APPENDIX O
Geochronology Study

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Memorandum

To:	Andy Kallus – Washington State Department of Ecology
Date:	July 27, 2017
Subject:	Sediment Geochronology Study Weyerhaeuser Mill A Former Site Everett, Washington Ecology Agreed Order No. DE 8979

INTRODUCTION

This technical memorandum presents the results of a sediment geochronology study completed at the Weyerhaeuser Mill A Former Site (Site) located in Everett, Washington (Figure 1). The geochronology study was completed by the Port of Everett (Port) and Weyerhaeuser Company to evaluate net sedimentation rates in the Marine Area of the Site and to support identification and evaluation of remedial actions. The Site is subject to a formal cleanup under Ecology's Agreed Order No. DE 8979. Specific details regarding current and historical land use, previous environmental studies, conceptual site model, and activities to characterize the nature and extent of Site contamination to provide sufficient information to evaluate and select cleanup actions is presented in the Remedial Investigation/Feasibility Study (RI/FS) Work Plan (GeoEngineers 2014).

GEOCHRONOLOGY SAMPLING AND ANALYSIS

The sample collection and testing described in this document is based on the results of sediment sampling and chemical analysis performed as part of the remedial investigation (RI) for the Marine Area of the Site. Geochronology sampling and analysis was completed in accordance to the Ecology-approved addendum to the RI/FS Work Plan and associated Marine Area Sampling and Analysis Plan (SAP; GeoEngineers 2017).

Sediment Core Collection

Sediment cores were advanced at three separate locations utilizing vibracore technologies. This coring methodology was selected based on previously observed material type, water depth and vessel traffic (i.e., active shipping channel). Coring activities utilized a separate, 3.7-inch outer diameter (OD) and 3.5-inch internal diameter (ID) clear CAB (butryn) core barrel at each location. The cores were advanced to a depth of approximately 5 feet below mud line (bml). A minimum of three cores were advanced at each sample location to facilitate selection of a minimally disturbed core, of sufficient core length to complete the sediment deposition evaluation and to meet the Marine Area SAP acceptance criteria for sediment cores. Additional cores were advanced at each location if the core target penetration depth or minimum acceptance requirements were not met. Core deployments were within an approximate 10-foot radius of the initial deployment to the extent practicable. Sediment core collection, including the location, number of core attempts, penetration depths and percent recovery is summarized in Table 1. Procedures for vessel positioning, decontamination, field documentation, and collection and processing of sediment samples are described in the Marine Area SAP.

Sample Processing

The sediment core from each location exhibiting the least amount of disturbance, highest recovery and least amount of anthropogenic material was visually classified in accordance with ASTM International (ASTM) D 2488 methods and the Unified Soil Classification System (ASTM D 2487). Material descriptions, including the visual

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absence or presence of biota, bioturbation and/or wood debris in the sediment core are described in the exploration logs provided in Attachment 1.

To gain sufficient material for laboratory analysis, two sediment cores from each sample location were processed to collect samples for isotope analyses. One core was used to collect samples for lead isotope analysis and the second core was used to collect samples for cesium isotope analysis. The two sediment cores from each sample location exhibiting the least amount of disturbance, the least amount of anthropogenic material, and highest sediment recovery were selected for sample processing. Sample processing for isotope analysis included the following:

- "Decompressing" each sediment core based on the core penetration and recovery length;
- Sectioning each decompressed sediment core into approximate 2-centimeter (cm) intervals;
- Homogenizing each 2-cm interval into a uniform color and consistency; and
- Placing the homogenized sample interval into laboratory prepared jars for potential analysis.

Laboratory Analysis

Initially, every third sample interval from the mudline surface to approximately 100 cm below the mudline from the two cores at each location were submitted to the Teledyne-Brown Engineering (TBE) laboratory located in Knoxville, Tennessee for the following isotope analysis:

- Lead-210 (Pb-210)
- Cesium-137 (Cs-137)

Cs-137 and Pb-210 results for sample locations MAF-GC-01 through MAF-GC-03 are summarized in Tables 2 through 4, respectively. Copies of the laboratory reports are provided in Attachment 2. Laboratory data were subject to an Environmental Protection Agency Stage 2A validation. A copy of the data validation report is provided in Attachment 3. Based on the data quality review, the data were of acceptable quality for the intended use.

Deviation from the Work Plan Addendum

One deviation from the Work Plan Addendum was encountered during the project. Up to five sample attempts were made at location MAF-GC-03 to collect a sediment core meeting the minimum Marine Area SAP acceptance criteria. Sediment recoveries at this location ranged from 62 to 67 percent with one core attempt (MAF-GC-04-4) only achieving a 10 percent recovery due to a piece of wood lodged within the sampler. Based on the consistency of the percent recovery achieved at this location after multiple attempts, addition sediment cores were not attempted and the two sediment cores with the highest percent recovery and least amount of observed disturbance were selected for sample processing.

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EVALUATION

Sedimentation Rate based on Cs-137 Activity

Cs-137 is not a naturally occurring radioisotope; rather it is produced during nuclear fission. The primary source of Cs-137 to sediment is the atmospheric fallout from historical testing of nuclear weapons. The dates of two horizons associated with atmospheric fallout from nuclear testing (1954 and 1963) can be identified in Puget Sound sediment as spikes in concentration. In general, the first appearance of detectable Cs-137 activity marks the year 1954, and the maximum detectable Cs-137 activity generally marks the year 1963 (Jeter 2000). The thickness of sediment between these two peaks, over a 9-year period, indicates the rate of sediment accumulation in that time period.

Cs-137 results for locations MAF-GC-01 through MAF-GC-03 are summarized in Tables 2 through 4 and are shown graphically on Figure 2 as measured activity in picocuries per gram (pCI/G) at depth below mudline. Based on a review of the results, Cs-137 occurrence associated with historical atmospheric fallout from testing of nuclear weapons (i.e., initial occurrence of Cs-137 marking the first use of nuclear weapons in 1954 followed by a Cs-137 peak marking the height of nuclear weapon testing in 1963) was not identified. Due to the absence of detected Cs-137 at each sample location, the sedimentation rate based on Cs-137 Activity could not be determined.

Sedimentation Rate based on Pb-210 Activity

Pb-210 is a natural isotope that is produced in the decay series of Uranium-238. Sediment contains a background level of Pb-210 that is "supported" by the decay of Radium-226 from sediment and rocks. Recently deposited sediment also includes an excess of "unsupported" Pb-210 that is produced by decay of Radon-222 gas and incorporated into sediment by atmospheric fallout (Maureen et al., 2006). The excess ("unsupported") activity at each sample location was used to estimate the sedimentation rate. For this evaluation, it is assumed that the sediment is homogeneous, undisturbed and that the sedimentation rate is constant over time.

PB-210 results for locations MAF-GC-01 through MAF-GC-03 are summarized in Tables 2 through 4 and are shown graphically on Figures 3 through 5 as measured activity in picocuries per gram (pCI/G) at depth below mudline. At sample locations MAF-GC-01 and MAF-GC-02, the background or "supported" Pb-210 activity was determined by averaging four deepest measurements at each location where Pb-210 activity did not change appreciably between samples over depth. At location MAF-GC-03, sediment below a depth of approximately 74 cm was different in composition from the overlying material and was interpreted to represent a separate depositional unit. Using the baseline assumption of a homogeneous material for calculating sedimentation rate (Jeter 2000 and Battelle 1995) and the observed variability in the measured data, PB-210 results from the lower depositional unit were not used for determining background activity. In addition, the result for sample MAF-GC-03-27 located within the upper depositional unit was considered an outlier from the data set and not used for determining background activity. Therefore, the background activity was measured using the results from samples MAF-GC-03-24, MAF-GC-03-30, MAF-GC-03-33.

Sedimentation Rate Based on the Pb-210 Radioactive Decay Coefficient

The correlation between the Pb-210 radioactive decay coefficient and the ratio of excess Pb-210 concentration versus depth is the basis for determining sedimentation rates using the Jeter method (Jeter 2000). According to Jeter, the decay of Pb-210 translates into a logarithmic (Log_{10}) decrease in excess Pb-210 concentration

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with depth. Therefore, the sedimentation rate is equivalent to the radioactive decay coefficient divided by the slope of the trend line between the Log_{10} of excess Pb-210 activity versus depth.

For sample locations MAF-GC-01 through MAF-GC-03, the trend line of the Log_{10} of excess Pb-210 activity versus depth and calculation sedimentation rates are shown on Figures 3 through 5. The calculated sedimentation rate for each location using the Pb-210 radioactive decay coefficient is as follows:

- Calculated Sedimentation Rate for MAF-GC-01 – 1.65 cm/year
- Calculated Sedimentation Rate for MAF-GC-02 – 1.57 cm/year
- Calculated Sedimentation Rate for MAF-GC-03 – 0.59 cm/year

Sedimentation Rate Based on the Pb-210 Radioactive Decay Constant

The correlation between the Pb-210 radioactive decay constant and the ratio of excess Pb-210 concentration versus depth is the basis for determining sedimentation rates using the Battelle method (Battelle 1995). According to Battelle, the decay of Pb-210 translates into a natural logarithmic (LN) decrease in excess Pb-210 concentration with depth. Therefore, the sedimentation rate is equivalent to the radioactive decay constant divided by the slope of the trend line between the LN of excess Pb-210 activity versus depth.

For sample locations MAF-GC-01 through MAF-GC-03, the trend line of the LN of excess Pb-210 activity versus depth and calculated sedimentation rates are shown on Figures 3 through 5. The calculated sedimentation rate for each location using the Pb-210 radioactive decay constant is as follows:

- Calculated Sedimentation Rate for MAF-GC-01 – 1.65 cm/year
- Calculated Sedimentation Rate for MAF-GC-02 – 1.56 cm/year
- Calculated Sedimentation Rate for MAF-GC-03 – 0.59 cm/year

REFERENCES

Battelle, 1995, "Historical Trends in the Accumulation of Chemicals in Puget Sound," Battelle/Marine Sciences Laboratory, Sequim, Washington, January 1995.

GeoEngineers, Inc., "Work Plan Addendum for Geochronology Sampling and Analysis at the Former Mill A Marine Area, Everett, Washington," prepared for the Washington State Department of Ecology on Behalf of Port of Everett, Weyerhaeuser Company and Washington State Department of Natural Resources, GEI File 0676-020-05, Dated January 20, 2017.

GeoEngineers, Inc., "Remedial Investigation/Feasibility Study Work Plan, Weyerhaeuser Mill A Former, Everett, Washington, Ecology Agreed Order No. DE 8979," prepared for the Washington State Department of Ecology on Behalf of Port of Everett, Weyerhaeuser Company and Washington State Department of Natural Resources, GEI File 0676-020-01, Dated October 16, 2014.

Jeter, 2000, "Determining the Ages of Recent Sediments Using Measurements of Trace Radioactivity," by Hewitt W. Jeter, Teledyne, New Jersey, March 2000.

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Maureen K. Corcoran and Julie R. Kelly, “Sediment-Tracing Technology: An Overview”, September 2006.

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Attachments

Attachment 1. Exploration Logs

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TABLES

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Table 1

Sampling Location Coordinates and Core Recovery Data Summary

Weyerhaeuser Mill A Former

Everett, Washington

Sampling Location[1] Identification	Core Identification	Sample Coordinates[2]		Penetration Depth (cm)	Core Recovery (cm)	Percent Recovery	Acceptance Criteria Met (Y/N)
		Easting	Northing				
MAF-GC-01	MAF-GC-01-1	1298539.66	359097.52	158	138	87%	Y
	MAF-GC-01-2	1298538.35	359094.29	158	138	87%	Y
	MAF-GC-01-3	1298540.36	359097.97	158	0	0%	N
	MAF-GC-01-4	1298545.13	359094.65	158	131	83%	Y
MAF-GC-02	MAF-GC-02-1	1298969.69	359681.36	158	96	61%	N
	MAF-GC-02-2	1298966.05	359681.22	158	119	75%	Y
	MAF-GC-02-3	1298968.15	359683.14	158	15	9%	N
	MAF-GC-02-4	1298967.12	359682.23	158	128	81%	Y
	MAF-GC-02-5	1298968.63	359683.21	158	116	73%	N
	MAF-GC-02-6	1298964.74	359683.75	158	88	56%	N
MAF-GC-03	MAF-GC-03-1	1299187.46	360172.39	158	98	62%	N
	MAF-GC-03-2	1299186.18	360181.35	158	104	66%	Y[3]
	MAF-GC-03-3	1299180.70	360177.12	158	106	67%	Y[3]
	MAF-GC-03-4	1299184.11	360180.44	158	15	9%	N
	MAF-GC-03-5	1299182.04	360179.08	158	101	64%	N

Notes:

[1] Approximate sampling locations are shown on Figure 1.

[2] Coordinates are referenced to North American Datum 83 (NAD 83) Washington State Plane North.

[3] Core with highest percent recovery used for geochronology analysis.

cm = centimeter

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Table 2

MAF-GC-01 Radioisotope (Cs-137 and Pb-210) Analytical Results Summary

Weyerhaeuser Mill A Former

Everett, Washington

Sample Identification	Depth Interval (cm)	Pb-210 Activity (pCi/g)		Cs-137 Activity (pCi/g)	
		Result/MDC	Error Delta	Result/MDC	Error Delta
MAF-GC-02-1	0 -- 2	--	--	--	--
MAF-GC-02-2	2 -- 5	--	--	--	--
MAF-GC-02-3	5 -- 7	0.505	± 0.044	0.165	± 0.080
MAF-GC-02-4	7 -- 9	--	--	--	--
MAF-GC-02-5	9 -- 12	--	--	--	--
MAF-GC-02-6	12 -- 14	0.278	± 0.039	0.169	± 0.087
MAF-GC-02-7	14 -- 16	--	--	--	--
MAF-GC-02-8	16 -- 18	--	--	--	--
MAF-GC-02-9	18 -- 21	0.152	± 0.037	0.088 U	± 0.054
MAF-GC-02-10	21 -- 23	--	--	--	--
MAF-GC-02-11	23 -- 25	--	--	--	--
MAF-GC-02-12	25 -- 28	0.108	± 0.035	0.0841 U	± 0.051
MAF-GC-02-13	28 -- 30	--	--	--	--
MAF-GC-02-14	30 -- 32	--	--	--	--
MAF-GC-02-15	32 -- 35	0.109	± 0.037	0.0944 U	± 0.055
MAF-GC-02-16	35 -- 37	--	--	--	--
MAF-GC-02-17	37 -- 39	--	--	--	--
MAF-GC-02-18	39 -- 42	0.081	± 0.037	0.0927 U	± 0.054
MAF-GC-02-19	42 -- 44	--	--	--	--
MAF-GC-02-20	44 -- 46	--	--	--	--
MAF-GC-02-21	46 -- 49	0.111	± 0.033	0.0981 U	± 0.052
MAF-GC-02-22	49 -- 51	--	--	--	--
MAF-GC-02-23	51 -- 53	--	--	--	--
MAF-GC-02-24	53 -- 55	0.073	± 0.037	0.0743 U	± 0.047
MAF-GC-02-25	55 -- 58	--	--	--	--
MAF-GC-02-26	58 -- 60	--	--	--	--
MAF-GC-02-27	60 -- 62	0.055 U	± 0.033	0.0642 U	± 0.046
MAF-GC-02-28	62 -- 65	--	--	--	--
MAF-GC-02-29	65 -- 67	--	--	--	--
MAF-GC-02-30	67 -- 69	0.104	± 0.034	0.0892 U	± 0.067
MAF-GC-02-31	69 -- 72	--	--	--	--
MAF-GC-02-32	72 -- 74	--	--	--	--
MAF-GC-02-33	74 -- 76	0.116	± 0.035	0.0744 U	± 0.041
MAF-GC-02-34	76 -- 79	--	--	--	--
MAF-GC-02-35	79 -- 81	--	--	--	--
MAF-GC-02-36	81 -- 83	0.054 U	± 0.032	0.0626 U	± 0.039
MAF-GC-02-37	83 -- 85	--	--	--	--
MAF-GC-02-38	85 -- 88	--	--	--	--
MAF-GC-02-39	88 -- 90	0.058 U	± 0.035	0.0830 U	± 0.048
MAF-GC-02-40	90 -- 92	--	--	--	--

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Sample Identification	Depth Interval (cm)	Pb-210 Activity (pCi/g)		Cs-137 Activity (pCi/g)	
		Result/MDC	Error Delta	Result/MDC	Error Delta
MAF-GC-02-41	92 -- 95	--	--	--	--
MAF-GC-02-42	95 -- 97	0.060 U	± 0.036	0.0912 U	± 0.059
MAF-GC-02-43	97 -- 99	--	--	--	--
MAF-GC-02-44	99 -- 102	--	--	--	--
MAF-GC-02-45	102 -- 104	0.060 U	± 0.036	0.0798 U	± 0.039
MAF-GC-02-46	104 -- 106	--	--	--	--
MAF-GC-02-47	106 -- 109	--	--	--	--
MAF-GC-02-48	109 -- 111	--	--	--	--
MAF-GC-02-49	111 -- 113	--	--	--	--
MAF-GC-02-50	113 -- 116	--	--	--	--
MAF-GC-02-51	116 -- 118	--	--	--	--
MAF-GC-02-52	118 -- 120	--	--	--	--
MAF-GC-02-53	120 -- 122	--	--	--	--
MAF-GC-02-54	122 -- 125	--	--	--	--
MAF-GC-02-55	125 -- 127	--	--	--	--
MAF-GC-02-56	127 -- 129	--	--	--	--
MAF-GC-02-57	129 -- 132	--	--	--	--
MAF-GC-02-58	132 -- 134	--	--	--	--
MAF-GC-02-59	134 -- 136	--	--	--	--
MAF-GC-02-60	136 -- 139	--	--	--	--
MAF-GC-02-61	139 -- 141	--	--	--	--
MAF-GC-02-62	141 -- 143	--	--	--	--
MAF-GC-02-63	143 -- 146	--	--	--	--
MAF-GC-02-64	146 -- 148	--	--	--	--

Notes:

cm = centimeter

MDC = Minimum detectable concentration

pCi/g = picocuries per gram

U = not detected

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Table 3

MAF-GC-02 Radioisotope (Cs-137 and Pb-210) Analytical Results Summary

Weyerhaeuser Mill A Former

Everett, Washington

Sample Identification	Depth Interval (cm)	Pb-210 Activity (pCi/g)		Cs-137 Activity (pCi/g)	
		Result/MDC	Error Delta	Result/MDC	Error Delta
MAF-GC-02-1	0 -- 2	--	--	--	--
MAF-GC-02-2	2 -- 4	--	--	--	--
MAF-GC-02-3	4 -- 7	0.29	± 0.042	0.092 U	± 0.051
MAF-GC-02-4	7 -- 9	--	--	--	--
MAF-GC-02-5	9 -- 10.9	--	--	--	--
MAF-GC-02-6	10.9 -- 13.1	0.265	± 0.042	0.185	± 0.085
MAF-GC-02-7	13.1 -- 15.3	--	--	--	--
MAF-GC-02-8	15.3 -- 17.4	--	--	--	--
MAF-GC-02-9	17.4 -- 19.6	0.288	± 0.043	0.131	± 0.092
MAF-GC-02-10	19.6 -- 21.8	--	--	--	--
MAF-GC-02-11	21.8 -- 24	--	--	--	--
MAF-GC-02-12	24 -- 26.2	0.193	± 0.038	0.090 U	± 0.053
MAF-GC-02-13	26.2 -- 28.3	--	--	--	--
MAF-GC-02-14	28.3 -- 30.5	--	--	--	--
MAF-GC-02-15	30.5 -- 32.7	0.149	± 0.038	0.090 U	± 0.057
MAF-GC-02-16	32.7 -- 34.9	--	--	--	--
MAF-GC-02-17	34.9 -- 37.1	--	--	--	--
MAF-GC-02-18	37.1 -- 39.2	0.164	± 0.041	0.098 U	± 0.059
MAF-GC-02-19	39.2 -- 41.4	--	--	--	--
MAF-GC-02-20	41.4 -- 43.6	--	--	--	--
MAF-GC-02-21	43.6 -- 45.8	0.129	± 0.037	0.098 U	± 0.060
MAF-GC-02-22	45.8 -- 48	--	--	--	--
MAF-GC-02-23	48 -- 50.1	--	--	--	--
MAF-GC-02-24	50.1 -- 52.3	0.15	± 0.041	0.097 U	± 0.056
MAF-GC-02-25	52.3 -- 54.5	--	--	--	--
MAF-GC-02-26	54.5 -- 56.7	--	--	--	--
MAF-GC-02-27	56.7 -- 58.9	0.162	± 0.041	0.077 U	± 0.045
MAF-GC-02-28	58.9 -- 61	--	--	--	--
MAF-GC-02-29	61 -- 63.2	--	--	--	--
MAF-GC-02-30	63.2 -- 65.4	0.138	± 0.039	0.080 U	± 0.049
MAF-GC-02-31	65.4 -- 67.6	--	--	--	--
MAF-GC-02-32	67.6 -- 69.8	--	--	--	--
MAF-GC-02-33	69.8 -- 71.9	0.129	± 0.036	0.068 U	± 0.044
MAF-GC-02-34	71.9 -- 74.1	--	--	--	--
MAF-GC-02-35	74.1 -- 76.3	--	--	--	--
MAF-GC-02-36	76.3 -- 78.5	0.091	± 0.040	0.072 U	± 0.045
MAF-GC-02-37	78.5 -- 80.7	--	--	--	--
MAF-GC-02-38	80.7 -- 82.8	--	--	--	--
MAF-GC-02-39	82.8 -- 85	0.062 U	± 0.038	0.086 U	± 0.053

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Sample Identification	Depth Interval (cm)	Pb-210 Activity (pCi/g)		Cs-137 Activity (pCi/g)	
		Result/MDC	Error Delta	Result/MDC	Error Delta
MAF-GC-02-40	85 -- 87.2	--	--	--	--
MAF-GC-02-41	87.2 -- 89.4	--	--	--	--
MAF-GC-02-42	89.4 -- 91.6	0.059 U	± 0.035	0.065 U	± 0.037
MAF-GC-02-43	91.6 -- 93.7	--	--	--	--
MAF-GC-02-44	93.7 -- 95.9	--	--	--	--
MAF-GC-02-45	95.9 -- 98.1	0.082	± 0.036	0.087 U	± 0.053
MAF-GC-02-46	98.1 -- 100	--	--	--	--
MAF-GC-02-47	100 -- 102	--	--	--	--
MAF-GC-02-48	102 -- 105	--	--	--	--
MAF-GC-02-49	105 -- 107	--	--	--	--
MAF-GC-02-50	107 -- 109	--	--	--	--
MAF-GC-02-51	109 -- 111	--	--	--	--
MAF-GC-02-52	111 -- 113	--	--	--	--
MAF-GC-02-53	113 -- 116	--	--	--	--
MAF-GC-02-54	116 -- 118	--	--	--	--
MAF-GC-02-55	118 -- 120	--	--	--	--
MAF-GC-02-56	120 -- 122	--	--	--	--
MAF-GC-02-57	122 -- 124	--	--	--	--
MAF-GC-02-58	124 -- 126	--	--	--	--
MAF-GC-02-59	126 -- 129	--	--	--	--
MAF-GC-02-60	129 -- 131	--	--	--	--
MAF-GC-02-61	131 -- 133	--	--	--	--
MAF-GC-02-62	133 -- 135	--	--	--	--
MAF-GC-02-63	135 -- 137	--	--	--	--
MAF-GC-02-64	137 -- 140	--	--	--	--
MAF-GC-02-65	140 -- 142	--	--	--	--
MAF-GC-02-66	142 -- 144	--	--	--	--
MAF-GC-02-67	144 -- 146	--	--	--	--
MAF-GC-02-68	146 -- 148	--	--	--	--

Notes:

cm = centimeter

MDC = Minimum detectable concentration

pCi/g = picocuries per gram

U = not detected

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Table 4

MAF-GC-03 Radioisotope (Cs-137 and Pb-210) Analytical Results Summary

Weyerhaeuser Mill A Former

Everett, Washington

Sample Identification	Depth Interval (cm)	Pb-210 Activity (pCi/g)		Cs-137 Activity (pCi/g)	
		Result/MDC	Error Delta	Result/MDC	Error Delta
MAF-GC-03-1	0 -- 2	--	--	--	--
MAF-GC-03-2	2 -- 4	--	--	--	--
MAF-GC-03-3	4 -- 7	0.24	± 0.060	0.09 U	± 0.054
MAF-GC-03-4	7 -- 9	--	--	--	--
MAF-GC-03-5	9 -- 11.2	--	--	--	--
MAF-GC-03-6	11.2 -- 13.4	0.18	± 0.058	0.09 U	± 0.055
MAF-GC-03-7	13.4 -- 15.7	--	--	--	--
MAF-GC-03-8	15.7 -- 17.9	--	--	--	--
MAF-GC-03-9	17.9 -- 20.2	0.17	± 0.057	0.09 U	± 0.050
MAF-GC-03-10	20.2 -- 22.4	--	--	--	--
MAF-GC-03-11	22.4 -- 24.6	--	--	--	--
MAF-GC-03-12	24.6 -- 26.9	0.13	± 0.065	0.10 U	± 0.056
MAF-GC-03-13	26.9 -- 29.1	--	--	--	--
MAF-GC-03-14	29.1 -- 31.4	--	--	--	--
MAF-GC-03-15	31.4 -- 33.6	0.16 U	± 0.091	0.07 U	± 0.043
MAF-GC-03-16	33.6 -- 35.8	--	--	--	--
MAF-GC-03-17	35.8 -- 38.1	--	--	--	--
MAF-GC-03-18	38.1 -- 40.3	0.10 U	± 0.064	0.09 U	± 0.054
MAF-GC-03-19	40.3 -- 42.6	--	--	--	--
MAF-GC-03-20	42.6 -- 44.8	--	--	--	--
MAF-GC-03-21	44.8 -- 47	0.14	± 0.078	0.094 U	± 0.052
MAF-GC-03-22	47 -- 49.3	--	--	--	--
MAF-GC-03-23	49.3 -- 51.5	--	--	--	--
MAF-GC-03-24	51.5 -- 53.8	0.10	± 0.053	0.06 U	± 0.032
MAF-GC-03-25	53.8 -- 56	--	--	--	--
MAF-GC-03-26	56 -- 58.2	--	--	--	--
MAF-GC-03-27	58.2 -- 60.5	0.26	± 0.087	0.07 U	± 0.038
MAF-GC-03-28	60.5 -- 62.7	--	--	--	--
MAF-GC-03-29	62.7 -- 65	--	--	--	--
MAF-GC-03-30	65 -- 67.2	0.09 U	± 0.058	0.06 U	± 0.040
MAF-GC-03-31	67.2 -- 69.4	--	--	--	--
MAF-GC-03-32	69.4 -- 71.7	--	--	--	--
MAF-GC-03-33	71.7 -- 73.9	0.087 U	± 0.047	0.089 U	± 0.053
MAF-GC-03-34	73.9 -- 76.2	--	--	--	--
MAF-GC-03-35	76.2 -- 78.4	--	--	--	--
MAF-GC-03-36	78.4 -- 80.6	0.14	± 0.068	0.10 U	± 0.061
MAF-GC-03-37	80.6 -- 82.9	--	--	--	--
MAF-GC-03-38	82.9 -- 85.1	--	--	--	--
MAF-GC-03-39	85.1 -- 87.4	0.20	± 0.072	0.09 U	± 0.045
MAF-GC-03-40	87.4 -- 89.6	--	--	--	--

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Sample Identification	Depth Interval (cm)	Pb-210 Activity (pCi/g)		Cs-137 Activity (pCi/g)	
		Result/MDC	Error Delta	Result/MDC	Error Delta
MAF-GC-03-41	89.6 -- 91.8	--	--	--	--
MAF-GC-03-42	91.8 -- 94.1	0.10 U	± 0.063	0.09 U	± 0.053
MAF-GC-03-43	94.1 -- 96.3	--	--	--	--
MAF-GC-03-44	96.3 -- 98.6	--	--	--	--
MAF-GC-03-45	98.6 -- 101	0.17	± 0.062	0.07 U	± 0.043
MAF-GC-03-46	101 -- 103	--	--	--	--
MAF-GC-03-47	103 -- 105	--	--	--	--
MAF-GC-03-48	105 -- 108	--	--	--	--
MAF-GC-03-49	108 -- 110	--	--	--	--
MAF-GC-03-50	110 -- 112	--	--	--	--
MAF-GC-03-51	112 -- 114	--	--	--	--
MAF-GC-03-52	114 -- 116	--	--	--	--
MAF-GC-03-53	116 -- 119	--	--	--	--
MAF-GC-03-54	119 -- 121	--	--	--	--
MAF-GC-03-55	121 -- 123	--	--	--	--
MAF-GC-03-56	123 -- 125	--	--	--	--
MAF-GC-03-57	125 -- 128	--	--	--	--
MAF-GC-03-58	128 -- 130	--	--	--	--
MAF-GC-03-59	130 -- 132	--	--	--	--
MAF-GC-03-60	132 -- 134	--	--	--	--
MAF-GC-03-61	134 -- 137	--	--	--	--
MAF-GC-03-62	137 -- 139	--	--	--	--
MAF-GC-03-63	139 -- 141	--	--	--	--
MAF-GC-03-64	141 -- 143	--	--	--	--
MAF-GC-03-65	143 -- 146	--	--	--	--
MAF-GC-03-66	146 -- 148	--	--	--	--

Notes:

cm = centimeter

MDC = Minimum detectable concentration

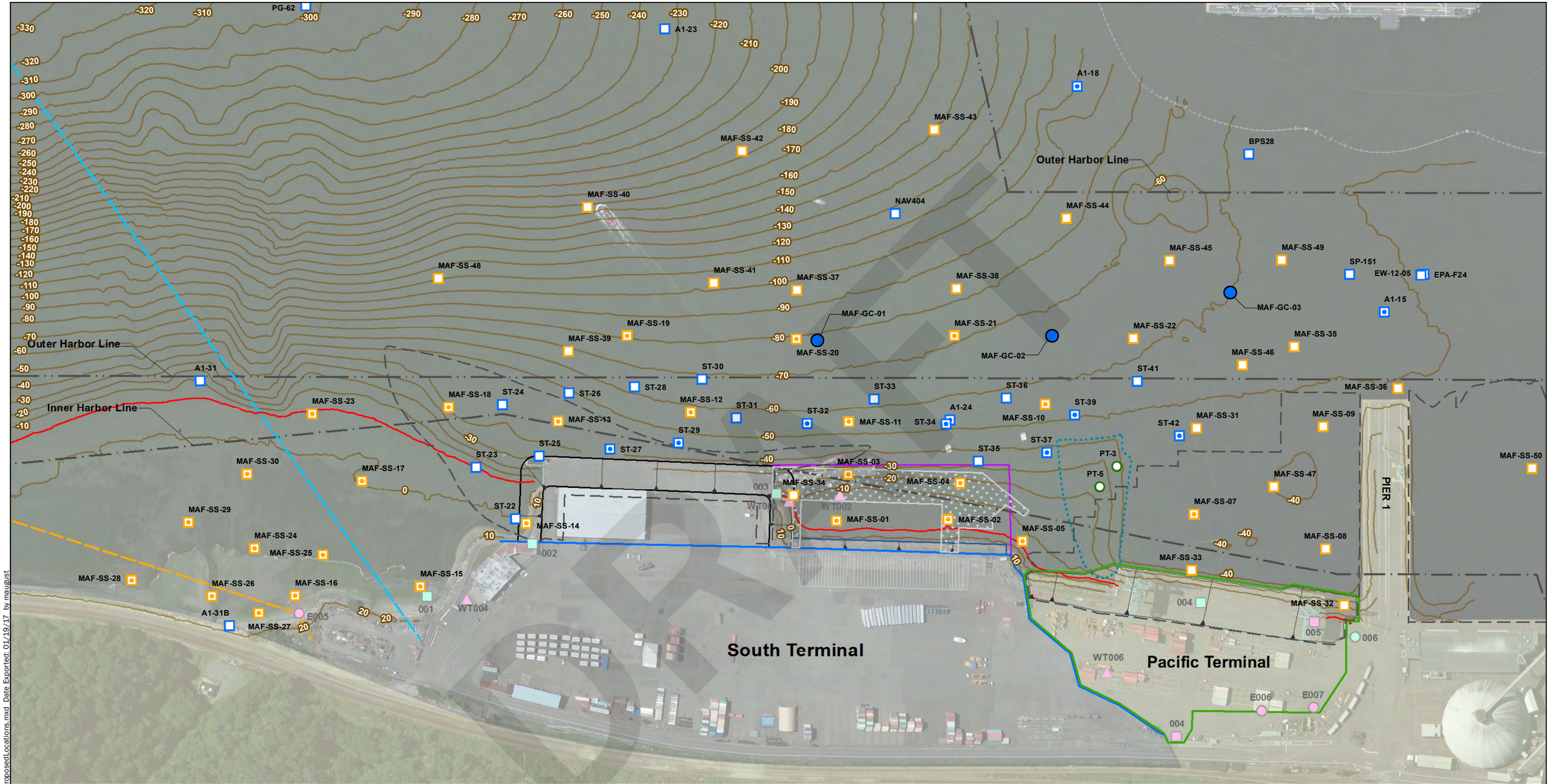
pCi/g = picocuries per gram

U = not detected

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FIGURES

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300 0 300

Feet

Notes:
1. The locations of all features shown are approximate. 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and contentof electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
Data Source: Base aerial from Bing Maps, 2011.
Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- Sediment Core Location for Isotope Analysis

Remedial Investigation (RI) Surface Sediment Investigation

- Surface Sediment Sample Location Only
- Surface Sediment Sample Location With Co-Located Sediment Core/Subsurface Sediment Sample (See Figure X)

Previous Surface Sediment Investigation

- Surface Sediment Sample Location Only
- Surface Sediment Sample Location With Co-Located Sediment Core/Subsurface Sediment Sample (See Figure X)

Interim Action DMMP Sediment Characterization

- Z-Layer Sample Location at Interim Action Surface

- Construction Berm Fill
- Historical Pier
- Interim Action Dredge Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- -3 Feet Mean Low Low Water (MLLW) Elevation Contour Line
- Bulkhead
- Integrated Cleanup Containment and Terminal Use Area

- Historical Industrial Outfall
- Former Combined Sewer Outfall (CSO)
- Former Stormwater Outfall
- Current CSO
- Current Stormwater Outfall
- Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- Historic Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)

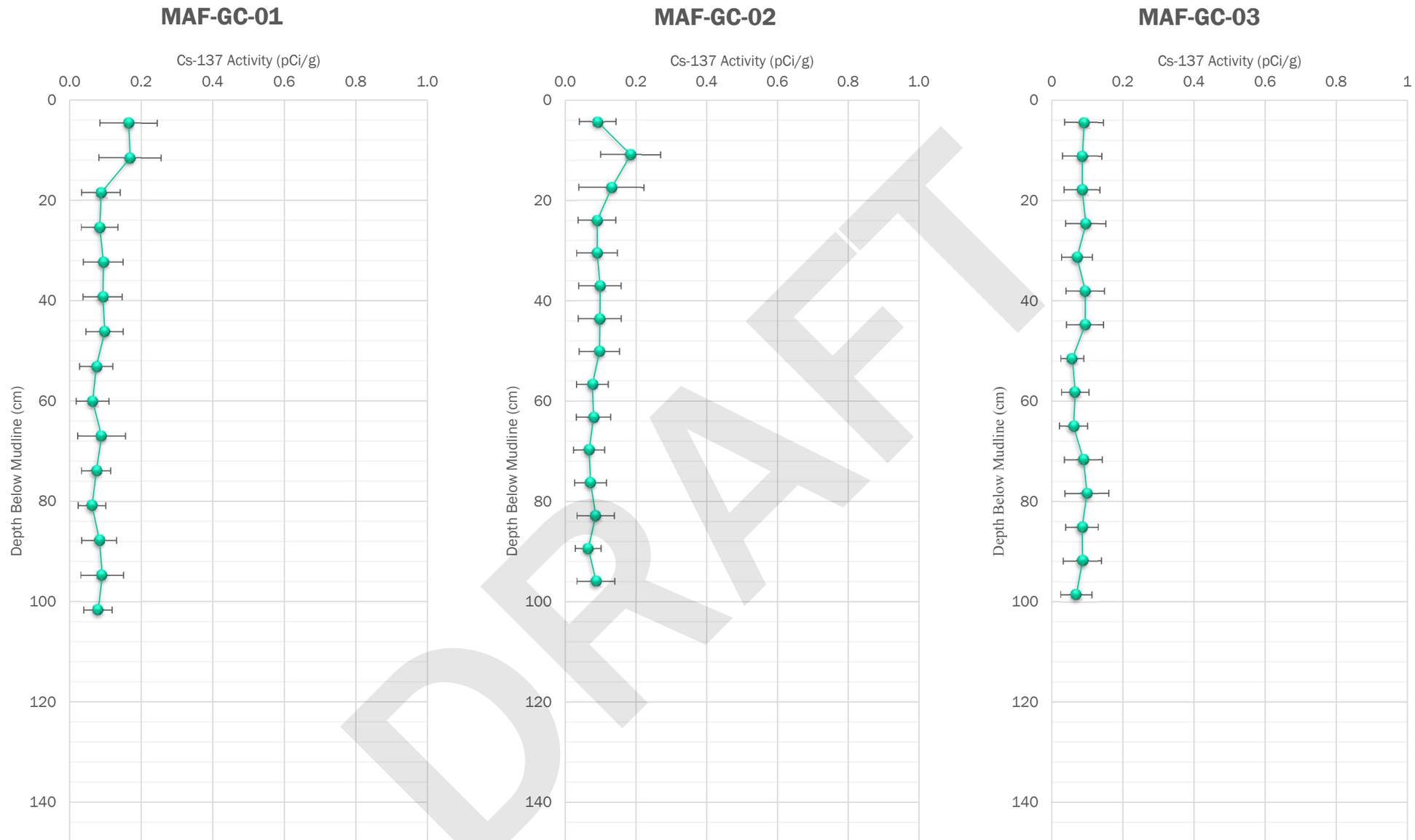
Sediment Core Investigation Locations for Isotope Analysis

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 1

P:\0\067602\GIS\IsotopeAnalysis\067602005_F01_ProposedLocations.mxd Date Exported: 01/19/17 by maugust



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Notes:

1. This figure is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Weyerhaeuser Mill A Former Site geochronology study results (Tables 2 through 4).

Legend

Measured Cs-137 Activity and Error Delta

Cs = cesium

pCI/G = picocuries per gram

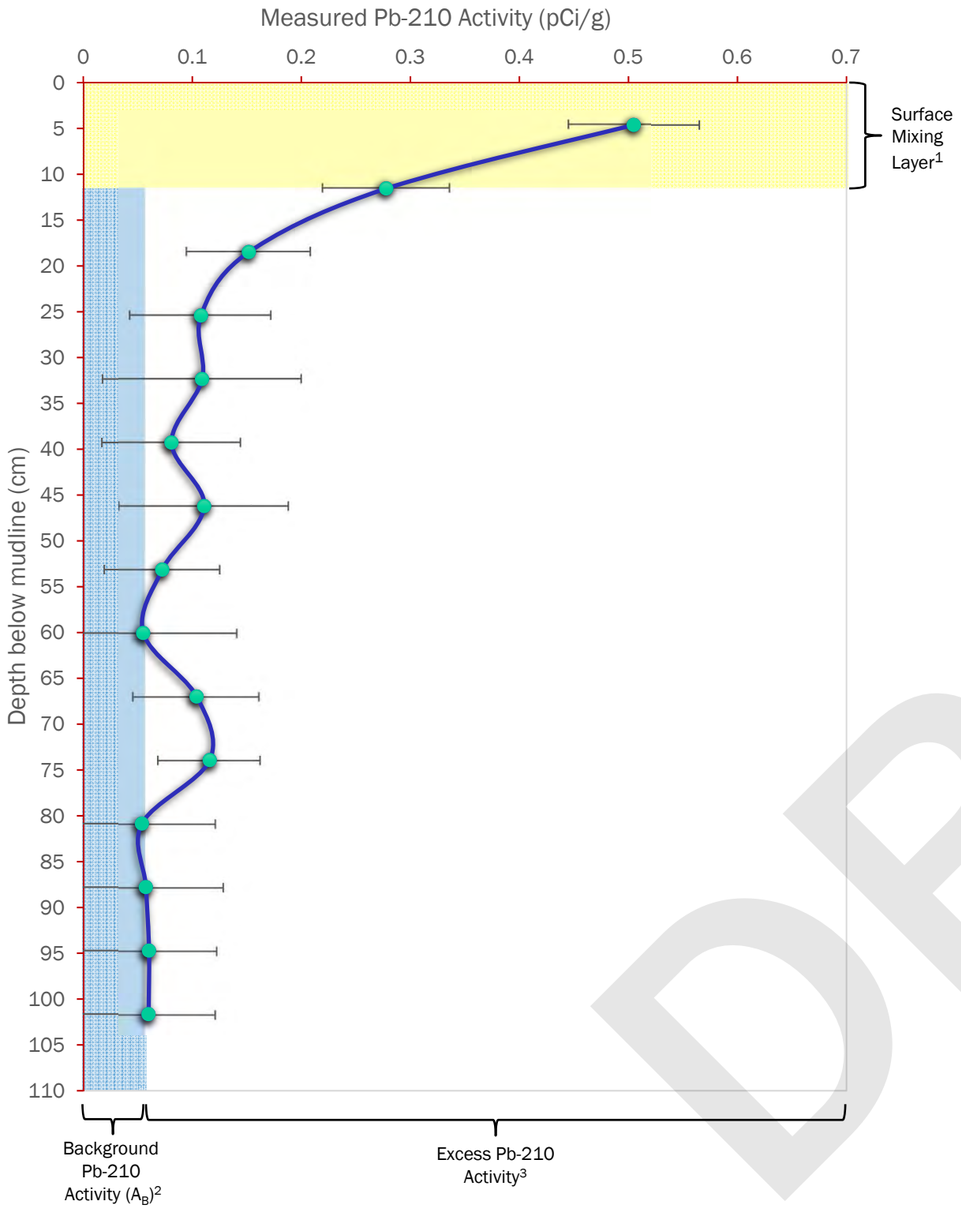
Cesium-137 Activity

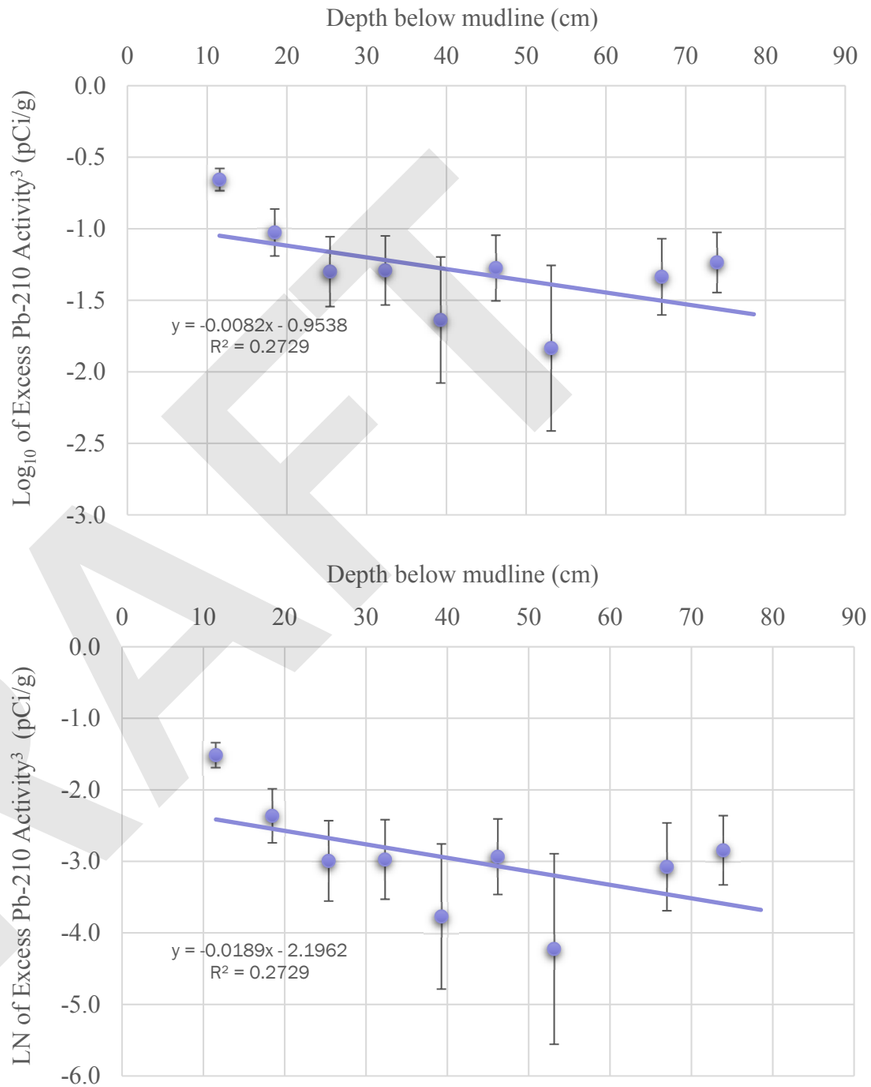
Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 2

https://projects.geoengineers.com/sites/067602005/Draft/GeoChronology Study_Fig 03 Date Exported: 04/17/17





Sedimentation Rate Based On Jeter Method

$$Sedimentation\ Rate = \frac{(Pb-210\ Decay\ Coefficient)}{(Slop\ of\ Log_{10}\ Excess\ Pb-210\ Activity)}$$

$$Sedimentation\ Rate = \frac{(-0.01352)}{(-0.0082)}$$

$$Sedimentation\ Rate = 1.65\ \text{cm/year}$$

Sedimentation Rate Based On Battelle Method

$$Sedimentation\ Rate = \frac{(Pb-210\ Decay\ Constant)}{(Slop\ of\ LN\ Excess\ Pb-210\ Activity)}$$

$$Sedimentation\ Rate = \frac{(-0.031)}{(-0.0189)}$$

$$Sedimentation\ Rate = 1.65\ \text{cm/year}$$

Notes:

1. The depth at which surface measurements do not fluctuate significantly is used to identify the surface mixed layer. Mixing may result from human and/or natural processes.
2. Background Pb-210 Activity (A_B) is the average of the four deepest samples in which Pb-210 Activity does not fluctuate significantly.
3. Excess Pb-210 Activity is the difference of A_B and the measured Pb-210 Activity.
4. This figure is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Weyerhaeuser Mill A Former Site geochronology study results (Table 2).

Legend

Measured Pb-210 Activity and Error Delta

Pb = lead

pCI/G = picocuries per gram

Lead-210 Activity and Sedimentation Rate
MAF-GC-01

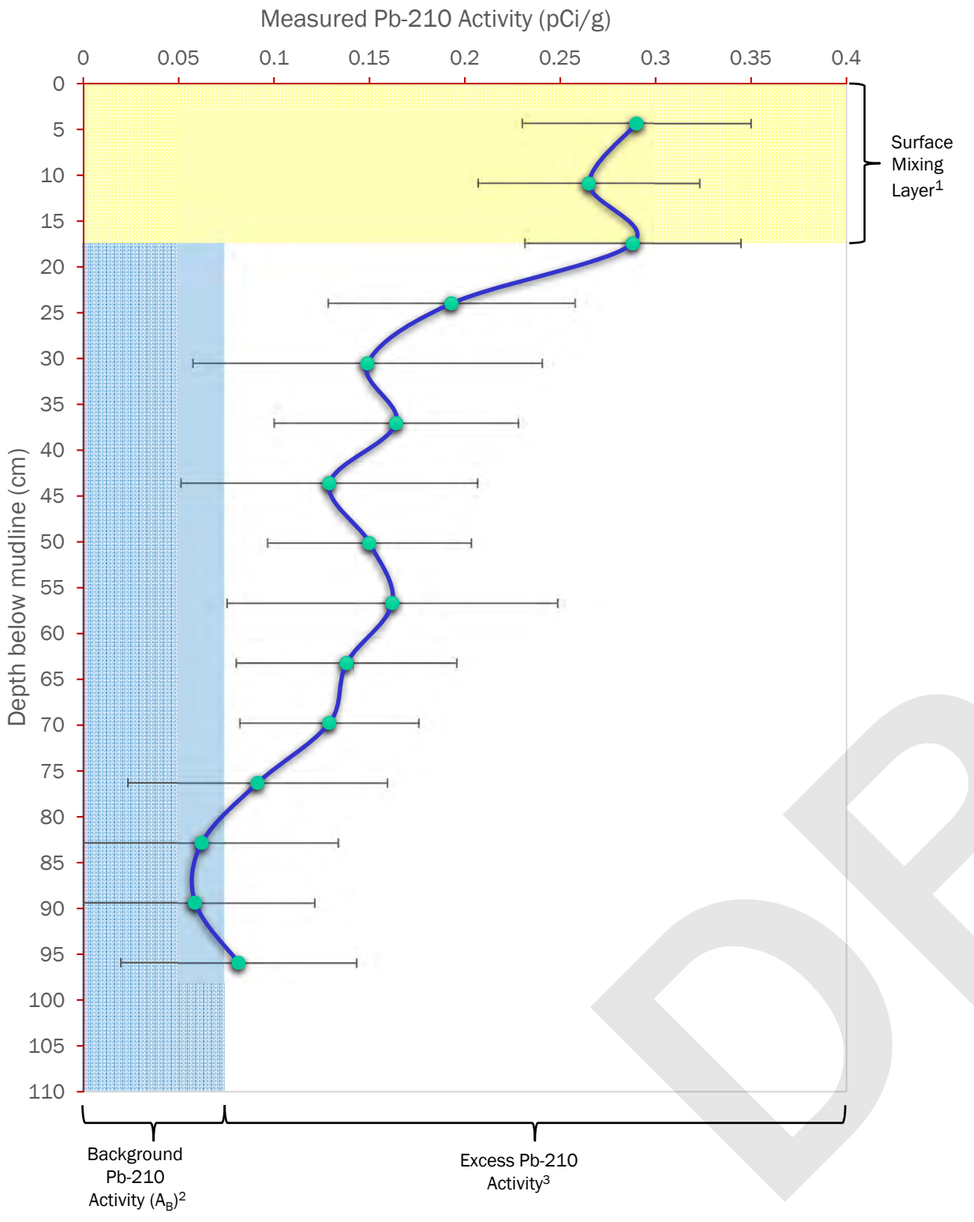
Weyerhaeuser Mill A Former
Everett, Washington

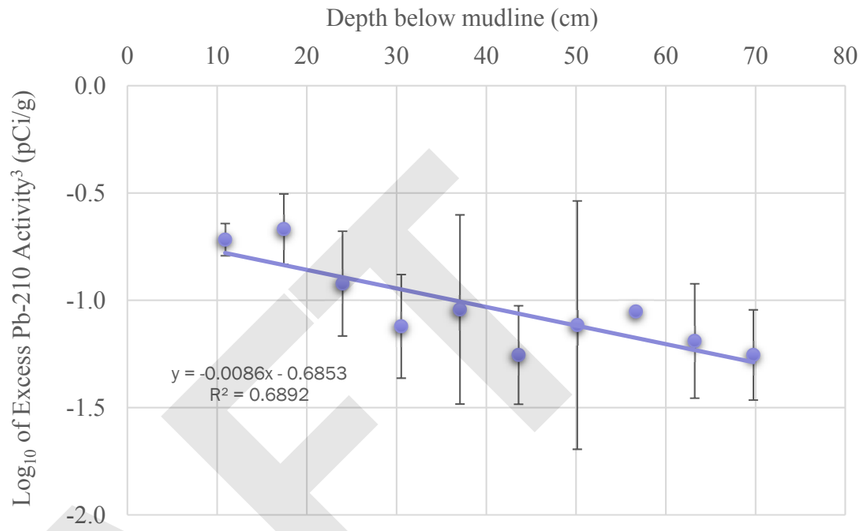
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Figure 3

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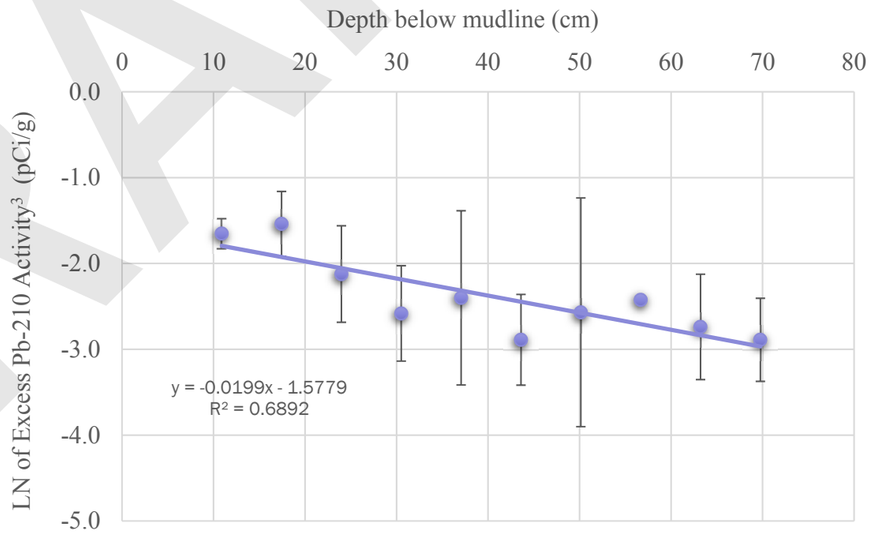


Sedimentation Rate Based On Jeter Method

$$Sedimentation\ Rate = \frac{(Pb - 210\ Decay\ Coefficient)}{(Slop\ of\ Log_{10}\ Excess\ Pb - 210\ Activity)}$$

$$Sedimentation\ Rate = \frac{(-0.01352)}{(-0.0086)}$$

$$Sedimentation\ Rate = 1.57\ \text{cm/year}$$



Sedimentation Rate Based On Battelle Method

$$Sedimentation\ Rate = \frac{(Pb - 210\ Decay\ Constant)}{(Slop\ of\ LN\ Excess\ Pb - 210\ Activity)}$$

$$Sedimentation\ Rate = \frac{(-0.031)}{(-0.0199)}$$

$$Sedimentation\ Rate = 1.56\ \text{cm/year}$$

Notes:

1. The depth at which surface measurements do not fluctuate significantly is used to identify the surface mixed layer. Mixing may result from human and/or natural processes.
2. Background Pb-210 Activity (A_B) is the average of the four deepest samples in which Pb-210 Activity does not fluctuate significantly.
3. Excess Pb-210 Activity is the difference of A_B and the measured Pb-210 Activity.
4. This figure is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Weyerhaeuser Mill A Former Site geochronology study results (Table 3).

Legend

Measured Pb-210 Activity and Error Delta

Pb = lead

pCI/G = picocuries per gram

Lead-210 Activity and Sedimentation Rate
MAF-GC-02

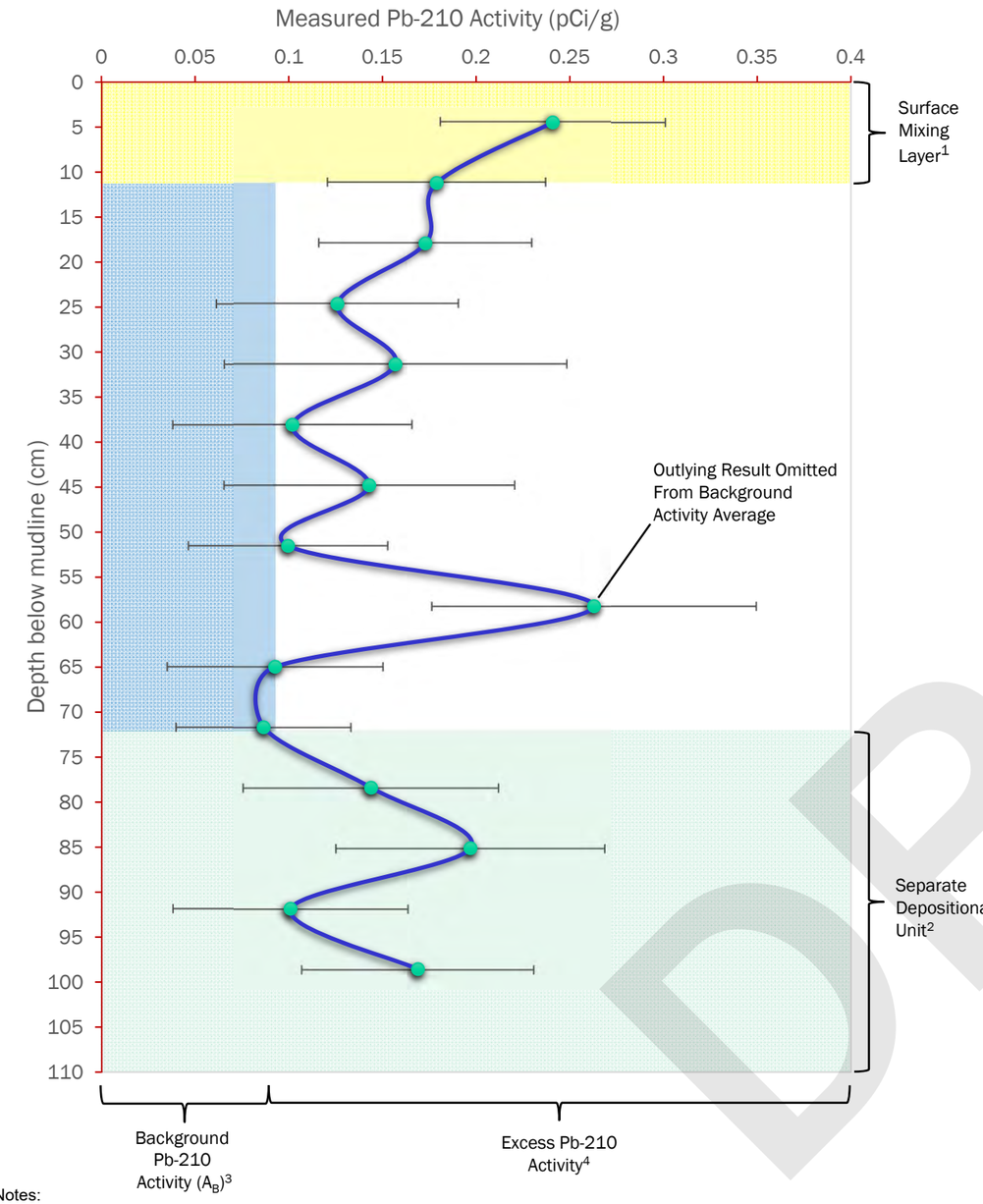
Weyerhaeuser Mill A Former
Everett, Washington

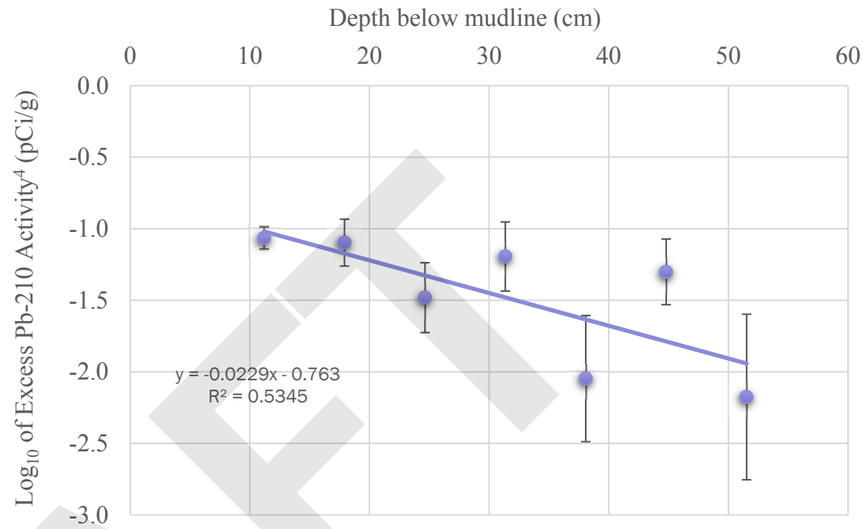
GeoEngineers

Figure 4

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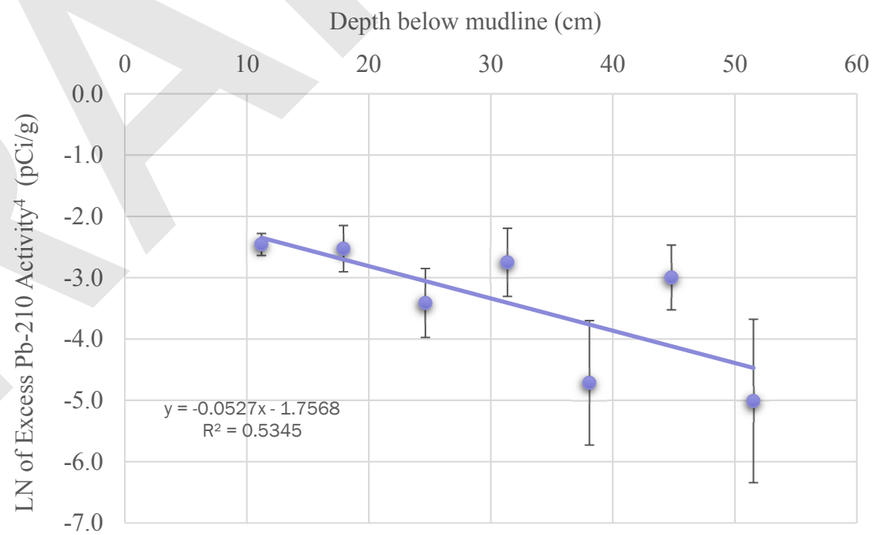


Sedimentation Rate Based On Jeter Method

$$Sedimentation\ Rate = \frac{(Pb-210\ Decay\ Coefficient)}{(Slop\ of\ Log_{10}\ Excess\ Pb-210\ Activity)}$$

$$Sedimentation\ Rate = \frac{(-0.01352)}{(-0.0229)}$$

$$Sedimentation\ Rate = 0.59\ \text{cm/year}$$



Sedimentation Rate Based On Battelle Method

$$Sedimentation\ Rate = \frac{(Pb-210\ Decay\ Constant)}{(Slop\ of\ LN\ Excess\ Pb-210\ Activity)}$$

$$Sedimentation\ Rate = \frac{(-0.031)}{(-0.0527)}$$

$$Sedimentation\ Rate = 0.59\ \text{cm/year}$$

Notes:

1. The depth at which surface measurements do not fluctuate significantly is used to identify the surface mixed layer. Mixing may result from human and/or natural processes.
2. Material encountered at depths greater than 74 cm below mud line is different in composition than the overlying material and represents a separate depositional unit. Baseline assumption for Jeter and Battelle methods assume a homogeneous material for evaluating sedimentation rate, therefore results within this lower unit were not included in the Pb-210 sedimentation evaluation.
3. Background Pb-210 Activity (A_B) is the average of the four deepest samples in which Pb-210 Activity does not fluctuate significantly. Sample MAF-GC-03-27 is an outlying result and was not used determine background PB-210 Activity.
4. Excess Pb-210 Activity is the difference of A_B and the measured Pb-210 Activity.

This figure is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Weyerhaeuser Mill A Former Site geochronology study results (Table 4).

Legend

Measured Pb-210 Activity and Error Delta

Pb = lead

pCI/G = picocuries per gram

Lead-210 Activity and Sedimentation Rate
MAF-GC-03

Weyerhaeuser Mill A Former
Everett, Washington

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Figure 5

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ATTACHMENT 1
Exploration Logs

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SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

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Key to Exploration Logs

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Figure A-1

Drilled	Start	End	Total Depth (ft)	Logged By	Driller	Drilling Method
	2/13/2017	2/13/2017	5.2	RST	Gravity Consulting, LLC	Vibracore

Mudline Elevation (ft)	Vertical Datum	Drilling Equipment
84.87	MLLW	Research Vessel Tieton

Easting (X) / Northing (Y)	Horizontal Datum	Surface Water Time Measured	Depth to Mudline (ft)	Water Elevation (ft)
359095.52 / 1298539.66	NAD83	8:25:00 AM	95.6	10.73

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered %	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Wood Content (%)	REMARKS
	0		88		Sample collected every approximately 2 cm		SM	Brown silty fine sand with trace wood debris (flakes)	NS	<5	
							SP	Brown fine sand with trace wood debris (flakes)	NS	<1	
									NS	<1	
							SP	Brown fine sand with occasoinal shells	NS	<1	
-80	5								NS	<1	

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Note: See Figure A-1 for explanation of symbols.

Log of Boring MAF-GC-01-1

GeoEngineers

Project: Weyerhaeuser Mill A Former
Project Location: Everett, Washington
Project Number: 0676-020-05

Figure A-2
Sheet 1 of 1

Seattle: Date:4/19/17 Path:W:\PROJECTS\0676020\GINT\0676020G05.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_STANDARD

Drilled	Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
	2/13/2017	2/13/2017	5.2	RST	Gravity Consulting, LLC	Vibracore

Mudline Elevation (ft)	Vertical Datum	Drilling Equipment
67.31	MLLW	Research Vessel Tieton

Easting (X) / Northing (Y)	Horizontal Datum	Surface Water Time Measured	Depth to Mudline (ft)	Water Elevation (ft)
359682.23 / 1298967.12	NAD83	9:30:00 AM	76.1	8.79

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered %	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Wood Content (%)	REMARKS
65	0		81		Sample collected every approximately 2 cm		SM	Dark brown silty fine sand with occasional wood debris (bark, chips)	NS	10	
							SM	Dark brown-gray silty fine sand with occasional wood debris (bark, sawdust, chips)	NS	5	
									NS	5	
									NS	<1	
							SM	Gray silty fine sand with occasional shells	NS	<1	
	5								NS	<1	

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Note: See Figure A-1 for explanation of symbols.

Log of Boring MAF-GC-02-4

GeoEngineers

Project: Weyerhaeuser Mill A Former
Project Location: Everett, Washington
Project Number: 0676-020-05

Figure A-3
Sheet 1 of 1

Seattle: Date:4/19/17 Path:W:\PROJECTS\0676020\GINT\0676020G05.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_STANDARD

Drilled Start 2/10/2017 End 2/10/2017	Total Depth (ft) 5.2	Logged By RST Checked By	Driller Gravity Consulting, LLC	Drilling Method Vibracore
Mudline Elevation (ft) 68.22		Vertical Datum MLLW	Drilling Equipment Research Vessel Tieton	
Easting (X) 360177.12 Northing (Y) 1299180.7		Horizontal Datum NAD83	Surface Water Time Measured 10:09:00 AM	Depth to Mudline (ft) 74.1 / Water Elevation (ft) 5.88
Notes:				

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered %	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Wood Content (%)	REMARKS
65	0		66		Sample collected every approximately 2 cm		SM	Dark brown silty fine sand with occasional wood debris (bark, sawdust, chips)	NS	10	
							SM	Dark brown-gray silty fine sand	NS	<1	
							SM	Dark brown silty fine to coarse sand with occasional gravel	NS	0	
							ML	Gray silt with occasional shells	NS	0	
									NS	0	
	5								NS	0	

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Note: See Figure A-1 for explanation of symbols.

Log of Boring MAF-GC-03-3

GeoEngineers

Project: Weyerhaeuser Mill A Former
Project Location: Everett, Washington
Project Number: 0676-020-05

Figure A-4
Sheet 1 of 1

Seattle: Date:4/19/17 Path:W:\PROJECTS\0676020\GINT\0676020G5.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_STANDARD

ATTACHMENT 2
Laboratory Data Reports

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

Work Order #: L71890

GeoEngineers

March 30, 2017

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TELEDYNE
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Knoxville, TN 37931-3133

Robert Trahan
GeoEngineers, Inc.
600 Stewart Street, Suite 1700
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Case Narrative - L71890
GE002-3EREG-17

03/31/2017 08:44

DRAFT

Sample Receipt

The following samples were received on March 8, 2017 in good condition, unless otherwise noted.

Cross Reference Table

Client ID	Laboratory ID	Station ID(if applicable)
MAF-GC-03-1	L71890-1	MAF-GC-03
MAF-GC-03-2	L71890-2	MAF-GC-03
MAF-GC-03-3	L71890-3	MAF-GC-03
MAF-GC-03-4	L71890-4	MAF-GC-03
MAF-GC-03-5	L71890-5	MAF-GC-03
MAF-GC-03-6	L71890-6	MAF-GC-03
MAF-GC-03-7	L71890-7	MAF-GC-03
MAF-GC-03-8	L71890-8	MAF-GC-03
MAF-GC-03-9	L71890-9	MAF-GC-03
MAF-GC-03-10	L71890-10	MAF-GC-03
MAF-GC-03-11	L71890-11	MAF-GC-03
MAF-GC-03-12	L71890-12	MAF-GC-03
MAF-GC-03-13	L71890-13	MAF-GC-03
MAF-GC-03-14	L71890-14	MAF-GC-03
MAF-GC-03-15	L71890-15	MAF-GC-03
MAF-GC-03-16	L71890-16	MAF-GC-03
MAF-GC-03-17	L71890-17	MAF-GC-03
MAF-GC-03-18	L71890-18	MAF-GC-03
MAF-GC-03-19	L71890-19	MAF-GC-03
MAF-GC-03-20	L71890-20	MAF-GC-03
MAF-GC-03-21	L71890-21	MAF-GC-03
MAF-GC-03-22	L71890-22	MAF-GC-03
MAF-GC-03-23	L71890-23	MAF-GC-03
MAF-GC-03-24	L71890-24	MAF-GC-03
MAF-GC-03-25	L71890-25	MAF-GC-03
MAF-GC-03-26	L71890-26	MAF-GC-03
MAF-GC-03-27	L71890-27	MAF-GC-03
MAF-GC-03-28	L71890-28	MAF-GC-03
MAF-GC-03-29	L71890-29	MAF-GC-03
MAF-GC-03-30	L71890-30	MAF-GC-03
MAF-GC-03-31	L71890-31	MAF-GC-03

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

Case Narrative - L71890
GE002-3EREG-17

03/31/2017 08:44

Client ID	Laboratory ID	Station ID(if applicable)
MAF-GC-03-32	L71890-32	MAF-GC-03
MAF-GC-03-33	L71890-33	MAF-GC-03
MAF-GC-03-34	L71890-34	MAF-GC-03
MAF-GC-03-35	L71890-35	MAF-GC-03
MAF-GC-03-36	L71890-36	MAF-GC-03
MAF-GC-03-37	L71890-37	MAF-GC-03
MAF-GC-03-38	L71890-38	MAF-GC-03
MAF-GC-03-39	L71890-39	MAF-GC-03
MAF-GC-03-40	L71890-40	MAF-GC-03
MAF-GC-03-41	L71890-41	MAF-GC-03
MAF-GC-03-42	L71890-42	MAF-GC-03
MAF-GC-03-43	L71890-43	MAF-GC-03
MAF-GC-03-44	L71890-44	MAF-GC-03
MAF-GC-03-45	L71890-45	MAF-GC-03
MAF-GC-03-46	L71890-46	MAF-GC-03
MAF-GC-03-47	L71890-47	MAF-GC-03
MAF-GC-03-48	L71890-48	MAF-GC-03
MAF-GC-03-49	L71890-49	MAF-GC-03
MAF-GC-03-50	L71890-50	MAF-GC-03
MAF-GC-03-51	L71890-51	MAF-GC-03
MAF-GC-03-52	L71890-52	MAF-GC-03
MAF-GC-03-53	L71890-53	MAF-GC-03
MAF-GC-03-54	L71890-54	MAF-GC-03
MAF-GC-03-55	L71890-55	MAF-GC-03
MAF-GC-03-56	L71890-56	MAF-GC-03
MAF-GC-03-57	L71890-57	MAF-GC-03
MAF-GC-03-58	L71890-58	MAF-GC-03
MAF-GC-03-59	L71890-59	MAF-GC-03
MAF-GC-03-60	L71890-60	MAF-GC-03
MAF-GC-03-61	L71890-61	MAF-GC-03
MAF-GC-03-62	L71890-62	MAF-GC-03
MAF-GC-03-63	L71890-63	MAF-GC-03
MAF-GC-03-64	L71890-64	MAF-GC-03
MAF-GC-03-65	L71890-65	MAF-GC-03
MAF-GC-03-66	L71890-66	MAF-GC-03

DRAFT

Sample Analysis

TELEDYNE
BROWN ENGINEERING, INC.
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Knoxville, TN 37931-3133

Case Narrative - L71890
GE002-3EREG-17

03/31/2017 08:44

Instruments used for all analyses were in calibration.
Standard solutions used in analyses were National Institute of Standards and Technology (NIST) traceable.

Analytical Method Cross Reference Table

Radiological Parameter	TBE Knoxville Method	Reference Method

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03/31/2017 08:44

Special Considerations

There did not appear to be any interfering nuclides. The bismuth carrier was used to gravimetrically calculate the yield.

The laboratory was unable to meet the dection level of 0.1 pCi/g for samples L71890 -15, 18, and 42. The count time was extended to 24 hours for samples 18, and 42 and to 800 minutes for sample 15 to achieve the best possible detection level.

Gamma Spectroscopy

Quality Control

Quality control samples were analyzed as WG24439.

Duplicate Sample

Duplicates were analyzed for the following samples. All duplicate results were within acceptance limits, unless otherwise noted.

Client ID	Laboratory ID	QC Sample #
MAF-GC-03-3	L71890-3	WG24439-1

PB-210

Quality Control

Quality control samples were analyzed as WG24457.

Method Blank

All blanks were within acceptance limits, unless otherwise noted.

Laboratory Control Sample

All laboratory control samples were within acceptance limits, unless otherwise noted.

Duplicate Sample

Duplicates were analyzed for the following samples. All duplicate results were within acceptance limits, unless otherwise noted.

Client ID	Laboratory ID	QC Sample #
MAF-GC-03-3	L71890-3	WG24457-3

Matrix Spike

All matrix spike results were within acceptance limits, unless otherwise noted.

Matrix Spike Duplicate

Matrix spike duplicate result was within acceptance limits, unless otherwise noted.

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TELEDYNE
BROWN ENGINEERING, INC.
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2508 Quality Lane
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Case Narrative - L71890
GE002-3EREG-17

03/31/2017 08:44

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

DRAFT

ANALYTICAL RESULTS

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Report of Analysis

03/30/17 13:51

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71890

GeoEngineers, Inc.
GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-03-1** Collect Start: 02/23/2017 13:00 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:00 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-1

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-2** Collect Start: 02/23/2017 13:02 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:02 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-2

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-3** Collect Start: 02/23/2017 13:04 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:04 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 27.63
LIMS Number: L71890-3

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
PB-210	2015	**2.41E-01**	6.00E-02	9.87E-02	pCi/gDry		4.1102	g dry	02/23/17 13:04	03/21/17	800	M	+
CS-137	2007	9.15E-03	5.42E-02	**9.11E-02**	pCi/g Dry		117.83	g dry	02/23/17 13:04	03/14/17	3950	Sec	U No

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-4** Collect Start: 02/23/2017 13:06 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:06 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-4

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

03/30/17 13:51

L71890

GeoEngineers, Inc.

