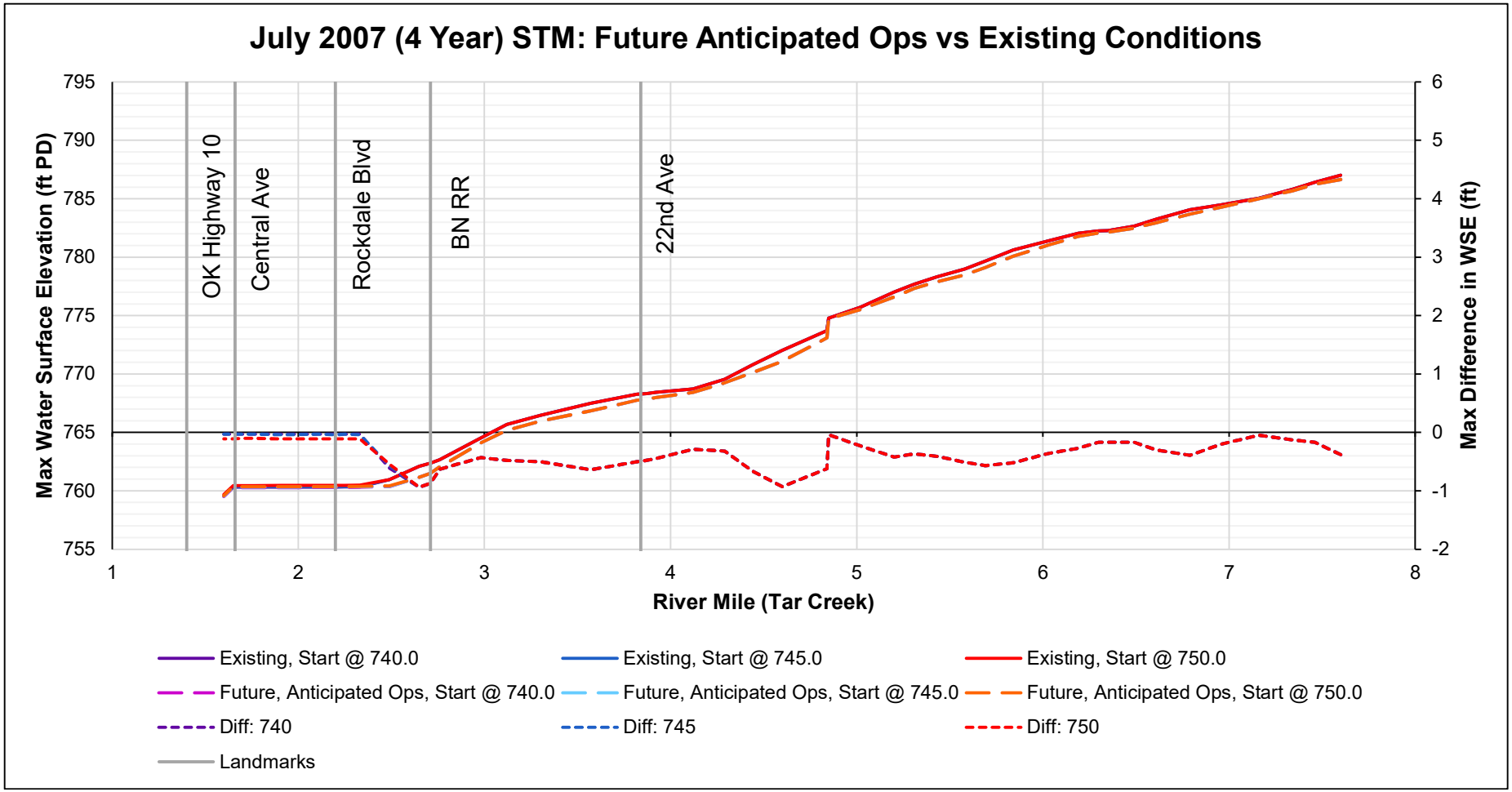

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
E 60 Road
786
782
778
774
770
6
5
4
3
2
1
0
-1
-2
-3
-4
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

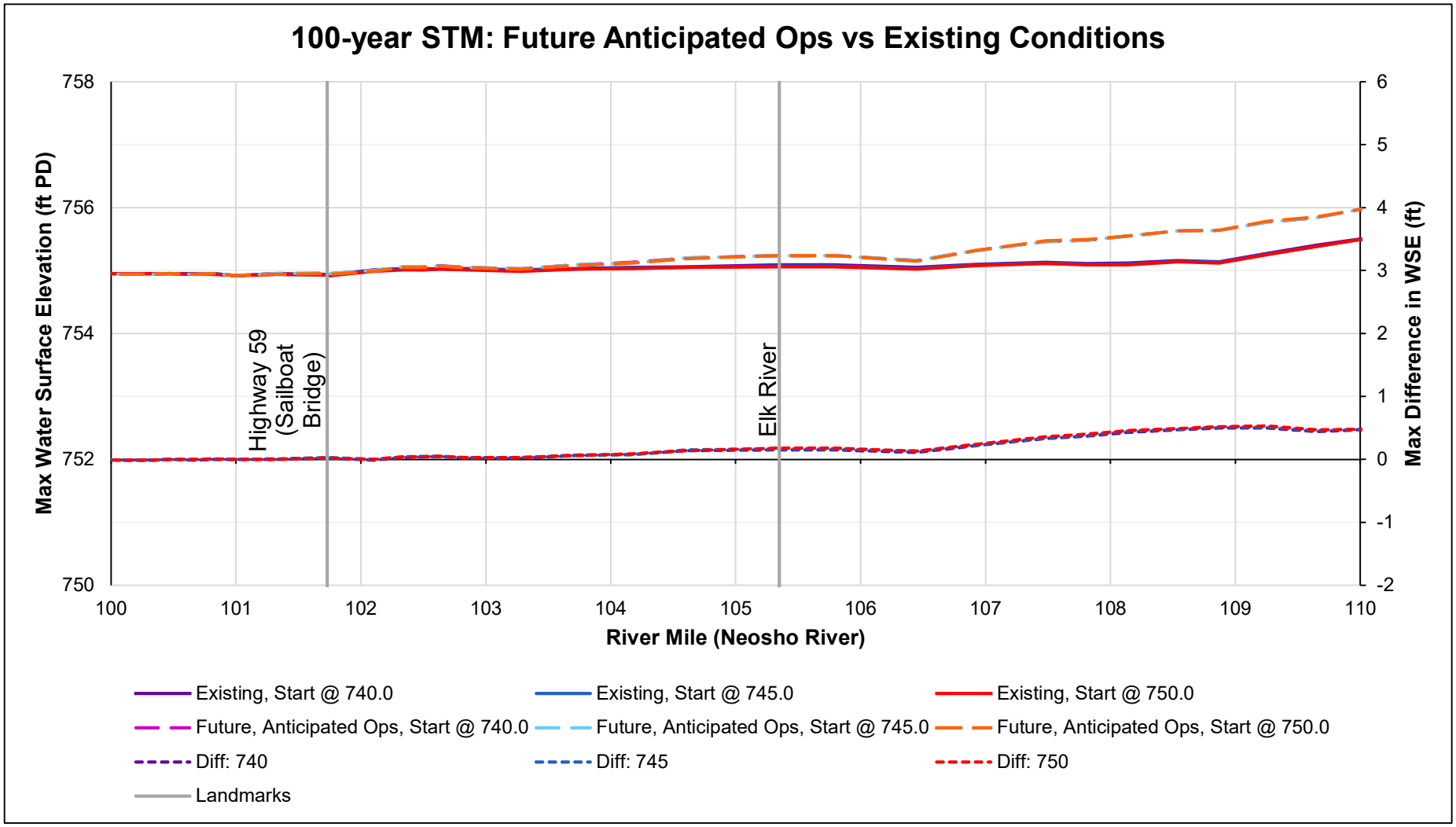

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
762
758
754
750
746
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
Highway 60
OK Highway 10
0
1
2
3
4
5
6
7
8
9
10
River Mile (Spring River)
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

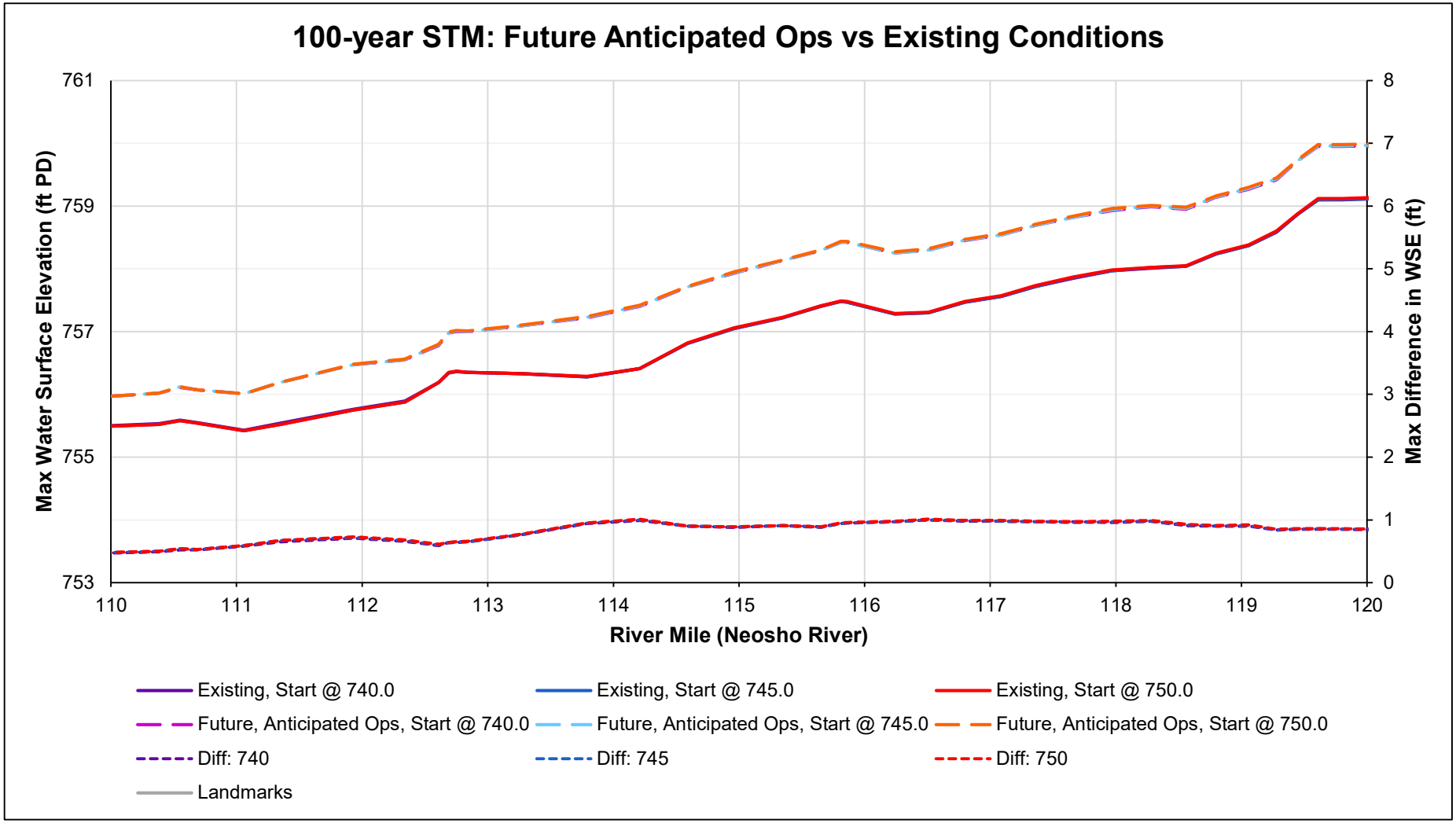

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Spring River)
Interstate 44
E 57 Road
OK/KS State Line
786
778
770
762
754
4
3
2
1
0
-1
-2
-3
-4
10
11
12
13
14
15
16
17
18
19
20
21
22
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

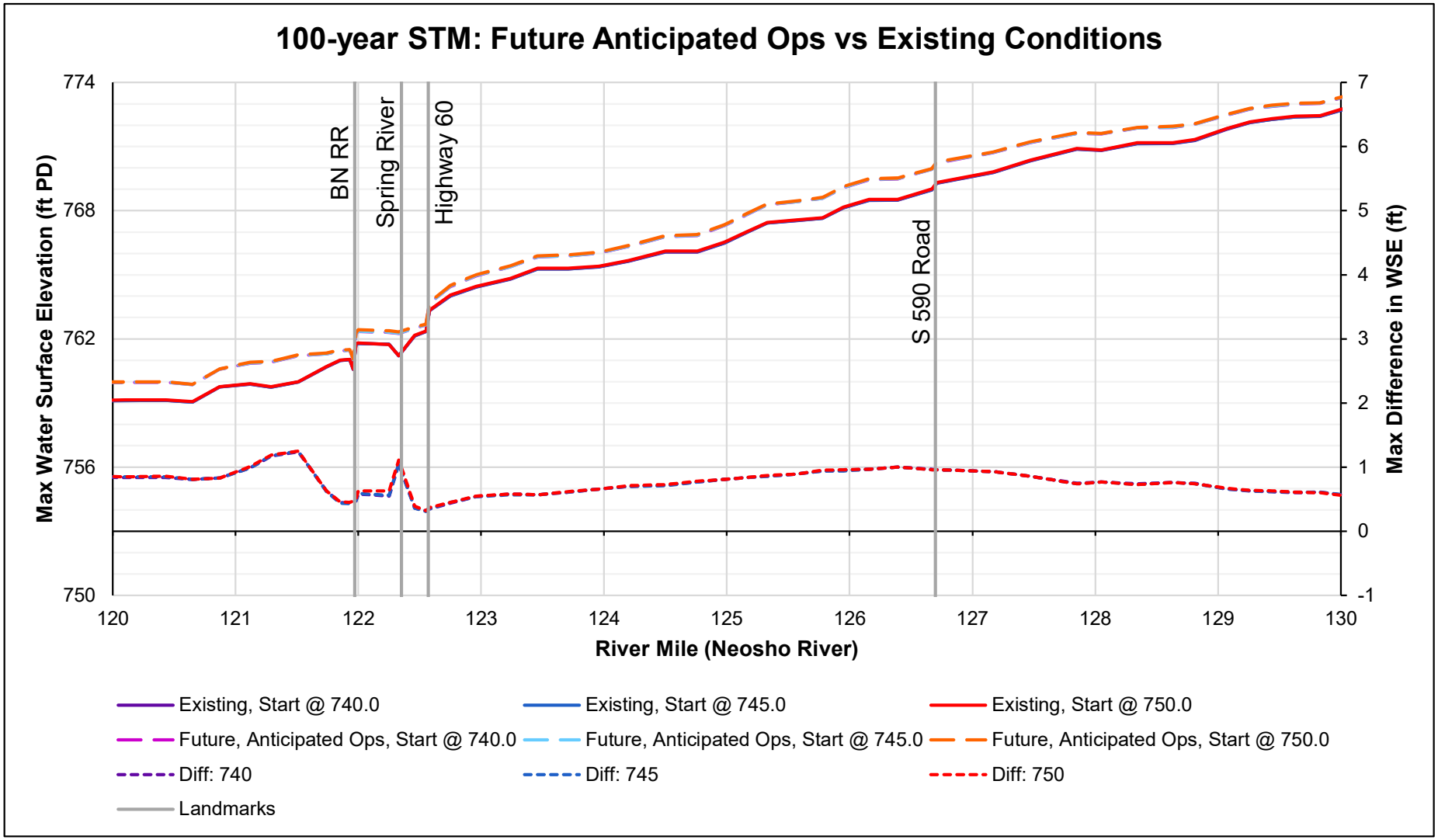

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
762
758
754
750
746
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
OK Highway 10
OK/MO State Line
Highway 43
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
River Mile (Elk River)
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

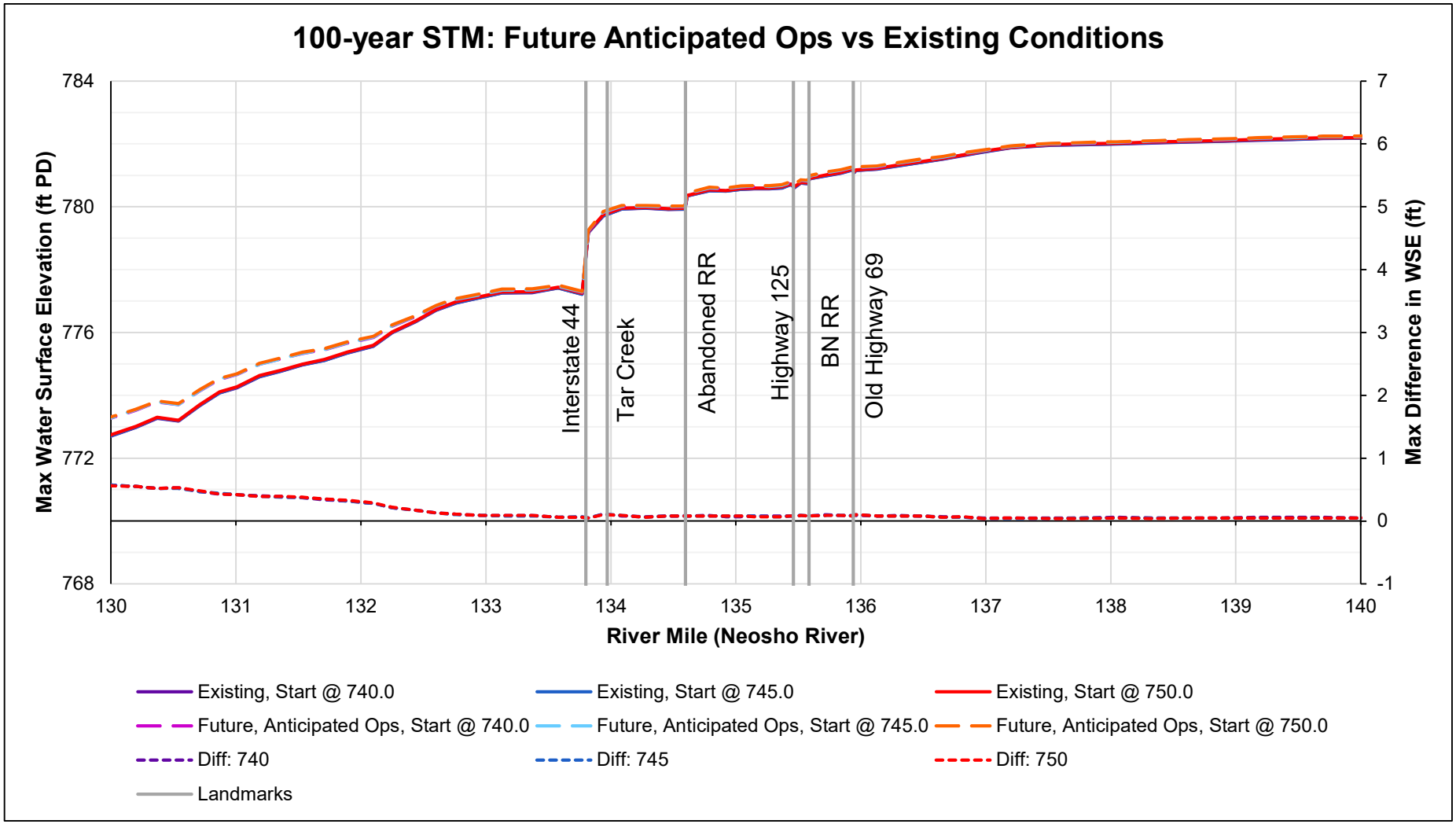

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
780
774
768
762
756
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
15
16
17
18
19
20
River Mile (Elk River)
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

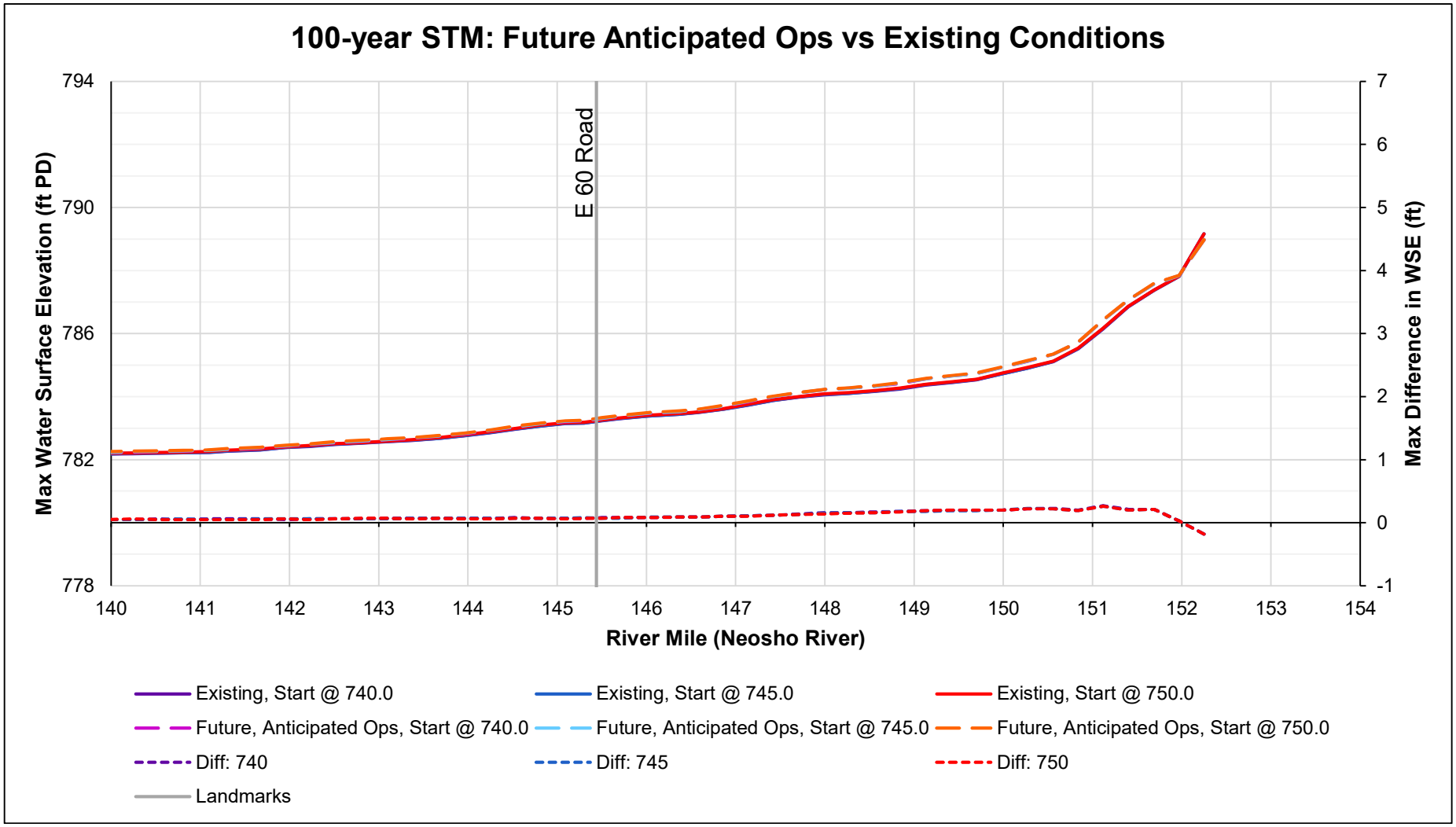

July 2007 (4 Year) STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Tar Creek)
795
790
785
780
775
770
765
760
755
6
5
4
3
2
1
0
-1
-2
1
2
3
4
5
6
7
8
OK Highway 10
Central Ave
Rockdale Blvd
BN RR
22nd Ave
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