Robert Trahan

GE002-3EREG-17

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Sample ID: **MAF-GC-03-5** Collect Start: 02/23/2017 13:08 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:08 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-5

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-6** Collect Start: 02/23/2017 13:10 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:10 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 38
LIMS Number: L71890-6

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
PB-210	2015	**1.79E-01**	5.81E-02	9.88E-02	pCi/gDry		4.0674	g dry	02/23/17 13:10	03/21/17	800	M	+
CS-137	2007	8.29E-02	4.58E-02	**8.60E-02**	pCi/g Dry		102.04	g dry	02/23/17 13:10	03/14/17	13265	Sec	U No

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-7** Collect Start: 02/23/2017 13:12 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:12 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-7

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-8** Collect Start: 02/23/2017 13:14 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:14 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-8

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

03/30/17 13:51

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71890

GeoEngineers, Inc.
GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-03-9** Collect Start: 02/23/2017 13:16 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:16 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 37.4
LIMS Number: L71890-9

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.73E-01**	5.67E-02	9.72E-02	pCi/gDry		4.0422	g dry	02/23/17 13:16	03/21/17	800	M	+			
CS-137	2007	1.65E-02	4.99E-02	**8.55E-02**	pCi/g Dry		106.88	g dry	02/23/17 13:16	03/14/17	7196	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-10** Collect Start: 02/23/2017 13:18 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:18 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-10

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-11** Collect Start: 02/23/2017 13:20 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:20 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-11

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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GE002-3EREG-17

Sample ID: **MAF-GC-03-12** Collect Start: 02/23/2017 13:22 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:22 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 30.82
LIMS Number: L71890-12

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.26E-01**	6.46E-02	1.14E-01	pCi/gDry		4.3337	g dry	02/23/17 13:22	03/21/17	800	M	+			
CS-137	2007	2.49E-02	5.61E-02	**9.60E-02**	pCi/g Dry		139.52	g dry	02/23/17 13:22	03/14/17	7230	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-13** Collect Start: 02/23/2017 13:24 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:24 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-13

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-14** Collect Start: 02/23/2017 13:26 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:26 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-14

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

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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

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MDC - Minimum Detectable Concentration

Report of Analysis

03/30/17 13:51

TELEDYNE BROWN ENGINEERING, INC.
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GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-03-15** Collect Start: 02/23/2017 13:28 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:28 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 30.45
LIMS Number: L71890-15

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	1.57E-01	9.14E-02	**1.62E-01**	pCi/gDry		4.3516	g dry	02/23/17 13:28	03/21/17	800	M	U	Spec		
CS-137	2007	3.60E-03	4.28E-02	**7.10E-02**	pCi/g Dry		139.73	g dry	02/23/17 13:28	03/14/17	4816	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-16** Collect Start: 02/23/2017 13:30 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:30 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-16

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-17** Collect Start: 02/23/2017 13:32 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:32 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-17

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

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MDC - Minimum Detectable Concentration

Report of Analysis

03/30/17 13:51

TELEDYNE BROWN ENGINEERING, INC.
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GE002-3EREG-17

Sample ID: **MAF-GC-03-18** Collect Start: 02/23/2017 13:34 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:34 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 28.02
LIMS Number: L71890-18

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	7.94E-02	6.39E-02	**1.02E-01**	pCi/gDry		4.1424	g dry	02/23/17 13:34	03/23/17	1440	M	U	Spec		
CS-137	2007	2.69E-02	5.37E-02	**9.45E-02**	pCi/g Dry		149.95	g dry	02/23/17 13:34	03/14/17	4912	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-19** Collect Start: 02/23/2017 13:36 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:36 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-19

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-20** Collect Start: 02/23/2017 13:38 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:38 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-20

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
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U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

03/30/17 13:51

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L71890

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Robert Trahan

GE002-3EREG-17

Sample ID: **MAF-GC-03-21** Collect Start: 02/23/2017 13:40 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:40 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 24.62
LIMS Number: L71890-21

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.43E-01**	7.76E-02	1.37E-01	pCi/gDry		4.0651	g dry	02/23/17 13:40	03/21/17	800	M	+			
CS-137	2007	-6.57E-03	5.71E-02	**9.38E-02**	pCi/g Dry		161.87	g dry	02/23/17 13:40	03/14/17	4937	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-22** Collect Start: 02/23/2017 13:42 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:42 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-22

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-23** Collect Start: 02/23/2017 13:44 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:44 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-23

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

03/30/17 13:51

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GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-03-24** Collect Start: 02/23/2017 13:46 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:46 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 17.91
LIMS Number: L71890-24

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**9.97E-02**	5.33E-02	9.40E-02	pCi/gDry		4.2324	g dry	02/23/17 13:46	03/21/17	800	M	+			
CS-137	2007	1.13E-03	3.20E-02	**5.80E-02**	pCi/g Dry		189.93	g dry	02/23/17 13:46	03/14/17	5038	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-25** Collect Start: 02/23/2017 13:48 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:48 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-25

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-26** Collect Start: 02/23/2017 13:50 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:50 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-26

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-03-27** Collect Start: 02/23/2017 13:52 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:52 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 23.95
LIMS Number: L71890-27

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**2.63E-01**	8.65E-02	1.48E-01	pCi/gDry		4.0199	g dry	02/23/17 13:52	03/21/17	800	M	+			
CS-137	2007	1.50E-02	3.82E-02	**6.60E-02**	pCi/g Dry		158.25	g dry	02/23/17 13:52	03/14/17	4090	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-28** Collect Start: 02/23/2017 13:54 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:54 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-28

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-29** Collect Start: 02/23/2017 13:56 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:56 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-29

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

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Sample ID: **MAF-GC-03-30** Collect Start: 02/23/2017 13:58 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 13:58 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 21.53
LIMS Number: L71890-30

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	7.05E-02	5.77E-02	**9.28E-02**	pCi/gDry		4.0237	g dry	02/23/17 13:58	03/23/17	1440	M	U			
CS-137	2007	-1.56E-02	3.95E-02	**6.11E-02**	pCi/g Dry		180.48	g dry	02/23/17 13:58	03/14/17	3938	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-31** Collect Start: 02/23/2017 14:00 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:00 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-31

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-32** Collect Start: 02/23/2017 14:02 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:02 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-32

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

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Sample ID: **MAF-GC-03-33** Collect Start: 02/23/2017 14:04 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:04 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 23.01
LIMS Number: L71890-33

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	1.28E-02	4.68E-02	**8.66E-02**	pCi/gDry		4.019	g dry	02/23/17 14:04	03/21/17	800	M	U			
CS-137	2007	5.79E-03	5.28E-02	**8.92E-02**	pCi/g Dry		171.07	g dry	02/23/17 14:04	03/14/17	3954	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-34** Collect Start: 02/23/2017 14:06 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:06 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-34

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-35** Collect Start: 02/23/2017 14:08 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:08 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-35

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-03-36** Collect Start: 02/23/2017 14:10 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:10 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 23.34
LIMS Number: L71890-36

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.44E-01**	6.80E-02	1.19E-01	pCi/gDry		4.0668	g dry	02/23/17 14:10	03/21/17	800	M	+			
CS-137	2007	-1.27E-02	6.12E-02	**9.91E-02**	pCi/g Dry		155.03	g dry	02/23/17 14:10	03/14/17	4044	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-37** Collect Start: 02/23/2017 14:12 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:12 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-37

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-38** Collect Start: 02/23/2017 14:14 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:14 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-38

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

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Sample ID: **MAF-GC-03-39** Collect Start: 02/23/2017 14:16 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:16 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 21.36
LIMS Number: L71890-39

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.97E-01**	7.16E-02	1.23E-01	pCi/gDry		4.073	g dry	02/23/17 14:16	03/21/17	800	M	+			
CS-137	2007	2.10E-02	4.52E-02	**8.52E-02**	pCi/g Dry		164.6	g dry	02/23/17 14:16	03/14/17	4013	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-40** Collect Start: 02/23/2017 14:18 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:18 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-40

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-41** Collect Start: 02/23/2017 14:20 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:20 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-41

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-03-42** Collect Start: 02/23/2017 14:22 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:22 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 22.7
LIMS Number: L71890-42

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	8.02E-02	6.28E-02	**1.01E-01**	pCi/gDry		4.0269	g dry	02/23/17 14:22	03/23/17	1440	M	U	Spec		
CS-137	2007	-2.82E-03	5.33E-02	**8.65E-02**	pCi/g Dry		175.03	g dry	02/23/17 14:22	03/14/17	5896	Sec	U		No	

Comment: 1 Gamma for Cs-137
Comment: C1 Gamma for Cs-137

Sample ID: **MAF-GC-03-43** Collect Start: 02/23/2017 14:24 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:24 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-43

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-03-44** Collect Start: 02/23/2017 14:26 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:26 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-44

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-03-45** Collect Start: 02/23/2017 14:28 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:28 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 22.67
LIMS Number: L71890-45

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.69E-01**	6.18E-02	1.07E-01	pCi/gDry		4.0209	g dry	02/23/17 14:28	03/21/17	800	M	+			
CS-137	2007	-9.12E-03	4.34E-02	**6.91E-02**	pCi/g Dry		177.8	g dry	02/23/17 14:28	03/14/17	5203	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-03-46** Collect Start: 02/23/2017 14:30 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:30 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-46

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-47** Collect Start: 02/23/2017 14:32 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:32 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-47

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-48** Collect Start: 02/23/2017 14:34 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:34 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-48

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

03/30/17 13:51

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Sample ID: **MAF-GC-03-49** Collect Start: 02/23/2017 14:36 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:36 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-49

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-50** Collect Start: 02/23/2017 14:38 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:38 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-50

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-51** Collect Start: 02/23/2017 14:40 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:40 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-51

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-52** Collect Start: 02/23/2017 14:42 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:42 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-52

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

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Sample ID: **MAF-GC-03-53** Collect Start: 02/23/2017 14:44 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:44 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-53

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-54** Collect Start: 02/23/2017 14:46 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:46 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-54

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-55** Collect Start: 02/23/2017 14:48 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:48 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-55

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-56** Collect Start: 02/23/2017 14:50 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:50 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-56

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

L71890

GeoEngineers, Inc.
GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-03-57** Collect Start: 02/23/2017 14:52 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:52 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-57

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-58** Collect Start: 02/23/2017 14:54 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:54 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-58

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-59** Collect Start: 02/23/2017 14:56 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:56 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-59

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-60** Collect Start: 02/23/2017 14:58 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 14:58 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-60

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

L71890

GeoEngineers, Inc.
GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-03-61** Collect Start: 02/23/2017 15:00 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 15:00 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-61

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-62** Collect Start: 02/23/2017 15:02 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 15:02 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-62

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-63** Collect Start: 02/23/2017 15:04 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 15:04 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-63

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-64** Collect Start: 02/23/2017 15:06 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 15:06 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-64

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

03/30/17 13:51

L71890

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Sample ID: **MAF-GC-03-65** Collect Start: 02/23/2017 15:08 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 15:08 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-65

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-03-66** Collect Start: 02/23/2017 15:10 Matrix: Sediment/Silt (SS)
Station: MAF-GC-03 Collect Stop: 02/23/2017 15:10 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71890-66

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

DRAFT

QC Summary Report for L71890

GE002-3EREG-17

03/30/2017 13:54

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
WG24439-1	All non-detects.	SS						<30	U	NE
L71890-3										

GAMMA

Associated Samples for WG24439

Sample #	Client ID
L71890-3	MAF-GC-03-3
L71890-6	MAF-GC-03-6
L71890-9	MAF-GC-03-9
L71890-12	MAF-GC-03-12
L71890-15	MAF-GC-03-15
L71890-18	MAF-GC-03-18
L71890-21	MAF-GC-03-21
L71890-24	MAF-GC-03-24
L71890-27	MAF-GC-03-27
L71890-30	MAF-GC-03-30
L71890-33	MAF-GC-03-33
L71890-36	MAF-GC-03-36
L71890-39	MAF-GC-03-39
L71890-42	MAF-GC-03-42
L71890-45	MAF-GC-03-45

DRAFT

+	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 L71890

GE002-3EREG-17

03/30/2017 13:54

TELEDYNE BROWN ENGINEERING
Everywhereyoulook™

PB-210

Method Blank Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Blank Result	Units	Qualifier	P/F
WG24457-1	PB-210	WO	03/23/2017 16:25	< 7.500E-01	pCi/Total	U	P

LCS Sample Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Spike Value	LCS Result	Units	Spike Recovery	Range	Qualifier	P/F
WG24457-2	PB-210	WO	03/21/2017 17:44	1.42E+02	3.390E+02	pCi/Total	106.8	70-130	+	P

Spike ID: **210PB-012505**
Spike Conc: **6.35E+02**
Spike Vol: **5.00E-01**

Duplicate Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Original Result	DUP Result	Units	RPD	Range	Qualifier	P/F
WG24457-3	PB-210	SS	03/21/2017 17:44	2.410E-01	2.330E-01	pCi/gDry		<30	*	NE
L71890-3										

Matrix Spike Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Decay Corrected Spike Value	Original Result	MS Result	Units	Spike Recovery	Range	Qualifier	P/F
WG24457-4	PB-210	SS	03/21/2017 17:44	3.51E+01	1.790E-01	4.120E+01	pCi/gDry	116.7	60-140	+	P
L71890-6											

Spike ID: **210PB-012505**
Spike Conc: **6.35E+02**
Spike Vol: **5.00E-01**

DRAFT

+	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 L71890

GE002-3EREG-17

03/30/2017 13:54

TELEDYNE BROWN ENGINEERING
Everywhereyoulook™

PB-210

Matrix Spike Duplicate Summary

Decay Corrected

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Spike Value	MSD Result	MSD Recovery	Units	RPD	Range	Qualifier	P/F
WG24457-5	PB-210	SS	03/21/2017 17:44	3.50E+01	4.120E+01	117.3	pCi/gDry	0.5	<30	+	P
WG24457-4											
Spike ID:	**210PB-012505**										
Spike Conc:	**6.35E+02**										
Spike Vol:	**5.00E-01**										

DRAFT

+	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

DRAFT

GeoEngineers

Sample Collection/Receipt Sheet

L71890

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-03-1	MAF-GC-03	SS	2/23/2017	13:00	2/23/2017	13:00	4oz		
	MAF-GC-03-2	MAF-GC-03	SS	2/23/2017	13:02	2/23/2017	13:02	4oz		
	MAF-GC-03-3	MAF-GC-03	SS	2/23/2017	13:04	2/23/2017	13:04	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-4	MAF-GC-03	SS	2/23/2017	13:06	2/23/2017	13:06	4oz		
	MAF-GC-03-5	MAF-GC-03	SS	2/23/2017	13:08	2/23/2017	13:08	4oz		
	MAF-GC-03-6	MAF-GC-03	SS	2/23/2017	13:10	2/23/2017	13:10	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-7	MAF-GC-03	SS	2/23/2017	13:12	2/23/2017	13:12	4oz		
	MAF-GC-03-8	MAF-GC-03	SS	2/23/2017	13:14	2/23/2017	13:14	4oz		
	MAF-GC-03-9	MAF-GC-03	SS	2/23/2017	13:16	2/23/2017	13:16	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-10	MAF-GC-03	SS	2/23/2017	13:18	2/23/2017	13:18	4oz		
	MAF-GC-03-11	MAF-GC-03	SS	2/23/2017	13:20	2/23/2017	13:20	4oz		
	MAF-GC-03-12	MAF-GC-03	SS	2/23/2017	13:22	2/23/2017	13:22	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-13	MAF-GC-03	SS	2/23/2017	13:24	2/23/2017	13:24	4oz		
	MAF-GC-03-14	MAF-GC-03	SS	2/23/2017	13:26	2/23/2017	13:26	4oz		
	MAF-GC-03-15	MAF-GC-03	SS	2/23/2017	13:28	2/23/2017	13:28	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-16	MAF-GC-03	SS	2/23/2017	13:30	2/23/2017	13:30	4oz		
	MAF-GC-03-17	MAF-GC-03	SS	2/23/2017	13:32	2/23/2017	13:32	4oz		
	MAF-GC-03-18	MAF-GC-03	SS	2/23/2017	13:34	2/23/2017	13:34	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-19	MAF-GC-03	SS	2/23/2017	13:36	2/23/2017	13:36	4oz		
	MAF-GC-03-20	MAF-GC-03	SS	2/23/2017	13:38	2/23/2017	13:38	4oz		

Relinquished by: _____ Date: 02.27.2017
Received by: _____ Date: 3/1/17

Relinquished by: _____ Date: _____
Received by: Shannon Cap Date: 3/8/17

DRAFT

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-03-21	MAF-GC-03	SS	2/23/2017	13:40	2/23/2017	13:40	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-22	MAF-GC-03	SS	2/23/2017	13:42	2/23/2017	13:42	4oz		
	MAF-GC-03-23	MAF-GC-03	SS	2/23/2017	13:44	2/23/2017	13:44	4oz		
	MAF-GC-03-24	MAF-GC-03	SS	2/23/2017	13:46	2/23/2017	13:46	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-25	MAF-GC-03	SS	2/23/2017	13:48	2/23/2017	13:48	4oz		
	MAF-GC-03-26	MAF-GC-03	SS	2/23/2017	13:50	2/23/2017	13:50	4oz		
	MAF-GC-03-27	MAF-GC-03	SS	2/23/2017	13:52	2/23/2017	13:52	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-28	MAF-GC-03	SS	2/23/2017	13:54	2/23/2017	13:54	4oz		
	MAF-GC-03-29	MAF-GC-03	SS	2/23/2017	13:56	2/23/2017	13:56	4oz		
	MAF-GC-03-30	MAF-GC-03	SS	2/23/2017	13:58	2/23/2017	13:58	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-31	MAF-GC-03	SS	2/23/2017	14:00	2/23/2017	14:00	4oz		
	MAF-GC-03-32	MAF-GC-03	SS	2/23/2017	14:02	2/23/2017	14:02	4oz		
	MAF-GC-03-33	MAF-GC-03	SS	2/23/2017	14:04	2/23/2017	14:04	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-34	MAF-GC-03	SS	2/23/2017	14:06	2/23/2017	14:06	4oz		
	MAF-GC-03-35	MAF-GC-03	SS	2/23/2017	14:08	2/23/2017	14:08	4oz		
	MAF-GC-03-36	MAF-GC-03	SS	2/23/2017	14:10	2/23/2017	14:10	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-37	MAF-GC-03	SS	2/23/2017	14:12	2/23/2017	14:12	4oz		
	MAF-GC-03-38	MAF-GC-03	SS	2/23/2017	14:14	2/23/2017	14:14	4oz		
	MAF-GC-03-39	MAF-GC-03	SS	2/23/2017	14:16	2/23/2017	14:16	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-40	MAF-GC-03	SS	2/23/2017	14:18	2/23/2017	14:18	4oz		

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: SCopen Date: 3/8/17 Received by: _____ Date: _____

DRAFT

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-03-41	MAF-GC-03	SS	2/23/2017	14:20	2/23/2017	14:20	4oz		
	MAF-GC-03-42	MAF-GC-03	SS	2/23/2017	14:22	2/23/2017	14:22	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-43	MAF-GC-03	SS	2/23/2017	14:24	2/23/2017	14:24	4oz		
	MAF-GC-03-44	MAF-GC-03	SS	2/23/2017	14:26	2/23/2017	14:26	4oz		
	MAF-GC-03-45	MAF-GC-03	SS	2/23/2017	14:28	2/23/2017	14:28	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-03-46	MAF-GC-03	SS	2/23/2017	14:30	2/23/2017	14:30	4oz		
	MAF-GC-03-47	MAF-GC-03	SS	2/23/2017	14:32	2/23/2017	14:32	4oz		
	MAF-GC-03-48	MAF-GC-03	SS	2/23/2017	14:34	2/23/2017	14:34	4oz		
	MAF-GC-03-49	MAF-GC-03	SS	2/23/2017	14:36	2/23/2017	14:36	4oz		
	MAF-GC-03-50	MAF-GC-03	SS	2/23/2017	14:38	2/23/2017	14:38	4oz		
	MAF-GC-03-51	MAF-GC-03	SS	2/23/2017	14:40	2/23/2017	14:40	4oz		
	MAF-GC-03-52	MAF-GC-03	SS	2/23/2017	14:42	2/23/2017	14:42	4oz		
	MAF-GC-03-53	MAF-GC-03	SS	2/23/2017	14:44	2/23/2017	14:44	4oz		
	MAF-GC-03-54	MAF-GC-03	SS	2/23/2017	14:46	2/23/2017	14:46	4oz		
	MAF-GC-03-55	MAF-GC-03	SS	2/23/2017	14:48	2/23/2017	14:48	4oz		
	MAF-GC-03-56	MAF-GC-03	SS	2/23/2017	14:50	2/23/2017	14:50	4oz		
	MAF-GC-03-57	MAF-GC-03	SS	2/23/2017	14:52	2/23/2017	14:52	4oz		
	MAF-GC-03-58	MAF-GC-03	SS	2/23/2017	14:54	2/23/2017	14:54	4oz		
	MAF-GC-03-59	MAF-GC-03	SS	2/23/2017	14:56	2/23/2017	14:56	4oz		
	MAF-GC-03-60	MAF-GC-03	SS	2/23/2017	14:58	2/23/2017	14:58	4oz		

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: S Cooper Date: 3/8/17 Received by: _____ Date: _____

DRAFT

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-03-61	MAF-GC-03	SS	2/23/2017	15:00	2/23/2017	15:00	4oz		
	MAF-GC-03-62	MAF-GC-03	SS	2/23/2017	15:02	2/23/2017	15:02	4oz		
	MAF-GC-03-63	MAF-GC-03	SS	2/23/2017	15:04	2/23/2017	15:04	4oz		
	MAF-GC-03-64	MAF-GC-03	SS	2/23/2017	15:06	2/23/2017	15:06	4oz		
	MAF-GC-03-65	MAF-GC-03	SS	2/23/2017	15:08	2/23/2017	15:08	4oz		
	MAF-GC-03-66	MAF-GC-03	SS	2/23/2017	15:10	2/23/2017	15:10	4oz		

DRAFT

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: S. Cooley Date: 3/8/17 Received by: _____ Date: _____

03/30/17 13:54

SR #: SR51358

Client: GeoEngineers

Teledyne Brown Engineering
Sample Receipt Verification/Variance Report

Project #: GE002-3EREG-17

LIMS #L71890

Initiated By: KNOXLAB
Init Date: 03/09/17 Receive Date: 03/08/17

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 and in appropriate container(s)			NA	
9	Other (Describe)			NA	

DRAFT

INTERNAL CHAIN OF CUSTODY

DRAFT

Internal Chain of Custody

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Sample # L71890-1 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-2 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-3 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-4 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-5 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-6 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-7 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-8 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

DRAFT

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Sample # L71890-9 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-10 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-11 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-12 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-13 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-14 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-15 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-16 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By

DRAFT

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Sample # L71890-16 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-17 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-18 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-19 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-20 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-21 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-22 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-23 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-24 Containernum 1

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Sample # L71890-24 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-25 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-26 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-27 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-28 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-29 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-30 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-31 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By

DRAFT

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Sample # L71890-31 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Sample # L71890-32 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

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Sample # L71890-33 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

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Sample # L71890-34 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

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Sample # L71890-35 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

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Sample # L71890-36 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

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Sample # L71890-37 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

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Sample # L71890-38 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

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Sample # L71890-39 Containernum 1

DRAFT

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Sample # L71890-39 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-40 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-41 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-42 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-43 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-44 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-45 Containernum 1

Prod	Analyst
PB-210	SVO
GELI	MJW

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

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Sample # L71890-46 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By

DRAFT

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Sample # L71890-46 Containernum 1

Relinquish Date Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-47 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-48 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-49 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-50 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-51 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-52 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-53 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-54 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By

DRAFT

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Sample # L71890-54 Containernum 1

Relinquish Date Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-55 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-56 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-57 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-58 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-59 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-60 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-61 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

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Sample # L71890-62 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By

DRAFT

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Sample # L71890-62 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71890-63 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71890-64 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71890-65 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71890-66 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71890

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L71890-1 SS MAF-GC-03-1

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-2 SS MAF-GC-03-2

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-3 SS MAF-GC-03-3

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-4 SS MAF-GC-03-4

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-5 SS MAF-GC-03-5

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-6 SS MAF-GC-03-6

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-7 SS MAF-GC-03-7

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71890-8 SS MAF-GC-03-8

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-9 SS MAF-GC-03-9

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-10 SS MAF-GC-03-10

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-11 SS MAF-GC-03-11

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-12 SS MAF-GC-03-12

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-13 SS MAF-GC-03-13

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-14 SS MAF-GC-03-14

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71890-15 SS MAF-GC-03-15

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-16 SS MAF-GC-03-16

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-17 SS MAF-GC-03-17

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-18 SS MAF-GC-03-18

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/23/17

****

L71890-19 SS MAF-GC-03-19

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-20 SS MAF-GC-03-20

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-21 SS MAF-GC-03-21

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17

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Internal Chain of Custody
Supplemental Sheet

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L71890-21	**SS**	**MAF-GC-03-21**		
Aliquot	PB-210		SVO	03/15/17
Count Room	GELI		BCG	03/14/17
Count Room	PB-210		KPW	03/21/17

****

L71890-22	**SS**	**MAF-GC-03-22**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71890-23	**SS**	**MAF-GC-03-23**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71890-24	**SS**	**MAF-GC-03-24**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
%Moisture			MJW	03/13/17
Aliquot	GELI		MJW	03/14/17
Aliquot	PB-210		SVO	03/15/17
Count Room	GELI		BCG	03/14/17
Count Room	PB-210		KPW	03/21/17

****

L71890-25	**SS**	**MAF-GC-03-25**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71890-26	**SS**	**MAF-GC-03-26**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71890-27	**SS**	**MAF-GC-03-27**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
%Moisture			MJW	03/13/17
Aliquot	GELI		MJW	03/14/17
Aliquot	PB-210		SVO	03/15/17
Count Room	GELI		BCG	03/14/17
Count Room	PB-210		KPW	03/21/17

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Internal Chain of Custody
Supplemental Sheet

L71890

L71890-28 SS MAF-GC-03-28

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-29 SS MAF-GC-03-29

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-30 SS MAF-GC-03-30

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/23/17

****

L71890-31 SS MAF-GC-03-31

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-32 SS MAF-GC-03-32

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-33 SS MAF-GC-03-33

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-34 SS MAF-GC-03-34

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Internal Chain of Custody
Supplemental Sheet

L71890

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L71890-35 SS MAF-GC-03-35

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-36 SS MAF-GC-03-36

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-37 SS MAF-GC-03-37

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-38 SS MAF-GC-03-38

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-39 SS MAF-GC-03-39

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-40 SS MAF-GC-03-40

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-41 SS MAF-GC-03-41

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71890

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L71890-42 SS MAF-GC-03-42

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/23/17

****

L71890-42C1 SS MAF-GC-03-42

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	PB-210	SVO	03/15/17

****

L71890-43 SS MAF-GC-03-43

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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L71890-44 SS MAF-GC-03-44

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-45 SS MAF-GC-03-45

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/15/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	03/21/17

****

L71890-46 SS MAF-GC-03-46

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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L71890-47 SS MAF-GC-03-47

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71890

L71890-47 **SS** **MAF-GC-03-47**
Count Room SAMPLE

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L71890-48 **SS** **MAF-GC-03-48**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-49 **SS** **MAF-GC-03-49**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-50 **SS** **MAF-GC-03-50**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-51 **SS** **MAF-GC-03-51**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-52 **SS** **MAF-GC-03-52**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-53 **SS** **MAF-GC-03-53**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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L71890-54 **SS** **MAF-GC-03-54**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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L71890-55 **SS** **MAF-GC-03-55**

Process step	Prod	Analyst	Date

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71890

L71890-55 **SS** **MAF-GC-03-55**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-56 **SS** **MAF-GC-03-56**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-57 **SS** **MAF-GC-03-57**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-58 **SS** **MAF-GC-03-58**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-59 **SS** **MAF-GC-03-59**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-60 **SS** **MAF-GC-03-60**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-61 **SS** **MAF-GC-03-61**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-62 **SS** **MAF-GC-03-62**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71890

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L71890-63 SS MAF-GC-03-63

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-64 SS MAF-GC-03-64

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-65 SS MAF-GC-03-65

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71890-66 SS MAF-GC-03-66

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

DRAFT

GAMMA SPECTROSCOPY

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Gamma Spectroscopy

Background

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:42:46.88
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 24-FEB-2017 10:06:58.61

LIMS No., Customer Name, Client ID: 01BG022417MT WO TBE DET01 BKG
Sample ID : 01BG022417MT Smple Date: 24-FEB-2017 10:07:00.00
Sample Type : WO Geometry : 0135L011414
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 1.50000 Real Time : 2 00:00:32.50
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.34	683	3632	0.83	126.89	3.80E-01	3.95E-03	16.3	7.23E-01
2	1	66.73	288	2315	1.25	133.66	4.84E-01	1.67E-03	27.1	7.21E-01
3	2	72.84	819	2460	0.79	145.88	6.87E-01	4.74E-03	9.7	3.26E+00
4	2	75.01	1640	2487	0.80	150.21	7.61E-01	9.49E-03	5.1	
5	1	84.75	1206	2631	1.21	169.68	1.08E+00	6.98E-03	7.6	2.63E+00
6	1	87.28	458	2150	0.84	174.75	1.16E+00	2.65E-03	16.7	1.09E+00
7	1	92.67	2370	3680	1.06	185.50	1.32E+00	1.37E-02	5.2	5.22E+00
8	1	139.84	277	2421	0.82	279.79	1.98E+00	1.60E-03	30.0	2.72E-01
9	1	143.78	446	1974	0.90	287.66	1.99E+00	2.58E-03	16.4	7.19E-01
10	1	163.54	283	2271	1.30	327.16	2.00E+00	1.64E-03	28.6	6.77E-01
11	1	185.75	1803	3323	0.97	371.57	1.96E+00	1.04E-02	6.4	4.99E-01
12	1	198.45	437	2099	1.10	396.96	1.92E+00	2.53E-03	18.0	1.68E+00
13	1	238.60	1216	2068	0.97	477.21	1.77E+00	7.04E-03	6.8	3.15E-01
14	1	295.25	510	1991	1.30	590.48	1.57E+00	2.95E-03	16.4	1.69E+00
15	1	337.99	377	1794	1.57	675.94	1.44E+00	2.18E-03	20.8	3.41E+00
16	1	351.91	876	1785	1.47	703.76	1.41E+00	5.07E-03	9.6	3.55E+00
17	1	510.87	6086	2367	2.76	1021.65	1.10E+00	3.52E-02	2.3	2.54E+00
18	1	569.56	190	1072	2.01	1139.04	1.03E+00	1.10E-03	33.1	1.30E+00
19	1	583.18	579	1152	1.51	1166.29	1.01E+00	3.35E-03	12.4	2.28E+00
20	1	609.30	707	1623	1.62	1218.54	9.80E-01	4.09E-03	12.7	1.61E+00
21	1	802.91	242	639	1.63	1605.89	8.09E-01	1.40E-03	20.6	1.70E+00
22	1	846.73	464	840	1.41	1693.59	7.79E-01	2.69E-03	13.4	5.64E-01
23	1	911.12	415	553	1.67	1822.44	7.39E-01	2.40E-03	12.0	7.28E-01
24	1	968.80	156	435	1.57	1937.88	7.07E-01	9.05E-04	25.4	9.13E-01
25	1	1001.30	143	455	1.90	2002.94	6.90E-01	8.25E-04	29.5	1.99E+00
26	1	1120.20	187	480	2.06	2240.95	6.36E-01	1.08E-03	25.4	2.10E+00
27	1	1460.50	916	423	2.15	2922.45	5.30E-01	5.30E-03	6.1	8.85E-01
28	1	1763.93	245	170	2.93	3530.41	4.77E-01	1.42E-03	13.1	1.29E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	916	10.67*	5.303E-01	2.532E+02	2.532E+02	12.24
RA-226	186.21	1803	3.28*	1.957E+00	4.394E+02	4.394E+02	12.86
AC-228	835.50	------	1.75	7.864E-01	------ Line Not Found		------
	911.07	415	27.70*	7.390E-01	3.175E+01	3.176E+01	23.91
TH-228	238.63	1216	44.60*	1.766E+00	2.415E+01	2.417E+01	13.64

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:33:24.04
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 24-FEB-2017 10:07:00.43

LIMS No., Customer Name, Client ID: 02BG022417MT WO TBE DET02 BKG
Sample ID : 02BG022417MT Smple Date: 24-FEB-2017 10:08:00.00
Sample Type : WO Geometry : 0235L111411
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:19.79
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.22	195	2427	1.07	76.71	1.03E-01	1.13E-03	42.6	
2	4	63.24	494	1678	0.79	110.95	4.77E-01	2.86E-03	13.3	1.37E+00
3	4	66.35	269	2406	1.08	117.19	5.60E-01	1.56E-03	30.5	
4	4	72.81	957	2233	1.03	130.20	7.32E-01	5.54E-03	8.3	1.14E+00
5	4	74.93	1920	2020	0.93	134.46	7.86E-01	1.11E-02	4.4	
6	4	77.04	240	1577	0.86	138.69	8.38E-01	1.39E-03	26.8	
7	2	84.69	1113	2101	1.18	154.09	1.01E+00	6.44E-03	7.5	9.74E-01
8	2	87.21	437	2089	1.09	159.16	1.06E+00	2.53E-03	18.1	
9	0	92.59	1385	2707	1.12	169.98	1.16E+00	8.02E-03	7.3	
10	0	139.69	219	1813	1.03	264.70	1.48E+00	1.26E-03	31.6	
11	0	144.05	302	2299	0.77	273.48	1.48E+00	1.75E-03	28.1	
12	0	185.58	1067	2499	1.12	357.01	1.39E+00	6.17E-03	9.0	
13	0	198.09	279	1810	1.25	382.17	1.35E+00	1.61E-03	26.0	
14	0	238.74	492	1937	1.07	463.92	1.22E+00	2.85E-03	16.1	
15	0	295.11	413	1808	1.22	577.32	1.06E+00	2.39E-03	20.5	
16	0	351.78	467	1436	1.19	691.30	9.30E-01	2.70E-03	15.9	
17	0	510.95	4419	1678	2.77	1011.45	7.01E-01	2.56E-02	2.7	
18	0	569.44	156	569	1.89	1129.08	6.45E-01	9.02E-04	27.8	
19	0	583.11	271	594	1.20	1156.58	6.33E-01	1.57E-03	17.3	
20	0	609.57	482	961	1.38	1209.81	6.12E-01	2.79E-03	13.7	
21	0	802.58	159	616	1.40	1598.02	4.94E-01	9.19E-04	34.0	
22	0	846.84	419	576	1.81	1687.05	4.74E-01	2.42E-03	12.2	
23	0	911.77	100	458	1.59	1817.65	4.47E-01	5.76E-04	43.0	
24	0	969.06	86	340	1.32	1932.87	4.26E-01	4.97E-04	41.7	
25	0	1000.74	84	339	1.82	1996.59	4.16E-01	4.87E-04	43.7	
26	0	1120.75	238	348	1.41	2238.00	3.80E-01	1.38E-03	18.4	
27	0	1460.65	494	357	2.06	2921.68	3.10E-01	2.86E-03	10.6	
28	0	1729.22	107	109	4.87	3461.90	2.75E-01	6.20E-04	23.8	
29	0	1764.67	217	168	2.15	3533.22	2.71E-01	1.26E-03	15.3	

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	494	10.67*	3.103E-01	2.334E+02	2.334E+02	21.13
RA-226	186.21	1067	3.28*	1.395E+00	3.648E+02	3.648E+02	17.96
AC-228	835.50	------	1.75	4.789E-01	------ Line Not Found		------
	911.07	100	27.70*	4.473E-01	1.257E+01	1.258E+01	86.05

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:28:45.67
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:10.62

LIMS No., Customer Name, Client ID: 06BG022417MT WO TBE DET06 BKG
Sample ID : 06BG022417MT Smple Date: 24-FEB-2017 10:00:00.00
Sample Type : WO Geometry : 0635L011614
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:35.75
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.20	430	2708	0.77	126.99	2.88E-01	2.49E-03	20.6	6.06E-01
2	4	72.72	822	2133	0.79	146.03	5.22E-01	4.76E-03	9.1	1.49E+00
3	4	74.93	1698	2071	0.82	150.44	5.79E-01	9.83E-03	4.7	
4	2	84.70	1270	2334	1.23	169.99	8.20E-01	7.35E-03	6.9	1.16E+00
5	2	87.39	524	1926	0.95	175.36	8.80E-01	3.03E-03	14.2	
6	1	92.62	1376	3435	1.02	185.83	9.88E-01	7.96E-03	8.4	2.41E+00
7	1	123.15	288	1971	0.98	246.88	1.35E+00	1.67E-03	24.9	8.01E+00
8	1	143.60	172	2499	1.12	287.77	1.40E+00	9.95E-04	48.8	8.40E-01
9	1	185.65	933	2661	0.78	371.84	1.31E+00	5.40E-03	10.1	1.14E+00
10	1	238.56	573	1801	0.90	477.64	1.14E+00	3.31E-03	13.0	9.26E-01
11	1	241.63	256	2019	1.42	483.77	1.13E+00	1.48E-03	31.0	1.08E+00
12	1	295.34	355	1886	1.45	591.16	9.80E-01	2.05E-03	22.7	2.47E+00
13	1	351.93	477	1858	1.33	704.31	8.65E-01	2.76E-03	17.4	2.66E+00
14	1	510.71	3619	2187	2.62	1021.75	6.69E-01	2.09E-02	3.5	2.27E+00
15	1	582.68	310	791	1.54	1165.61	6.12E-01	1.80E-03	17.2	9.43E-01
16	1	609.01	550	913	1.41	1218.26	5.94E-01	3.18E-03	11.2	9.71E-01
17	1	803.53	445	705	1.14	1607.05	4.89E-01	2.57E-03	12.6	8.50E+01
18	1	846.27	242	654	1.67	1692.49	4.71E-01	1.40E-03	21.5	1.86E+00
19	1	910.48	224	447	1.59	1820.82	4.45E-01	1.30E-03	18.9	1.47E+00
20	1	968.22	154	465	1.79	1936.20	4.24E-01	8.92E-04	28.3	7.66E-01
21	1	1119.86	203	430	2.34	2239.24	3.75E-01	1.18E-03	23.7	1.16E+00
22	1	1460.10	1357	241	1.97	2919.03	2.91E-01	7.85E-03	3.8	1.32E+00
23	1	1763.25	227	256	2.46	3524.60	2.37E-01	1.31E-03	18.8	1.91E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1357	10.67*	2.911E-01	6.833E+02	6.833E+02	7.50
RA-226	186.21	933	3.28*	1.310E+00	3.396E+02	3.396E+02	20.24
AC-228	835.50	------	1.75	4.753E-01	------ Line Not Found		------
	911.07	224	27.70*	4.452E-01	2.845E+01	2.846E+01	37.72
TH-228	238.63	573	44.60*	1.135E+00	1.769E+01	1.771E+01	25.94
	240.98	256	3.95	1.126E+00	8.987E+01	8.996E+01	62.06
TH-232	583.14	310	30.25	6.118E-01	2.622E+01	2.622E+01	34.49
	911.07	224	27.70*	4.452E-01	2.845E+01	2.845E+01	37.72
	969.11	154	16.60	4.240E-01	3.427E+01	3.427E+01	56.58
U-235	143.76	172	10.50*	1.395E+00	1.836E+01	1.836E+01	97.61

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:20:04.34
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:12.58

LIMS No., Customer Name, Client ID: 07BG022417MT WO TBE DET07 BKG
Sample ID : 07BG022417MT Smple Date: 24-FEB-2017 10:03:00.00
Sample Type : WO Geometry : 0735L011514
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:19.42
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	5	63.46	655	3475	1.71	127.67	4.44E-01	3.79E-03	17.2	8.15E+00
2	5	66.47	373	2773	1.26	133.68	5.36E-01	2.16E-03	25.1	
3	5	70.20	735	4840	2.37	141.16	6.54E-01	4.26E-03	21.1	
4	5	72.79	1699	3102	1.43	146.35	7.38E-01	9.83E-03	6.8	
5	5	74.97	3058	3093	1.52	150.70	8.08E-01	1.77E-02	3.9	
6	2	84.73	1372	2865	1.33	170.25	1.11E+00	7.94E-03	7.3	8.76E-01
7	2	87.32	503	3052	1.43	175.44	1.18E+00	2.91E-03	21.1	
8	1	92.68	1572	3589	1.71	186.18	1.33E+00	9.10E-03	7.8	5.20E+00
9	1	140.11	545	2629	1.45	281.14	1.93E+00	3.15E-03	16.7	8.96E+00
10	1	143.48	239	2624	1.38	287.88	1.94E+00	1.39E-03	37.6	7.50E-01
11	1	185.65	1075	3734	1.30	372.32	1.91E+00	6.22E-03	11.4	3.34E-01
12	1	198.19	516	2542	1.51	397.44	1.87E+00	2.99E-03	17.4	3.87E+00
13	1	238.46	926	2657	1.26	478.07	1.72E+00	5.36E-03	10.5	1.60E+00
14	1	295.17	415	2385	1.34	591.58	1.52E+00	2.40E-03	22.6	1.24E+00
15	1	338.17	266	2083	1.20	677.67	1.39E+00	1.54E-03	32.6	1.65E+00
16	1	351.87	848	1908	1.63	705.09	1.35E+00	4.91E-03	10.2	2.27E+00
17	1	510.69	6256	2500	2.84	1022.98	1.05E+00	3.62E-02	2.3	1.61E+00
18	1	569.60	309	1096	2.11	1140.88	9.70E-01	1.79E-03	20.8	7.92E-01
19	1	582.96	547	1031	1.73	1167.61	9.54E-01	3.17E-03	11.8	9.88E-01
20	1	608.97	760	1619	1.68	1219.66	9.25E-01	4.40E-03	11.2	1.69E+00
21	1	802.71	177	743	2.04	1607.33	7.60E-01	1.03E-03	29.8	1.54E+00
22	1	846.56	364	917	1.95	1695.05	7.32E-01	2.11E-03	16.9	5.32E-01
23	1	910.65	400	660	2.09	1823.26	6.94E-01	2.32E-03	14.2	3.62E+00
24	1	1120.54	243	529	2.59	2243.10	5.96E-01	1.41E-03	20.2	1.96E+00
25	1	1460.61	1521	622	2.20	2923.08	4.89E-01	8.80E-03	4.9	1.13E+00
26	1	1764.40	371	264	2.71	3530.29	4.27E-01	2.15E-03	11.3	8.12E-01

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1521	10.67*	4.892E-01	4.558E+02	4.558E+02	9.80
RA-226	186.21	1075	3.28*	1.907E+00	2.687E+02	2.687E+02	22.85
AC-228	835.50	------	1.75	7.388E-01	------ Line Not Found		------
	911.07	400	27.70*	6.940E-01	3.255E+01	3.256E+01	28.46
TH-228	238.63	926	44.60*	1.720E+00	1.889E+01	1.891E+01	21.05
	240.98	------	3.95	1.710E+00	------ Line Not Found		------
TH-232	583.14	547	30.25	9.544E-01	2.966E+01	2.966E+01	23.51

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:29:30.68
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 24-FEB-2017 09:53:14.01

LIMS No., Customer Name, Client ID: 08BG022417MT WO TBE DET08 BKG
Sample ID : 08BG022417MT Smple Date: 24-FEB-2017 10:02:00.00
Sample Type : WO Geometry : 0835L010912
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 25 Energy Tol : 2.00000 Real Time : 2 00:00:40.43
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	16.10	797	7811	1.10	39.04	4.65E-01	4.61E-03	19.6	2.18E+00
2	1	24.26	864	5425	2.14	55.39	7.17E-01	5.00E-03	15.8	2.48E+00
3	1	46.51	1398	3863	1.19	99.94	1.42E+00	8.09E-03	8.8	8.57E-01
4	3	63.41	1627	3906	1.67	133.77	1.74E+00	9.42E-03	7.5	2.87E+01
5	3	66.52	593	4675	1.95	140.01	1.78E+00	3.43E-03	23.9	
6	3	70.00	407	4662	1.95	146.97	1.82E+00	2.35E-03	35.3	
7	3	72.78	2498	2712	1.12	152.52	1.84E+00	1.45E-02	4.1	
8	3	75.04	5743	3858	1.68	157.07	1.86E+00	3.32E-02	2.5	
9	4	84.87	2199	2955	1.33	176.74	1.91E+00	1.27E-02	4.8	1.35E+00
10	4	87.46	612	2533	1.12	181.91	1.91E+00	3.54E-03	14.4	
11	1	92.70	1484	3279	1.23	192.41	1.92E+00	8.59E-03	7.4	1.25E+00
12	1	185.91	755	3098	1.20	378.95	1.54E+00	4.37E-03	13.8	5.09E-01
13	1	238.78	592	2486	1.27	484.71	1.29E+00	3.42E-03	15.7	1.16E+00
14	1	296.04	284	2250	1.83	599.20	1.09E+00	1.64E-03	31.7	4.05E+00
15	1	351.88	257	1667	1.37	710.82	9.35E-01	1.49E-03	29.2	4.85E-01
16	1	510.93	4169	2665	3.01	1028.58	6.70E-01	2.41E-02	3.6	1.13E+00
17	1	608.09	608	1461	2.94	1222.55	5.76E-01	3.52E-03	14.6	2.92E+00
18	1	801.66	72	685	1.45	1608.67	4.56E-01	4.16E-04	69.0	2.03E+00
19	1	845.11	248	602	1.64	1695.28	4.37E-01	1.44E-03	19.6	1.11E+00
20	1	909.86	236	530	1.73	1824.32	4.12E-01	1.36E-03	20.7	9.71E-01
21	1	1462.23	1139	245	2.06	2923.13	2.83E-01	6.59E-03	4.1	7.63E-01
22	1	1768.28	173	182	2.27	3530.47	2.40E-01	1.00E-03	17.7	1.47E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1139	10.67*	2.831E-01	5.899E+02	5.899E+02	8.20
RA-226	186.21	755	3.28*	1.538E+00	2.341E+02	2.341E+02	27.57
AC-228	835.50	------	1.75	4.413E-01	------ Line Not Found		------
	911.07	236	27.70*	4.121E-01	3.230E+01	3.231E+01	41.39
TH-228	238.63	592	44.60*	1.292E+00	1.606E+01	1.608E+01	31.37
	240.98	------	3.95	1.283E+00	------ Line Not Found		------

Flag: "*" = Keyline

Summary of Nuclide Activity Page : 2
Sample ID : 08BG022417MT Acquisition date : 24-FEB-2017 09:53:14
Total number of lines in spectrum 22

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:31:15.57
TBE11 31-TP20610B HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:07.37

LIMS No., Customer Name, Client ID: 11BG022417MT WO TBE DET11 BKG
Sample ID : 11BG022417MT Smple Date: 24-FEB-2017 09:56:00.00
Sample Type : WO Geometry : 1135L121311
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 80 Energy Tol : 2.00000 Real Time : 2 00:01:06.50
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	62.94	420	3110	1.88	125.28	3.80E-01	2.43E-03	23.5	
2	0	66.39	227	2789	1.07	132.17	4.72E-01	1.31E-03	39.2	
3	0	74.98	1024	4592	1.13	149.35	7.10E-01	5.92E-03	12.5	
4	0	84.54	822	3055	1.36	168.47	9.61E-01	4.76E-03	12.1	
5	0	92.68	814	3409	1.39	184.75	1.14E+00	4.71E-03	13.9	
6	0	139.80	200	2506	1.22	278.99	1.60E+00	1.16E-03	43.9	
7	0	185.65	767	2400	1.35	370.70	1.53E+00	4.44E-03	11.6	
8	0	198.15	278	2354	1.70	395.69	1.49E+00	1.61E-03	30.9	
9	0	238.53	939	2459	1.27	476.45	1.35E+00	5.43E-03	10.1	
10	0	241.75	242	1730	1.74	482.90	1.34E+00	1.40E-03	29.3	
11	0	294.93	555	2309	1.48	589.25	1.18E+00	3.21E-03	17.8	
12	0	338.38	312	1826	1.65	676.15	1.06E+00	1.81E-03	26.2	
13	0	351.78	646	1758	1.36	702.93	1.03E+00	3.74E-03	12.7	
14	0	510.84	4218	2375	2.66	1021.01	7.82E-01	2.44E-02	3.2	
15	0	569.27	186	977	1.55	1137.85	7.20E-01	1.07E-03	33.4	
16	0	583.25	442	892	1.72	1165.80	7.07E-01	2.56E-03	13.5	
17	0	609.23	676	1237	1.51	1217.76	6.84E-01	3.91E-03	11.1	
18	0	802.83	168	617	1.65	1604.85	5.55E-01	9.70E-04	29.7	
19	0	846.63	433	653	1.42	1692.42	5.33E-01	2.50E-03	13.1	
20	0	910.86	357	673	1.85	1820.85	5.04E-01	2.06E-03	16.3	
21	0	968.71	193	517	1.09	1936.50	4.81E-01	1.12E-03	24.6	
22	0	1001.32	121	454	2.17	2001.69	4.69E-01	6.99E-04	36.5	
23	0	1119.98	225	374	2.41	2238.92	4.30E-01	1.30E-03	17.9	
24	0	1460.60	1072	398	1.99	2919.79	3.52E-01	6.20E-03	5.6	
25	0	1764.35	275	199	1.83	3526.89	3.08E-01	1.59E-03	12.7	
26	0	1847.12	40	110	1.10	3692.31	2.99E-01	2.30E-04	52.0	

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1072	10.67*	3.519E-01	4.465E+02	4.465E+02	11.14
RA-226	186.21	767	3.28*	1.535E+00	2.385E+02	2.385E+02	23.26
AC-228	835.50	------	1.75	5.384E-01	------ Line Not Found		------
	911.07	357	27.70*	5.040E-01	3.995E+01	3.996E+01	32.62
TH-228	238.63	939	44.60*	1.353E+00	2.434E+01	2.436E+01	20.13
	240.98	242	3.95	1.342E+00	7.152E+01	7.159E+01	58.58
TH-232	583.14	442	30.25	7.072E-01	3.232E+01	3.232E+01	27.01

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:20:52.08
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:08.39

LIMS No., Customer Name, Client ID: 14BG022417MT WO TBE DET14 BKG
Sample ID : 14BG022417MT Smple Date: 24-FEB-2017 09:58:00.00
Sample Type : WO Geometry : 1435L121511
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 2.00000 Real Time : 2 00:00:37.78
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	6	63.14	620	4164	2.02	123.79	2.16E-01	3.59E-03	21.4	9.97E+00
2	6	66.17	570	2790	1.33	129.86	2.80E-01	3.30E-03	16.7	
3	6	70.12	642	5267	2.48	137.76	3.74E-01	3.72E-03	25.7	
4	6	72.48	1172	2470	1.13	142.48	4.34E-01	6.78E-03	7.8	
5	6	74.65	2735	3195	1.57	146.83	4.91E-01	1.58E-02	4.3	
6	1	84.37	1233	3138	1.51	166.29	7.56E-01	7.14E-03	8.7	2.21E+00
7	1	87.08	585	2730	1.29	171.71	8.28E-01	3.38E-03	16.2	
8	1	92.34	1086	3460	1.26	182.25	9.62E-01	6.29E-03	10.6	1.19E+00
9	1	139.40	345	2857	1.16	276.44	1.61E+00	1.99E-03	27.3	1.77E+00
10	1	185.56	838	3116	1.18	368.85	1.62E+00	4.85E-03	12.5	2.16E+00
11	1	198.18	295	3017	1.18	394.11	1.58E+00	1.71E-03	34.1	7.73E-01
12	1	209.59	263	2545	1.58	416.95	1.55E+00	1.52E-03	33.8	1.44E+00
13	1	238.43	1043	2849	1.23	474.69	1.45E+00	6.03E-03	9.7	1.41E+00
14	1	294.98	451	2103	1.22	587.91	1.27E+00	2.61E-03	18.9	1.90E+00
15	1	338.27	354	2275	1.94	674.58	1.16E+00	2.05E-03	26.6	8.13E-01
16	1	351.87	735	2231	1.56	701.81	1.13E+00	4.25E-03	13.0	1.84E+00
17	1	510.94	5244	2605	2.74	1020.29	8.68E-01	3.03E-02	2.7	1.42E+00
18	1	569.51	179	1237	1.71	1137.58	8.04E-01	1.04E-03	38.7	1.20E+00
19	1	583.20	505	1081	1.45	1165.00	7.90E-01	2.92E-03	12.9	9.41E-01
20	1	609.17	854	1520	2.14	1217.00	7.66E-01	4.94E-03	9.6	6.21E+00
21	1	802.78	192	757	1.99	1604.72	6.26E-01	1.11E-03	28.5	7.00E-01
22	1	846.96	405	908	2.18	1693.21	6.01E-01	2.34E-03	16.1	1.66E+00
23	1	911.05	429	711	2.41	1821.59	5.69E-01	2.48E-03	13.7	1.50E+00
24	1	969.27	197	744	1.52	1938.19	5.42E-01	1.14E-03	29.3	1.72E+00
25	1	1001.34	131	531	2.44	2002.44	5.29E-01	7.58E-04	36.5	1.17E+00
26	1	1120.67	315	604	2.70	2241.46	4.85E-01	1.82E-03	18.0	9.80E-01
27	1	1238.17	125	459	2.31	2476.85	4.49E-01	7.24E-04	36.4	8.18E-01
28	1	1461.22	1294	432	2.39	2923.76	3.96E-01	7.49E-03	4.7	2.07E+00
29	1	1765.11	279	237	2.60	3532.73	3.49E-01	1.62E-03	13.1	1.26E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1294	10.67*	3.962E-01	4.786E+02	4.786E+02	9.34
RA-226	186.21	838	3.28*	1.616E+00	2.472E+02	2.472E+02	24.97
AC-228	835.50	------	1.75	6.071E-01	------ Line Not Found		------
	911.07	429	27.70*	5.686E-01	4.256E+01	4.257E+01	27.45

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:19:17.77
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:09.64

LIMS No., Customer Name, Client ID: 15BG022417MT WO TBE DET15 BKG
Sample ID : 15BG022417MT Smple Date: 24-FEB-2017 10:01:00.00
Sample Type : WO Geometry : 1535L080811
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 2.00000 Real Time : 2 00:00:14.12
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	63.51	710	2633	1.27	121.07	4.49E-01	4.11E-03	13.0	2.49E+00
2	2	66.26	338	2574	1.35	126.59	5.30E-01	1.96E-03	26.7	
3	7	72.96	1331	3212	1.42	140.01	7.29E-01	7.71E-03	8.5	6.90E+00
4	7	75.17	2439	2036	1.01	144.46	7.94E-01	1.41E-02	3.6	
5	7	77.37	290	1596	0.88	148.87	8.56E-01	1.68E-03	22.7	
6	5	84.95	1291	2479	1.29	164.07	1.06E+00	7.47E-03	7.2	1.07E+00
7	5	87.51	495	1818	1.03	169.20	1.12E+00	2.87E-03	14.5	
8	1	92.85	1651	2924	1.18	179.89	1.23E+00	9.55E-03	6.6	6.59E+00
9	1	185.94	809	2935	0.98	366.53	1.50E+00	4.68E-03	13.0	1.08E+00
10	1	198.08	430	2308	1.78	390.88	1.45E+00	2.49E-03	20.6	6.00E+00
11	1	238.78	461	1655	0.91	472.47	1.30E+00	2.67E-03	15.3	4.98E-01
12	1	295.43	283	1610	1.09	586.03	1.13E+00	1.64E-03	26.1	1.99E+00
13	1	352.04	428	1102	1.07	699.49	9.90E-01	2.48E-03	14.2	1.01E+00
14	1	511.12	3987	1672	2.70	1018.31	7.48E-01	2.31E-02	2.8	1.23E+00
15	1	583.32	225	826	1.42	1162.98	6.75E-01	1.30E-03	25.7	2.12E+00
16	1	609.54	485	929	1.51	1215.50	6.53E-01	2.81E-03	13.0	1.35E+00
17	1	803.14	152	475	2.01	1603.36	5.24E-01	8.80E-04	29.0	4.18E-01
18	1	847.08	454	520	1.75	1691.36	5.02E-01	2.63E-03	10.7	1.18E+00
19	1	911.65	160	456	2.15	1820.68	4.72E-01	9.23E-04	29.9	1.77E+00
20	1	1001.73	56	308	1.36	2001.08	4.36E-01	3.21E-04	58.2	1.54E+00
21	1	1120.73	113	325	1.56	2239.36	3.97E-01	6.56E-04	31.3	1.32E+00
22	1	1461.64	634	223	2.03	2921.77	3.18E-01	3.67E-03	6.6	1.03E+00
23	1	1766.39	227	211	4.62	3531.50	2.76E-01	1.32E-03	19.7	2.13E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	634	10.67*	3.181E-01	2.924E+02	2.924E+02	13.25
RA-226	186.21	809	3.28*	1.497E+00	2.576E+02	2.576E+02	26.03
AC-228	835.50	------	1.75	5.074E-01	------ Line Not Found		------
	911.07	160	27.70*	4.721E-01	1.908E+01	1.909E+01	59.77
TH-228	238.63	461	44.60*	1.302E+00	1.241E+01	1.242E+01	30.69
	240.98	------	3.95	1.294E+00	------ Line Not Found		------
TH-232	583.14	225	30.25	6.754E-01	1.723E+01	1.723E+01	51.41
	911.07	160	27.70*	4.721E-01	1.908E+01	1.908E+01	59.77
	969.11	------	16.60	4.486E-01	------ Line Not Found		------
U-235	143.76	------	10.50*	1.602E+00	------ Line Not Found		------

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:32:27.74
TBE23 03017322 HpGe ********** Aquisition Date/Time: 24-FEB-2017 09:53:06.88

LIMS No., Customer Name, Client ID: 23BG022417MT WO TBE DET23 BKG
Sample ID : 23BG022417MT Smple Date: 24-FEB-2017 09:54:00.00
Sample Type : WO Geometry : 2335L090704
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 50 Energy Tol : 2.00000 Real Time : 2 00:02:31.23
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	5	33.51	1447	211	1.42	67.85	8.98E-02	8.37E-03	5.0	1.52E+02
2	5	35.66	3239	1234	3.87	72.14	1.24E-01	1.87E-02	4.3	
3	5	39.68	1845	2898	3.20	80.15	2.06E-01	1.07E-02	8.4	
4	5	42.42	603	2475	1.95	85.61	2.73E-01	3.49E-03	17.6	
5	5	44.79	1302	5715	3.88	90.35	3.38E-01	7.54E-03	13.9	
6	5	48.07	256	3097	1.67	96.90	4.36E-01	1.48E-03	35.6	
7	0	63.03	1164	5614	2.28	126.76	9.32E-01	6.74E-03	13.6	
8	0	92.44	2644	6652	2.22	185.46	1.69E+00	1.53E-02	6.8	
9	0	143.39	232	4706	1.29	287.16	2.05E+00	1.34E-03	55.8	
10	0	185.47	1773	6274	2.32	371.16	1.95E+00	1.03E-02	10.0	
11	0	238.50	583	4015	1.81	477.04	1.72E+00	3.37E-03	21.5	
12	0	294.85	287	2836	1.94	589.57	1.50E+00	1.66E-03	36.3	
13	0	352.01	763	2901	2.63	703.72	1.32E+00	4.42E-03	15.8	
14	0	510.81	4262	2991	3.29	1020.96	9.85E-01	2.47E-02	3.7	
15	0	569.13	251	1354	2.11	1137.50	9.05E-01	1.45E-03	30.1	
16	0	583.43	510	1563	2.90	1166.08	8.88E-01	2.95E-03	17.9	
17	0	609.29	640	1676	2.32	1217.76	8.59E-01	3.71E-03	13.8	
18	0	911.25	499	904	2.38	1821.50	6.38E-01	2.89E-03	15.5	
19	0	1063.39	163	412	1.41	2125.86	5.73E-01	9.42E-04	24.6	
20	0	1120.96	272	704	2.61	2241.07	5.52E-01	1.58E-03	23.9	
21	0	1460.76	2134	433	2.78	2921.39	4.59E-01	1.24E-02	3.4	
22	0	1763.83	356	211	2.51	3528.67	4.01E-01	2.06E-03	10.7	

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	2134	10.67*	4.595E-01	6.810E+02	6.810E+02	6.73
RA-226	186.21	1773	3.28*	1.948E+00	4.339E+02	4.339E+02	20.07
AC-228	835.50	------	1.75	6.790E-01	------ Line Not Found		------
	911.07	499	27.70*	6.382E-01	4.412E+01	4.414E+01	30.94
TH-228	238.63	583	44.60*	1.725E+00	1.185E+01	1.186E+01	42.90
	240.98	------	3.95	1.714E+00	------ Line Not Found		------
TH-232	583.14	510	30.25	8.880E-01	2.971E+01	2.971E+01	35.84
	911.07	499	27.70*	6.382E-01	4.412E+01	4.412E+01	30.94
	969.11	------	16.60	6.111E-01	------ Line Not Found		------
U-235	143.76	232	10.50*	2.047E+00	1.686E+01	1.686E+01	111.63
	163.35	------	4.70	2.019E+00	------ Line Not Found		------

DRAFT

GAMMA SPECTROSCOPY

Initial Calibration

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:29:41.63
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 27-FEB-2015 17:04:36.87

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

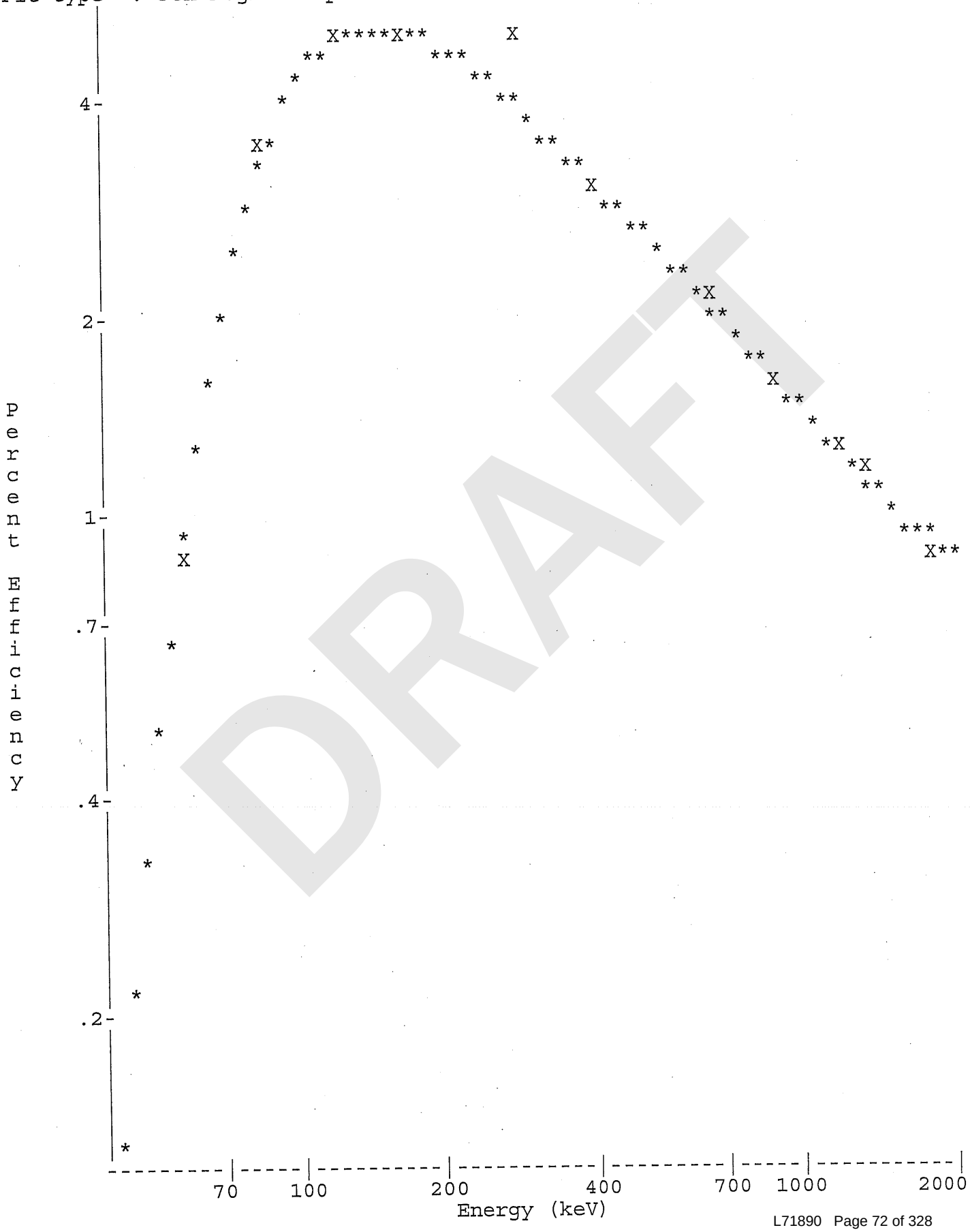
Sample ID : 01B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 90 Energy Tol : 1.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 01B150022715
BKGFILE : 01BG013015MT
Real Time : 0 16:36:40.47
Live time : 0 16:33:13.16

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.61	140132	68186	0.82	119.13	8.86E-01	2.35E+00	0.4	8.78E+01
2	1	66.49	1213	32230	0.82	132.86	1.47E+00	2.04E-02	22.2	2.44E+01
3	1	72.82	1569	36804	0.78	145.49	2.06E+00	2.63E-02	18.5	1.55E+00
4	1	75.00	2845	37880	0.63	149.85	2.26E+00	4.77E-02	10.4	9.87E-01
5	10	84.40	9621	92258	2.12	168.60	3.09E+00	1.61E-01	5.9	1.43E+02
6	10	85.89	10647	78357	1.61	171.56	3.22E+00	1.79E-01	7.3	
7	10	88.07	423098	33652	0.87	175.92	3.39E+00	7.10E+00	0.2	
8	1	122.11	208489	46655	0.87	243.83	4.96E+00	3.50E+00	0.3	3.12E+00
9	1	136.50	26688	36786	0.87	272.55	5.14E+00	4.48E-01	1.5	2.78E-01
10	1	165.88	104305	37605	0.92	331.17	5.10E+00	1.75E+00	0.5	2.16E+00
11	1	186.17	1120	20002	1.74	371.67	4.91E+00	1.88E-02	20.1	4.54E+00
12	1	255.15	2556	24264	1.08	509.32	4.15E+00	4.29E-02	10.7	3.58E-01
13	1	279.07	3456	24986	1.36	557.06	3.92E+00	5.80E-02	8.4	6.56E+00
14	1	310.47	549	15497	1.13	619.72	3.64E+00	9.21E-03	36.1	1.10E-01
15	1	391.58	58425	26029	1.14	781.63	3.08E+00	9.80E-01	0.7	3.23E+00
16	1	510.83	2930	19866	2.42	1019.66	2.53E+00	4.92E-02	9.5	1.87E+00
17	1	661.54	314668	23450	1.40	1320.55	2.06E+00	5.28E+00	0.2	1.08E+01
18	1	813.72	647	10680	1.44	1624.41	1.74E+00	1.08E-02	28.0	5.29E-01
19	1	821.43	1093	13269	1.92	1639.82	1.72E+00	1.83E-02	19.9	1.38E+00
20	1	898.07	58780	22504	1.61	1792.87	1.60E+00	9.86E-01	0.7	2.47E+00
21	1	1173.31	316433	13765	1.85	2342.66	1.27E+00	5.31E+00	0.2	2.45E+01
22	5	1325.85	1286	4577	3.17	2647.45	1.15E+00	2.16E-02	12.8	2.94E+01
23	5	1332.57	289049	2425	1.99	2660.87	1.15E+00	4.85E+00	0.2	
24	1	1835.93	36450	1540	2.37	3667.00	9.23E-01	6.12E-01	0.6	9.40E+00
25	1	1886.02	41	635	2.78	3767.15	9.11E-01	6.89E-04	123.5	1.98E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE01$1
Calib Date: 21-JUL-2015 11:29
Detector :
Fit type : 5th Degree Empirical
Geometry : 01B150022715



DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:39:29.88
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 27-FEB-2015 17:04:36.87

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 01B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 90 Energy Tol : 1.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 01B150022715
BKGFILE : 01BG013015MT
Real Time : 0 16:36:40.47
Live time : 0 16:33:13.16

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.61	140132	68186	0.82	119.13	8.86E-01	2.35E+00	0.4	8.78E+01
2	1	66.49*	1086	32230	0.82	132.86	1.47E+00	1.82E-02	25.2	2.44E+01
3	1	72.82*	1214	36804	0.78	145.49	2.06E+00	2.04E-02	24.1	1.55E+00
4	1	75.00*	2146	37880	0.63	149.85	2.26E+00	3.60E-02	14.0	9.87E-01
5	10	84.40*	9241	92258	2.12	168.60	3.09E+00	1.55E-01	6.2	1.43E+02
6	10	85.89	10647	78357	1.61	171.56	3.22E+00	1.79E-01	7.3	
7	10	88.07*	422940	33652	0.87	175.92	3.39E+00	7.10E+00	0.2	
8	1	122.11	208489	46655	0.87	243.83	4.96E+00	3.50E+00	0.3	3.12E+00
9	1	136.50	26688	36786	0.87	272.55	5.14E+00	4.48E-01	1.5	2.78E-01
10	1	165.88	104305	37605	0.92	331.17	5.10E+00	1.75E+00	0.5	2.16E+00
11	1	186.17*	436	20002	1.74	371.67	4.91E+00	7.32E-03	53.5	4.54E+00
12	1	255.15	2556	24264	1.08	509.32	4.15E+00	4.29E-02	10.7	3.58E-01
13	1	279.07	3456	24986	1.36	557.06	3.92E+00	5.80E-02	8.4	6.56E+00
14	1	310.47	549	15497	1.13	619.72	3.64E+00	9.21E-03	36.1	1.10E-01
15	1	391.58	58425	26029	1.14	781.63	3.08E+00	9.80E-01	0.7	3.23E+00
16	1	510.83*	935	19866	2.42	1019.66	2.53E+00	1.57E-02	30.8	1.87E+00
17	1	661.54	314668	23450	1.40	1320.55	2.06E+00	5.28E+00	0.2	1.08E+01
18	1	813.72	647	10680	1.44	1624.41	1.74E+00	1.08E-02	28.0	5.29E-01
19	1	821.43	1093	13269	1.92	1639.82	1.72E+00	1.83E-02	19.9	1.38E+00
20	1	898.07	58780	22504	1.61	1792.87	1.60E+00	9.86E-01	0.7	2.47E+00
21	1	1173.31	316433	13765	1.85	2342.66	1.27E+00	5.31E+00	0.2	2.45E+01
22	5	1325.85	1286	4577	3.17	2647.45	1.15E+00	2.16E-02	12.8	2.94E+01
23	5	1332.57	289049	2425	1.99	2660.87	1.15E+00	4.85E+00	0.2	
24	1	1835.93	36450	1540	2.37	3667.00	9.23E-01	6.12E-01	0.6	9.40E+00
25	1	1886.02	41	635	2.78	3767.15	9.11E-01	6.89E-04	123.5	1.98E+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
01-AM241	59.54	140132	35.90*	8.856E-01	7.396E+02	7.410E+02	0.88
02-CD109	88.03	422940	3.72*	3.386E+00	5.635E+03	1.061E+04	0.33
03-CO57	122.06	208489	85.51*	4.956E+00	8.255E+01	2.434E+02	0.59
04-CE139	165.85	104305	80.35*	5.098E+00	4.273E+01	3.587E+02	0.95
05-HG203	279.20	3456	81.46*	3.917E+00	1.817E+00	9.737E+02	16.80

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06-SN113	391.69	58425	64.90*	3.082E+00	4.901E+01	6.244E+02	1.35
08-CS137	661.65	314668	85.12*	2.061E+00	3.010E+02	3.091E+02	0.42
09-Y88	898.02	58780	93.40*	1.598E+00	6.607E+01	1.030E+03	1.36
10-CO60	1173.22	316433	100.00	1.272E+00	4.175E+02	4.861E+02	0.40
	1332.49	289049	100.00*	1.145E+00	4.235E+02	4.931E+02	0.38
12-Y88	1836.01	36450	99.38*	9.230E-01	6.668E+01	1.039E+03	1.20

Flag: "*" = Keyline

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Total number of lines in spectrum 25
Number of unidentified lines 14
Number of lines tentatively identified by NID 11 44.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	7.396E+02	7.410E+02	0.065E+02	0.88	
02-CD109	462.90D	1.88	5.635E+03	1.061E+04	0.004E+04	0.33	
03-CO57	270.90D	2.95	8.255E+01	2.434E+02	0.014E+02	0.59	
04-CE139	137.66D	8.40	4.273E+01	3.587E+02	0.034E+02	0.95	
05-HG203	46.61D	536.	1.817E+00	9.737E+02	1.636E+02	16.80	
06-SN113	115.10D	12.7	4.901E+01	6.244E+02	0.085E+02	1.35	
08-CS137	30.17Y	1.03	3.010E+02	3.091E+02	0.013E+02	0.42	
09-Y88	106.65D	15.6	6.607E+01	1.030E+03	0.014E+03	1.36	
10-CO60	5.27Y	1.16	4.235E+02	4.931E+02	0.019E+02	0.38	
12-Y88	106.65D	15.6	6.668E+01	1.039E+03	0.012E+03	1.20	
			---------	---------			
	Total Activity :		7.408E+03	1.642E+04			

Grand Total Activity : 7.408E+03 1.642E+04

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

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It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	66.49	1086	32230	0.82	132.86	131	5	1.82E-02	50.3	1.47E+00	
1	72.82	1214	36804	0.78	145.49	143	5	2.04E-02	48.2	2.06E+00	
1	75.00	2146	37880	0.63	149.85	148	5	3.60E-02	28.0	2.26E+00	
10	84.40	9241	92258	2.12	168.60	163	19	1.55E-01	12.3	3.09E+00	
10	85.89	10647	78357	1.61	171.56	163	19	1.79E-01	14.7	3.22E+00	
1	136.50	26688	36786	0.87	272.55	268	10	4.48E-01	3.0	5.14E+00	
1	186.17	436	20002	1.74	371.67	369	6	7.32E-03	****	4.91E+00	
1	255.15	2556	24264	1.08	509.32	506	8	4.29E-02	21.5	4.15E+00	
1	310.47	549	15497	1.13	619.72	618	6	9.21E-03	72.2	3.64E+00	
1	510.83	935	19866	2.42	1019.66	1015	11	1.57E-02	61.7	2.53E+00	
1	813.72	647	10680	1.44	1624.41	1621	8	1.08E-02	55.9	1.74E+00	
1	821.43	1093	13269	1.92	1639.82	1635	10	1.83E-02	39.9	1.72E+00	
5	1325.85	1286	4577	3.17	2647.45	2635	44	2.16E-02	25.7	1.15E+00	
1	1886.02	41	635	2.78	3767.15	3761	12	6.89E-04	****	9.11E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	25	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	11	44.00%

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
01-AM241	432.70Y	1.00	7.396E+02	7.410E+02	0.065E+02	0.88	
02-CD109	462.90D	1.88	5.635E+03	1.061E+04	0.004E+04	0.33	
03-CO57	270.90D	2.95	8.255E+01	2.434E+02	0.014E+02	0.59	
04-CE139	137.66D	8.40	4.273E+01	3.587E+02	0.034E+02	0.95	
05-HG203	46.61D	536.	1.817E+00	9.737E+02	1.636E+02	16.80	
06-SN113	115.10D	12.7	4.901E+01	6.244E+02	0.085E+02	1.35	
08-CS137	30.17Y	1.03	3.010E+02	3.091E+02	0.013E+02	0.42	
09-Y88	106.65D	15.6	6.607E+01	1.030E+03	0.014E+03	1.36	
10-CO60	5.27Y	1.16	4.235E+02	4.931E+02	0.019E+02	0.38	
12-Y88	106.65D	15.6	6.668E+01	1.039E+03	0.012E+03	1.20	
	Total Activity :		7.408E+03	1.642E+04			

Grand Total Activity : 7.408E+03 1.642E+04

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 ----

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Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	7.410E+02	6.549E+00	4.348E+00	0.000E+00	170.409
02-CD109	1.061E+04	3.552E+01	2.127E+01	0.000E+00	498.779
03-CO57	2.434E+02	1.429E+00	8.647E-01	0.000E+00	281.463
04-CE139	3.587E+02	3.417E+00	2.273E+00	0.000E+00	157.849
05-HG203	9.737E+02	1.636E+02	1.816E+02	0.000E+00	5.361
06-SN113	6.244E+02	8.454E+00	6.664E+00	0.000E+00	93.702
08-CS137	3.091E+02	1.295E+00	5.231E-01	0.000E+00	590.894
09-Y88	1.030E+03	1.403E+01	1.041E+01	0.000E+00	98.894
10-CO60	4.931E+02	1.869E+00	3.975E-01	0.000E+00	1240.603
12-Y88	1.039E+03	1.244E+01	3.943E+00	0.000E+00	263.555

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	5.148E+01		2.450E+01	3.558E+01	0.000E+00	1.447

DRAFT

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A,01B150022715     ,07/21/2015 11:39,01/01/2014 12:00,   1.000E+00,B150 MIXED GAM
B,01B150022715     ,CALIBRATION          ,07/21/2015 11:29,01B150022715
C,01-AM241,YES,    7.410E+02,   6.549E+00,   4.348E+00,,  170.409
C,02-CD109,YES,    1.061E+04,   3.552E+01,   2.127E+01,,  498.779
C,03-CO57 ,YES,    2.434E+02,   1.429E+00,   8.647E-01,,  281.463
C,04-CE139,YES,    3.587E+02,   3.417E+00,   2.273E+00,,  157.849
C,05-HG203,YES,    9.737E+02,   1.636E+02,   1.816E+02,,    5.361
C,06-SN113,YES,    6.244E+02,   8.454E+00,   6.664E+00,,   93.702
C,08-CS137,YES,    3.091E+02,   1.295E+00,   5.231E-01,,  590.894
C,09-Y88  ,YES,    1.030E+03,   1.403E+01,   1.041E+01,,   98.894
C,10-CO60 ,YES,    4.931E+02,   1.869E+00,   3.975E-01,, 1240.603
C,12-Y88  ,YES,    1.039E+03,   1.244E+01,   3.943E+00,,  263.555
C,07-SR85 ,NO ,    5.148E+01,   2.450E+01,   3.558E+01,,    1.447
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DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-OCT-2011 15:49:45.83
TBE02 P-10712A HpGe ********** Aquisition Date/Time: 17-OCT-2011 16:43:59.80

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA STD

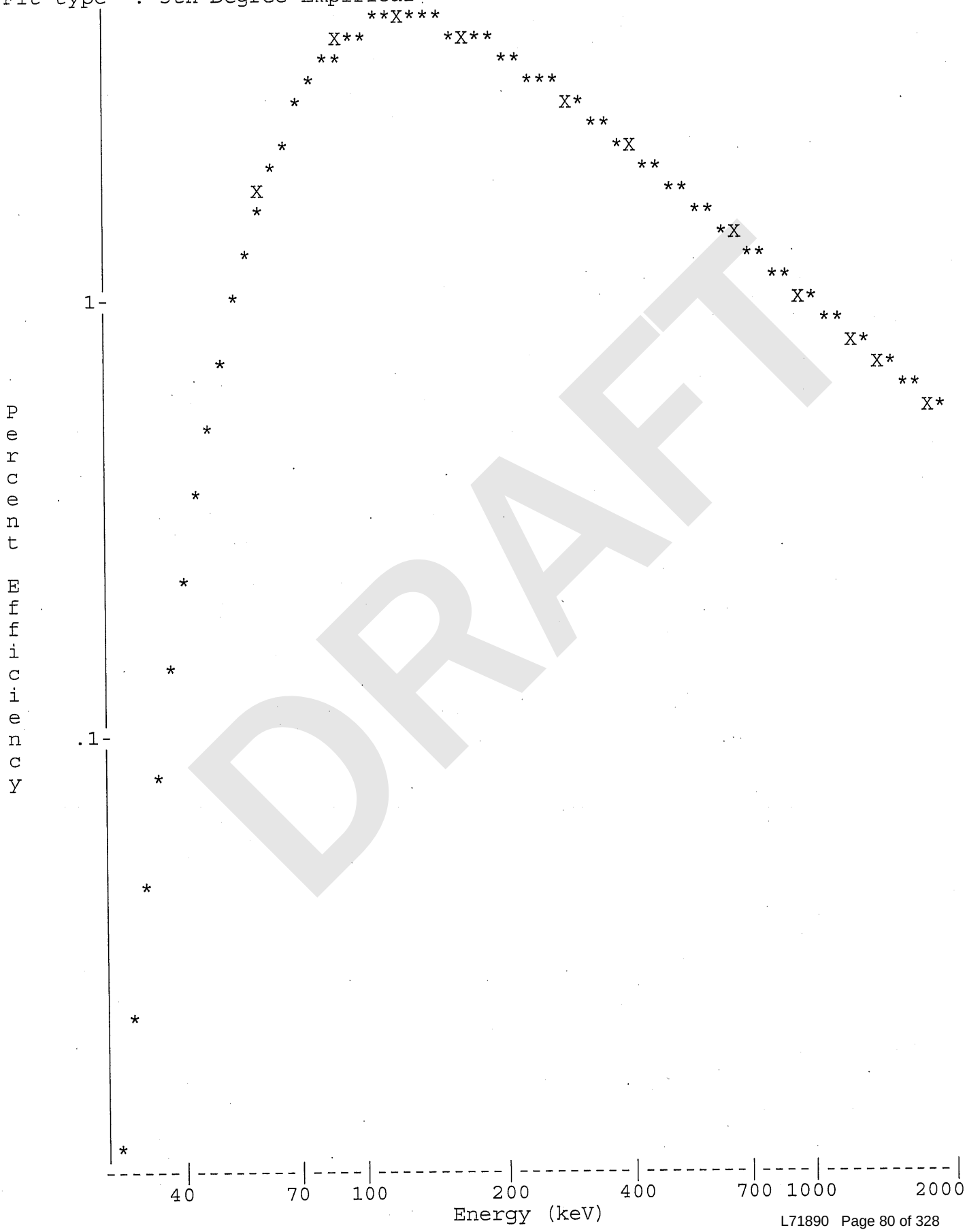
Sample ID : 02B150111711
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 02B150101711
BKGFILE : 02BG091611MT
Real Time : 0 15:33:33.25
Live time : 0 15:16:10.15

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	37.61	827	43862	0.90	58.45	1.55E-01	1.51E-02	40.2	7.35E-01
2	6	58.19	7925	62555	1.56	99.86	1.54E+00	1.44E-01	6.1	3.05E+00
3	6	59.46	119194	47386	0.92	102.43	1.66E+00	2.17E+00	0.4	
4	2	70.76	2590	34502	0.74	125.15	2.61E+00	4.71E-02	10.3	8.72E+00
5	2	72.82	6084	42950	0.77	129.30	2.76E+00	1.11E-01	5.3	
6	10	83.98	14864	130301	2.43	151.74	3.45E+00	2.70E-01	5.3	2.63E+02
7	10	85.82	18187	84209	1.67	155.46	3.54E+00	3.31E-01	3.5	
8	10	87.99	324636	43865	1.05	159.82	3.64E+00	5.91E+00	0.2	
9	1	92.96	2334	40271	1.35	169.82	3.84E+00	4.25E-02	14.5	1.35E+00
10	1	96.51	1170	33179	1.09	176.97	3.95E+00	2.13E-02	24.8	4.39E+00
11	7	117.84	3315	46448	1.91	219.89	4.28E+00	6.03E-02	11.1	1.14E+02
12	7	122.07	175715	32139	1.03	228.39	4.30E+00	3.20E+00	0.3	
13	1	136.49	22075	43383	1.01	257.40	4.27E+00	4.02E-01	1.9	4.40E+00
14	1	165.90	175190	57286	1.07	316.57	4.01E+00	3.19E+00	0.4	9.27E+01
15	1	170.94	1425	25109	1.31	326.73	3.96E+00	2.59E-02	18.7	1.33E+00
16	1	174.59	1093	20091	1.78	334.07	3.92E+00	1.99E-02	20.7	5.60E-01
17	1	255.18	5650	22216	1.23	496.22	3.06E+00	1.03E-01	4.9	4.22E+00
18	6	274.80	1462	22443	1.75	535.71	2.89E+00	2.66E-02	18.6	2.47E+01
19	6	279.24	96630	17346	1.17	544.63	2.86E+00	1.76E+00	0.4	
20	1	352.14	611	12774	1.34	691.32	2.37E+00	1.11E-02	32.3	8.87E-01
21	2	387.55	1383	15399	1.62	762.57	2.18E+00	2.52E-02	15.9	5.30E+01
22	2	391.74	118280	15458	1.29	771.01	2.16E+00	2.15E+00	0.3	
23	1	396.51	653	14308	1.31	780.61	2.14E+00	1.19E-02	32.1	9.26E-01
24	1	400.74	884	14560	1.83	789.12	2.12E+00	1.61E-02	24.9	1.02E+00
25	1	511.26	2843	15749	2.53	1011.50	1.72E+00	5.17E-02	9.3	1.06E+00
26	1	661.67	92901	24979	1.51	1314.17	1.36E+00	1.69E+00	0.5	2.56E+01
27	1	814.13	1931	8629	1.53	1620.98	1.13E+00	3.51E-02	9.6	5.30E-01
28	1	898.02	128112	23984	1.68	1789.79	1.03E+00	2.33E+00	0.4	2.93E+01
29	1	1173.17	97839	14991	1.88	2343.54	8.05E-01	1.78E+00	0.4	1.75E+01
30	5	1178.27	320	2127	1.12	2353.80	8.02E-01	5.83E-03	18.9	2.19E+00
31	5	1182.82	1288	5213	3.07	2362.95	7.99E-01	2.34E-02	11.9	
32	10	1328.11	7012	9934	5.14	2655.35	7.22E-01	1.28E-01	6.1	4.01E+01
33	10	1332.45	88398	3643	1.94	2664.10	7.20E-01	1.61E+00	0.4	
34	10	1335.60	3593	7493	4.26	2670.43	7.18E-01	6.54E-02	11.0	
35	10	1341.73	1524	3828	3.01	2682.76	7.15E-01	2.77E-02	9.5	
36	1	1836.03	75423	7835	2.37	3677.66	5.66E-01	1.37E+00	0.5	3.55E+01
37	1	1858.55	349	873	3.93	3722.98	5.62E-01	6.34E-03	19.2	2.02E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE02$1
Calib Date: 21-OCT-2011 15:49
Detector :
Geometry : 02B150101711
Fit type : 5th Degree Empirical



DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 2-NOV-2011 16:59:51.44
TBE02 P-10712A HpGe ********** Aquisition Date/Time: 17-OCT-2011 16:43:59.80

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA STD

Sample ID : 02B150101711
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 02B150101711
BKGFILE : 02BG101411MT
Real Time : 0 15:33:33.25
Live time : 0 15:16:10.15