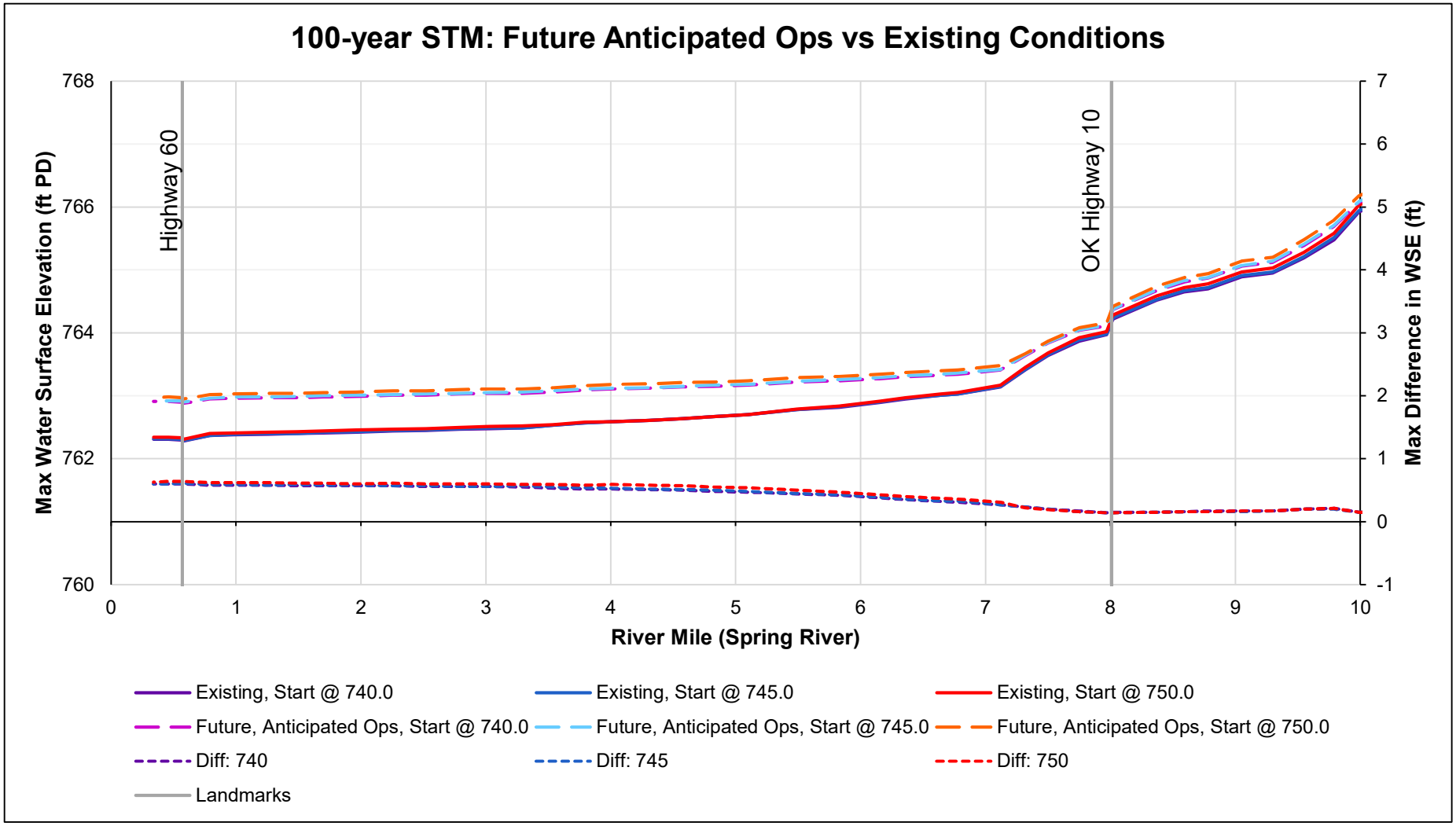

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
100
101
102
103
104
105
106
107
108
109
110
Highway 59 (Sailboat Bridge)
Elk River
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

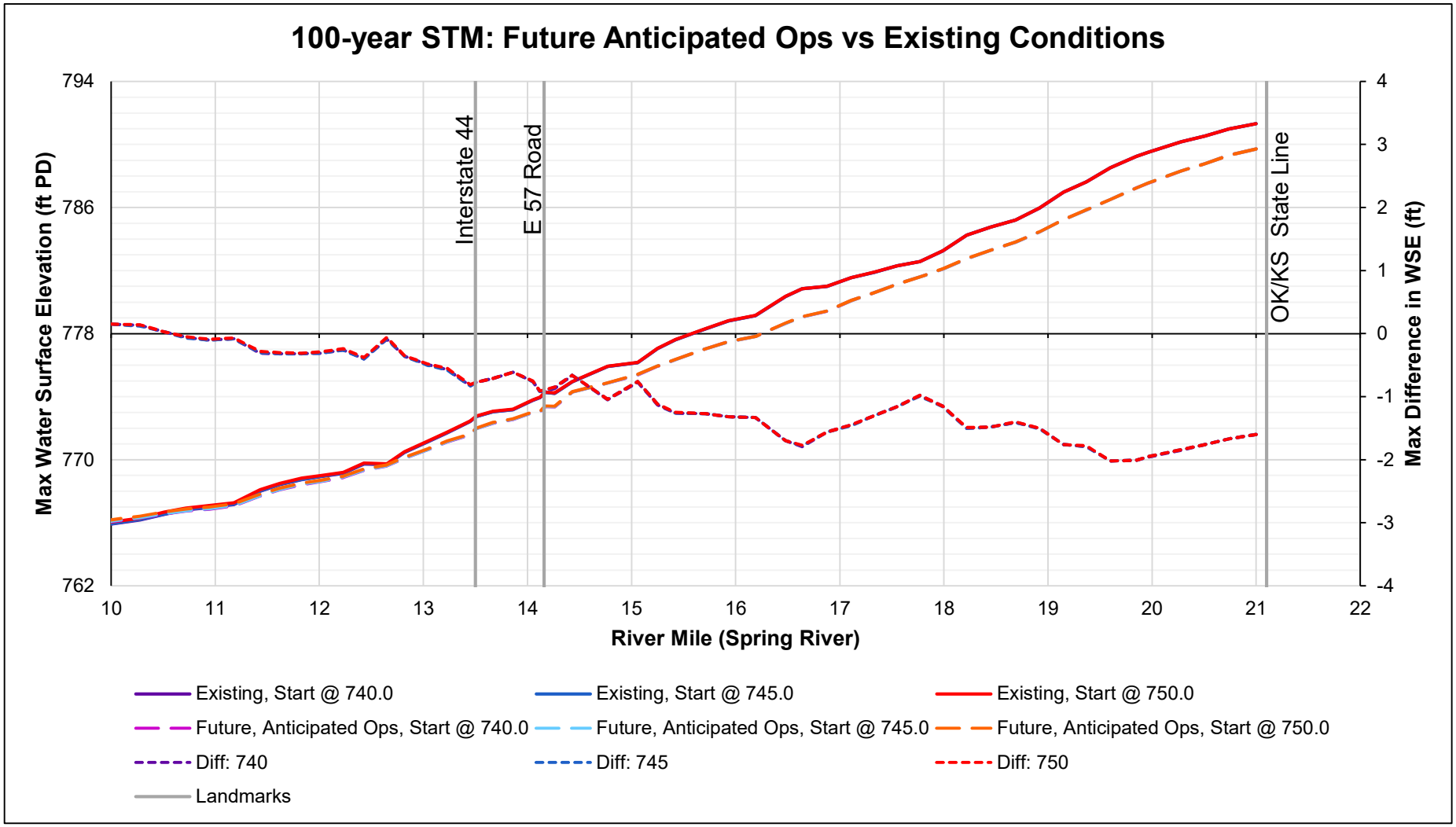

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
761
759
757
755
753
Max Difference in WSE (ft)
8
7
6
5
4
3
2
1
0
110
111
112
113
114
115
116
117
118
119
120
River Mile (Neosho River)
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

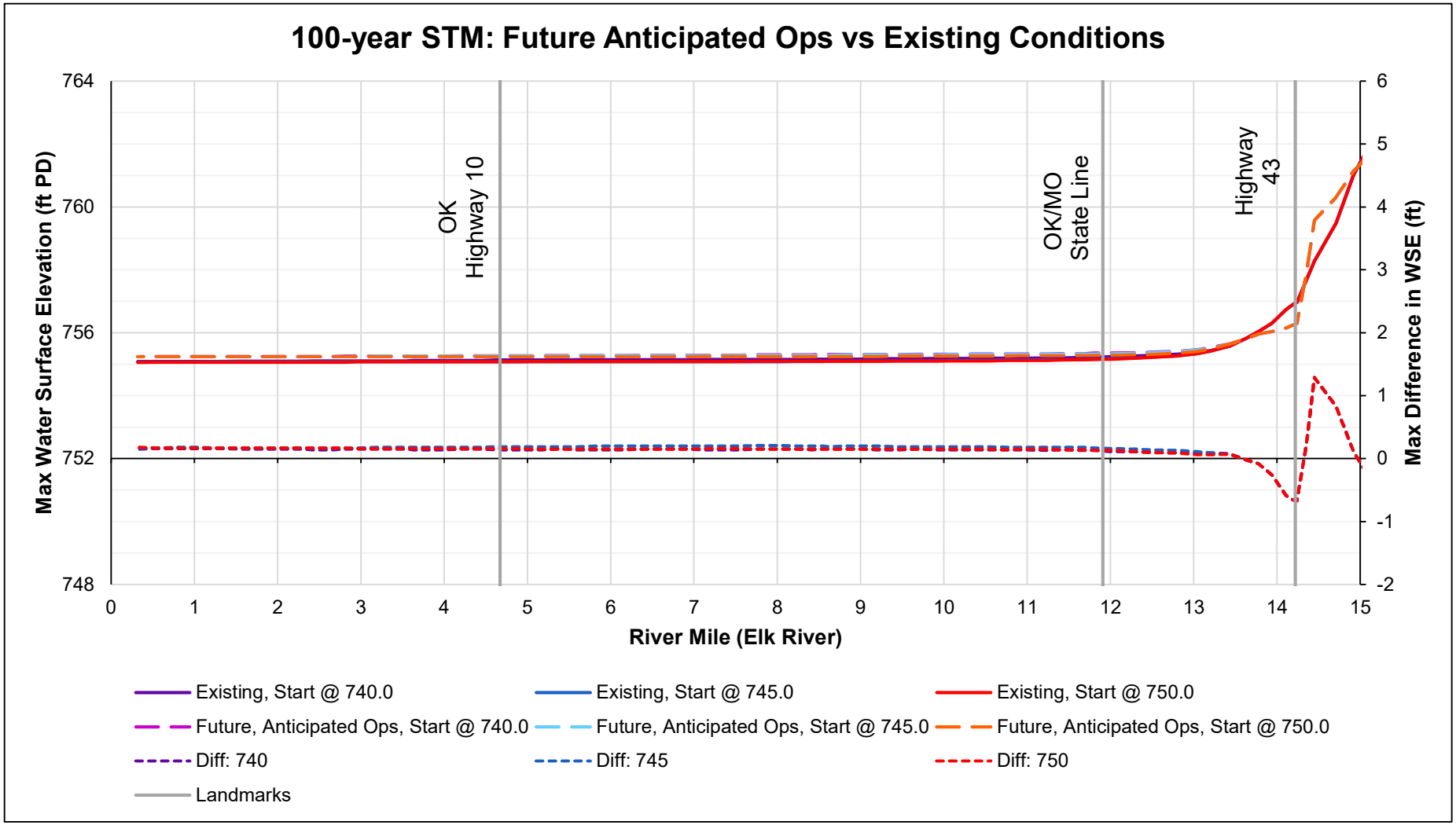

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
774
768
762
756
750
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
120
121
122
123
124
125
126
127
128
129
130
River Mile (Neosho River)
BN RR
Spring River
Highway 60
S 590 Road
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

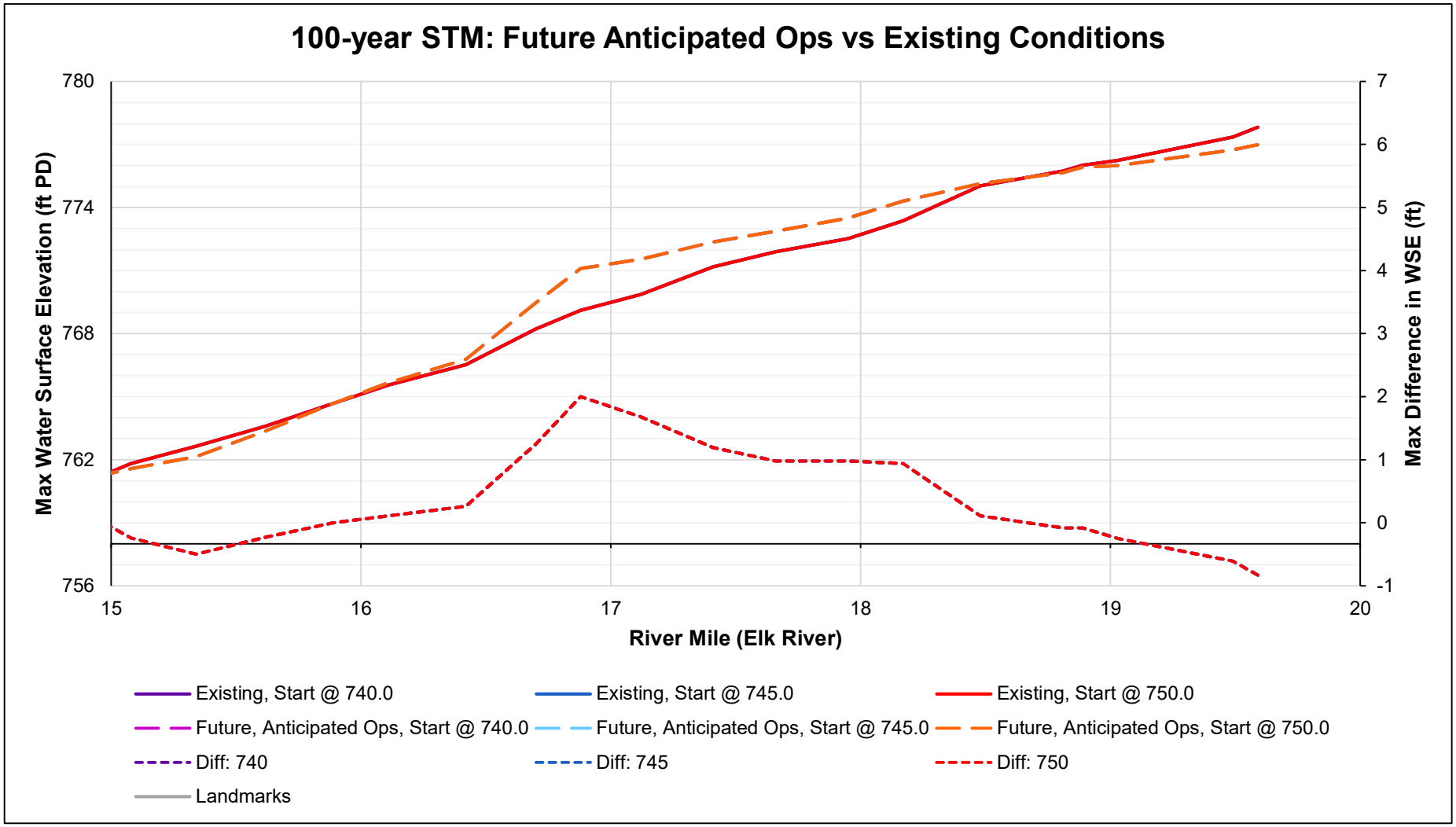

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
784
780
776
772
768
7
6
5
4
3
2
1
0
-1
130
131
132
133
134
135
136
137
138
139
140
Interstate 44
Tar Creek
Abandoned RR
Highway 125
BN RR
Old Highway 69
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

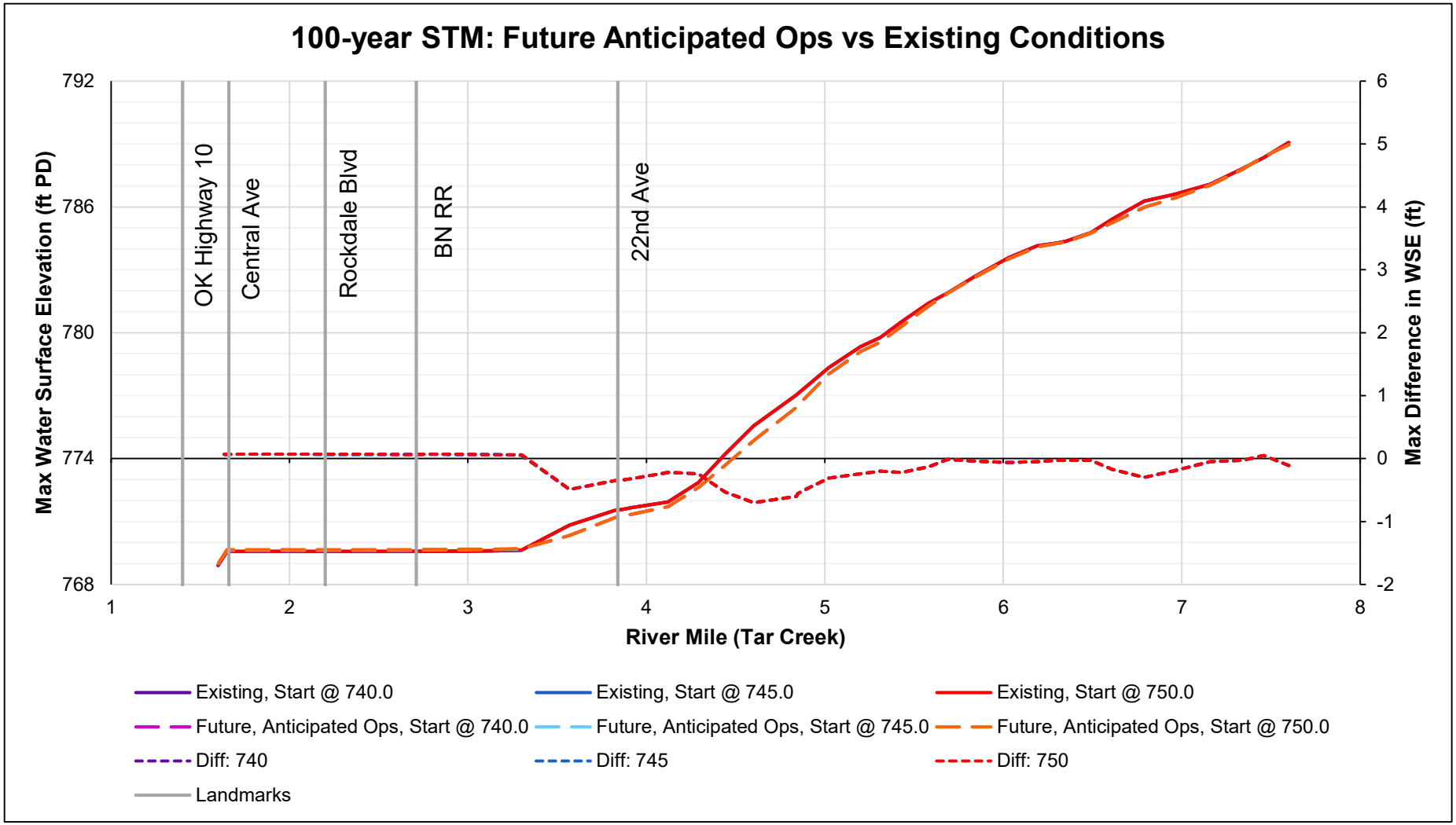

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
E 60 Road
794
790
786
782
778
7
6
5
4
3
2
1
0
-1
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

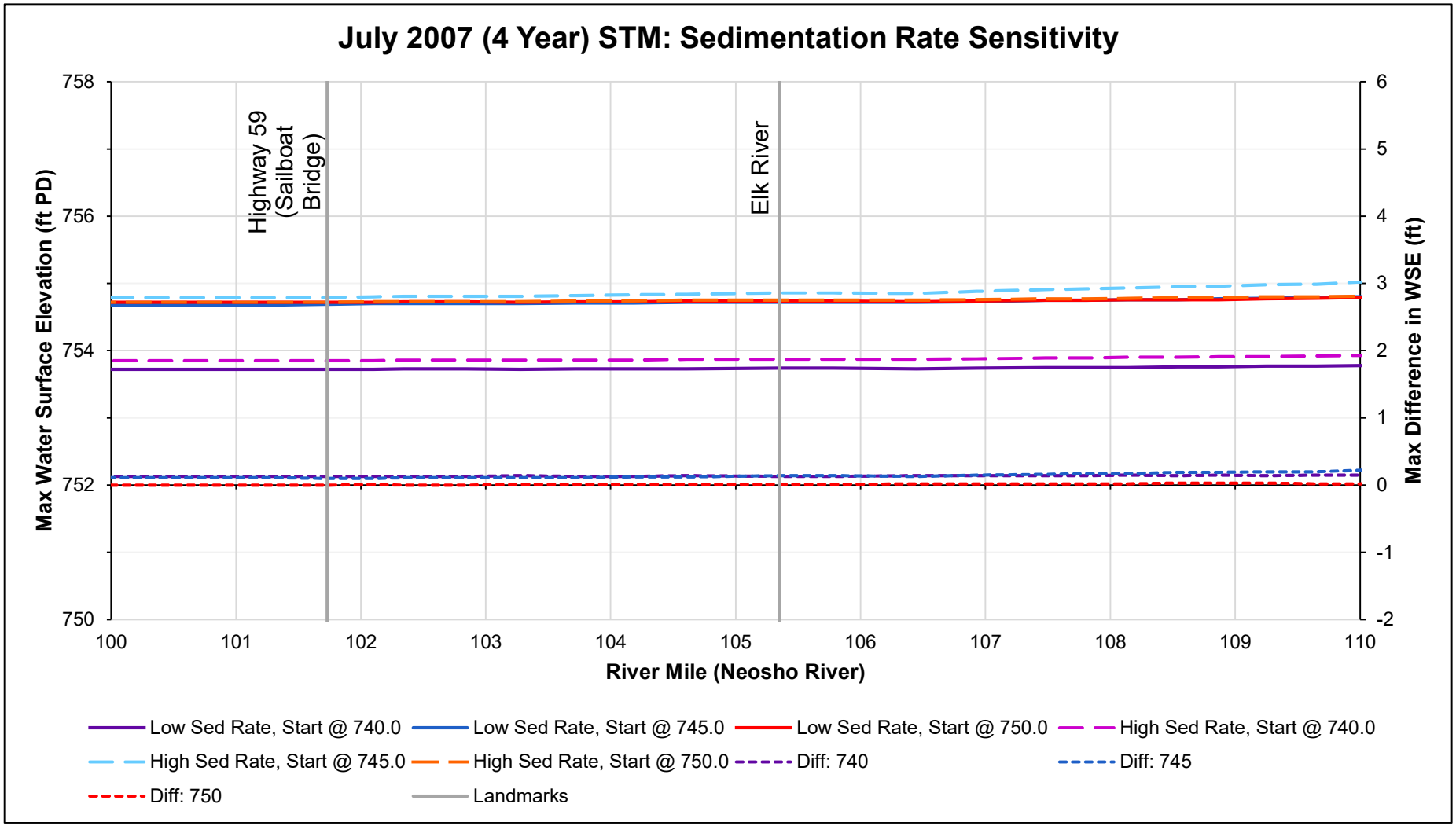

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Spring River)
Highway 60
OK Highway 10
768
766
764
762
760
7
6
5
4
3
2
1
0
-1
0
1
2
3
4
5
6
7
8
9
10
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

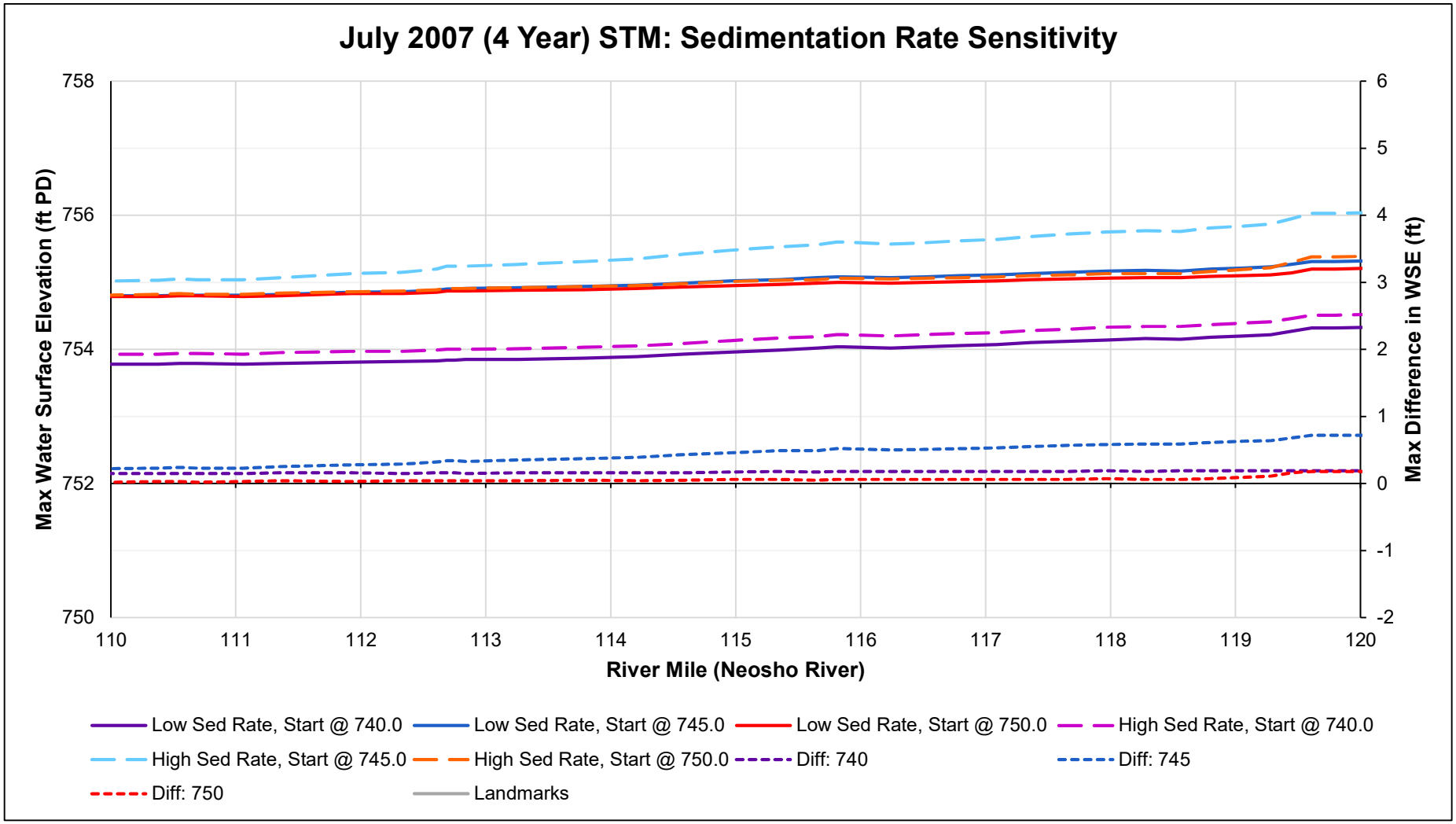

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
794
786
778
770
762
Max Difference in WSE (ft)
4
3
2
1
0
-1
-2
-3
-4
Interstate 44
E 57 Road
OK/KS State Line
10
11
12
13
14
15
16
17
18
19
20
21
22
River Mile (Spring River)
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