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	37.61	827	43862	0.90	58.45	1.55E-01	1.51E-02	40.2	7.35E-01
2	6	58.19	7925	62555	1.56	99.86	1.54E+00	1.44E-01	6.1	3.05E+00
3	6	59.46	119194	47386	0.92	102.43	1.66E+00	2.17E+00	0.4	
4	2	70.76*	2222	34502	0.74	125.15	2.61E+00	4.04E-02	12.1	8.72E+00
5	2	72.82*	5717	42950	0.77	129.30	2.76E+00	1.04E-01	5.6	
6	10	83.98*	14511	130301	2.43	151.74	3.45E+00	2.64E-01	5.4	2.63E+02
7	10	85.82*	17835	84209	1.67	155.46	3.54E+00	3.24E-01	3.6	
8	10	87.99*	324482	43865	1.05	159.82	3.64E+00	5.90E+00	0.2	
9	1	92.96*	1895	40271	1.35	169.82	3.84E+00	3.45E-02	17.9	1.35E+00
10	1	96.51	1170	33179	1.09	176.97	3.95E+00	2.13E-02	24.8	4.39E+00
11	7	117.84	3315	46448	1.91	219.89	4.28E+00	6.03E-02	11.1	1.14E+02
12	7	122.07	175715	32139	1.03	228.39	4.30E+00	3.20E+00	0.3	
13	1	136.49	22075	43383	1.01	257.40	4.27E+00	4.02E-01	1.9	4.40E+00
14	1	165.90	175190	57286	1.07	316.57	4.01E+00	3.19E+00	0.4	9.27E+01
15	1	170.94	1425	25109	1.31	326.73	3.96E+00	2.59E-02	18.7	1.33E+00
16	1	174.59	1093	20091	1.78	334.07	3.92E+00	1.99E-02	20.7	5.60E-01
17	1	255.18	5650	22216	1.23	496.22	3.06E+00	1.03E-01	4.9	4.22E+00
18	6	274.80	1462	22443	1.75	535.71	2.89E+00	2.66E-02	18.6	2.47E+01
19	6	279.24	96630	17346	1.17	544.63	2.86E+00	1.76E+00	0.4	
20	2	387.55	1383	15399	1.62	762.57	2.18E+00	2.52E-02	15.9	5.30E+01
21	2	391.74	118280	15458	1.29	771.01	2.16E+00	2.15E+00	0.3	
22	1	396.51	653	14308	1.31	780.61	2.14E+00	1.19E-02	32.1	9.26E-01
23	1	400.74	884	14560	1.83	789.12	2.12E+00	1.61E-02	24.9	1.02E+00
24	1	511.26*	1562	15749	2.53	1011.50	1.72E+00	2.84E-02	17.1	1.06E+00
25	1	661.67	92901	24979	1.51	1314.17	1.36E+00	1.69E+00	0.5	2.56E+01
26	1	814.13	1931	8629	1.53	1620.98	1.13E+00	3.51E-02	9.6	5.30E-01
27	1	898.02	128112	23984	1.68	1789.79	1.03E+00	2.33E+00	0.4	2.93E+01
28	1	1173.17	97839	14991	1.88	2343.54	8.05E-01	1.78E+00	0.4	1.75E+01
29	5	1178.27	320	2127	1.12	2353.80	8.02E-01	5.83E-03	18.9	2.19E+00
30	5	1182.82	1288	5213	3.07	2362.95	7.99E-01	2.34E-02	11.9	
31	10	1328.11	7012	9934	5.14	2655.35	7.22E-01	1.28E-01	6.1	4.01E+01
32	10	1332.45	88398	3643	1.94	2664.10	7.20E-01	1.61E+00	0.4	
33	10	1335.60	3593	7493	4.26	2670.43	7.18E-01	6.54E-02	11.0	
34	10	1341.73	1524	3828	3.01	2682.76	7.15E-01	2.77E-02	9.5	
35	1	1836.03	75423	7835	2.37	3677.66	5.66E-01	1.37E+00	0.5	3.55E+01
36	1	1858.55	349	873	3.93	3722.98	5.62E-01	6.34E-03	19.2	2.02E+00

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

Nuclide Line Activity Report

DRAFT

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	119194	35.90*	1.656E+00	3.646E+02	3.648E+02	0.83
02-CD109	88.03	324482	3.72*	3.643E+00	4.356E+03	5.125E+03	0.41
03-CO57	122.06	175715	85.51*	4.299E+00	8.695E+01	1.148E+02	0.58
04-CE139	165.85	175190	80.35*	4.014E+00	9.880E+01	1.706E+02	0.74
05-HG203	279.20	96630	81.46*	2.856E+00	7.556E+01	3.794E+02	0.79
06-SN113	391.69	118280	64.90*	2.163E+00	1.533E+02	2.947E+02	0.69
08-CS137	661.65	92901	85.12*	1.363E+00	1.456E+02	1.466E+02	0.99
09-Y88	898.02	128112	93.40*	1.029E+00	2.424E+02	4.908E+02	0.78
10-CO60	1173.22	97839	100.00	8.051E-01	2.211E+02	2.299E+02	0.86
	1332.49	88398	100.00*	7.197E-01	2.234E+02	2.323E+02	0.74
12-Y88	1836.01	75423	99.38*	5.656E-01	2.441E+02	4.941E+02	0.95

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 02B150101711

Acquisition date : 17-OCT-2011 16:43:59

Total number of lines in spectrum 36
Number of unidentified lines 25
Number of lines tentatively identified by NID 11 30.56%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.646E+02	3.648E+02	0.030E+02	0.83	
02-CD109	462.90D	1.18	4.356E+03	5.125E+03	0.021E+03	0.41	
03-CO57	270.90D	1.32	8.695E+01	1.148E+02	0.007E+02	0.58	
04-CE139	137.66D	1.73	9.880E+01	1.706E+02	0.013E+02	0.74	
05-HG203	46.61D	5.02	7.556E+01	3.794E+02	0.030E+02	0.79	
06-SN113	115.10D	1.92	1.533E+02	2.947E+02	0.020E+02	0.69	
08-CS137	30.17Y	1.01	1.456E+02	1.466E+02	0.015E+02	0.99	
09-Y88	106.65D	2.02	2.424E+02	4.908E+02	0.038E+02	0.78	
10-CO60	5.27Y	1.04	2.234E+02	2.323E+02	0.017E+02	0.74	
12-Y88	106.65D	2.02	2.441E+02	4.941E+02	0.047E+02	0.95	
			---------	---------			
Total Activity :			5.991E+03	7.813E+03			
Grand Total Activity :			5.991E+03	7.813E+03			

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

DRAFT

Unidentified Energy Lines
Sample ID : 02B150101711

Acquisition date : 17-OCT-2011 16:43:59

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	37.61	827	43862	0.90	58.45	56	6	1.51E-02	80.4	1.55E-01	
6	58.19	7925	62555	1.56	99.86	96	14	1.44E-01	12.2	1.54E+00	
2	70.76	2222	34502	0.74	125.15	122	11	4.04E-02	24.1	2.61E+00	
2	72.82	5717	42950	0.77	129.30	122	11	1.04E-01	11.2	2.76E+00	
10	83.98	14511	130301	2.43	151.74	144	24	2.64E-01	10.8	3.45E+00	
10	85.82	17835	84209	1.67	155.46	144	24	3.24E-01	7.2	3.54E+00	
1	92.96	1895	40271	1.35	169.82	167	7	3.45E-02	35.8	3.84E+00	
1	96.51	1170	33179	1.09	176.97	175	6	2.13E-02	49.5	3.95E+00	
7	117.84	3315	46448	1.91	219.89	216	19	6.03E-02	22.3	4.28E+00	
1	136.49	22075	43383	1.01	257.40	253	10	4.02E-01	3.8	4.27E+00	
1	170.94	1425	25109	1.31	326.73	324	7	2.59E-02	37.4	3.96E+00	
1	174.59	1093	20091	1.78	334.07	332	6	1.99E-02	41.5	3.92E+00	
1	255.18	5650	22216	1.23	496.22	492	9	1.03E-01	9.9	3.06E+00	
6	274.80	1462	22443	1.75	535.71	531	20	2.66E-02	37.2	2.89E+00	
2	387.55	1383	15399	1.62	762.57	759	20	2.52E-02	31.8	2.18E+00	
1	396.51	653	14308	1.31	780.61	778	8	1.19E-02	64.1	2.14E+00	
1	400.74	884	14560	1.83	789.12	785	9	1.61E-02	49.7	2.12E+00	
1	511.26	1562	15749	2.53	1011.50	1005	13	2.84E-02	34.1	1.72E+00	
1	814.13	1931	8629	1.53	1620.98	1616	11	3.51E-02	19.2	1.13E+00	
5	1178.27	320	2127	1.12	2353.80	2352	17	5.83E-03	37.7	8.02E-01	
5	1182.82	1288	5213	3.07	2362.95	2352	17	2.34E-02	23.9	7.99E-01	
10	1328.11	7012	9934	5.14	2655.35	2639	51	1.28E-01	12.2	7.22E-01	
10	1335.60	3593	7493	4.26	2670.43	2639	51	6.54E-02	22.0	7.18E-01	
10	1341.73	1524	3828	3.01	2682.76	2639	51	2.77E-02	19.0	7.15E-01	
1	1858.55	349	873	3.93	3722.98	3717	14	6.34E-03	38.4	5.62E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	36	
Number of unidentified lines	25	
Number of lines tentatively identified by NID	11	30.56%

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
01-AM241	432.70Y	1.00	3.646E+02	3.648E+02	0.030E+02	0.83	
02-CD109	462.90D	1.18	4.356E+03	5.125E+03	0.021E+03	0.41	
03-CO57	270.90D	1.32	8.695E+01	1.148E+02	0.007E+02	0.58	
04-CE139	137.66D	1.73	9.880E+01	1.706E+02	0.013E+02	0.74	
05-HG203	46.61D	5.02	7.556E+01	3.794E+02	0.030E+02	0.79	
06-SN113	115.10D	1.92	1.533E+02	2.947E+02	0.020E+02	0.69	
08-CS137	30.17Y	1.01	1.456E+02	1.466E+02	0.015E+02	0.99	
09-Y88	106.65D	2.02	2.424E+02	4.908E+02	0.038E+02	0.78	
10-CO60	5.27Y	1.04	2.224E+02	2.313E+02	0.013E+02	0.56	
12-Y88	106.65D	2.02	2.441E+02	4.941E+02	0.047E+02	0.95	
			---------	---------			
	Total Activity :		5.990E+03	7.812E+03			
	Grand Total Activity :		5.990E+03	7.812E+03			

Flags: "K" = Keyline not found "M" = Manually accepted

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"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
01-AM241	3.648E+02	3.034E+00	2.963E+00	0.000E+00	123.130
02-CD109	5.125E+03	2.093E+01	1.590E+01	0.000E+00	322.340
03-CO57	1.148E+02	6.634E-01	5.501E-01	0.000E+00	208.649
04-CE139	1.706E+02	1.267E+00	7.937E-01	0.000E+00	215.005
05-HG203	3.794E+02	2.992E+00	2.451E+00	0.000E+00	154.786
06-SN113	2.947E+02	2.031E+00	1.454E+00	0.000E+00	202.673
08-CS137	1.466E+02	1.456E+00	9.101E-01	0.000E+00	161.113
09-Y88	4.908E+02	3.828E+00	2.146E+00	0.000E+00	228.678
10-CO60	2.313E+02	1.304E+00	7.374E-01	0.000E+00	313.640
12-Y88	4.941E+02	4.675E+00	1.913E+00	0.000E+00	258.262

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	3.689E+00		1.171E+00	1.692E+00	0.000E+00	2.181

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A,02B150101711    ,11/02/2011 16:59,07/01/2011 12:00,   1.000E+00,B150 MIXED GAM
B,02B150101711    ,CALIBRATION          ,10/21/2011 15:49,02B150101711
C,01-AM241,YES,   3.648E+02,   3.034E+00,   2.963E+00,,  123.130
C,02-CD109,YES,   5.125E+03,   2.093E+01,   1.590E+01,,  322.340
C,03-CO57 ,YES,   1.148E+02,   6.634E-01,   5.501E-01,,  208.649
C,04-CE139,YES,   1.706E+02,   1.267E+00,   7.937E-01,,  215.005
C,05-HG203,YES,   3.794E+02,   2.992E+00,   2.451E+00,,  154.786
C,06-SN113,YES,   2.947E+02,   2.031E+00,   1.454E+00,,  202.673
C,08-CS137,YES,   1.466E+02,   1.456E+00,   9.101E-01,,  161.113
C,09-Y88  ,YES,   4.908E+02,   3.828E+00,   2.146E+00,,  228.678
C,10-CO60 ,YES,   2.313E+02,   1.304E+00,   7.374E-01,,  313.640
C,12-Y88  ,YES,   4.941E+02,   4.675E+00,   1.913E+00,,  258.262
C,07-SR85 ,NO ,   3.689E+00,   1.171E+00,   1.692E+00,,    2.181
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DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 31-JAN-2012 16:42:57.23
TBE06 P-30563 HpGe ********** Aquisition Date/Time: 19-JAN-2012 17:45:12.85

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA
Sample ID : 06B150011912 Smple Date: 1-JUL-2011 12:00:00.00
Sample Type : CAL Geometry : 06B150011912
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 1.00000 Real Time : 0 15:52:22.09
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 15:50:39.36
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	65429	42879	0.87	119.69	8.75E-01	1.15E+00	0.7	5.47E+01
2	6	72.79	1917	18039	0.68	146.34	1.86E+00	3.36E-02	10.1	4.39E+00
3	6	74.89	2561	22475	0.79	150.53	2.01E+00	4.49E-02	9.0	
4	10	85.90	7813	61801	2.09	172.57	2.75E+00	1.37E-01	8.9	3.36E+01
5	10	88.01	227351	20657	0.85	176.78	2.87E+00	3.99E+00	0.2	
6	1	122.06	131424	30969	0.88	244.94	3.93E+00	2.30E+00	0.4	3.57E+00
7	1	136.48	16627	20063	0.90	273.81	4.01E+00	2.91E-01	1.7	7.26E-01
8	1	165.88	110015	24859	0.92	332.64	3.87E+00	1.93E+00	0.4	2.47E+00
9	1	185.92	595	13408	1.07	372.76	3.67E+00	1.04E-02	32.5	1.82E+00
10	1	255.15	3272	14970	1.17	511.32	2.96E+00	5.74E-02	7.0	1.76E+00
11	1	279.24	23787	15067	1.02	559.52	2.75E+00	4.17E-01	1.2	8.97E-01
12	1	310.05	479	9291	1.37	621.17	2.52E+00	8.39E-03	33.7	1.63E+00
13	1	351.89	637	8741	1.33	704.91	2.26E+00	1.12E-02	24.6	1.60E+00
14	1	391.75	65917	11605	1.13	784.68	2.06E+00	1.16E+00	0.5	1.14E+00
15	1	511.22	2330	11572	2.49	1023.72	1.63E+00	4.08E-02	9.7	1.06E+00
16	1	609.28	670	5445	1.14	1219.92	1.40E+00	1.17E-02	18.7	1.47E+00
17	1	661.63	92365	11119	1.37	1324.65	1.30E+00	1.62E+00	0.4	1.11E+00
18	1	813.98	1320	6062	1.58	1629.43	1.09E+00	2.31E-02	11.4	7.13E-01
19	1	898.00	69933	11193	1.57	1797.51	9.96E-01	1.23E+00	0.5	1.67E+00
20	1	1173.20	95973	5294	1.76	2347.91	7.87E-01	1.68E+00	0.4	2.02E+00
21	5	1324.99	1493	2920	2.96	2651.44	7.08E-01	2.62E-02	9.0	9.17E-01
22	5	1332.48	86099	1826	1.86	2666.42	7.04E-01	1.51E+00	0.4	
23	1	1460.66	388	1702	1.72	2922.70	6.51E-01	6.80E-03	21.2	7.80E-01
24	1	1836.02	40905	815	2.16	3673.05	5.44E-01	7.17E-01	0.5	1.40E+00

Nuclide Line Activity Report
Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	65429	35.90*	8.746E-01	3.653E+02	3.656E+02	1.46
02-CD109	88.03	227351	3.72*	2.867E+00	3.738E+03	5.062E+03	0.46
03-CO57	122.06	131424	85.51*	3.933E+00	6.851E+01	1.150E+02	0.75
04-CE139	165.85	110015	80.35*	3.869E+00	6.204E+01	1.721E+02	0.82
05-HG203	279.20	23787	81.46*	2.752E+00	1.861E+01	3.783E+02	2.33
06-SN113	391.69	65917	64.90*	2.059E+00	8.649E+01	2.929E+02	0.99
08-CS137	661.65	92365	85.12*	1.302E+00	1.461E+02	1.480E+02	0.81
09-Y88	898.02	69933	93.40*	9.959E-01	1.318E+02	4.917E+02	1.02
10-CO60	1173.22	95973	100.00	7.868E-01	2.139E+02	2.300E+02	0.73

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	1332.49	86099	100.00*	7.043E-01	2.143E+02	2.305E+02	0.71
12-Y88	1836.01	40905	99.38*	5.437E-01	1.327E+02	4.952E+02	1.05

Flag: "*" = Keyline

Summary of Nuclide Activity
Sample ID : 06B150011912 Acquisition date : 19-JAN-2012 17:45:12

Total number of lines in spectrum	24	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	11	45.83%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.653E+02	3.656E+02	0.053E+02	1.46	
02-CD109	462.90D	1.35	3.738E+03	5.062E+03	0.023E+03	0.46	
03-CO57	270.90D	1.68	6.851E+01	1.150E+02	0.009E+02	0.75	
04-CE139	137.66D	2.77	6.204E+01	1.721E+02	0.014E+02	0.82	
05-HG203	46.61D	20.3	1.861E+01	3.783E+02	0.088E+02	2.33	
06-SN113	115.10D	3.39	8.649E+01	2.929E+02	0.029E+02	0.99	
08-CS137	30.17Y	1.01	1.461E+02	1.480E+02	0.012E+02	0.81	
09-Y88	106.65D	3.73	1.318E+02	4.917E+02	0.050E+02	1.02	
10-CO60	5.27Y	1.08	2.143E+02	2.305E+02	0.016E+02	0.71	
12-Y88	106.65D	3.73	1.327E+02	4.952E+02	0.052E+02	1.05	
			---	---			
Total Activity :			4.964E+03	7.752E+03			
Grand Total Activity :			4.964E+03	7.752E+03			

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

Unidentified Energy Lines
Sample ID : 06B150011912 Acquisition date : 19-JAN-2012 17:45:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
6	72.79	1917	18039	0.68	146.34	144	10	3.36E-02	20.3	1.86E+00	
6	74.89	2561	22475	0.79	150.53	144	10	4.49E-02	18.0	2.01E+00	
10	85.90	7813	61801	2.09	172.57	165	19	1.37E-01	17.7	2.75E+00	
1	136.48	16627	20063	0.90	273.81	270	8	2.91E-01	3.3	4.01E+00	
1	185.92	595	13408	1.07	372.76	370	7	1.04E-02	65.0	3.67E+00	
1	255.15	3272	14970	1.17	511.32	507	9	5.74E-02	13.9	2.96E+00	
1	310.05	479	9291	1.37	621.17	619	7	8.39E-03	67.3	2.52E+00	
1	351.89	637	8741	1.33	704.91	702	7	1.12E-02	49.2	2.26E+00	
1	511.22	2330	11572	2.49	1023.72	1018	13	4.08E-02	19.5	1.63E+00	
1	609.28	670	5445	1.14	1219.92	1217	7	1.17E-02	37.3	1.40E+00	
1	813.98	1320	6062	1.58	1629.43	1625	10	2.31E-02	22.7	1.09E+00	
5	1324.99	1493	2920	2.96	2651.44	2642	34	2.62E-02	17.9	7.08E-01	
1	1460.66	388	1702	1.72	2922.70	2918	11	6.80E-03	42.5	6.51E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	24	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	11	45.83%

Nuclide Type :

Wtd Mean Wtd Mean

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Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.653E+02	3.656E+02	0.053E+02	1.46	
02-CD109	462.90D	1.35	3.738E+03	5.062E+03	0.023E+03	0.46	
03-CO57	270.90D	1.68	6.851E+01	1.150E+02	0.009E+02	0.75	
04-CE139	137.66D	2.77	6.204E+01	1.721E+02	0.014E+02	0.82	
05-HG203	46.61D	20.3	1.861E+01	3.783E+02	0.088E+02	2.33	
06-SN113	115.10D	3.39	8.649E+01	2.929E+02	0.029E+02	0.99	
08-CS137	30.17Y	1.01	1.461E+02	1.480E+02	0.012E+02	0.81	
09-Y88	106.65D	3.73	1.318E+02	4.917E+02	0.050E+02	1.02	
10-CO60	5.27Y	1.08	2.141E+02	2.303E+02	0.012E+02	0.51	
12-Y88	106.65D	3.73	1.327E+02	4.952E+02	0.052E+02	1.05	
			---------	---------			
	Total Activity :		4.963E+03	7.751E+03			
	Grand Total Activity :		4.963E+03	7.751E+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
01-AM241	3.656E+02	5.333E+00	3.423E+00	0.000E+00	106.821
02-CD109	5.062E+03	2.344E+01	1.480E+01	0.000E+00	341.990
03-CO57	1.150E+02	8.576E-01	5.189E-01	0.000E+00	221.718
04-CE139	1.721E+02	1.414E+00	8.222E-01	0.000E+00	209.248
05-HG203	3.783E+02	8.801E+00	7.372E+00	0.000E+00	51.324
06-SN113	2.929E+02	2.904E+00	1.902E+00	0.000E+00	154.050
08-CS137	1.480E+02	1.199E+00	6.319E-01	0.000E+00	234.189
09-Y88	4.917E+02	4.999E+00	2.646E+00	0.000E+00	185.866
10-CO60	2.303E+02	1.172E+00	5.239E-01	0.000E+00	439.594
12-Y88	4.952E+02	5.193E+00	1.246E+00	0.000E+00	397.528

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	4.417E+00		2.570E+00	3.792E+00	0.000E+00	1.165

A,06B150011912 ,01/31/2012 16:42,07/01/2011 12:00, 1.000E+00,150ML POLY BOTTLE MI,CAL
,BQ ,
B,06B150011912 ,CALIBRATION ,01/27/2012 12:57,06B150011912 ,NOBKG

C,01-AM241,YES, 3.656E+02, 5.333E+00, 3.423E+00,, 106.821
C,02-CD109,YES, 5.062E+03, 2.344E+01, 1.480E+01,, 341.990
C,03-CO57 ,YES, 1.150E+02, 8.576E-01, 5.189E-01,, 221.718
C,04-CE139,YES, 1.721E+02, 1.414E+00, 8.222E-01,, 209.248
C,05-HG203,YES, 3.783E+02, 8.801E+00, 7.372E+00,, 51.324
C,06-SN113,YES, 2.929E+02, 2.904E+00, 1.902E+00,, 154.050
C,08-CS137,YES, 1.480E+02, 1.199E+00, 6.319E-01,, 234.189
C,09-Y88 ,YES, 4.917E+02, 4.999E+00, 2.646E+00,, 185.866
C,10-CO60 ,YES, 2.303E+02, 1.172E+00, 5.239E-01,, 439.594
C,12-Y88 ,YES, 4.952E+02, 5.193E+00, 1.246E+00,, 397.528

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C,07-SR85 ,NO , 4.417E+00, 2.570E+00, 3.792E+00,, 1.165

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Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 11-NOV-2011 11:30:10.84
TBE07 P-10768B HpGe ********** Aquisition Date/Time: 18-OCT-2011 10:16:05.22

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

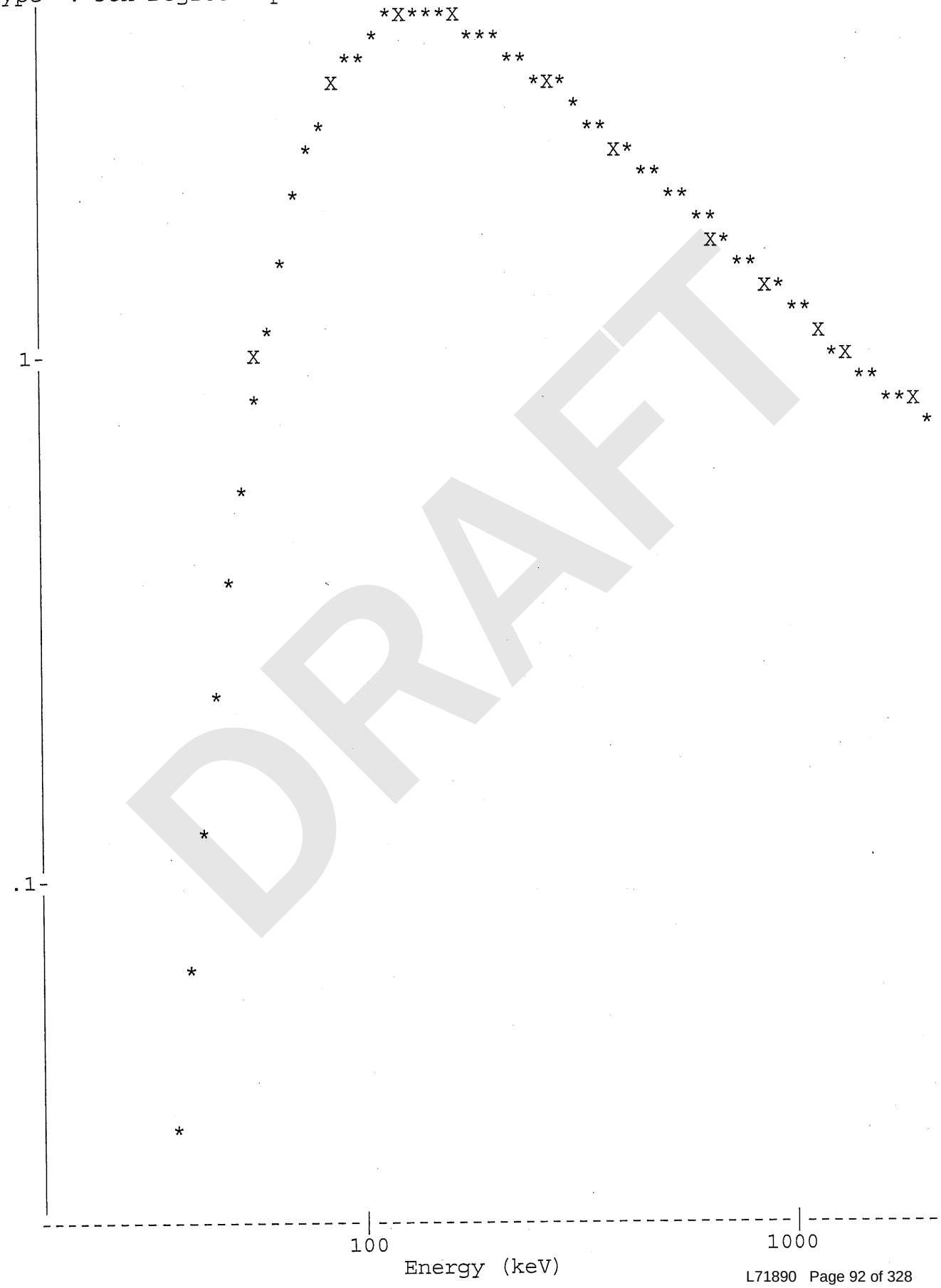
Sample ID : 07B150101811
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 07B150101811
BKGFILE : NOBKG
Real Time : 0 04:14:04.05
Live time : 0 04:13:08.20

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	20110	19589	1.21	119.65	1.01E+00	1.32E+00	1.6	1.35E+01
2	1	72.87	1103	12312	0.78	146.45	2.14E+00	7.26E-02	16.1	3.99E+00
3	1	75.09	745	9518	0.75	150.91	2.33E+00	4.91E-02	20.0	5.56E+00
4	1	88.05	80367	21925	1.19	176.86	3.30E+00	5.29E+00	0.5	2.16E+00
5	1	122.07	51737	15743	1.23	244.99	4.55E+00	3.41E+00	0.7	6.37E+00
6	1	136.49	6853	12354	1.27	273.86	4.67E+00	4.51E-01	3.4	4.84E-01
7	1	165.87	55036	12305	1.25	332.70	4.57E+00	3.62E+00	0.6	2.23E+00
8	1	255.12	1846	6784	1.33	511.41	3.66E+00	1.22E-01	8.7	3.17E-01
9	1	279.19	31790	7138	1.35	559.61	3.44E+00	2.09E+00	0.8	4.34E+00
10	1	391.69	40645	5938	1.44	784.86	2.69E+00	2.68E+00	0.6	2.60E+00
11	1	511.09	1190	4702	2.70	1023.92	2.19E+00	7.84E-02	12.2	1.25E+00
12	1	661.65	33655	5477	1.63	1325.33	1.79E+00	2.22E+00	0.7	1.32E+00
13	1	813.86	630	2245	1.88	1630.04	1.52E+00	4.15E-02	14.6	1.42E+00
14	1	898.03	48212	3990	1.81	1798.51	1.40E+00	3.17E+00	0.5	4.09E+00
15	1	1173.22	37966	2291	2.03	2349.31	1.13E+00	2.50E+00	0.6	5.11E+00
16	6	1325.22	1183	1469	3.80	2653.52	1.03E+00	7.79E-02	9.1	6.06E+00
17	6	1332.48	34658	996	2.16	2668.04	1.02E+00	2.28E+00	0.6	
18	1	1836.01	30490	449	2.56	3675.54	8.30E-01	2.01E+00	0.6	9.69E+00

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Spectrum : MCA0:[NDSCOUNT]TBE07$1
Calib Date: 11-NOV-2011 11:30
Detector :
Fit type : 5th Degree Empirical
Geometry : 07B150101811



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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 6-DEC-2011 15:51:48.27
TBE07 P-10768B HpGe ********** Aquisition Date/Time: 18-OCT-2011 10:16:05.22

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

Sample ID : 07B150101811
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 07B150101811
BKGFILE : NOBKG
Real Time : 0 04:14:04.05
Live time : 0 04:13:08.20

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	20110	19589	1.21	119.65	1.01E+00	1.32E+00	1.6	1.35E+01
2	1	72.87	1103	12312	0.78	146.45	2.14E+00	7.26E-02	16.1	3.99E+00
3	1	75.09	745	9518	0.75	150.91	2.33E+00	4.91E-02	20.0	5.56E+00
4	1	88.05	80367	21925	1.19	176.86	3.30E+00	5.29E+00	0.5	2.16E+00
5	1	122.07	51737	15743	1.23	244.99	4.55E+00	3.41E+00	0.7	6.37E+00
6	1	136.49	6853	12354	1.27	273.86	4.67E+00	4.51E-01	3.4	4.84E-01
7	1	165.87	55036	12305	1.25	332.70	4.57E+00	3.62E+00	0.6	2.23E+00
8	1	255.12	1846	6784	1.33	511.41	3.66E+00	1.22E-01	8.7	3.17E-01
9	1	279.19	31790	7138	1.35	559.61	3.44E+00	2.09E+00	0.8	4.34E+00
10	1	391.69	40645	5938	1.44	784.86	2.69E+00	2.68E+00	0.6	2.60E+00
11	1	511.09	1190	4702	2.70	1023.92	2.19E+00	7.84E-02	12.2	1.25E+00
12	1	661.65	33655	5477	1.63	1325.33	1.79E+00	2.22E+00	0.7	1.32E+00
13	1	813.86	630	2245	1.88	1630.04	1.52E+00	4.15E-02	14.6	1.42E+00
14	1	898.03	48212	3990	1.81	1798.51	1.40E+00	3.17E+00	0.5	4.09E+00
15	1	1173.22	37966	2291	2.03	2349.31	1.13E+00	2.50E+00	0.6	5.11E+00
16	6	1325.22	1183	1469	3.80	2653.52	1.03E+00	7.79E-02	9.1	6.06E+00
17	6	1332.48	34658	996	2.16	2668.04	1.02E+00	2.28E+00	0.6	
18	1	1836.01	30490	449	2.56	3675.54	8.30E-01	2.01E+00	0.6	9.69E+00

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	20110	35.90*	1.011E+00	3.649E+02	3.651E+02	3.13
02-CD109	88.03	80367	3.72*	3.298E+00	4.312E+03	5.077E+03	1.04
03-CO57	122.06	51737	85.51*	4.554E+00	8.747E+01	1.156E+02	1.31
04-CE139	165.85	55036	80.35*	4.572E+00	9.865E+01	1.708E+02	1.17
05-HG203	279.20	31790	81.46*	3.444E+00	7.461E+01	3.774E+02	1.55
06-SN113	391.69	40645	64.90*	2.688E+00	1.534E+02	2.958E+02	1.26
08-CS137	661.65	33655	85.12*	1.794E+00	1.451E+02	1.461E+02	1.45
09-Y88	898.02	48212	93.40*	1.404E+00	2.421E+02	4.918E+02	1.09
10-CO60	1173.22	37966	100.00	1.131E+00	2.211E+02	2.299E+02	1.19
	1332.49	34658	100.00*	1.024E+00	2.228E+02	2.317E+02	1.14
12-Y88	1836.01	30490	99.38*	8.297E-01	2.435E+02	4.945E+02	1.20

Flag: "*" = Keyline

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Summary of Nuclide Activity
Sample ID : 07B150101811

Acquisition date : 18-OCT-2011 10:16:05

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.649E+02	3.651E+02	0.114E+02	3.13	
02-CD109	462.90D	1.18	4.312E+03	5.077E+03	0.053E+03	1.04	
03-CO57	270.90D	1.32	8.747E+01	1.156E+02	0.015E+02	1.31	
04-CE139	137.66D	1.73	9.865E+01	1.708E+02	0.020E+02	1.17	
05-HG203	46.61D	5.06	7.461E+01	3.774E+02	0.058E+02	1.55	
06-SN113	115.10D	1.93	1.534E+02	2.958E+02	0.037E+02	1.26	
08-CS137	30.17Y	1.01	1.451E+02	1.461E+02	0.021E+02	1.45	
09-Y88	106.65D	2.03	2.421E+02	4.918E+02	0.053E+02	1.09	
10-CO60	5.27Y	1.04	2.228E+02	2.317E+02	0.026E+02	1.14	
12-Y88	106.65D	2.03	2.435E+02	4.945E+02	0.059E+02	1.20	
			---------	---------			
	Total Activity :		5.945E+03	7.766E+03			

Grand Total Activity : 5.945E+03 7.766E+03

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

DRAFT

Unidentified Energy Lines
Sample ID : 07B150101811 Acquisition date : 18-OCT-2011 10:16:05

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.87	1103	12312	0.78	146.45	144	6	7.26E-02	32.2	2.14E+00	
1	75.09	745	9518	0.75	150.91	149	5	4.91E-02	40.1	2.33E+00	
1	136.49	6853	12354	1.27	273.86	269	11	4.51E-01	6.7	4.67E+00	
1	255.12	1846	6784	1.33	511.41	507	10	1.22E-01	17.3	3.66E+00	
1	511.09	1190	4702	2.70	1023.92	1017	13	7.84E-02	24.5	2.19E+00	
1	813.86	630	2245	1.88	1630.04	1625	10	4.15E-02	29.2	1.52E+00	
6	1325.22	1183	1469	3.80	2653.52	2643	34	7.79E-02	18.1	1.03E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

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
01-AM241	432.70Y	1.00	3.649E+02	3.651E+02	0.114E+02	3.13	
02-CD109	462.90D	1.18	4.312E+03	5.077E+03	0.053E+03	1.04	
03-CO57	270.90D	1.32	8.747E+01	1.156E+02	0.015E+02	1.31	
04-CE139	137.66D	1.73	9.865E+01	1.708E+02	0.020E+02	1.17	
05-HG203	46.61D	5.06	7.461E+01	3.774E+02	0.058E+02	1.55	
06-SN113	115.10D	1.93	1.534E+02	2.958E+02	0.037E+02	1.26	
08-CS137	30.17Y	1.01	1.451E+02	1.461E+02	0.021E+02	1.45	
09-Y88	106.65D	2.03	2.421E+02	4.918E+02	0.053E+02	1.09	
10-CO60	5.27Y	1.04	2.220E+02	2.309E+02	0.019E+02	0.82	
12-Y88	106.65D	2.03	2.435E+02	4.945E+02	0.059E+02	1.20	
	Total Activity :		5.944E+03	7.765E+03			

Grand Total Activity : 5.944E+03 7.765E+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
01-AM241	3.651E+02	1.144E+01	8.619E+00	0.000E+00	42.358
02-CD109	5.077E+03	5.272E+01	3.405E+01	0.000E+00	149.106
03-CO57	1.156E+02	1.513E+00	1.009E+00	0.000E+00	114.567

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04-CE139	1.708E+02	2.005E+00	1.252E+00	0.000E+00	136.400
05-HG203	3.774E+02	5.844E+00	3.974E+00	0.000E+00	94.971
06-SN113	2.958E+02	3.741E+00	2.171E+00	0.000E+00	136.269
08-CS137	1.461E+02	2.125E+00	1.246E+00	0.000E+00	117.252
09-Y88	4.918E+02	5.338E+00	2.592E+00	0.000E+00	189.755
10-CO60	2.309E+02	1.897E+00	9.936E-01	0.000E+00	232.343
12-Y88	4.945E+02	5.949E+00	1.383E+00	0.000E+00	357.416

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	4.590E+00		1.896E+00	2.825E+00	0.000E+00	1.625

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A,07B150101811     ,12/06/2011 15:51,07/01/2011 12:00,   1.000E+00,150ML POLY BOT
B,07B150101811     ,CALIBRATION         ,11/11/2011 11:30,07B150101811
C,01-AM241,YES,   3.651E+02,   1.144E+01,   8.619E+00,,   42.358
C,02-CD109,YES,   5.077E+03,   5.272E+01,   3.405E+01,,  149.106
C,03-CO57 ,YES,   1.156E+02,   1.513E+00,   1.009E+00,,  114.567
C,04-CE139,YES,   1.708E+02,   2.005E+00,   1.252E+00,,  136.400
C,05-HG203,YES,   3.774E+02,   5.844E+00,   3.974E+00,,   94.971
C,06-SN113,YES,   2.958E+02,   3.741E+00,   2.171E+00,,  136.269
C,08-CS137,YES,   1.461E+02,   2.125E+00,   1.246E+00,,  117.252
C,09-Y88  ,YES,   4.918E+02,   5.338E+00,   2.592E+00,,  189.755
C,10-CO60 ,YES,   2.309E+02,   1.897E+00,   9.936E-01,,  232.343
C,12-Y88  ,YES,   4.945E+02,   5.949E+00,   1.383E+00,,  357.416
C,07-SR85 ,NO ,   4.590E+00,   1.896E+00,   2.825E+00,,    1.625
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DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:42:17.34
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 27-FEB-2015 10:12:22.89

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 08B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

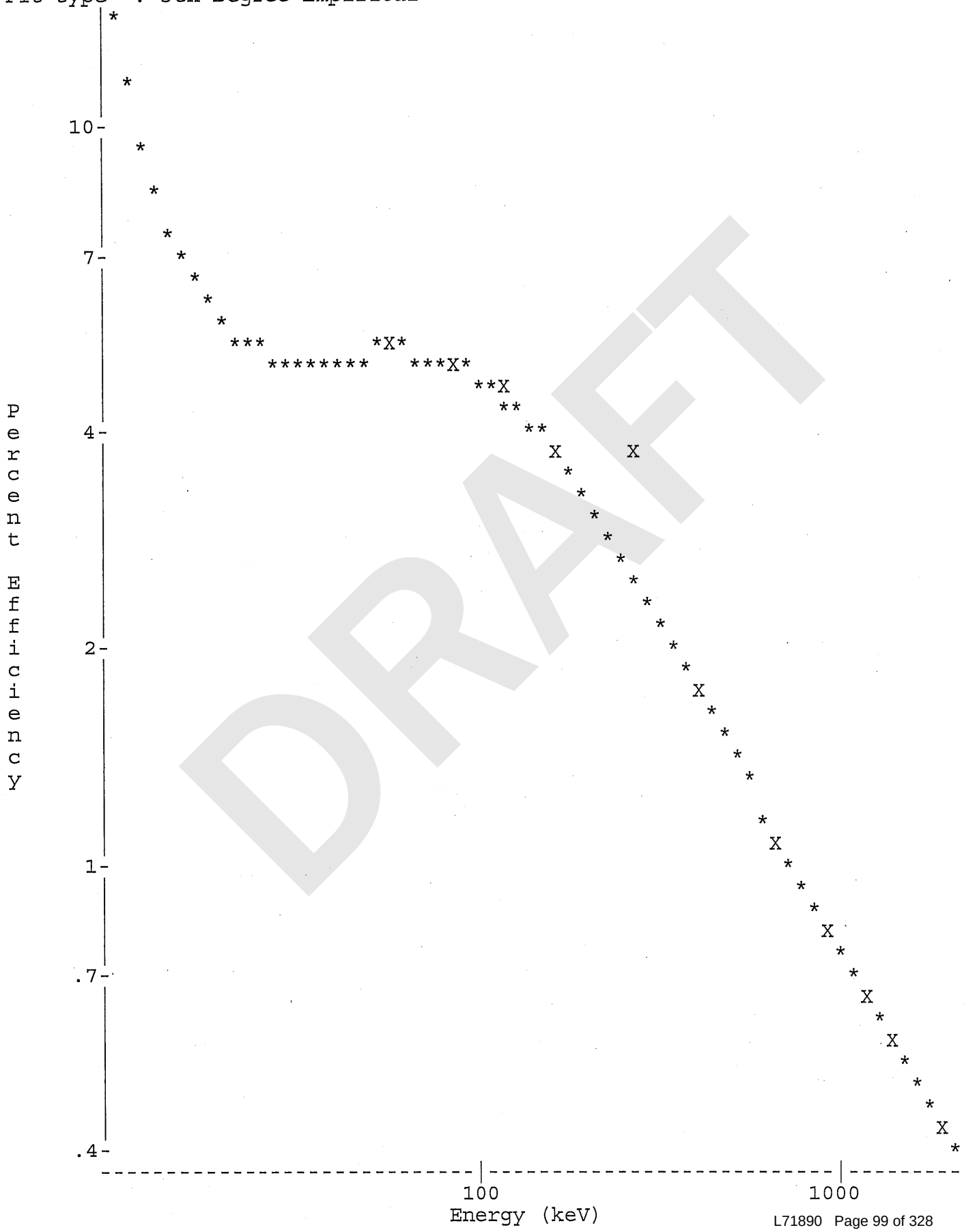
Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 08B150022715
BKGFILE : 08BG013015MT
Real Time : 0 06:44:32.10
Live time : 0 06:41:34.50

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	14.72	17538	63423	1.13	32.92	7.56E+00	7.28E-01	2.5	2.84E+02
2	3	17.58	13828	36461	1.29	38.64	6.13E+00	5.74E-01	2.2	5.13E+03
3	3	21.90	1741709	34446	1.17	47.28	5.28E+00	7.23E+01	0.1	
4	3	24.79	518495	29911	1.33	53.07	5.05E+00	2.15E+01	0.2	
5	1	32.75	37331	25270	2.33	68.99	4.87E+00	1.55E+00	1.0	2.88E+02
6	1	37.25	8012	17030	2.62	77.97	4.88E+00	3.33E-01	3.0	4.50E+01
7	1	43.31	415	15105	0.72	90.09	4.92E+00	1.72E-02	44.3	5.73E+00
8	4	49.48	16504	31173	1.55	102.43	4.95E+00	6.85E-01	2.1	5.02E+02
9	4	51.35	13166	30326	1.55	106.18	4.96E+00	5.46E-01	2.7	
10	4	53.16	12263	29705	1.56	109.80	4.97E+00	5.09E-01	2.8	
11	4	54.97	13665	28891	1.57	113.40	4.97E+00	5.67E-01	2.6	
12	4	57.15	16793	27905	1.57	117.77	4.97E+00	6.97E-01	2.4	
13	4	59.45	310326	17833	1.18	122.37	4.97E+00	1.29E+01	0.2	
14	10	67.51	9118	42128	2.83	138.47	4.95E+00	3.78E-01	5.6	8.23E+01
15	10	72.57	4417	19807	1.15	148.60	4.92E+00	1.83E-01	5.7	
16	10	74.94	8183	39210	2.09	153.34	4.90E+00	3.40E-01	5.0	
17	10	78.11	1121	22581	1.21	159.67	4.87E+00	4.65E-02	21.6	
18	6	85.59	5103	36824	1.99	174.63	4.79E+00	2.12E-01	11.4	3.06E+01
19	6	88.00	228307	14956	1.07	179.46	4.76E+00	9.48E+00	0.2	
20	1	122.05	74607	16842	1.10	247.53	4.27E+00	3.10E+00	0.5	4.02E+00
21	1	136.46	8978	8717	1.15	276.35	4.04E+00	3.73E-01	2.2	3.83E-01
22	1	165.86	29409	10373	1.13	335.13	3.61E+00	1.22E+00	0.9	2.42E+00
23	1	199.24	707	7235	1.16	401.88	3.17E+00	2.94E-02	21.2	4.95E-01
24	1	255.23	805	6977	1.48	513.82	2.60E+00	3.34E-02	19.1	4.62E-01
25	1	279.37	1022	7133	1.69	562.08	2.41E+00	4.24E-02	15.8	1.37E+00
26	1	391.70	13519	6648	1.28	786.68	1.76E+00	5.61E-01	1.5	8.74E-01
27	1	510.97	892	4982	2.35	1025.14	1.36E+00	3.70E-02	15.7	1.97E+00
28	1	661.63	65623	5373	1.49	1326.34	1.07E+00	2.72E+00	0.5	3.63E+00
29	1	814.29	433	3012	1.79	1631.51	8.81E-01	1.80E-02	23.4	5.22E-01
30	1	898.02	12237	5133	1.65	1798.90	8.07E-01	5.08E-01	1.5	6.29E-01
31	1	1173.18	64113	3149	1.85	2348.94	6.40E-01	2.66E+00	0.4	4.46E+00
32	1	1332.45	57699	1001	1.96	2667.29	5.75E-01	2.39E+00	0.4	7.74E+00
33	1	1461.25	156	416	1.62	2924.74	5.32E-01	6.46E-03	26.5	7.37E-01
34	1	1836.03	7064	267	2.27	3673.78	4.38E-01	2.93E-01	1.3	2.37E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE08$1
Calib Date: 21-JUL-2015 11:42
Detector :
Fit type : 5th Degree Empirical

Geometry : 08B150022715



DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:43:51.81
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 27-FEB-2015 10:12:22.89

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 08B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 08B150022715
BKGFILE : 08BG013015MT
Real Time : 0 06:44:32.10
Live time : 0 06:41:34.50

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	14.72	17538	63423	1.13	32.92	7.56E+00	7.28E-01	2.5	2.84E+02
2	3	17.58*	12770	36461	1.29	38.64	6.13E+00	5.30E-01	2.4	5.13E+03
3	3	21.90	1741709	34446	1.17	47.28	5.28E+00	7.23E+01	0.1	
4	3	24.79*	518387	29911	1.33	53.07	5.05E+00	2.15E+01	0.2	
5	1	32.75	37331	25270	2.33	68.99	4.87E+00	1.55E+00	1.0	2.88E+02
6	1	37.25	8012	17030	2.62	77.97	4.88E+00	3.33E-01	3.0	4.50E+01
7	1	43.31	415	15105	0.72	90.09	4.92E+00	1.72E-02	44.3	5.73E+00
8	4	49.48	16504	31173	1.55	102.43	4.95E+00	6.85E-01	2.1	5.02E+02
9	4	51.35	13166	30326	1.55	106.18	4.96E+00	5.46E-01	2.7	
10	4	53.16	12263	29705	1.56	109.80	4.97E+00	5.09E-01	2.8	
11	4	54.97	13665	28891	1.57	113.40	4.97E+00	5.67E-01	2.6	
12	4	57.15	16793	27905	1.57	117.77	4.97E+00	6.97E-01	2.4	
13	4	59.45	310326	17833	1.18	122.37	4.97E+00	1.29E+01	0.2	
14	10	67.51*	9063	42128	2.83	138.47	4.95E+00	3.76E-01	5.6	8.23E+01
15	10	72.57*	4040	19807	1.15	148.60	4.92E+00	1.68E-01	6.2	
16	10	74.94*	7528	39210	2.09	153.34	4.90E+00	3.12E-01	5.5	
17	10	78.11*	1010	22581	1.21	159.67	4.87E+00	4.19E-02	24.0	
18	6	85.59*	4826	36824	1.99	174.63	4.79E+00	2.00E-01	12.0	3.06E+01
19	6	88.00*	228205	14956	1.07	179.46	4.76E+00	9.47E+00	0.2	
20	1	122.05	74607	16842	1.10	247.53	4.27E+00	3.10E+00	0.5	4.02E+00
21	1	136.46	8978	8717	1.15	276.35	4.04E+00	3.73E-01	2.2	3.83E-01
22	1	165.86	29409	10373	1.13	335.13	3.61E+00	1.22E+00	0.9	2.42E+00
23	1	199.24*	670	7235	1.16	401.88	3.17E+00	2.78E-02	22.4	4.95E-01
24	1	255.23	805	6977	1.48	513.82	2.60E+00	3.34E-02	19.1	4.62E-01
25	1	279.37	1022	7133	1.69	562.08	2.41E+00	4.24E-02	15.8	1.37E+00
26	1	391.70	13519	6648	1.28	786.68	1.76E+00	5.61E-01	1.5	8.74E-01
27	1	510.97*	342	4982	2.35	1025.14	1.36E+00	1.42E-02	41.2	1.97E+00
28	1	661.63	65623	5373	1.49	1326.34	1.07E+00	2.72E+00	0.5	3.63E+00
29	1	814.29	433	3012	1.79	1631.51	8.81E-01	1.80E-02	23.4	5.22E-01
30	1	898.02	12237	5133	1.65	1798.90	8.07E-01	5.08E-01	1.5	6.29E-01
31	1	1173.18	64113	3149	1.85	2348.94	6.40E-01	2.66E+00	0.4	4.46E+00
32	1	1332.45	57699	1001	1.96	2667.29	5.75E-01	2.39E+00	0.4	7.74E+00
33	1	1461.25*	4	416	1.62	2924.74	5.32E-01	1.81E-04	956.3	7.37E-01
34	1	1836.03	7064	267	2.27	3673.78	4.38E-01	2.93E-01	1.3	2.37E+00

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

Nuclide Line Activity Report

DRAFT

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	310326	35.90*	4.972E+00	7.215E+02	7.228E+02	0.39
02-CD109	88.03	228205	3.72*	4.761E+00	5.348E+03	1.006E+04	0.45
03-CO57	122.06	74607	85.51*	4.265E+00	8.490E+01	2.500E+02	1.04
04-CE139	165.85	29409	80.35*	3.606E+00	4.212E+01	3.528E+02	1.81
05-HG203	279.20	1022	81.46*	2.407E+00	2.164E+00	1.151E+03	31.55
06-SN113	391.69	13519	64.90*	1.762E+00	4.908E+01	6.233E+02	2.90
08-CS137	661.65	65623	85.12*	1.067E+00	2.998E+02	3.078E+02	0.92
09-Y88	898.02	12237	93.40*	8.074E-01	6.735E+01	1.046E+03	2.96
10-CO60	1173.22	64113	100.00	6.403E-01	4.156E+02	4.838E+02	0.90
	1332.49	57699	100.00*	5.750E-01	4.165E+02	4.849E+02	0.87
12-Y88	1836.01	7064	99.38*	4.378E-01	6.738E+01	1.047E+03	2.64

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 08B150022715

Acquisition date : 27-FEB-2015 10:12:22

Total number of lines in spectrum	34	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	11	32.35%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	7.215E+02	7.228E+02	0.028E+02	0.39	
02-CD109	462.90D	1.88	5.348E+03	1.006E+04	0.005E+04	0.45	
03-CO57	270.90D	2.94	8.490E+01	2.500E+02	0.026E+02	1.04	
04-CE139	137.66D	8.37	4.212E+01	3.528E+02	0.064E+02	1.81	
05-HG203	46.61D	532.	2.164E+00	1.151E+03	0.363E+03	31.55	
06-SN113	115.10D	12.7	4.908E+01	6.233E+02	0.181E+02	2.90	
08-CS137	30.17Y	1.03	2.998E+02	3.078E+02	0.028E+02	0.92	
09-Y88	106.65D	15.5	6.735E+01	1.046E+03	0.031E+03	2.96	
10-CO60	5.27Y	1.16	4.165E+02	4.849E+02	0.042E+02	0.87	
12-Y88	106.65D	15.5	6.738E+01	1.047E+03	0.028E+03	2.64	
			---------	---------			
	Total Activity :		7.099E+03	1.605E+04			

Grand Total Activity :	7.099E+03	1.605E+04

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

DRAFT

Unidentified Energy Lines
Sample ID : 08B150022715
Acquisition date : 27-FEB-2015 10:12:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	14.72	17538	63423	1.13	32.92	30	7	7.28E-01	5.0	7.56E+00	
3	17.58	12770	36461	1.29	38.64	36	23	5.30E-01	4.8	6.13E+00	
3	21.90	1741709	34446	1.17	47.28	36	23	7.23E+01	0.2	5.28E+00	
3	24.79	518387	29911	1.33	53.07	36	23	2.15E+01	0.3	5.05E+00	
1	32.75	37331	25270	2.33	68.99	62	12	1.55E+00	2.0	4.87E+00	
1	37.25	8012	17030	2.62	77.97	74	8	3.33E-01	6.0	4.88E+00	
1	43.31	415	15105	0.72	90.09	88	5	1.72E-02	88.7	4.92E+00	
4	49.48	16504	31173	1.55	102.43	96	31	6.85E-01	4.2	4.95E+00	
4	51.35	13166	30326	1.55	106.18	96	31	5.46E-01	5.4	4.96E+00	
4	53.16	12263	29705	1.56	109.80	96	31	5.09E-01	5.7	4.97E+00	
4	54.97	13665	28891	1.57	113.40	96	31	5.67E-01	5.1	4.97E+00	
4	57.15	16793	27905	1.57	117.77	96	31	6.97E-01	4.8	4.97E+00	
10	67.51	9063	42128	2.83	138.47	130	35	3.76E-01	11.3	4.95E+00	
10	72.57	4040	19807	1.15	148.60	130	35	1.68E-01	12.4	4.92E+00	
10	74.94	7528	39210	2.09	153.34	130	35	3.12E-01	11.0	4.90E+00	
10	78.11	1010	22581	1.21	159.67	130	35	4.19E-02	48.0	4.87E+00	
6	85.59	4826	36824	1.99	174.63	167	19	2.00E-01	24.1	4.79E+00	
1	136.46	8978	8717	1.15	276.35	272	9	3.73E-01	4.3	4.04E+00	
1	199.24	670	7235	1.16	401.88	398	8	2.78E-02	44.9	3.17E+00	
1	255.23	805	6977	1.48	513.82	510	9	3.34E-02	38.1	2.60E+00	
1	510.97	342	4982	2.35	1025.14	1020	11	1.42E-02	82.3	1.36E+00	
1	814.29	433	3012	1.79	1631.51	1627	9	1.80E-02	46.8	8.81E-01	
1	1461.25	4	416	1.62	2924.74	2920	11	1.81E-04	****	5.32E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	34	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	11	32.35%

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
01-AM241	432.70Y	1.00	7.215E+02	7.228E+02	0.028E+02	0.39	
02-CD109	462.90D	1.88	5.348E+03	1.006E+04	0.005E+04	0.45	
03-CO57	270.90D	2.94	8.490E+01	2.500E+02	0.026E+02	1.04	
04-CE139	137.66D	8.37	4.212E+01	3.528E+02	0.064E+02	1.81	
05-HG203	46.61D	532.	2.164E+00	1.151E+03	0.363E+03	31.55	
06-SN113	115.10D	12.7	4.908E+01	6.233E+02	0.181E+02	2.90	
08-CS137	30.17Y	1.03	2.998E+02	3.078E+02	0.028E+02	0.92	
09-Y88	106.65D	15.5	6.735E+01	1.046E+03	0.031E+03	2.96	
10-CO60	5.27Y	1.16	4.161E+02	4.843E+02	0.030E+02	0.63	
12-Y88	106.65D	15.5	6.738E+01	1.047E+03	0.028E+03	2.64	
			---------	---------			
	Total Activity :		7.099E+03	1.605E+04			

Grand Total Activity : 7.099E+03 1.605E+04

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

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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
01-AM241	7.228E+02	2.787E+00	1.449E+00	0.000E+00	498.806
02-CD109	1.006E+04	4.557E+01	2.567E+01	0.000E+00	391.942
03-CO57	2.500E+02	2.603E+00	1.455E+00	0.000E+00	171.806
04-CE139	3.528E+02	6.402E+00	4.520E+00	0.000E+00	78.046
05-HG203	1.151E+03	3.631E+02	3.998E+02	0.000E+00	2.879
06-SN113	6.233E+02	1.809E+01	1.551E+01	0.000E+00	40.196
08-CS137	3.078E+02	2.817E+00	1.315E+00	0.000E+00	234.021
09-Y88	1.046E+03	3.096E+01	2.685E+01	0.000E+00	38.962
10-CO60	4.843E+02	3.029E+00	1.056E+00	0.000E+00	458.826
12-Y88	1.047E+03	2.762E+01	8.642E+00	0.000E+00	121.140

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	6.034E+01		5.744E+01	8.551E+01	0.000E+00	0.706

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A,08B150022715     ,07/21/2015 11:43,01/01/2014 12:00,   1.000E+00,B150 MIXED GAM
B,08B150022715     ,CALIBRATION          ,07/21/2015 11:42,08B150022715
C,01-AM241,YES,    7.228E+02,    2.787E+00,    1.449E+00,,  498.806
C,02-CD109,YES,    1.006E+04,    4.557E+01,    2.567E+01,,  391.942
C,03-CO57 ,YES,    2.500E+02,    2.603E+00,    1.455E+00,,  171.806
C,04-CE139,YES,    3.528E+02,    6.402E+00,    4.520E+00,,   78.046
C,05-HG203,YES,    1.151E+03,    3.631E+02,    3.998E+02,,    2.879
C,06-SN113,YES,    6.233E+02,    1.809E+01,    1.551E+01,,   40.196
C,08-CS137,YES,    3.078E+02,    2.817E+00,    1.315E+00,,  234.021
C,09-Y88  ,YES,    1.046E+03,    3.096E+01,    2.685E+01,,   38.962
C,10-CO60 ,YES,    4.843E+02,    3.029E+00,    1.056E+00,,  458.826
C,12-Y88  ,YES,    1.047E+03,    2.762E+01,    8.642E+00,,  121.140
C,07-SR85 ,NO ,    6.034E+01,    5.744E+01,    8.551E+01,,    0.706
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DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-OCT-2011 15:25:15.26
TBE11 P-20610B HpGe ********** Aquisition Date/Time: 14-OCT-2011 08:57:12.91

LIMS No., Customer Name, Client ID: 150ML POLY MIXED GAMMA CALIBRATION

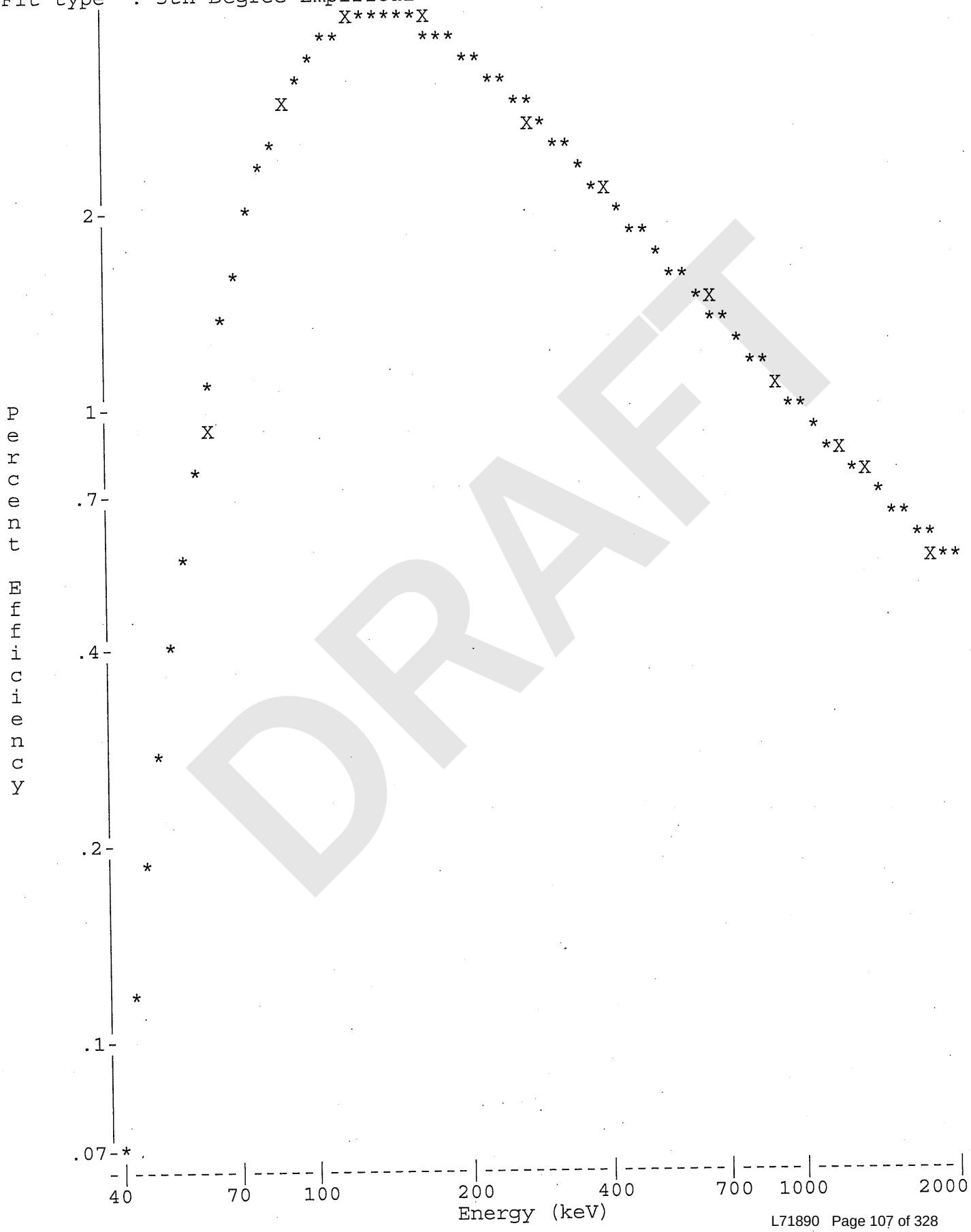
Sample ID : 11B150101411
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 11B150101411
BKGFILE : NOBKG
Real Time : 0 05:55:06.88
Live time : 0 05:51:28.26

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	59.44	24881	29498	1.32	118.93	8.96E-01	1.18E+00	1.6	
2	0	72.78	748	19670	0.97	145.60	1.84E+00	3.55E-02	31.3	
3	0	88.04	93899	37852	1.30	176.13	2.79E+00	4.45E+00	0.5	
4	0	122.06	60058	28219	1.31	244.15	3.80E+00	2.85E+00	0.7	
5	0	136.47	7456	15683	1.28	272.97	3.88E+00	3.54E-01	3.4	
6	0	165.89	65206	24061	1.37	331.80	3.77E+00	3.09E+00	0.7	
7	0	255.22	1684	8501	1.27	510.45	2.93E+00	7.99E-02	10.2	
8	0	279.25	36984	13991	1.41	558.50	2.74E+00	1.75E+00	0.9	
9	0	391.72	44272	11915	1.47	783.41	2.08E+00	2.10E+00	0.7	
10	0	511.10	969	5583	2.18	1022.12	1.66E+00	4.59E-02	15.8	
11	0	661.66	35623	10267	1.66	1323.16	1.33E+00	1.69E+00	0.9	
12	0	813.98	791	3480	1.78	1627.72	1.12E+00	3.75E-02	15.4	
13	0	898.00	49930	8605	1.82	1795.72	1.03E+00	2.37E+00	0.6	
14	0	1173.19	38263	5800	1.94	2345.90	8.20E-01	1.81E+00	0.7	
15	10	1326.52	2241	3138	5.32	2652.44	7.40E-01	1.06E-01	10.2	1.75E+01
16	10	1332.46	36177	1392	2.24	2664.31	7.37E-01	1.72E+00	0.6	
17	10	1338.31	332	1222	2.06	2676.00	7.35E-01	1.58E-02	23.8	
18	0	1836.03	30793	2153	2.35	3670.94	5.78E-01	1.46E+00	0.7	

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE11$1
Calib Date: 26-OCT-2011 15:25
Detector :
Fit type : 5th Degree Empirical
Geometry : 11B150101411



DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 2-NOV-2011 17:00:50.91
TBE11 P-20610B HpGe ********** Aquisition Date/Time: 14-OCT-2011 08:57:12.91

LIMS No., Customer Name, Client ID: 150ML POLY MIXED GAMMA CALIBRATION

Sample ID : 11B150101411
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 11B150101411
BKGFILE : NOBKG
Real Time : 0 05:55:06.88
Live time : 0 05:51:28.26

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	59.44	24881	29498	1.32	118.93	8.96E-01	1.18E+00	1.6	
2	0	72.78	748	19670	0.97	145.60	1.84E+00	3.55E-02	31.3	
3	0	88.04	93899	37852	1.30	176.13	2.79E+00	4.45E+00	0.5	
4	0	122.06	60058	28219	1.31	244.15	3.80E+00	2.85E+00	0.7	
5	0	136.47	7456	15683	1.28	272.97	3.88E+00	3.54E-01	3.4	
6	0	165.89	65206	24061	1.37	331.80	3.77E+00	3.09E+00	0.7	
7	0	255.22	1684	8501	1.27	510.45	2.93E+00	7.99E-02	10.2	
8	0	279.25	36984	13991	1.41	558.50	2.74E+00	1.75E+00	0.9	
9	0	391.72	44272	11915	1.47	783.41	2.08E+00	2.10E+00	0.7	
10	0	511.10	969	5583	2.18	1022.12	1.66E+00	4.59E-02	15.8	
11	0	661.66	35623	10267	1.66	1323.16	1.33E+00	1.69E+00	0.9	
12	0	813.98	791	3480	1.78	1627.72	1.12E+00	3.75E-02	15.4	
13	0	898.00	49930	8605	1.82	1795.72	1.03E+00	2.37E+00	0.6	
14	0	1173.19	38263	5800	1.94	2345.90	8.20E-01	1.81E+00	0.7	
15	10	1326.52	2241	3138	5.32	2652.44	7.40E-01	1.06E-01	10.2	1.75E+01
16	10	1332.46	36177	1392	2.24	2664.31	7.37E-01	1.72E+00	0.6	
17	10	1338.31	332	1222	2.06	2676.00	7.35E-01	1.58E-02	23.8	
18	0	1836.03	30793	2153	2.35	3670.94	5.78E-01	1.46E+00	0.7	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	24881	35.90*	8.963E-01	3.667E+02	3.669E+02	3.12
02-CD109	88.03	93899	3.72*	2.791E+00	4.288E+03	5.018E+03	1.08
03-CO57	122.06	60058	85.51*	3.799E+00	8.768E+01	1.147E+02	1.44
04-CE139	165.85	65206	80.35*	3.767E+00	1.022E+02	1.733E+02	1.32
05-HG203	279.20	36984	81.46*	2.739E+00	7.859E+01	3.745E+02	1.74
06-SN113	391.69	44272	64.90*	2.076E+00	1.558E+02	2.933E+02	1.46
08-CS137	661.65	35623	85.12*	1.332E+00	1.490E+02	1.499E+02	1.70
09-Y88	898.02	49930	93.40*	1.028E+00	2.466E+02	4.880E+02	1.24
10-CO60	1173.22	38263	100.00	8.195E-01	2.214E+02	2.299E+02	1.44
	1332.49	36177	100.00*	7.374E-01	2.326E+02	2.416E+02	1.13
12-Y88	1836.01	30793	99.38*	5.781E-01	2.541E+02	5.029E+02	1.39

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 11B150101411

Acquisition date : 14-OCT-2011 08:57:12

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.667E+02	3.669E+02	0.114E+02	3.12	
02-CD109	462.90D	1.17	4.288E+03	5.018E+03	0.054E+03	1.08	
03-CO57	270.90D	1.31	8.768E+01	1.147E+02	0.017E+02	1.44	
04-CE139	137.66D	1.70	1.022E+02	1.733E+02	0.023E+02	1.32	
05-HG203	46.61D	4.77	7.859E+01	3.745E+02	0.065E+02	1.74	
06-SN113	115.10D	1.88	1.558E+02	2.933E+02	0.043E+02	1.46	
08-CS137	30.17Y	1.01	1.490E+02	1.499E+02	0.026E+02	1.70	
09-Y88	106.65D	1.98	2.466E+02	4.880E+02	0.060E+02	1.24	
10-CO60	5.27Y	1.04	2.326E+02	2.416E+02	0.027E+02	1.13	
12-Y88	106.65D	1.98	2.541E+02	5.029E+02	0.070E+02	1.39	
			---------	---------			
Total Activity :			5.961E+03	7.723E+03			
Grand Total Activity :			5.961E+03	7.723E+03			

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

DRAFT

Unidentified Energy Lines
Sample ID : 11B150101411 Acquisition date : 14-OCT-2011 08:57:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	72.78	748	19670	0.97	145.60	143	7	3.55E-02	62.6	1.84E+00	
0	136.47	7456	15683	1.28	272.97	268	10	3.54E-01	6.7	3.88E+00	
0	255.22	1684	8501	1.27	510.45	506	9	7.99E-02	20.4	2.93E+00	
0	511.10	969	5583	2.18	1022.12	1017	12	4.59E-02	31.5	1.66E+00	
0	813.98	791	3480	1.78	1627.72	1622	12	3.75E-02	30.7	1.12E+00	
10	1326.52	2241	3138	5.32	2652.44	2638	47	1.06E-01	20.5	7.40E-01	
10	1338.31	332	1222	2.06	2676.00	2638	47	1.58E-02	47.5	7.35E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

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
01-AM241	432.70Y	1.00	3.667E+02	3.669E+02	0.114E+02	3.12	
02-CD109	462.90D	1.17	4.288E+03	5.018E+03	0.054E+03	1.08	
03-CO57	270.90D	1.31	8.768E+01	1.147E+02	0.017E+02	1.44	
04-CE139	137.66D	1.70	1.022E+02	1.733E+02	0.023E+02	1.32	
05-HG203	46.61D	4.77	7.859E+01	3.745E+02	0.065E+02	1.74	
06-SN113	115.10D	1.88	1.558E+02	2.933E+02	0.043E+02	1.46	
08-CS137	30.17Y	1.01	1.490E+02	1.499E+02	0.026E+02	1.70	
09-Y88	106.65D	1.98	2.466E+02	4.880E+02	0.060E+02	1.24	
10-CO60	5.27Y	1.04	2.326E+02	2.416E+02	0.027E+02	1.13	
12-Y88	106.65D	1.98	2.541E+02	5.029E+02	0.070E+02	1.39	
			---------	---------			
	Total Activity :		5.961E+03	7.723E+03			
	Grand Total Activity :		5.961E+03	7.723E+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
01-AM241	3.669E+02	1.145E+01	5.054E+00	0.000E+00	72.584
02-CD109	5.018E+03	5.434E+01	2.136E+01	0.000E+00	234.933
03-CO57	1.147E+02	1.653E+00	6.386E-01	0.000E+00	179.616

04-CE139	1.733E+02	2.294E+00	7.899E-01	0.000E+00	219.446
05-HG203	3.745E+02	6.517E+00	2.475E+00	0.000E+00	151.329
06-SN113	2.933E+02	4.268E+00	1.463E+00	0.000E+00	200.382
08-CS137	1.499E+02	2.555E+00	8.601E-01	0.000E+00	174.336
09-Y88	4.880E+02	6.032E+00	1.947E+00	0.000E+00	250.633
10-CO60	2.416E+02	2.723E+00	6.764E-01	0.000E+00	357.188
12-Y88	5.029E+02	6.995E+00	1.440E+00	0.000E+00	349.218

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	2.206E-01		9.972E-01	1.608E+00	0.000E+00	0.137

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A,11B150101411     ,11/02/2011 17:00,07/01/2011 12:00,   1.000E+00,150ML POLY MIX
B,11B150101411     ,CALIBRATION          ,10/26/2011 15:25,11B150101411
C,01-AM241,YES,   3.669E+02,   1.145E+01,   5.054E+00,,   72.584
C,02-CD109,YES,   5.018E+03,   5.434E+01,   2.136E+01,,  234.933
C,03-CO57 ,YES,   1.147E+02,   1.653E+00,   6.386E-01,,  179.616
C,04-CE139,YES,   1.733E+02,   2.294E+00,   7.899E-01,,  219.446
C,05-HG203,YES,   3.745E+02,   6.517E+00,   2.475E+00,,  151.329
C,06-SN113,YES,   2.933E+02,   4.268E+00,   1.463E+00,,  200.382
C,08-CS137,YES,   1.499E+02,   2.555E+00,   8.601E-01,,  174.336
C,09-Y88  ,YES,   4.880E+02,   6.032E+00,   1.947E+00,,  250.633
C,10-CO60 ,YES,   2.416E+02,   2.723E+00,   6.764E-01,,  357.188
C,12-Y88  ,YES,   5.029E+02,   6.995E+00,   1.440E+00,,  349.218
C,07-SR85 ,NO ,   2.206E-01,   9.972E-01,   1.608E+00,,    0.137
```

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 3-FEB-2012 12:29:58.29
TBE14 P-10933A HpGe ********** Aquisition Date/Time: 20-JAN-2012 11:01:41.32

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA
Sample ID : 14B150012012 Smple Date: 1-JUL-2011 12:00:00.00
Sample Type : CAL Geometry : 14B150012012
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 10:01:42.46
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 10:00:00.00
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.55	13516	20328	1.13	115.98	2.89E-01	3.75E-01	2.2	5.06E+00
2	1	66.67	574	13234	1.00	130.22	5.79E-01	1.59E-02	33.4	2.60E+00
3	3	72.82	909	10935	0.85	142.53	8.96E-01	2.53E-02	17.6	5.97E-01
4	3	75.05	1489	13314	0.98	147.00	1.02E+00	4.14E-02	12.5	
5	1	88.03	88235	24136	1.09	172.97	1.75E+00	2.45E+00	0.5	5.29E+00
6	1	122.05	63148	18884	1.13	241.04	3.00E+00	1.75E+00	0.6	4.03E+00
7	1	136.46	8288	14154	1.14	269.88	3.18E+00	2.30E-01	2.9	2.13E+00
8	1	165.84	56885	18530	1.15	328.69	3.21E+00	1.58E+00	0.7	2.10E+00
9	1	255.11	1570	9137	1.19	507.33	2.59E+00	4.36E-02	11.2	1.46E+00
10	1	279.19	13224	10447	1.27	555.53	2.43E+00	3.67E-01	1.8	1.22E+00
11	1	391.70	38015	8623	1.33	780.70	1.88E+00	1.06E+00	0.7	7.29E-01
12	1	510.82	1877	7615	2.65	1019.12	1.53E+00	5.21E-02	10.1	8.37E-01
13	1	609.14	455	3380	1.51	1215.92	1.34E+00	1.26E-02	21.7	2.85E+00
14	1	661.64	56020	7176	1.54	1321.00	1.25E+00	1.56E+00	0.5	3.82E+00
15	1	813.81	702	4110	1.97	1625.62	1.07E+00	1.95E-02	18.1	2.28E+00
16	1	898.03	42991	7192	1.75	1794.21	9.84E-01	1.19E+00	0.7	7.16E+00
17	1	1173.22	61297	3295	1.96	2345.19	7.91E-01	1.70E+00	0.5	1.55E+01
18	1	1324.67	879	1732	3.10	2648.44	7.19E-01	2.44E-02	10.6	1.77E+00
19	1	1332.48	55410	2162	2.06	2664.08	7.15E-01	1.54E+00	0.5	9.45E+00
20	1	1460.69	352	1118	2.52	2920.80	6.68E-01	9.78E-03	20.2	1.14E+00
21	1	1836.00	27307	679	2.47	3672.46	5.79E-01	7.59E-01	0.6	1.59E+01

Nuclide Line Activity Report
Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	13516	35.90*	2.887E-01	3.622E+02	3.626E+02	4.44
02-CD109	88.03	88235	3.72*	1.752E+00	3.760E+03	5.097E+03	0.94
03-CO57	122.06	63148	85.51*	2.995E+00	6.849E+01	1.152E+02	1.16
04-CE139	165.85	56885	80.35*	3.214E+00	6.118E+01	1.702E+02	1.32
05-HG203	279.20	13224	81.46*	2.427E+00	1.858E+01	3.812E+02	3.56
06-SN113	391.69	38015	64.90*	1.877E+00	8.667E+01	2.946E+02	1.42
08-CS137	661.65	56020	85.12*	1.255E+00	1.457E+02	1.476E+02	1.06
09-Y88	898.02	42991	93.40*	9.840E-01	1.299E+02	4.866E+02	1.31
10-CO60	1173.22	61297	100.00	7.914E-01	2.152E+02	2.315E+02	0.92
	1332.49	55410	100.00*	7.153E-01	2.152E+02	2.315E+02	0.93
12-Y88	1836.01	27307	99.38*	5.787E-01	1.319E+02	4.940E+02	1.30

Flag: "*" = Keyline

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Sample ID : 14B150012012 Acquisition date : 20-JAN-2012 11:01:41

Total number of lines in spectrum 21
Number of unidentified lines 10
Number of lines tentatively identified by NID 11 52.38%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.622E+02	3.626E+02	0.161E+02	4.44	
02-CD109	462.90D	1.36	3.760E+03	5.097E+03	0.048E+03	0.94	
03-CO57	270.90D	1.68	6.849E+01	1.152E+02	0.013E+02	1.16	
04-CE139	137.66D	2.78	6.118E+01	1.702E+02	0.022E+02	1.32	
05-HG203	46.61D	20.5	1.858E+01	3.812E+02	0.136E+02	3.56	
06-SN113	115.10D	3.40	8.667E+01	2.946E+02	0.042E+02	1.42	
08-CS137	30.17Y	1.01	1.457E+02	1.476E+02	0.016E+02	1.06	
09-Y88	106.65D	3.75	1.299E+02	4.866E+02	0.064E+02	1.31	
10-CO60	5.27Y	1.08	2.152E+02	2.315E+02	0.022E+02	0.93	
12-Y88	106.65D	3.75	1.319E+02	4.940E+02	0.064E+02	1.30	
			---------	---------			
	Total Activity :		4.980E+03	7.781E+03			
	Grand Total Activity :		4.980E+03	7.781E+03			

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

Sample ID : 14B150012012 Acquisition date : 20-JAN-2012 11:01:41

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	66.67	574	13234	1.00	130.22	127	7	1.59E-02	66.8	5.79E-01	
3	72.82	909	10935	0.85	142.53	140	11	2.53E-02	35.2	8.96E-01	
3	75.05	1489	13314	0.98	147.00	140	11	4.14E-02	25.0	1.02E+00	
1	136.46	8288	14154	1.14	269.88	265	10	2.30E-01	5.8	3.18E+00	
1	255.11	1570	9137	1.19	507.33	503	9	4.36E-02	22.5	2.59E+00	
1	510.82	1877	7615	2.65	1019.12	1012	14	5.21E-02	20.2	1.53E+00	
1	609.14	455	3380	1.51	1215.92	1213	7	1.26E-02	43.3	1.34E+00	
1	813.81	702	4110	1.97	1625.62	1621	11	1.95E-02	36.1	1.07E+00	
1	1324.67	879	1732	3.10	2648.44	2642	14	2.44E-02	21.1	7.19E-01	
1	1460.69	352	1118	2.52	2920.80	2915	13	9.78E-03	40.4	6.68E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 21
Number of unidentified lines 10
Number of lines tentatively identified by NID 11 52.38%

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
01-AM241	432.70Y	1.00	3.622E+02	3.626E+02	0.161E+02	4.44	
02-CD109	462.90D	1.36	3.760E+03	5.097E+03	0.048E+03	0.94	
03-CO57	270.90D	1.68	6.849E+01	1.152E+02	0.013E+02	1.16	
04-CE139	137.66D	2.78	6.118E+01	1.702E+02	0.022E+02	1.32	

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05-HG203	46.61D	20.5	1.858E+01	3.812E+02	0.136E+02	3.56
06-SN113	115.10D	3.40	8.667E+01	2.946E+02	0.042E+02	1.42
08-CS137	30.17Y	1.01	1.457E+02	1.476E+02	0.016E+02	1.06
09-Y88	106.65D	3.75	1.299E+02	4.866E+02	0.064E+02	1.31
10-CO60	5.27Y	1.08	2.152E+02	2.315E+02	0.015E+02	0.65
12-Y88	106.65D	3.75	1.319E+02	4.940E+02	0.064E+02	1.30
			---------	---------		
	Total Activity :		4.980E+03	7.781E+03		
	Grand Total Activity :		4.980E+03	7.781E+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
01-AM241	3.626E+02	1.611E+01	1.317E+01	0.000E+00	27.530
02-CD109	5.097E+03	4.816E+01	3.291E+01	0.000E+00	154.865
03-CO57	1.152E+02	1.337E+00	8.999E-01	0.000E+00	127.987
04-CE139	1.702E+02	2.250E+00	1.345E+00	0.000E+00	126.518
05-HG203	3.812E+02	1.356E+01	1.128E+01	0.000E+00	33.804
06-SN113	2.946E+02	4.179E+00	2.840E+00	0.000E+00	103.728
08-CS137	1.476E+02	1.569E+00	8.722E-01	0.000E+00	169.235
09-Y88	4.866E+02	6.367E+00	3.637E+00	0.000E+00	133.799
10-CO60	2.315E+02	1.514E+00	6.928E-01	0.000E+00	334.122
12-Y88	4.940E+02	6.408E+00	1.671E+00	0.000E+00	295.624

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	7.322E+00		3.731E+00	5.579E+00	0.000E+00	1.313

A,14B150012012 ,02/03/2012 12:29,07/01/2011 12:00, 1.000E+00,150ML POLY BOTTLE MI,CAL
,BQ ,
B,14B150012012 ,CALIBRATION ,01/27/2012 14:34,14B150012012 ,NOBKG

C,01-AM241,YES, 3.626E+02, 1.611E+01, 1.317E+01,, 27.530
C,02-CD109,YES, 5.097E+03, 4.816E+01, 3.291E+01,, 154.865
C,03-CO57 ,YES, 1.152E+02, 1.337E+00, 8.999E-01,, 127.987
C,04-CE139,YES, 1.702E+02, 2.250E+00, 1.345E+00,, 126.518
C,05-HG203,YES, 3.812E+02, 1.356E+01, 1.128E+01,, 33.804
C,06-SN113,YES, 2.946E+02, 4.179E+00, 2.840E+00,, 103.728
C,08-CS137,YES, 1.476E+02, 1.569E+00, 8.722E-01,, 169.235
C,09-Y88 ,YES, 4.866E+02, 6.367E+00, 3.637E+00,, 133.799
C,10-CO60 ,YES, 2.315E+02, 1.514E+00, 6.928E-01,, 334.122
C,12-Y88 ,YES, 4.940E+02, 6.408E+00, 1.671E+00,, 295.624
C,07-SR85 ,NO , 7.322E+00, 3.731E+00, 5.579E+00,, 1.313

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Sec. Review: Analyst: LIMS: ___

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 20-AUG-2004 14:54:55.64
TBE23 03017322 HpGe ********** Aquisition Date/Time: 20-AUG-2004 13:54:22.19

LIMS No., Customer Name, Client ID: DET23 B150ML STD ANALYTICS 1JUL04
Sample ID : 23B150082004 Smple Date: 20-AUG-2004 12:00:00.00
Sample Type : STD Geometry : 23B150061103
Quantity : 1.00000E+00 Total BKGFILE : 23BG081304MT
Start Channel : 50 Energy Tol : 1.00000 Real Time : 0 01:00:17.70
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:00:00.00
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	10	33.76*	1898	297	1.05	67.69	2.35E-01	5.27E-01	4.2	2.39E+01
2	10	35.42*	2903	1268	2.19	71.01	3.22E-01	8.07E-01	4.6	
3	10	37.88	2223	3160	2.01	75.92	4.82E-01	6.17E-01	6.7	
4	10	40.75	977	3695	1.53	81.67	7.14E-01	2.71E-01	12.1	
5	10	42.77	1044	7384	2.26	85.69	9.02E-01	2.90E-01	16.0	
6	0	59.57	14738	9715	1.07	119.27	2.86E+00	4.09E+00	1.5	
7	1	70.92	1369	5386	1.04	141.96	4.06E+00	3.80E-01	8.9	1.49E+00
8	1	72.94	2174	5190	1.04	145.99	4.25E+00	6.04E-01	5.7	
9	9	82.67	1633	9265	1.65	165.43	4.97E+00	4.54E-01	10.8	1.09E+01
10	9	85.27*	2081	12080	2.29	170.63	5.12E+00	5.78E-01	14.5	
11	9	88.10	40267	4581	1.08	176.28	5.27E+00	1.12E+01	0.6	
12	0	122.13	22824	6852	1.09	244.30	5.98E+00	6.34E+00	1.0	
13	0	136.50	2877	6059	1.00	273.01	5.93E+00	7.99E-01	5.6	
14	0	165.95	26436	5926	1.12	331.87	5.60E+00	7.34E+00	0.9	
15	0	255.23	941	3128	1.26	510.34	4.37E+00	2.61E-01	12.0	
16	0	279.28	27412	3183	1.21	558.41	4.09E+00	7.61E+00	0.7	
17	0	391.82	19160	2503	1.28	783.43	3.14E+00	5.32E+00	0.9	
18	0	510.97*	392	1411	2.94	1021.72	2.51E+00	1.09E-01	19.4	
19	0	661.78	10936	2340	1.48	1323.41	2.01E+00	3.04E+00	1.4	
20	0	814.56	309	913	1.28	1629.11	1.67E+00	8.57E-02	19.9	
21	0	898.25	22777	1335	1.65	1796.63	1.53E+00	6.33E+00	0.8	
22	0	1173.51	12551	930	1.83	2347.76	1.21E+00	3.49E+00	1.1	
23	0	1325.20	497	514	2.75	2651.60	1.09E+00	1.38E-01	10.6	
24	0	1332.74	11486	689	1.89	2666.71	1.09E+00	3.19E+00	1.1	
25	0	1835.88	13494	214	2.19	3675.20	8.53E-01	3.75E+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
01-AM241	59.54	14738	35.90*	2.857E+00	3.991E+02	3.991E+02	3.08
02-CD109	88.03	40267	3.72*	5.270E+00	5.706E+03	5.706E+03	1.13
03-CO57	122.06	22824	85.51*	5.980E+00	1.240E+02	1.240E+02	1.94
04-CE139	165.85	26436	80.35*	5.602E+00	1.631E+02	1.632E+02	1.73
05-HG203	279.20	27412	81.46*	4.093E+00	2.284E+02	2.287E+02	1.46
06-SN113	391.69	19160	64.90*	3.141E+00	2.611E+02	2.612E+02	1.82
08-CS137	661.65	10936	85.12*	2.009E+00	1.777E+02	1.777E+02	2.71

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09-Y88	898.02	22777	93.40*	1.531E+00	4.424E+02	4.427E+02	1.51
10-CO60	1173.22	12551	100.00	1.209E+00	2.883E+02	2.883E+02	2.12
	1332.49	11486	100.00*	1.085E+00	2.940E+02	2.940E+02	2.15
12-Y88	1836.01	13494	99.38*	8.527E-01	4.423E+02	4.426E+02	1.81

Flag: "*" = Keyline

Summary of Nuclide Activity

Sample ID : 23B150082004 Acquisition date : 20-AUG-2004 13:54:22

Total number of lines in spectrum 25

Number of unidentified lines 14

Number of lines tentatively identified by NID 11 44.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/Total	Decay Corr BQ/Total	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.991E+02	3.991E+02	0.123E+02	3.08	
02-CD109	462.90D	1.00	5.706E+03	5.706E+03	0.065E+03	1.13	
03-CO57	270.90D	1.00	1.240E+02	1.240E+02	0.024E+02	1.94	
04-CE139	137.66D	1.00	1.631E+02	1.632E+02	0.028E+02	1.73	
05-HG203	46.61D	1.00	2.284E+02	2.287E+02	0.033E+02	1.46	
06-SN113	115.10D	1.00	2.611E+02	2.612E+02	0.048E+02	1.82	
08-CS137	30.17Y	1.00	1.777E+02	1.777E+02	0.048E+02	2.71	
09-Y88	106.65D	1.00	4.424E+02	4.427E+02	0.067E+02	1.51	
10-CO60	5.27Y	1.00	2.940E+02	2.940E+02	0.063E+02	2.15	
12-Y88	106.65D	1.00	4.423E+02	4.426E+02	0.080E+02	1.81	
			---------	---------			
	Total Activity :		8.238E+03	8.240E+03			
	Grand Total Activity :		8.238E+03	8.240E+03			

Flags: "K" = Keyline not found "M" = Manually accepted

"E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines

Sample ID : 23B150082004 Acquisition date : 20-AUG-2004 13:54:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
10	33.76	1898	297	1.05	67.69	65	29	5.27E-01	8.4	2.35E-01	
10	35.42	2903	1268	2.19	71.01	65	29	8.07E-01	9.2	3.22E-01	
10	37.88	2223	3160	2.01	75.92	65	29	6.17E-01	13.4	4.82E-01	
10	40.75	977	3695	1.53	81.67	65	29	2.71E-01	24.1	7.14E-01	
10	42.77	1044	7384	2.26	85.69	65	29	2.90E-01	31.9	9.02E-01	
1	70.92	1369	5386	1.04	141.96	138	13	3.80E-01	17.8	4.06E+00	
1	72.94	2174	5190	1.04	145.99	138	13	6.04E-01	11.5	4.25E+00	
9	82.67	1633	9265	1.65	165.43	160	24	4.54E-01	21.6	4.97E+00	
9	85.27	2081	12080	2.29	170.63	160	24	5.78E-01	29.1	5.12E+00	
0	136.50	2877	6059	1.00	273.01	268	11	7.99E-01	11.1	5.93E+00	
0	255.23	941	3128	1.26	510.34	505	11	2.61E-01	23.9	4.37E+00	
0	510.97	392	1411	2.94	1021.72	1016	11	1.09E-01	38.7	2.51E+00	
0	814.56	309	913	1.28	1629.11	1624	11	8.57E-02	39.8	1.67E+00	
0	1325.20	497	514	2.75	2651.60	2645	14	1.38E-01	21.3	1.09E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 25

Number of unidentified lines 14

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Number of lines tentatively identified by NID 11 44.00%

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
01-AM241	432.70Y	1.00	3.991E+02	3.991E+02	0.123E+02	3.08	
02-CD109	462.90D	1.00	5.706E+03	5.706E+03	0.065E+03	1.13	
03-CO57	270.90D	1.00	1.240E+02	1.240E+02	0.024E+02	1.94	
04-CE139	137.66D	1.00	1.631E+02	1.632E+02	0.028E+02	1.73	
05-HG203	46.61D	1.00	2.284E+02	2.287E+02	0.033E+02	1.46	
06-SN113	115.10D	1.00	2.611E+02	2.612E+02	0.048E+02	1.82	
08-CS137	30.17Y	1.00	1.777E+02	1.777E+02	0.048E+02	2.71	
09-Y88	106.65D	1.00	4.424E+02	4.427E+02	0.067E+02	1.51	
10-CO60	5.27Y	1.00	2.911E+02	2.911E+02	0.044E+02	1.51	
12-Y88	106.65D	1.00	4.423E+02	4.426E+02	0.080E+02	1.81	
			---------	---------			
	Total Activity :		8.235E+03	8.237E+03			
	Grand Total Activity :		8.235E+03	8.237E+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
01-AM241	3.991E+02	1.230E+01	8.833E+00	0.000E+00	45.185
02-CD109	5.706E+03	6.466E+01	4.507E+01	0.000E+00	126.601
03-CO57	1.240E+02	2.400E+00	1.585E+00	0.000E+00	78.219
04-CE139	1.632E+02	2.817E+00	1.625E+00	0.000E+00	100.430
05-HG203	2.287E+02	3.348E+00	1.766E+00	0.000E+00	129.489
06-SN113	2.612E+02	4.753E+00	2.404E+00	0.000E+00	108.671
08-CS137	1.777E+02	4.820E+00	2.915E+00	0.000E+00	60.936
09-Y88	4.427E+02	6.690E+00	2.937E+00	0.000E+00	150.729
10-CO60	2.911E+02	4.397E+00	2.402E+00	0.000E+00	121.163
12-Y88	4.426E+02	7.996E+00	1.979E+00	0.000E+00	223.662

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

Nuclide	Key-Line Activity (BQ/Total)	K.L. Ided	Act error	MDA (BQ/Total)	MDA error	Act/MDA
07-SR85	2.408E+00		1.245E+00	1.954E+00	0.000E+00	1.232

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 1-NOV-2011 14:25:47.58
TBE15 P-10635B HpGe ********** Aquisition Date/Time: 20-OCT-2011 09:22:57.42

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

Sample ID : 15B150102011
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 15B150102011
BKGFILE : 15BG102111MT
Real Time : 0 06:08:57.59
Live time : 0 06:07:47.94

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.56	33028	27838	0.82	113.70	1.15E+00	1.50E+00	1.1	2.77E+01
2	1	72.88*	1813	16972	0.64	140.39	2.43E+00	8.22E-02	10.8	4.75E+01
3	1	74.95*	838	18432	0.79	144.54	2.63E+00	3.80E-02	25.9	2.14E+00
4	10	81.88	1682	36396	1.97	158.42	3.25E+00	7.62E-02	21.9	9.84E+01
5	10	82.98*	2265	29909	1.64	160.62	3.34E+00	1.03E-01	14.1	
6	10	85.34*	6238	34527	1.99	165.35	3.52E+00	2.83E-01	6.8	
7	10	88.03*	134016	12216	0.87	170.74	3.72E+00	6.07E+00	0.3	
8	1	122.06*	81911	20581	0.83	238.93	5.08E+00	3.71E+00	0.5	3.90E+00
9	1	136.47	10684	15782	0.83	267.80	5.18E+00	4.84E-01	2.3	3.19E-01
10	1	165.85	87387	18226	0.88	326.66	4.99E+00	3.96E+00	0.5	2.53E+00
11	1	255.09	2631	8444	0.94	505.46	3.82E+00	1.19E-01	6.4	1.01E+00
12	1	279.17	46200	11047	0.99	553.69	3.56E+00	2.09E+00	0.7	2.11E+00
13	1	391.67	57390	7960	1.09	779.07	2.66E+00	2.60E+00	0.5	2.16E+00
14	1	510.93*	1248	7014	2.75	1018.00	2.09E+00	5.66E-02	14.7	5.27E-01
15	1	661.64	45737	7039	1.30	1319.92	1.65E+00	2.07E+00	0.6	1.74E+00
16	1	814.13	1081	3296	1.39	1625.39	1.36E+00	4.90E-02	10.4	1.56E+00
17	1	898.04	60801	5685	1.51	1793.45	1.24E+00	2.76E+00	0.5	7.53E+00
18	1	1173.23	47327	3489	1.69	2344.67	9.68E-01	2.14E+00	0.6	4.64E+00
19	6	1325.13	1432	1966	3.17	2648.90	8.67E-01	6.49E-02	7.5	7.20E+00
20	6	1332.49	42399	1218	1.82	2663.65	8.62E-01	1.92E+00	0.5	
21	1	1835.99	35108	750	2.15	3671.99	6.66E-01	1.59E+00	0.6	1.09E+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
01-AM241	59.54	33028	35.90*	1.152E+00	3.617E+02	3.619E+02	2.20
02-CD109	88.03	134016	3.72*	3.725E+00	4.383E+03	5.175E+03	0.60
03-CO57	122.06	81911	85.51*	5.079E+00	8.546E+01	1.135E+02	0.96
04-CE139	165.85	87387	80.35*	4.989E+00	9.878E+01	1.728E+02	0.92
05-HG203	279.20	46200	81.46*	3.556E+00	7.227E+01	3.767E+02	1.30
06-SN113	391.69	57390	64.90*	2.657E+00	1.508E+02	2.943E+02	1.04
08-CS137	661.65	45737	85.12*	1.654E+00	1.472E+02	1.483E+02	1.20
09-Y88	898.02	60801	93.40*	1.244E+00	2.371E+02	4.879E+02	0.99
10-CO60	1173.22	47327	100.00	9.685E-01	2.214E+02	2.305E+02	1.10

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	1332.49	42399	100.00*	8.625E-01	2.228E+02	2.319E+02	1.02
12-Y88	1836.01	35108	99.38*	6.663E-01	2.403E+02	4.944E+02	1.14

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15B150102011

Acquisition date : 20-OCT-2011 09:22:57

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.617E+02	3.619E+02	0.080E+02	2.20	
02-CD109	462.90D	1.18	4.383E+03	5.175E+03	0.031E+03	0.60	
03-CO57	270.90D	1.33	8.546E+01	1.135E+02	0.011E+02	0.96	
04-CE139	137.66D	1.75	9.878E+01	1.728E+02	0.016E+02	0.92	
05-HG203	46.61D	5.21	7.227E+01	3.767E+02	0.049E+02	1.30	
06-SN113	115.10D	1.95	1.508E+02	2.943E+02	0.031E+02	1.04	
08-CS137	30.17Y	1.01	1.472E+02	1.483E+02	0.018E+02	1.20	
09-Y88	106.65D	2.06	2.371E+02	4.879E+02	0.048E+02	0.99	
10-CO60	5.27Y	1.04	2.228E+02	2.319E+02	0.024E+02	1.02	
12-Y88	106.65D	2.06	2.403E+02	4.944E+02	0.057E+02	1.14	
			---------	---------			
	Total Activity :		5.999E+03	7.857E+03			
	Grand Total Activity :		5.999E+03	7.857E+03			

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

DRAFT

Unidentified Energy Lines
Sample ID : 15B150102011 Acquisition date : 20-OCT-2011 09:22:57

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.88	1813	16972	0.64	140.39	138	5	8.22E-02	21.5	2.43E+00	
1	74.95	838	18432	0.79	144.54	143	6	3.80E-02	51.9	2.63E+00	
10	81.88	1682	36396	1.97	158.42	153	24	7.62E-02	43.7	3.25E+00	
10	82.98	2265	29909	1.64	160.62	153	24	1.03E-01	28.2	3.34E+00	
10	85.34	6238	34527	1.99	165.35	153	24	2.83E-01	13.7	3.52E+00	
1	136.47	10684	15782	0.83	267.80	264	9	4.84E-01	4.7	5.18E+00	
1	255.09	2631	8444	0.94	505.46	502	8	1.19E-01	12.7	3.82E+00	
1	510.93	1248	7014	2.75	1018.00	1011	14	5.66E-02	29.3	2.09E+00	
1	814.13	1081	3296	1.39	1625.39	1621	10	4.90E-02	20.7	1.36E+00	
6	1325.13	1432	1966	3.17	2648.90	2640	31	6.49E-02	15.0	8.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

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
01-AM241	432.70Y	1.00	3.617E+02	3.619E+02	0.080E+02	2.20	
02-CD109	462.90D	1.18	4.383E+03	5.175E+03	0.031E+03	0.60	
03-CO57	270.90D	1.33	8.546E+01	1.135E+02	0.011E+02	0.96	
04-CE139	137.66D	1.75	9.878E+01	1.728E+02	0.016E+02	0.92	
05-HG203	46.61D	5.21	7.227E+01	3.767E+02	0.049E+02	1.30	
06-SN113	115.10D	1.95	1.508E+02	2.943E+02	0.031E+02	1.04	
08-CS137	30.17Y	1.01	1.472E+02	1.483E+02	0.018E+02	1.20	
09-Y88	106.65D	2.06	2.371E+02	4.879E+02	0.048E+02	0.99	
10-CO60	5.27Y	1.04	2.221E+02	2.312E+02	0.017E+02	0.75	
12-Y88	106.65D	2.06	2.403E+02	4.944E+02	0.057E+02	1.14	
	Total Activity :		5.999E+03	7.856E+03			
	Grand Total Activity :		5.999E+03	7.856E+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

DRAFT

01-AM241	3.619E+02	7.961E+00	5.614E+00	0.000E+00	64.471
02-CD109	5.175E+03	3.111E+01	1.954E+01	0.000E+00	264.885
03-CO57	1.135E+02	1.092E+00	6.621E-01	0.000E+00	171.479
04-CE139	1.728E+02	1.589E+00	8.403E-01	0.000E+00	205.604
05-HG203	3.767E+02	4.912E+00	2.874E+00	0.000E+00	131.049
06-SN113	2.943E+02	3.069E+00	1.635E+00	0.000E+00	180.030
08-CS137	1.483E+02	1.785E+00	1.002E+00	0.000E+00	148.039
09-Y88	4.879E+02	4.808E+00	2.191E+00	0.000E+00	222.709
10-CO60	2.312E+02	1.733E+00	9.010E-01	0.000E+00	256.626
12-Y88	4.944E+02	5.651E+00	1.302E+00	0.000E+00	379.647

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	2.322E+00		1.445E+00	2.162E+00	0.000E+00	1.074

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```
A,15B150102011    ,11/01/2011 14:25,07/01/2011 12:00,   1.000E+00,150ML POLY BOT
B,15B150102011    ,CALIBRATION         ,11/01/2011 14:21,15B150102011
C,01-AM241,YES,   3.619E+02,   7.961E+00,   5.614E+00,,   64.471
C,02-CD109,YES,   5.175E+03,   3.111E+01,   1.954E+01,,  264.885
C,03-CO57 ,YES,   1.135E+02,   1.092E+00,   6.621E-01,,  171.479
C,04-CE139,YES,   1.728E+02,   1.589E+00,   8.403E-01,,  205.604
C,05-HG203,YES,   3.767E+02,   4.912E+00,   2.874E+00,,  131.049
C,06-SN113,YES,   2.943E+02,   3.069E+00,   1.635E+00,,  180.030
C,08-CS137,YES,   1.483E+02,   1.785E+00,   1.002E+00,,  148.039
C,09-Y88  ,YES,   4.879E+02,   4.808E+00,   2.191E+00,,  222.709
C,10-CO60 ,YES,   2.312E+02,   1.733E+00,   9.010E-01,,  256.626
C,12-Y88  ,YES,   4.944E+02,   5.651E+00,   1.302E+00,,  379.647
C,07-SR85 ,NO ,   2.322E+00,   1.445E+00,   2.162E+00,,    1.074
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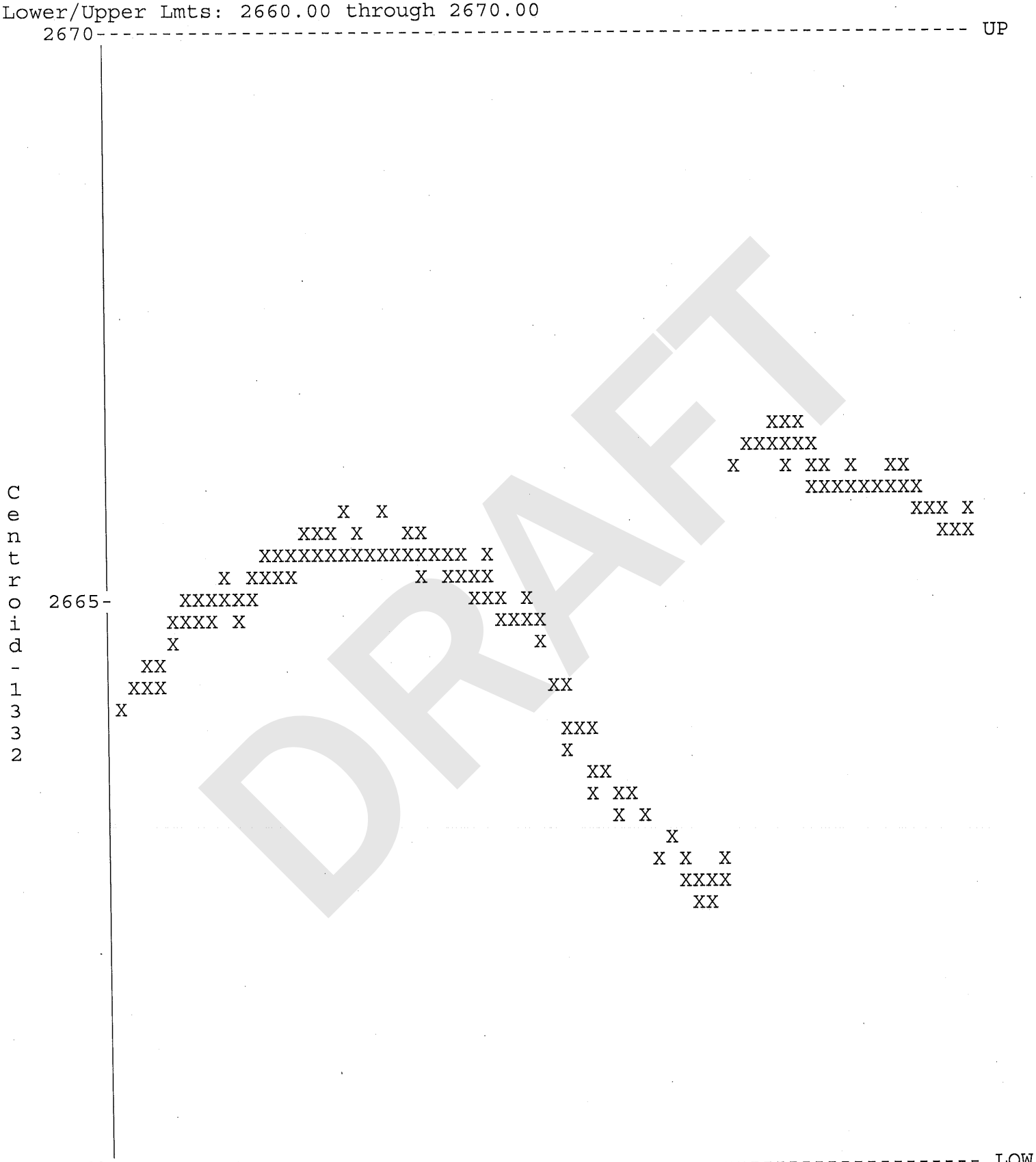
DRAFT

GAMMA SPECTROSCOPY

Daily Source and Background Checks

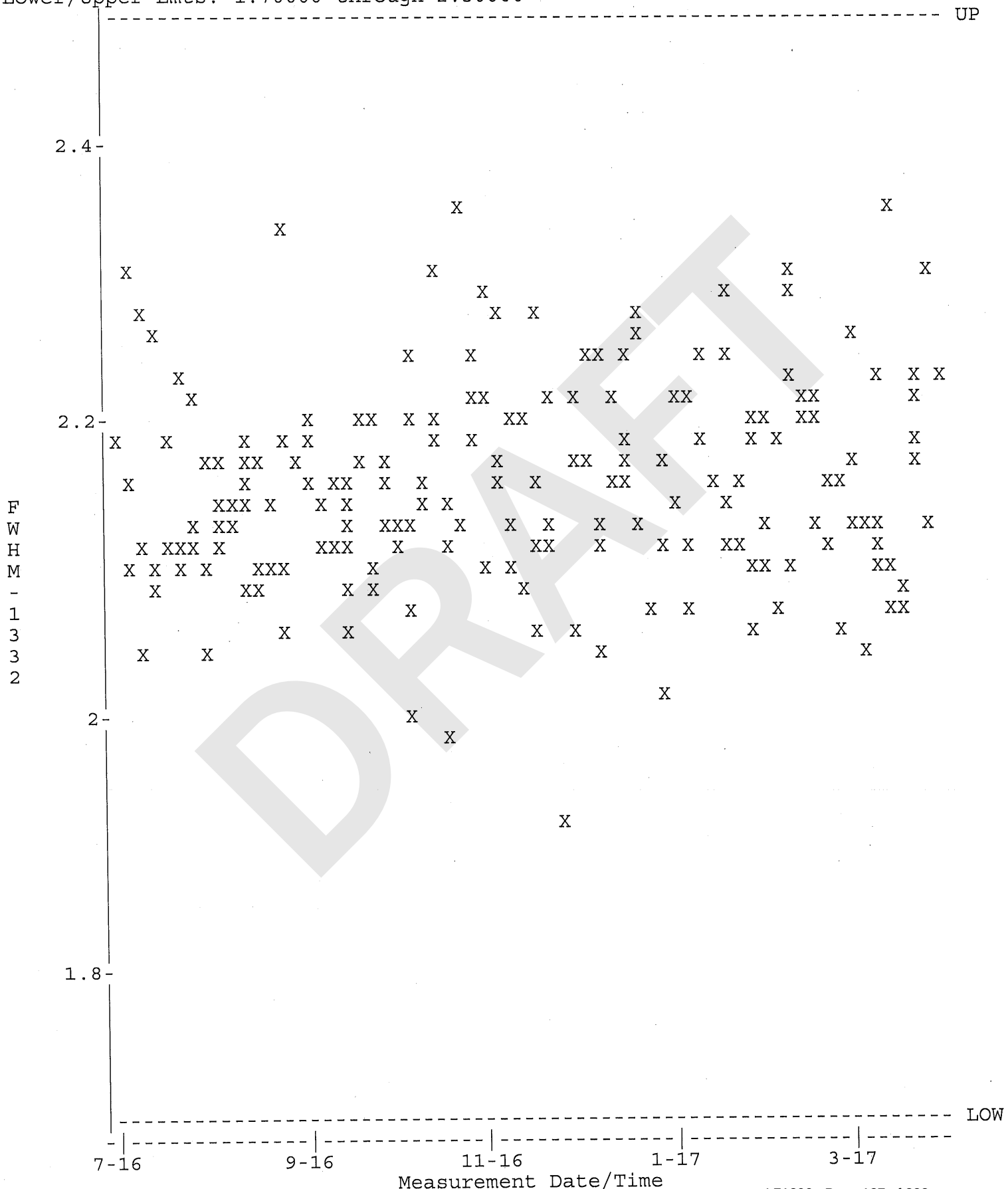
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



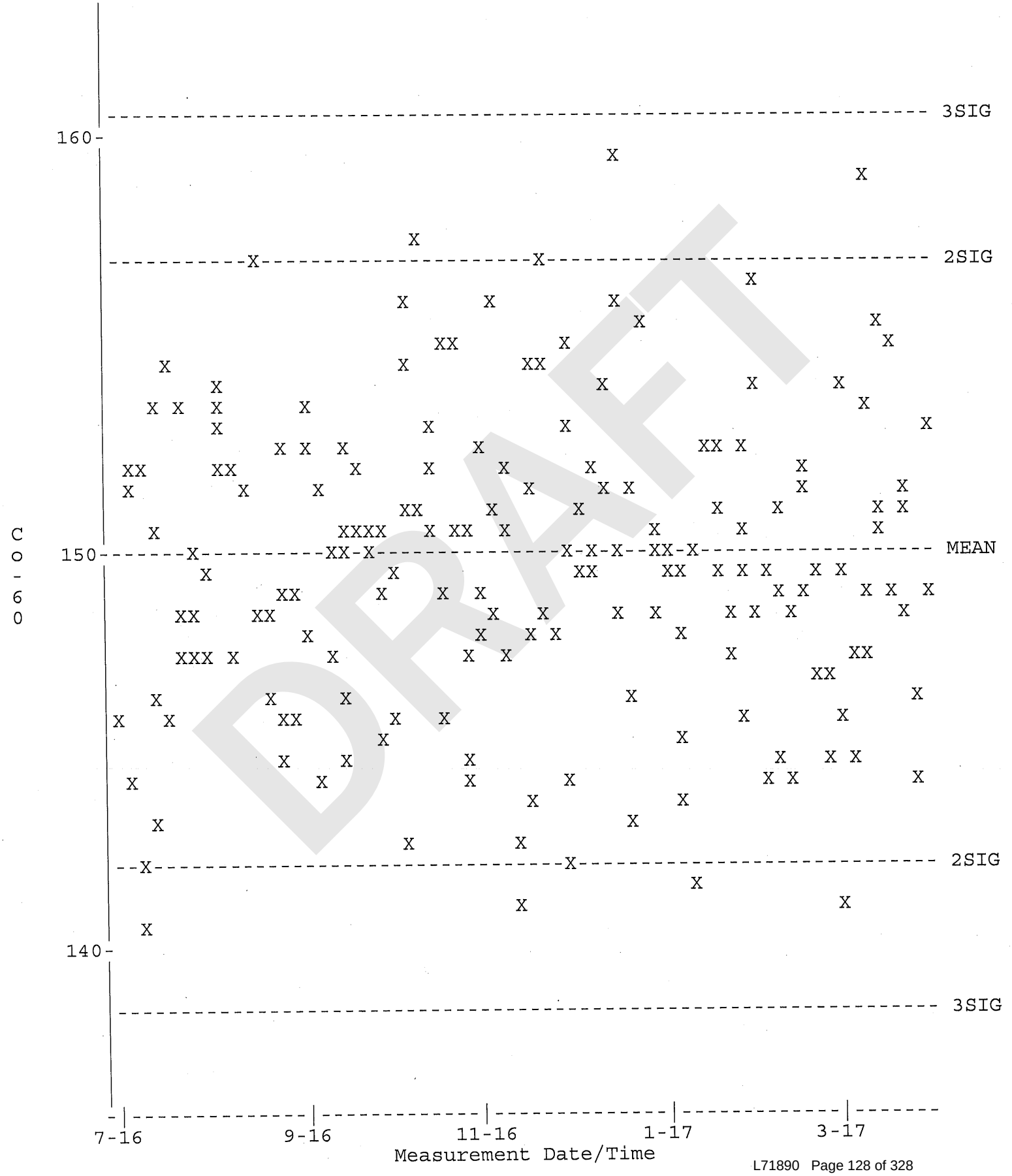
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.70000 through 2.50000



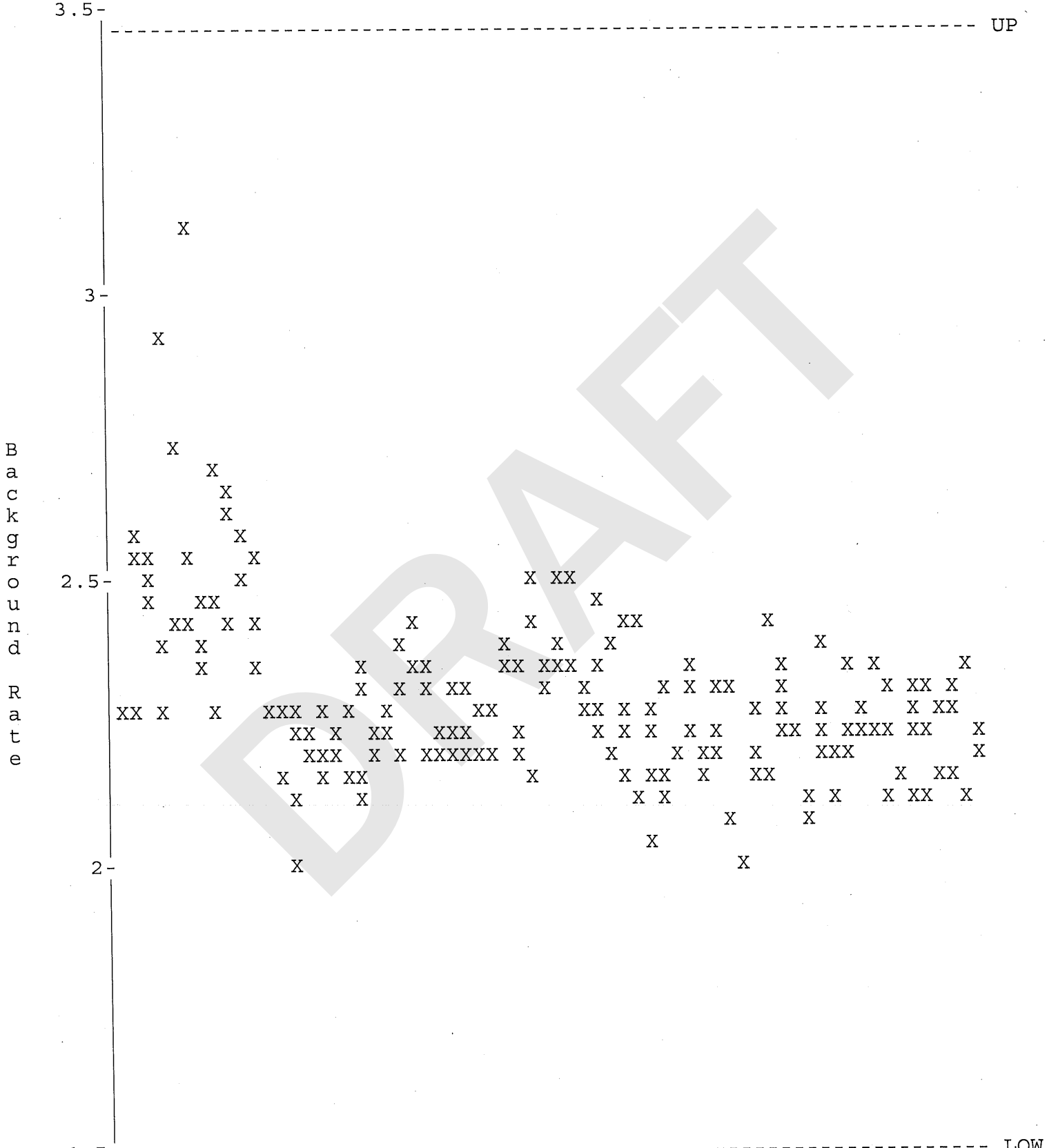
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Mean +- Std Dev : 149.834 +- 3.69888 (2.47 %)



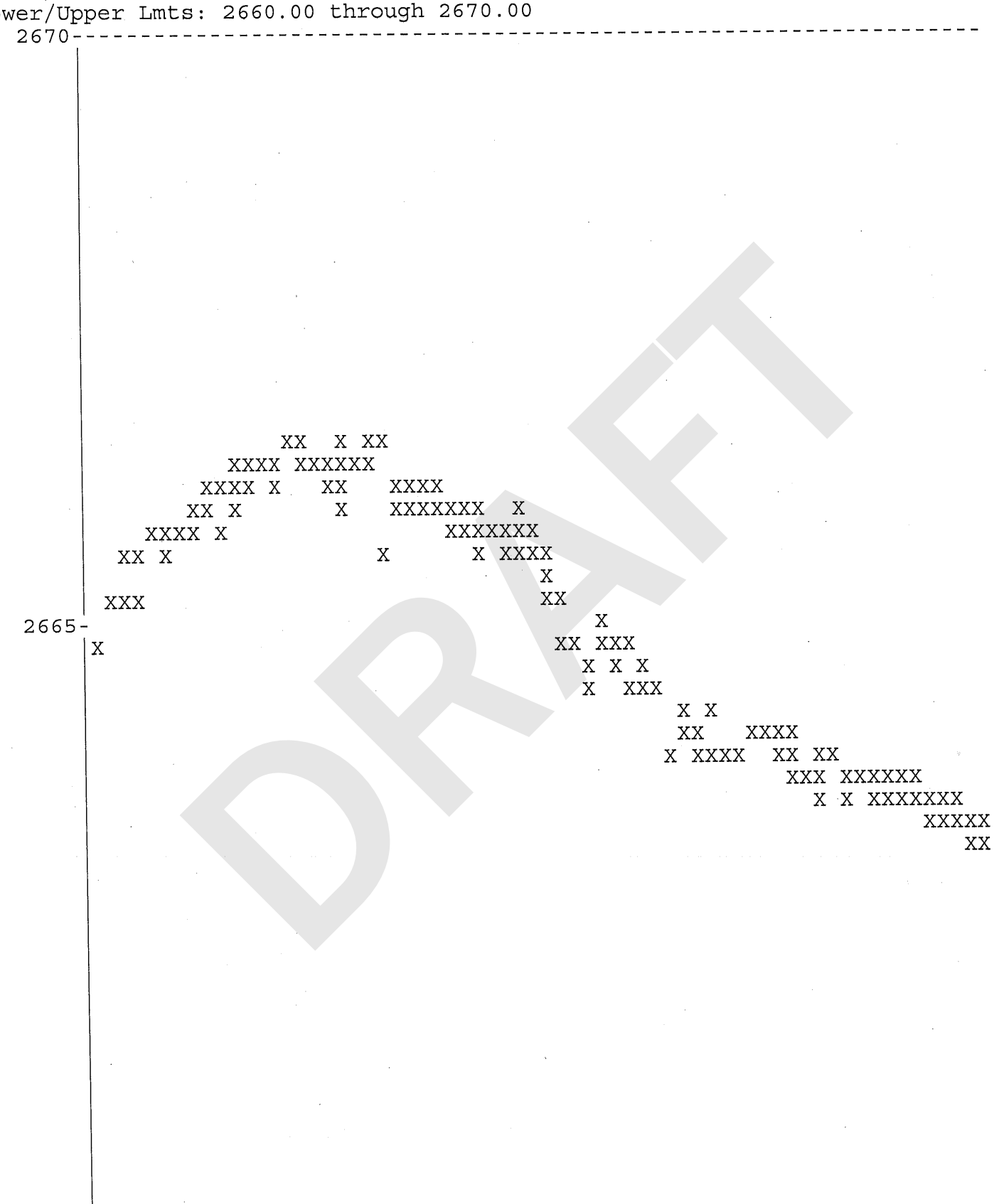
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE01_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 3.50000



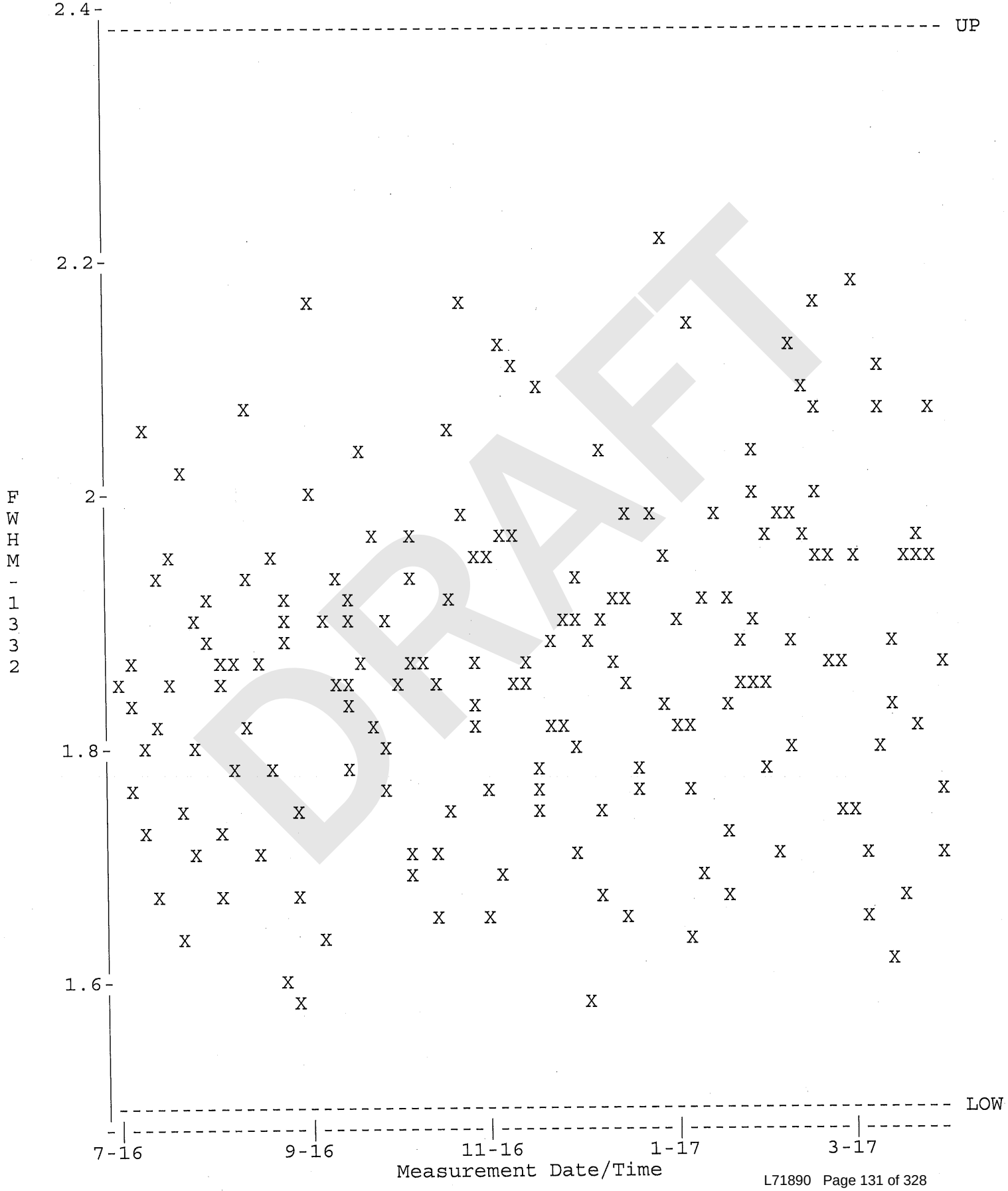
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



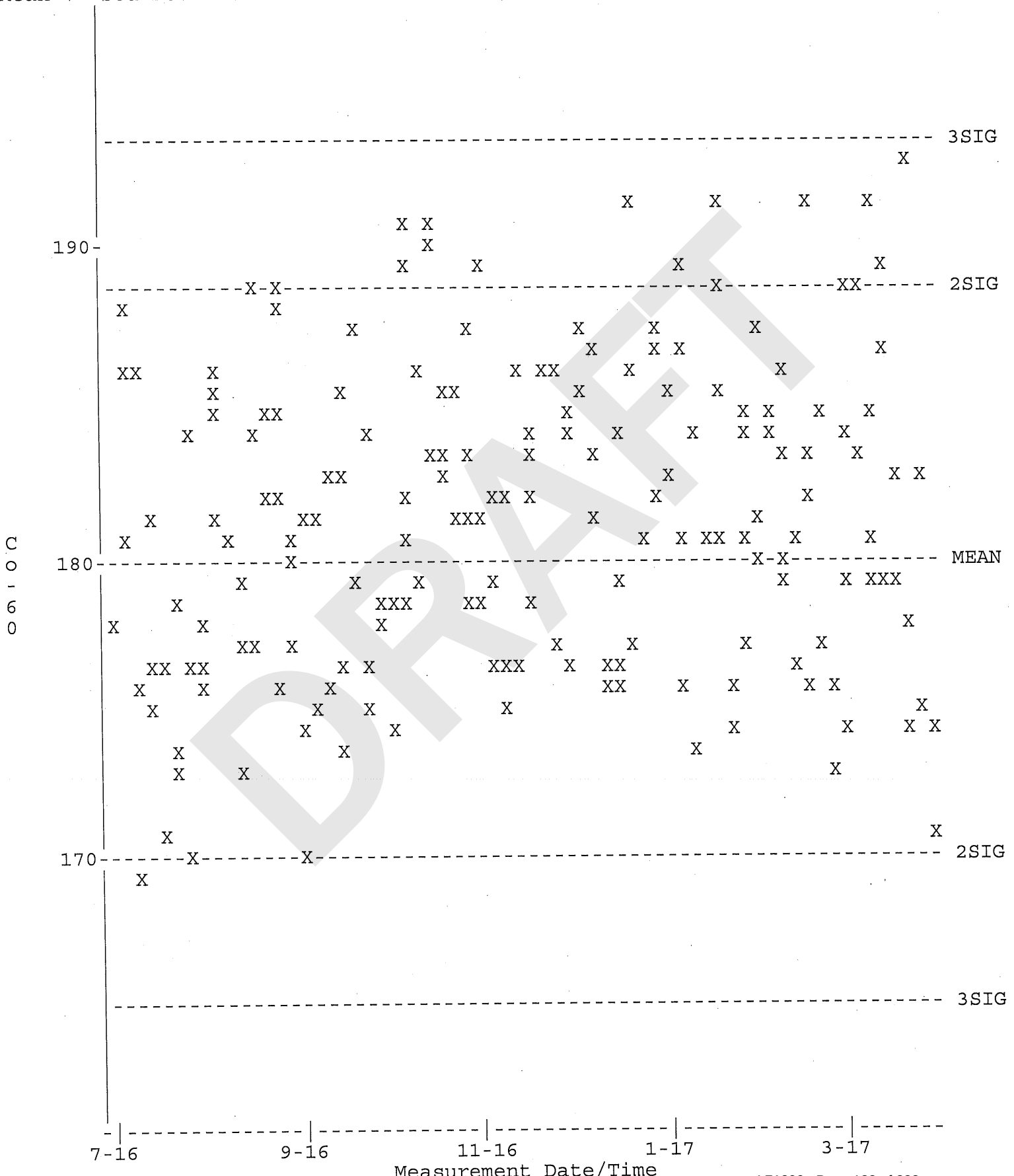
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QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.40000



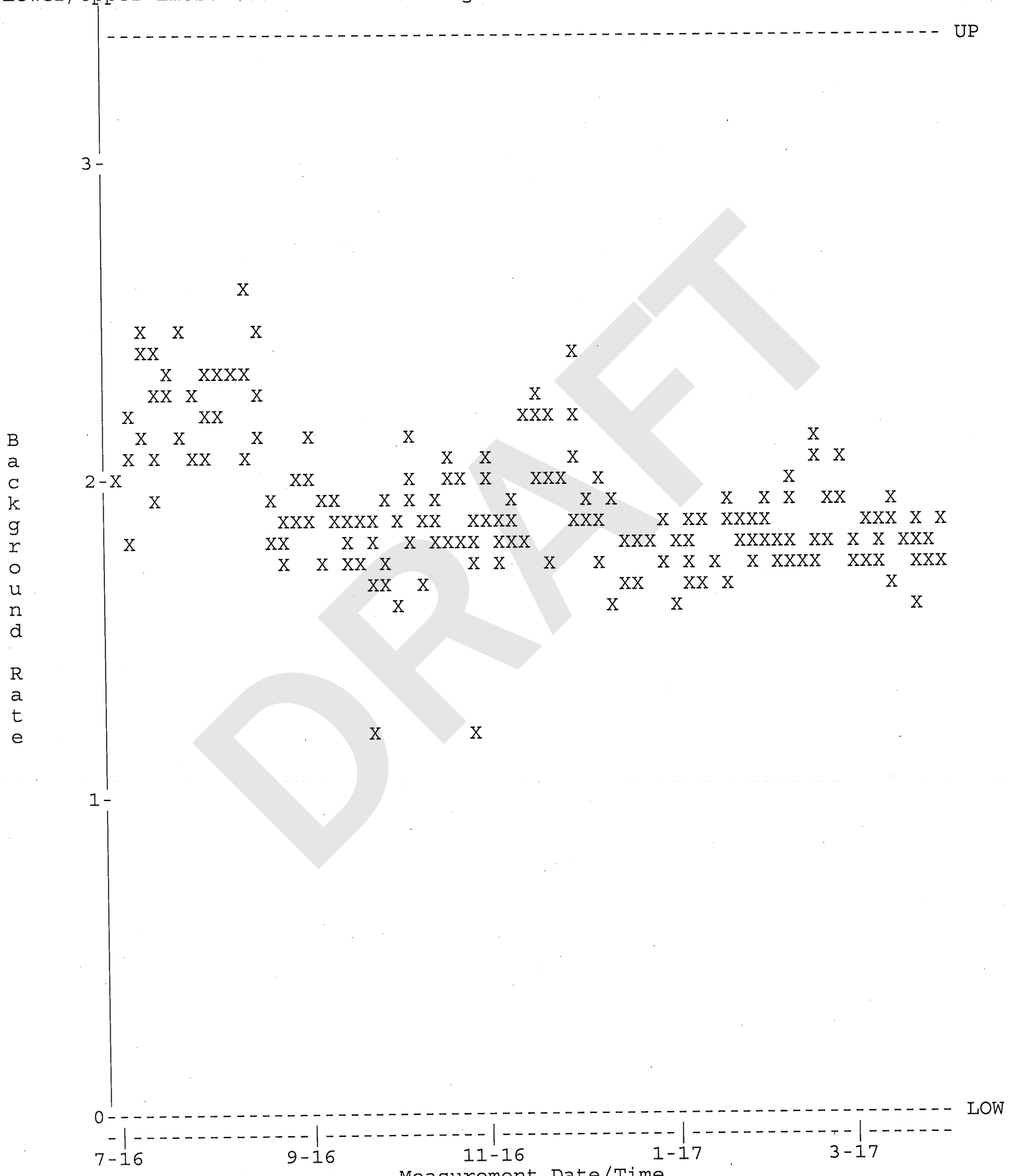
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Mean +- Std Dev : 179.674 +- 4.81923 (2.68 %)



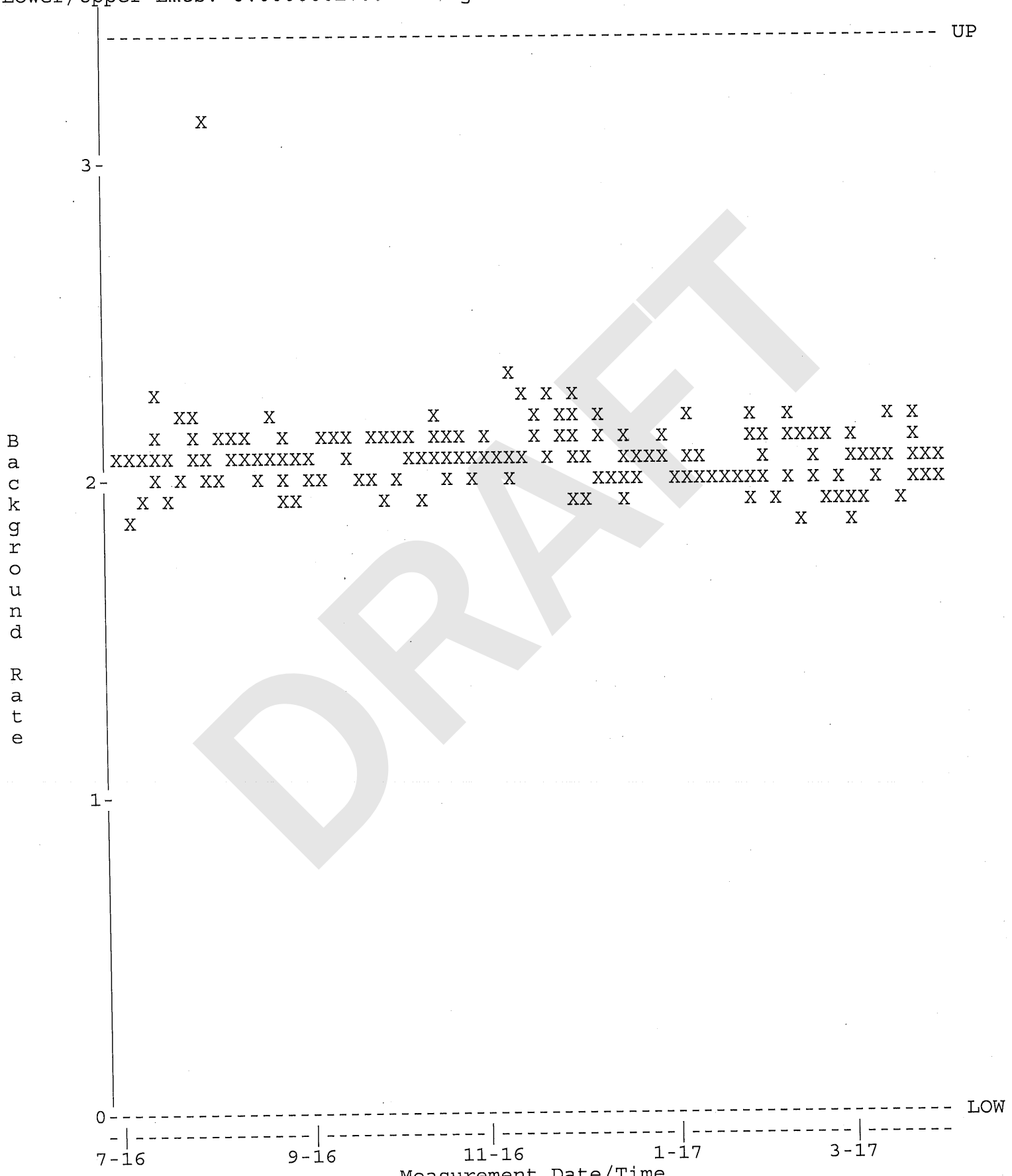
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE02_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



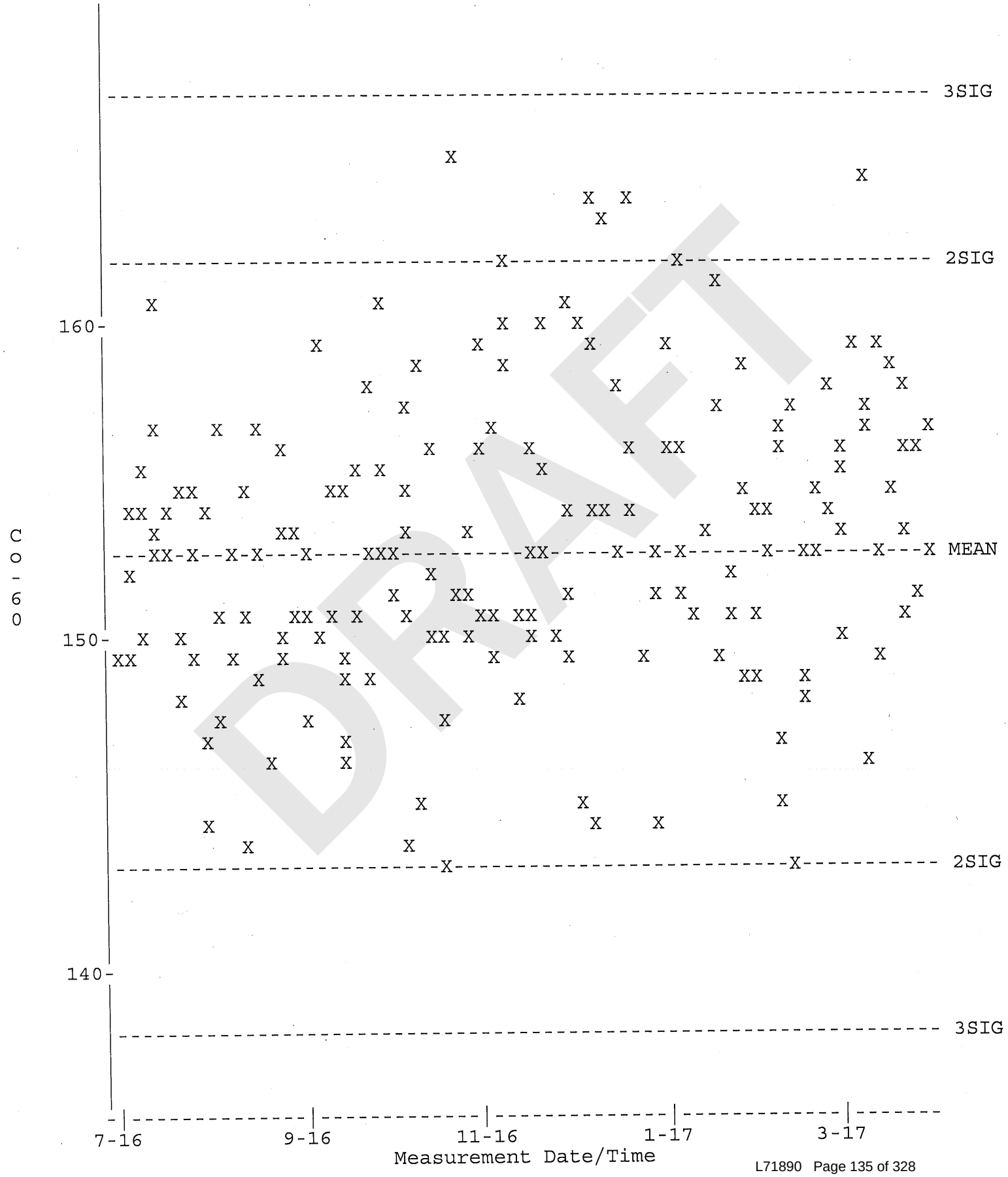
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE06_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:13 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



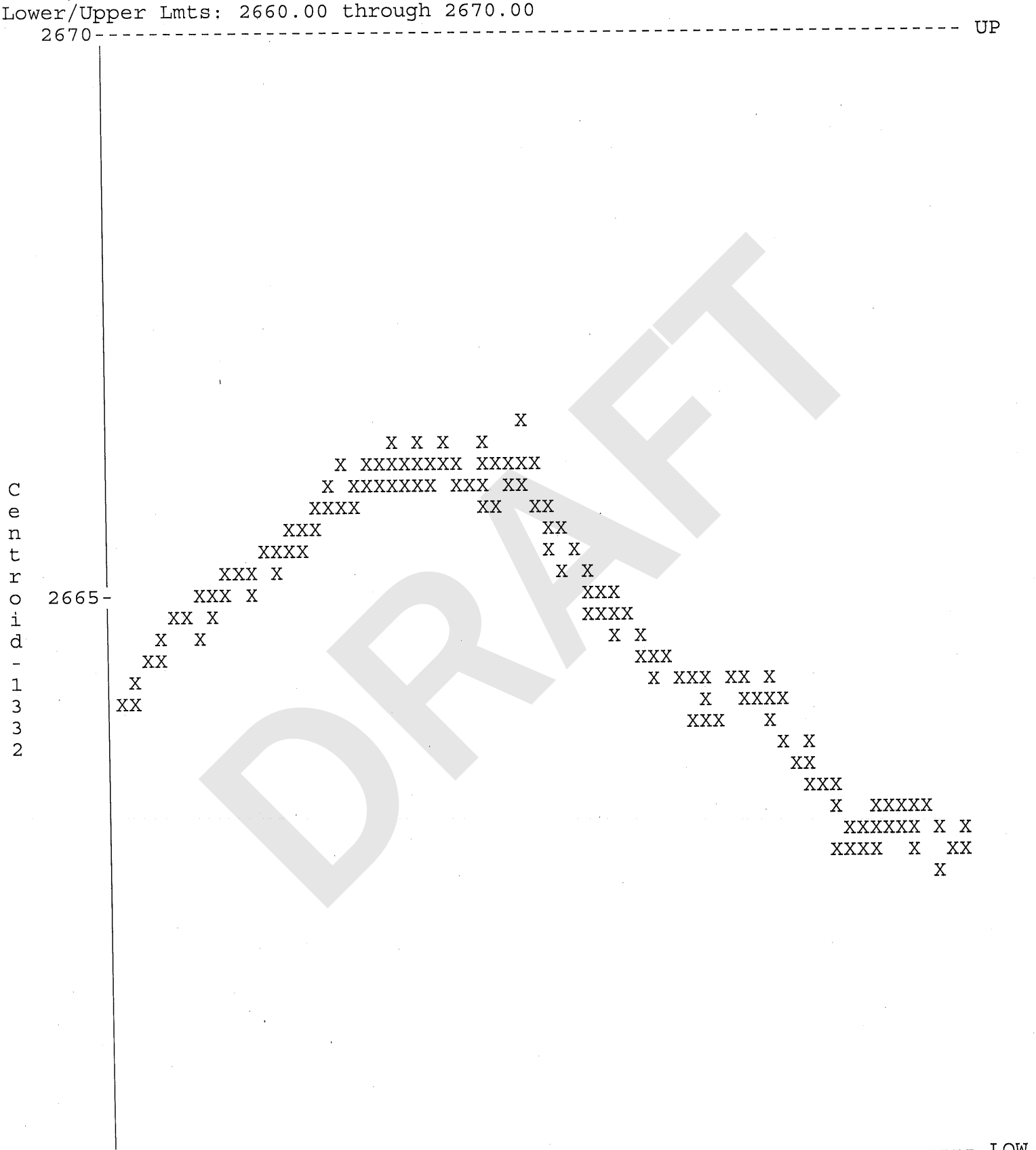
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Mean +- Std Dev : 152.759 +- 4.77464 (3.13 %)



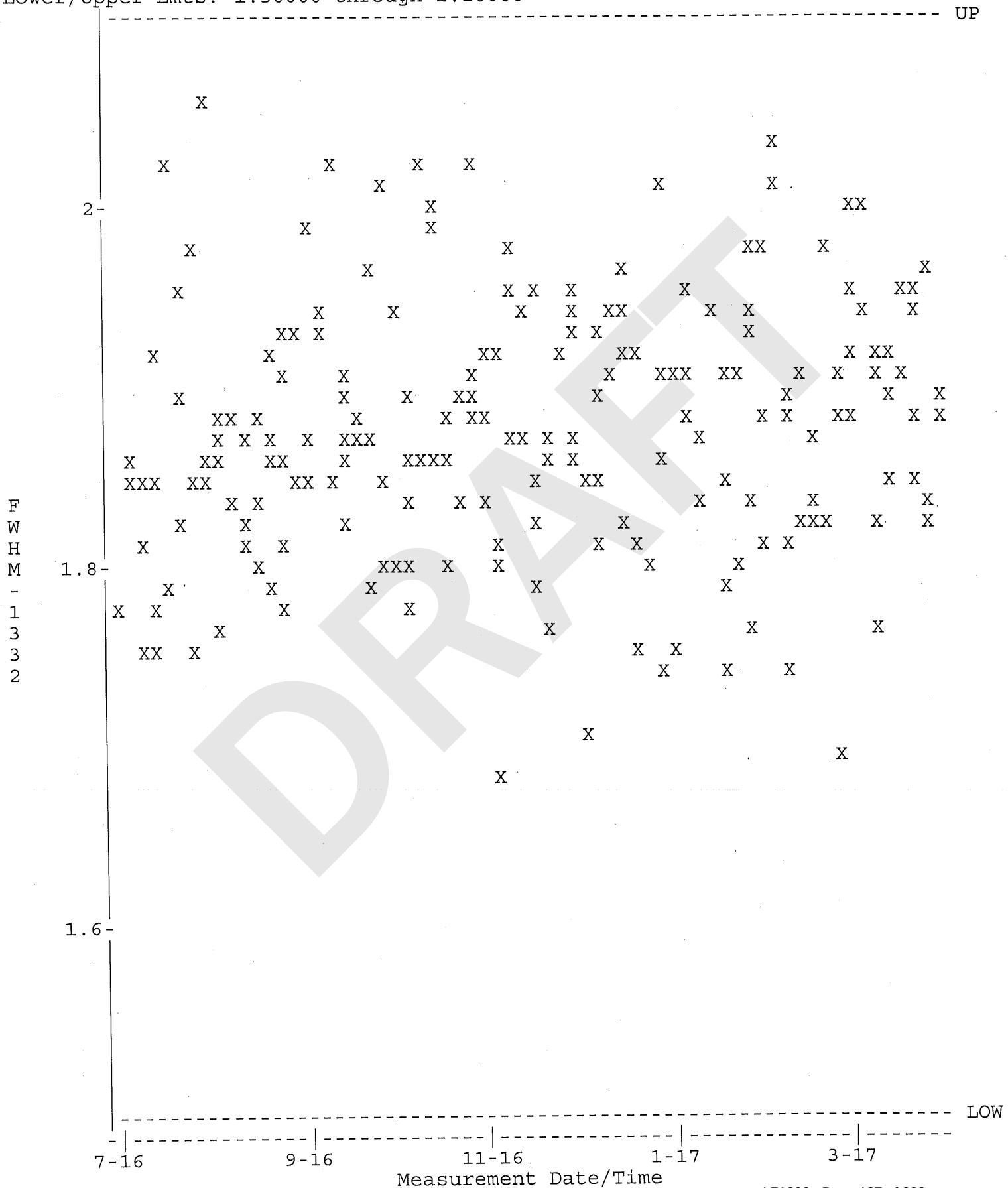
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.10000



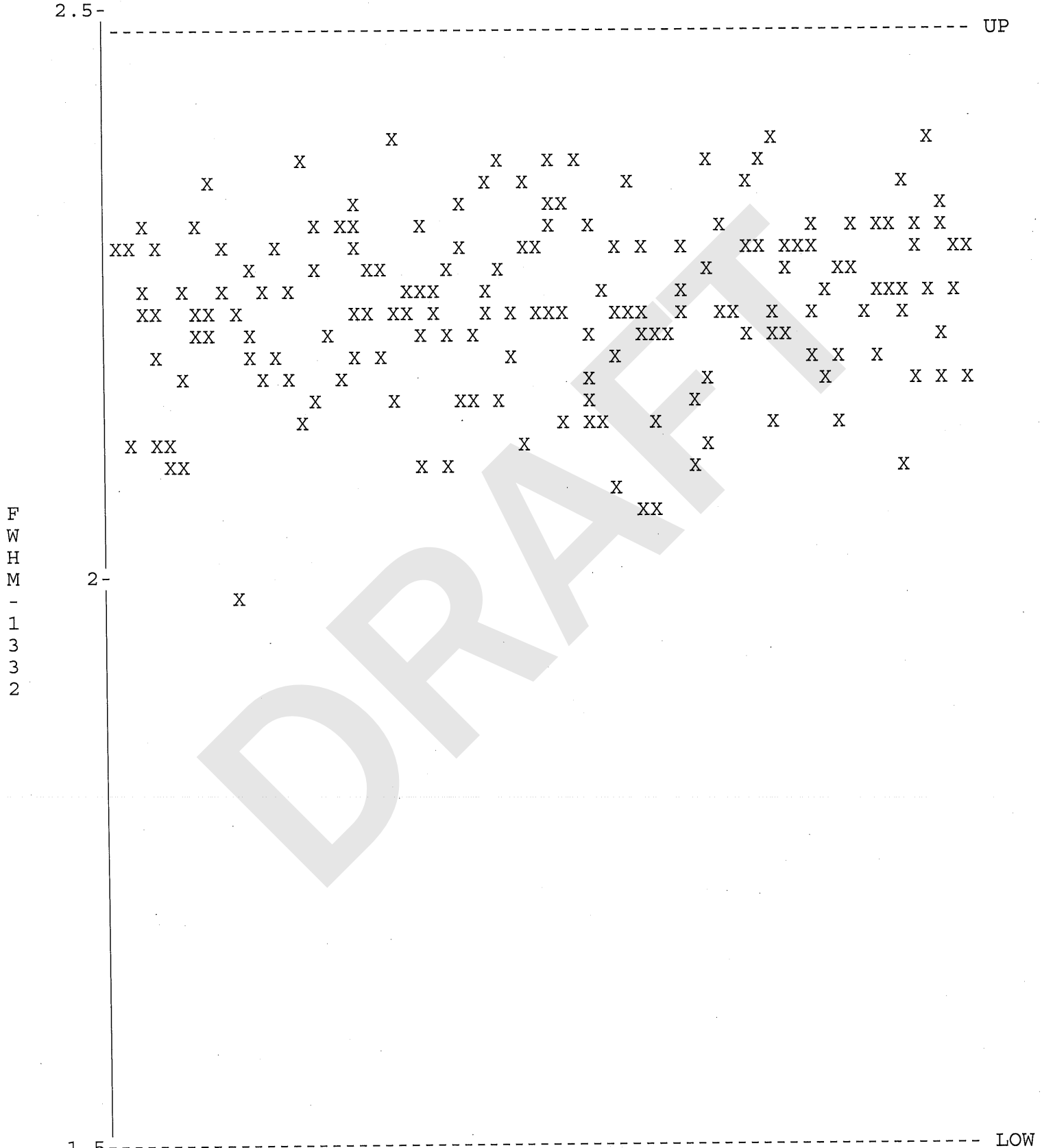
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



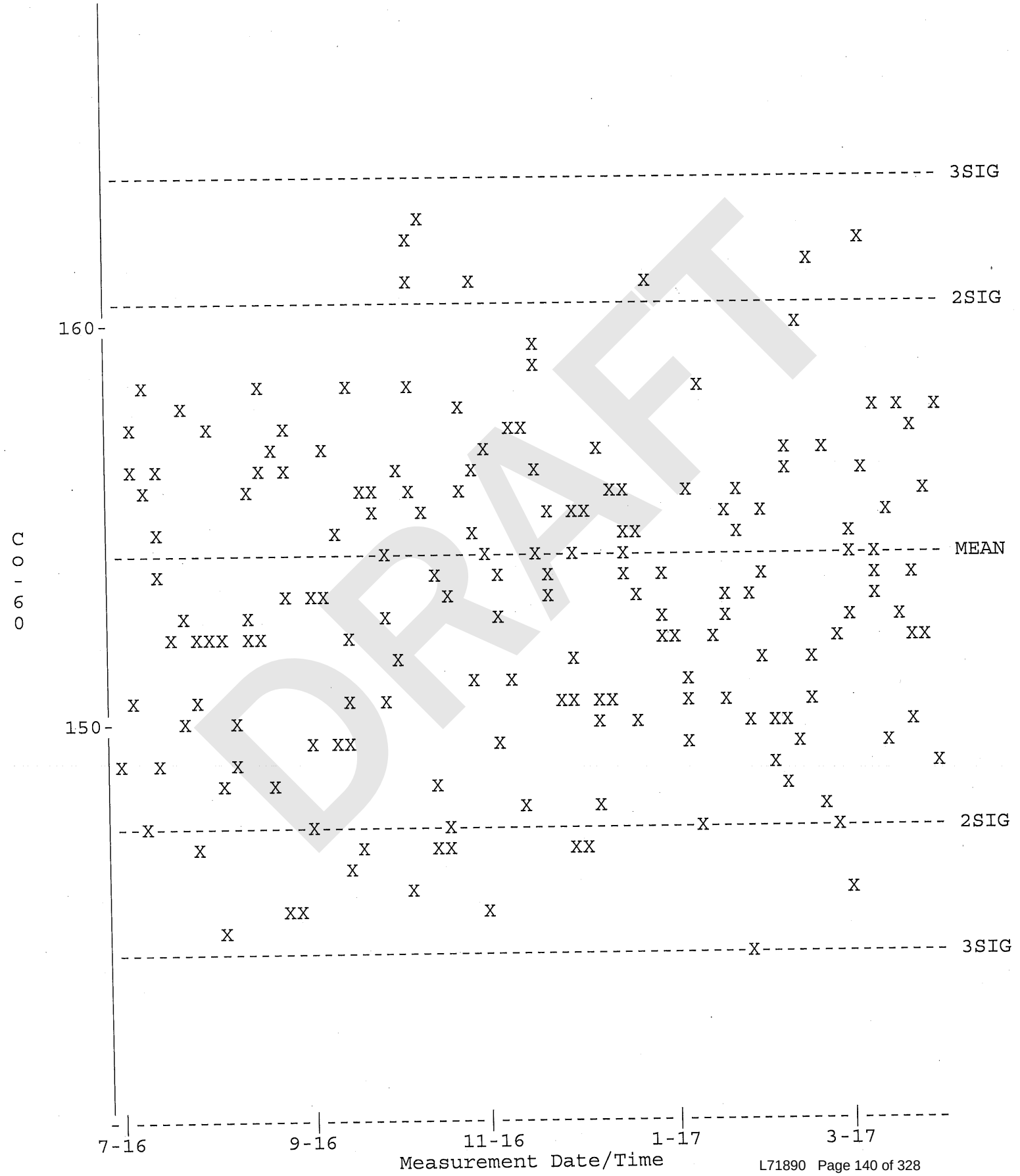
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.50000



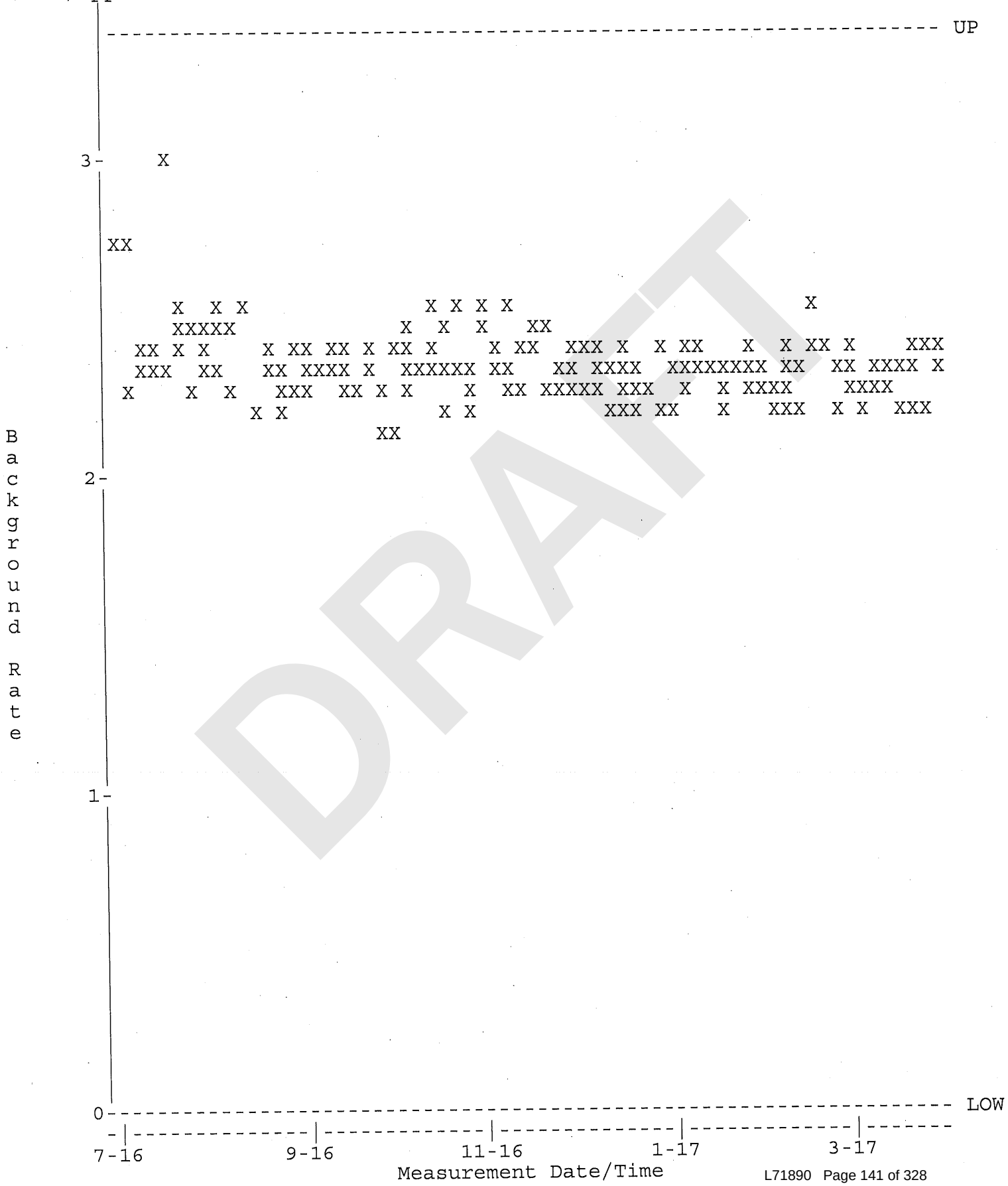
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Mean +- Std Dev : 154.048 +- 3.18076 (2.06 %)



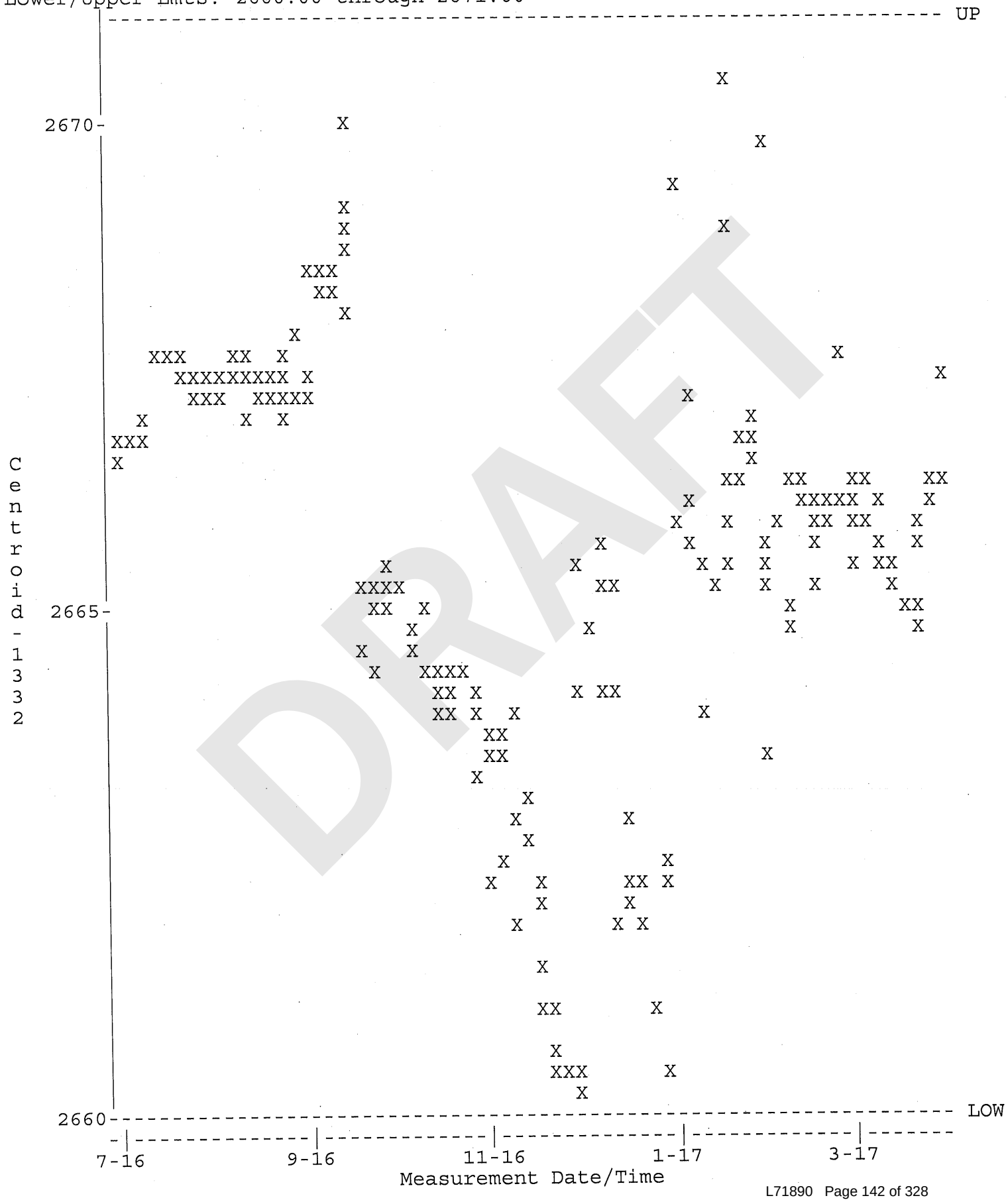
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE07_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:10 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



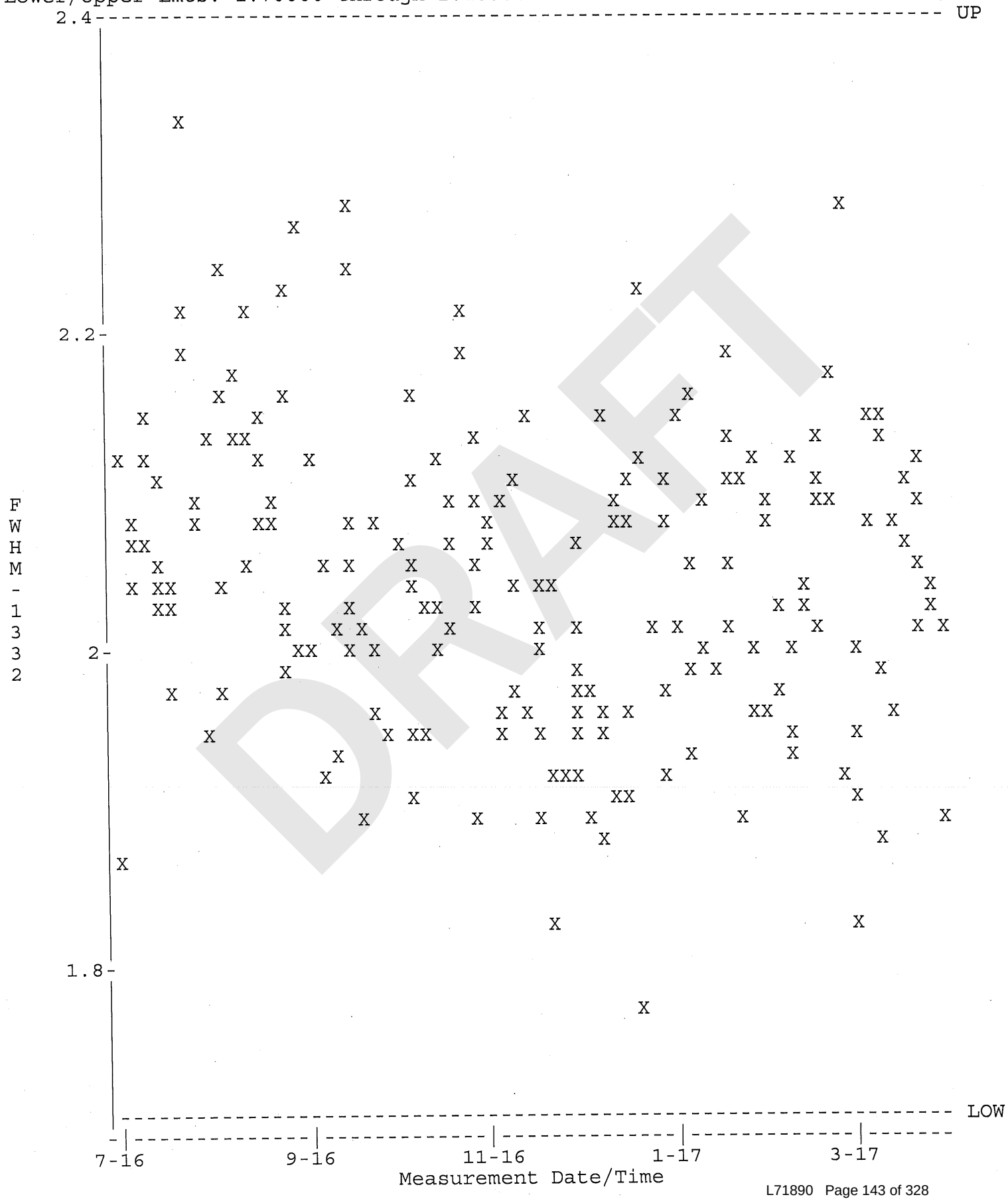
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2671.00



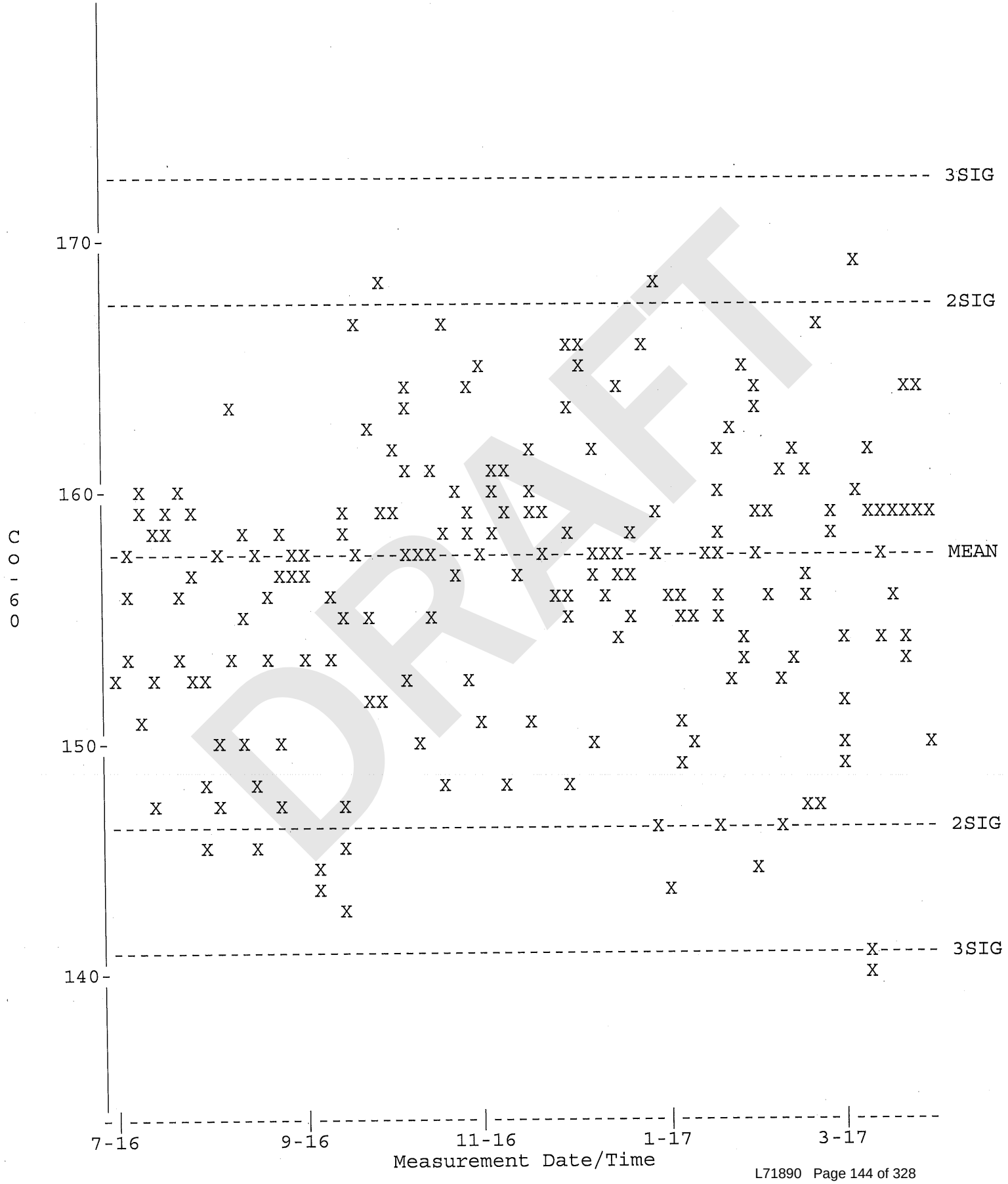
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.70000 through 2.40000



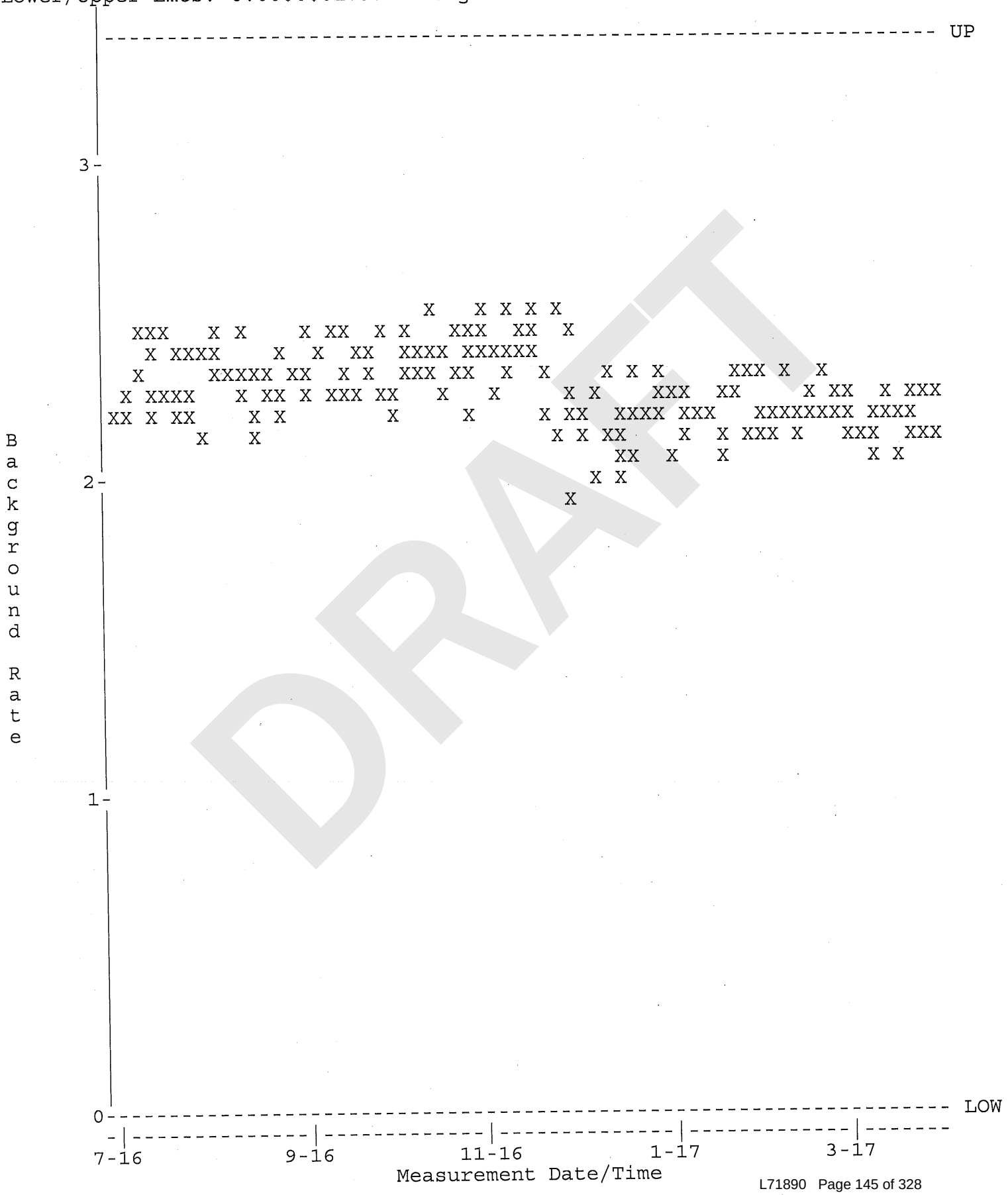
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:09 through 30-MAR-2017 00:00
Mean +- Std Dev : 157.382 +- 5.24375 (3.33 %)



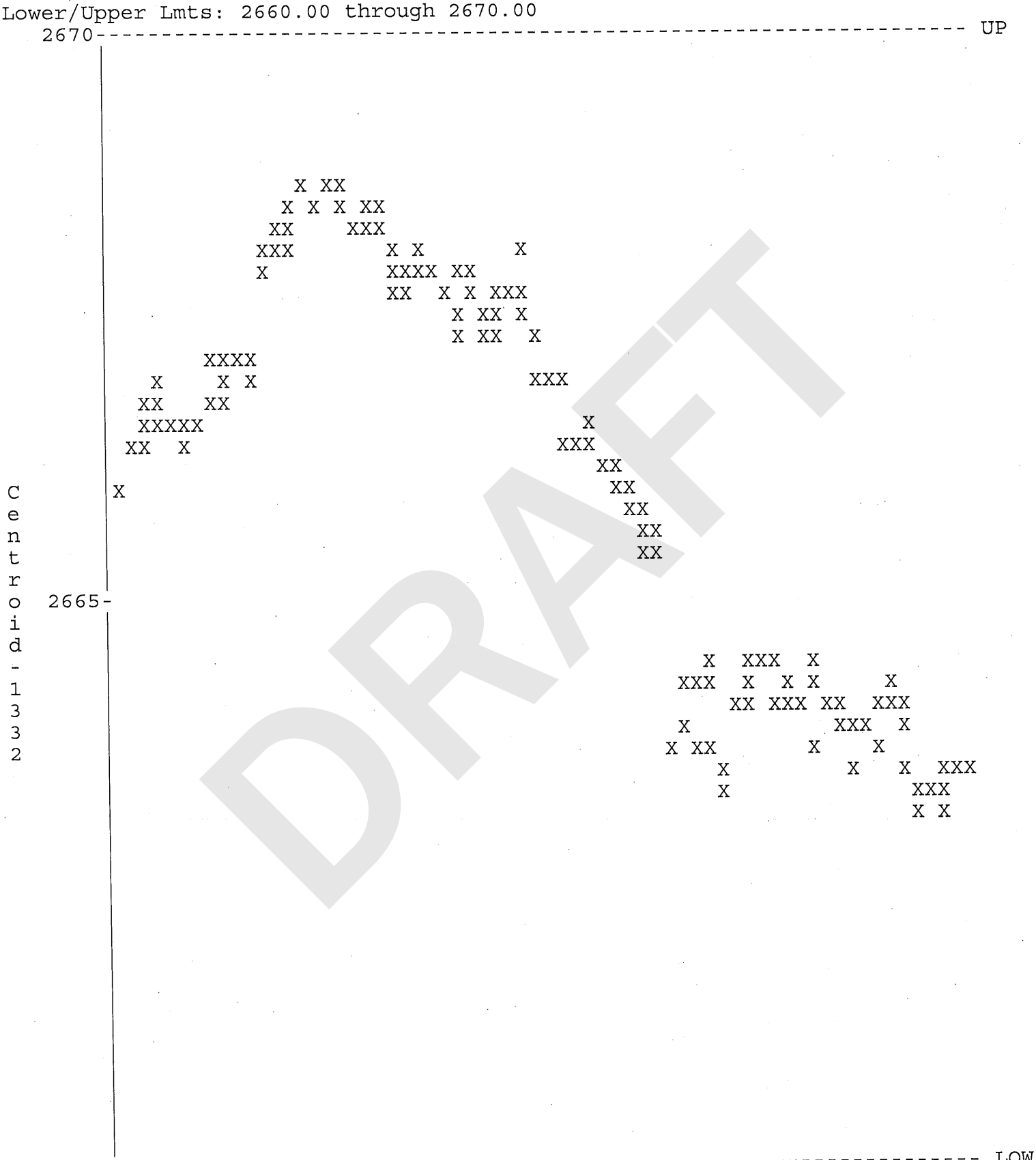
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE08_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:25 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



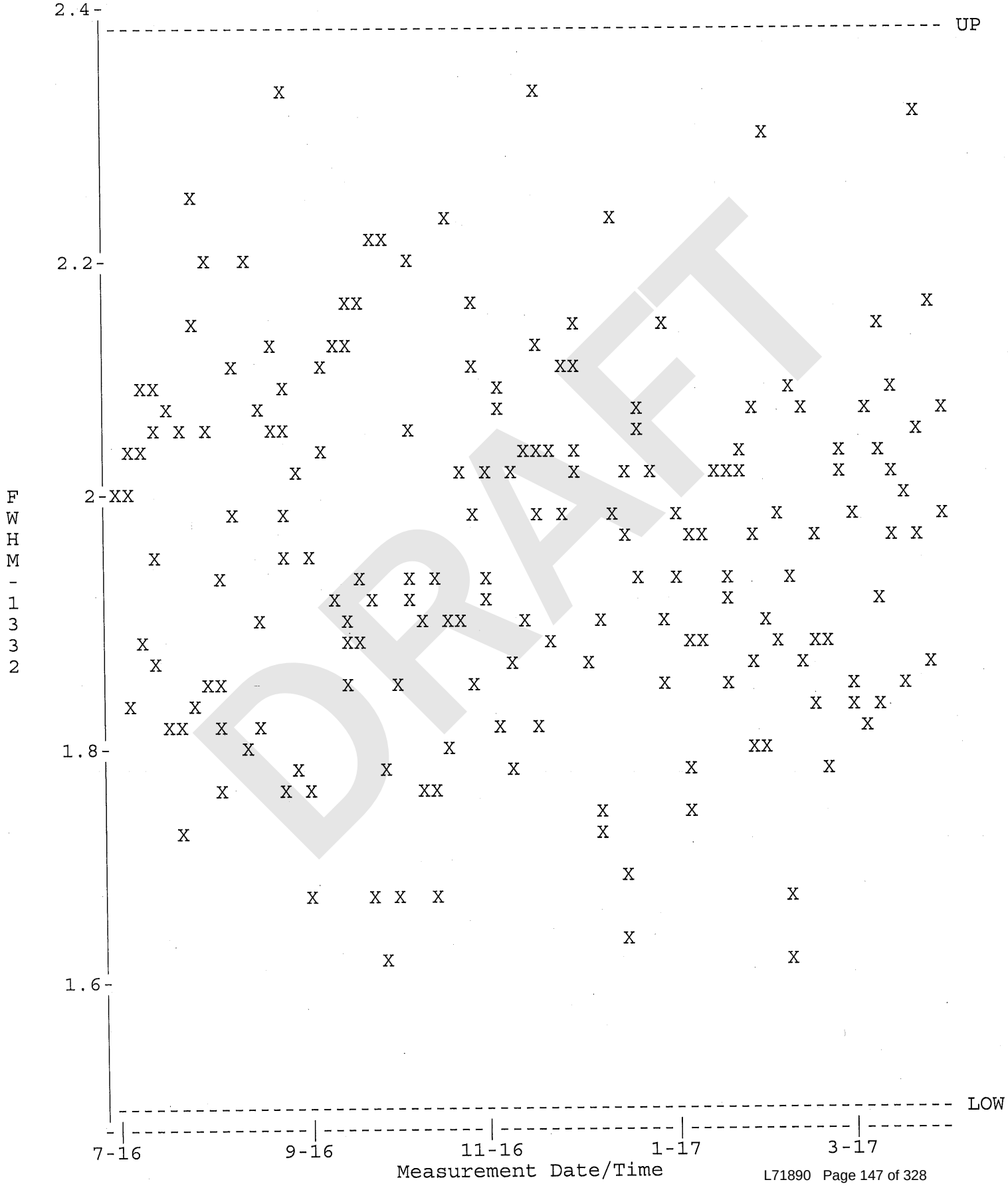
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



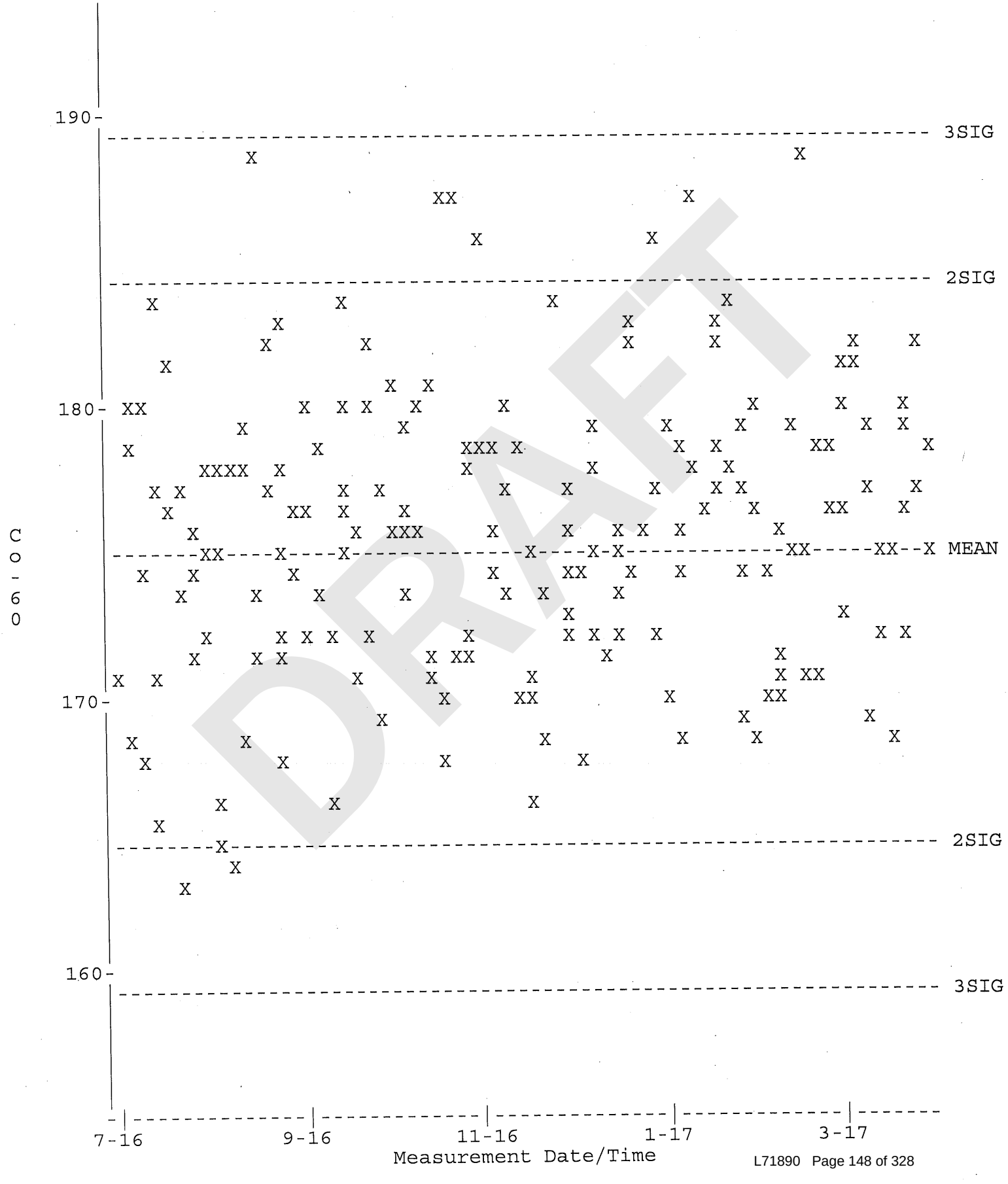
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.40000



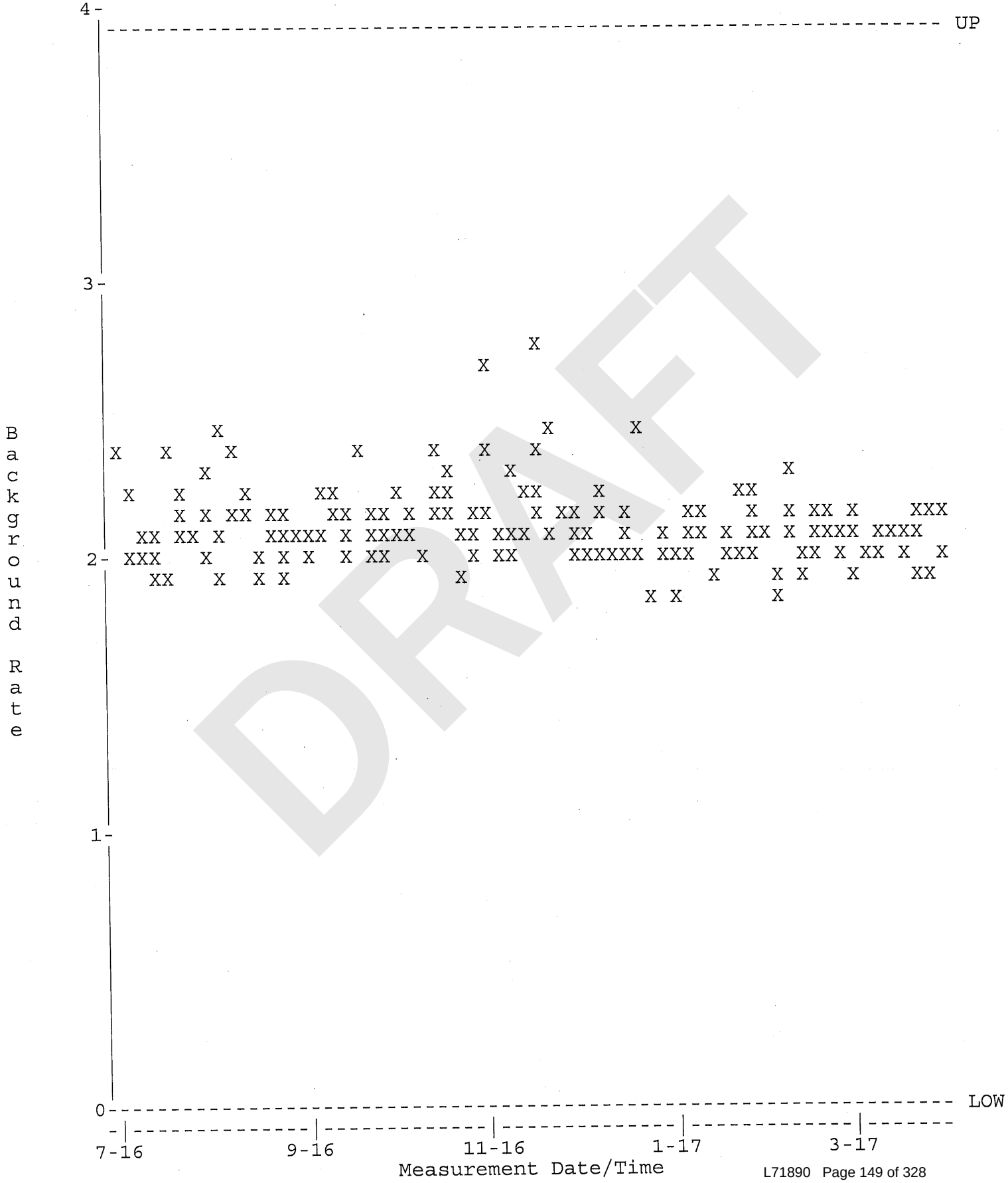
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Mean +- Std Dev : 174.786 +- 5.07535 (2.90 %)



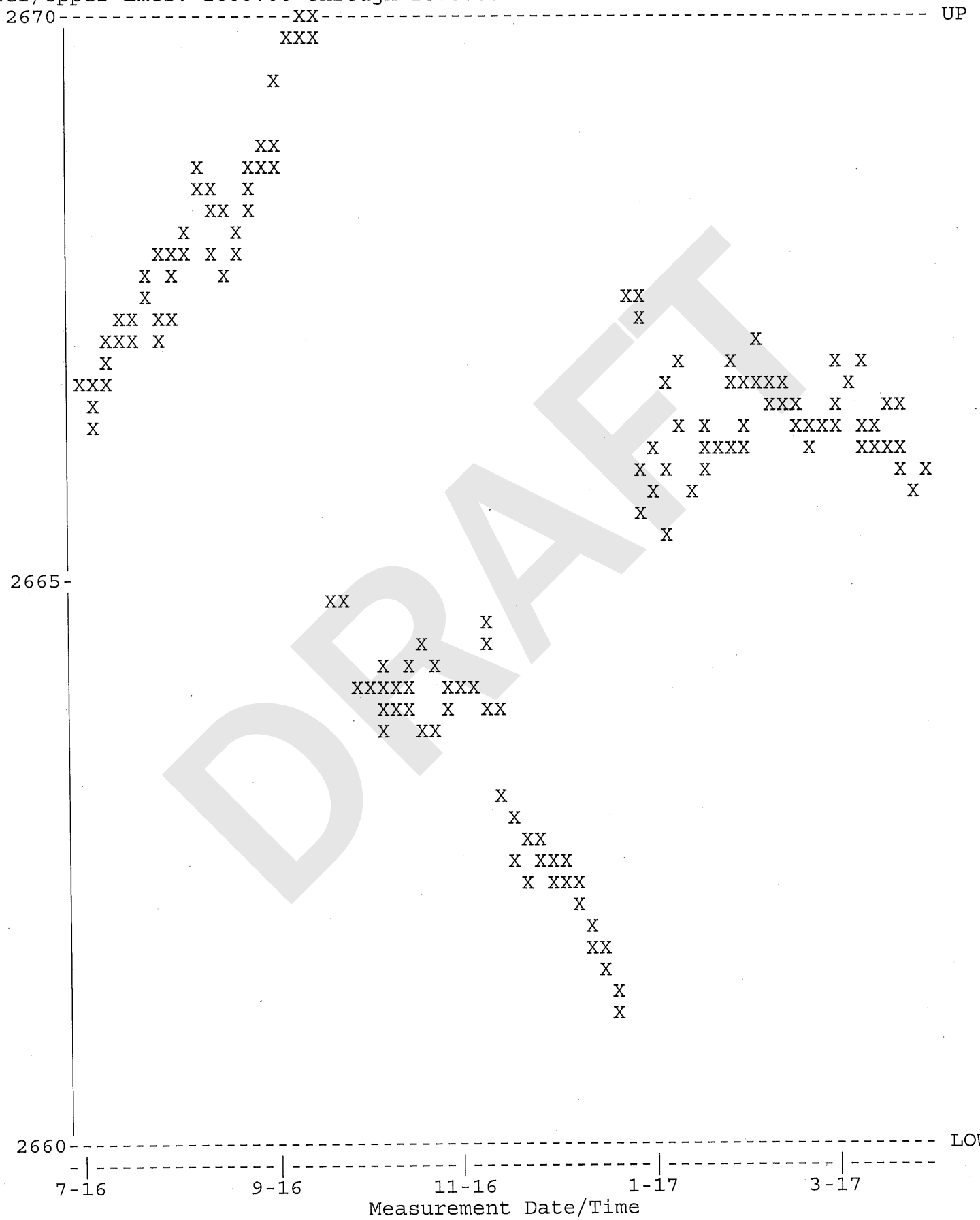
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE11_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 4.00000



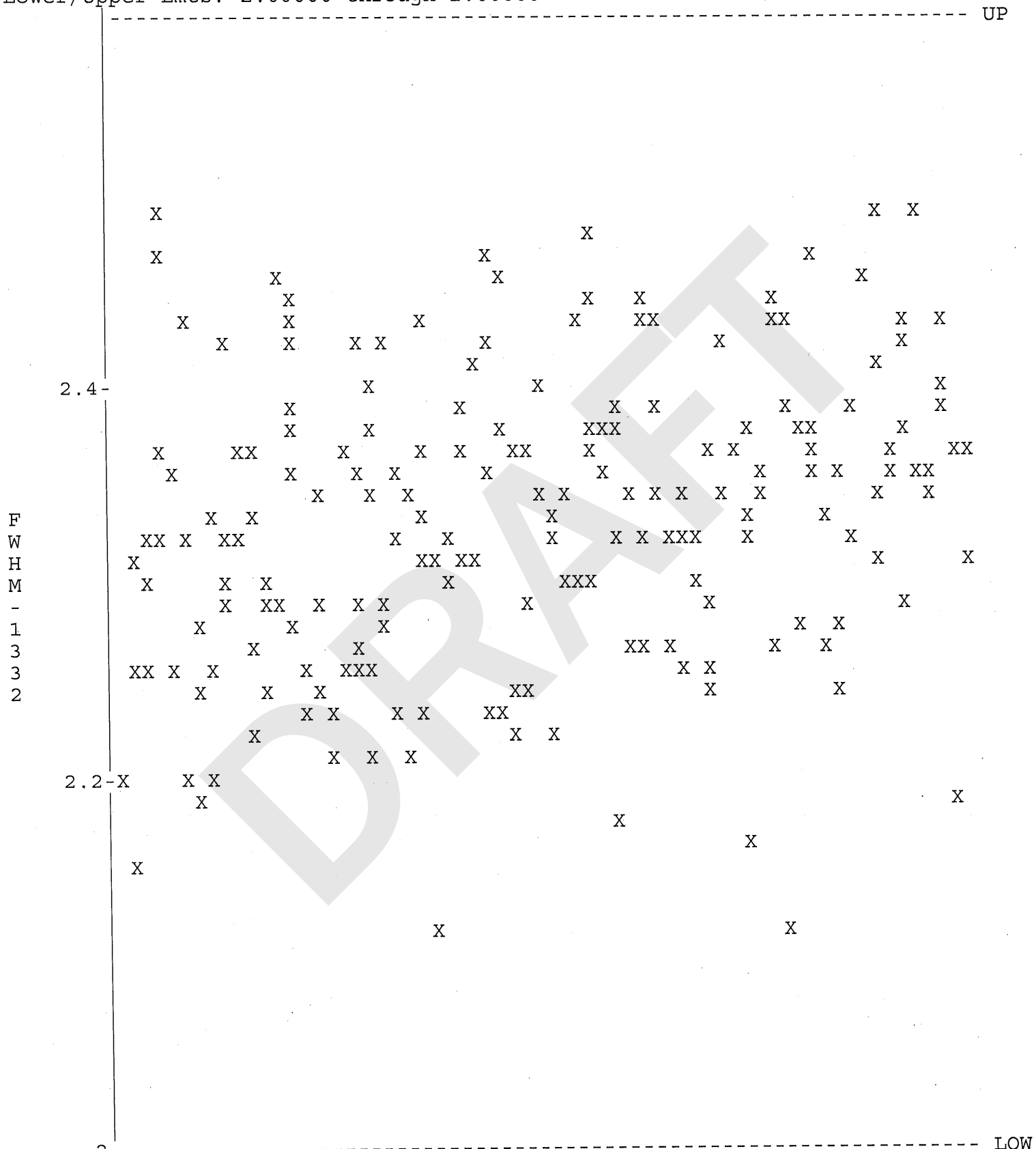
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



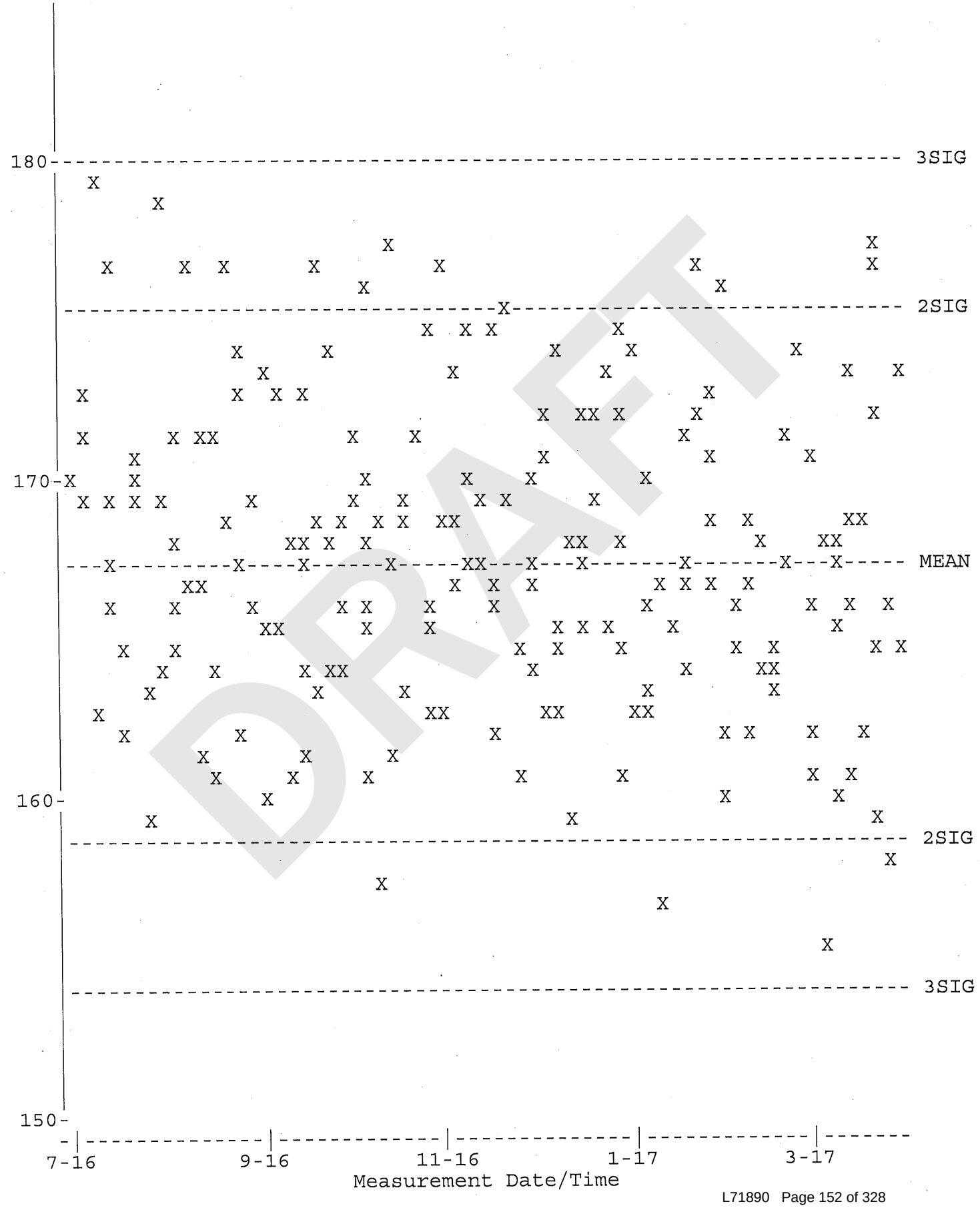
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2.00000 through 2.60000



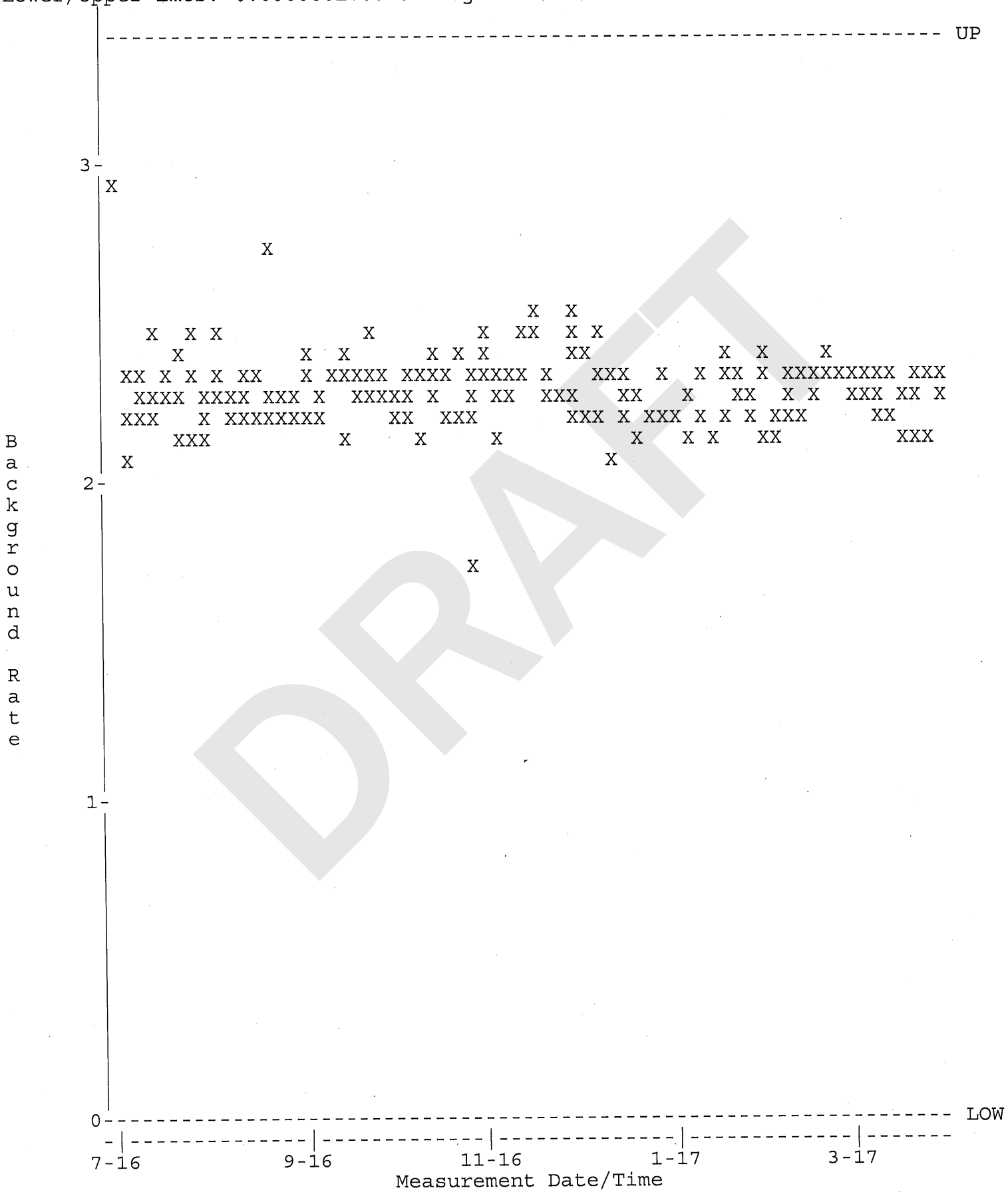
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Mean +- Std Dev : 167.424 +- 4.31182 (2.58 %)



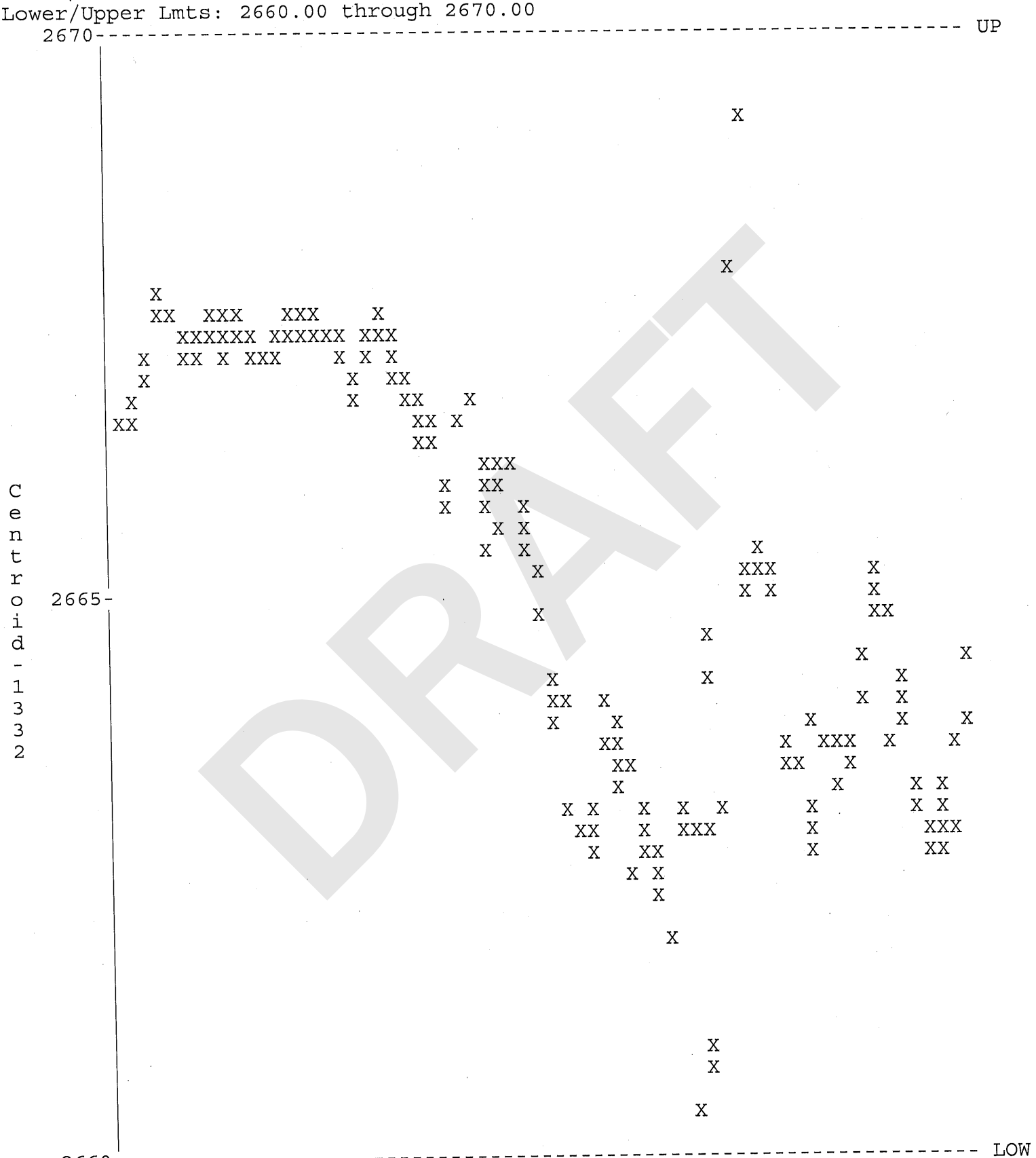
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE14_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



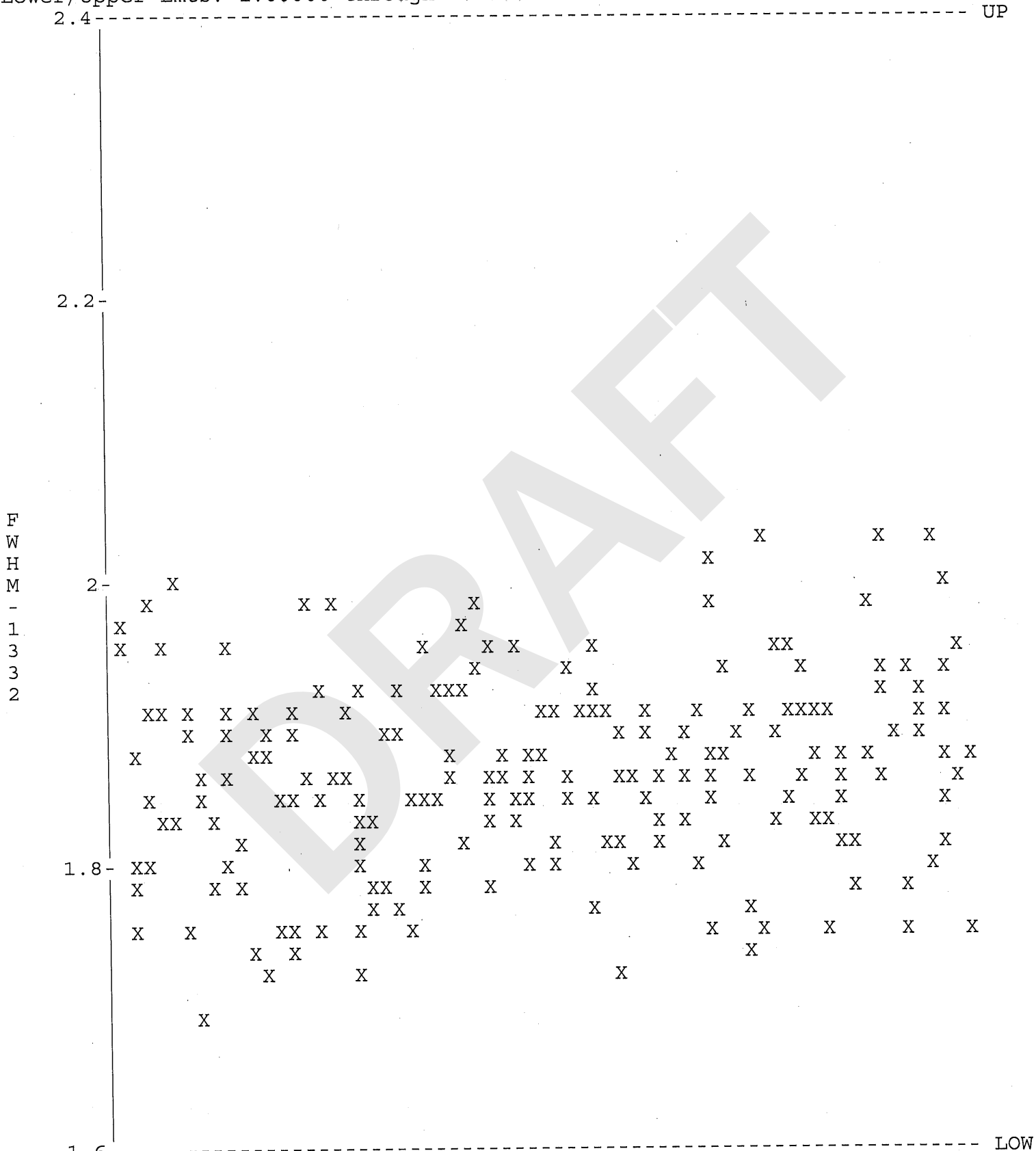
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



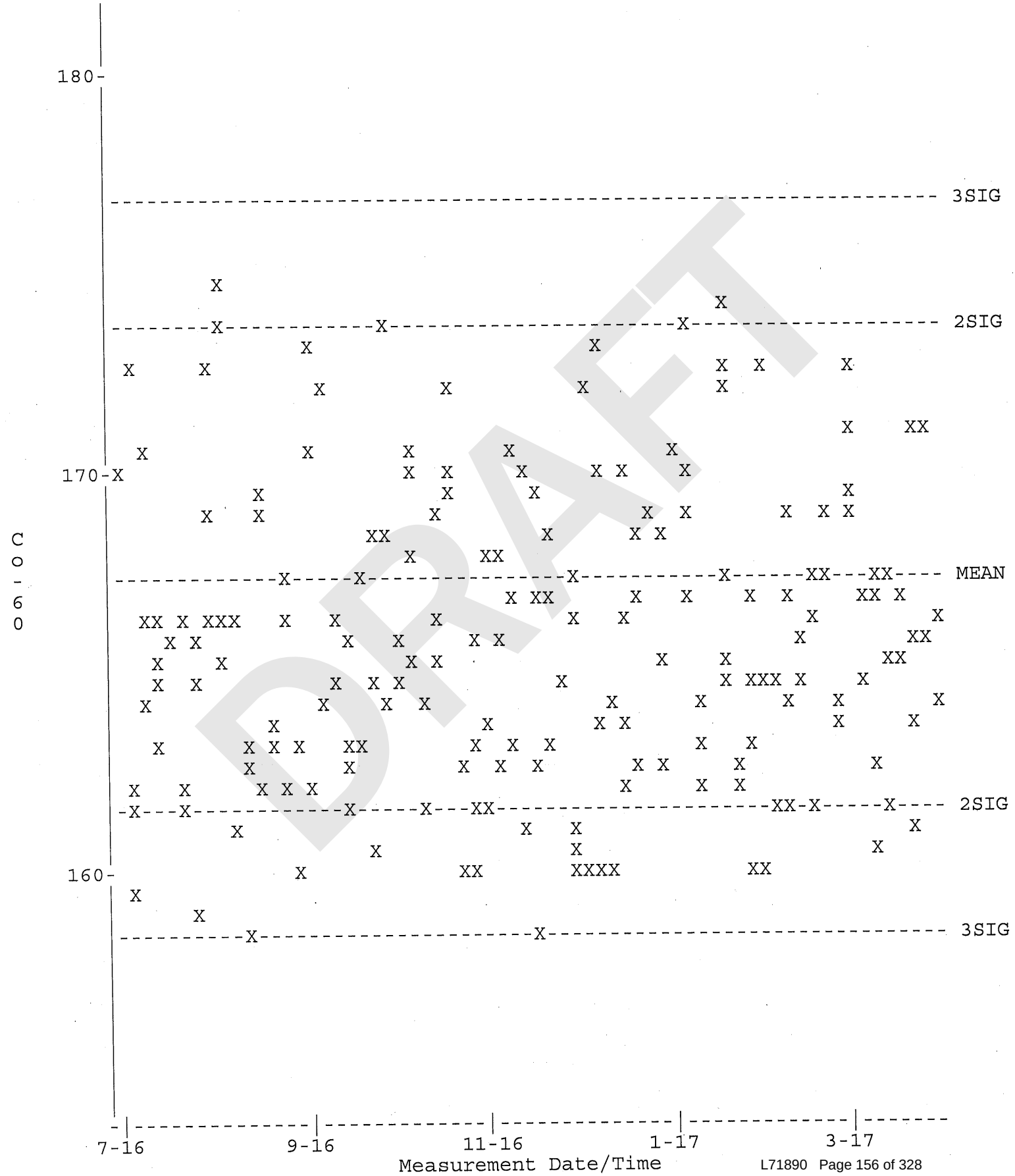
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.60000 through 2.40000



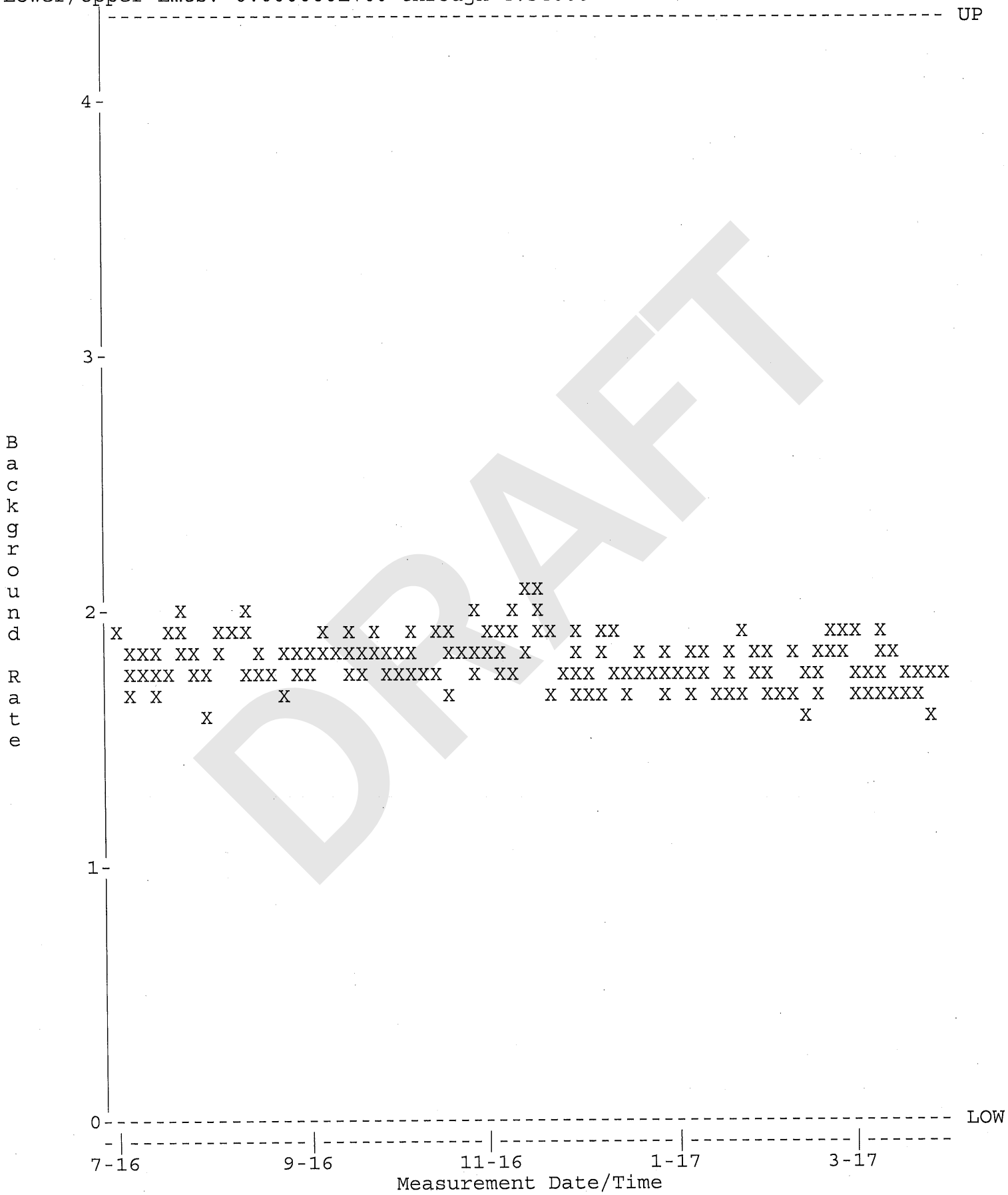
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:09 through 30-MAR-2017 00:00
Mean +- Std Dev : 167.933 +- 3.08657 (1.84 %)



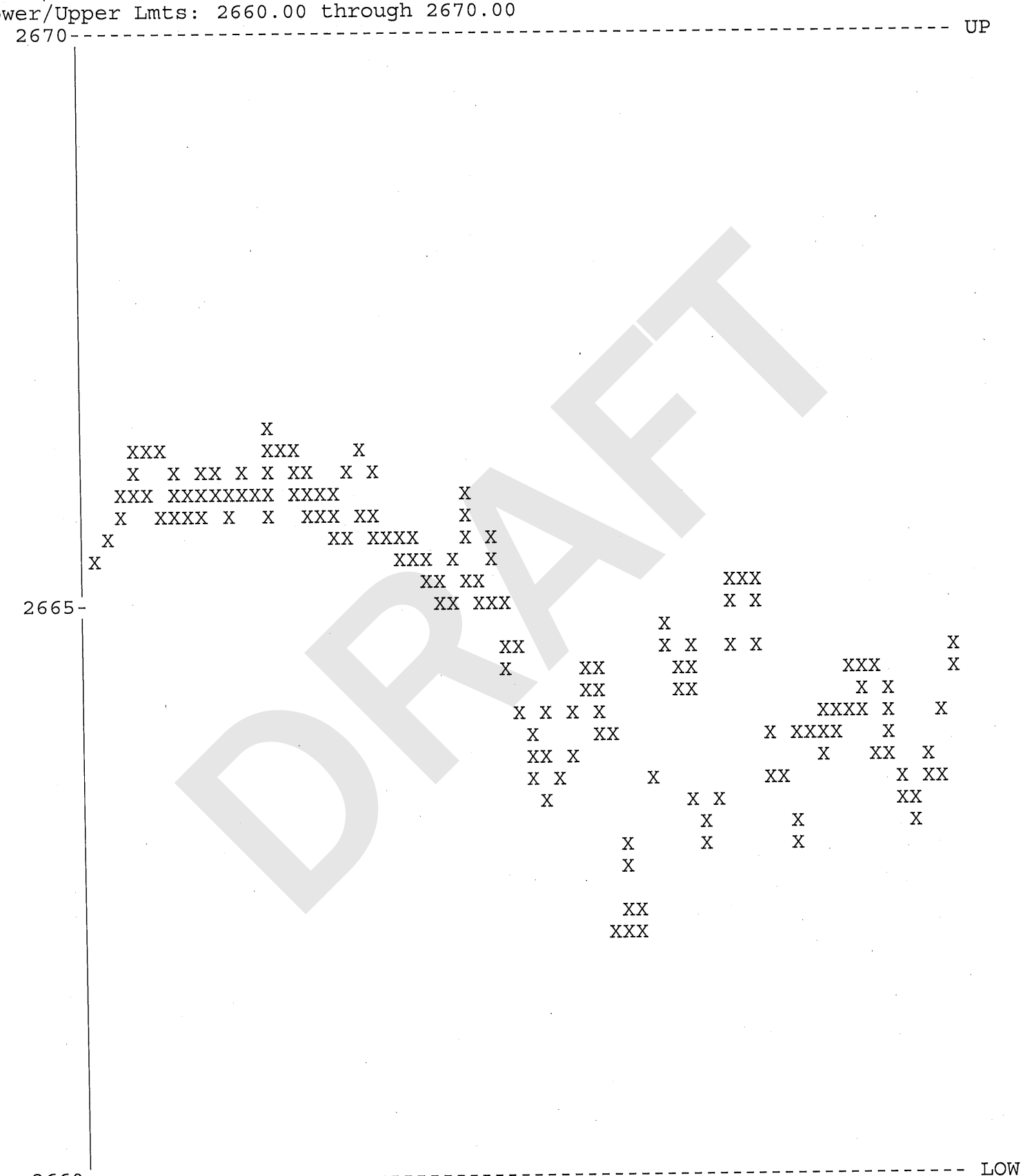
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE15_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:26 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 4.34000



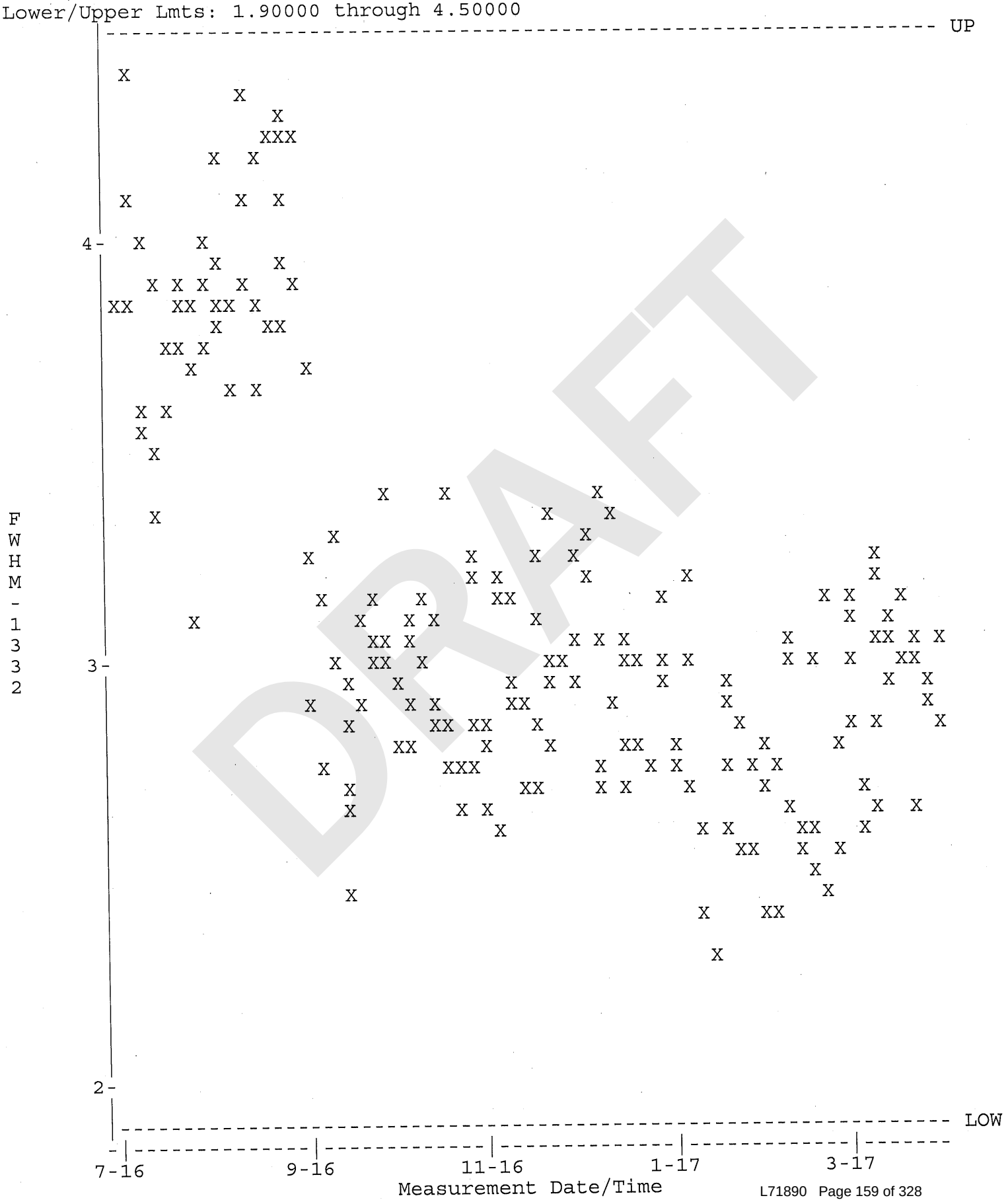
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



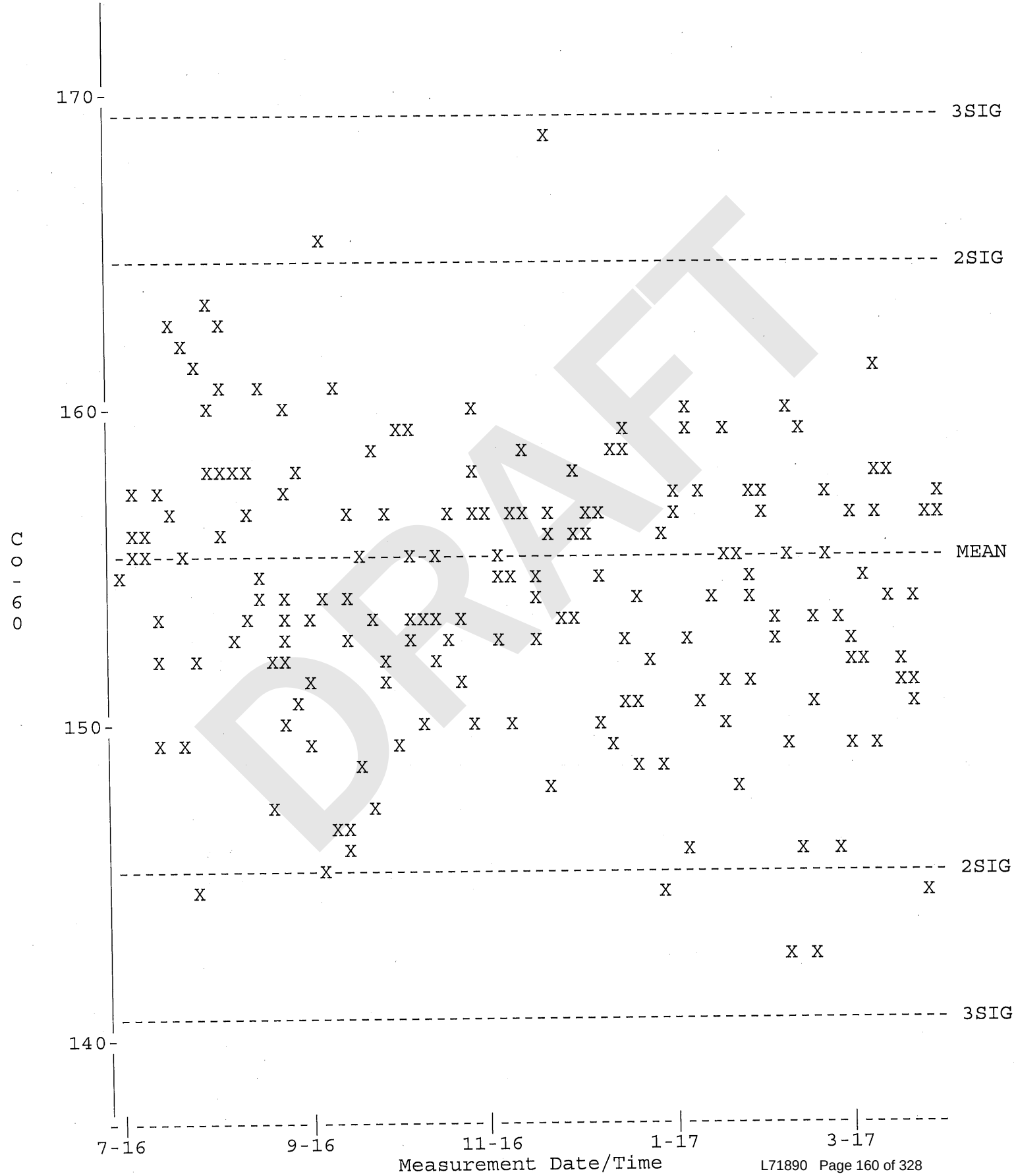
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.90000 through 4.50000



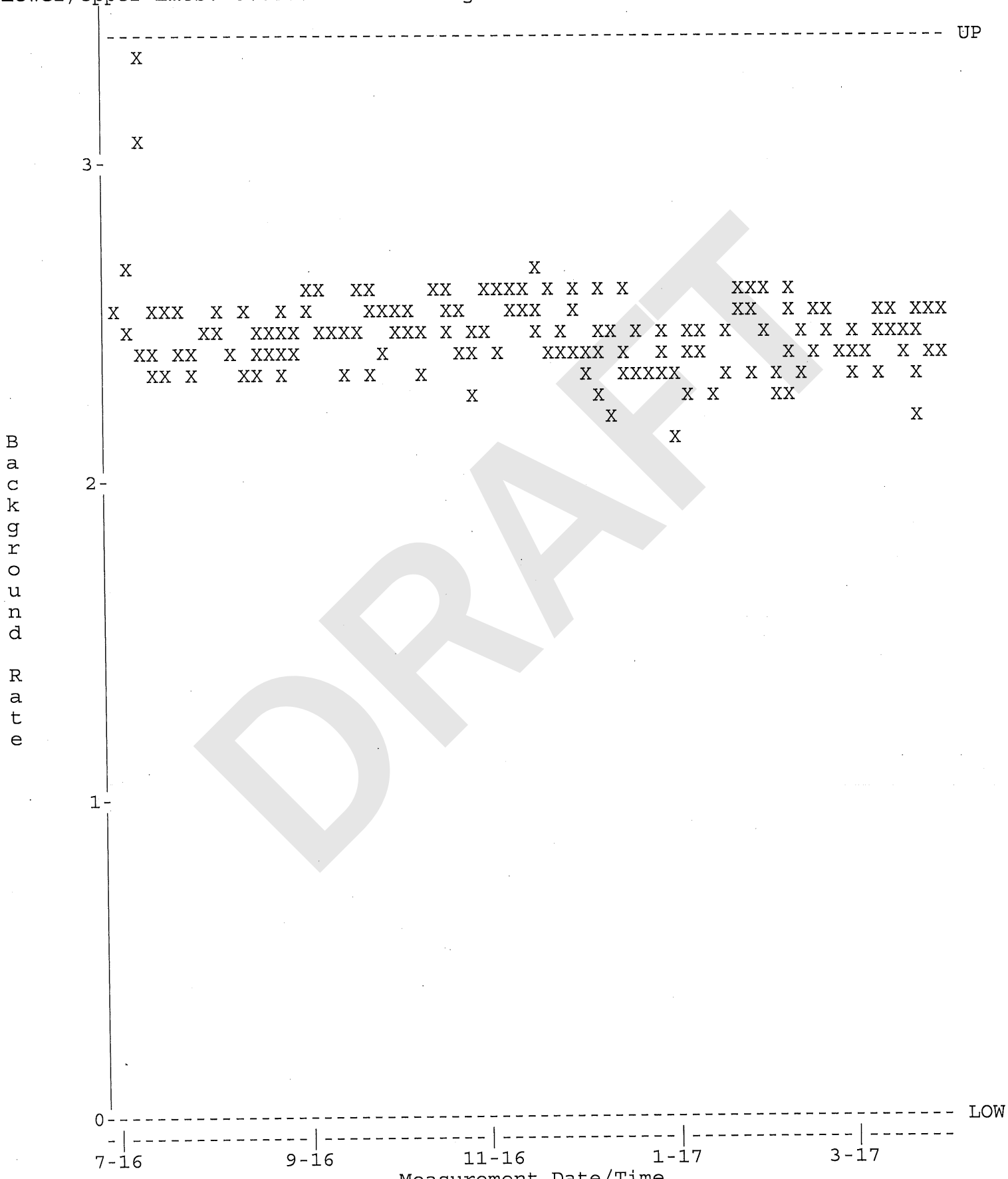
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Mean +- Std Dev : 155.329 +- 4.74159 (3.05 %)



DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE23_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



DRAFT

GAMMA SPECTROSCOPY

Sample and QC Raw Data

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 08:00:20.75
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 14-MAR-2017 06:54:10.87

LIMS No., Customer Name, Client ID: L71890-3 SS GEOENGINEERS SEDIMENT

Sample ID : 01L71890-3
Sample Type : SS
Quantity : 1.17830E+02 g Dry
Start Channel : 90 Energy Tol : 1.50000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:04:00.
Geometry : 01B150022715
BKGFILE : 01BG022417MT
Real Time : 0 01:05:50.91
Live time : 0 01:05:50.01

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	74.99*	13	126	0.89	150.16	2.26E+00	3.26E-03	133.4	3.12E+00
2	2	77.11	42	129	1.14	154.40	2.46E+00	1.07E-02	48.5	
3	1	92.70*	57	75	1.05	185.58	3.72E+00	1.43E-02	31.7	6.46E-01
4	1	185.90*	47	109	1.35	371.87	4.92E+00	1.18E-02	49.6	5.92E-01
5	1	238.59*	144	49	1.15	477.19	4.33E+00	3.64E-02	12.1	1.77E+00
6	1	241.54	52	50	1.39	483.10	4.30E+00	1.33E-02	28.1	
7	1	295.41*	63	84	1.65	590.80	3.77E+00	1.59E-02	34.4	1.55E+00
8	1	338.39*	27	42	1.62	676.73	3.43E+00	6.84E-03	47.9	1.52E+00
9	1	351.85*	68	53	1.53	703.64	3.33E+00	1.73E-02	26.9	3.10E+00
10	1	511.12*	21	60	2.99	1022.15	2.52E+00	5.44E-03	102.7	9.78E-01
11	1	583.01*	50	27	1.46	1165.95	2.28E+00	1.25E-02	25.0	9.61E-01
12	1	609.05*	80	17	1.34	1218.04	2.20E+00	2.03E-02	16.5	1.35E+00
13	1	911.44*	25	16	2.18	1823.09	1.58E+00	6.30E-03	41.0	1.62E+00
14	1	1120.41*	15	5	1.61	2241.37	1.32E+00	3.91E-03	39.8	6.99E-01
15	1	1460.59*	209	8	2.24	2922.63	1.07E+00	5.28E-02	7.9	4.32E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.772E+00	------	Line Not Found	------
	911.07	25	27.70*	1.578E+00	3.303E-01	3.324E-01	82.06

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 01L71890-3

Acquisition date : 14-MAR-2017 06:54:10

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	3.303E-01	3.324E-01	2.727E-01	82.06	
			---	---			
Total Activity :			3.303E-01	3.324E-01			
Grand Total Activity :			3.303E-01	3.324E-01			

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

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It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	74.99	13	126	0.89	150.16	147	16	3.26E-03	****	2.26E+00	
2	77.11	42	129	1.14	154.40	147	16	1.07E-02	97.0	2.46E+00	
1	92.70	57	75	1.05	185.58	182	7	1.43E-02	63.3	3.72E+00	
1	185.90	47	109	1.35	371.87	367	12	1.18E-02	99.2	4.92E+00	
1	238.59	144	49	1.15	477.19	469	18	3.64E-02	24.2	4.33E+00	
1	241.54	52	50	1.39	483.10	469	18	1.33E-02	56.3	4.30E+00	
1	295.41	63	84	1.65	590.80	583	14	1.59E-02	68.8	3.77E+00	
1	338.39	27	42	1.62	676.73	673	8	6.84E-03	95.7	3.43E+00	
1	351.85	68	53	1.53	703.64	698	13	1.73E-02	53.9	3.33E+00	
1	511.12	21	60	2.99	1022.15	1014	17	5.44E-03	****	2.52E+00	
1	583.01	50	27	1.46	1165.95	1162	10	1.25E-02	50.0	2.28E+00	
1	609.05	80	17	1.34	1218.04	1213	11	2.03E-02	32.9	2.20E+00	
1	1120.41	15	5	1.61	2241.37	2236	10	3.91E-03	79.5	1.32E+00	
1	1460.59	209	8	2.24	2922.63	2915	15	5.28E-02	15.7	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	3.303E-01	3.324E-01	2.727E-01	82.06	
	Total Activity :		3.303E-01	3.324E-01			
Grand Total Activity :			3.303E-01	3.324E-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
AC-228	3.324E-01	2.727E-01	2.467E-01	0.000E+00	1.347

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

Key-Line

DRAFT

Nuclide	Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-3.734E-02		6.058E-02	7.890E-02	0.000E+00	-0.473
CS-137	9.153E-03		5.420E-02	9.110E-02	0.000E+00	0.100

DRAFT