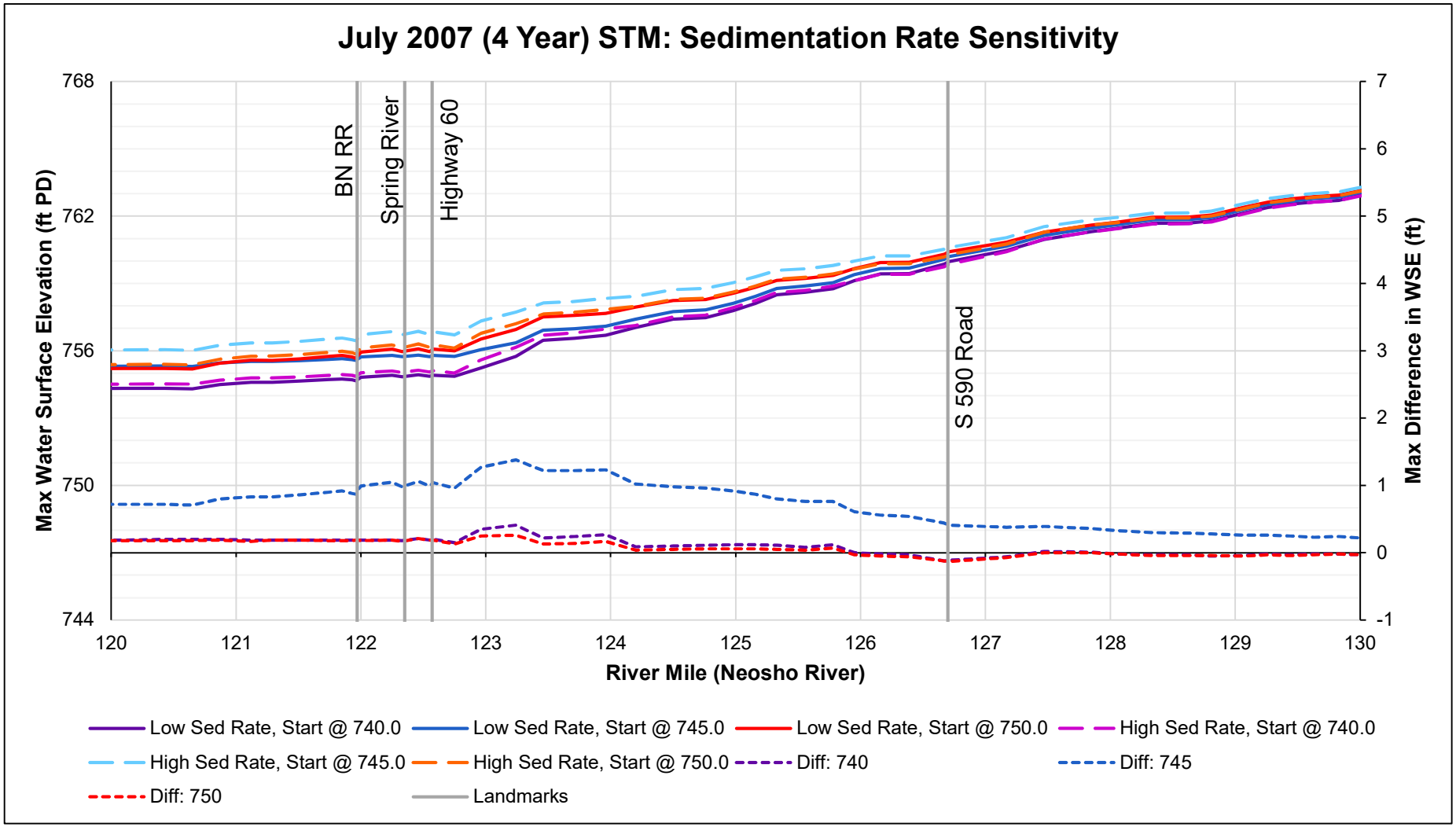

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
764
760
756
752
748
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
River Mile (Elk River)
OK
Highway 10
OK/MO
State Line
Highway
43
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

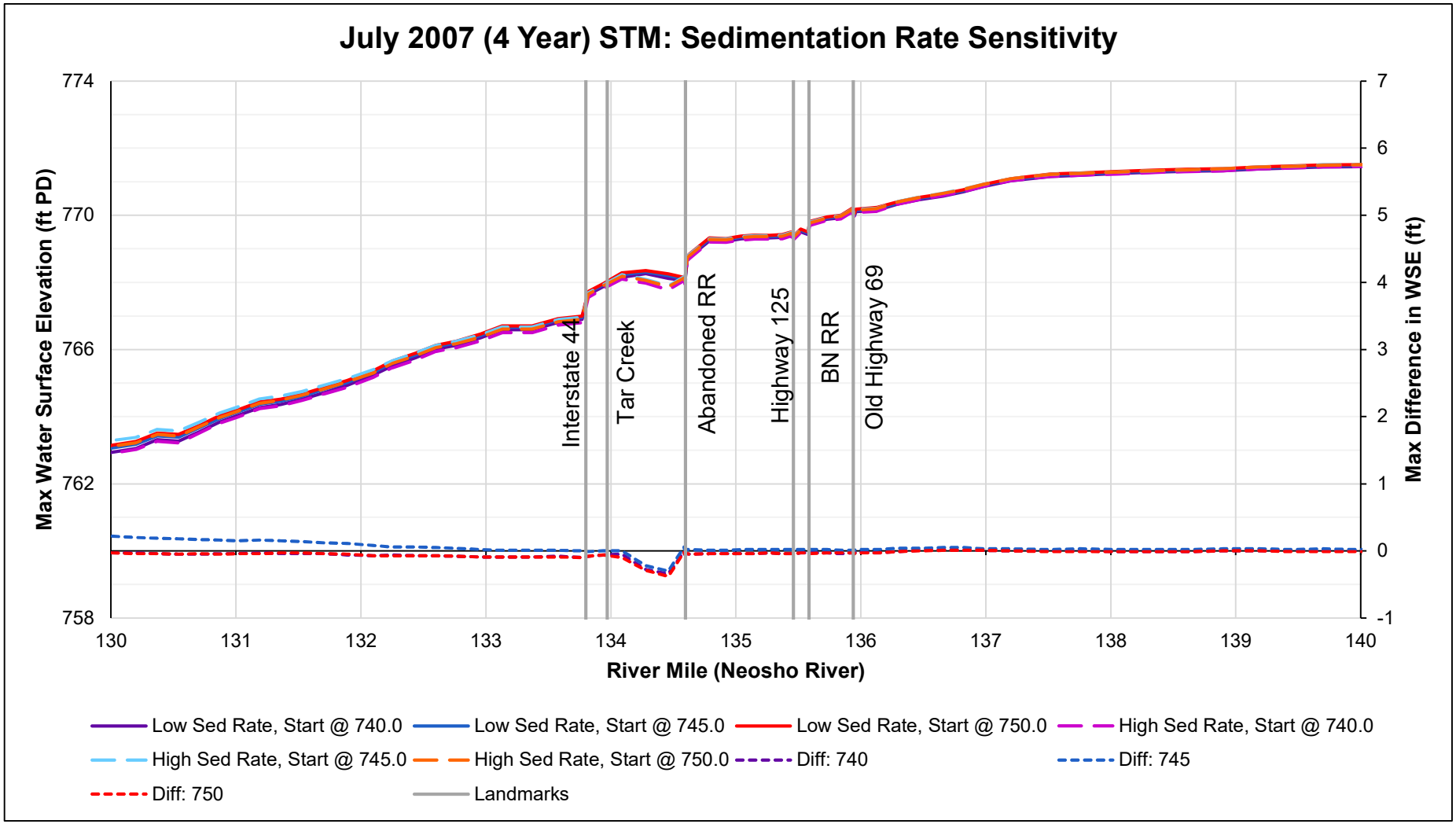

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
780
774
768
762
756
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
15
16
17
18
19
20
River Mile (Elk River)
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

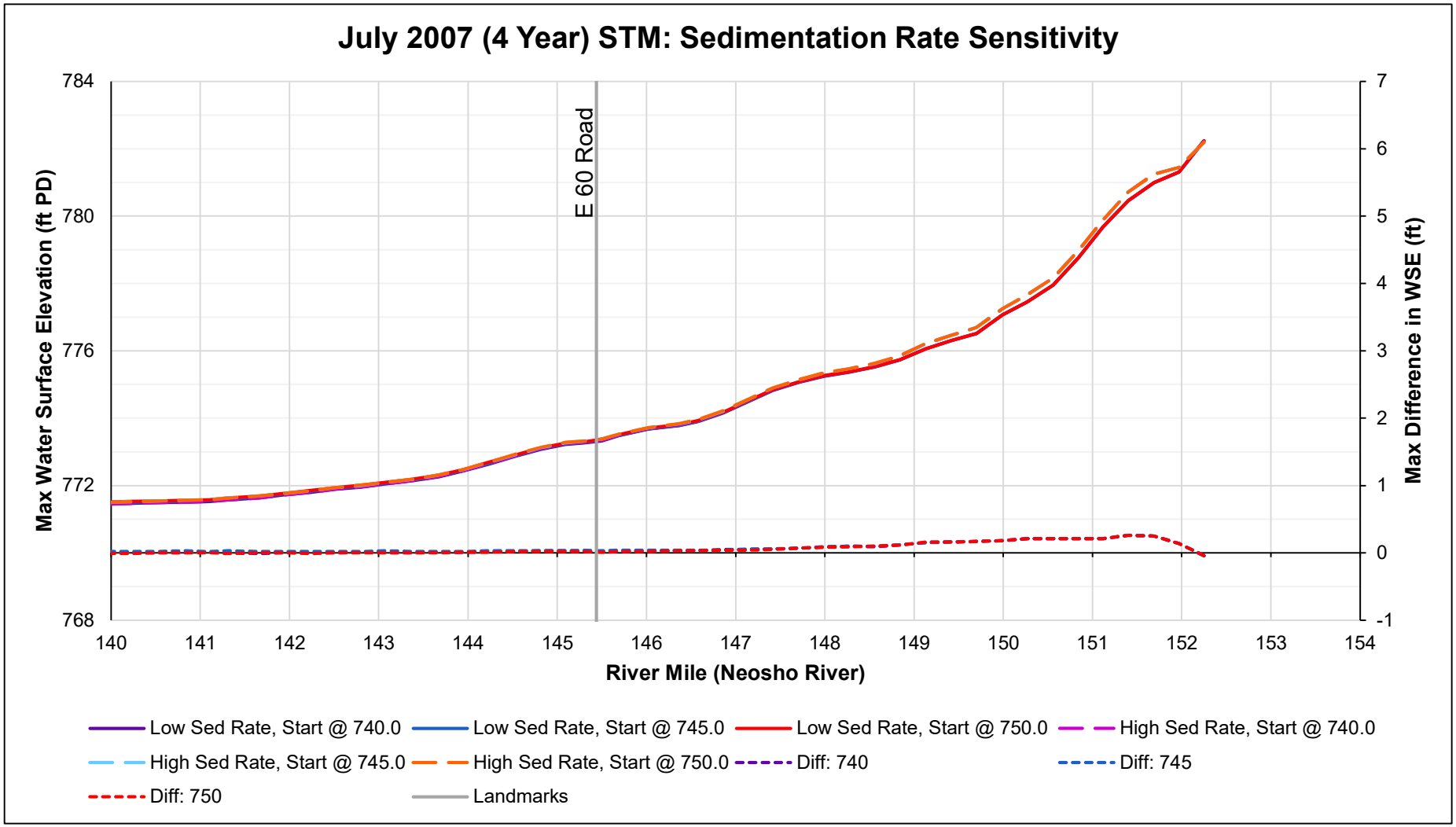

100-year STM: Future Anticipated Ops vs Existing Conditions
Max Water Surface Elevation (ft PD)
792
786
780
774
768
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
OK Highway 10
Central Ave
Rockdale Blvd
BN RR
22nd Ave
1
2
3
4
5
6
7
8
River Mile (Tar Creek)
Existing, Start @ 740.0
Existing, Start @ 745.0
Existing, Start @ 750.0
Future, Anticipated Ops, Start @ 740.0
Future, Anticipated Ops, Start @ 745.0
Future, Anticipated Ops, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

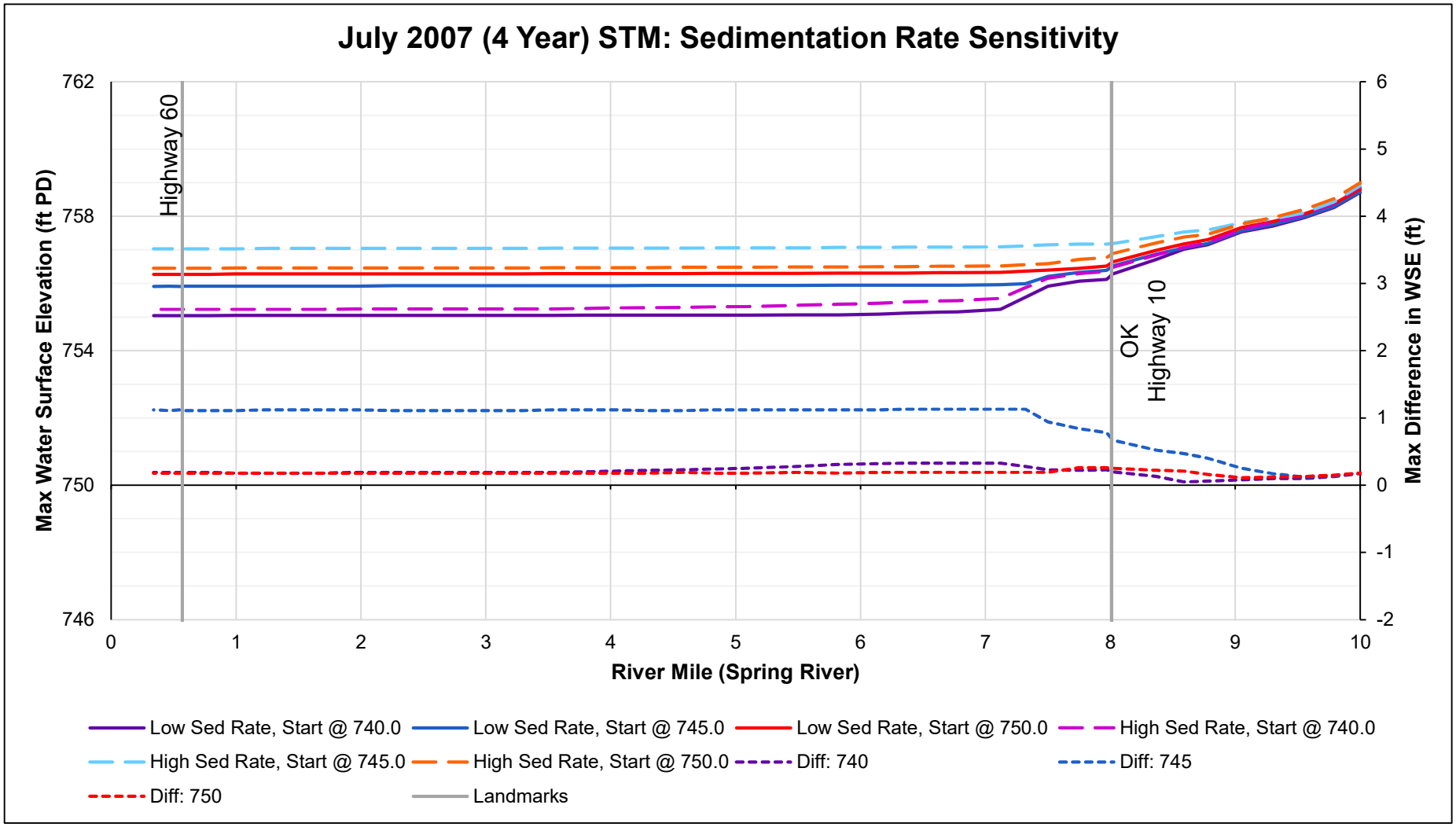

July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
Highway 59 (Sailboat Bridge)
Elk River
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
100
101
102
103
104
105
106
107
108
109
110
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