```
A,01L71890-3       ,03/14/2017 08:00,02/23/2017 13:04,   1.178E+02,L71890-3 SS GE
B,01L71890-3       ,CS134_137           ,01/05/2017 07:18,01B150022715
C,AC-228   ,YES,    3.324E-01,    2.727E-01,    2.467E-01,,     1.347
C,CS-134   ,NO ,   -3.734E-02,    6.058E-02,    7.890E-02,,    -0.473
C,CS-137   ,NO ,    9.153E-03,    5.420E-02,    9.110E-02,,     0.100
```

DRAFT

Sec. Review: Analyst: BG

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 10:35:26.36
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 14-MAR-2017 06:54:11.19

LIMS No., Customer Name, Client ID: L71890-6 SS GEOENGINEERS SEDIMENT

Sample ID : 02L71890-6
Sample Type : SS
Quantity : 1.02040E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:10:00.
Geometry : 02B150101711
BKGFILE : 02BG022417MT
Real Time : 0 03:41:06.86
Live time : 0 03:41:04.79

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	74.76*	75	480	1.03	134.12	2.90E+00	5.66E-03	53.3	
2	0	76.92*	163	314	0.82	138.45	3.04E+00	1.23E-02	19.4	
3	0	85.89*	152	537	4.39	156.51	3.55E+00	1.14E-02	33.4	
4	0	185.91*	171	323	1.00	357.67	3.79E+00	1.29E-02	23.4	
5	0	238.46*	310	293	1.04	463.38	3.22E+00	2.34E-02	11.8	
6	0	241.66	84	195	2.24	469.80	3.19E+00	6.31E-03	30.2	
7	0	295.06*	122	164	1.17	577.21	2.73E+00	9.18E-03	22.2	
8	0	337.95	127	146	1.74	663.48	2.45E+00	9.56E-03	20.4	
9	0	351.86*	240	152	1.50	691.45	2.37E+00	1.81E-02	12.4	
10	0	583.15*	109	60	1.27	1156.65	1.53E+00	8.20E-03	17.3	
11	0	609.47*	142	97	1.27	1209.59	1.47E+00	1.07E-02	18.0	
12	0	911.31*	72	59	1.37	1816.72	1.02E+00	5.42E-03	25.6	
13	0	968.66*	71	39	1.94	1932.08	9.59E-01	5.34E-03	21.9	
14	0	1120.18*	53	20	1.60	2236.83	8.39E-01	3.99E-03	25.1	
15	0	1460.57*	459	34	1.82	2921.52	6.67E-01	3.46E-02	5.9	
16	0	1501.64	19	6	0.92	3004.13	6.52E-01	1.43E-03	35.7	
17	0	1764.72*	38	0	2.29	3533.31	5.80E-01	2.89E-03	20.5	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.153E+00	------	Line Not Found	------
	911.07	72	27.70*	1.015E+00	5.102E-01	5.134E-01	51.24

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 02L71890-6

Acquisition date : 14-MAR-2017 06:54:11

Total number of lines in spectrum	17	
Number of unidentified lines	16	
Number of lines tentatively identified by NID	1	5.88%

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	5.102E-01	5.134E-01	2.631E-01	51.24	
	Total Activity :		5.102E-01	5.134E-01			
	Grand Total Activity :		5.102E-01	5.134E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 02L71890-6 Acquisition date : 14-MAR-2017 06:54:11

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	74.76	75	480	1.03	134.12	130	7	5.66E-03	****	2.90E+00	
0	76.92	163	314	0.82	138.45	137	6	1.23E-02	38.8	3.04E+00	
0	85.89	152	537	4.39	156.51	150	13	1.14E-02	66.8	3.55E+00	
0	185.91	171	323	1.00	357.67	352	12	1.29E-02	46.8	3.79E+00	
0	238.46	310	293	1.04	463.38	459	9	2.34E-02	23.6	3.22E+00	
0	241.66	84	195	2.24	469.80	468	7	6.31E-03	60.3	3.19E+00	
0	295.06	122	164	1.17	577.21	573	9	9.18E-03	44.4	2.73E+00	
0	337.95	127	146	1.74	663.48	659	11	9.56E-03	40.7	2.45E+00	
0	351.86	240	152	1.50	691.45	687	11	1.81E-02	24.9	2.37E+00	
0	583.15	109	60	1.27	1156.65	1152	10	8.20E-03	34.5	1.53E+00	
0	609.47	142	97	1.27	1209.59	1204	13	1.07E-02	36.0	1.47E+00	
0	968.66	71	39	1.94	1932.08	1927	12	5.34E-03	43.8	9.59E-01	
0	1120.18	53	20	1.60	2236.83	2231	13	3.99E-03	50.1	8.39E-01	
0	1460.57	459	34	1.82	2921.52	2912	20	3.46E-02	11.7	6.67E-01	
0	1501.64	19	6	0.92	3004.13	2997	13	1.43E-03	71.5	6.52E-01	
0	1764.72	38	0	2.29	3533.31	3527	13	2.89E-03	40.9	5.80E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	17	
Number of unidentified lines	16	
Number of lines tentatively identified by NID	1	5.88%

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	5.102E-01	5.134E-01	2.631E-01	51.24	
			---	---			
Total Activity :			5.102E-01	5.134E-01			
Grand Total Activity :			5.102E-01	5.134E-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
AC-228	5.134E-01	2.631E-01	2.715E-01	0.000E+00	1.891

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	2.684E-02		4.744E-02	6.990E-02	0.000E+00	0.384
CS-137	8.293E-02		4.580E-02	8.596E-02	0.000E+00	0.965

DRAFT

```
A,02L71890-6       ,03/14/2017 10:35,02/23/2017 13:10,   1.020E+02,L71890-6 SS GE
B,02L71890-6       ,CS134_137           ,01/03/2017 08:02,02B150101711
C,AC-228  ,YES,    5.134E-01,   2.631E-01,   2.715E-01,,     1.891
C,CS-134  ,NO ,    2.684E-02,   4.744E-02,   6.990E-02,,     0.384
C,CS-137  ,NO ,    8.293E-02,   4.580E-02,   8.596E-02,,     0.965
```

DRAFT

Sec. Review: Analyst: BCK

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 08:54:13.02
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 14-MAR-2017 06:54:11.54

LIMS No., Customer Name, Client ID: L71890-9 SS GEOENGINEERS SEDIMENT

Sample ID : 07L71890-9
Sample Type : SS
Quantity : 1.06880E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:16:00.
Geometry : 07B150101811
BKGFILE : 07BG022417MT
Real Time : 0 01:59:56.62
Live time : 0 01:59:55.58

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	238.54*	235	279	1.99	478.22	3.83E+00	3.26E-02	18.5	2.05E+00
2	1	351.75*	150	100	2.09	704.86	2.91E+00	2.09E-02	16.7	7.90E-01
3	1	583.02*	76	84	1.78	1167.73	1.98E+00	1.05E-02	27.7	1.58E+00
4	1	608.89*	108	66	1.81	1219.50	1.91E+00	1.50E-02	18.7	8.25E-01
5	1	968.88	57	20	3.01	1939.74	1.32E+00	7.96E-03	23.0	1.33E+00
6	1	1120.26*	34	38	2.60	2242.52	1.17E+00	4.70E-03	44.0	2.39E+00
7	1	1460.49*	347	4	2.48	2922.84	9.57E-01	4.82E-02	6.2	9.03E-01
8	1	1764.29*	24	3	2.72	3530.05	8.48E-01	3.27E-03	31.8	6.86E-01

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

Nuclide Line Activity Report

Flag: "*" = Keyline

DRAFT

Sample ID : 07L71890-9 Acquisition date : 14-MAR-2017 06:54:11

Total number of lines in spectrum	8	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	238.54	235	279	1.99	478.22	470	18	3.26E-02	37.1	3.83E+00	
1	351.75	150	100	2.09	704.86	698	13	2.09E-02	33.5	2.91E+00	
1	583.02	76	84	1.78	1167.73	1162	13	1.05E-02	55.4	1.98E+00	
1	608.89	108	66	1.81	1219.50	1214	11	1.50E-02	37.3	1.91E+00	
1	968.88	57	20	3.01	1939.74	1934	17	7.96E-03	46.1	1.32E+00	
1	1120.26	34	38	2.60	2242.52	2236	14	4.70E-03	87.9	1.17E+00	
1	1460.49	347	4	2.48	2922.84	2914	20	4.82E-02	12.4	9.57E-01	
1	1764.29	24	3	2.72	3530.05	3522	14	3.27E-03	63.7	8.48E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 8
Number of unidentified lines 8
Number of lines tentatively identified by NID 0 0.00%
**** There are no nuclides meeting summary criteria ****

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

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	2.286E-02		5.190E-02	7.869E-02	0.000E+00	0.291
CS-137	1.647E-02		4.987E-02	8.554E-02	0.000E+00	0.192
AC-228	1.640E-01		1.996E-01	3.664E-01	0.000E+00	0.448

DRAFT

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A,07L71890-9       ,03/14/2017 08:54,02/23/2017 13:16,   1.069E+02,L71890-9 SS GE
B,07L71890-9       ,CS134_137           ,01/05/2017 07:18,07B150101811
C,CS-134   ,NO ,   2.286E-02,   5.190E-02,   7.869E-02,,     0.291
C,CS-137   ,NO ,   1.647E-02,   4.987E-02,   8.554E-02,,     0.192
C,AC-228   ,NO ,   1.640E-01,   1.996E-01,   3.664E-01,,     0.448
```

DRAFT

Sec. Review: Analyst: DG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 08:54:50.32
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 14-MAR-2017 06:54:11.77

LIMS No., Customer Name, Client ID: L71890-12 SS GEOENGINEERS SEDIMENT

Sample ID : 08L71890-12 Smple Date: 23-FEB-2017 13:22:00.
Sample Type : SS Geometry : 08B150022715
Quantity : 1.39520E+02 g Dry BKGFILE : 08BG022417MT
Start Channel : 25 Energy Tol : 2.00000 Real Time : 0 02:00:32.23
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 02:00:30.12
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.25*	46	251	1.13	133.41	4.96E+00	6.37E-03	67.3	1.24E+00
2	1	77.12	110	329	0.83	161.07	4.88E+00	1.52E-02	30.1	2.09E+00
3	1	84.41*	62	165	1.51	175.61	4.80E+00	8.61E-03	41.1	2.13E+00
4	1	92.99*	92	196	1.22	192.71	4.70E+00	1.27E-02	30.0	5.33E+00
5	1	185.94*	121	192	2.91	378.09	3.34E+00	1.68E-02	26.3	3.11E+00
6	1	239.16*	163	232	1.59	484.23	2.75E+00	2.26E-02	20.7	1.88E+00
7	1	295.62*	73	113	2.64	596.86	2.29E+00	1.02E-02	31.4	1.06E+00
8	1	339.24	75	56	2.02	683.87	2.02E+00	1.04E-02	21.4	6.60E-01
9	1	352.60*	153	100	2.05	710.52	1.95E+00	2.12E-02	17.4	2.14E+00
10	1	510.89*	51	107	2.85	1026.28	1.37E+00	7.08E-03	58.0	4.17E-01
11	1	582.55	65	60	2.01	1169.25	1.20E+00	9.01E-03	28.9	1.56E+00
12	1	608.56*	78	66	1.72	1221.14	1.15E+00	1.07E-02	27.9	1.60E+00
13	1	910.13*	52	28	4.29	1822.90	7.98E-01	7.16E-03	27.9	2.03E+00
14	1	1460.62*	202	19	2.19	2921.78	5.32E-01	2.80E-02	9.7	1.43E+00
15	1	1764.23	26	11	3.58	3528.06	4.53E-01	3.60E-03	33.5	5.96E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	9.012E-01	------	Line Not Found	------
	911.07	52	27.70*	7.979E-01	6.278E-01	6.317E-01	55.72

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 08L71890-12

Acquisition date : 14-MAR-2017 06:54:11

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	6.278E-01	6.317E-01	3.520E-01	55.72	
	Total Activity :		6.278E-01	6.317E-01			
	Grand Total Activity :		6.278E-01	6.317E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 08L71890-12

Acquisition date : 14-MAR-2017 06:54:11

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.25	46	251	1.13	133.41	129	9	6.37E-03	****	4.96E+00	
1	77.12	110	329	0.83	161.07	159	7	1.52E-02	60.2	4.88E+00	
1	84.41	62	165	1.51	175.61	172	8	8.61E-03	82.1	4.80E+00	
1	92.99	92	196	1.22	192.71	189	8	1.27E-02	60.0	4.70E+00	
1	185.94	121	192	2.91	378.09	371	13	1.68E-02	52.5	3.34E+00	
1	239.16	163	232	1.59	484.23	480	12	2.26E-02	41.3	2.75E+00	
1	295.62	73	113	2.64	596.86	592	12	1.02E-02	62.7	2.29E+00	
1	339.24	75	56	2.02	683.87	680	9	1.04E-02	42.9	2.02E+00	
1	352.60	153	100	2.05	710.52	702	16	2.12E-02	34.7	1.95E+00	
1	510.89	51	107	2.85	1026.28	1019	18	7.08E-03	****	1.37E+00	
1	582.55	65	60	2.01	1169.25	1163	15	9.01E-03	57.8	1.20E+00	
1	608.56	78	66	1.72	1221.14	1214	16	1.07E-02	55.8	1.15E+00	
1	1460.62	202	19	2.19	2921.78	2912	20	2.80E-02	19.4	5.32E-01	
1	1764.23	26	11	3.58	3528.06	3519	15	3.60E-03	67.0	4.53E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	6.278E-01	6.317E-01	3.520E-01	55.72	
		Total Activity :	6.278E-01	6.317E-01			

Grand Total Activity : 6.278E-01 6.317E-01

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	6.317E-01	3.520E-01	2.950E-01	0.000E+00	2.141

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

Key-Line

DRAFT

Nuclide	Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-1.658E-02		6.025E-02	8.236E-02	0.000E+00	-0.201
CS-137	2.485E-02		5.611E-02	9.601E-02	0.000E+00	0.259

DRAFT

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A,08L71890-12      ,03/14/2017 08:54,02/23/2017 13:22,   1.395E+02,L71890-12 SS G
B,08L71890-12      ,CS134_137           ,03/03/2017 07:12,08B150022715
C,AC-228   ,YES,   6.317E-01,   3.520E-01,   2.950E-01,,     2.141
C,CS-134   ,NO ,  -1.658E-02,   6.025E-02,   8.236E-02,,    -0.201
C,CS-137   ,NO ,   2.485E-02,   5.611E-02,   9.601E-02,,     0.259
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 08:14:33.33
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 14-MAR-2017 06:54:12.35

LIMS No., Customer Name, Client ID: L71890-15 SS GEOENGINEERS SEDIMENT

Sample ID : 15L71890-15
Sample Type : SS
Quantity : 1.39730E+02 g Dry
Start Channel : 90 Energy Tol : 1.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:28:00.
Geometry : 15B150102011
BKGFILE : 15BG022417MT
Real Time : 0 01:20:16.35
Live time : 0 01:20:15.77

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	87.48*	21	195	0.98	169.12	3.68E+00	4.34E-03	127.2	1.79E+00
2	1	92.10*	103	195	2.93	178.40	4.00E+00	2.14E-02	27.0	1.40E+01
3	1	186.02*	80	115	1.35	366.70	4.74E+00	1.67E-02	31.4	1.32E+00
4	1	238.72*	176	133	1.06	472.35	4.02E+00	3.65E-02	17.3	3.50E+00
5	1	270.50	53	75	2.27	536.05	3.65E+00	1.11E-02	34.1	7.36E-01
6	1	295.27*	79	74	1.52	585.71	3.39E+00	1.65E-02	23.7	5.87E+00
7	1	338.20	46	58	1.70	671.76	3.02E+00	9.59E-03	36.5	1.42E+00
8	1	351.79*	121	75	1.24	698.99	2.92E+00	2.51E-02	16.9	1.14E+00
9	1	510.96*	26	43	3.32	1017.97	2.09E+00	5.36E-03	77.8	2.12E+00
10	1	583.08*	65	47	1.62	1162.49	1.86E+00	1.36E-02	22.8	3.07E+00
11	1	609.14*	54	42	1.43	1214.71	1.78E+00	1.11E-02	25.6	8.72E+00
12	1	846.49*	13	9	2.10	1690.19	1.31E+00	2.69E-03	57.3	4.86E+00
13	1	910.73*	37	18	2.02	1818.84	1.23E+00	7.69E-03	29.2	9.42E-01
14	1	1120.94*	11	16	0.68	2239.79	1.01E+00	2.27E-03	77.6	4.47E+00
15	1	1460.73*	237	0	1.95	2919.95	7.96E-01	4.92E-02	6.9	9.42E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.395E+00	------	Line Not Found	------
	911.07	37	27.70*	1.228E+00	4.373E-01	4.400E-01	58.37

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15L71890-15

Acquisition date : 14-MAR-2017 06:54:12

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	4.373E-01	4.400E-01	2.568E-01	58.37	
	Total Activity :		4.373E-01	4.400E-01			
	Grand Total Activity :		4.373E-01	4.400E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 15L71890-15

Acquisition date : 14-MAR-2017 06:54:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	87.48	21	195	0.98	169.12	164	9	4.34E-03	****	3.68E+00	
1	92.10	103	195	2.93	178.40	176	10	2.14E-02	54.0	4.00E+00	
1	186.02	80	115	1.35	366.70	360	13	1.67E-02	62.8	4.74E+00	
1	238.72	176	133	1.06	472.35	466	16	3.65E-02	34.5	4.02E+00	
1	270.50	53	75	2.27	536.05	531	11	1.11E-02	68.2	3.65E+00	
1	295.27	79	74	1.52	585.71	581	10	1.65E-02	47.4	3.39E+00	
1	338.20	46	58	1.70	671.76	667	12	9.59E-03	73.1	3.02E+00	
1	351.79	121	75	1.24	698.99	694	11	2.51E-02	33.8	2.92E+00	
1	510.96	26	43	3.32	1017.97	1010	18	5.36E-03	****	2.09E+00	
1	583.08	65	47	1.62	1162.49	1155	12	1.36E-02	45.7	1.86E+00	
1	609.14	54	42	1.43	1214.71	1214	5	1.11E-02	51.2	1.78E+00	
1	846.49	13	9	2.10	1690.19	1687	7	2.69E-03	****	1.31E+00	
1	1120.94	11	16	0.68	2239.79	2233	10	2.27E-03	****	1.01E+00	
1	1460.73	237	0	1.95	2919.95	2912	15	4.92E-02	13.7	7.96E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	4.373E-01	4.400E-01	2.568E-01	58.37	
			---------	---------			
Total Activity :			4.373E-01	4.400E-01			
Grand Total Activity :			4.373E-01	4.400E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	4.400E-01	2.568E-01	2.612E-01	0.000E+00	1.684

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

Key-Line

DRAFT

Nuclide	Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-5.236E-02		5.289E-02	6.813E-02	0.000E+00	-0.769
CS-137	3.598E-03		4.284E-02	7.102E-02	0.000E+00	0.051

DRAFT

```
A,15L71890-15      ,03/14/2017 08:14,02/23/2017 13:28,   1.397E+02,L71890-15 SS G
B,15L71890-15      ,CS134_137           ,01/10/2017 07:46,15B150102011
C,AC-228   ,YES,    4.400E-01,   2.568E-01,   2.612E-01,,     1.684
C,CS-134   ,NO ,   -5.236E-02,   5.289E-02,   6.813E-02,,    -0.769
C,CS-137   ,NO ,    3.598E-03,   4.284E-02,   7.102E-02,,     0.051
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 08:16:16.39
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 14-MAR-2017 06:54:13.44

LIMS No., Customer Name, Client ID: L71890-18 SS GEOENGINEERS SEDIMENT

Sample ID : 06L71890-18
Sample Type : SS
Quantity : 1.49950E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:34:00.
Geometry : 06B150011912
BKGFILE : 06BG022417MT
Real Time : 0 01:21:53.35
Live time : 0 01:21:52.18

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	238.61*	97	131	0.99	477.74	3.12E+00	1.97E-02	22.5	5.10E+00
2	1	295.13*	61	91	1.08	590.75	2.63E+00	1.25E-02	34.1	2.09E+00
3	1	337.98	42	67	1.74	676.42	2.34E+00	8.60E-03	40.9	6.40E-01
4	1	351.88*	77	110	1.44	704.22	2.26E+00	1.57E-02	32.7	2.10E+00
5	1	583.18*	43	35	1.76	1166.61	1.45E+00	8.68E-03	33.9	2.17E+00
6	1	608.97*	67	39	1.76	1218.17	1.40E+00	1.35E-02	24.2	3.46E+00
7	1	910.98*	25	33	2.07	1821.81	9.83E-01	5.01E-03	51.9	1.28E+00
8	1	968.93*	18	17	1.93	1937.62	9.31E-01	3.70E-03	50.2	1.12E+00
9	1	1119.54*	25	5	2.79	2238.60	8.20E-01	5.02E-03	28.5	1.92E+00
10	1	1377.21	15	7	1.40	2753.42	6.85E-01	3.02E-03	41.1	7.15E-01
11	1	1460.25*	235	3	1.90	2919.33	6.52E-01	4.78E-02	7.3	5.67E-01
12	1	1763.78*	15	0	2.46	3525.64	5.60E-01	2.96E-03	32.6	4.27E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.109E+00	------	Line Not Found	------
	911.07	25	27.70*	9.834E-01	3.317E-01	3.338E-01	103.72

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 06L71890-18

Acquisition date : 14-MAR-2017 06:54:13

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	3.317E-01	3.338E-01	3.462E-01	103.72	
	Total Activity :		3.317E-01	3.338E-01			
	Grand Total Activity :		3.317E-01	3.338E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 06L71890-18 Acquisition date : 14-MAR-2017 06:54:13

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	238.61	97	131	0.99	477.74	472	9	1.97E-02	45.0	3.12E+00	
1	295.13	61	91	1.08	590.75	584	11	1.25E-02	68.2	2.63E+00	
1	337.98	42	67	1.74	676.42	672	11	8.60E-03	81.9	2.34E+00	
1	351.88	77	110	1.44	704.22	698	15	1.57E-02	65.4	2.26E+00	
1	583.18	43	35	1.76	1166.61	1160	13	8.68E-03	67.7	1.45E+00	
1	608.97	67	39	1.76	1218.17	1212	12	1.35E-02	48.5	1.40E+00	
1	968.93	18	17	1.93	1937.62	1932	10	3.70E-03	****	9.31E-01	
1	1119.54	25	5	2.79	2238.60	2234	10	5.02E-03	57.0	8.20E-01	
1	1377.21	15	7	1.40	2753.42	2748	9	3.02E-03	82.1	6.85E-01	
1	1460.25	235	3	1.90	2919.33	2913	12	4.78E-02	14.5	6.52E-01	
1	1763.78	15	0	2.46	3525.64	3519	12	2.96E-03	65.2	5.60E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	3.317E-01	3.338E-01	3.462E-01	103.72	
			---	---			
Total Activity :			3.317E-01	3.338E-01			
Grand Total Activity :			3.317E-01	3.338E-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
AC-228	3.338E-01	3.462E-01	3.486E-01	0.000E+00	0.957

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

DRAFT

CS-134	4.673E-03	5.137E-02	7.581E-02	0.000E+00	0.062
CS-137	2.691E-02	5.372E-02	9.453E-02	0.000E+00	0.285

DRAFT

```
A,06L71890-18      ,03/14/2017 08:16,02/23/2017 13:34,   1.499E+02,L71890-18 SS G
B,06L71890-18      ,CS134_137           ,01/05/2017 07:18,06B150011912
C,AC-228   ,YES,   3.338E-01,   3.462E-01,   3.486E-01,,     0.957
C,CS-134   ,NO ,   4.673E-03,   5.137E-02,   7.581E-02,,     0.062
C,CS-137   ,NO ,   2.691E-02,   5.372E-02,   9.453E-02,,     0.285
```

DRAFT

Sec. Review: 2 Analyst: DG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 08:16:42.84
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 14-MAR-2017 06:54:14.48

LIMS No., Customer Name, Client ID: L71890-21 SS GEOENGINEERS SEDIMENT

Sample ID : 14L71890-21
Sample Type : SS
Quantity : 1.61870E+02 g Dry
Start Channel : 90 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:40:00.
Geometry : 14B150012012
BKGFILE : 14BG022417MT
Real Time : 0 01:22:18.10
Live time : 0 01:22:16.78

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	92.33*	21	197	1.75	182.22	1.98E+00	4.34E-03	141.6	2.78E+00
2	1	185.84*	48	154	1.66	369.41	3.11E+00	9.64E-03	54.0	1.78E+00
3	1	238.29*	118	120	1.13	474.42	2.71E+00	2.39E-02	19.8	2.60E+00
4	1	295.39*	51	76	2.02	588.73	2.33E+00	1.03E-02	36.4	6.30E-01
5	1	351.90*	85	108	1.43	701.86	2.04E+00	1.72E-02	29.1	1.68E+00
6	1	511.03*	23	90	2.67	1020.49	1.53E+00	4.61E-03	120.2	1.58E+00
7	1	583.16*	68	41	2.80	1164.92	1.38E+00	1.37E-02	25.1	1.31E+00
8	1	609.17*	90	43	1.82	1217.01	1.34E+00	1.82E-02	19.7	1.63E+00
9	1	911.61*	33	18	2.95	1822.70	9.72E-01	6.69E-03	32.9	6.85E-01
10	1	1461.16*	200	13	2.33	2923.63	6.67E-01	4.06E-02	9.1	1.40E+00

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.086E+00	------	Line Not Found	------
	911.07	33	27.70*	9.721E-01	4.149E-01	4.175E-01	65.70

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 14L71890-21

Acquisition date : 14-MAR-2017 06:54:14

Total number of lines in spectrum	10	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	1	10.00%

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	4.149E-01	4.175E-01	2.743E-01	65.70	
	Total Activity :		4.149E-01	4.175E-01			
	Grand Total Activity :		4.149E-01	4.175E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 14L71890-21 Acquisition date : 14-MAR-2017 06:54:14

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	92.33	21	197	1.75	182.22	178	13	4.34E-03	****	1.98E+00	
1	185.84	48	154	1.66	369.41	363	11	9.64E-03	****	3.11E+00	
1	238.29	118	120	1.13	474.42	469	9	2.39E-02	39.7	2.71E+00	
1	295.39	51	76	2.02	588.73	584	10	1.03E-02	72.8	2.33E+00	
1	351.90	85	108	1.43	701.86	695	14	1.72E-02	58.2	2.04E+00	
1	511.03	23	90	2.67	1020.49	1010	20	4.61E-03	****	1.53E+00	
1	583.16	68	41	2.80	1164.92	1157	15	1.37E-02	50.2	1.38E+00	
1	609.17	90	43	1.82	1217.01	1209	14	1.82E-02	39.5	1.34E+00	
1	1461.16	200	13	2.33	2923.63	2914	18	4.06E-02	18.3	6.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	10	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	1	10.00%

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	4.149E-01	4.175E-01	2.743E-01	65.70	
			---	---			
Total Activity :			4.149E-01	4.175E-01			
Grand Total Activity :			4.149E-01	4.175E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	4.175E-01	2.743E-01	3.161E-01	0.000E+00	1.321

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	1.746E-03		6.321E-02	9.131E-02	0.000E+00	0.019
CS-137	-6.566E-03		5.710E-02	9.379E-02	0.000E+00	-0.070

DRAFT

```
A,14L71890-21      ,03/14/2017 08:16,02/23/2017 13:40,   1.619E+02,L71890-21 SS G
B,14L71890-21      ,CS134_137           ,01/03/2017 08:02,14B150012012
C,AC-228   ,YES,    4.175E-01,   2.743E-01,   3.161E-01,,     1.321
C,CS-134   ,NO ,    1.746E-03,   6.321E-02,   9.131E-02,,     0.019
C,CS-137   ,NO ,   -6.566E-03,   5.710E-02,   9.379E-02,,    -0.070
```

DRAFT

Sec. Review: Analyst: BC

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 08:18:37.34
TBE23 03017322 HpGe ********** Aquisition Date/Time: 14-MAR-2017 06:54:16.42

LIMS No., Customer Name, Client ID: L71890-24 SS GEOENGINEERS SEDIMENT

Sample ID : 23L71890-24
Sample Type : SS
Quantity : 1.89930E+02 g Dry
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:46:00.
Geometry : 23B150082004
BKGFILE : 23BG022417MT
Real Time : 0 01:24:02.58
Live time : 0 01:23:57.62

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	33.83*	42	62	2.64	68.48	3.72E-01	8.41E-03	59.7	1.50E+00
2	0	185.21*	88	231	1.87	370.65	5.71E+00	1.75E-02	40.4	
3	0	239.11*	386	217	2.18	478.26	4.87E+00	7.66E-02	11.0	
4	0	294.90*	75	123	1.61	589.67	4.13E+00	1.49E-02	31.4	
5	0	351.18*	165	109	1.90	702.07	3.56E+00	3.28E-02	16.9	
6	0	510.57*	36	80	1.85	1020.48	2.55E+00	7.06E-03	70.4	
7	0	582.87*	94	60	2.96	1164.97	2.27E+00	1.86E-02	23.2	
8	0	608.79*	86	74	2.29	1216.77	2.19E+00	1.70E-02	24.6	
9	0	910.41*	54	24	2.53	1819.82	1.56E+00	1.07E-02	26.5	
10	0	1459.95*	379	20	2.78	2919.76	1.07E+00	7.52E-02	6.3	
11	0	1763.08*	22	4	2.43	3527.16	9.15E-01	4.43E-03	33.0	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.747E+00	------ Line Not Found		------
	911.07	54	27.70*	1.564E+00	3.528E-01	3.550E-01	53.10

Flag: "*" = Keyline

DRAFT

Sample ID : 23L71890-24 Acquisition date : 14-MAR-2017 06:54:16

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	3.528E-01	3.550E-01	1.885E-01	53.10	
			---------	---------			
Total Activity :			3.528E-01	3.550E-01			
Grand Total Activity :			3.528E-01	3.550E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 23L71890-24 Acquisition date : 14-MAR-2017 06:54:16

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	33.83	42	62	2.64	68.48	61	19	8.41E-03	****	3.72E-01	
0	185.21	88	231	1.87	370.65	363	15	1.75E-02	80.9	5.71E+00	
0	239.11	386	217	2.18	478.26	468	21	7.66E-02	21.9	4.87E+00	
0	294.90	75	123	1.61	589.67	585	11	1.49E-02	62.9	4.13E+00	
0	351.18	165	109	1.90	702.07	693	17	3.28E-02	33.8	3.56E+00	
0	510.57	36	80	1.85	1020.48	1012	18	7.06E-03	****	2.55E+00	
0	582.87	94	60	2.96	1164.97	1155	20	1.86E-02	46.5	2.27E+00	
0	608.79	86	74	2.29	1216.77	1210	14	1.70E-02	49.1	2.19E+00	
0	1459.95	379	20	2.78	2919.76	2911	20	7.52E-02	12.6	1.07E+00	
0	1763.08	22	4	2.43	3527.16	3518	16	4.43E-03	66.0	9.15E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	3.528E-01	3.550E-01	1.885E-01	53.10	
		Total Activity :	3.528E-01	3.550E-01			
		Grand Total Activity :	3.528E-01	3.550E-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
AC-228	3.550E-01	1.885E-01	2.084E-01	0.000E+00	1.704

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	5.068E-02		4.587E-02	7.555E-02	0.000E+00	0.671

DRAFT

CS-137	1.128E-03	3.200E-02	5.795E-02	0.000E+00	0.019

DRAFT

```
A,23L71890-24      ,03/14/2017 08:18,02/23/2017 13:46,   1.899E+02,L71890-24 SS G
B,23L71890-24      ,CS134_137           ,01/05/2017 07:18,23B150082004
C,AC-228  ,YES,    3.550E-01,   1.885E-01,   2.084E-01,,     1.704
C,CS-134  ,NO ,    5.068E-02,   4.587E-02,   7.555E-02,,     0.671
C,CS-137  ,NO ,    1.128E-03,   3.200E-02,   5.795E-02,,     0.019
```

DRAFT

Sec. Review: 2 Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 09:10:51.02
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 14-MAR-2017 08:02:27.48

LIMS No., Customer Name, Client ID: L71890-27 SS GEOENGINEERS SEDIMENT

Sample ID : 01L71890-27
Sample Type : SS
Quantity : 1.58250E+02 g Dry
Start Channel : 90 Energy Tol : 1.50000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:52:00.
Geometry : 01B150022715
BKGFILE : 01BG022417MT
Real Time : 0 01:08:10.66
Live time : 0 01:08:09.71

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	72.91*	26	57	0.97	146.02	2.07E+00	6.40E-03	47.8	3.69E+00
2	1	75.00*	55	90	1.04	150.20	2.26E+00	1.34E-02	33.1	
3	1	77.00	56	112	1.09	154.20	2.45E+00	1.37E-02	34.6	
4	1	93.17*	13	178	1.50	186.52	3.75E+00	3.24E-03	201.9	7.23E+00
5	1	185.87*	39	129	1.38	371.81	4.92E+00	9.42E-03	59.7	1.45E+00
6	5	238.74*	176	66	1.08	477.49	4.33E+00	4.31E-02	10.9	1.27E+00
7	5	241.76	46	105	2.03	483.54	4.30E+00	1.13E-02	57.5	
8	1	295.25*	48	83	1.44	590.47	3.77E+00	1.18E-02	39.0	3.04E+00
9	1	338.46*	36	69	1.40	676.88	3.43E+00	8.84E-03	48.8	9.09E-01
10	1	351.92*	109	65	1.27	703.79	3.33E+00	2.66E-02	18.7	1.32E+00
11	1	583.00*	73	26	1.99	1165.93	2.28E+00	1.78E-02	20.6	9.65E-01
12	1	609.38*	89	43	1.69	1218.70	2.20E+00	2.18E-02	20.2	2.80E+00
13	1	727.34	32	23	1.74	1454.69	1.91E+00	7.84E-03	36.0	5.62E-01
14	1	911.45*	41	28	2.07	1823.10	1.58E+00	1.00E-02	35.2	2.30E+00
15	4	1120.43*	31	15	2.90	2241.42	1.32E+00	7.49E-03	30.6	7.23E-01
16	4	1128.79	20	19	2.91	2258.16	1.31E+00	4.91E-03	56.4	
17	1	1460.51*	256	7	2.36	2922.46	1.07E+00	6.26E-02	6.9	1.16E+00
18	1	1763.80*	19	3	2.87	3530.15	9.42E-01	4.60E-03	30.1	4.46E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.772E+00	------	Line Not Found	------
	911.07	41	27.70*	1.578E+00	3.907E-01	3.932E-01	70.41

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 01L71890-27

Acquisition date : 14-MAR-2017 08:02:27

Total number of lines in spectrum	18	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	1	5.56%

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	3.907E-01	3.932E-01	2.768E-01	70.41	
			---------	---------			
Total Activity :			3.907E-01	3.932E-01			
Grand Total Activity :			3.907E-01	3.932E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 01L71890-27 Acquisition date : 14-MAR-2017 08:02:27

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.91	26	57	0.97	146.02	144	15	6.40E-03	95.6	2.07E+00	
1	75.00	55	90	1.04	150.20	144	15	1.34E-02	66.1	2.26E+00	
1	77.00	56	112	1.09	154.20	144	15	1.37E-02	69.2	2.45E+00	
1	93.17	13	178	1.50	186.52	181	10	3.24E-03	****	3.75E+00	
1	185.87	39	129	1.38	371.81	368	10	9.42E-03	****	4.92E+00	
5	238.74	176	66	1.08	477.49	470	21	4.31E-02	21.7	4.33E+00	
5	241.76	46	105	2.03	483.54	470	21	1.13E-02	****	4.30E+00	
1	295.25	48	83	1.44	590.47	585	10	1.18E-02	78.0	3.77E+00	
1	338.46	36	69	1.40	676.88	671	11	8.84E-03	97.5	3.43E+00	
1	351.92	109	65	1.27	703.79	698	12	2.66E-02	37.3	3.33E+00	
1	583.00	73	26	1.99	1165.93	1160	15	1.78E-02	41.2	2.28E+00	
1	609.38	89	43	1.69	1218.70	1212	14	2.18E-02	40.3	2.20E+00	
1	727.34	32	23	1.74	1454.69	1449	12	7.84E-03	71.9	1.91E+00	
4	1120.43	31	15	2.90	2241.42	2236	30	7.49E-03	61.2	1.32E+00	
4	1128.79	20	19	2.91	2258.16	2236	30	4.91E-03	****	1.31E+00	
1	1460.51	256	7	2.36	2922.46	2915	14	6.26E-02	13.8	1.07E+00	
1	1763.80	19	3	2.87	3530.15	3525	11	4.60E-03	60.3	9.42E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	1	5.56%

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	3.907E-01	3.932E-01	2.768E-01	70.41	
			---------	---------			
	Total Activity :		3.907E-01	3.932E-01			
	Grand Total Activity :		3.907E-01	3.932E-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
AC-228	3.932E-01	2.768E-01	2.434E-01	0.000E+00	1.615

DRAFT

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-1.815E-03		4.042E-02	5.774E-02	0.000E+00	-0.031
CS-137	1.497E-02		3.824E-02	6.600E-02	0.000E+00	0.227

DRAFT

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A,01L71890-27     ,03/14/2017 09:10,02/23/2017 13:52,   1.583E+02,L71890-27 SS G
B,01L71890-27     ,CS134_137           ,01/05/2017 07:18,01B150022715
C,AC-228  ,YES,   3.932E-01,   2.768E-01,   2.434E-01,,    1.615
C,CS-134  ,NO ,  -1.815E-03,   4.042E-02,   5.774E-02,,   -0.031
C,CS-137  ,NO ,   1.497E-02,   3.824E-02,   6.600E-02,,    0.227
```

DRAFT

Sec. ~~Review~~: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 09:28:00.43
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 14-MAR-2017 08:22:16.33

LIMS No., Customer Name, Client ID: L71890-30 SS GEOENGINEERS SEDIMENT

Sample ID : 15L71890-30
Sample Type : SS
Quantity : 1.80480E+02 g Dry
Start Channel : 90 Energy Tol : 1.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:58:00.
Geometry : 15B150102011
BKGFILE : 15BG022417MT
Real Time : 0 01:05:38.09
Live time : 0 01:05:37.59

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.95*	53	142	1.56	144.00	2.63E+00	1.35E-02	46.1	3.48E+00
2	1	77.28*	87	131	1.72	148.69	2.84E+00	2.22E-02	30.0	
3	6	90.28	20	37	1.15	174.74	3.88E+00	4.98E-03	46.8	5.63E+00
4	6	93.02*	109	98	1.82	180.24	4.06E+00	2.77E-02	19.5	
5	1	185.75*	104	151	2.99	366.16	4.74E+00	2.65E-02	26.8	6.32E+00
6	1	238.52*	186	84	1.63	471.95	4.03E+00	4.72E-02	11.5	3.28E+00
7	1	241.70	62	68	1.74	478.32	3.99E+00	1.58E-02	32.0	
8	1	295.05*	89	49	1.78	585.26	3.40E+00	2.25E-02	20.0	1.92E+00
9	1	338.37	45	64	1.83	672.10	3.02E+00	1.15E-02	43.2	1.32E+00
10	1	351.85*	97	85	1.21	699.10	2.92E+00	2.45E-02	21.7	2.88E+00
11	1	462.00	17	23	1.87	919.88	2.29E+00	4.23E-03	54.1	7.41E-01
12	1	582.78*	48	23	1.51	1161.89	1.86E+00	1.23E-02	24.5	7.95E-01
13	1	609.12*	74	38	1.77	1214.66	1.78E+00	1.88E-02	22.0	1.88E+00
14	1	911.36*	34	11	2.40	1820.10	1.23E+00	8.52E-03	27.3	5.30E-01
15	1	1120.13*	18	5	1.90	2238.17	1.01E+00	4.61E-03	38.8	1.95E+00
16	1	1460.60	226	4	2.15	2919.69	7.96E-01	5.75E-02	6.9	6.50E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.395E+00	------	Line Not Found	------
	911.07	34	27.70*	1.227E+00	3.755E-01	3.778E-01	54.69

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15L71890-30

Acquisition date : 14-MAR-2017 08:22:16

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	3.755E-01	3.778E-01	2.066E-01	54.69	
		Total Activity :	3.755E-01	3.778E-01			
		Grand Total Activity :	3.755E-01	3.778E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.95	53	142	1.56	144.00	137	17	1.35E-02	92.3	2.63E+00	
1	77.28	87	131	1.72	148.69	137	17	2.22E-02	60.0	2.84E+00	
6	90.28	20	37	1.15	174.74	173	12	4.98E-03	93.6	3.88E+00	
6	93.02	109	98	1.82	180.24	173	12	2.77E-02	38.9	4.06E+00	
1	185.75	104	151	2.99	366.16	360	14	2.65E-02	53.6	4.74E+00	
1	238.52	186	84	1.63	471.95	464	20	4.72E-02	23.0	4.03E+00	
1	241.70	62	68	1.74	478.32	464	20	1.58E-02	64.0	3.99E+00	
1	295.05	89	49	1.78	585.26	578	13	2.25E-02	40.0	3.40E+00	
1	338.37	45	64	1.83	672.10	665	16	1.15E-02	86.4	3.02E+00	
1	351.85	97	85	1.21	699.10	694	12	2.45E-02	43.4	2.92E+00	
1	462.00	17	23	1.87	919.88	917	8	4.23E-03	****	2.29E+00	
1	582.78	48	23	1.51	1161.89	1157	11	1.23E-02	48.9	1.86E+00	
1	609.12	74	38	1.77	1214.66	1208	15	1.88E-02	43.9	1.78E+00	
1	1120.13	18	5	1.90	2238.17	2235	10	4.61E-03	77.5	1.01E+00	
1	1460.60	226	4	2.15	2919.69	2912	14	5.75E-02	13.8	7.96E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	3.755E-01	3.778E-01	2.066E-01	54.69	
Total Activity :			3.755E-01	3.778E-01			
Grand Total Activity :			3.755E-01	3.778E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	3.778E-01	2.066E-01	2.657E-01	0.000E+00	1.422

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	3.942E-03		4.232E-02	6.109E-02	0.000E+00	0.065
CS-137	-1.556E-02		3.949E-02	6.110E-02	0.000E+00	-0.255

DRAFT

```
A,15L71890-30      ,03/14/2017 09:28,02/23/2017 13:58,   1.805E+02,L71890-30 SS G
B,15L71890-30      ,CS134_137           ,01/10/2017 07:46,15B150102011
C,AC-228   ,YES,   3.778E-01,   2.066E-01,   2.657E-01,,    1.422
C,CS-134   ,NO ,   3.942E-03,   4.232E-02,   6.109E-02,,    0.065
C,CS-137   ,NO ,  -1.556E-02,   3.949E-02,   6.110E-02,,   -0.255
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 09:28:28.14
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 14-MAR-2017 08:22:17.51

LIMS No., Customer Name, Client ID: L71890-33 SS GEOENGINEERS SEDIMENT

Sample ID : 06L71890-33 Smple Date: 23-FEB-2017 14:04:00.
Sample Type : SS Geometry : 06B150011912
Quantity : 1.71070E+02 g Dry BKGFILE : 06BG022417MT
Start Channel : 40 Energy Tol : 2.00000 Real Time : 0 01:05:55.39
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:05:54.42
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	185.76*	45	98	1.55	372.06	3.67E+00	1.14E-02	43.5	1.20E+00
2	1	238.61*	81	110	0.92	477.75	3.12E+00	2.05E-02	26.3	1.59E+00
3	1	295.32*	39	58	1.40	591.13	2.63E+00	9.90E-03	38.1	4.30E+00
4	1	351.83*	78	49	1.46	704.10	2.26E+00	1.98E-02	21.5	1.69E+00
5	1	582.79*	43	20	2.03	1165.84	1.45E+00	1.10E-02	25.7	3.58E+00
6	1	608.97*	68	8	1.74	1218.17	1.40E+00	1.73E-02	16.0	8.90E-01
7	1	910.59*	22	10	1.17	1821.03	9.84E-01	5.58E-03	39.1	1.12E+00
8	1	970.90	44	15	1.88	1941.55	9.30E-01	1.11E-02	25.9	1.39E+01
9	1	1460.32*	153	6	1.89	2919.47	6.51E-01	3.86E-02	9.5	8.43E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.109E+00	------	Line Not Found	------
	911.07	22	27.70*	9.837E-01	3.233E-01	3.253E-01	78.13

Flag: "*" = Keyline

DRAFT

Sample ID : 06L71890-33 Acquisition date : 14-MAR-2017 08:22:17

Total number of lines in spectrum	9	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	1	11.11%

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	3.233E-01	3.253E-01	2.541E-01	78.13	
			---------	---------			
Total Activity :			3.233E-01	3.253E-01			
Grand Total Activity :			3.233E-01	3.253E-01			

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

DRAFT

Sample ID : 06L71890-33 Acquisition date : 14-MAR-2017 08:22:17

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	185.76	45	98	1.55	372.06	368	9	1.14E-02	87.0	3.67E+00	
1	238.61	81	110	0.92	477.75	473	9	2.05E-02	52.6	3.12E+00	
1	295.32	39	58	1.40	591.13	587	9	9.90E-03	76.3	2.63E+00	
1	351.83	78	49	1.46	704.10	698	11	1.98E-02	42.9	2.26E+00	
1	582.79	43	20	2.03	1165.84	1161	10	1.10E-02	51.3	1.45E+00	
1	608.97	68	8	1.74	1218.17	1213	11	1.73E-02	32.0	1.40E+00	
1	970.90	44	15	1.88	1941.55	1932	18	1.11E-02	51.8	9.30E-01	
1	1460.32	153	6	1.89	2919.47	2913	12	3.86E-02	19.1	6.51E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	9	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	1	11.11%

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	3.233E-01	3.253E-01	2.541E-01	78.13	
	Total Activity :		3.233E-01	3.253E-01			
	Grand Total Activity :		3.233E-01	3.253E-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
AC-228	3.253E-01	2.541E-01	2.684E-01	0.000E+00	1.212

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-3.192E-02		4.464E-02	5.450E-02	0.000E+00	-0.586
CS-137	5.791E-03		5.284E-02	8.919E-02	0.000E+00	0.065

DRAFT

```
A,06L71890-33      ,03/14/2017 09:28,02/23/2017 14:04,   1.711E+02,L71890-33 SS G
B,06L71890-33      ,CS134_137           ,01/05/2017 07:18,06B150011912
C,AC-228   ,YES,    3.253E-01,   2.541E-01,   2.684E-01,,    1.212
C,CS-134   ,NO ,   -3.192E-02,   4.464E-02,   5.450E-02,,   -0.586
C,CS-137   ,NO ,    5.791E-03,   5.284E-02,   8.919E-02,,    0.065
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 09:29:52.40
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 14-MAR-2017 08:22:19.00

LIMS No., Customer Name, Client ID: L71890-36 SS GEOENGINEERS SEDIMENT

Sample ID : 14L71890-36
Sample Type : SS
Quantity : 1.55030E+02 g Dry
Start Channel : 90 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 14:10:00.
Geometry : 14B150012012
BKGFILE : 14BG022417MT
Real Time : 0 01:07:24.82
Live time : 0 01:07:23.76

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	4	74.51*	77	122	2.07	146.55	9.89E-01	1.90E-02	33.7	4.54E+00
2	4	76.79	35	86	1.36	151.12	1.12E+00	8.71E-03	52.9	
3	1	84.44*	5	123	1.74	166.43	1.55E+00	1.14E-03	429.7	2.64E+00
4	1	238.27*	109	115	1.23	474.38	2.71E+00	2.69E-02	21.8	1.37E+00
5	1	241.66	30	88	1.94	481.17	2.69E+00	7.37E-03	57.9	1.51E+00
6	1	295.07*	41	91	1.87	588.08	2.33E+00	1.02E-02	51.9	2.05E+00
7	1	351.96*	65	55	1.43	701.98	2.04E+00	1.61E-02	25.8	1.14E+00
8	1	510.88*	21	63	3.46	1020.19	1.53E+00	5.10E-03	108.8	2.13E+00
9	1	583.32*	35	27	2.06	1165.24	1.38E+00	8.60E-03	33.7	6.38E-01
10	1	609.20*	48	33	1.78	1217.06	1.34E+00	1.20E-02	30.6	1.70E+00
11	1	911.76*	29	27	2.62	1823.01	9.72E-01	7.20E-03	44.1	1.37E+00
12	1	970.85*	7	18	4.52	1941.35	9.23E-01	1.77E-03	175.7	1.43E+00
13	1	1461.09*	179	0	2.66	2923.49	6.67E-01	4.43E-02	8.2	1.26E+00

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.086E+00	------	Line Not Found	------
	911.07	29	27.70*	9.719E-01	4.661E-01	4.690E-01	88.23

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 14L71890-36

Acquisition date : 14-MAR-2017 08:22:19

Total number of lines in spectrum	13	
Number of unidentified lines	12	
Number of lines tentatively identified by NID	1	7.69%

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	4.661E-01	4.690E-01	4.138E-01	88.23	
			---	---			
Total Activity :			4.661E-01	4.690E-01			
Grand Total Activity :			4.661E-01	4.690E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	74.51	77	122	2.07	146.55	140	15	1.90E-02	67.4	9.89E-01	
4	76.79	35	86	1.36	151.12	140	15	8.71E-03	****	1.12E+00	
1	84.44	5	123	1.74	166.43	163	8	1.14E-03	****	1.55E+00	
1	238.27	109	115	1.23	474.38	469	10	2.69E-02	43.5	2.71E+00	
1	241.66	30	88	1.94	481.17	478	8	7.37E-03	****	2.69E+00	
1	295.07	41	91	1.87	588.08	581	13	1.02E-02	****	2.33E+00	
1	351.96	65	55	1.43	701.98	697	10	1.61E-02	51.5	2.04E+00	
1	510.88	21	63	3.46	1020.19	1011	18	5.10E-03	****	1.53E+00	
1	583.32	35	27	2.06	1165.24	1161	9	8.60E-03	67.3	1.38E+00	
1	609.20	48	33	1.78	1217.06	1210	13	1.20E-02	61.1	1.34E+00	
1	970.85	7	18	4.52	1941.35	1932	19	1.77E-03	****	9.23E-01	
1	1461.09	179	0	2.66	2923.49	2914	17	4.43E-02	16.4	6.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	13	
Number of unidentified lines	12	
Number of lines tentatively identified by NID	1	7.69%

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	4.661E-01	4.690E-01	4.138E-01	88.23	
Total Activity :			4.661E-01	4.690E-01			
Grand Total Activity :			4.661E-01	4.690E-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
AC-228	4.690E-01	4.138E-01	4.111E-01	0.000E+00	1.141

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

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CS-134	-1.301E-02	7.562E-02	1.061E-01	0.000E+00	-0.123
CS-137	-1.274E-02	6.120E-02	9.906E-02	0.000E+00	-0.129

DRAFT

```
A,14L71890-36      ,03/14/2017 09:29,02/23/2017 14:10,   1.550E+02,L71890-36 SS G
B,14L71890-36      ,CS134_137           ,01/03/2017 08:02,14B150012012
C,AC-228   ,YES,    4.690E-01,   4.138E-01,   4.111E-01,,    1.141
C,CS-134   ,NO ,   -1.301E-02,   7.562E-02,   1.061E-01,,   -0.123
C,CS-137   ,NO ,   -1.274E-02,   6.120E-02,   9.906E-02,,   -0.129
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 09:32:22.89
TBE23 03017322 HpGe ********** Aquisition Date/Time: 14-MAR-2017 08:22:21.25

LIMS No., Customer Name, Client ID: L71890-39 SS GEOENGINEERS SEDIMENT

Sample ID : 23L71890-39
Sample Type : SS
Quantity : 1.64600E+02 g Dry
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 14:16:00.
Geometry : 23B150082004
BKGFILE : 23BG022417MT
Real Time : 0 01:06:56.32
Live time : 0 01:06:52.55

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	185.71*	69	234	1.03	371.65	5.71E+00	1.72E-02	53.3	
2	0	238.88*	264	165	2.12	477.79	4.87E+00	6.59E-02	12.9	
3	0	294.58*	91	123	2.23	589.04	4.14E+00	2.27E-02	30.1	
4	0	351.35*	126	101	2.20	702.40	3.56E+00	3.15E-02	19.9	
5	0	609.87*	98	78	2.79	1218.92	2.18E+00	2.44E-02	26.0	
6	0	1460.07*	279	10	2.66	2919.99	1.07E+00	6.94E-02	7.0	

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

Nuclide Line Activity Report

Flag: "*" = Keyline

DRAFT

Sample ID : 23L71890-39 Acquisition date : 14-MAR-2017 08:22:21

Total number of lines in spectrum	6	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

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

DRAFT

Unidentified Energy Lines
Sample ID : 23L71890-39 Acquisition date : 14-MAR-2017 08:22:21

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	185.71	69	234	1.03	371.65	361	17	1.72E-02	****	5.71E+00	
0	238.88	264	165	2.12	477.79	471	17	6.59E-02	25.7	4.87E+00	
0	294.58	91	123	2.23	589.04	579	17	2.27E-02	60.2	4.14E+00	
0	351.35	126	101	2.20	702.40	693	15	3.15E-02	39.8	3.56E+00	
0	609.87	98	78	2.79	1218.92	1208	22	2.44E-02	52.0	2.18E+00	
0	1460.07	279	10	2.66	2919.99	2910	17	6.94E-02	13.9	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 6
Number of unidentified lines 6
Number of lines tentatively identified by NID 0 0.00%
**** There are no nuclides meeting summary criteria ****

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

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	1.392E-02		6.447E-02	9.890E-02	0.000E+00	0.141
CS-137	2.097E-02		4.522E-02	8.517E-02	0.000E+00	0.246
AC-228	3.679E-01		1.955E-01	4.136E-01	0.000E+00	0.889

DRAFT

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A,23L71890-39     ,03/14/2017 09:32,02/23/2017 14:16,   1.646E+02,L71890-39 SS G
B,23L71890-39     ,CS134_137          ,01/05/2017 07:18,23B150082004
C,CS-134  ,NO ,   1.392E-02,   6.447E-02,   9.890E-02,,     0.141
C,CS-137  ,NO ,   2.097E-02,   4.522E-02,   8.517E-02,,     0.246
C,AC-228  ,NO ,   3.679E-01,   1.955E-01,   4.136E-01,,     0.889
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 10:35:39.88
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 14-MAR-2017 08:57:19.15

LIMS No., Customer Name, Client ID: L71890-42 SS GEOENGINEERS SEDIMENT

Sample ID : 08L71890-42 Smple Date: 23-FEB-2017 14:22:00.
Sample Type : SS Geometry : 08B150022715
Quantity : 1.75030E+02 g Dry BKGFILE : 08BG022417MT
Start Channel : 25 Energy Tol : 2.00000 Real Time : 0 01:38:17.75
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:38:16.02
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.29*	17	277	2.00	133.49	4.96E+00	2.95E-03	188.7	2.18E+00
2	1	74.95*	61	242	1.38	156.75	4.90E+00	1.04E-02	53.4	2.50E+00
3	1	77.14	137	197	1.13	161.12	4.88E+00	2.32E-02	20.0	
4	1	92.97*	46	307	1.67	192.69	4.70E+00	7.81E-03	82.5	1.65E+00
5	1	186.46*	62	114	1.97	379.14	3.33E+00	1.06E-02	36.2	1.90E+00
6	1	239.23*	123	249	1.39	484.38	2.75E+00	2.09E-02	29.2	1.13E+00
7	1	295.95*	50	79	1.57	597.51	2.29E+00	8.46E-03	36.1	1.79E+00
8	1	352.74*	105	73	1.36	710.79	1.95E+00	1.78E-02	18.1	6.90E+00
9	1	511.17*	30	49	2.89	1026.85	1.36E+00	5.10E-03	68.2	1.19E+00
10	1	582.94	63	58	3.13	1170.02	1.20E+00	1.08E-02	30.5	1.97E+00
11	1	608.61*	72	81	1.88	1221.25	1.15E+00	1.23E-02	31.5	1.07E+00
12	1	910.31*	29	39	2.09	1823.26	7.98E-01	4.97E-03	46.7	5.36E-01
13	1	968.22	26	26	2.95	1938.84	7.56E-01	4.36E-03	39.4	4.09E+00
14	1	1345.14	13	4	1.34	2691.21	5.70E-01	2.13E-03	40.8	3.10E-01
15	1	1460.62*	215	15	2.05	2921.78	5.32E-01	3.65E-02	8.4	2.47E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	9.012E-01	------	Line Not Found	------
	911.07	29	27.70*	7.977E-01	3.474E-01	3.496E-01	93.49

Flag: "*" = Keyline

DRAFT

Sample ID : 08L71890-42 Acquisition date : 14-MAR-2017 08:57:19

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	3.474E-01	3.496E-01	3.268E-01	93.49	
	Total Activity :		3.474E-01	3.496E-01			
	Grand Total Activity :		3.474E-01	3.496E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.29	17	277	2.00	133.49	129	10	2.95E-03	****	4.96E+00	
1	74.95	61	242	1.38	156.75	149	17	1.04E-02	****	4.90E+00	
1	77.14	137	197	1.13	161.12	149	17	2.32E-02	40.1	4.88E+00	
1	92.97	46	307	1.67	192.69	187	13	7.81E-03	****	4.70E+00	
1	186.46	62	114	1.97	379.14	374	10	1.06E-02	72.4	3.33E+00	
1	239.23	123	249	1.39	484.38	478	14	2.09E-02	58.3	2.75E+00	
1	295.95	50	79	1.57	597.51	593	9	8.46E-03	72.1	2.29E+00	
1	352.74	105	73	1.36	710.79	707	9	1.78E-02	36.2	1.95E+00	
1	511.17	30	49	2.89	1026.85	1020	14	5.10E-03	****	1.36E+00	
1	582.94	63	58	3.13	1170.02	1162	17	1.08E-02	61.0	1.20E+00	
1	608.61	72	81	1.88	1221.25	1214	17	1.23E-02	63.1	1.15E+00	
1	968.22	26	26	2.95	1938.84	1935	10	4.36E-03	78.7	7.56E-01	
1	1345.14	13	4	1.34	2691.21	2686	9	2.13E-03	81.5	5.70E-01	
1	1460.62	215	15	2.05	2921.78	2915	15	3.65E-02	16.9	5.32E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	3.474E-01	3.496E-01	3.268E-01	93.49	
Total Activity :			3.474E-01	3.496E-01			
Grand Total Activity :			3.474E-01	3.496E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	3.496E-01	3.268E-01	2.617E-01	0.000E+00	1.336

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

Key-Line

DRAFT

Nuclide	Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-2.501E-02		5.462E-02	7.224E-02	0.000E+00	-0.346
CS-137	-2.824E-03		5.325E-02	8.650E-02	0.000E+00	-0.033

DRAFT

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A,08L71890-42      ,03/14/2017 10:35,02/23/2017 14:22,   1.750E+02,L71890-42 SS G
B,08L71890-42      ,CS134_137           ,03/03/2017 07:12,08B150022715
C,AC-228   ,YES,    3.496E-01,   3.268E-01,   2.617E-01,,    1.336
C,CS-134   ,NO ,   -2.501E-02,   5.462E-02,   7.224E-02,,   -0.346
C,CS-137   ,NO ,   -2.824E-03,   5.325E-02,   8.650E-02,,   -0.033
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 10:36:16.49
TBE11 31-TP20610B HpGe ******* Aquisition Date/Time: 14-MAR-2017 09:09:18.96

LIMS No., Customer Name, Client ID: L71890-45 SS GEOENGINEERS SEDIMENT

Sample ID : 11L71890-45 Smple Date: 23-FEB-2017 14:28:00.
Sample Type : SS Geometry : 11B150101411
Quantity : 1.77800E+02 g Dry BKGFILE : 11BG022417MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 01:26:45.22
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:26:42.76
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.81*	116	208	1.57	149.01	1.98E+00	2.23E-02	24.3	1.86E+00
2	1	77.16	91	175	1.58	153.71	2.14E+00	1.75E-02	30.6	
3	1	238.45*	220	85	1.69	476.28	3.08E+00	4.23E-02	10.9	1.99E+00
4	1	241.65*	62	85	1.69	482.69	3.05E+00	1.19E-02	33.5	
5	0	295.54*	33	104	1.50	590.46	2.62E+00	6.41E-03	65.0	
6	0	351.92*	142	78	1.32	703.22	2.27E+00	2.73E-02	16.0	
7	0	510.76*	51	77	2.53	1020.86	1.66E+00	9.87E-03	48.3	
8	0	583.25*	76	53	1.74	1165.82	1.48E+00	1.46E-02	26.1	
9	0	609.15*	71	39	1.31	1217.59	1.43E+00	1.36E-02	21.6	
10	0	910.45*	36	24	1.95	1820.02	1.02E+00	6.97E-03	33.3	
11	0	1120.67*	23	20	1.17	2240.29	8.52E-01	4.47E-03	46.0	
12	0	1460.38*	265	4	2.00	2919.35	6.85E-01	5.09E-02	6.7	
13	0	1763.98*	18	0	0.82	3526.15	5.94E-01	3.41E-03	29.4	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.140E+00	------ Line Not Found		------
	911.07	36	27.70*	1.016E+00	3.765E-01	3.789E-01	66.65

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 11L71890-45

Acquisition date : 14-MAR-2017 09:09:18

Total number of lines in spectrum	13	
Number of unidentified lines	12	
Number of lines tentatively identified by NID	1	7.69%

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	3.765E-01	3.789E-01	2.525E-01	66.65	
			---------	---------			
Total Activity :			3.765E-01	3.789E-01			
Grand Total Activity :			3.765E-01	3.789E-01			

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

DRAFT

Sample ID : 11L71890-45 Acquisition date : 14-MAR-2017 09:09:18

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.81	116	208	1.57	149.01	142	18	2.23E-02	48.6	1.98E+00	
1	77.16	91	175	1.58	153.71	142	18	1.75E-02	61.2	2.14E+00	
1	238.45	220	85	1.69	476.28	469	29	4.23E-02	21.7	3.08E+00	
1	241.65	62	85	1.69	482.69	469	29	1.19E-02	66.9	3.05E+00	
0	295.54	33	104	1.50	590.46	588	10	6.41E-03	****	2.62E+00	
0	351.92	142	78	1.32	703.22	697	14	2.73E-02	32.0	2.27E+00	
0	510.76	51	77	2.53	1020.86	1012	18	9.87E-03	96.7	1.66E+00	
0	583.25	76	53	1.74	1165.82	1157	19	1.46E-02	52.1	1.48E+00	
0	609.15	71	39	1.31	1217.59	1213	10	1.36E-02	43.2	1.43E+00	
0	1120.67	23	20	1.17	2240.29	2234	12	4.47E-03	92.1	8.52E-01	
0	1460.38	265	4	2.00	2919.35	2911	15	5.09E-02	13.5	6.85E-01	
0	1763.98	18	0	0.82	3526.15	3520	11	3.41E-03	58.7	5.94E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	13	
Number of unidentified lines	12	
Number of lines tentatively identified by NID	1	7.69%

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	3.765E-01	3.789E-01	2.525E-01	66.65	
Total Activity :			3.765E-01	3.789E-01			
Grand Total Activity :			3.765E-01	3.789E-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
AC-228	3.789E-01	2.525E-01	2.046E-01	0.000E+00	1.852

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

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CS-134	-4.195E-03	4.731E-02	6.624E-02	0.000E+00	-0.063
CS-137	-9.123E-03	4.337E-02	6.911E-02	0.000E+00	-0.132

DRAFT

```
A,11L71890-45      ,03/14/2017 10:36,02/23/2017 14:28,   1.778E+02,L71890-45 SS G
B,11L71890-45      ,CS134_137           ,01/03/2017 08:01,11B150101411
C,AC-228   ,YES,   3.789E-01,   2.525E-01,   2.046E-01,,    1.852
C,CS-134   ,NO ,  -4.195E-03,   4.731E-02,   6.624E-02,,   -0.063
C,CS-137   ,NO ,  -9.123E-03,   4.337E-02,   6.911E-02,,   -0.132
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 10:29:20.73
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 14-MAR-2017 08:57:18.58

LIMS No., Customer Name, Client ID: WG24439-1 SS GEOENGINEERS SEDIMENT

Sample ID : 07WG24439-1
Sample Type : SS
Quantity : 1.17830E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 13:04:00.
Geometry : 07B150101811
BKGFILE : 07BG022417MT
Real Time : 0 01:31:50.92
Live time : 0 01:31:50.14

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	238.53*	205	106	1.65	478.19	3.83E+00	3.71E-02	11.9	2.36E+00
2	2	241.58	84	115	1.99	484.31	3.80E+00	1.53E-02	31.5	
3	1	294.73*	74	123	2.52	590.71	3.31E+00	1.34E-02	32.4	4.32E+00
4	1	351.77*	122	68	1.85	704.89	2.91E+00	2.21E-02	16.7	8.55E-01
5	1	510.44*	61	42	3.54	1022.47	2.20E+00	1.10E-02	37.2	1.14E+00
6	1	583.37*	68	63	2.97	1168.43	1.98E+00	1.23E-02	29.8	6.75E+00
7	1	609.15*	107	71	1.78	1220.03	1.91E+00	1.94E-02	21.8	2.90E+00
8	1	910.82*	41	42	1.86	1823.61	1.39E+00	7.48E-03	38.0	4.36E-01
9	1	968.21	59	19	6.96	1938.41	1.32E+00	1.07E-02	21.7	1.81E+00
10	1	1460.39*	277	21	2.48	2922.64	9.57E-01	5.02E-02	7.6	7.00E-01
11	1	1764.30*	16	4	1.95	3530.09	8.48E-01	2.92E-03	44.8	4.67E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.550E+00	------	Line Not Found	------
	911.07	41	27.70*	1.388E+00	4.464E-01	4.492E-01	76.01

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 07WG24439-1

Acquisition date : 14-MAR-2017 08:57:18

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	4.464E-01	4.492E-01	3.414E-01	76.01	
			---	---			
Total Activity :			4.464E-01	4.492E-01			
Grand Total Activity :			4.464E-01	4.492E-01			

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

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Unidentified Energy Lines
Sample ID : 07WG24439-1 Acquisition date : 14-MAR-2017 08:57:18

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	238.53	205	106	1.65	478.19	472	28	3.71E-02	23.9	3.83E+00	
2	241.58	84	115	1.99	484.31	472	28	1.53E-02	63.1	3.80E+00	
1	294.73	74	123	2.52	590.71	585	12	1.34E-02	64.8	3.31E+00	
1	351.77	122	68	1.85	704.89	700	11	2.21E-02	33.4	2.91E+00	
1	510.44	61	42	3.54	1022.47	1014	17	1.10E-02	74.4	2.20E+00	
1	583.37	68	63	2.97	1168.43	1163	16	1.23E-02	59.6	1.98E+00	
1	609.15	107	71	1.78	1220.03	1211	17	1.94E-02	43.6	1.91E+00	
1	968.21	59	19	6.96	1938.41	1930	19	1.07E-02	43.3	1.32E+00	
1	1460.39	277	21	2.48	2922.64	2914	17	5.02E-02	15.2	9.57E-01	
1	1764.30	16	4	1.95	3530.09	3522	15	2.92E-03	89.6	8.48E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	4.464E-01	4.492E-01	3.414E-01	76.01	
			---------	---------			
Total Activity :			4.464E-01	4.492E-01			
Grand Total Activity :			4.464E-01	4.492E-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
AC-228	4.492E-01	3.414E-01	2.816E-01	0.000E+00	1.595

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	3.193E-02		6.115E-02	9.354E-02	0.000E+00	0.341

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CS-137	-1.335E-02	4.575E-02	7.377E-02	0.000E+00	-0.181