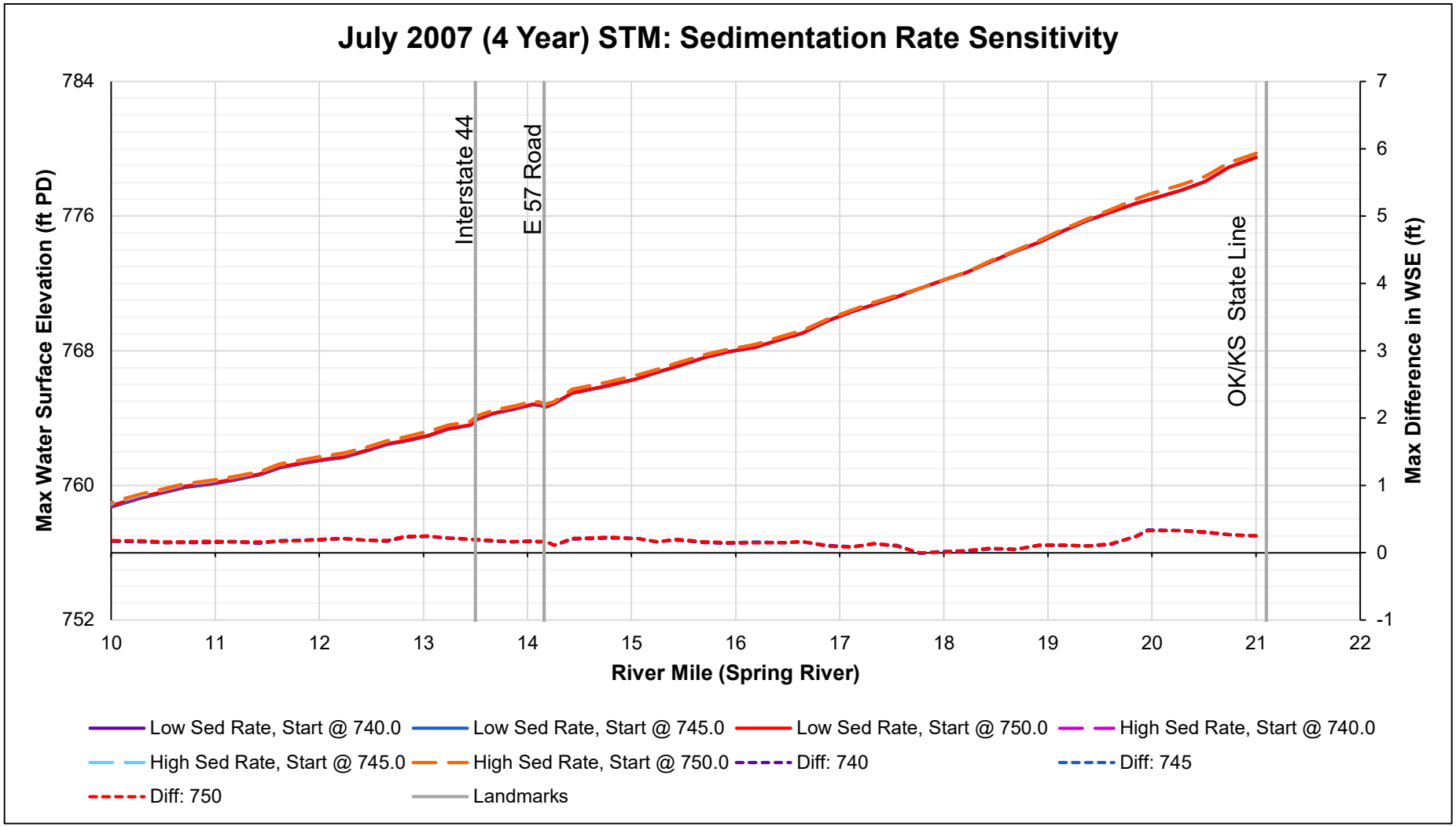

July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
110
111
112
113
114
115
116
117
118
119
120
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
768
762
756
750
744
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
BN RR
Spring River
Highway 60
S 590 Road
120
121
122
123
124
125
126
127
128
129
130
River Mile (Neosho River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
774
770
766
762
758
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
130
131
132
133
134
135
136
137
138
139
140
River Mile (Neosho River)
Interstate 44
Tar Creek
Abandoned RR
Highway 125
BN RR
Old Highway 69
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
E 60 Road
784
780
776
772
768
7
6
5
4
3
2
1
0
-1
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
762
758
754
750
746
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
Highway 60
OK
Highway 10
0
1
2
3
4
5
6
7
8
9
10
River Mile (Spring River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
784
776
768
760
752
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
Interstate 44
E 57 Road
OK/KS State Line
10
11
12
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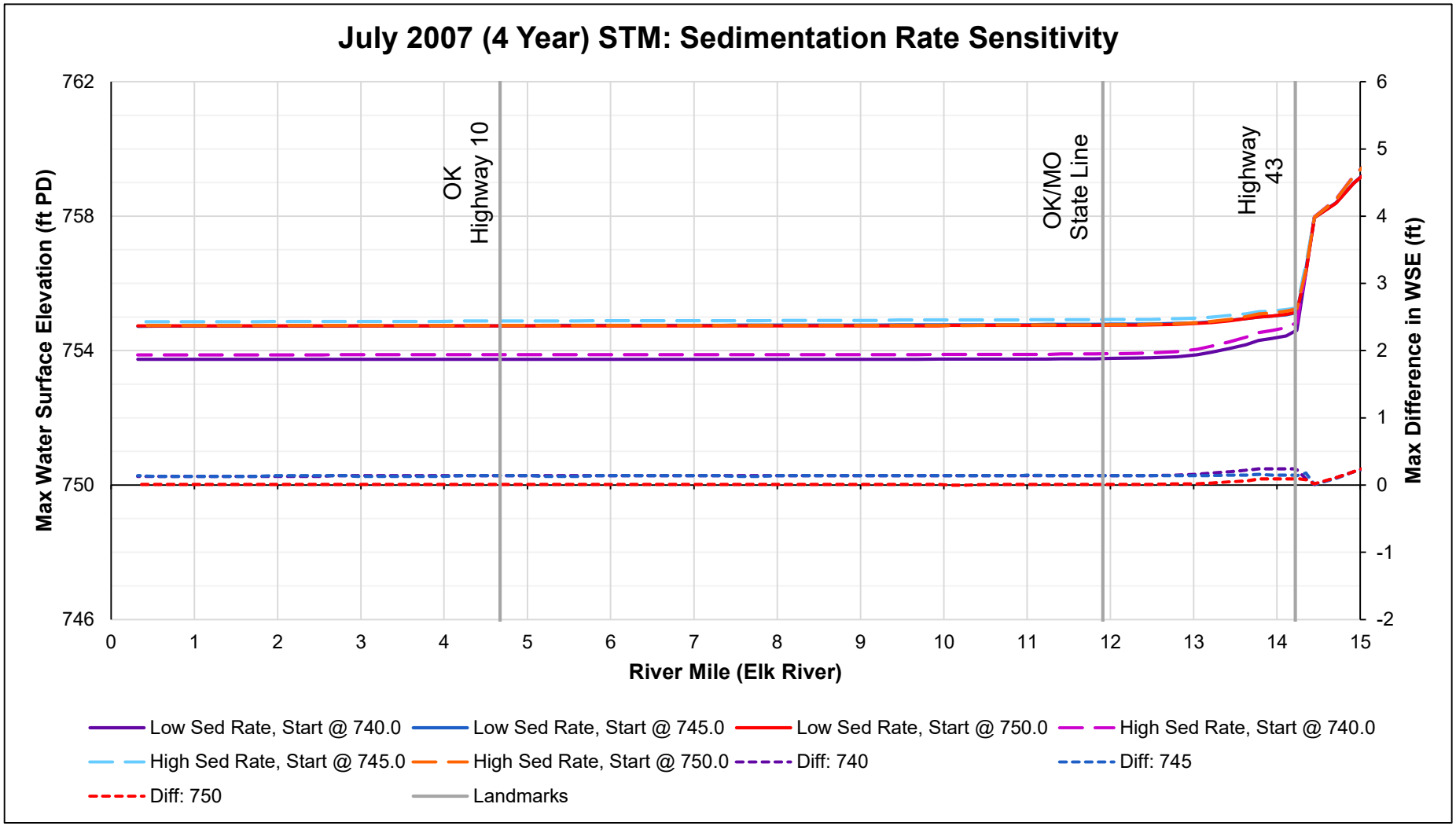
14
15
16
17
18
19
20
21
22
River Mile (Spring River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
762
758
754
750
746
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
OK
Highway 10
OK/MO
State Line
Highway
43
0
1
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4
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6
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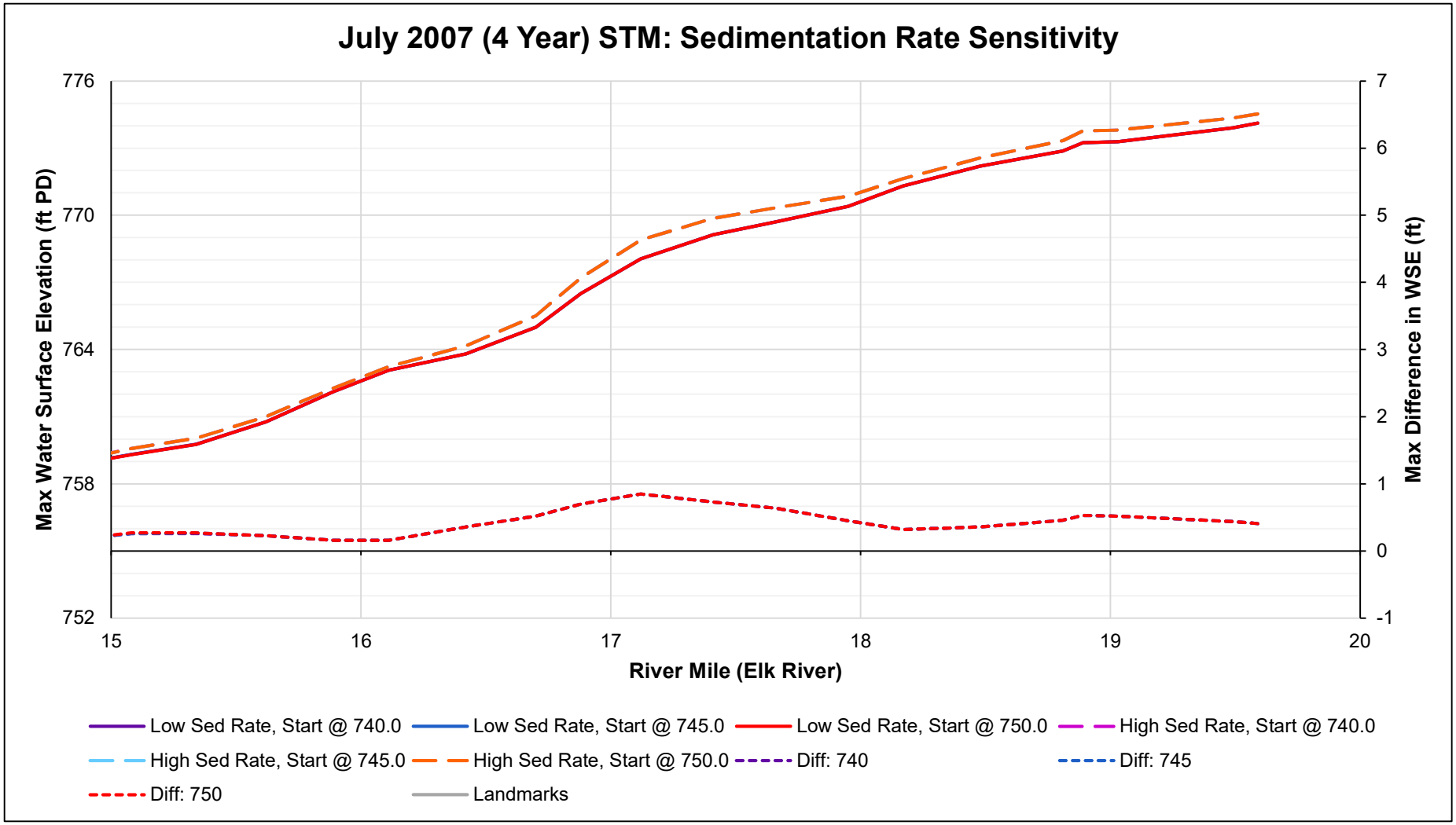
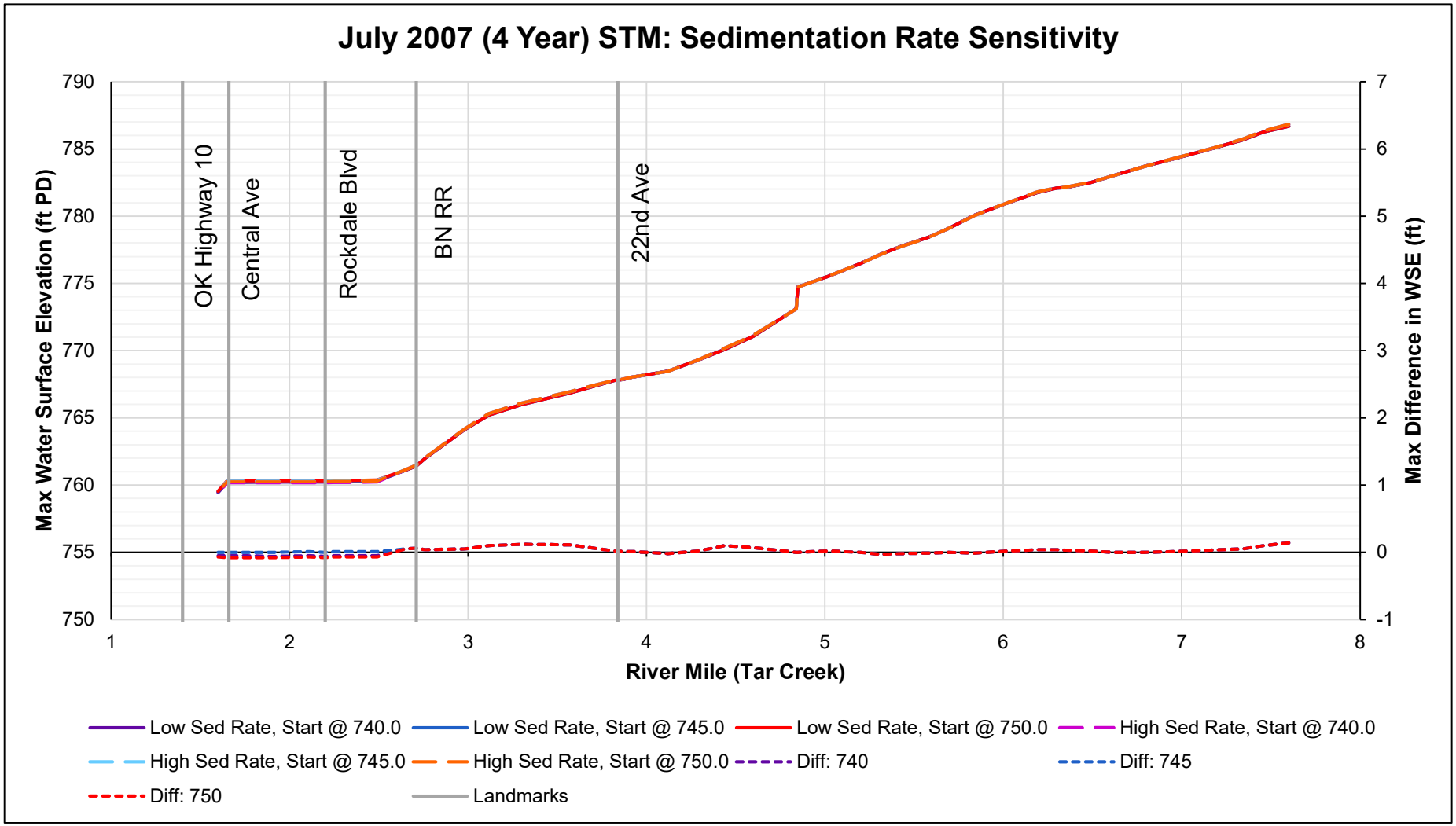
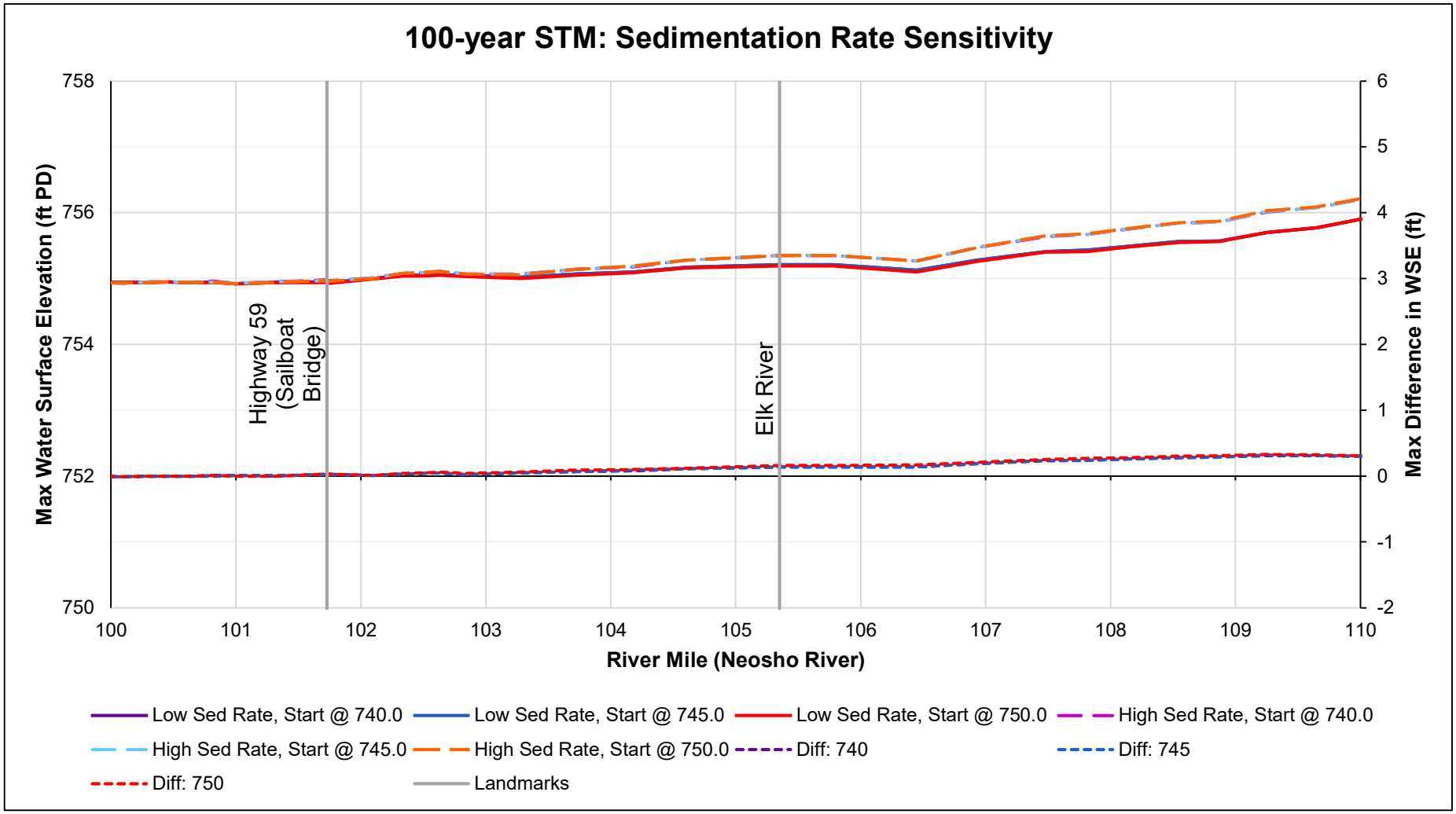
10
11
12
13
14
15
River Mile (Elk River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
776
770
764
758
752
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
15
16
17
18
19
20
River Mile (Elk River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