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```
A,07WG24439-1      ,03/14/2017 10:29,02/23/2017 13:04,   1.178E+02,WG24439-1 SS G
B,07WG24439-1      ,CS134_137              ,01/05/2017 07:18,07B150101811
C,AC-228   ,YES,    4.492E-01,   3.414E-01,   2.816E-01,,    1.595
C,CS-134   ,NO ,    3.193E-02,   6.115E-02,   9.354E-02,,    0.341
C,CS-137   ,NO ,   -1.335E-02,   4.575E-02,   7.377E-02,,   -0.181
```

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GAMMA SPECTROSCOPY

Prep and Run Logs

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Logbook Page

L71890

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
WG24439-1	SS	DUP	GELI	117.83 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-3	SS		GELI	117.83 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-6	SS		GELI	102.04 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-9	SS		GELI	106.88 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-12	SS		GELI	139.52 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-15	SS		GELI	139.73 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-18	SS		GELI	149.95 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-21	SS		GELI	161.87 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-24	SS		GELI	189.93 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-27	SS		GELI	158.25 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-30	SS		GELI	180.48 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-33	SS		GELI	171.07 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-36	SS		GELI	155.03 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-39	SS		GELI	164.6 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-42	SS		GELI	175.03 g dry	03/14/17	MJW	BALANCE 8							WG24439
L71890-45	SS		GELI	177.8 g dry	03/14/17	MJW	BALANCE 8							WG24439

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GAMMA SPECTROSCOPY

Balance and Pipette Check

DRAFT

Daily Balance Tolerance Check Reports

for : L71890

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Check Date: 14-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Prod		
NONE	BALANCE 8	14-MAR-17
GELI	BALANCE 8	14-MAR-17

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Daily Pipette Tolerance Check

for: L71890

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LEAD 210

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LEAD 210

Initial Calibration

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X COUNTER PB-210/BI-210 CALIBRATION											
Detector Number		Eff. STD	Alpha	Beta		Min Ctd	HV Value	Beta CPM	BI-210 D.F.	BI-210 DPM	BI-210 Beta Eff.
1	a	BIPO4 #5	940	18658	2/13/2015 10:10	30	1580	621.93	0.7749	1998	0.3112
1	b	#6	896	17727	2/13/2015 10:10	30	1580	590.90	0.7749	1998	0.2957
1	c	#7	42	16503	2/13/2015 10:10	30	1580	550.10	0.7749	1998	0.2753
1	d	#8	793	16949	2/13/2015 10:10	30	1580	564.97	0.7749	1998	0.2827
2	a	#9	5	15909	2/13/2015 10:10	30	1580	530.30	0.7749	1998	0.2654
2	b	#10	336	14247	2/13/2015 10:10	30	1580	474.90	0.7749	1998	0.2377
2	c	BIPO4 #5	868	18598	2/13/2015 10:52	30	1580	619.93	0.7719	1990	0.3115
2	d	#6	880	13022	2/13/2015 10:52	30	1580	434.07	0.7719	1990	0.2181
3	a	#7	5	15919	2/13/2015 10:52	30	1580	530.63	0.7718	1990	0.2666
3	b	#8	669	16745	2/13/2015 10:52	30	1580	558.17	0.7718	1990	0.2805
3	c	#9	3	15677	2/13/2015 10:52	30	1580	522.57	0.7718	1990	0.2626
3	d	#10	696	17488	2/13/2015 10:52	30	1580	582.93	0.7718	1990	0.2929
4	a	BIPO4 #5	861	18350	2/13/2015 12:00	30	1580	611.67	0.7668	1977	0.3094
4	b	#6	920	17425	2/13/2015 12:00	30	1580	580.83	0.7668	1977	0.2938
4	c	#7	2	16382	2/13/2015 12:00	30	1580	546.07	0.7668	1977	0.2762
4	d	#8	609	16975	2/13/2015 12:00	30	1580	565.83	0.7668	1977	0.2862
210PB-061014	Activity		MILK DATE/TIME								
	pCi/ml	BI YIELD			Standards Prepared by:					2/21/15	
210PB-061014-1	2013	0.577	2/11/2015 13:55								
210PB-061014-2	2013	0.577	2/11/2015 13:55		Calibration by:						
210PB-061014-3	2013	0.577	2/11/2015 13:55								
210PB-061014-4	2013	0.577	2/11/2015 13:55								
210PB-061014-5	2013	0.577	2/11/2015 13:55								
210PB-061014-6	2013	0.577	2/11/2015 13:55								

DRAFT

Y COUNTER PB-210/BI-210 CALIBRATION

Detector Number		Eff. STD	Alpha	Beta		Min Ctd	HV Value	Beta CPM	BI-210 D.F.	BI-210 DPM	BI-210 Beta Eff.
1	a	BIPO4 #5	927	17714	2/13/2015 15:55	30	1650	590.47	0.7497	1933	0.3054
1	b	#6	882	16925	2/13/2015 15:55	30	1650	564.17	0.7497	1933	0.2918
1	c	#7	121	16119	2/13/2015 15:55	30	1650	537.30	0.7497	1933	0.2779
1	d	#8	856	16581	2/13/2015 15:55	30	1650	552.70	0.7497	1933	0.2859
2	a	#9	6	15238	2/13/2015 15:55	30	1650	507.93	0.7497	1933	0.2627
2	b	#10	756	17135	2/13/2015 15:55	30	1650	571.17	0.7497	1933	0.2955
2	c	BIPO4 #5	1657	18377	2/18/2015 10:24	60	1650	306.28	0.3877	1000	0.3064
2	d	#6	2017	17684	2/18/2015 10:24	60	1650	294.73	0.3877	1000	0.2948
3	a	#7	90	16259	2/18/2015 10:24	60	1650	270.98	0.3877	1000	0.2711
3	b	#8	1726	17225	2/18/2015 10:24	60	1650	287.08	0.3877	1000	0.2872
3	c	#9	16	15783	2/18/2015 10:24	60	1650	263.05	0.3877	1000	0.2631
3	d	#10	1502	17714	2/18/2015 10:24	60	1650	295.23	0.3877	1000	0.2953
4	a	BIPO4 #5	3108	13982	2/20/2015 12:38	60	1650	233.03	0.2903	749	0.3113
4	b	#6	3099	13105	2/20/2015 12:38	60	1650	218.42	0.2903	749	0.2918
4	c	#7	3	12270	2/20/2015 12:38	60	1650	204.50	0.2903	749	0.2732
4	d	#8	2476	12496	2/20/2015 12:38	60	1650	208.27	0.2903	749	0.2782

210PB-061014	Activity		MILK DATE/TIME
	pCi/ml	BI YIELD	
210PB-061014-1	2013	0.577	2/11/2015 13:55
210PB-061014-2	2013	0.577	2/11/2015 13:55
210PB-061014-3	2013	0.577	2/11/2015 13:55
210PB-061014-4	2013	0.577	2/11/2015 13:55
210PB-061014-5	2013	0.577	2/11/2015 13:55
210PB-061014-6	2013	0.577	2/11/2015 13:55

Standards Prepared by: [signature] 2/21/15

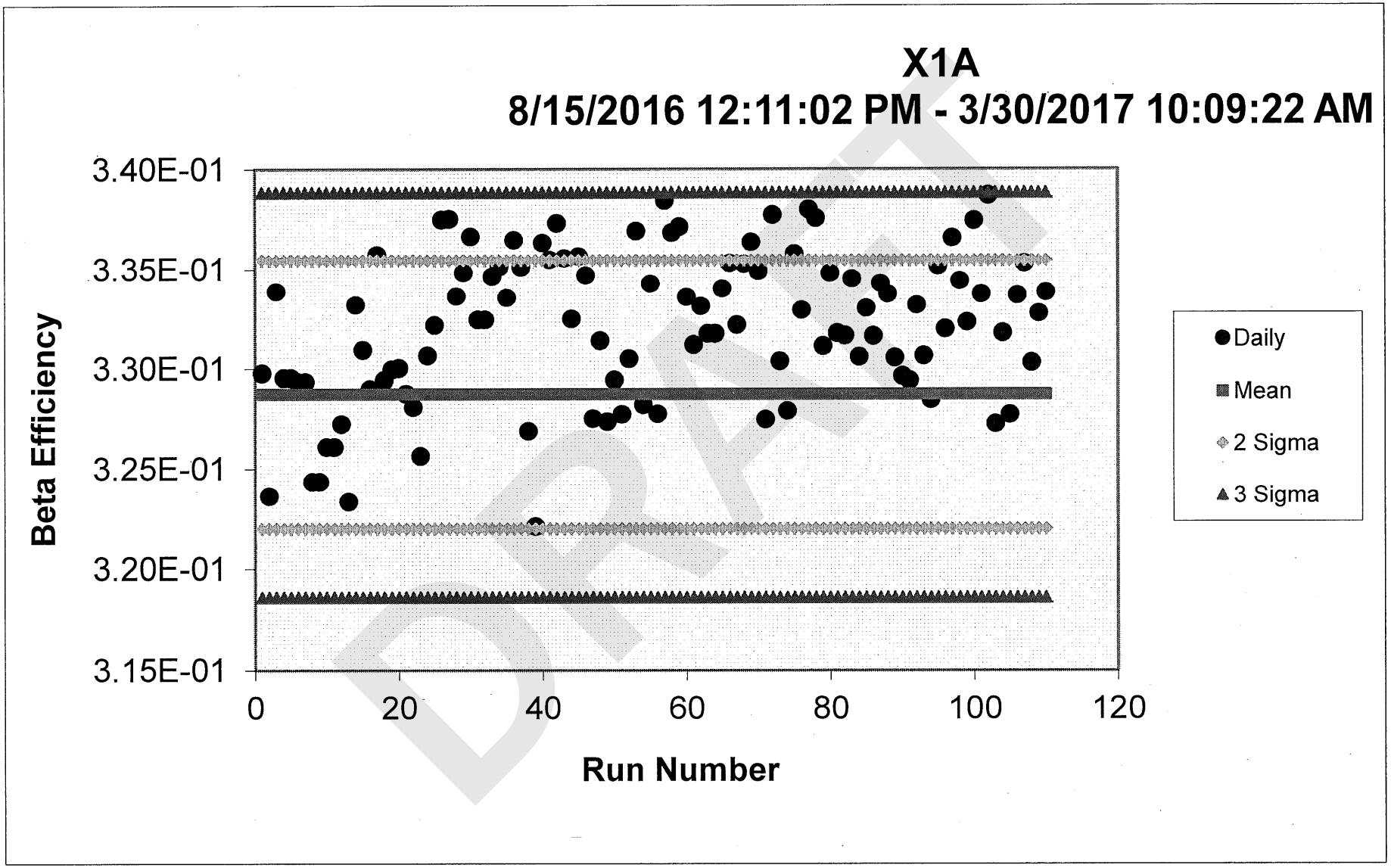
Calibration by: Keith Jett 2/21/15

DRAFT

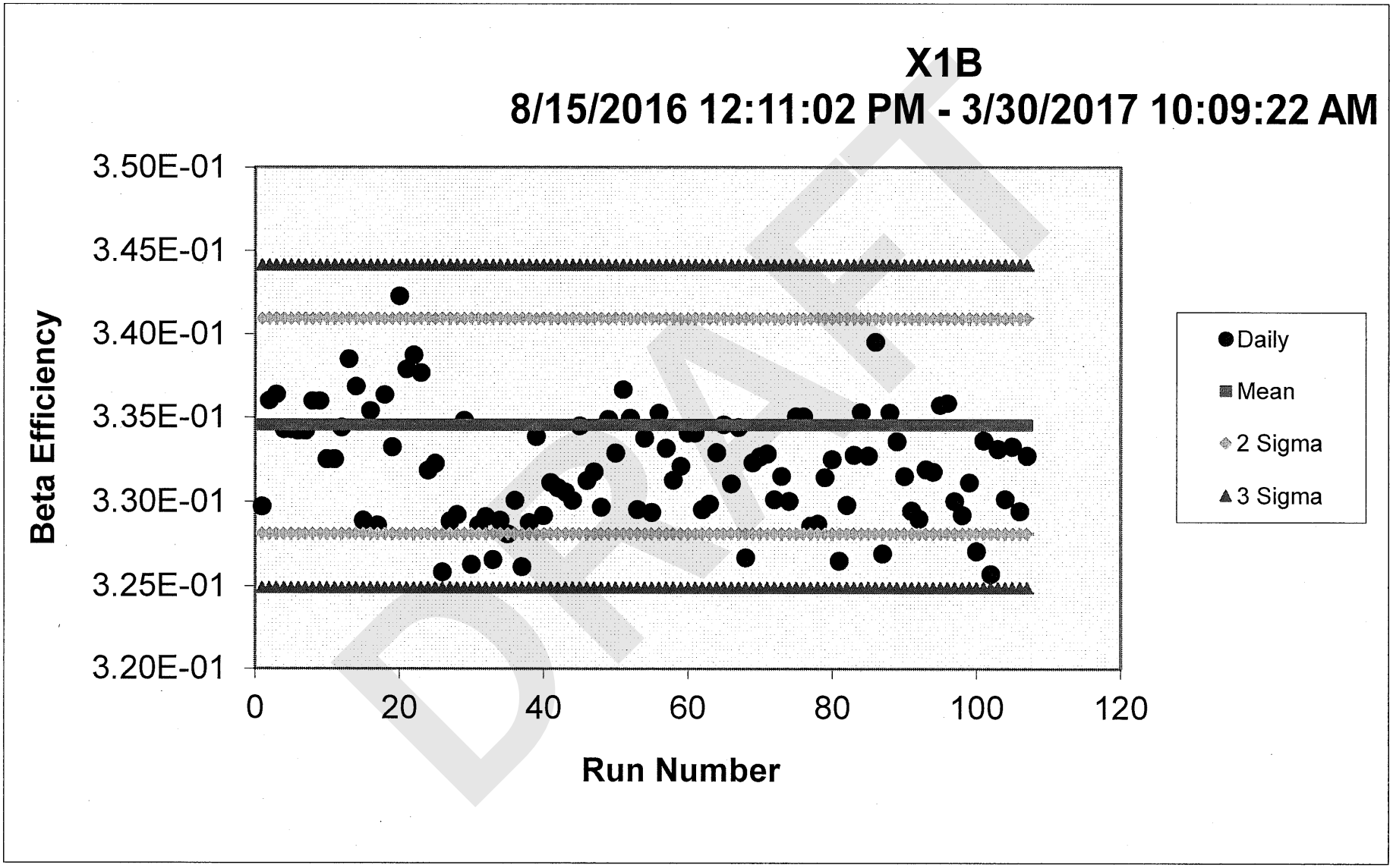
LEAD 210

Daily Source and Background Checks

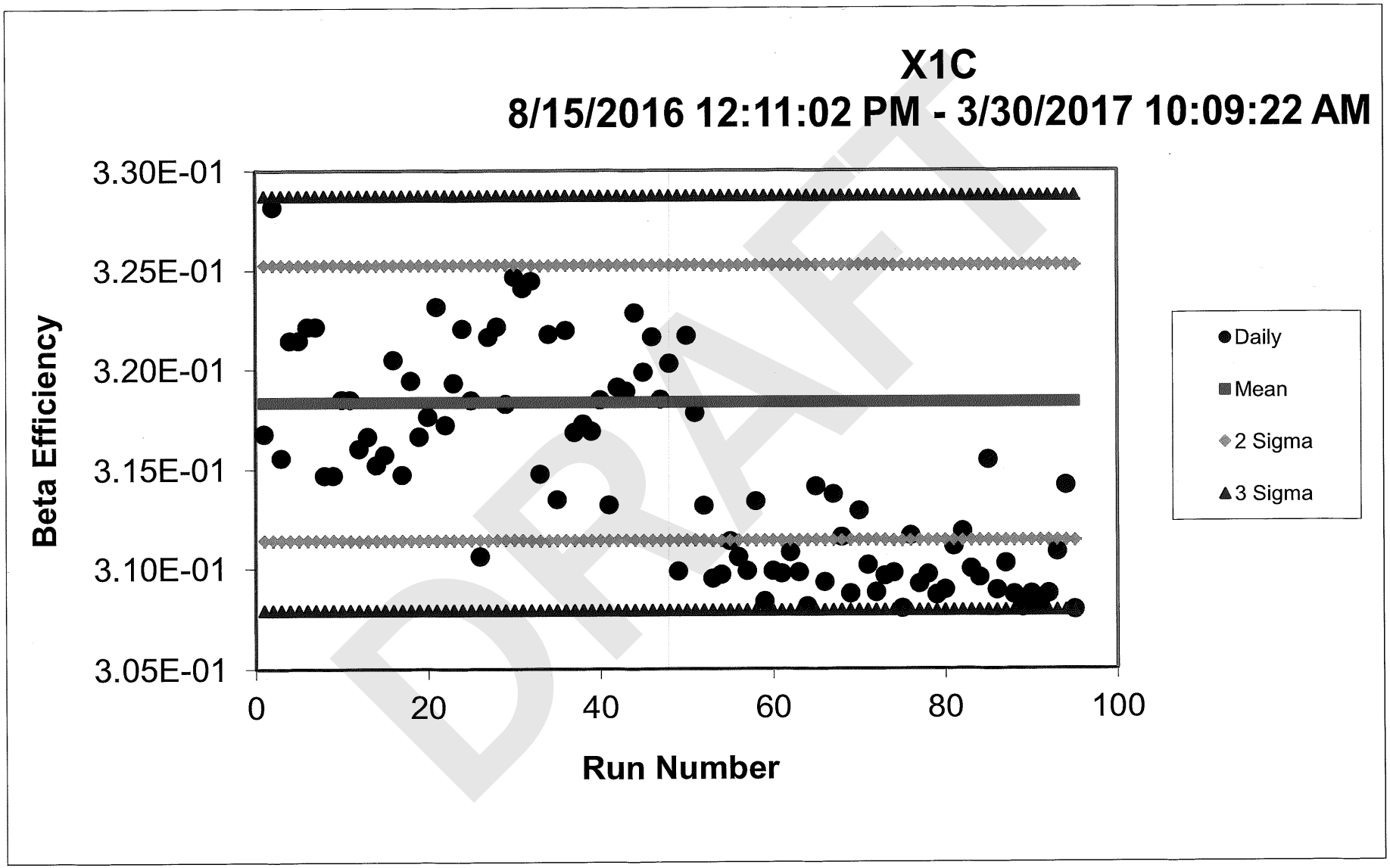
DRAFT

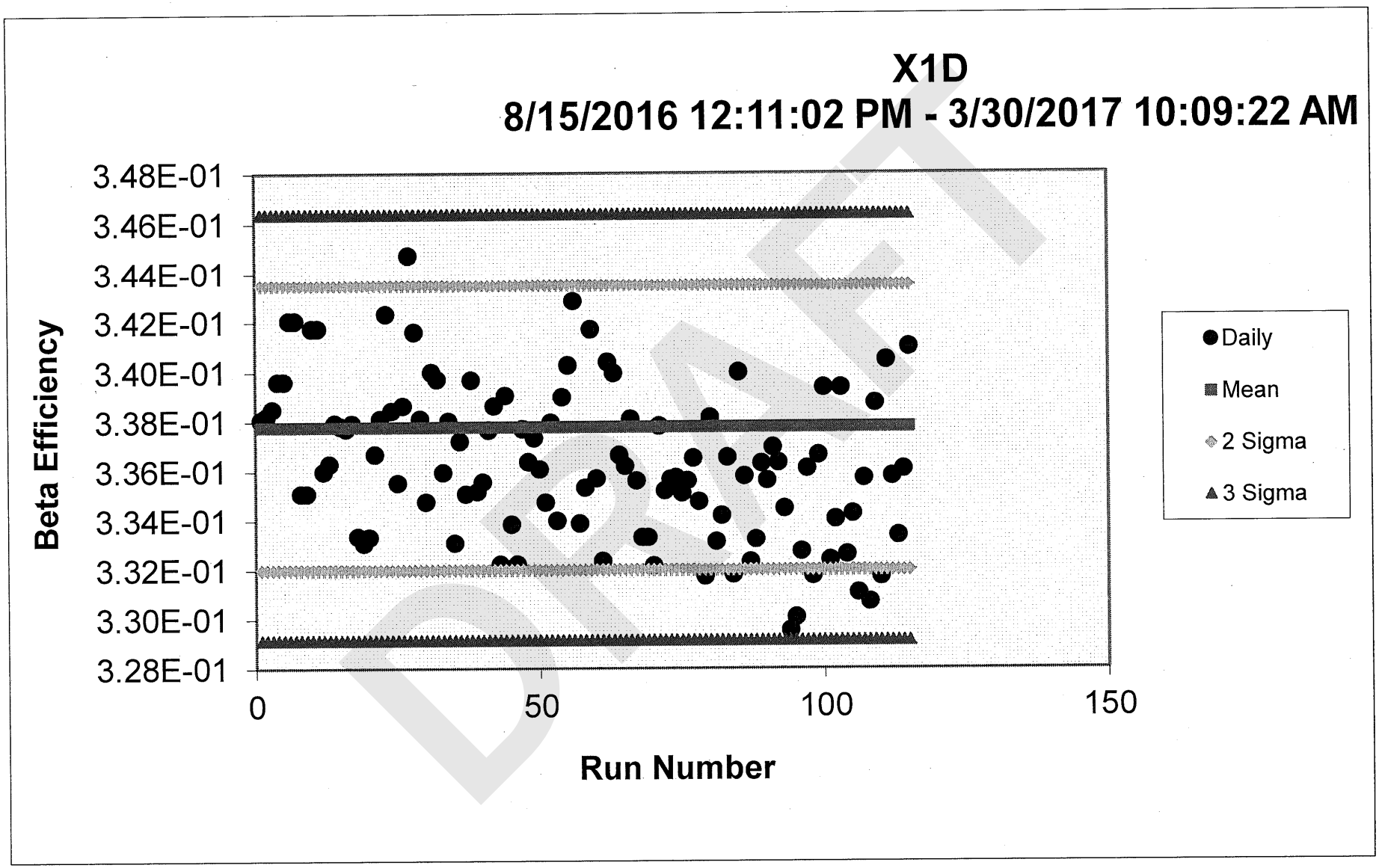

X1A
8/15/2016 12:11:02 PM - 3/30/2017 10:09:22 AM
Beta Efficiency
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
20
40
60
80
100
120
Run Number
Daily
Mean
2 Sigma
3 Sigma

DRAFT

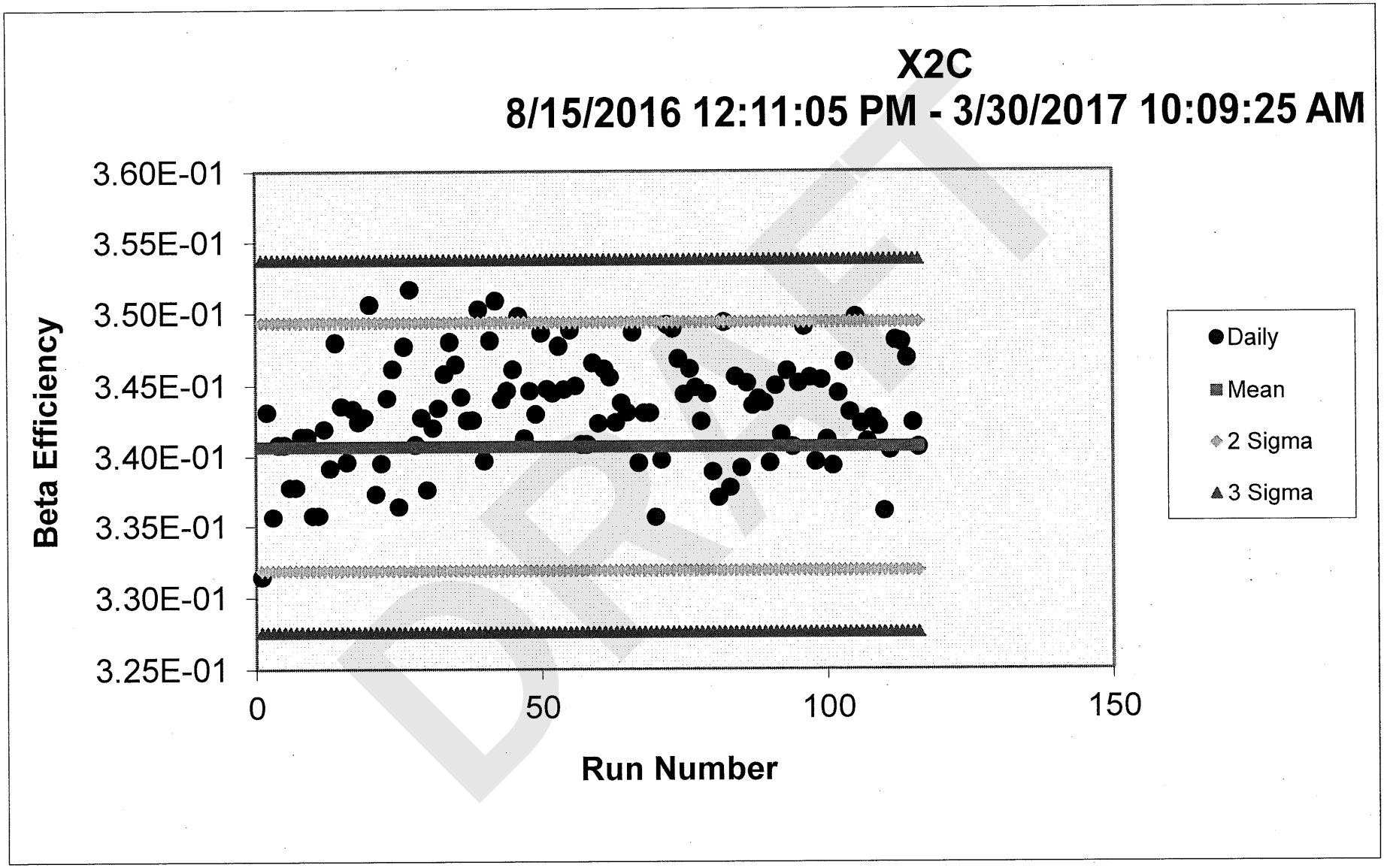

X1B
8/15/2016 12:11:02 PM - 3/30/2017 10:09:22 AM
Beta Efficiency
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
0
20
40
60
80
100
120
Run Number
Daily
Mean
2 Sigma
3 Sigma

DRAFT

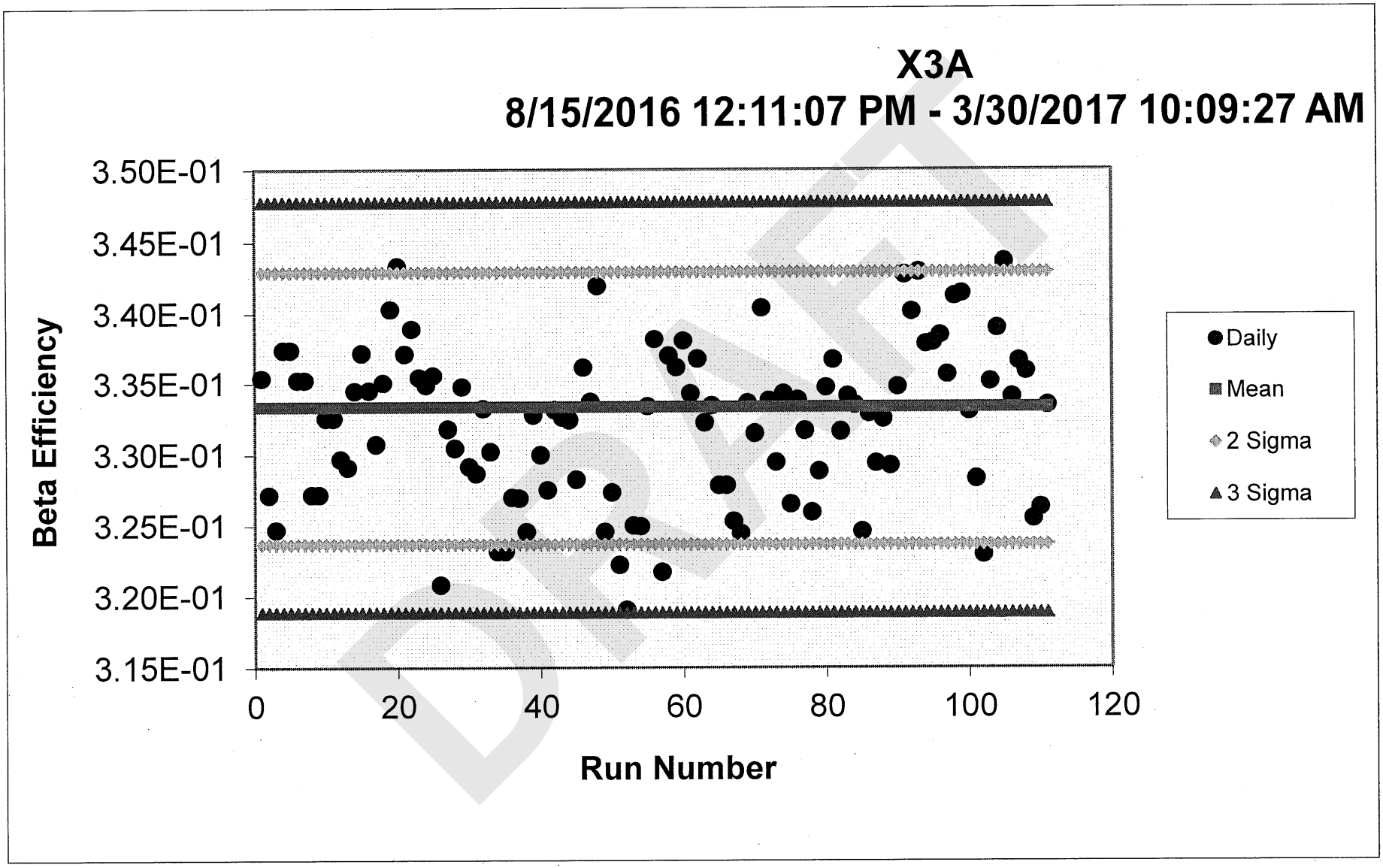

X1C
8/15/2016 12:11:02 PM - 3/30/2017 10:09:22 AM
Beta Efficiency
3.30E-01
3.25E-01
3.20E-01
3.15E-01
3.10E-01
3.05E-01
0
20
40
60
80
100
Run Number
Daily
Mean
2 Sigma
3 Sigma
DRAFT


X1D
8/15/2016 12:11:02 PM - 3/30/2017 10:09:22 AM
Beta Efficiency
3.48E-01
3.46E-01
3.44E-01
3.42E-01
3.40E-01
3.38E-01
3.36E-01
3.34E-01
3.32E-01
3.30E-01
3.28E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

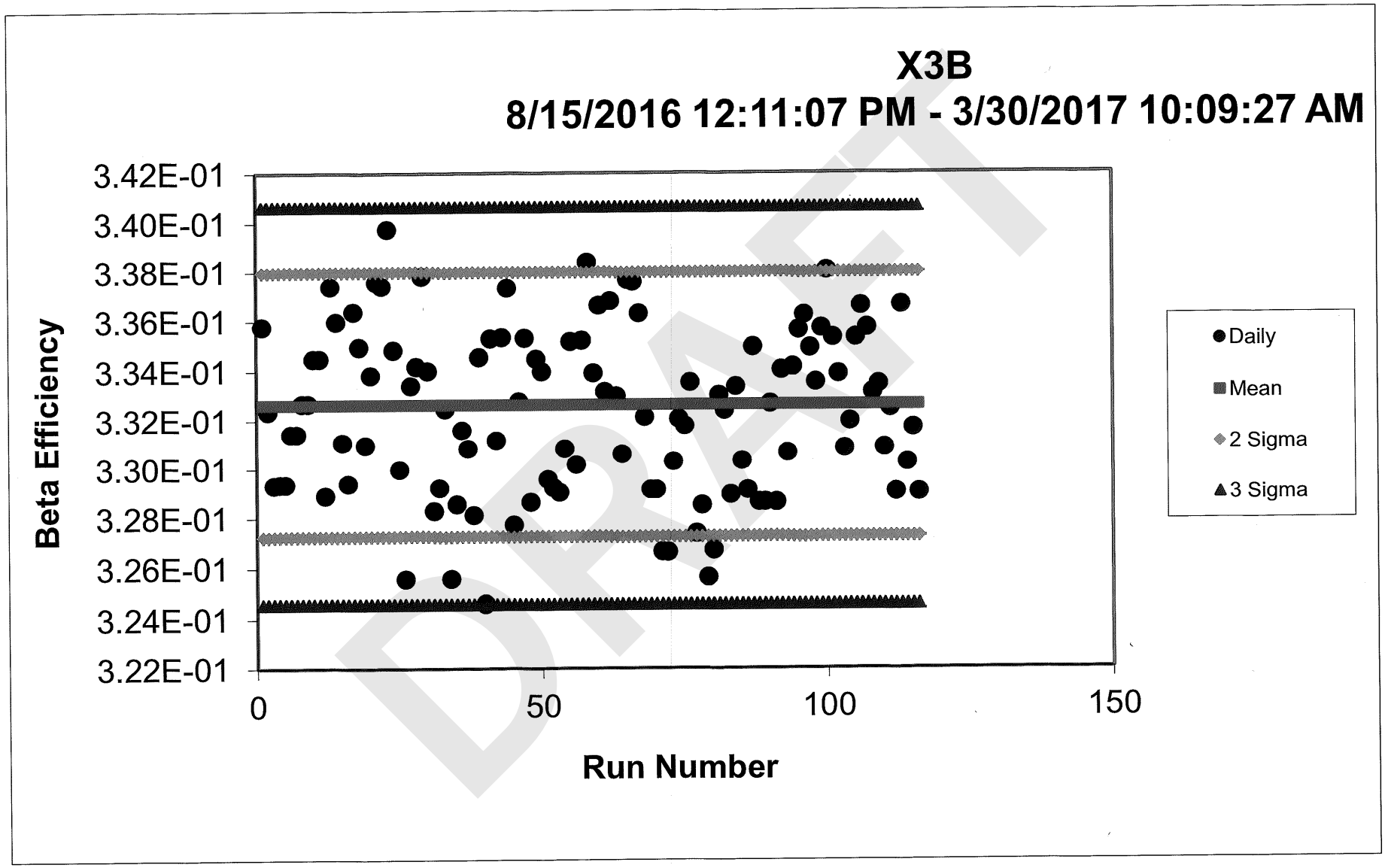
DRAFT


X2C
8/15/2016 12:11:05 PM - 3/30/2017 10:09:25 AM
Beta Efficiency
3.60E-01
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

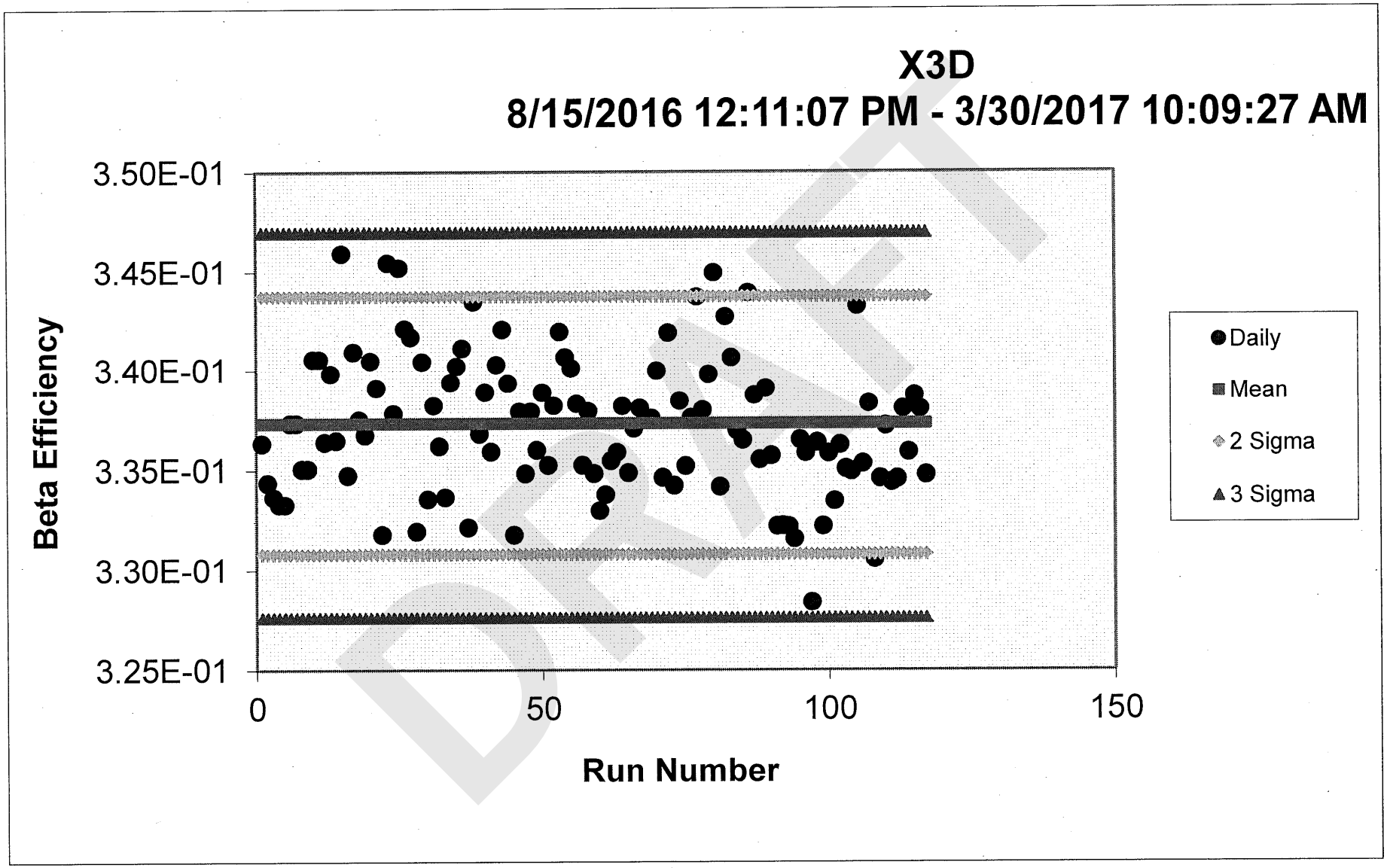
DRAFT


X3A
8/15/2016 12:11:07 PM - 3/30/2017 10:09:27 AM
Beta Efficiency
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
20
40
60
80
100
120
Run Number
Daily
Mean
2 Sigma
3 Sigma

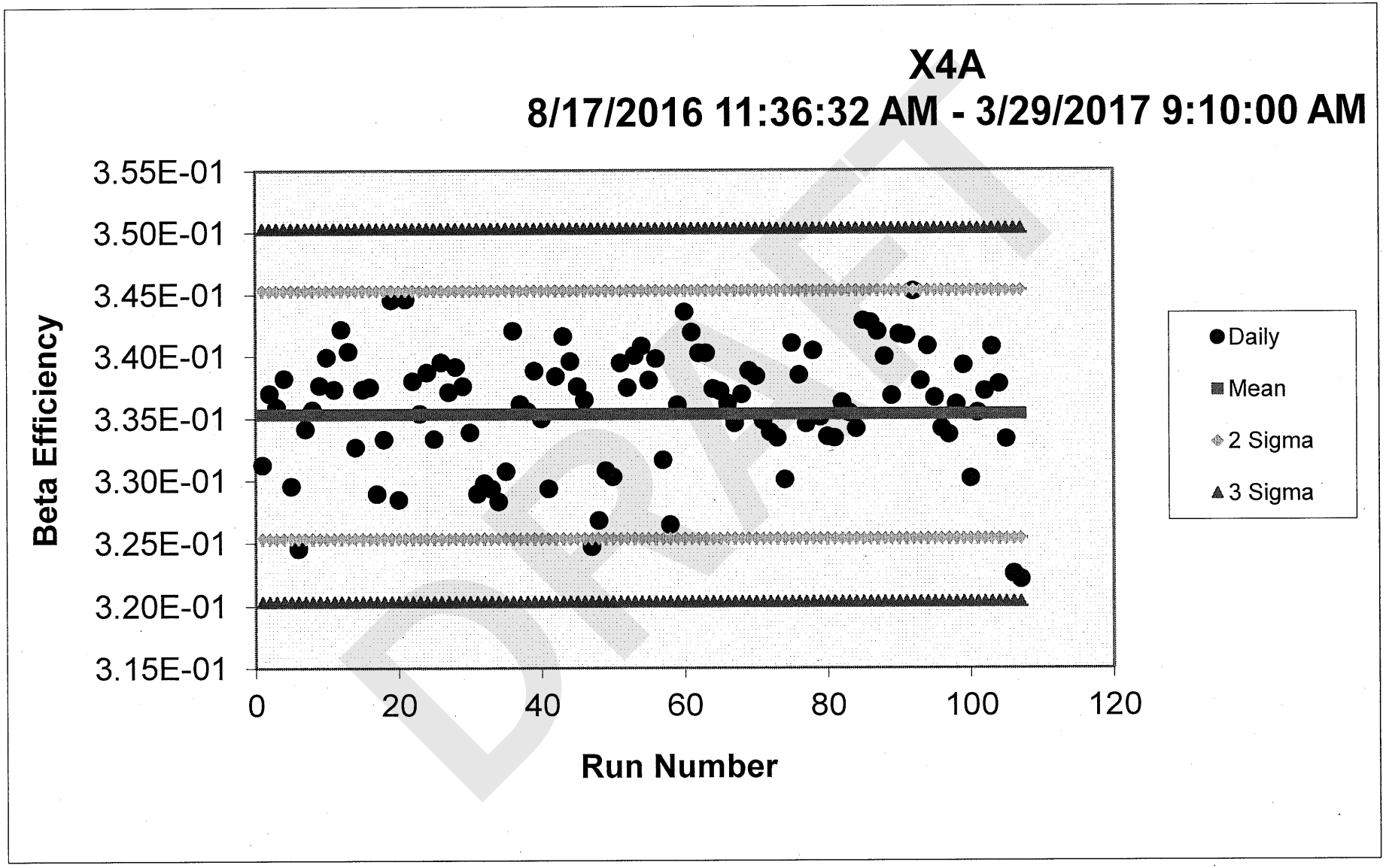
DRAFT


X3B
8/15/2016 12:11:07 PM - 3/30/2017 10:09:27 AM
Beta Efficiency
3.42E-01
3.40E-01
3.38E-01
3.36E-01
3.34E-01
3.32E-01
3.30E-01
3.28E-01
3.26E-01
3.24E-01
3.22E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

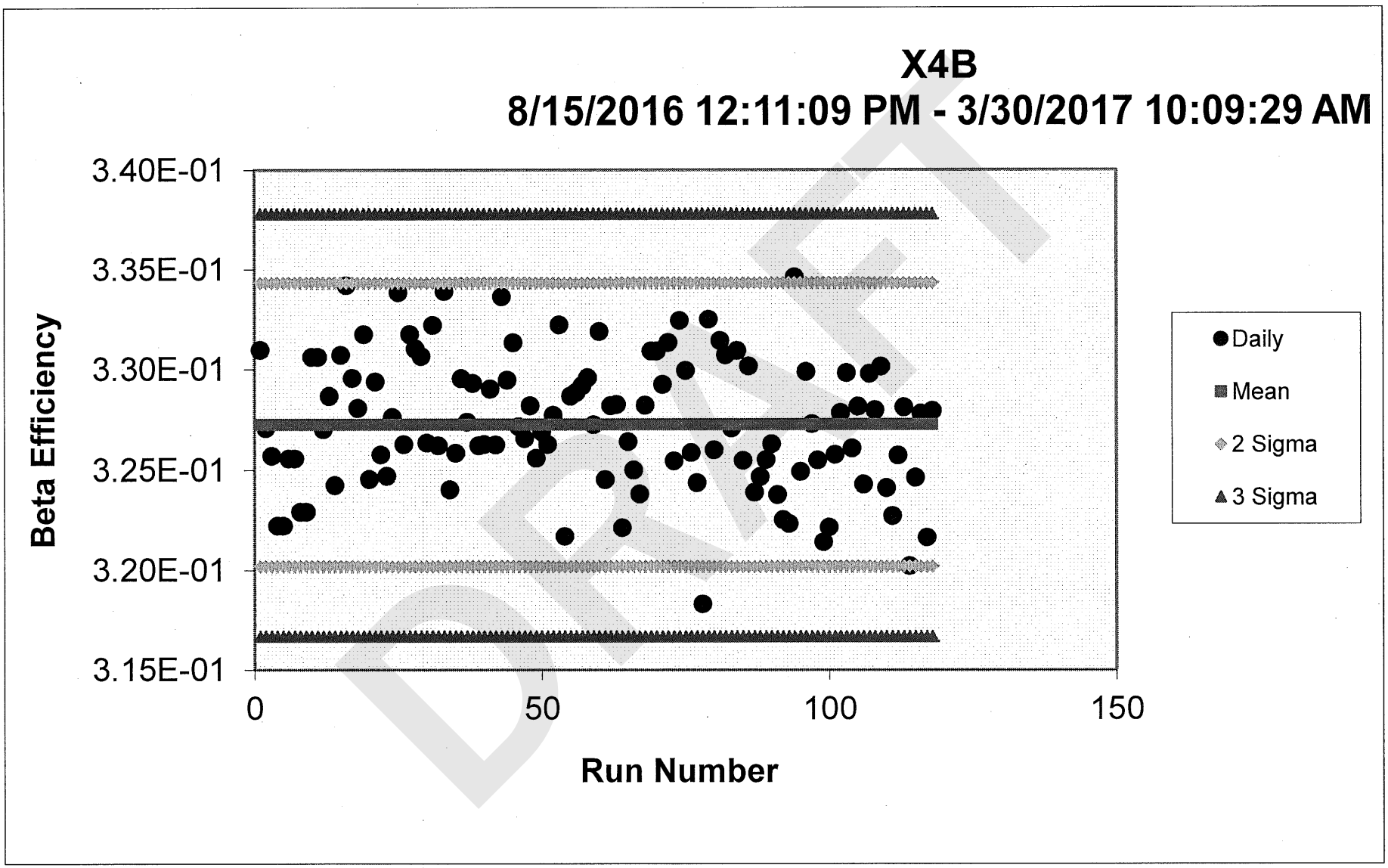
DRAFT


X3D
8/15/2016 12:11:07 PM - 3/30/2017 10:09:27 AM
Beta Efficiency
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

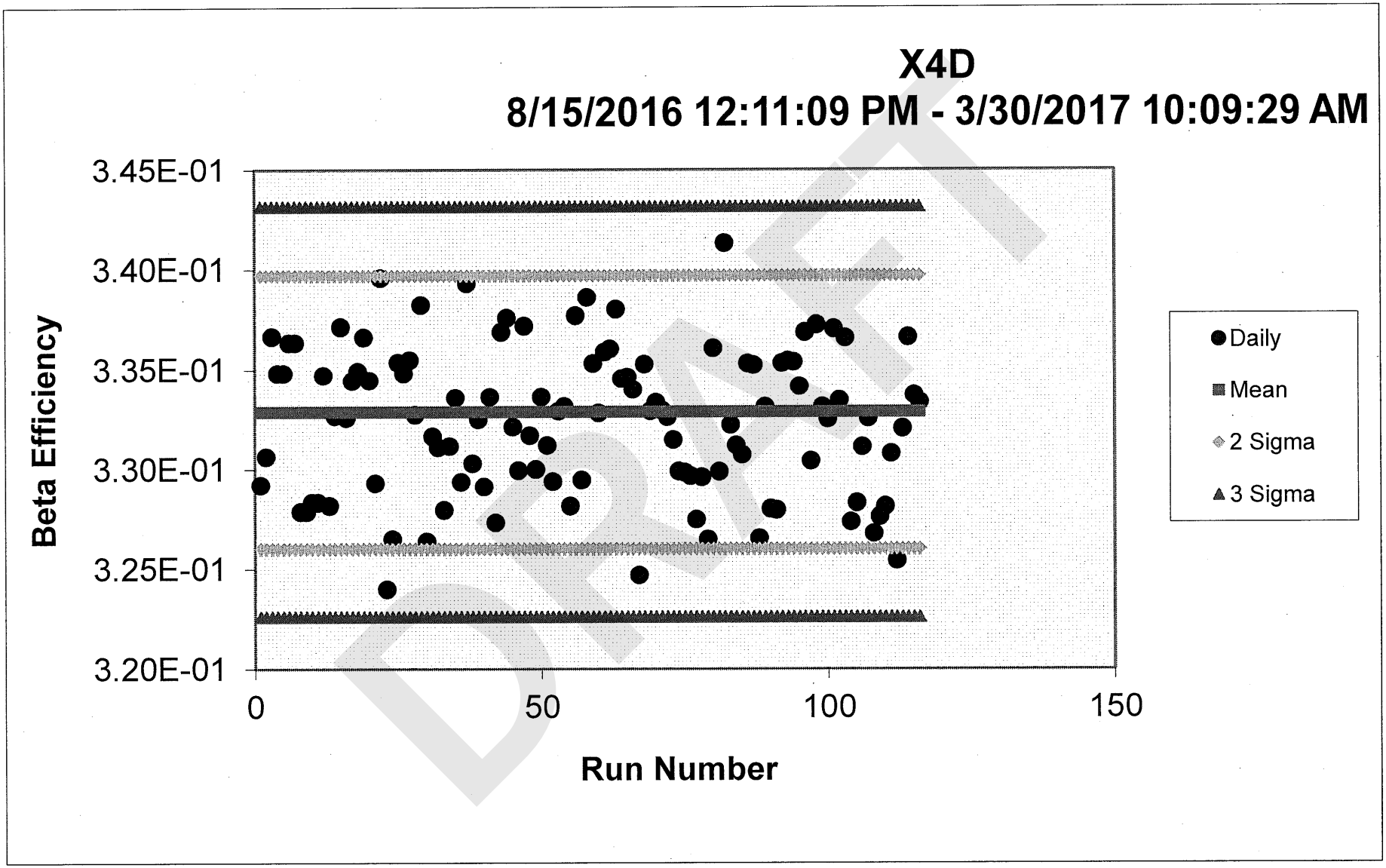
DRAFT


X4A
8/17/2016 11:36:32 AM - 3/29/2017 9:10:00 AM
Beta Efficiency
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
20
40
60
80
100
120
Run Number
Daily
Mean
2 Sigma
3 Sigma

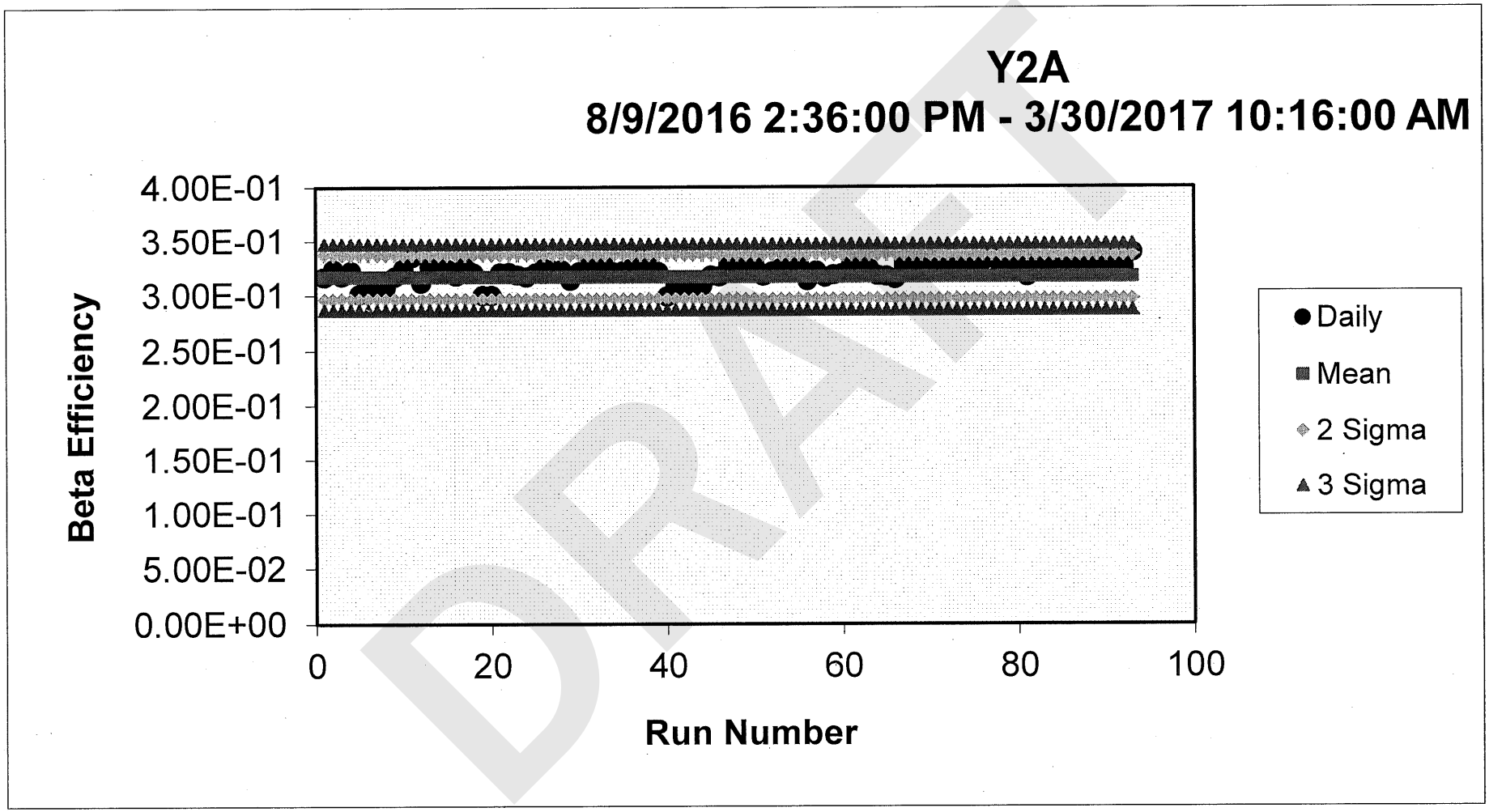
DRAFT


X4B
8/15/2016 12:11:09 PM - 3/30/2017 10:09:29 AM
Beta Efficiency
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

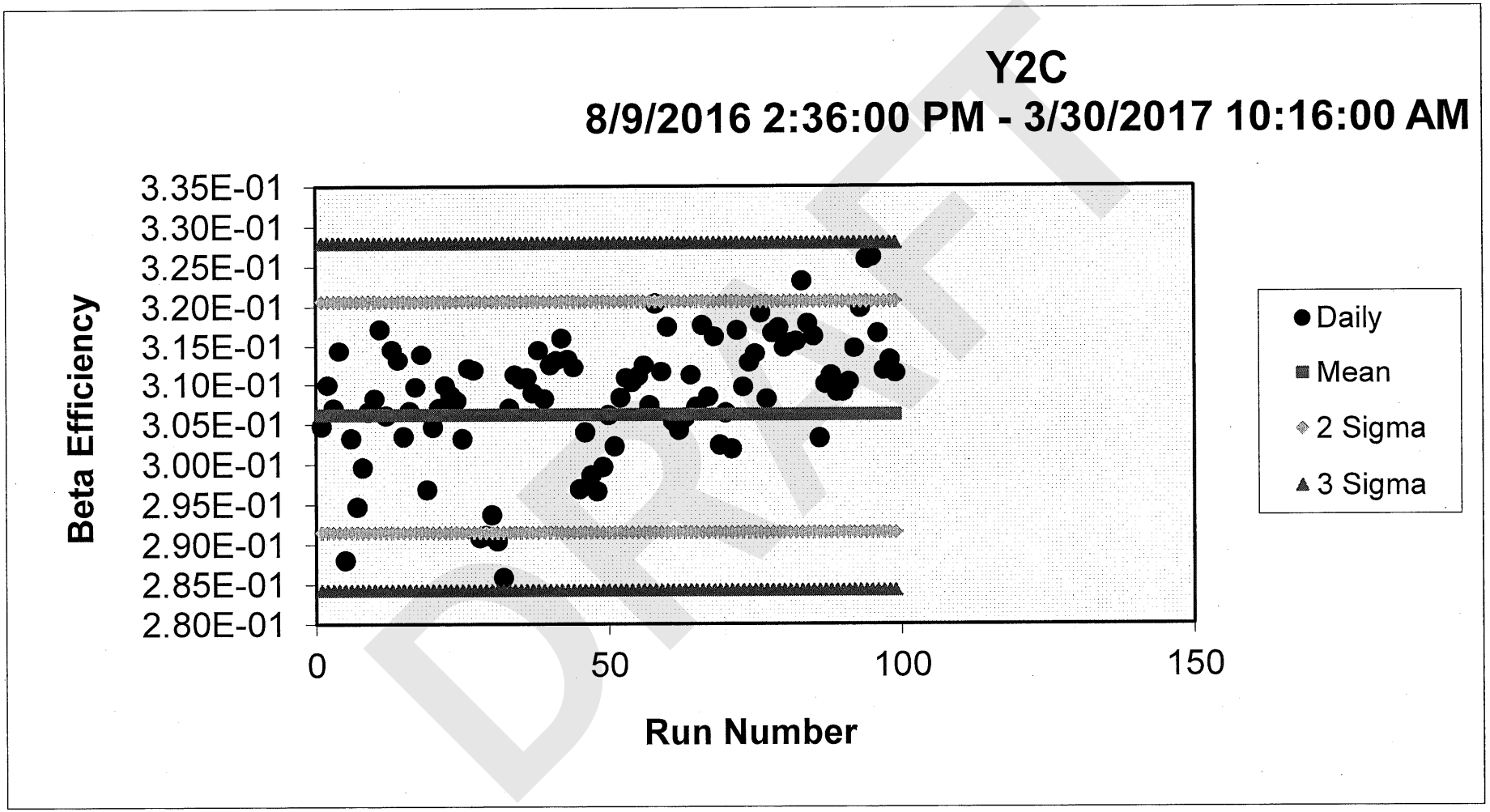
DRAFT


X4D
8/15/2016 12:11:09 PM - 3/30/2017 10:09:29 AM
Beta Efficiency
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

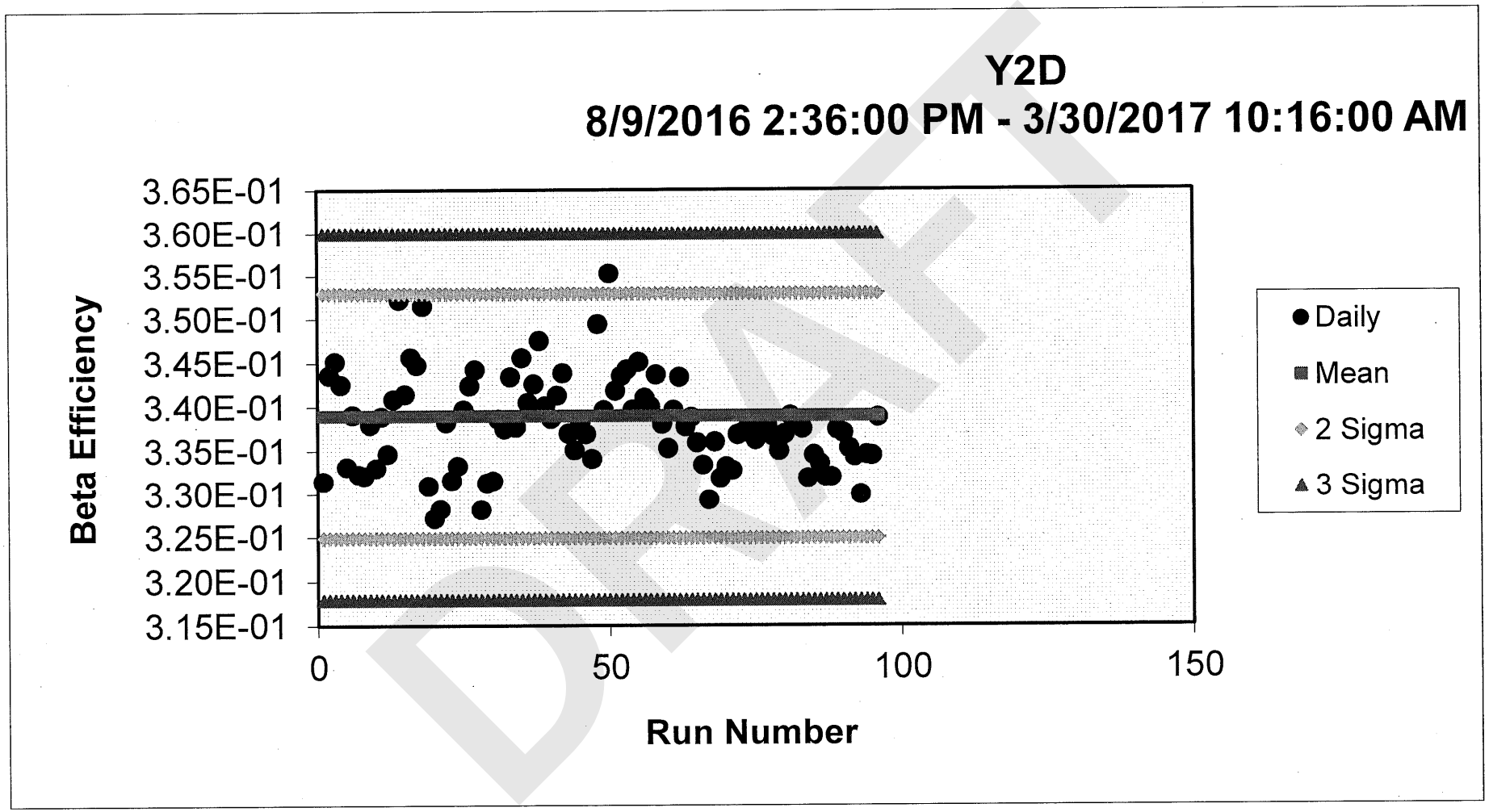
DRAFT


Y2A
8/9/2016 2:36:00 PM - 3/30/2017 10:16:00 AM
Beta Efficiency
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
0
20
40
60
80
100
Run Number
Daily
Mean
2 Sigma
3 Sigma

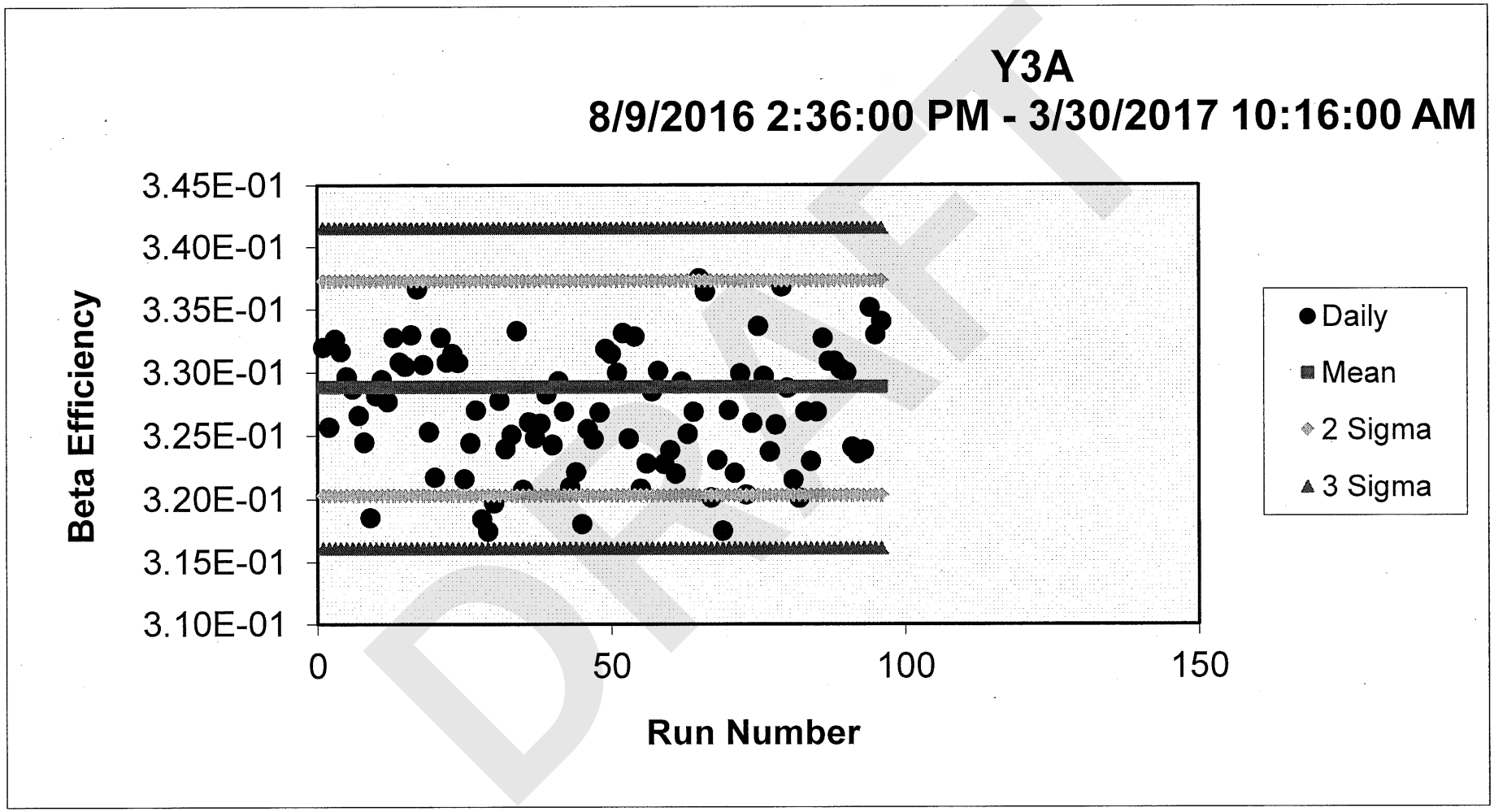
DRAFT


Y2C
8/9/2016 2:36:00 PM - 3/30/2017 10:16:00 AM
Beta Efficiency
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
3.10E-01
3.05E-01
3.00E-01
2.95E-01
2.90E-01
2.85E-01
2.80E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

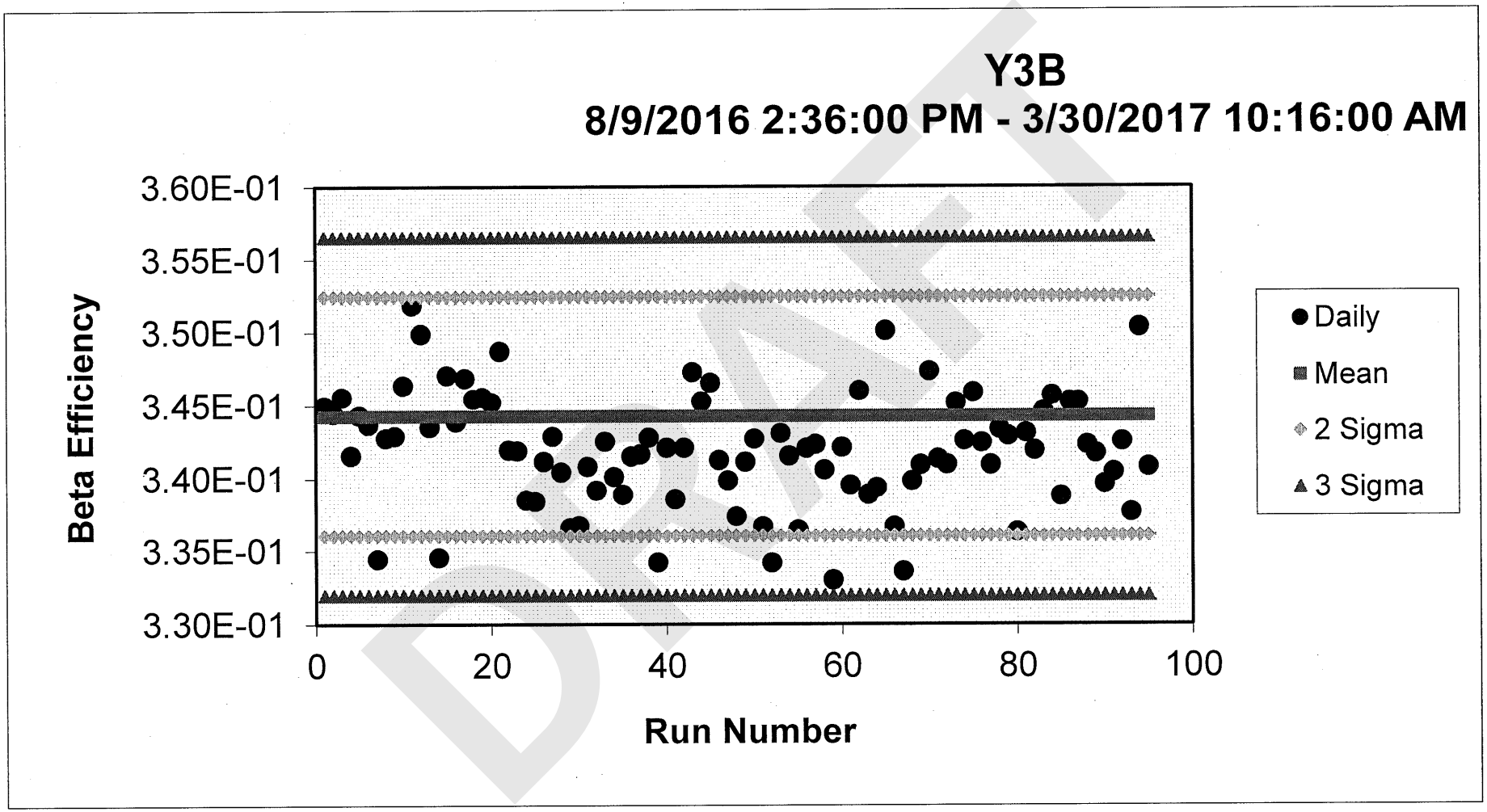
DRAFT


Y2D
8/9/2016 2:36:00 PM - 3/30/2017 10:16:00 AM
Beta Efficiency
3.65E-01
3.60E-01
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

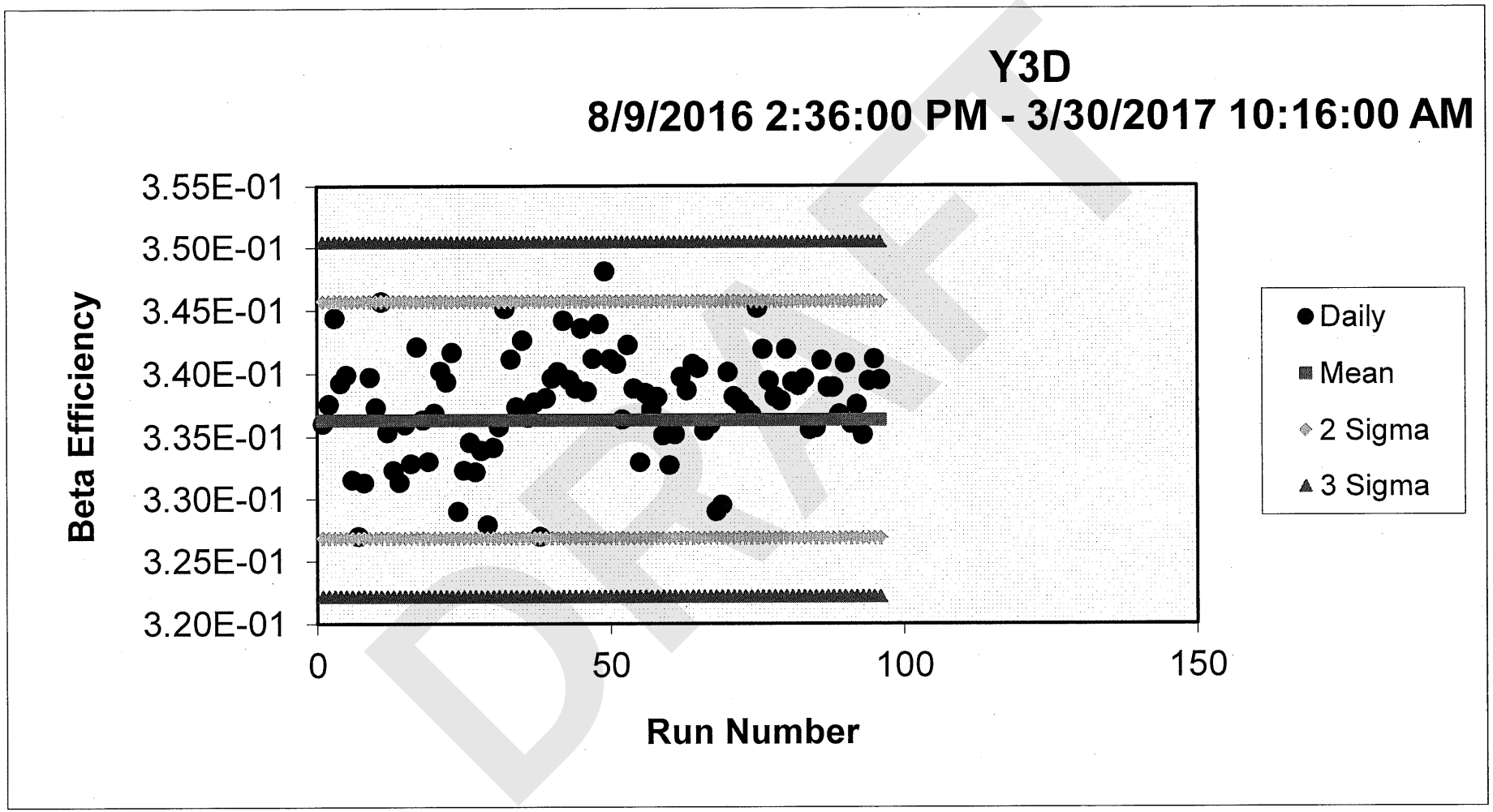
DRAFT


Y3A
8/9/2016 2:36:00 PM - 3/30/2017 10:16:00 AM
Beta Efficiency
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
3.10E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

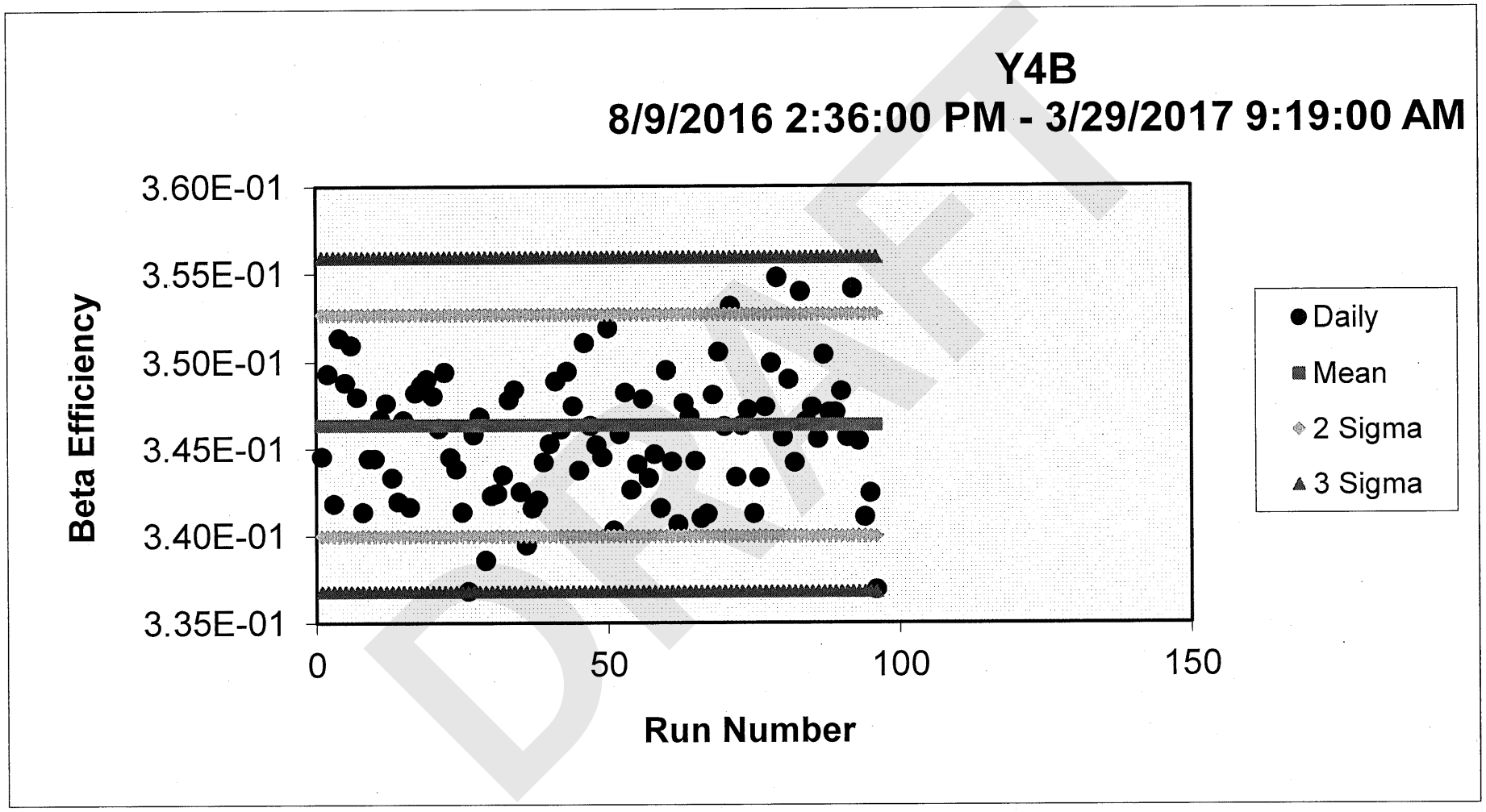
DRAFT


Y3B
8/9/2016 2:36:00 PM - 3/30/2017 10:16:00 AM
Beta Efficiency
3.60E-01
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
0
20
40
60
80
100
Run Number
Daily
Mean
2 Sigma
3 Sigma

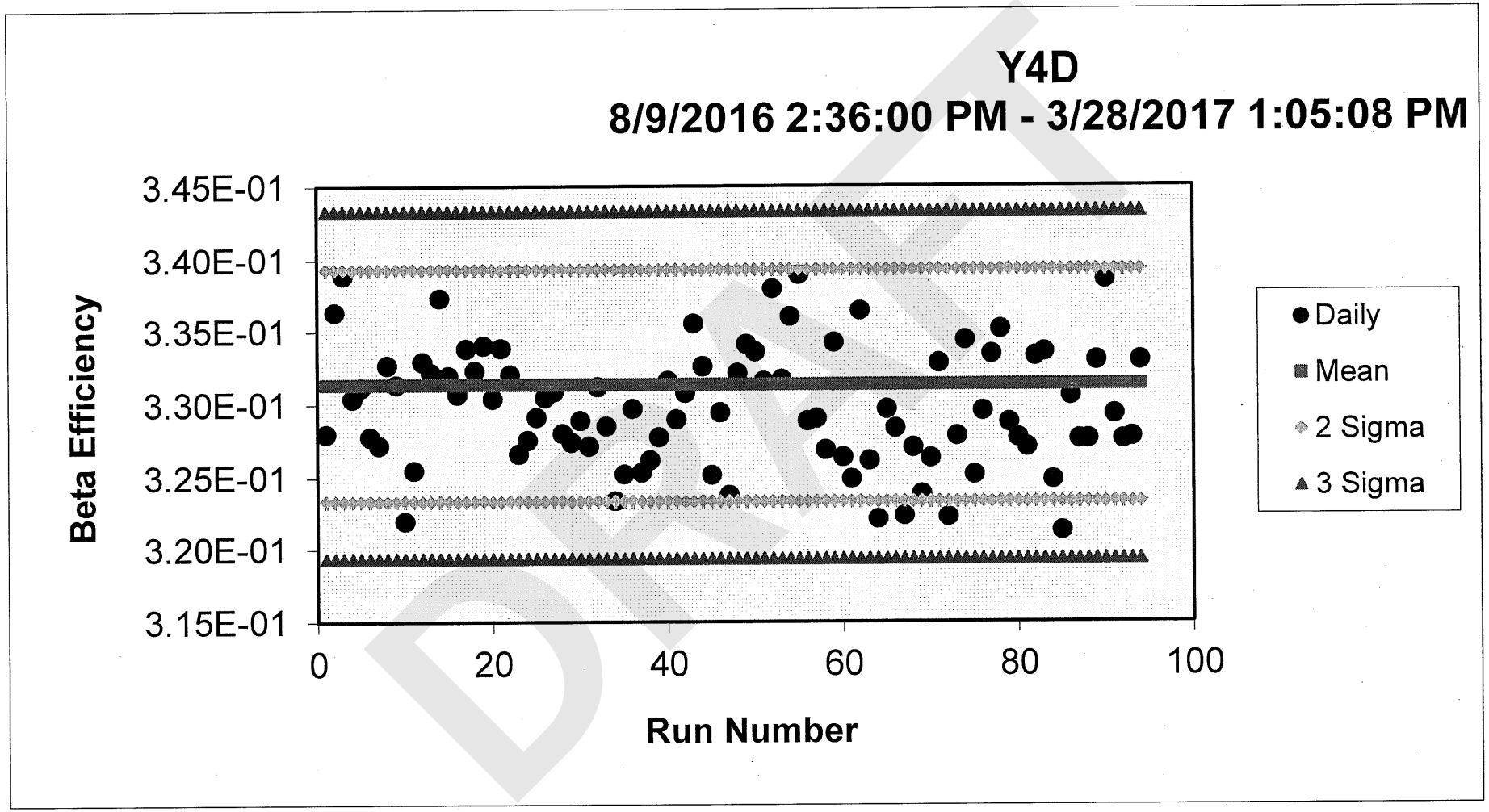
DRAFT


Y3D
8/9/2016 2:36:00 PM - 3/30/2017 10:16:00 AM
Beta Efficiency
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

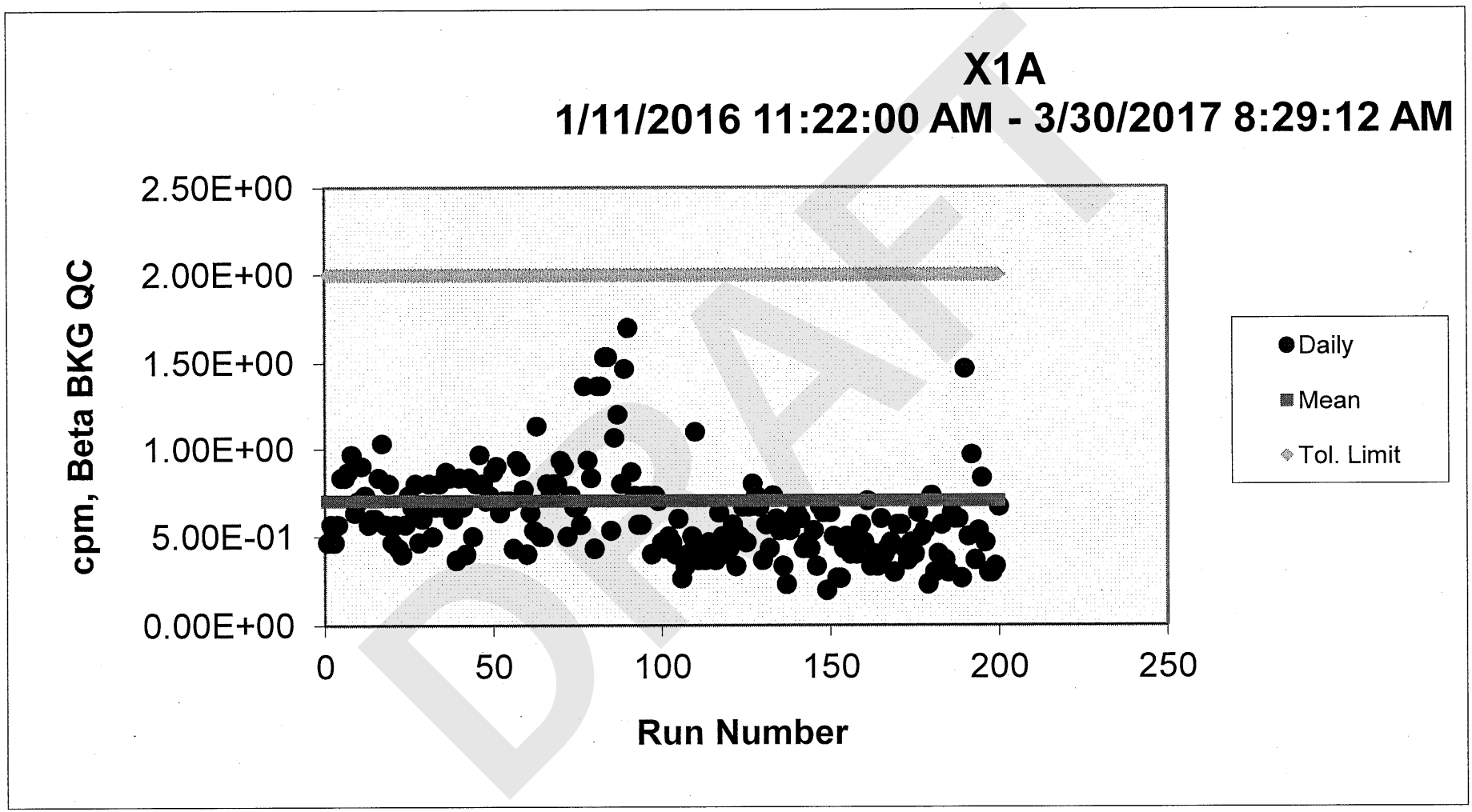
DRAFT


Y4B
8/9/2016 2:36:00 PM - 3/29/2017 9:19:00 AM
Beta Efficiency
3.60E-01
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

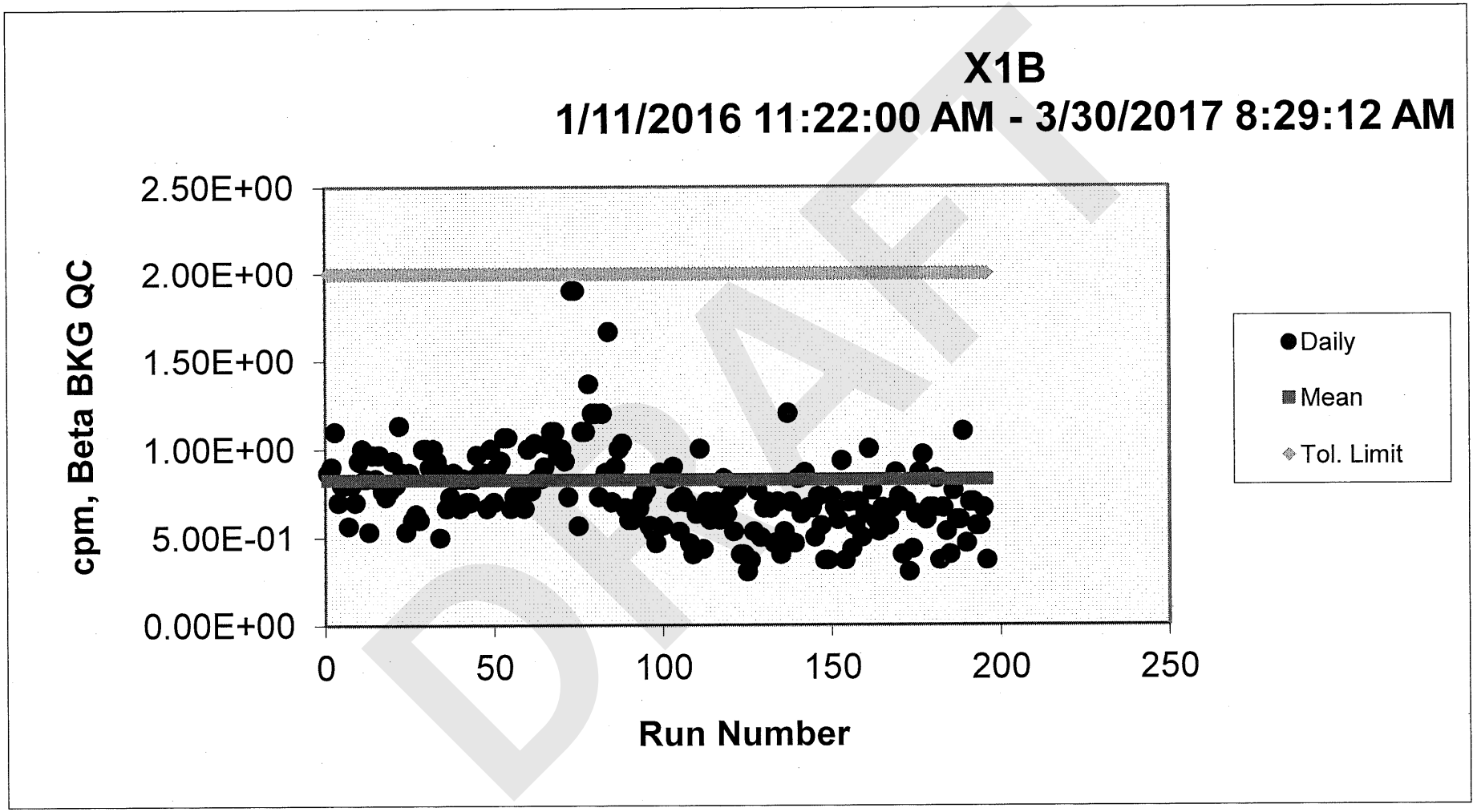
DRAFT


Y4D
8/9/2016 2:36:00 PM - 3/28/2017 1:05:08 PM
Beta Efficiency
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
20
40
60
80
100
Run Number
Daily
Mean
2 Sigma
3 Sigma

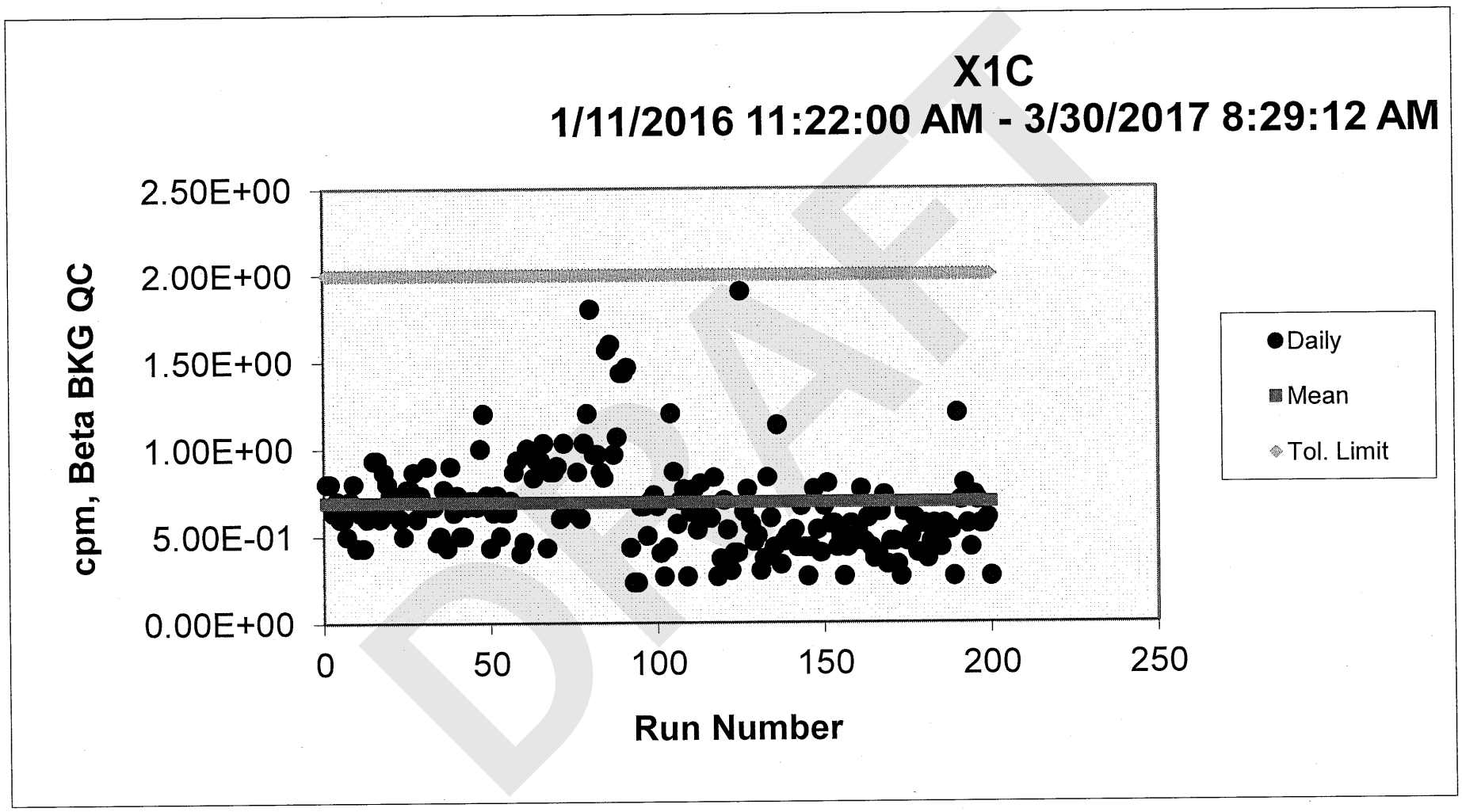
DRAFT


X1A
1/11/2016 11:22:00 AM - 3/30/2017 8:29:12 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

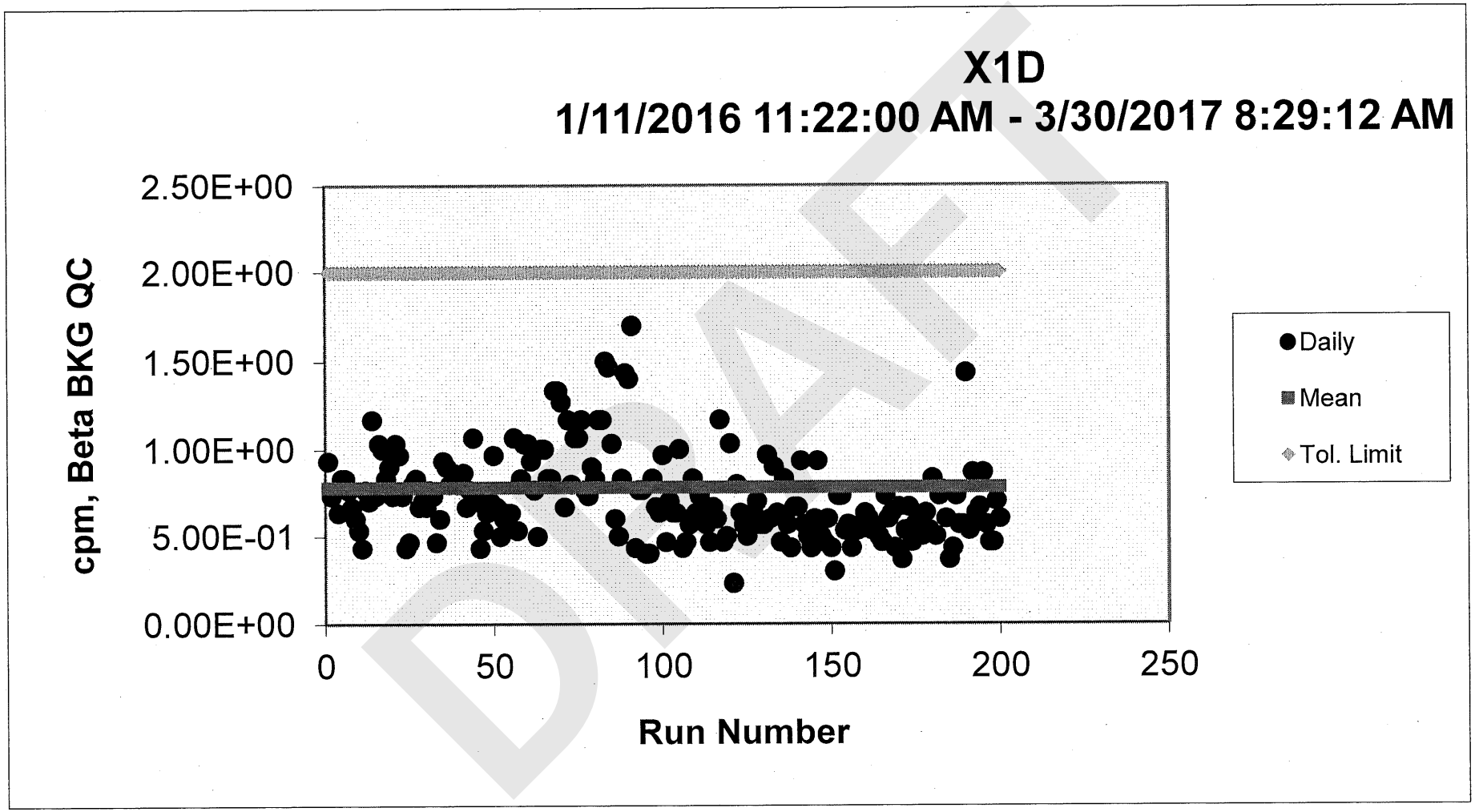
DRAFT


X1B
1/11/2016 11:22:00 AM - 3/30/2017 8:29:12 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

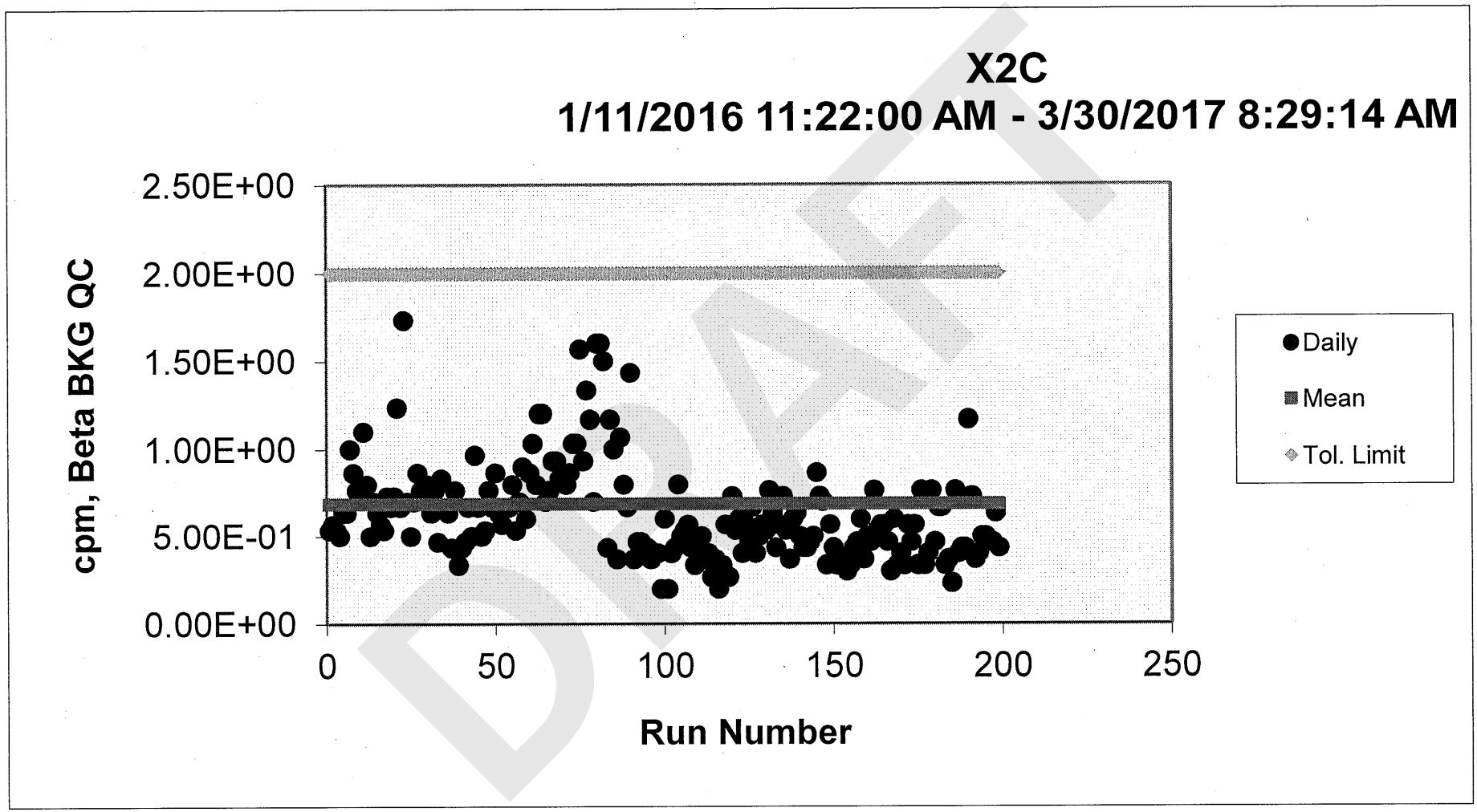
DRAFT


X1C
1/11/2016 11:22:00 AM - 3/30/2017 8:29:12 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

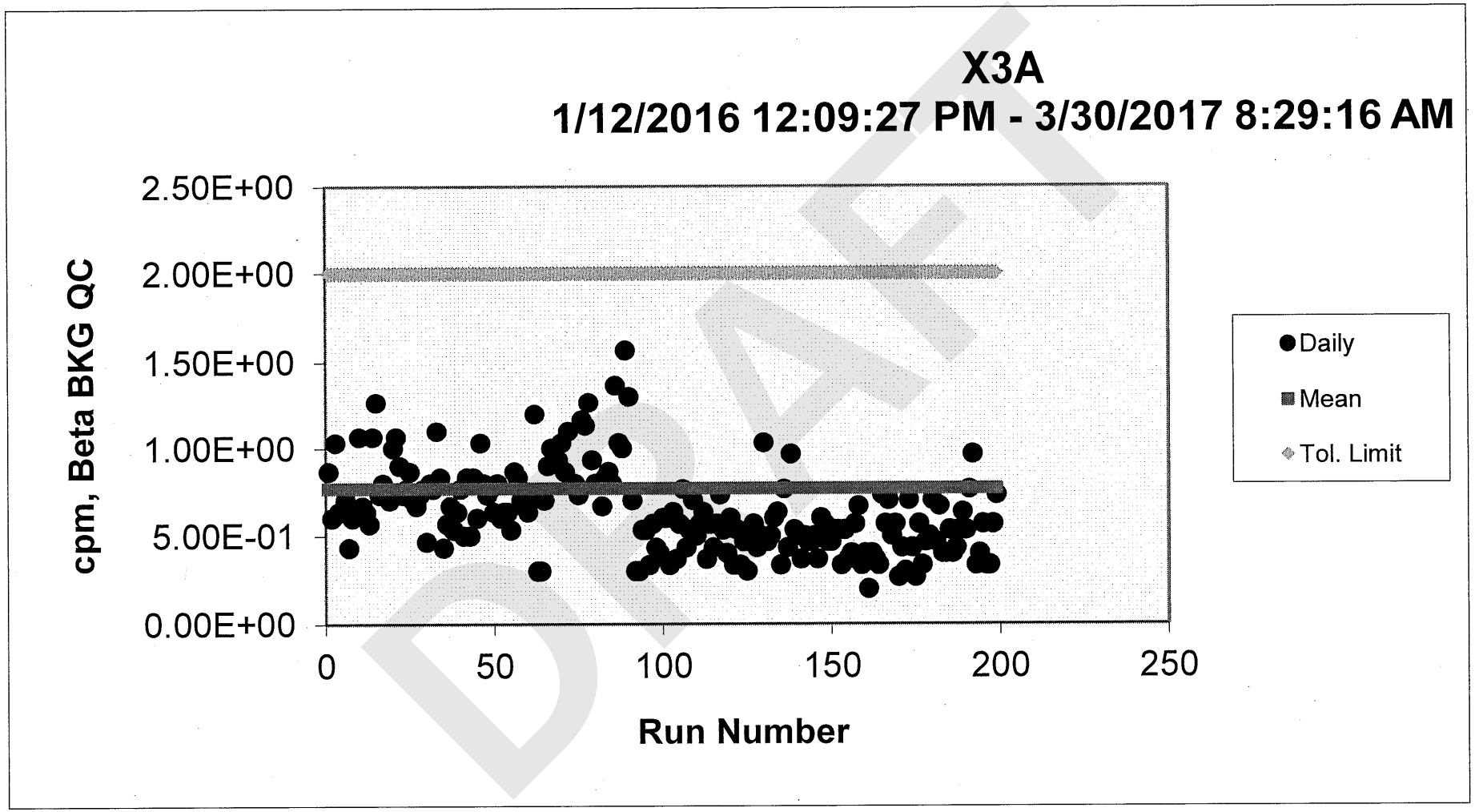
DRAFT


X1D
1/11/2016 11:22:00 AM - 3/30/2017 8:29:12 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

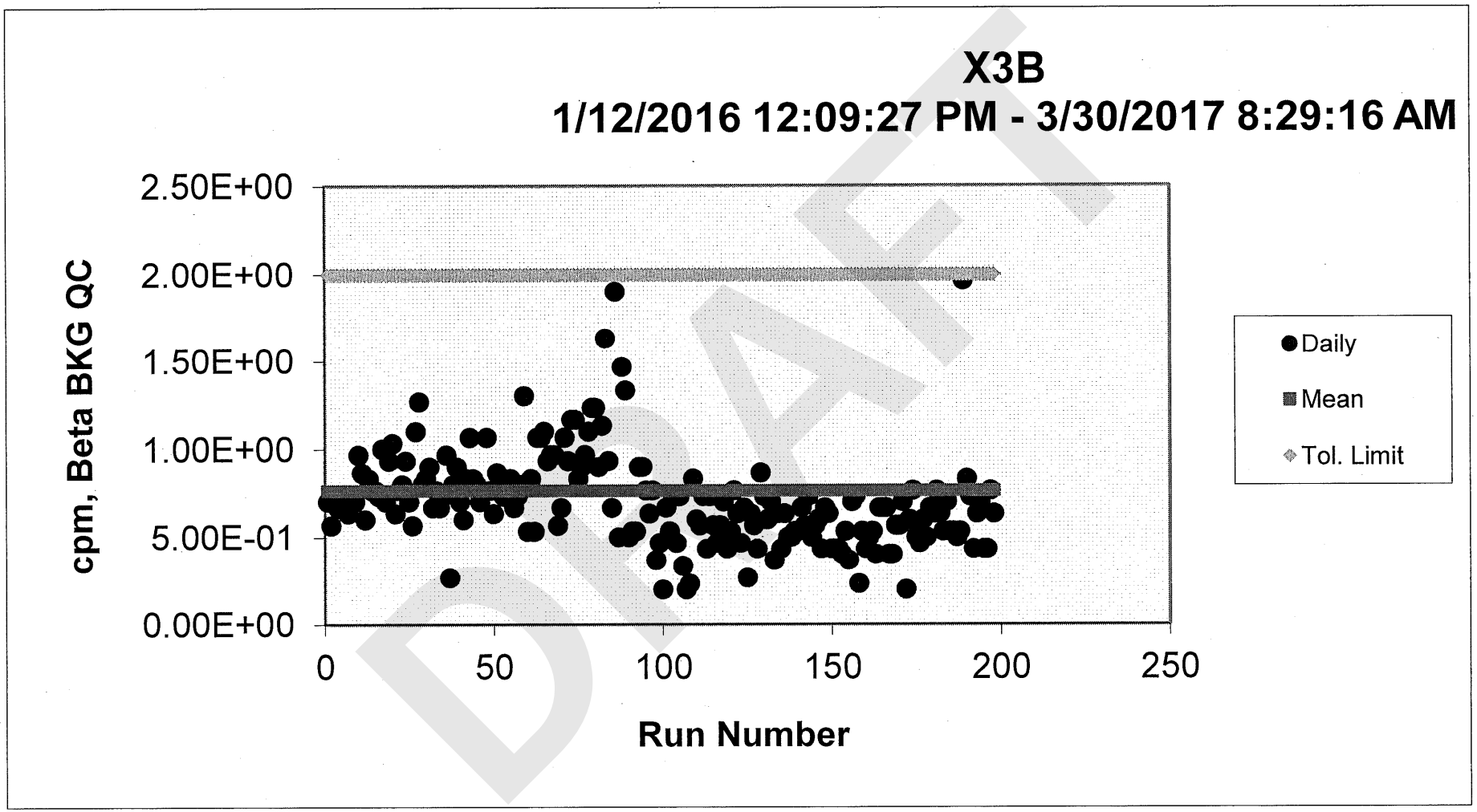
DRAFT


X2C
1/11/2016 11:22:00 AM - 3/30/2017 8:29:14 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

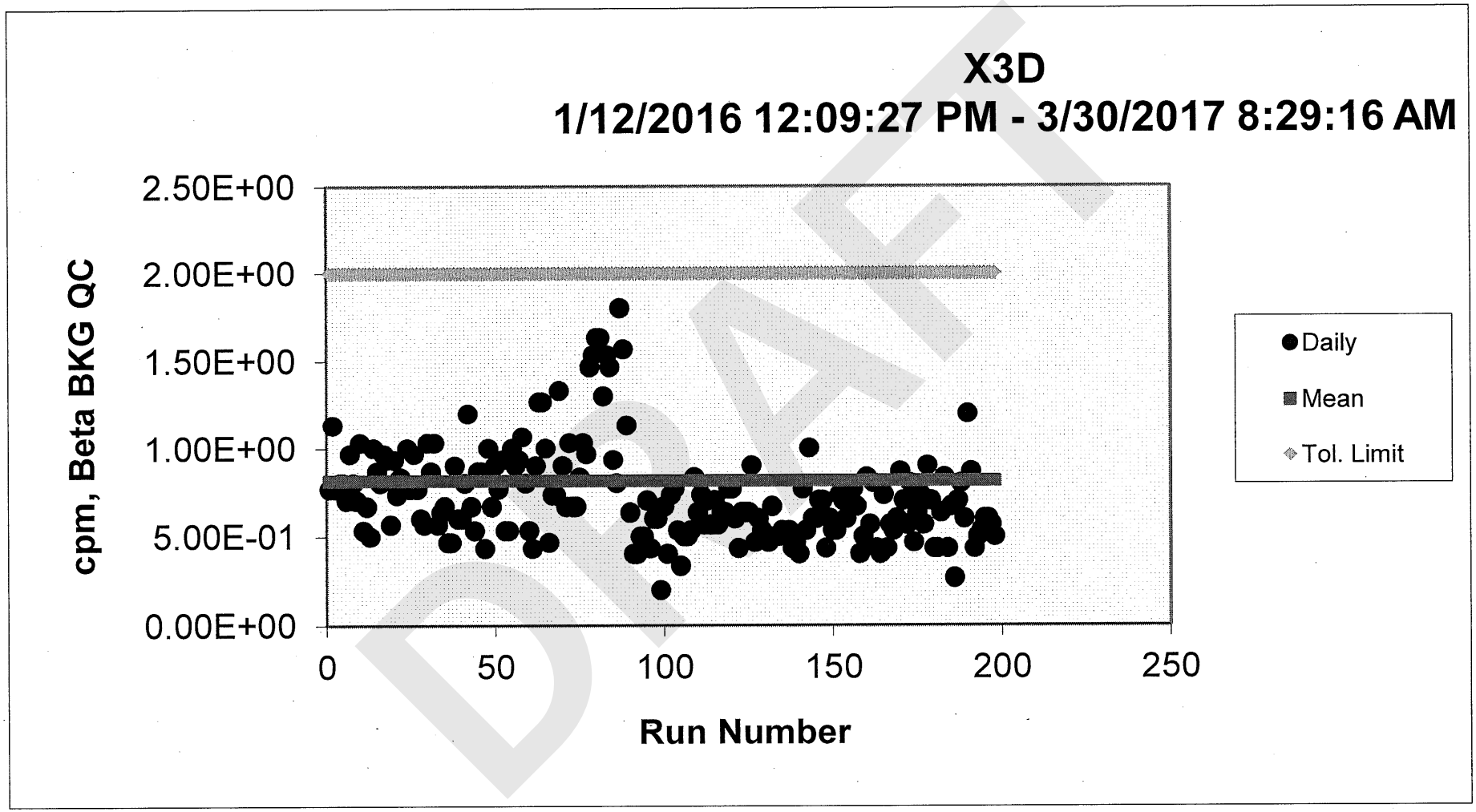
DRAFT


X3A
1/12/2016 12:09:27 PM - 3/30/2017 8:29:16 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

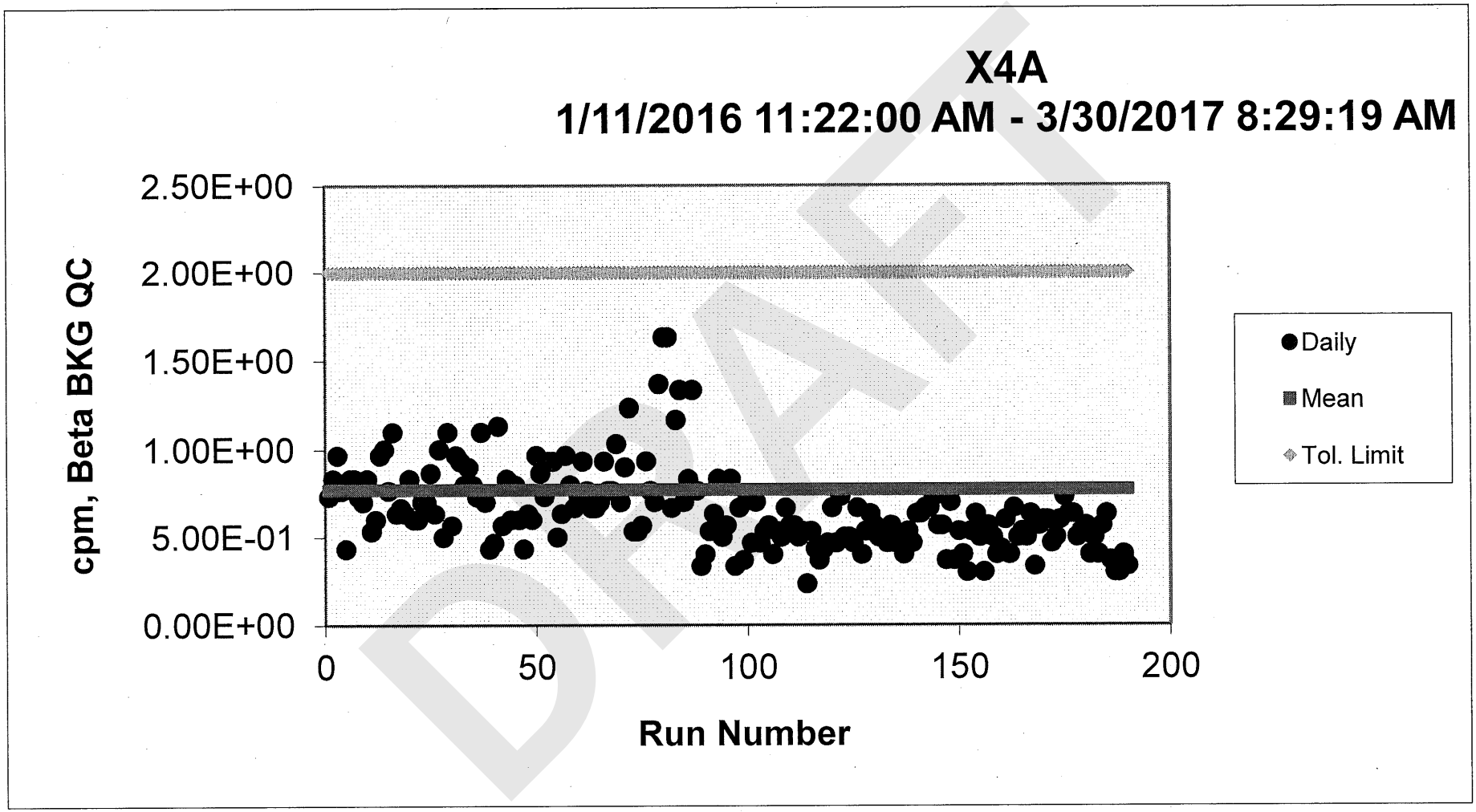
DRAFT


X3B
1/12/2016 12:09:27 PM - 3/30/2017 8:29:16 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

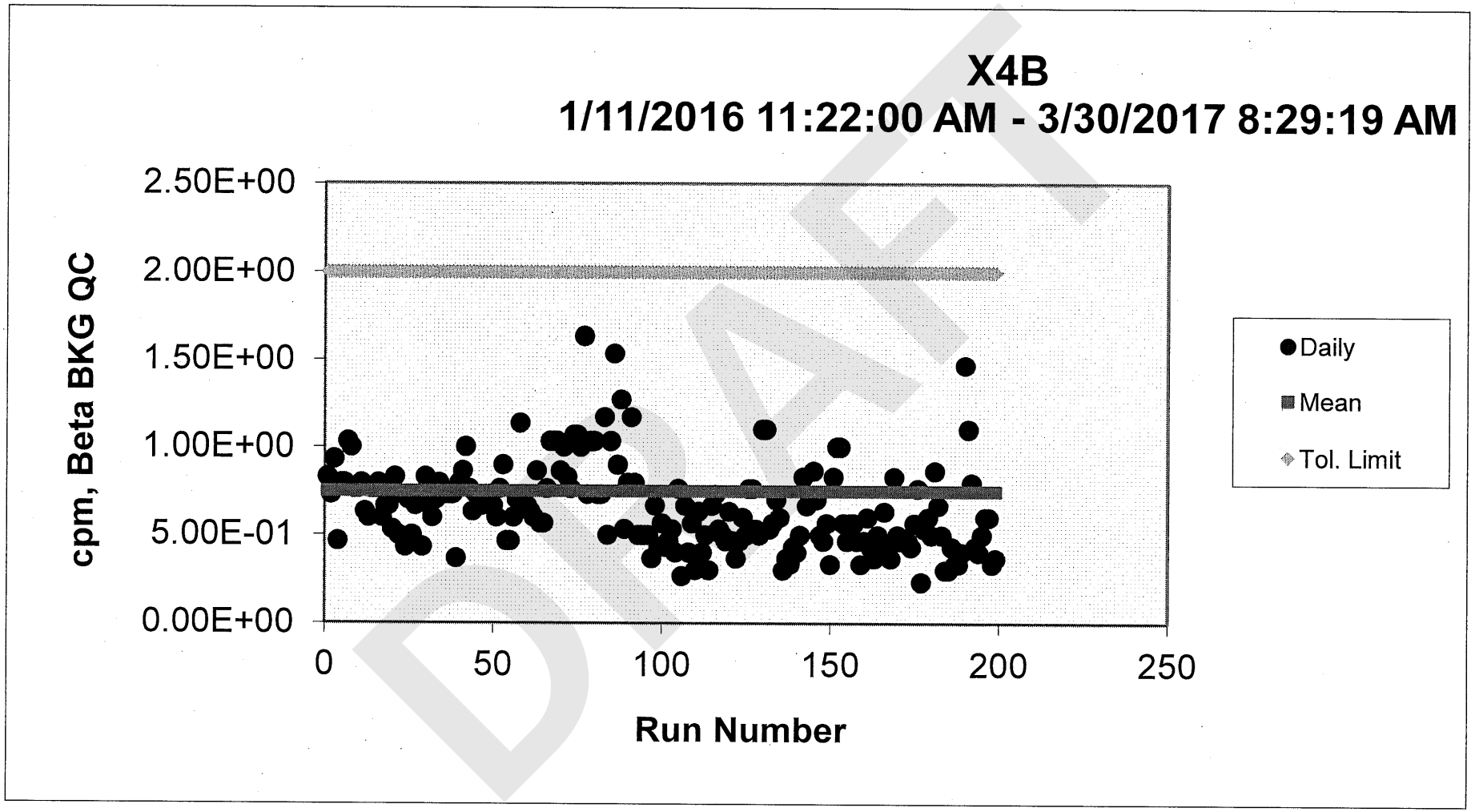
DRAFT


X3D
1/12/2016 12:09:27 PM - 3/30/2017 8:29:16 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

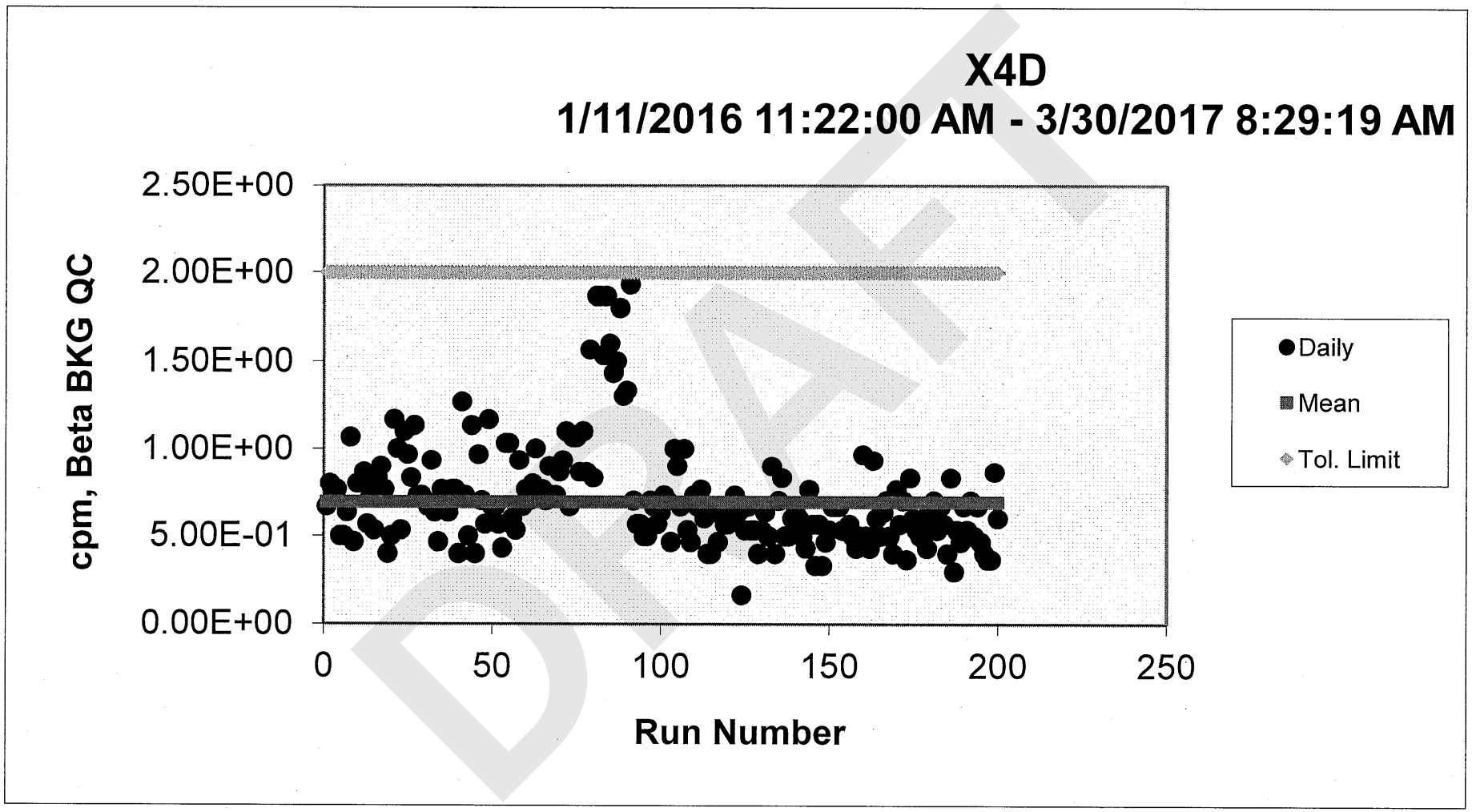
DRAFT


X4A
1/11/2016 11:22:00 AM - 3/30/2017 8:29:19 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

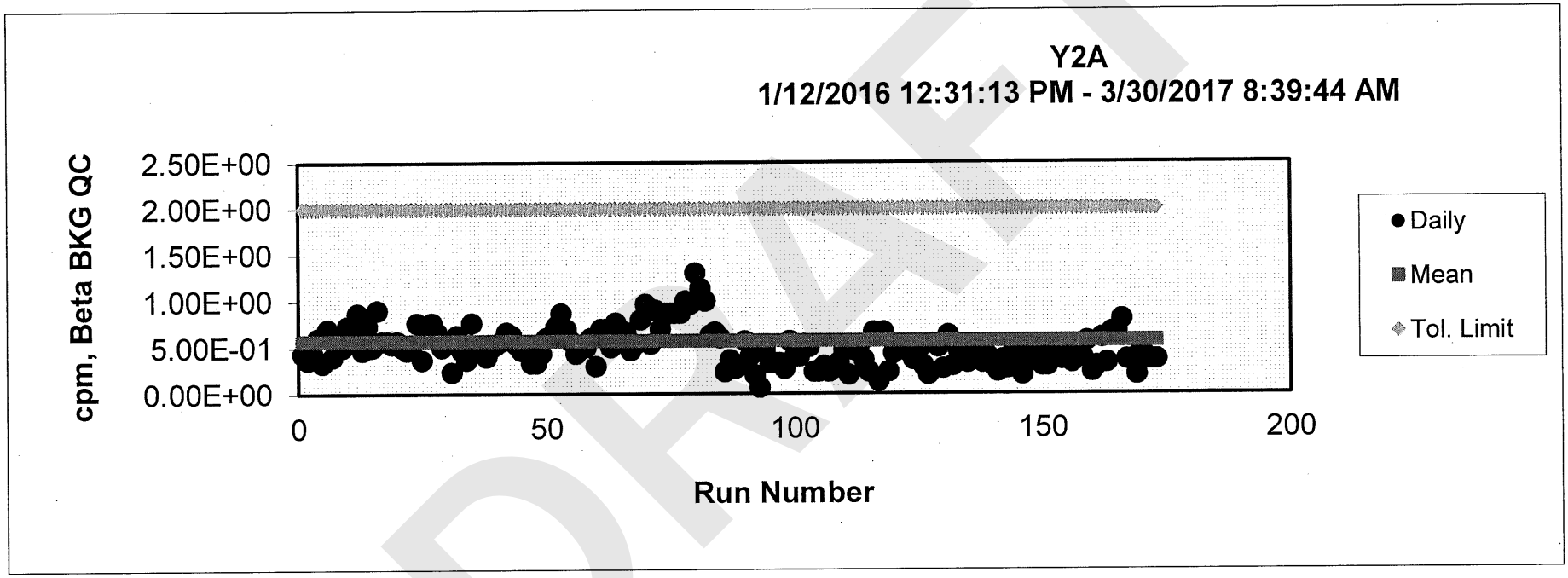
DRAFT


X4B
1/11/2016 11:22:00 AM - 3/30/2017 8:29:19 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

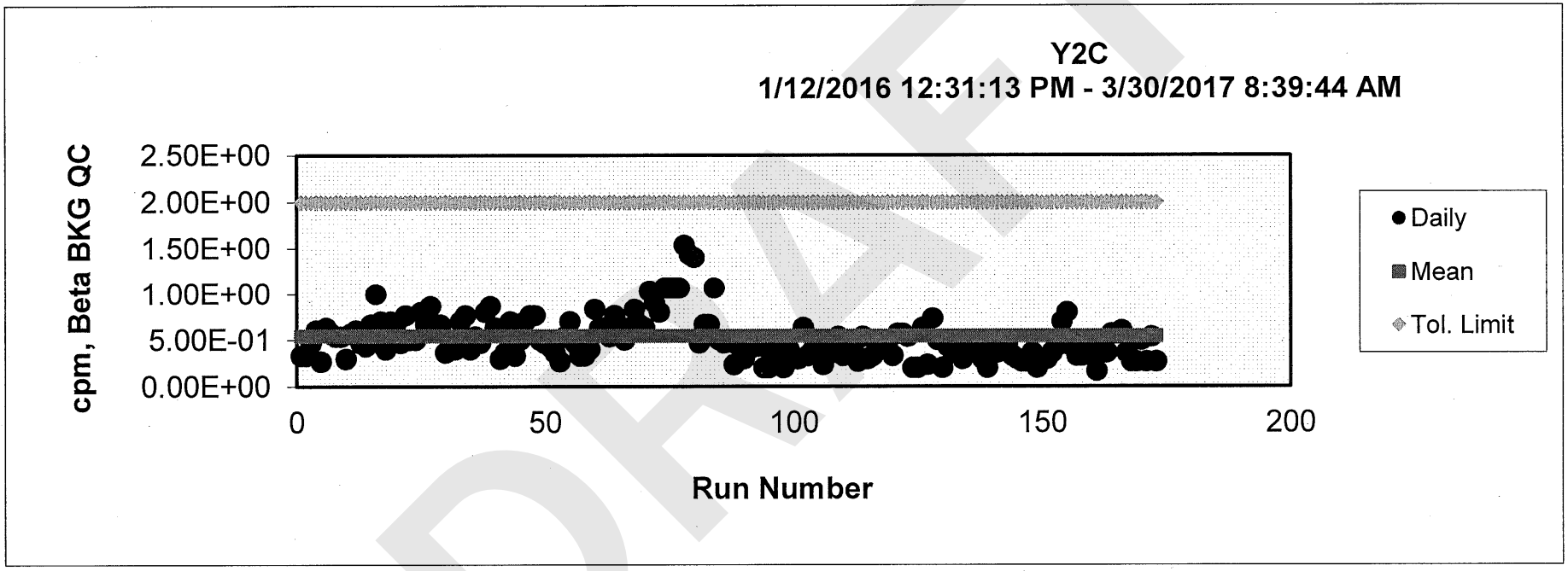
DRAFT


X4D
1/11/2016 11:22:00 AM - 3/30/2017 8:29:19 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

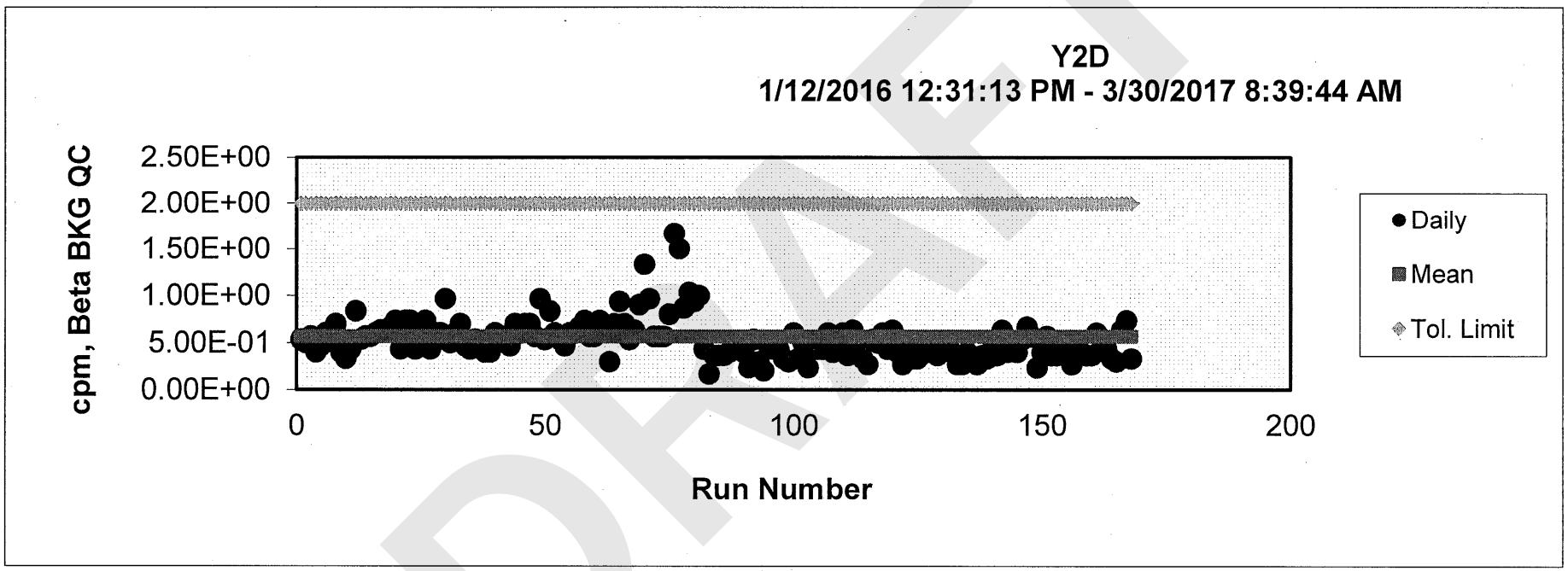
DRAFT


Y2A
1/12/2016 12:31:13 PM - 3/30/2017 8:39:44 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

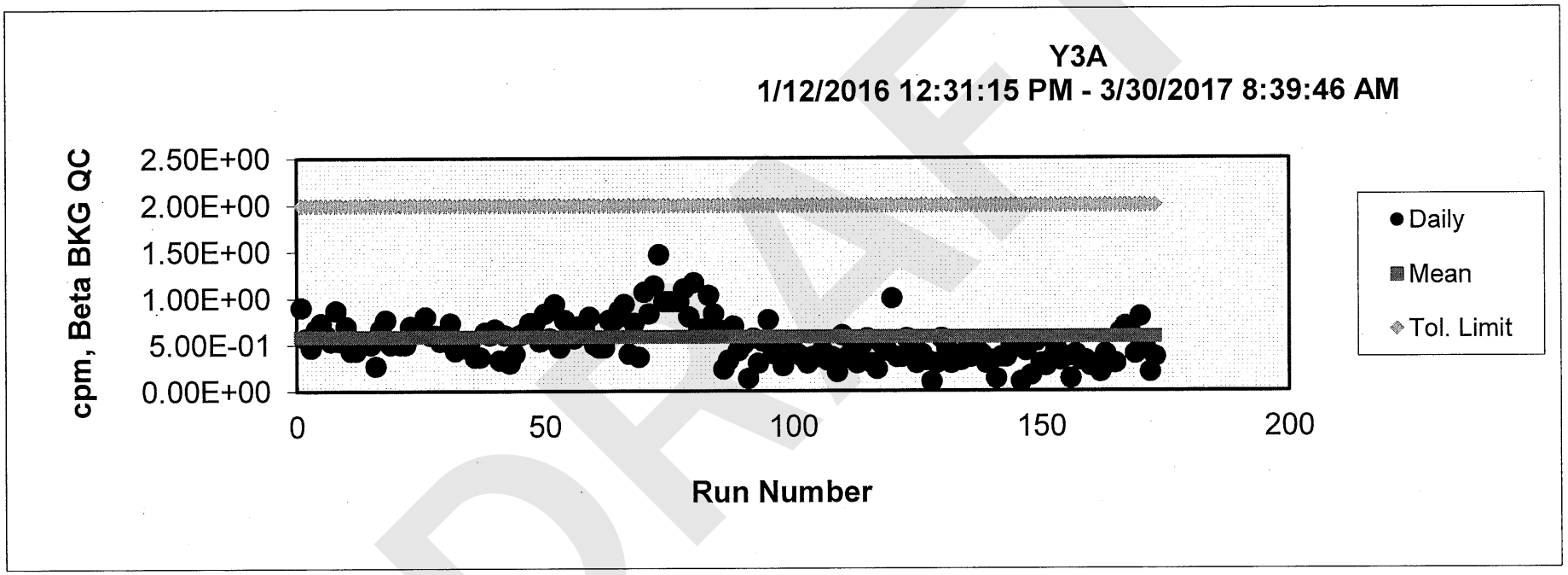
DRAFT


Y2C
1/12/2016 12:31:13 PM - 3/30/2017 8:39:44 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

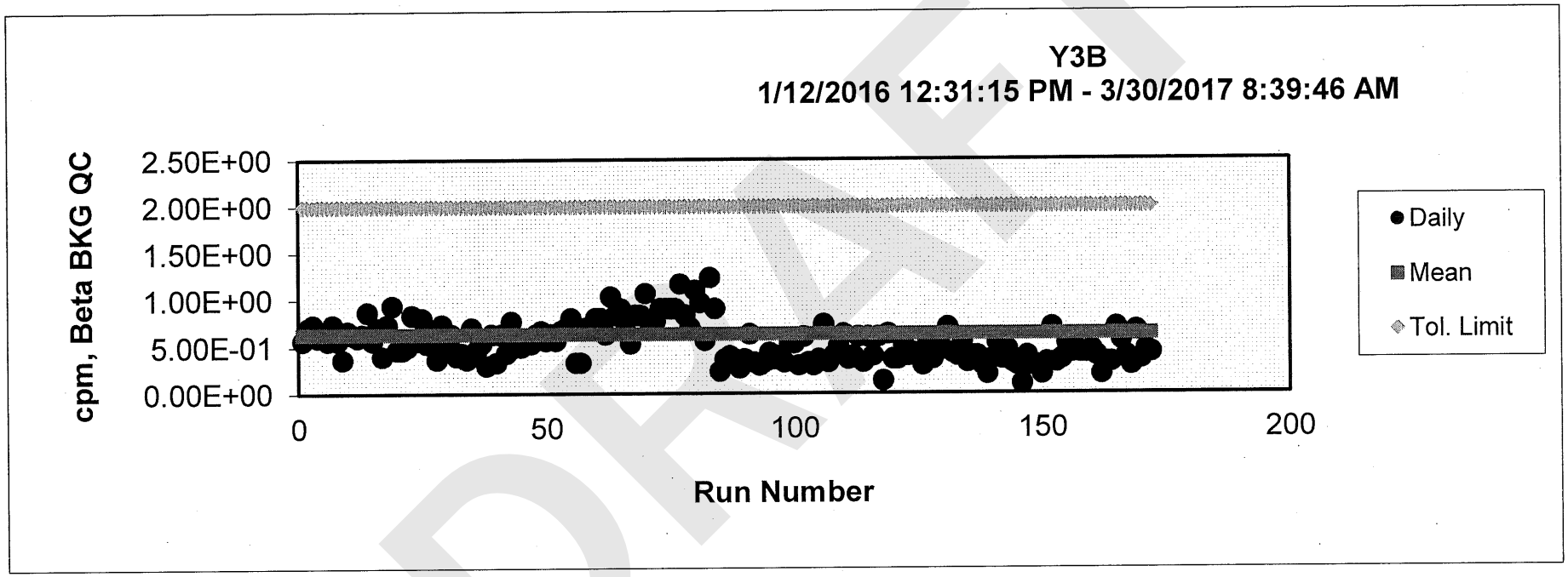
DRAFT


Y2D
1/12/2016 12:31:13 PM - 3/30/2017 8:39:44 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

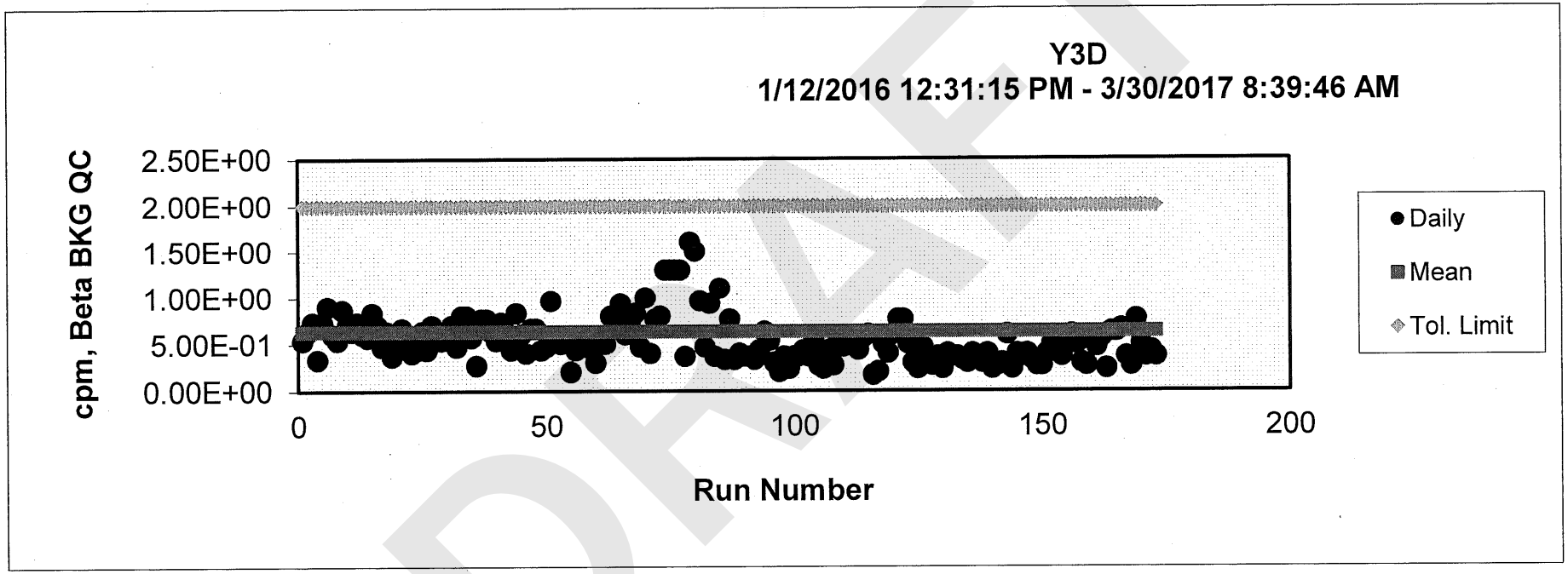
DRAFT


Y3A
1/12/2016 12:31:15 PM - 3/30/2017 8:39:46 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

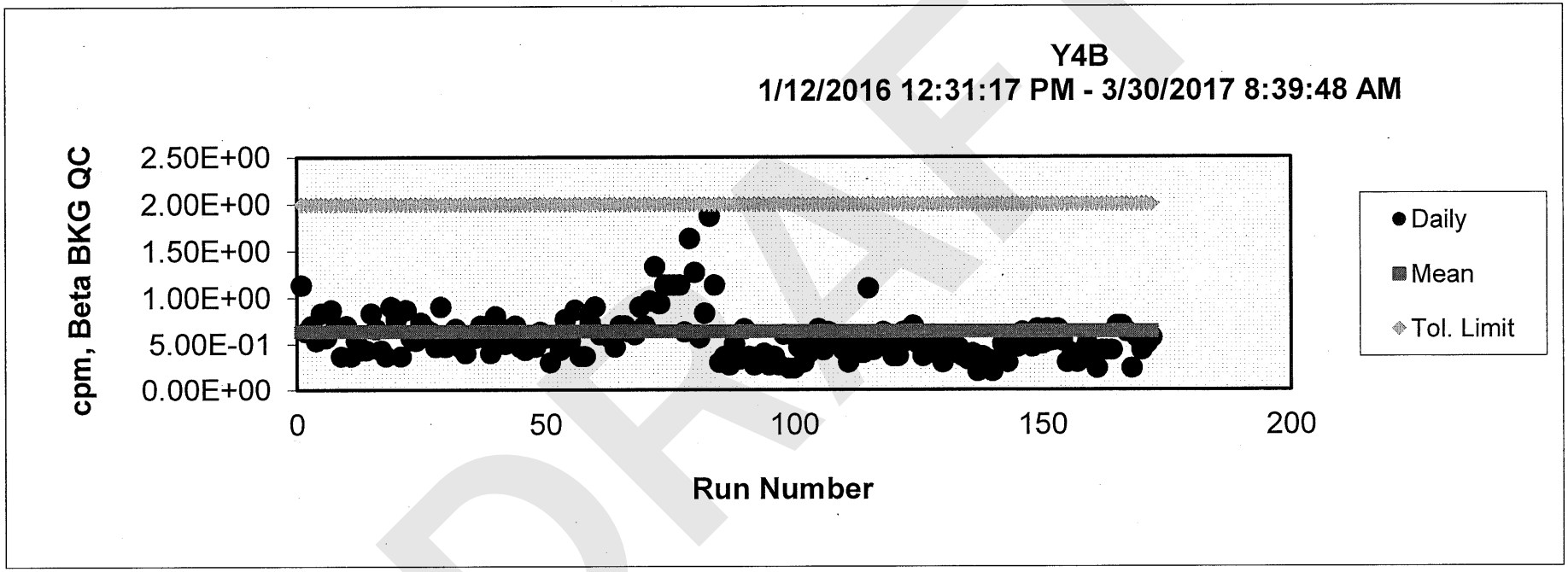
DRAFT


Y3B
1/12/2016 12:31:15 PM - 3/30/2017 8:39:46 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

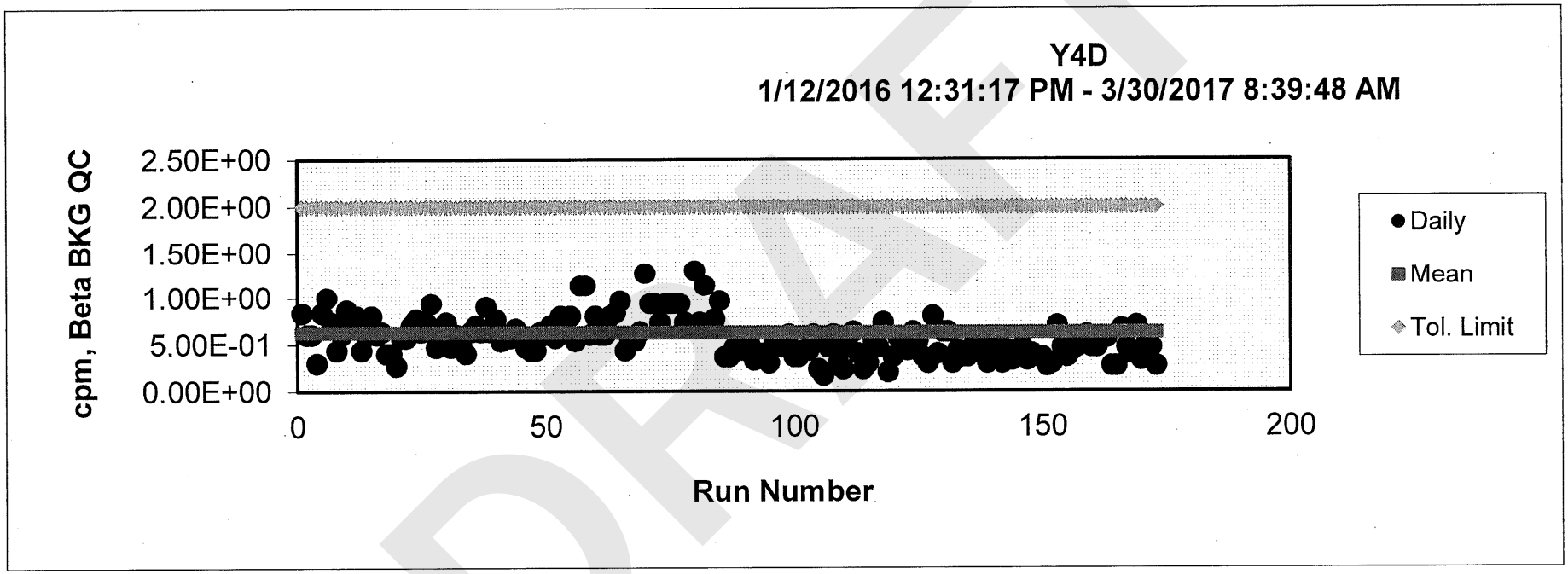
DRAFT


Y3D
1/12/2016 12:31:15 PM - 3/30/2017 8:39:46 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

DRAFT


Y4B
1/12/2016 12:31:17 PM - 3/30/2017 8:39:48 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

DRAFT


Y4D
1/12/2016 12:31:17 PM - 3/30/2017 8:39:48 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

DRAFT

LEAD 210

Sample and QC Raw Data

DRAFT

Counter ID: Y Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
L71890-3	918	4.66	800.00	03/21/2017 17:44		4.1102	g	pCi	PB-210	0.271	2.41E-01	6.00E-02	9.87E-02	g Dry	0.678	0.8846	1138.	1440.0	
WG24457-2	35126	4.66	800.00	03/21/2017 17:44		1.0000	%	pCi	PB-210	0.287	3.39E+02	3.71E+00	1.15E+00	Total	0.500	0.3985	1137.	1440.0	
WG24457-3	867	4.66	800.00	03/21/2017 17:44		4.1095	g	pCi	PB-210	0.295	2.33E-01	7.38E-02	1.25E-01	g Dry	0.498	0.8846	1163.	1440.0	
WG24457-4	44024	4.66	800.00	03/21/2017 17:44		4.0620	g	pCi	PB-210	0.292	4.12E+01	4.01E-01	1.17E-01	g Dry	0.565	0.8846	1254.	1440.0	
WG24457-5	45275	4.66	800.00	03/21/2017 17:44		4.0838	g	pCi	PB-210	0.278	4.12E+01	3.95E-01	1.11E-01	g Dry	0.606	0.8846	1192.	1440.0	

Reviewed 3/27/17 Date

Data Filename: Y032117PB.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

KH 3/27/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

DRAFT

2 a	L71811-1Y	7	303	########	800 800MIN	1650
2 b	WG24461-3Y	8	335	########	800 800MIN	1650
2 c	L71888-4Y ZFIF	1	473	########	800 800MIN	1650
2 d	-5Y	8	338	########	800 800MIN	1650
3 a	LL71890-3PB	24	918	########	800 800MIN	1650
3 b	WG24457-2PB	1085	35126	########	800 800MIN	1650
3 c		20	606	########	800 800MIN	1650
3 d	-3PB	34	867	########	800 800MIN	1650
4 a		30	724	########	800 800MIN	1650
4 b	-4PB	324	44024	########	800 800MIN	1650
4 c		63	736	########	800 800MIN	1650
4 d	-5PB	498	45275	########	800 800MIN	1650

DRAFT

Counter ID: Y Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
WG24457-1	582	4.66	800.00	03/23/2017 16:25		1.0000	%	pCi	PB-210	0.295	-4.06E-01	3.88E-01	7.50E-01	Total	0.445	0.6770	1163.	1440.0	

Reviewed [signature] Date 3/27/17

Data Filename: Y032317PB.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

[signature] 3/27/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

DRAFT

1 a				########	800 800MIN	1650
1 b				########	800 800MIN	1650
1 c				########	800 800MIN	1650
1 d				########	800 800MIN	1650
2 a				########	800 800MIN	1650
2 b				########	800 800MIN	1650
2 c				########	800 800MIN	1650
2 d				########	800 800MIN	1650
~~3 a~~	~~L71871-1I~~	~~7~~	~~283~~	~~########~~	~~800 800MIN~~	~~1650~~
~~3 b~~	~~-2I~~	~~13~~	~~311~~	~~########~~	~~800 800MIN~~	~~1650~~
3 c		26	600	########	800 800MIN	1650
3 d	WG24457-1PB	28	582	########	800 800MIN	1650
4 a				########	800 800MIN	1650
4 b				########	800 800MIN	1650
4 c				########	800 800MIN	1650
4 d				########	800 800MIN	1650

3/27/17

Y0323178B

DRAFT

Counter ID: X Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
L71890-6	912	4.66	800.00	03/21/2017 15:54		4.0674	g	pCi	PB-210	0.311	1.79E-01	5.81E-02	9.88E-02	g Dry	0.617	0.8940	1243.	1440.0	
L71890-9	1017	4.66	800.00	03/21/2017 15:54		4.0422	g	pCi	PB-210	0.296	1.73E-01	5.67E-02	9.72E-02	g Dry	0.708	0.8940	1413.	1440.0	
L71890-12	827	4.66	800.00	03/21/2017 15:54		4.3337	g	pCi	PB-210	0.275	1.26E-01	6.46E-02	1.14E-01	g Dry	0.569	0.8940	1245.	1440.0	
L71890-15	885	4.66	800.00	03/21/2017 15:54		4.3516	g	pCi	PB-210	0.283	1.57E-01	9.14E-02	1.62E-01	g Dry	0.405	0.8940	1369.	1440.0	
L71890-21	823	4.66	800.00	03/21/2017 15:54		4.0651	g	pCi	PB-210	0.312	1.43E-01	7.76E-02	1.37E-01	g Dry	0.446	0.8940	1251.	1440.0	
L71890-24	818	4.66	800.00	03/21/2017 15:54		4.2324	g	pCi	PB-210	0.267	9.97E-02	5.33E-02	9.40E-02	g Dry	0.726	0.8940	1239.	1440.0	
L71890-27	1007	4.66	800.00	03/21/2017 15:54		4.0199	g	pCi	PB-210	0.281	2.63E-01	8.65E-02	1.48E-01	g Dry	0.490	0.8940	1398.	1440.0	
L71890-33	761	4.66	800.00	03/21/2017 15:54		4.0190	g	pCi	PB-210	0.293	1.28E-02	4.68E-02	8.66E-02	g Dry	0.784	0.8940	1336.	1440.0	
L71890-36	881	4.66	800.00	03/21/2017 15:54		4.0668	g	pCi	PB-210	0.309	1.44E-01	6.80E-02	1.19E-01	g Dry	0.528	0.8940	1313.	1440.0	
L71890-39	923	4.66	800.00	03/21/2017 15:54		4.0730	g	pCi	PB-210	0.294	1.97E-01	7.16E-02	1.23E-01	g Dry	0.535	0.8940	1301.	1440.0	
L71890-45	959	4.66	800.00	03/21/2017 15:54		4.0209	g	pCi	PB-210	0.286	1.69E-01	6.18E-02	1.07E-01	g Dry	0.658	0.8940	1360.	1440.0	

Reviewed 3/27/17 Date

Data Filename: X032117N.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

3/27/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

DRAFT

X032117N

1 a	L71890-6PB210	20	912	########	800	800MIN	1580
1 b	-9	39	1017	########	800	800MIN	1580
1 c	-12	28	827	########	800	800MIN	1580
1 d	-15	44	885	########	800	800MIN	1580
2 a	-18	25	807	########	800	800MIN	1580
2 b		21	493	########	800	800MIN	1580
2 c	-21	29	823	########	800	800MIN	1580
2 d		20	522	########	800	800MIN	1580
3 a	-24	25	818	########	800	800MIN	1580
3 b	-27PB210	49	1007	########	800	800MIN	1580
3 c	-30	20	723	########	800	800MIN	1580
3 d	-33	39	761	########	800	800MIN	1580
4 a	-36	42	881	########	800	800MIN	1580
4 b	-39	30	923	########	800	800MIN	1580
4 c	-42	36	782	########	800	800MIN	1580
4 d	-45PB210	23	959	########	800	800MIN	1580

DRAFT

Counter ID: Y Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
L71890-18	1223	4.66	1440.00	03/23/2017 16:25		4.1424	g	pCi	PB-210	0.263	7.94E-02	6.39E-02	1.02E-01	g Dry	0.623	0.6970	1103.	1440.0	
L71890-30	1350	4.66	1440.00	03/23/2017 16:25		4.0237	g	pCi	PB-210	0.306	7.05E-02	5.77E-02	9.28E-02	g Dry	0.640	0.6970	1226.	1440.0	
L71890-42	1259	4.66	1440.00	03/23/2017 16:25		4.0269	g	pCi	PB-210	0.295	8.02E-02	6.28E-02	1.01E-01	g Dry	0.589	0.6970	1134.	1440.0	

Reviewed 3/27/17 Date

Data Filename: Y032317D.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

3/27/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

DRAFT

2 a	L71890-18PB	27	1223	########	1440 200MIN	1650
2 b		17	892	########	1440 200MIN	1650
2 c	-30PB	50	1350	########	1440 200MIN	1650
2 d	-42PB	42	1259	########	1440 200MIN	1650

Y032317D

DRAFT

Raw Data Sheet (rawdata)

03/30/17 14:05

Work Order: **L71890** Customer: **GeoEngineers**

Analysis: **PB-210** Project: **GE002-3EREG-17**

Sample ID / Client ID	Run #	Analysis	Reference Date/Time	Volume/ Aliquot	Scavenge Date/Time	Milking Date/Time	Mount Weight	Recovery	Count Date/Time	Detector ID	Total Counts	Sample dt	Bkg Counts	Bkg dt	Eff.	Decay & Ingrowth Factor	Analy
L71890-3		PB-210	23-feb-17 13:04	4.1102 g dry		03-20-17 14:10	.0526	67.84	03-21-17 17:44	Y3A	918	800 M	1138	1440 M	.271	.885	SVO
MAF-GC-03-3																	
Activity: **2.41E-01**	Error:	6.00E-02	MDC: 9.87E-02	pCi/gDry		**L71890-3**			**PB-210**								
L71890-6		PB-210	23-feb-17 13:10	4.0674 g dry		03-20-17 14:10	.0478	61.65	03-21-17 15:54	X1A	912	800 M	1243	1440 M	.311	.894	SVO
MAF-GC-03-6																	
Activity: **1.79E-01**	Error:	5.81E-02	MDC: 9.88E-02	pCi/gDry		**L71890-6**			**PB-210**								
L71890-9		PB-210	23-feb-17 13:16	4.0422 g dry		03-20-17 14:10	.0549	70.81	03-21-17 15:54	X1B	1017	800 M	1413	1440 M	.296	.894	SVO
MAF-GC-03-9																	
Activity: **1.73E-01**	Error:	5.67E-02	MDC: 9.72E-02	pCi/gDry		**L71890-9**			**PB-210**								
L71890-12		PB-210	23-feb-17 13:22	4.3337 g dry		03-20-17 14:10	.0441	56.88	03-21-17 15:54	X1C	827	800 M	1245	1440 M	.275	.894	SVO
MAF-GC-03-12																	
Activity: **1.26E-01**	Error:	6.46E-02	MDC: 1.14E-01	pCi/gDry		**L71890-12**			**PB-210**								
L71890-15		PB-210	23-feb-17 13:28	4.3516 g dry		03-20-17 14:10	.0314	40.5	03-21-17 15:54	X1D	885	800 M	1369	1440 M	.283	.894	SVO
MAF-GC-03-15																	
Activity: 1.57E-01	Error:	9.14E-02	MDC: **1.62E-01**	pCi/gDry		L71890-15			PB-210								
L71890-18		PB-210	23-feb-17 13:34	4.1424 g dry		03-20-17 14:10	.0483	62.3	03-23-17 16:25	Y2A	1223	1440 M	1103	1440 M	.263	.697	SVO
MAF-GC-03-18																	
Activity: 7.94E-02	Error:	6.39E-02	MDC: **1.02E-01**	pCi/gDry		L71890-18			PB-210								
L71890-21		PB-210	23-feb-17 13:40	4.0651 g dry		03-20-17 14:10	.0346	44.63	03-21-17 15:54	X2C	823	800 M	1251	1440 M	.312	.894	SVO
MAF-GC-03-21																	
Activity: **1.43E-01**	Error:	7.76E-02	MDC: 1.37E-01	pCi/gDry		**L71890-21**			**PB-210**								
L71890-24		PB-210	23-feb-17 13:46	4.2324 g dry		03-20-17 14:10	.0563	72.62	03-21-17 15:54	X3A	818	800 M	1239	1440 M	.267	.894	SVO
MAF-GC-03-24																	

DRAFT

Work Order: **L71890**
PB-210

Customer: **GeoEngineers**
GE002-3EREG-17

L71890-24	PB-210	23-feb-17 13:46	4.2324 g dry	03-20-17 14:10	.0563	72.62	03-21-17 15:54	X3A	818	800 M	1239	1440 M	.267	.894	SVO
MAF-GC-03-24															
Activity: **9.97E-02**	Error: 5.33E-02	MDC: 9.40E-02	pCi/gDry	**L71890-24**			**PB-210**								
L71890-27	PB-210	23-feb-17 13:52	4.0199 g dry	03-20-17 14:10	.038	49.01	03-21-17 15:54	X3B	1007	800 M	1398	1440 M	.281	.894	SVO
MAF-GC-03-27															
Activity: **2.63E-01**	Error: 8.65E-02	MDC: 1.48E-01	pCi/gDry	**L71890-27**			**PB-210**								
L71890-30	PB-210	23-feb-17 13:58	4.0237 g dry	03-20-17 14:10	.0496	63.98	03-23-17 16:25	Y2C	1350	1440 M	1226	1440 M	.306	.697	SVO
MAF-GC-03-30															
Activity: 7.05E-02	Error: 5.77E-02	MDC: **9.28E-02**	pCi/gDry	L71890-30			PB-210								
L71890-33	PB-210	23-feb-17 14:04	4.019 g dry	03-20-17 14:10	.0608	78.42	03-21-17 15:54	X3D	761	800 M	1336	1440 M	.293	.894	SVO
MAF-GC-03-33															
Activity: 1.28E-02	Error: 4.68E-02	MDC: **8.66E-02**	pCi/gDry	L71890-33			PB-210								
L71890-36	PB-210	23-feb-17 14:10	4.0668 g dry	03-20-17 14:10	.0409	52.75	03-21-17 15:54	X4A	881	800 M	1313	1440 M	.309	.894	SVO
MAF-GC-03-36															
Activity: **1.44E-01**	Error: 6.80E-02	MDC: 1.19E-01	pCi/gDry	**L71890-36**			**PB-210**								
L71890-39	PB-210	23-feb-17 14:16	4.073 g dry	03-20-17 14:10	.0415	53.53	03-21-17 15:54	X4B	923	800 M	1301	1440 M	.294	.894	SVO
MAF-GC-03-39															
Activity: **1.97E-01**	Error: 7.16E-02	MDC: 1.23E-01	pCi/gDry	**L71890-39**			**PB-210**								
L71890-42	PB-210	23-feb-17 14:22	4.0269 g dry	03-20-17 14:10	.0457	58.94	03-23-17 16:25	Y2D	1259	1440 M	1134	1440 M	.295	.697	SVO
MAF-GC-03-42															
Activity: 8.02E-02	Error: 6.28E-02	MDC: **1.01E-01**	pCi/gDry	L71890-42			PB-210								
L71890-45	PB-210	23-feb-17 14:28	4.0209 g dry	03-20-17 14:10	.051	65.78	03-21-17 15:54	X4D	959	800 M	1360	1440 M	.286	.894	SVO
MAF-GC-03-45															

DRAFT

Work Order: **L71890**
PB-210

Customer: **GeoEngineers**
GE002-3EREG-17

L71890-45	PB-210	23-feb-17 14:28	4.0209 g dry	03-20-17 14:10	.051	65.78	03-21-17 15:54	X4D	959	800 M	1360	1440 M	.286	.894	SVO
MAF-GC-03-45															

Activity: **1.69E-01** Error: 6.18E-02 MDC: 1.07E-01 pCi/gDry **L71890-45** **PB-210**

DRAFT

Raw Data Sheet (rawdata)

03/30/17 14:05

Work Order: **WG24457** Customer: **Teledyne Brown Engineering**

Analysis: **PB-210** Project: **TE511-LABQC**

Sample ID / Client ID	Run #	Analysis	Reference Date/Time	Volume/ Aliquot	Scavenge Date/Time	Milking Date/Time	Mount Weight	Recovery	Count Date/Time	Detector ID	Total Counts	Sample dt	Bkg Counts	Bkg dt	Eff.	Decay & Ingrowth Factor	Analy
WG24457-1		PB-210	15-mar-17 00:00	100 %		03-20-17 14:10	.0345	44.5	03-23-17 16:25	Y3D	582	800 M	1163	1440 M	.295	.677	SVO
Blank Samples																	
Activity: -4.06E-01	Error:	3.88E-01	MDC: **7.50E-01**	pCi/Total		WG24457-1			PB-210								
WG24457-2		PB-210	01-jul-91 12:00	100 %		03-20-17 14:10	.0388	50.05	03-21-17 17:44	Y3B	35126	800 M	1137	1440 M	.287	.399	SVO
Laboratory Control Samples																	
Activity: **3.39E+02**	Error:	3.71E+00	MDC: 1.15E+00	pCi/Total		**WG24457-2**			**PB-210**								
WG24457-3		PB-210	23-feb-17 13:04	4.1095 g dry		03-20-17 14:10	.0386	49.79	03-21-17 17:44	Y3D	867	800 M	1163	1440 M	.295	.885	SVO
MAF-GC-03-3																	
Activity: **2.33E-01**	Error:	7.38E-02	MDC: 1.25E-01	pCi/gDry		**WG24457-3**			**PB-210**								
WG24457-4		PB-210	23-feb-17 13:10	4.062 g dry		03-20-17 14:10	.0438	56.49	03-21-17 17:44	Y4B	44024	800 M	1254	1440 M	.292	.885	SVO
MAF-GC-03-6MS																	
Activity: **4.12E+01**	Error:	4.01E-01	MDC: 1.17E-01	pCi/gDry		**WG24457-4**			**PB-210**								
WG24457-5		PB-210	23-feb-17 13:10	4.0838 g dry		03-20-17 14:10	.047	60.62	03-21-17 17:44	Y4D	45275	800 M	1192	1440 M	.278	.885	SVO
MS																	
Activity: **4.12E+01**	Error:	3.95E-01	MDC: 1.11E-01	pCi/gDry		**WG24457-5**			**PB-210**								

DRAFT

LEAD 210

Recovery

DRAFT

WG24457

Pb-210 Recovery (Bi-210)

Bi-207 Tracer	
recovery 1	64.2
recovery 2	71.9
recovery 3	61.9
Average	66.00
2 sigma	10.47
RPD highest and lowest	14.95
< 30	Yes

DRAFT

Sec. Review: Analyst: JCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-MAR-2017 09:22:27.81
TBE23 03017322 HpGe ********** Aquisition Date/Time: 21-MAR-2017 06:38:57.47

LIMS No., Customer Name, Client ID: L71920-39BI BI-207

Sample ID : 23L71920-39BI
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: BI207

Smple Date: 21-MAR-2017 00:00:00.
Geometry : 2325MM093004
BKGFILE : 23BG022417MT
Real Time : 0 00:30:02.10
Live time : 0 00:30:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	33.92*	103	118	2.52	68.65	3.35E-01	5.72E-02	23.5	
2	0	43.92*	37	625	7.85	88.61	2.46E+00	2.03E-02	172.3	
3	0	73.87	4042	865	3.70	148.38	1.63E+01	2.25E+00	2.5	
4	3	84.43	1011	327	2.55	169.46	1.97E+01	5.62E-01	5.3	1.70E+00
5	3	86.76	354	341	2.51	174.11	2.03E+01	1.97E-01	14.9	
6	0	569.42*	2962	106	2.55	1138.08	7.91E+00	1.65E+00	2.1	
7	0	1063.37*	1201	38	2.67	2125.83	3.93E+00	6.67E-01	3.2	
8	0	1632.53	176	4	2.68	3265.52	2.59E+00	9.77E-02	8.1	
9	0	1768.88	52	11	2.63	3538.79	2.46E+00	2.90E-02	19.1	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1201	74.50*	3.934E+00	6.151E+02	6.151E+02	6.39
	1770.24	52	6.87	2.459E+00	4.644E+02	4.644E+02	38.22

Flag: "*" = Keyline

$\frac{608}{947} = 64.2\%$

DRAFT

Sample ID : 23L71920-39BI Acquisition date : 21-MAR-2017 06:38:57

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.00	6.151E+02	6.151E+02	0.393E+02	6.39	
	Total Activity :		6.151E+02	6.151E+02			
	Grand Total Activity :		6.151E+02	6.151E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	33.92	103	118	2.52	68.65	64	10	5.72E-02	47.0	3.35E-01	
0	43.92	37	625	7.85	88.61	77	21	2.03E-02	****	2.46E+00	
0	73.87	4042	865	3.70	148.38	136	23	2.25E+00	4.9	1.63E+01	
3	84.43	1011	327	2.55	169.46	159	23	5.62E-01	10.5	1.97E+01	
3	86.76	354	341	2.51	174.11	159	23	1.97E-01	29.9	2.03E+01	
0	569.42	2962	106	2.55	1138.08	1126	26	1.65E+00	4.1	7.91E+00	
0	1632.53	176	4	2.68	3265.52	3257	19	9.77E-02	16.2	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.00	6.080E+02	6.080E+02	0.384E+02	6.31	
	Total Activity :		6.080E+02	6.080E+02			
	Grand Total Activity :		6.080E+02	6.080E+02			

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

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	6.080E+02	3.837E+01	1.258E+01	0.000E+00	48.335

DRAFT