July 2007 (4 Year) STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
790
785
780
775
770
765
760
755
750
OK Highway 10
Central Ave
Rockdale Blvd
BN RR
22nd Ave
1
2
3
4
5
6
7
8
River Mile (Tar Creek)
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
Highway 59 (Sailboat Bridge)
Elk River
758
756
754
752
750
6
5
4
3
2
1
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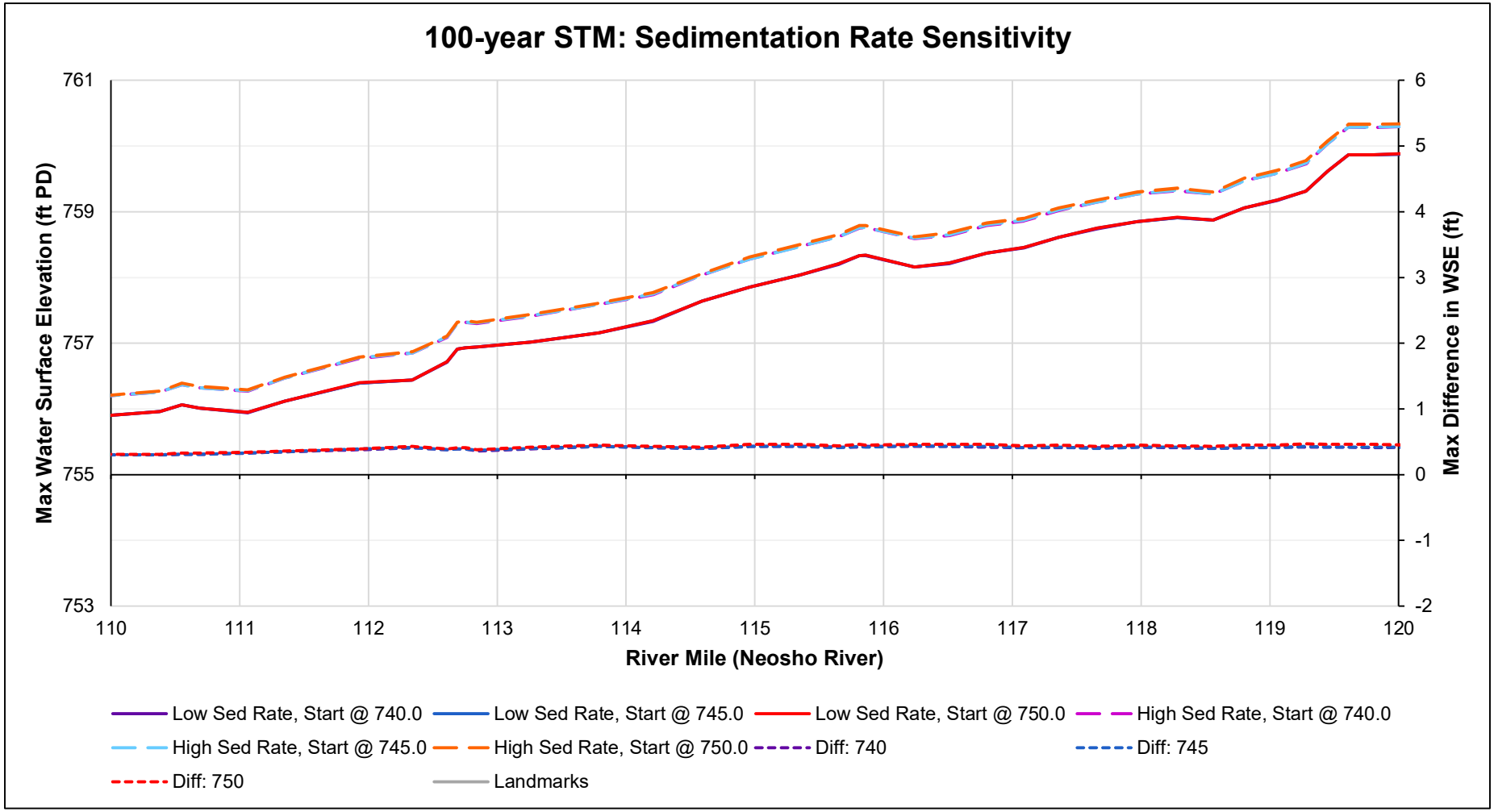
-1
-2
100
101
102
103
104
105
106
107
108
109
110
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
761
759
757
755
753
Max Difference in WSE (ft)
6
5
4
3
2
1
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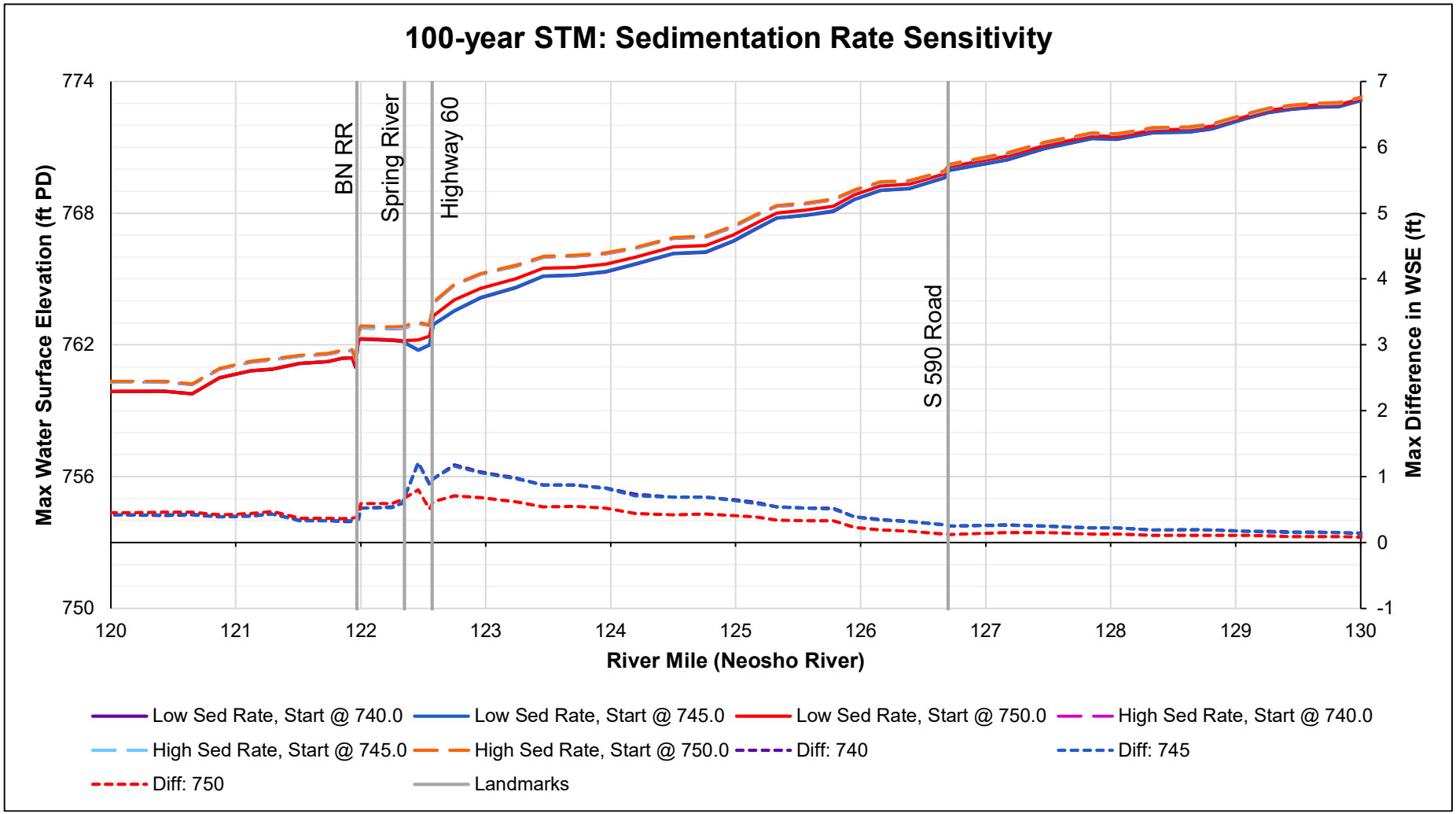
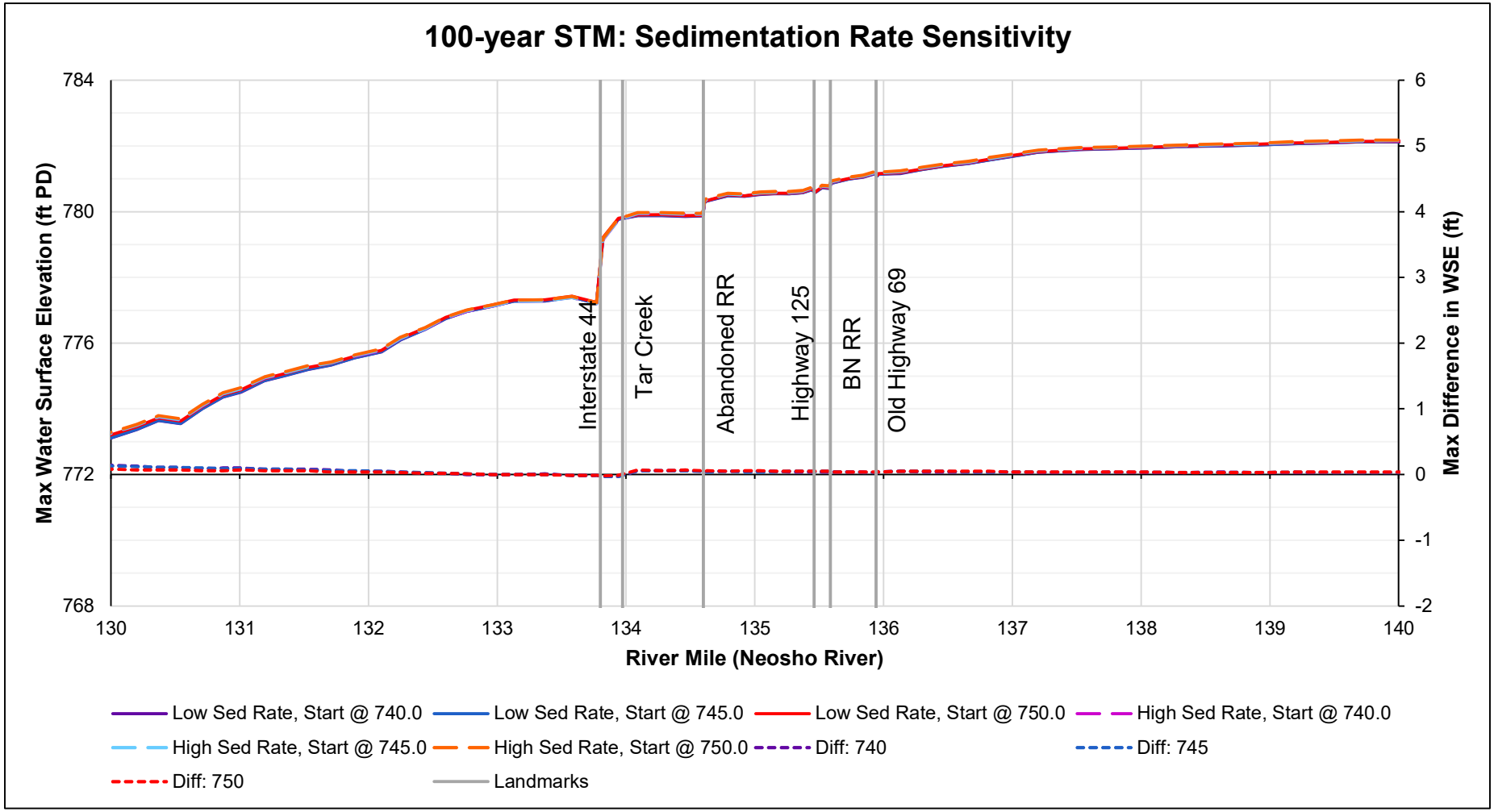
-1
-2
110
111
112
113
114
115
116
117
118
119
120
River Mile (Neosho River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
774
768
762
756
750
BN RR
Spring River
Highway 60
S 590 Road
120
121
122
123
124
125
126
127
128
129
130
River Mile (Neosho River)
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
784
780
776
772
768
6
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130
131
132
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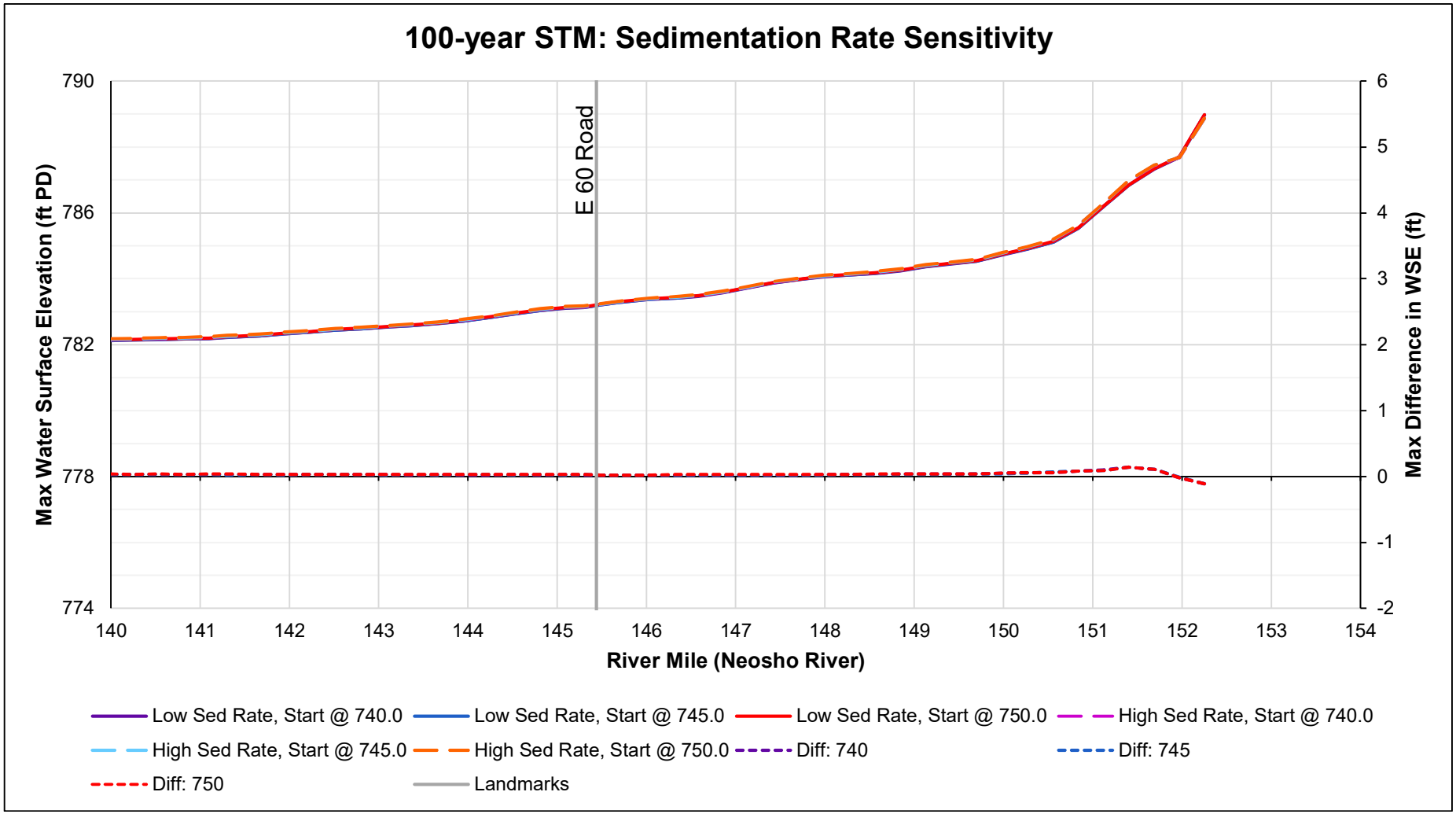
134
135
136
137
138
139
140
Interstate 44
Tar Creek
Abandoned RR
Highway 125
BN RR
Old Highway 69
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
790
786
782
778
774
Max Difference in WSE (ft)
6
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-2
E 60 Road
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142
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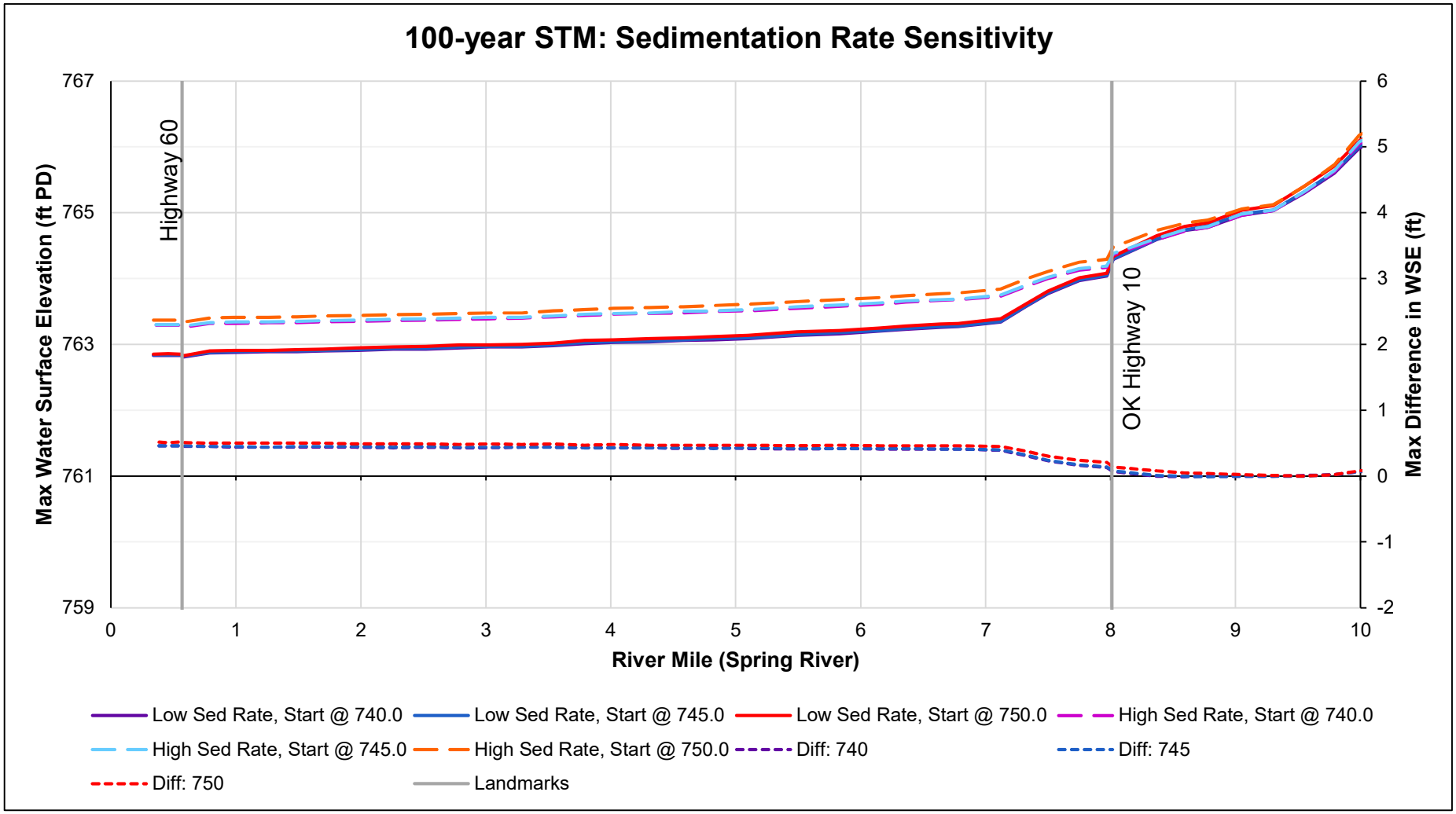
River Mile (Neosho River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Spring River)
Highway 60
OK Highway 10
767
765
763
761
759
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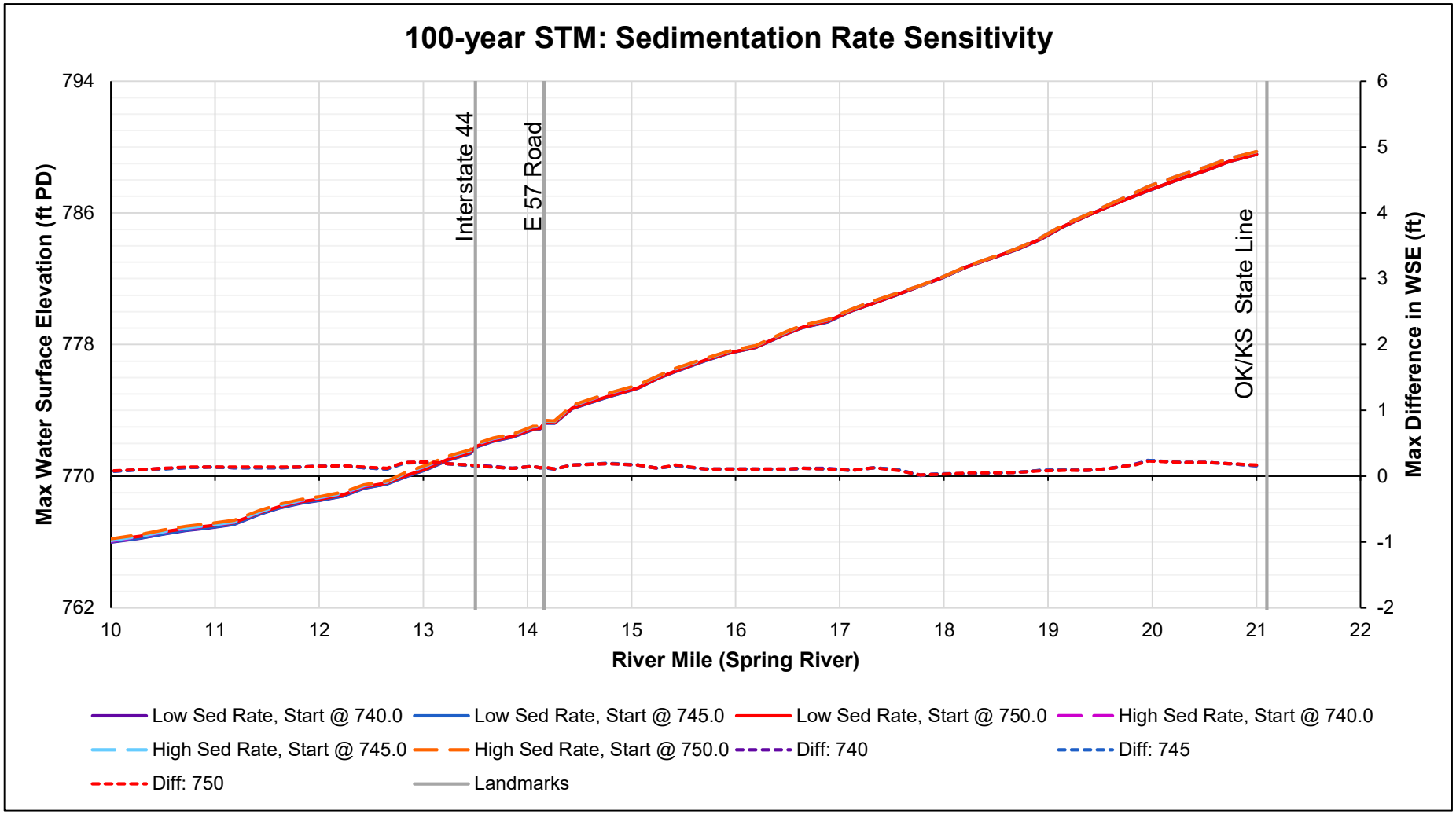
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
794
786
778
770
762
Max Difference in WSE (ft)
6
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-2
Interstate 44
E 57 Road
OK/KS State Line
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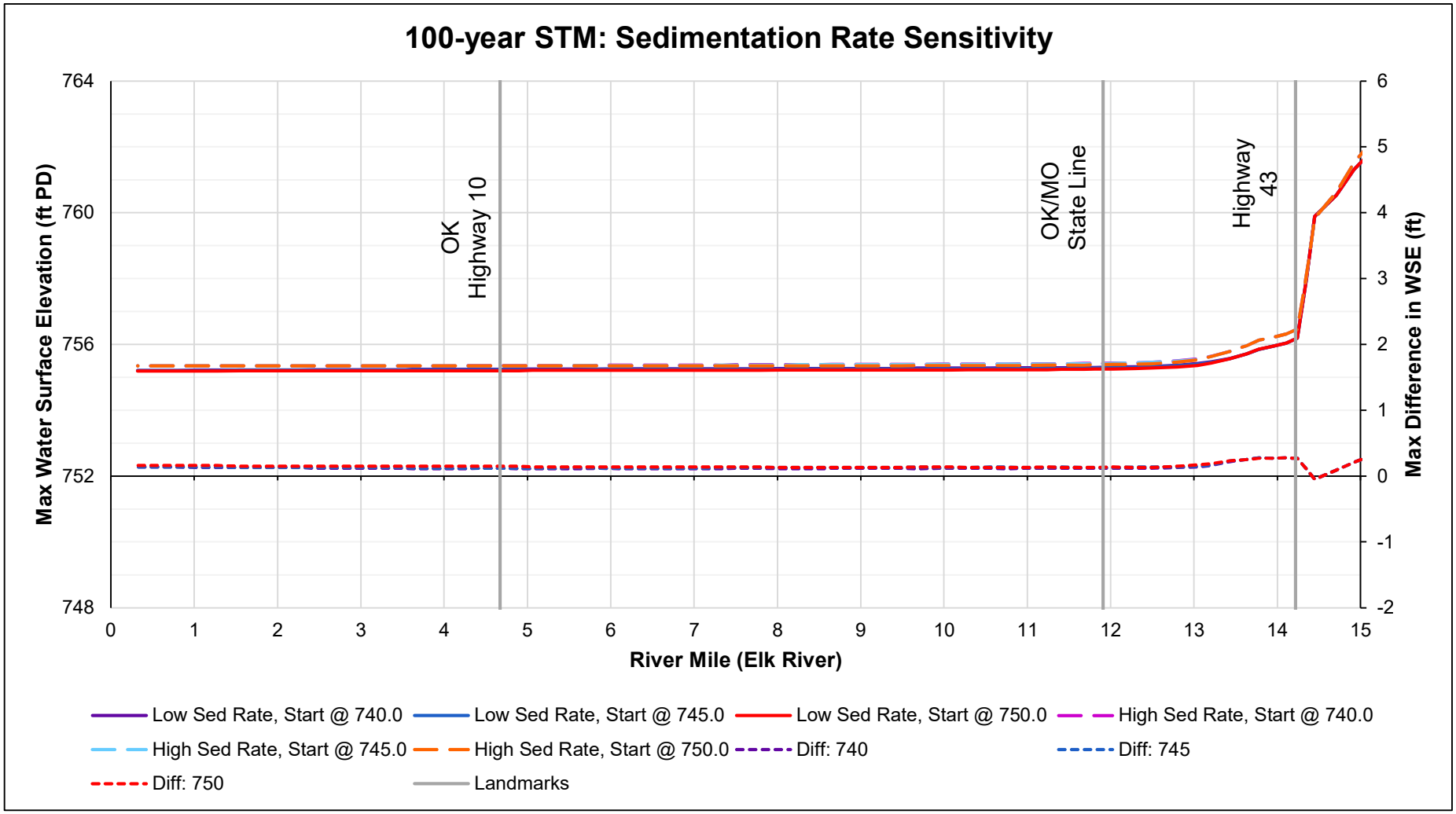
21
22
River Mile (Spring River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
764
760
756
752
748
Max Difference in WSE (ft)
6
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OK
Highway 10
OK/MO
State Line
Highway
43
0
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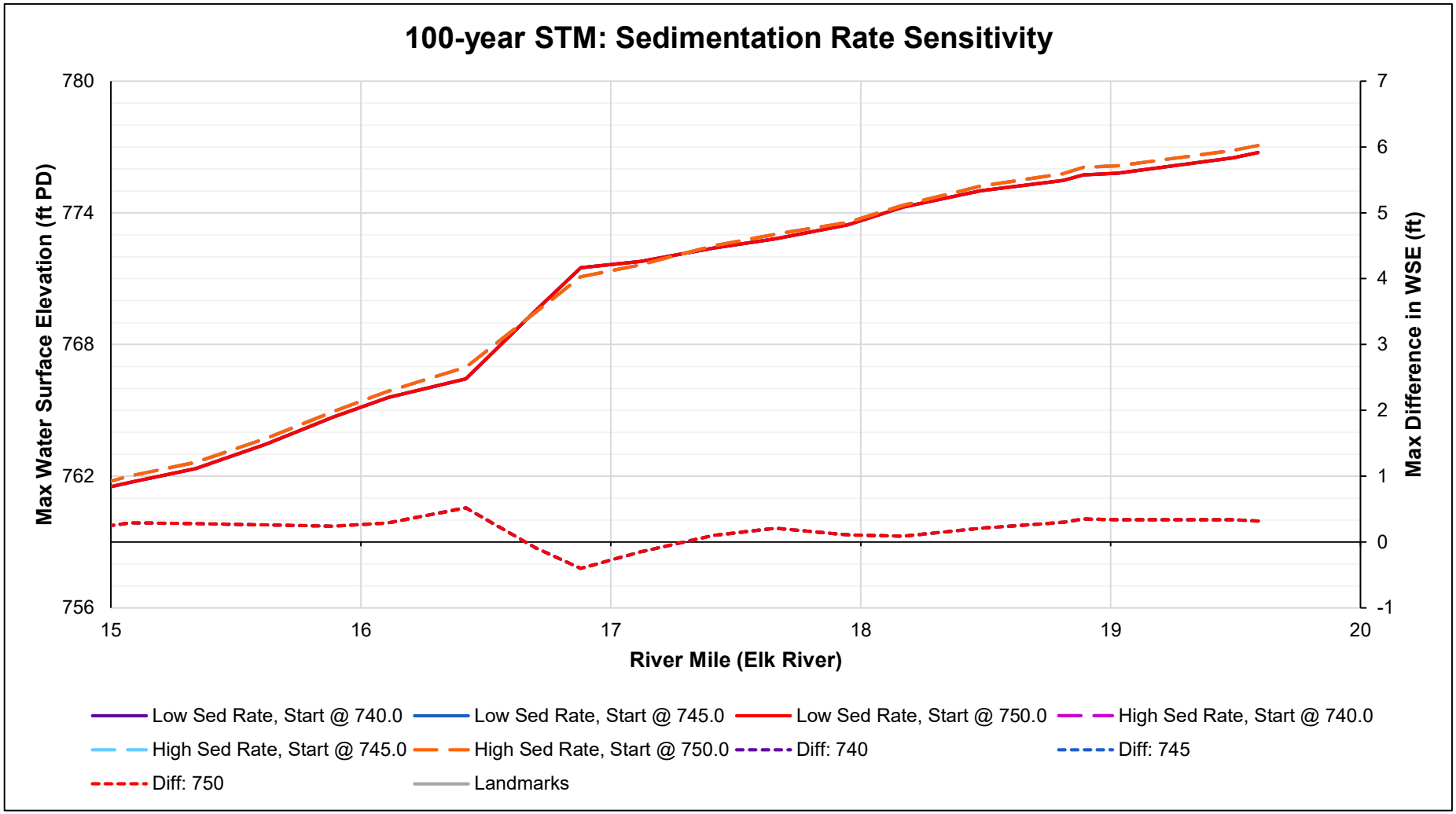
14
15
River Mile (Elk River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
780
774
768
762
756
Max Difference in WSE (ft)
7
6
5
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3
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1
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-1
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16
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18
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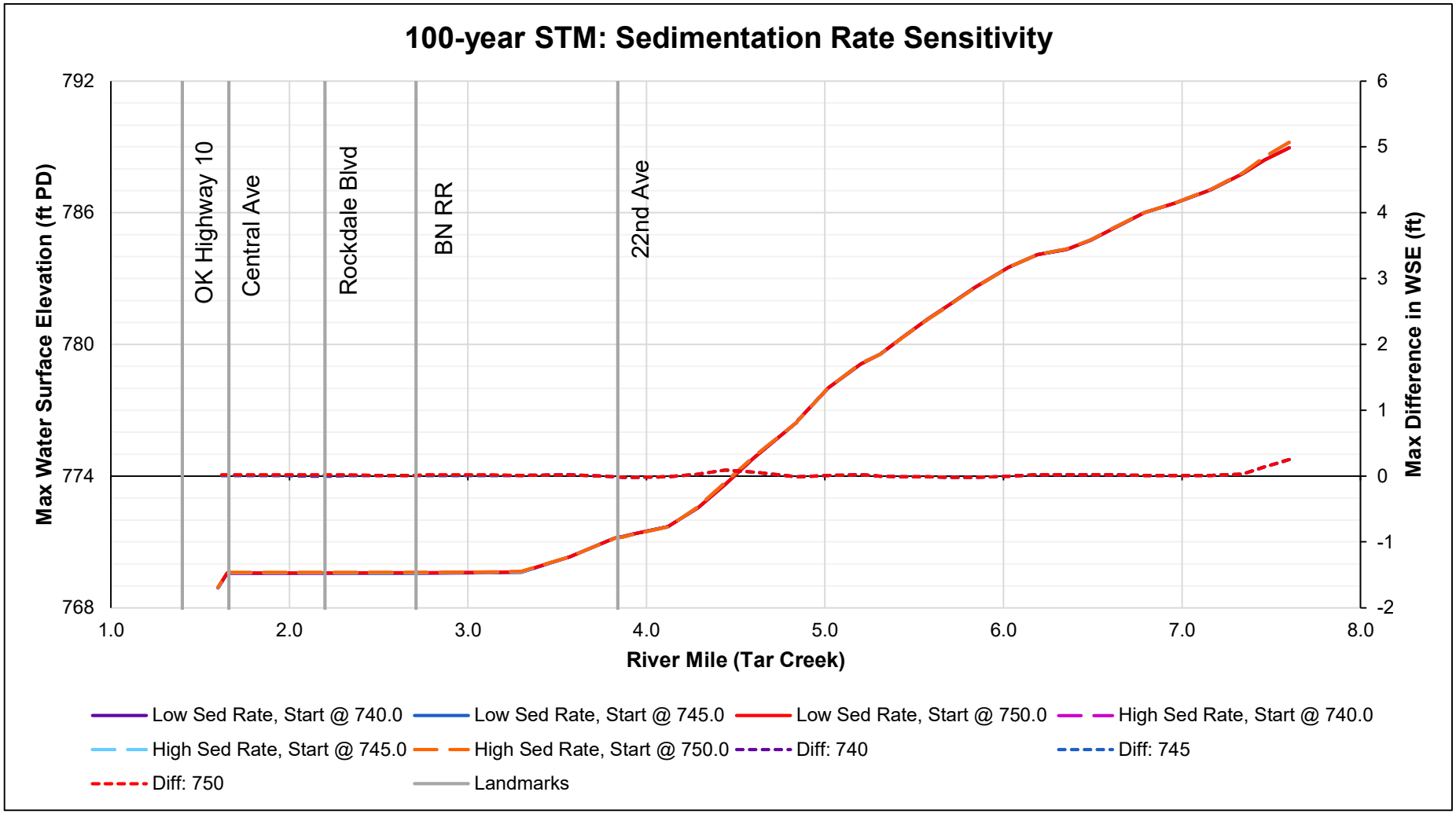
20
River Mile (Elk River)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Sedimentation Rate Sensitivity
Max Water Surface Elevation (ft PD)
792
786
780
774
768
Max Difference in WSE (ft)
6
5
4
3
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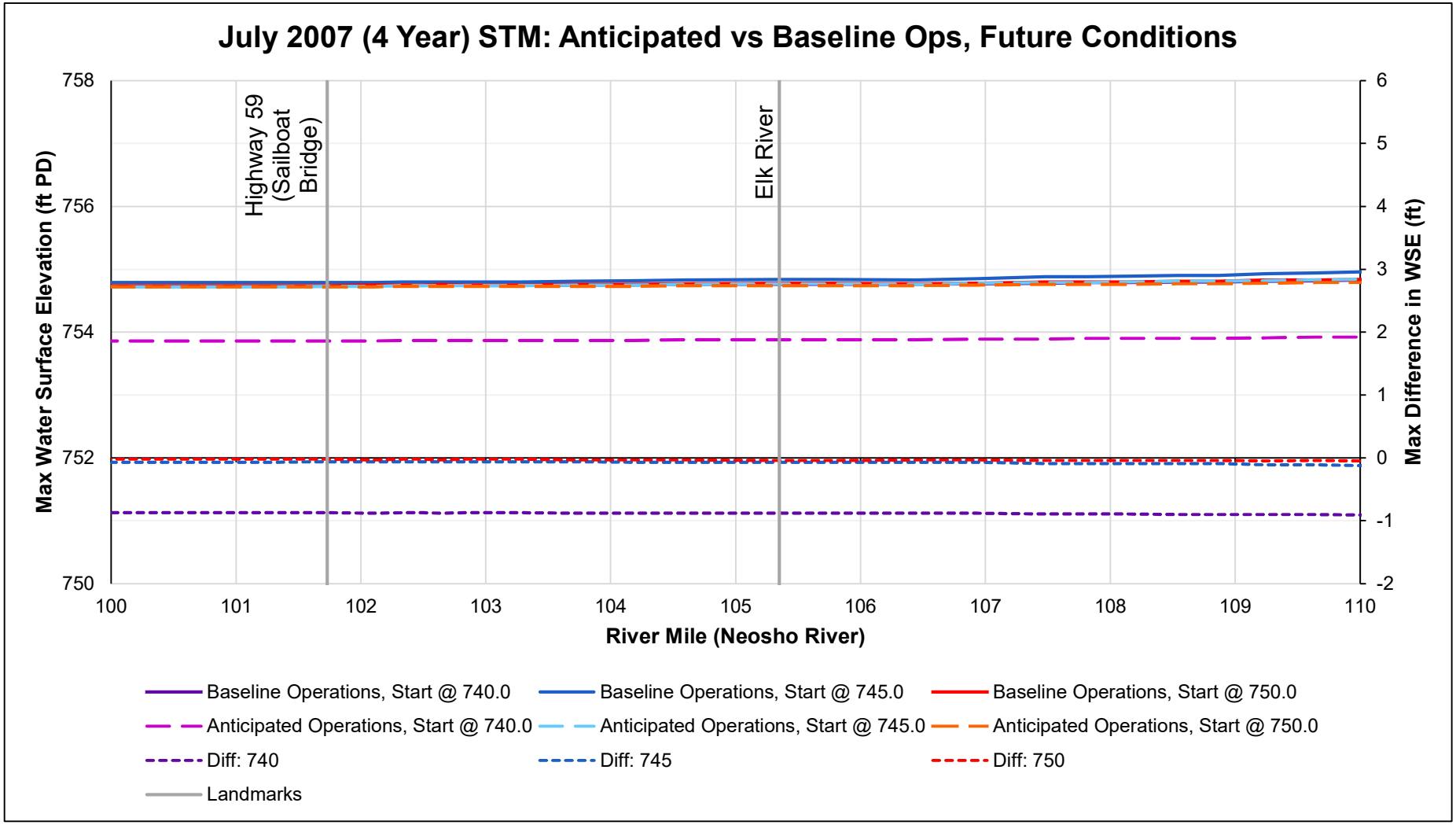
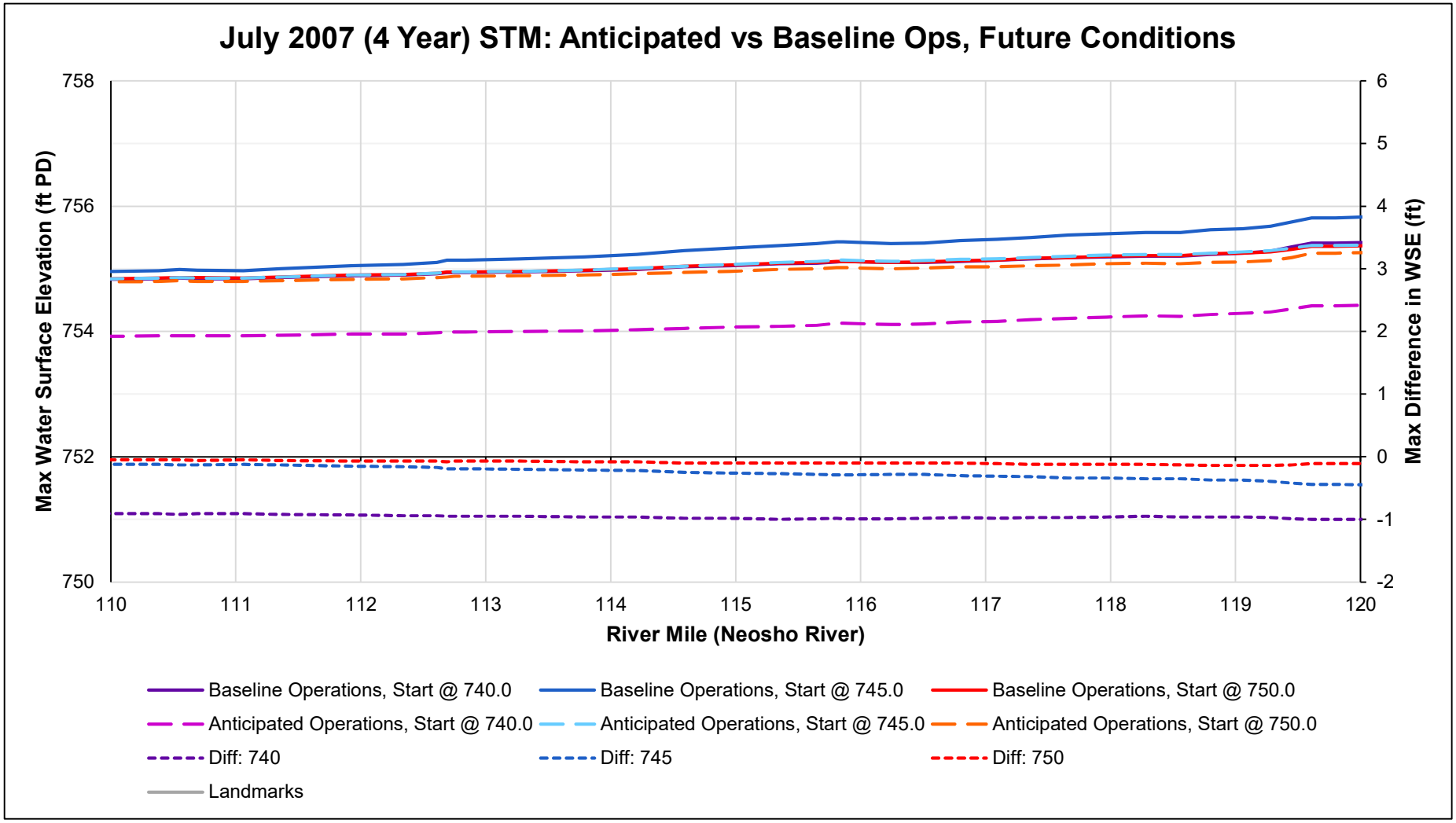
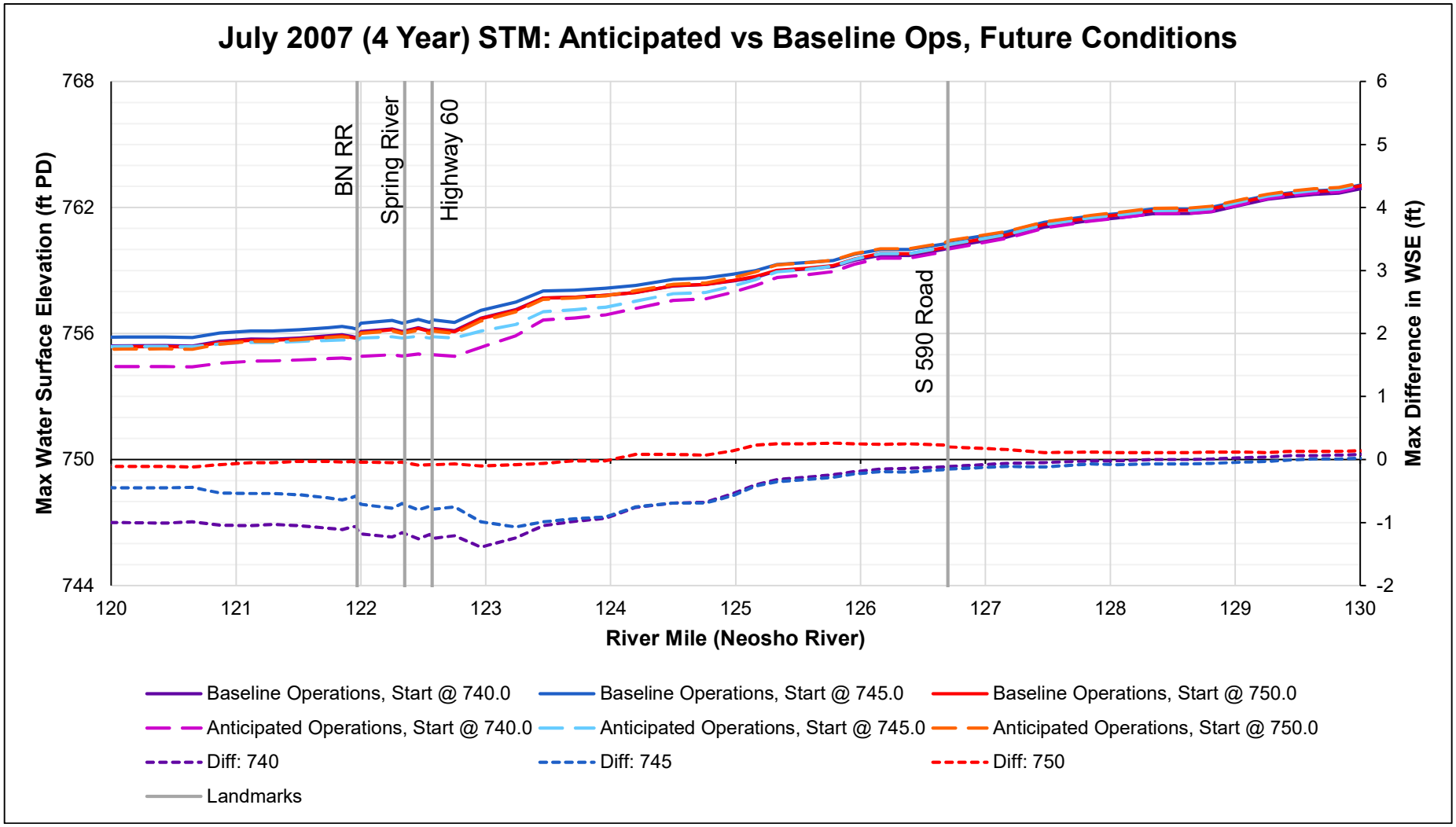
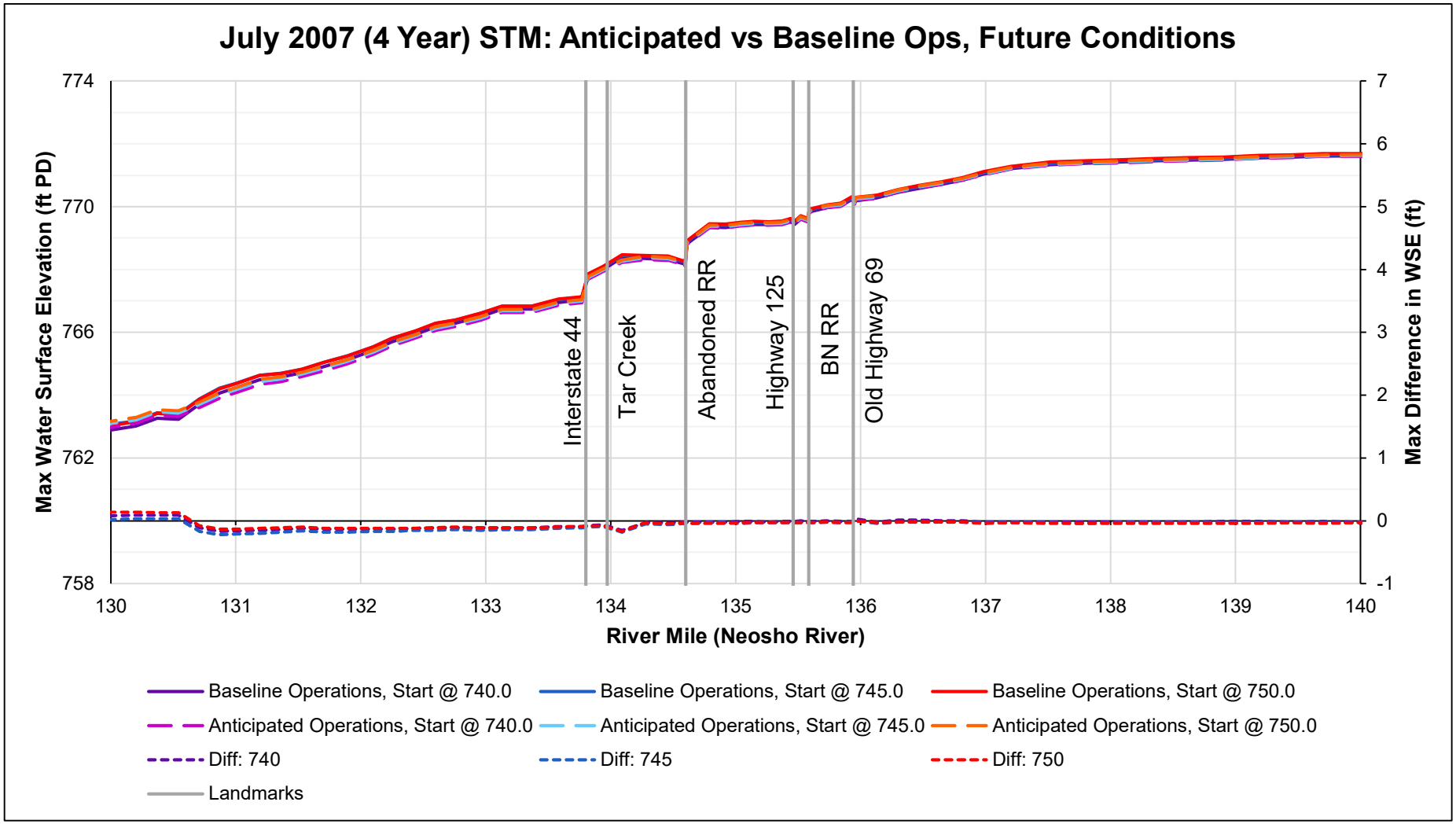
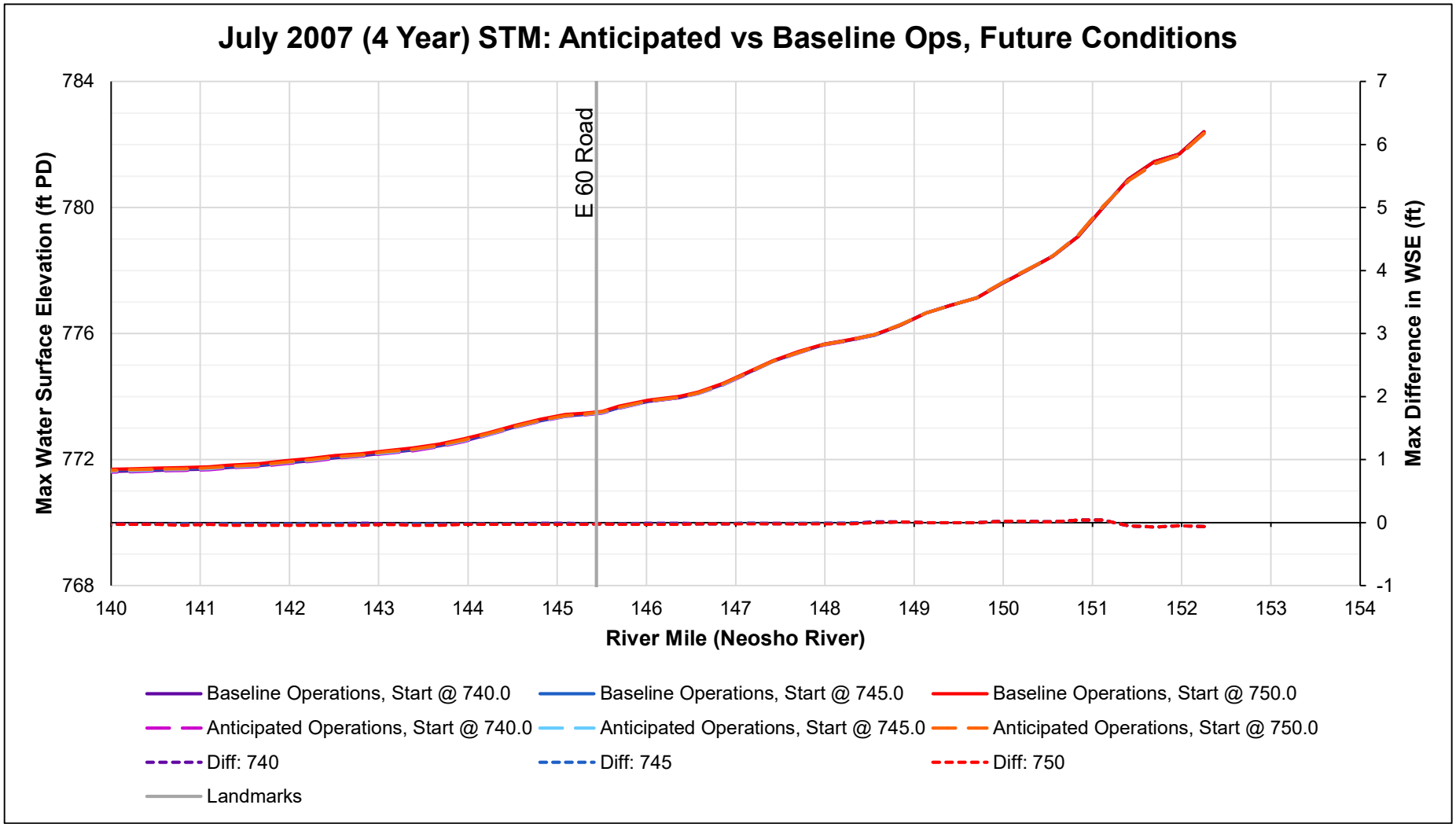
1
0
-1
-2
OK Highway 10
Central Ave
Rockdale Blvd
BN RR
22nd Ave
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
River Mile (Tar Creek)
Low Sed Rate, Start @ 740.0
Low Sed Rate, Start @ 745.0
Low Sed Rate, Start @ 750.0
High Sed Rate, Start @ 740.0
High Sed Rate, Start @ 745.0
High Sed Rate, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

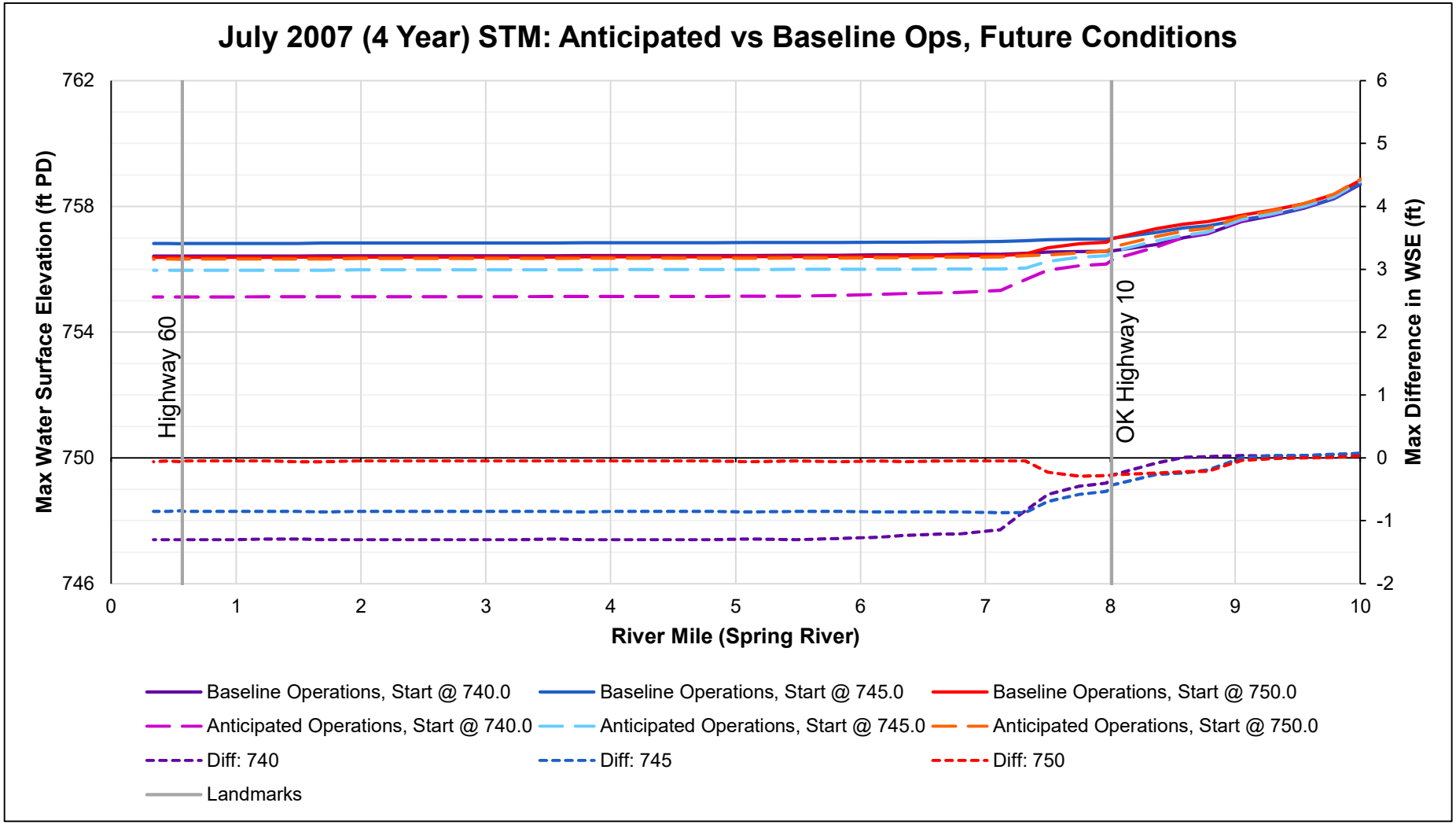

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
Highway 59 (Sailboat Bridge)
Elk River
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
100
101
102
103
104
105
106
107
108
109
110
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

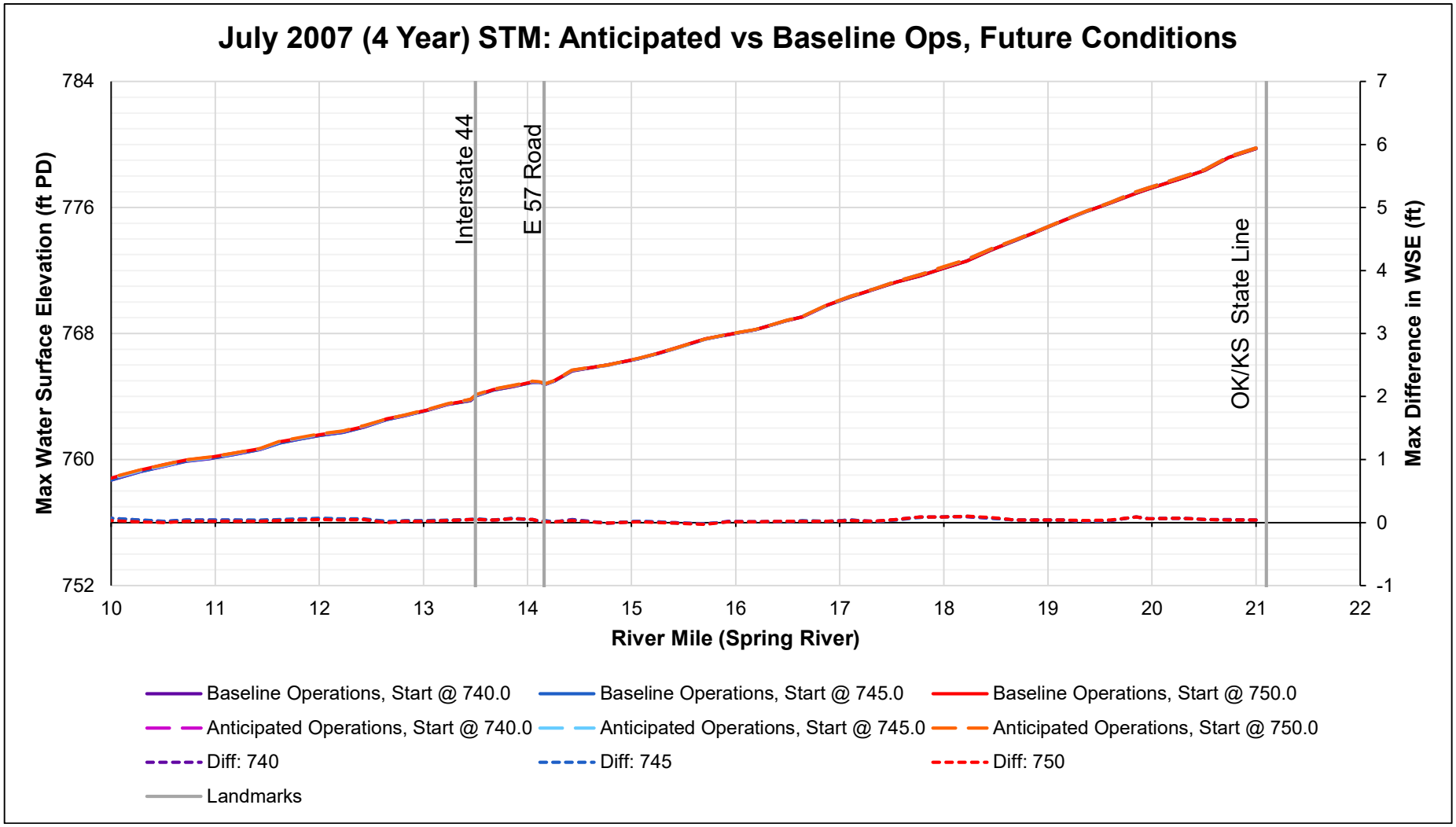

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
110
111
112
113
114
115
116
117
118
119
120
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

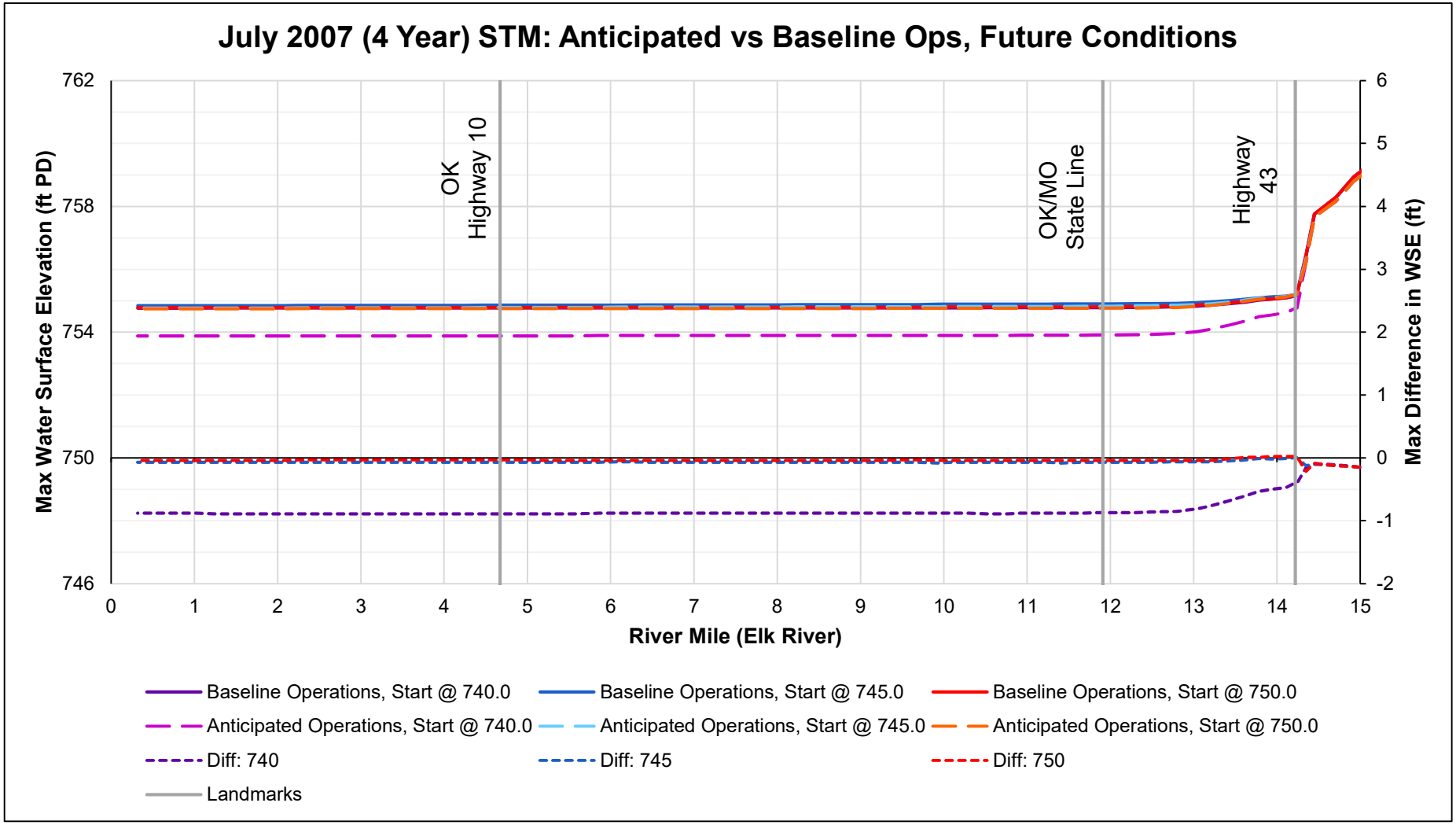

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
768
762
756
750
744
6
5
4
3
2
1
0
-1
-2
120
121
122
123
124
125
126
127
128
129
130
BN RR
Spring River
Highway 60
S 590 Road
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

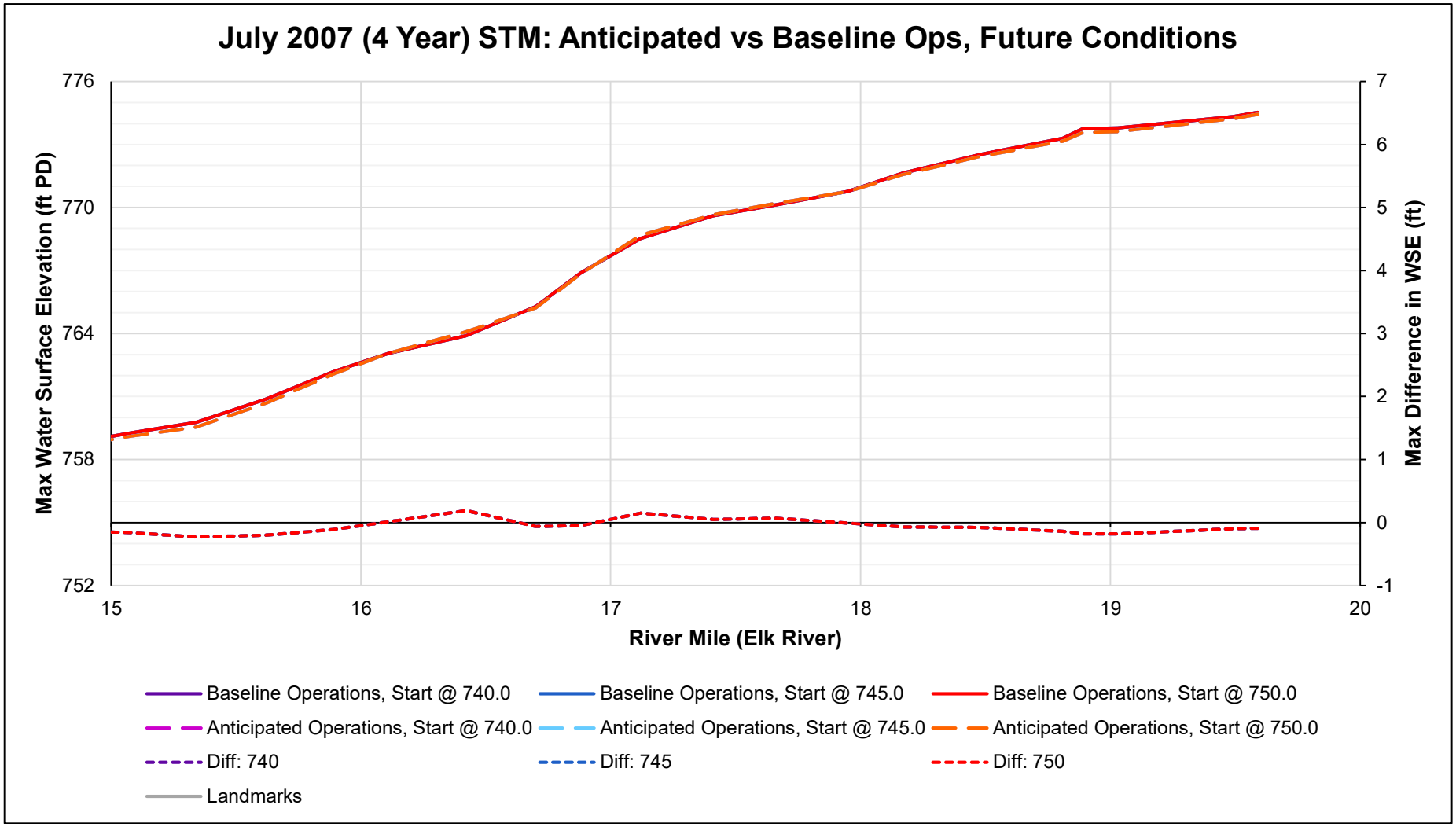

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
774
770
766
762
758
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
130
131
132
133
134
135
136
137
138
139
140
River Mile (Neosho River)
Interstate 44
Tar Creek
Abandoned RR
Highway 125
BN RR
Old Highway 69
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

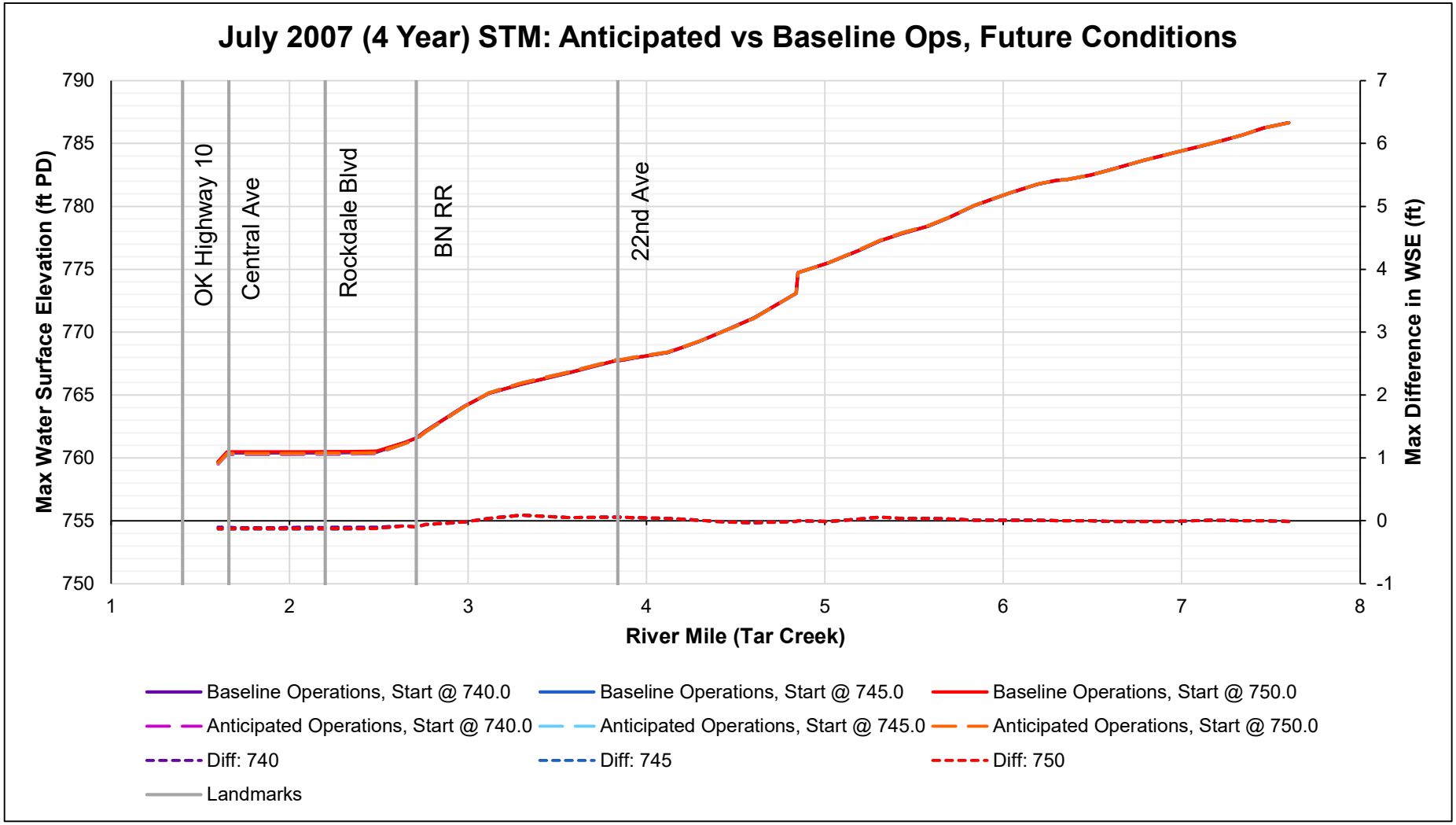

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
E 60 Road
784
780
776
772
768
7
6
5
4
3
2
1
0
-1
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

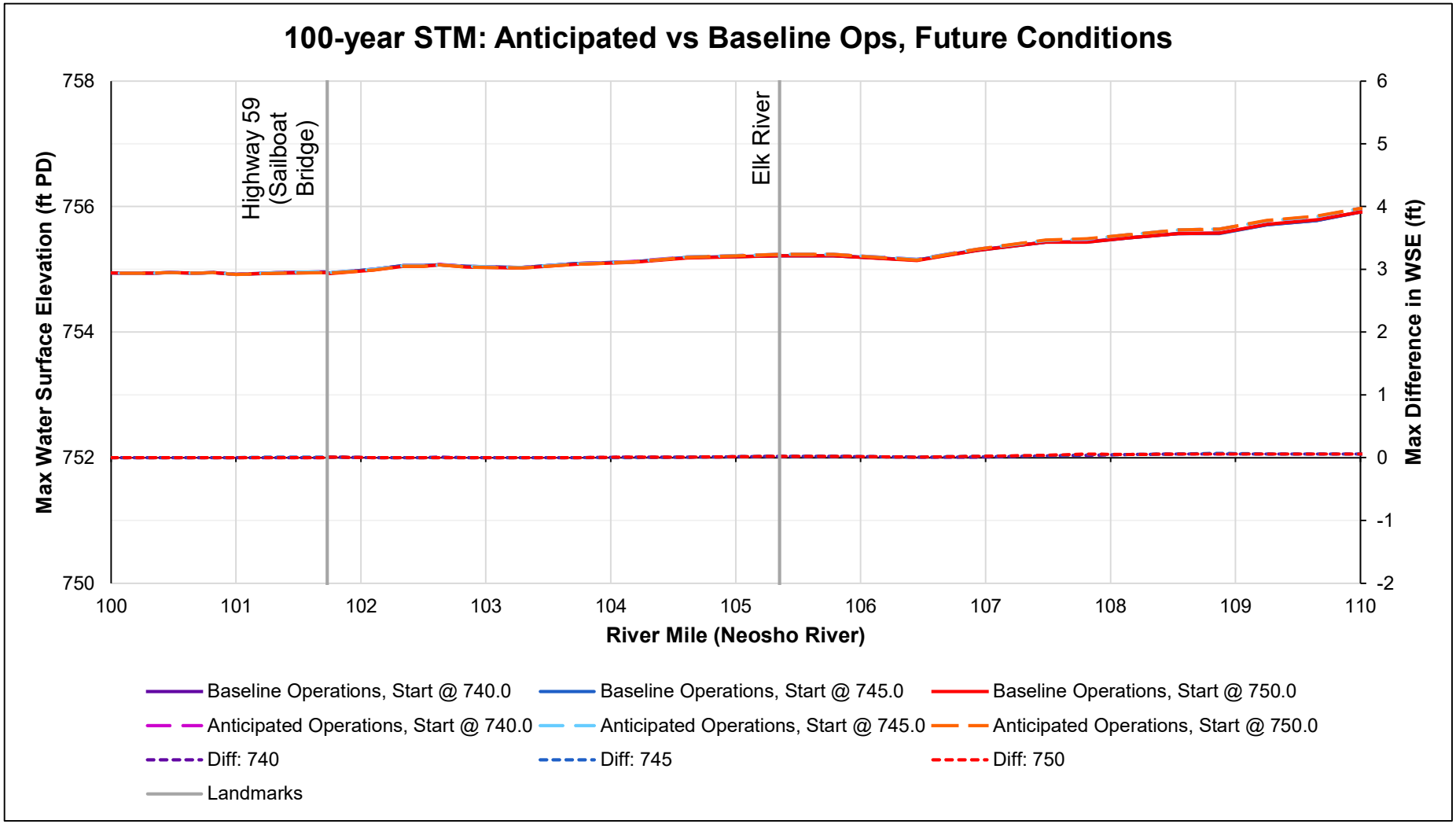

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Spring River)
762
758
754
750
746
6
5
4
3
2
1
0
-1
-2
0
1
2
3
4
5
6
7
8
9
10
Highway 60
OK Highway 10
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

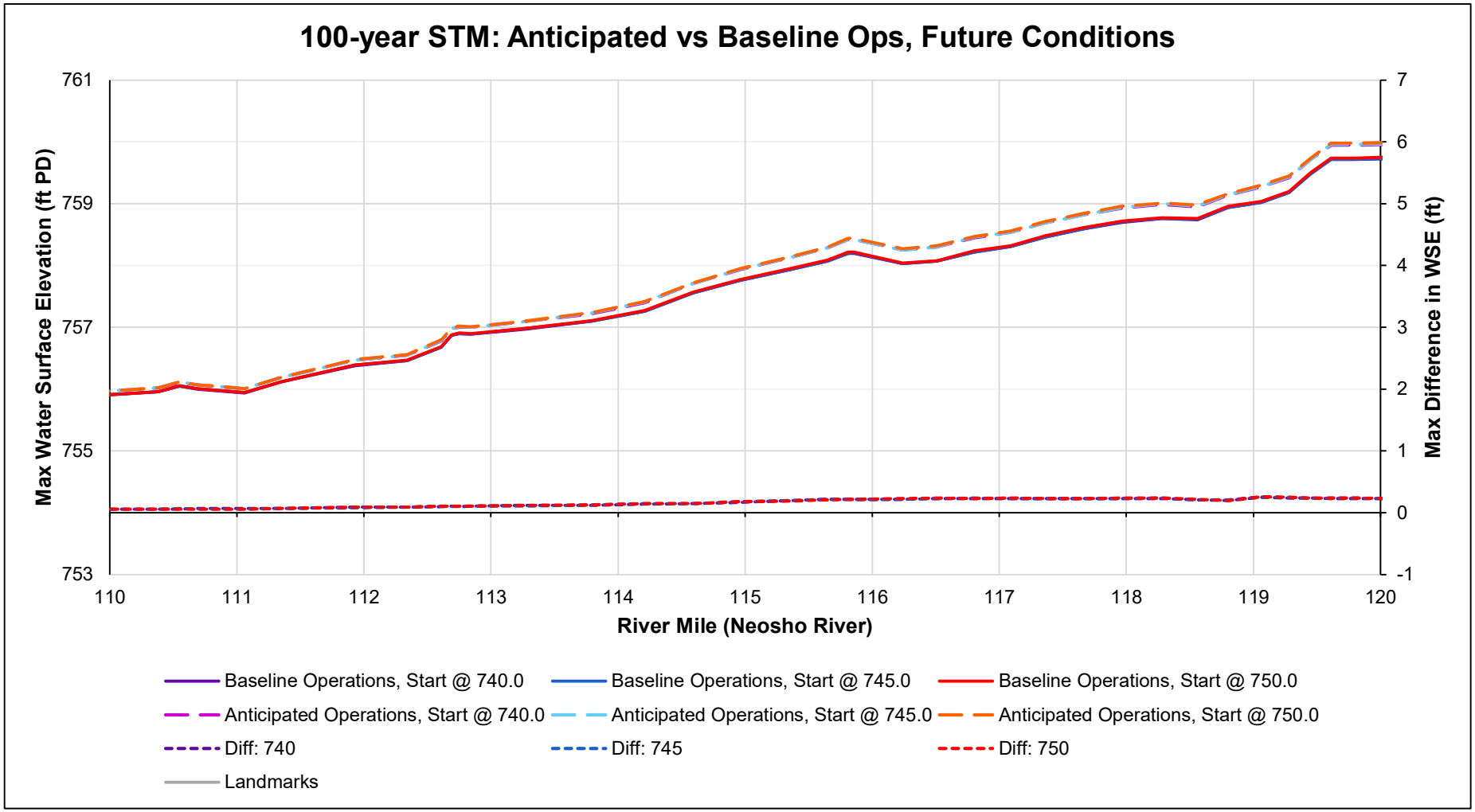

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Spring River)
Interstate 44
E 57 Road
OK/KS State Line
784
776
768
760
752
7
6
5
4
3
2
1
0
-1
10
11
12
13
14
15
16
17
18
19
20
21
22
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

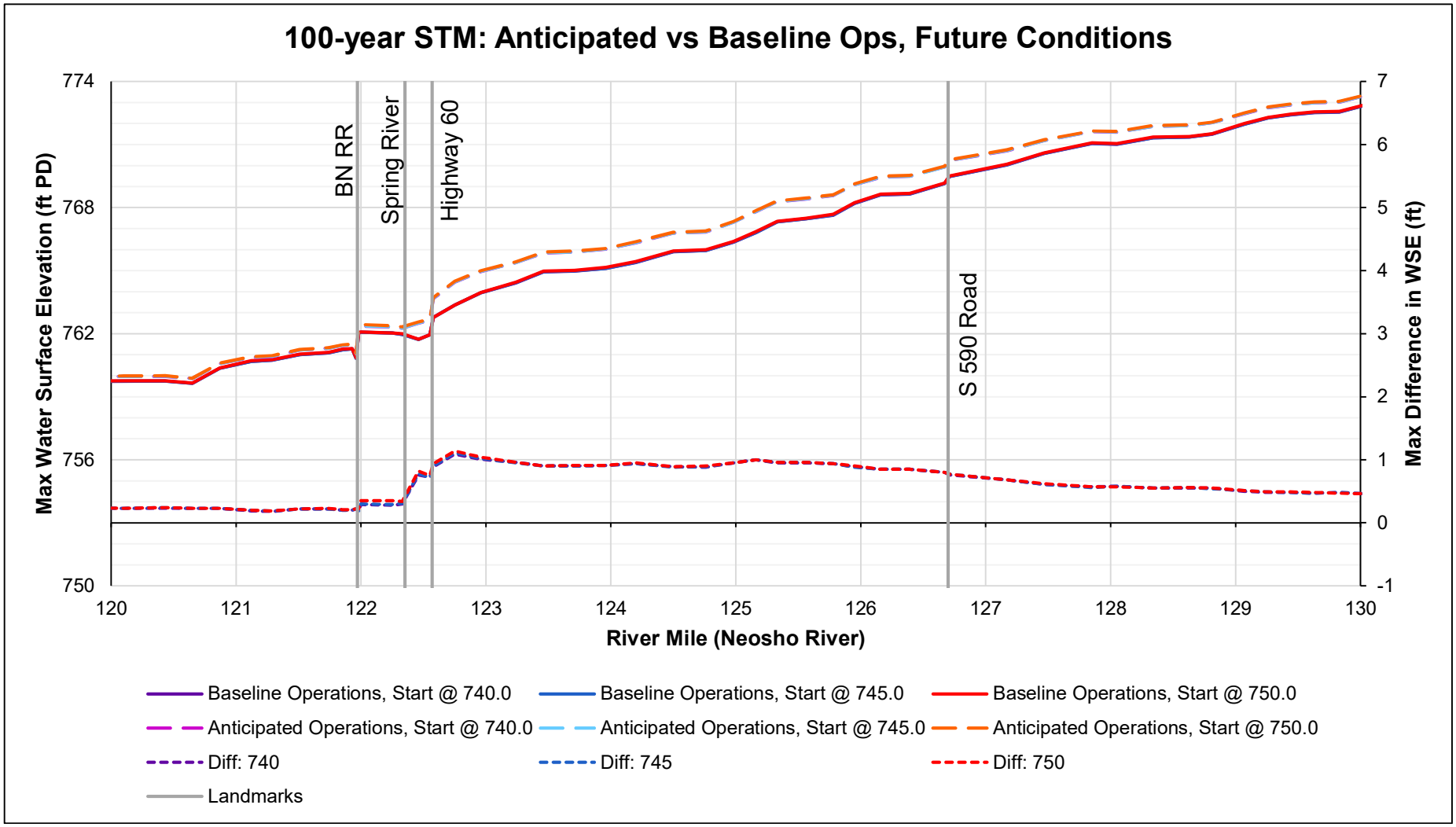

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
762
758
754
750
746
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
River Mile (Elk River)
OK
Highway 10
OK/MO
State Line
Highway
43
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

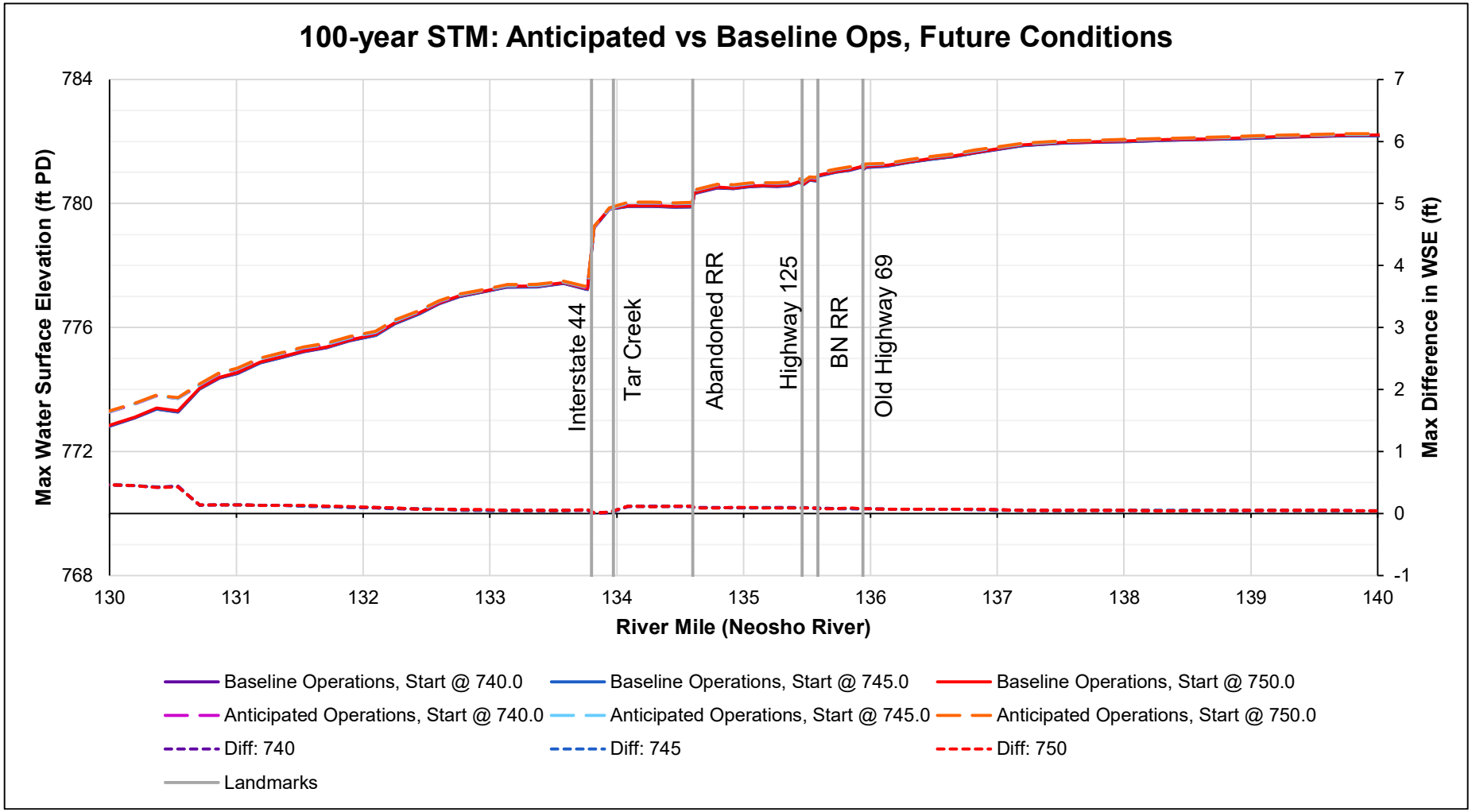

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
776
770
764
758
752
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
15
16
17
18
19
20
River Mile (Elk River)
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

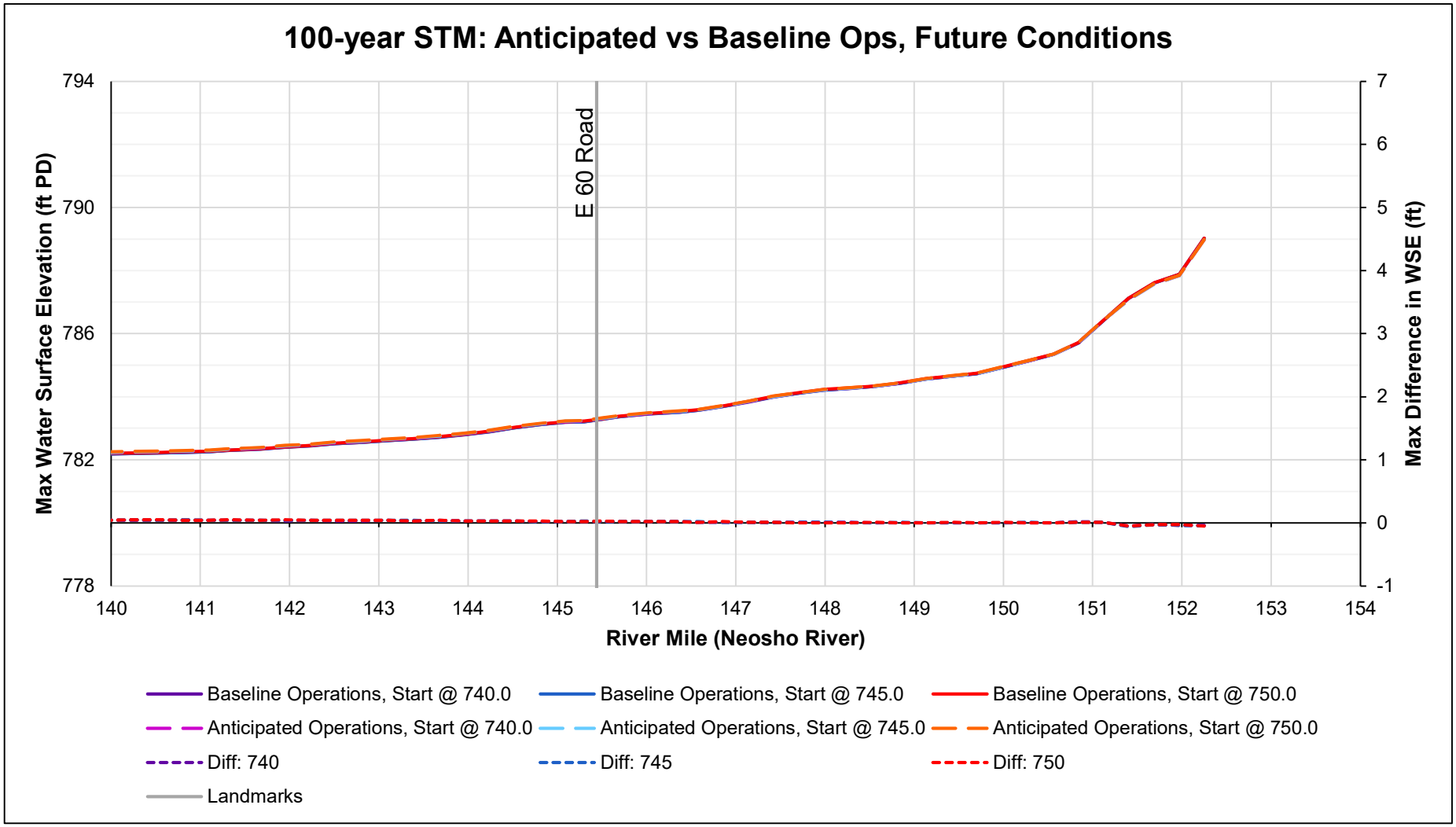

July 2007 (4 Year) STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Tar Creek)
790
785
780
775
770
765
760
755
750
7
6
5
4
3
2
1
0
-1
1
2
3
4
5
6
7
8
OK Highway 10
Central Ave
Rockdale Blvd
BN RR
22nd Ave
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

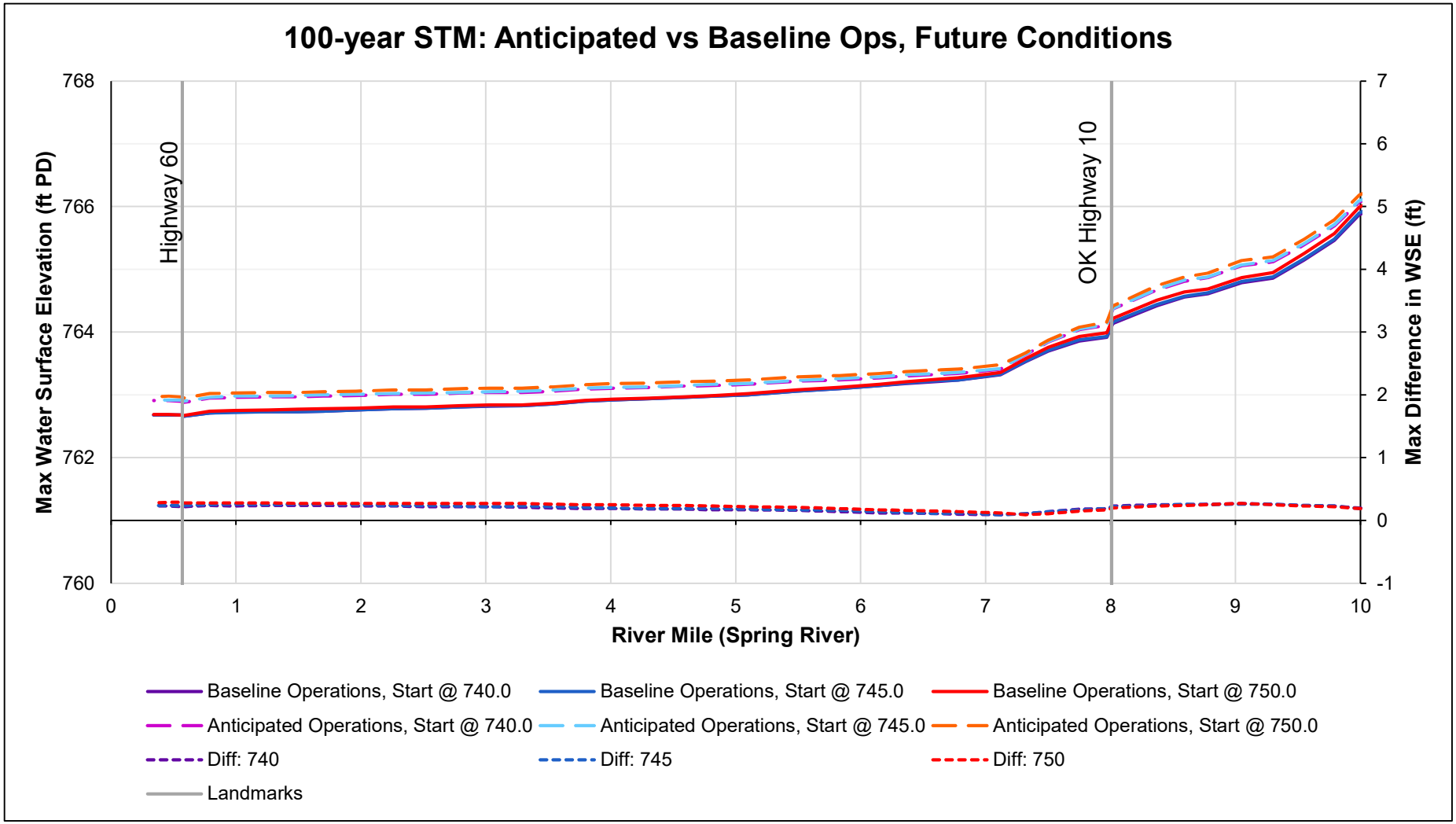

100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Neosho River)
Highway 59 (Sailboat Bridge)
Elk River
758
756
754
752
750
6
5
4
3
2
1
0
-1
-2
100
101
102
103
104
105
106
107
108
109
110
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

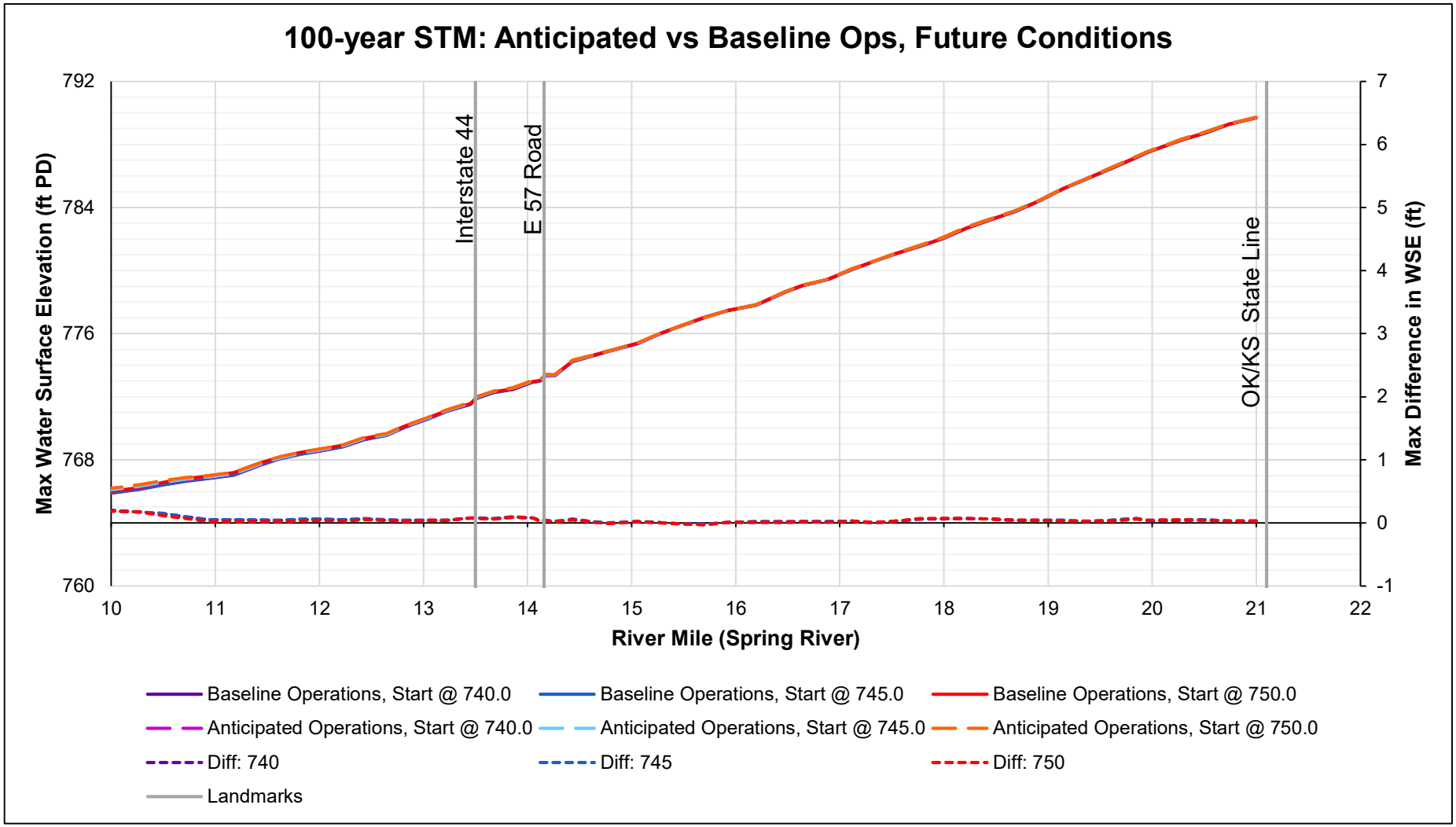

100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
761
759
757
755
753
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
110
111
112
113
114
115
116
117
118
119
120
River Mile (Neosho River)
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

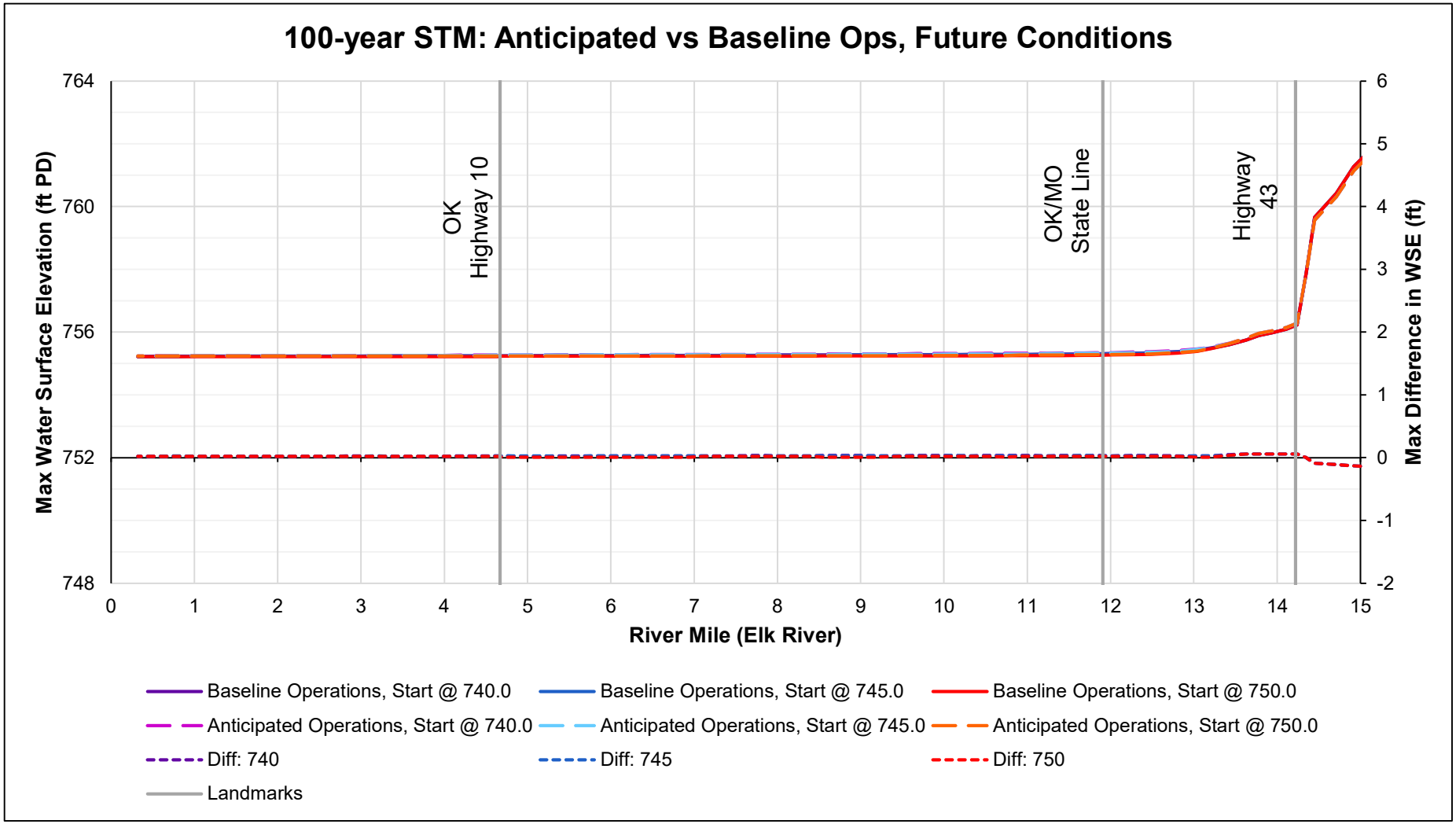

100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
774
768
762
756
750
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
120
121
122
123
124
125
126
127
128
129
130
River Mile (Neosho River)
BN RR
Spring River
Highway 60
S 590 Road
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

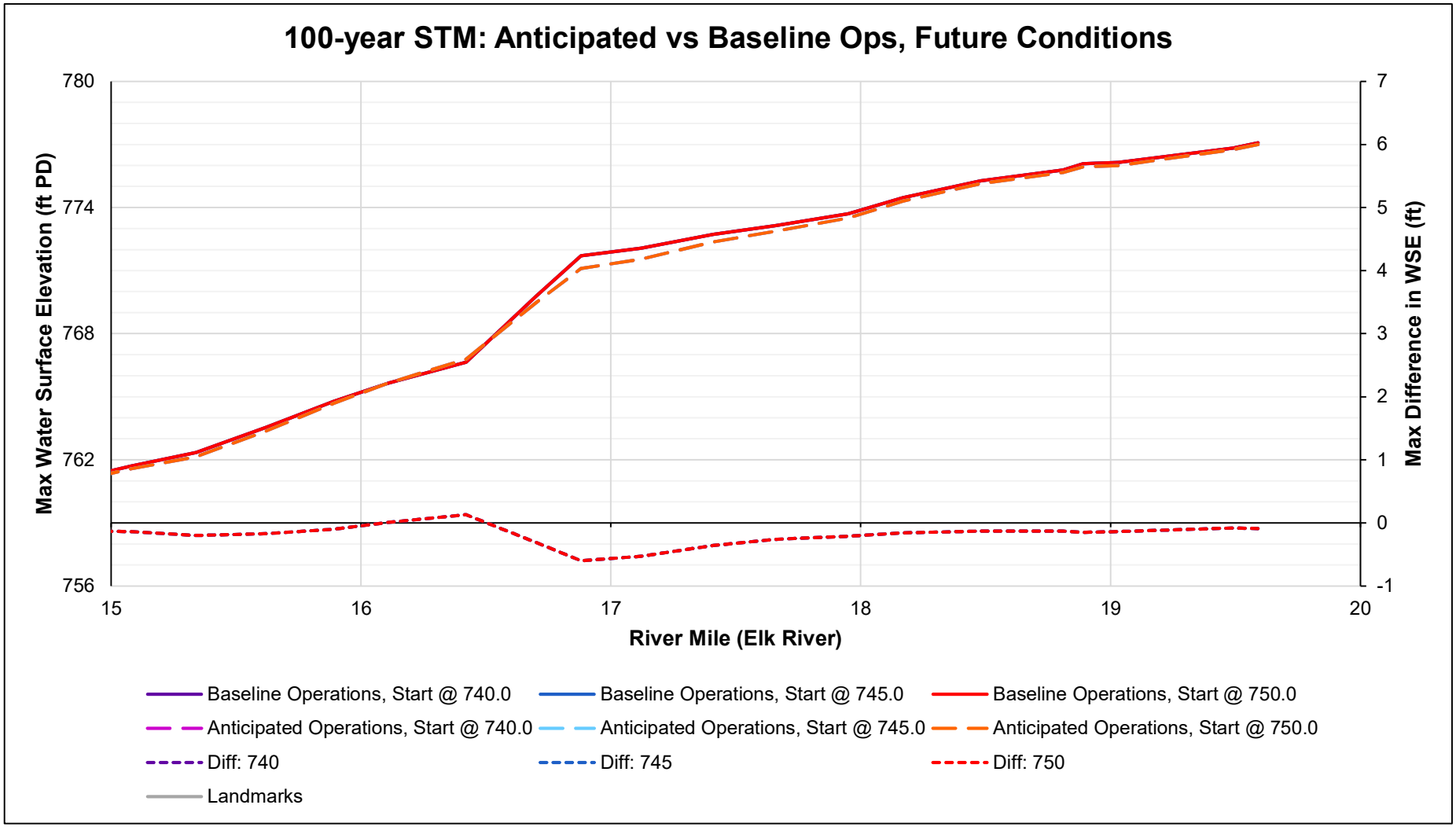

100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
784
780
776
772
768
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
130
131
132
133
134
135
136
137
138
139
140
River Mile (Neosho River)
Interstate 44
Tar Creek
Abandoned RR
Highway 125
BN RR
Old Highway 69
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks

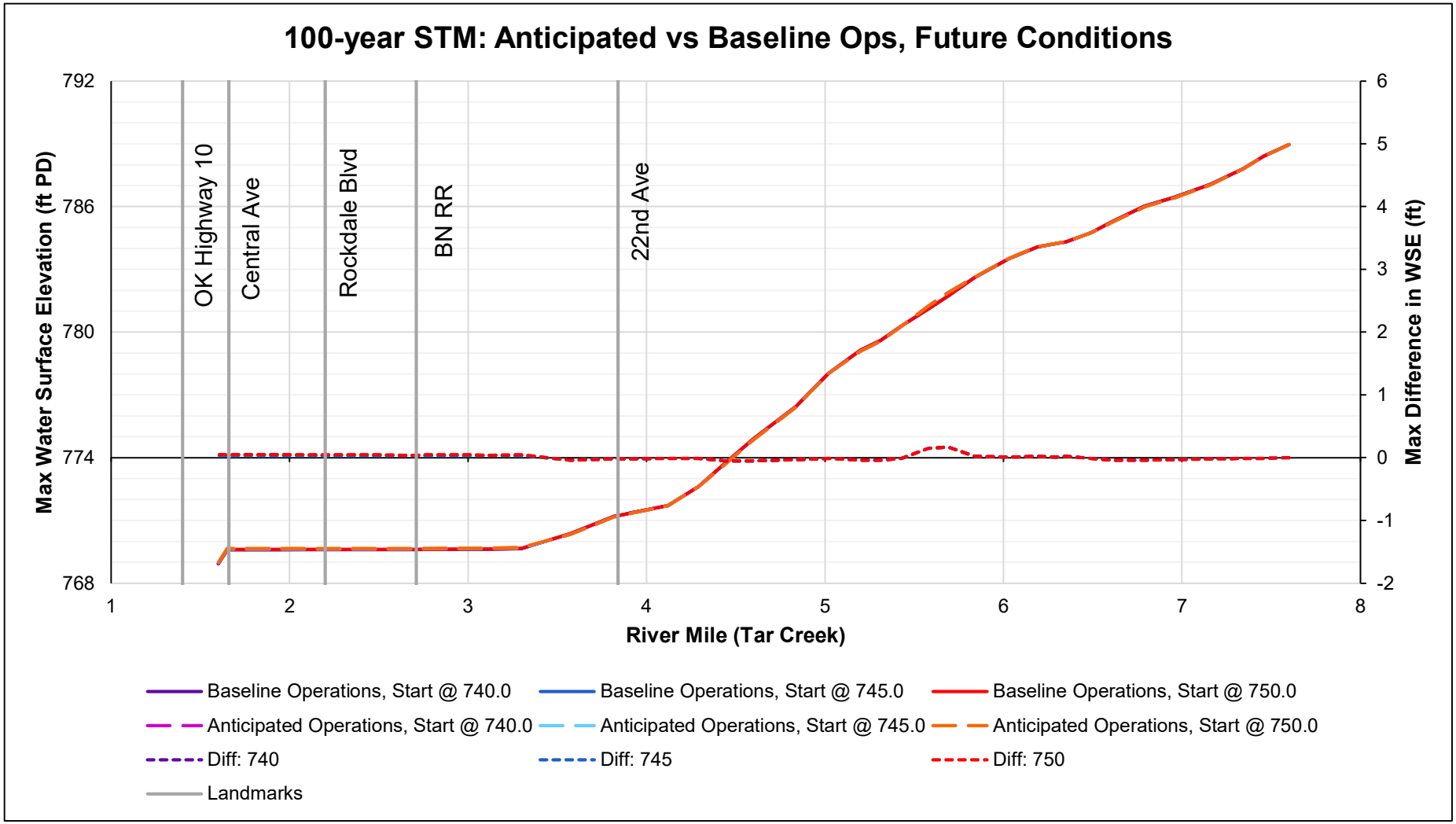

100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
794
790
786
782
778
E 60 Road
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
River Mile (Neosho River)
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
Max Difference in WSE (ft)
River Mile (Spring River)
Highway 60
OK Highway 10
768
766
764
762
760
7
6
5
4
3
2
1
0
-1
0
1
2
3
4
5
6
7
8
9
10
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
792
784
776
768
760
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
Interstate 44
E 57 Road
OK/KS State Line
10
11
12
13
14
15
16
17
18
19
20
21
22
River Mile (Spring River)
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
764
760
756
752
748
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
OK
Highway 10
OK/MO
State Line
Highway
43
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
River Mile (Elk River)
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
780
774
768
762
756
Max Difference in WSE (ft)
7
6
5
4
3
2
1
0
-1
15
16
17
18
19
20
River Mile (Elk River)
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks


100-year STM: Anticipated vs Baseline Ops, Future Conditions
Max Water Surface Elevation (ft PD)
792
786
780
774
768
Max Difference in WSE (ft)
6
5
4
3
2
1
0
-1
-2
OK Highway 10
Central Ave
Rockdale Blvd
BN RR
22nd Ave
1
2
3
4
5
6
7
8
River Mile (Tar Creek)
Baseline Operations, Start @ 740.0
Baseline Operations, Start @ 745.0
Baseline Operations, Start @ 750.0
Anticipated Operations, Start @ 740.0
Anticipated Operations, Start @ 745.0
Anticipated Operations, Start @ 750.0
Diff: 740
Diff: 745
Diff: 750
Landmarks