```
A,23L71920-39BI    ,03/21/2017 09:22,03/21/2017 00:00,   1.000E+00,L71920-39BI BI
B,23L71920-39BI    ,BI207                ,01/05/2017 07:18,2325MM093004
C,BI-207   ,YES,    6.080E+02,   3.837E+01,   1.258E+01,,   48.335
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-MAR-2017 09:23:19.41
TBE23 03017322 HpGe ********** Aquisition Date/Time: 21-MAR-2017 07:45:08.05

LIMS No., Customer Name, Client ID: L71920-42BI BI-207

Sample ID	: 23L71920-42BI			Smple Date:	21-MAR-2017 00:00:00.
Sample Type	: WO			Geometry	: 2325MM093004
Quantity	: 1.00000E+00 TOTAL			BKGFILE	: 23BG022417MT
Start Channel	: 50	Energy Tol	: 2.00000	Real Time	: 0 00:30:02.27
End Channel	: 4090	Pk Srch Sens:	5.00000	Live time	: 0 00:30:00.00
MDA Multiple	: 4.6600	Library Used:	BI207		

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	4	33.59*	96	10	1.58	67.99	3.05E-01	5.36E-02	18.2	1.30E+00
2	4	36.31*	133	127	3.20	73.42	6.21E-01	7.38E-02	31.5	
3	4	39.72*	133	275	3.52	80.24	1.26E+00	7.42E-02	35.1	
4	4	43.19*	111	334	3.52	87.15	2.22E+00	6.17E-02	35.4	
5	4	45.97*	20	171	1.76	92.70	3.20E+00	1.10E-02	99.5	
6	0	73.89	4112	906	3.59	148.44	1.63E+01	2.28E+00	2.4	
7	1	84.44	1061	333	2.23	169.48	1.97E+01	5.89E-01	4.8	3.65E+00
8	1	87.20	426	342	2.42	175.00	2.04E+01	2.36E-01	12.8	
9	0	569.41*	3099	111	2.38	1138.06	7.91E+00	1.72E+00	2.0	
10	0	1063.25*	1329	44	2.42	2125.59	3.93E+00	7.38E-01	3.0	
11	0	1632.29	171	0	1.94	3265.04	2.59E+00	9.50E-02	7.6	
12	0	1769.16	79	7	2.74	3539.36	2.46E+00	4.39E-02	13.8	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1329	74.50*	3.935E+00	6.805E+02	6.805E+02	6.01
	1770.24	79	6.87	2.459E+00	7.017E+02	7.017E+02	27.52

Flag: "*" = Keyline

$\frac{681}{947} = 71.9\%$

DRAFT

Sample ID : 23L71920-42BI Acquisition date : 21-MAR-2017 07:45:08

Total number of lines in spectrum	12	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	2	16.67%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.00	6.805E+02	6.805E+02	0.409E+02	6.01	
	Total Activity :		6.805E+02	6.805E+02			
	Grand Total Activity :		6.805E+02	6.805E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	33.59	96	10	1.58	67.99	64	32	5.36E-02	36.4	3.05E-01	
4	36.31	133	127	3.20	73.42	64	32	7.38E-02	63.0	6.21E-01	
4	39.72	133	275	3.52	80.24	64	32	7.42E-02	70.1	1.26E+00	
4	43.19	111	334	3.52	87.15	64	32	6.17E-02	70.9	2.22E+00	
4	45.97	20	171	1.76	92.70	64	32	1.10E-02	****	3.20E+00	
0	73.89	4112	906	3.59	148.44	136	22	2.28E+00	4.8	1.63E+01	
1	84.44	1061	333	2.23	169.48	160	23	5.89E-01	9.7	1.97E+01	
1	87.20	426	342	2.42	175.00	160	23	2.36E-01	25.6	2.04E+01	
0	569.41	3099	111	2.38	1138.06	1128	23	1.72E+00	4.0	7.91E+00	
0	1632.29	171	0	1.94	3265.04	3254	22	9.50E-02	15.3	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	2	16.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.00	6.814E+02	6.814E+02	0.400E+02	5.87	
			---	---			
	Total Activity :		6.814E+02	6.814E+02			
	Grand Total Activity :		6.814E+02	6.814E+02			

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/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	6.814E+02	4.002E+01	1.687E+01	0.000E+00	40.398

DRAFT

```
A,23L71920-42BI    ,03/21/2017 09:23,03/21/2017 00:00,   1.000E+00,L71920-42BI BI
B,23L71920-42BI    ,BI207                ,01/05/2017 07:18,2325MM093004
C,BI-207   ,YES,    6.814E+02,    4.002E+01,    1.687E+01,,    40.398
```

DRAFT

Sec. Review: Analyst: TSG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-MAR-2017 09:23:52.95
TBE23 03017322 HpGe ********** Aquisition Date/Time: 21-MAR-2017 07:13:38.06

LIMS No., Customer Name, Client ID: L71920-45BI BI-207

Sample ID	: 23L71920-45BI	Smple Date	: 21-MAR-2017 00:00:00.
Sample Type	: WO	Geometry	: 2325MM093004
Quantity	: 1.00000E+00 TOTAL	BKGFILE	: 23BG022417MT
Start Channel	: 50 Energy Tol : 2.00000	Real Time	: 0 00:30:02.10
End Channel	: 4090 Pk Srch Sens: 5.00000	Live time	: 0 00:30:00.00
MDA Multiple	: 4.6600 Library Used: BI207		

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	73.83	3769	807	3.73	148.30	1.63E+01	2.09E+00	2.5	
2	0	84.93	1183	580	2.38	170.46	1.98E+01	6.57E-01	6.1	
3	0	569.33*	2813	94	2.49	1137.90	7.91E+00	1.56E+00	2.1	
4	0	1063.35*	1146	68	2.51	2125.79	3.93E+00	6.37E-01	3.5	
5	0	1632.28	153	4	2.30	3265.02	2.59E+00	8.48E-02	8.8	
6	0	1769.74	61	19	2.52	3540.51	2.46E+00	3.37E-02	20.4	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1146	74.50*	3.934E+00	5.871E+02	5.871E+02	7.01
	1770.24	61	6.87	2.459E+00	5.394E+02	5.394E+02	40.83

Flag: "*" = Keyline

$\frac{586}{947} = 61.9\%$

DRAFT

Sample ID : 23L71920-45BI Acquisition date : 21-MAR-2017 07:13:38

Total number of lines in spectrum	6	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	2	33.33%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.00	5.871E+02	5.871E+02	0.411E+02	7.01	
	Total Activity :		5.871E+02	5.871E+02			
	Grand Total Activity :		5.871E+02	5.871E+02			

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

DRAFT

Sample ID : 23L71920-45BI Acquisition date : 21-MAR-2017 07:13:38

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	73.83	3769	807	3.73	148.30	137	22	2.09E+00	5.0	1.63E+01	
0	84.93	1183	580	2.38	170.46	160	24	6.57E-01	12.3	1.98E+01	
0	569.33	2813	94	2.49	1137.90	1127	21	1.56E+00	4.1	7.91E+00	
0	1632.28	153	4	2.30	3265.02	3256	19	8.48E-02	17.6	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	6	
Number of unidentified lines	4	
Number of lines tentatively identified by NID	2	33.33%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.00	5.855E+02	5.855E+02	0.404E+02	6.91	
	Total Activity :		5.855E+02	5.855E+02			
Grand Total Activity :			5.855E+02	5.855E+02			

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/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	5.855E+02	4.045E+01	1.577E+01	0.000E+00	37.117

DRAFT

```
A,23L71920-45BI    ,03/21/2017 09:23,03/21/2017 00:00,   1.000E+00,L71920-45BI BI
B,23L71920-45BI    ,BI207               ,01/05/2017 07:18,2325MM093004
C,BI-207   ,YES,    5.855E+02,   4.045E+01,   1.577E+01,,   37.117
```

DRAFT

LEAD 210

Prep and Run Logs

DRAFT

Logbook Page

L71890

PB-210

Sample#	Matrix	QC	Analysis	Spike Id	Spike Volume		Spike Conc
WG24457-2	WO	LCS	PB-210	210PB-012505	.5	mls	635.02
WG24457-4	SS	MS	PB-210	210PB-012505	.5	mls	635.02
WG24457-5	SS	MSD	PB-210	210PB-012505	.5	mls	635.02

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
WG24457-1	WO	BLK	PB-210	100 %	03/15/17	SVO	CYLINDER - GRADUATED	.0318	BALANCE 7	.0663	BALANCE 7	.0345	03/20/17	WG24457
WG24457-2	WO	LCS	PB-210	100 %	03/15/17	SVO	CYLINDER - GRADUATED	.0317	BALANCE 7	.0705	BALANCE 7	.0388	03/20/17	WG24457
WG24457-3	SS	DUP	PB-210	4.1095 g dry	03/15/17	SVO	BALANCE 7	.0317	BALANCE 7	.0703	BALANCE 7	.0386	03/20/17	WG24457
WG24457-4	SS	MS	PB-210	4.062 g dry	03/15/17	SVO	BALANCE 7	.0315	BALANCE 7	.0753	BALANCE 7	.0438	03/20/17	WG24457
WG24457-5	SS	MSD	PB-210	4.0838 g dry	03/15/17	SVO	BALANCE 7	.0314	BALANCE 7	.0784	BALANCE 7	.0470	03/20/17	WG24457
L71890-3	SS		PB-210	4.1102 g dry	03/15/17	SVO	BALANCE 7	.0320	BALANCE 7	.0846	BALANCE 7	.0526	03/20/17	
L71890-6	SS		PB-210	4.0674 g dry	03/15/17	SVO	BALANCE 7	.0318	BALANCE 7	.0796	BALANCE 7	.0478	03/20/17	
L71890-9	SS		PB-210	4.0422 g dry	03/15/17	SVO	BALANCE 7	.0322	BALANCE 7	.0871	BALANCE 7	.0549	03/20/17	
L71890-12	SS		PB-210	4.3337 g dry	03/15/17	SVO	BALANCE 7	.0318	BALANCE 7	.0759	BALANCE 7	.0441	03/20/17	
L71890-15	SS		PB-210	4.3516 g dry	03/15/17	SVO	BALANCE 7	.0318	BALANCE 7	.0632	BALANCE 7	.0314	03/20/17	
L71890-18	SS		PB-210	4.1424 g dry	03/15/17	SVO	BALANCE 7	.0316	BALANCE 7	.0799	BALANCE 7	.0483	03/20/17	
L71890-21	SS		PB-210	4.0651 g dry	03/15/17	SVO	BALANCE 7	.0316	BALANCE 7	.0662	BALANCE 7	.0346	03/20/17	
L71890-24	SS		PB-210	4.2324 g dry	03/15/17	SVO	BALANCE 7	.0317	BALANCE 7	.0880	BALANCE 7	.0563	03/20/17	
L71890-27	SS		PB-210	4.0199 g dry	03/15/17	SVO	BALANCE 7	.0319	BALANCE 7	.0699	BALANCE 7	.0380	03/20/17	
L71890-30	SS		PB-210	4.0237 g dry	03/15/17	SVO	BALANCE 7	.0323	BALANCE 7	.0819	BALANCE 7	.0496	03/20/17	
L71890-33	SS		PB-210	4.019 g dry	03/15/17	SVO	BALANCE 7	.0322	BALANCE 7	.0930	BALANCE 7	.0608	03/20/17	
L71890-36	SS		PB-210	4.0668 g dry	03/15/17	SVO	BALANCE 7	.0325	BALANCE 7	.0734	BALANCE 7	.0409	03/20/17	
L71890-39	SS		PB-210	4.073 g dry	03/15/17	SVO	BALANCE 7	.0327	BALANCE 7	.0742	BALANCE 7	.0415	03/20/17	
L71890-42	SS		PB-210	4.0269 g dry	03/15/17	SVO	BALANCE 7	.0316	BALANCE 7	.0773	BALANCE 7	.0457	03/20/17	

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Logbook Page

L71890

PB-210

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
L71890-45	SS		PB-210	4.0209 g dry	03/15/17	SVO	BALANCE 7	.0318	BALANCE 7	.0828	BALANCE 7	.0510	03/20/17	
L71890-42C1	SS		PB-210	4.0269 g dry	03/15/17	SVO	BALANCE 7	.0316	BALANCE 7	.0773	BALANCE 7	.0457	03/20/17	WG24457

DRAFT

LEAD 210

Balance and Pipette Check

DRAFT

Daily Balance Tolerance Check Reports

for : L71890

Instrument: BALANCE 7

Model: A&D HR200

Serial Number: 12103994

Description: 4 Place Analytical Balance

Known Weight	Result Weight
.0050	.0050
1.0000	1.0000
100.0000	99.9990

Check Date: 20-MAR-17

Analyst: CRH

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod

PB-210 BALANCE 7 20-MAR-17

DRAFT

Daily Balance Tolerance Check Reports

for : L71890

Instrument: BALANCE 7

Model: A&D HR200

Serial Number: 12103994

Description: 4 Place Analytical Balance

Known Weight	Result Weight
.0050	.0050
1.0000	.9999
100.0000	100.0000

Check Date: 15-MAR-17

Analyst: SVO

Weight Set Used: WTSET 1

Tolerance: 1%

Out of Range: N

Prod

PB-210 BALANCE 7 15-MAR-17

DRAFT

Daily Pipette Tolerance Check
for: L71890

Instrument: PIP ENV #7
Model: FISHERBRAND ELITE
Serial #: LU04803
Description: 100 - 1000 uL

Known	Result
.2	.2
1	1

Check Date: 15-MAR-17
Analyst: CRH
Balance: BALANCE 7
Room Temp: 20
Tolerance: 1%
Out of range: N

Prod	Instrument	Check Date
PB-210	PIP ENV #7	15-MAR-17

DRAFT

LEAD 210

Standard Certificates

DRAFT

%PB-
210%

Teledyne Brown Engineering

Source Certificate

Spike Id 210PB-012505

Nuclide: PB-210
Half Life: 22.26 YEARS
Original Std Id: P30621
Chemical Form: 1 M HNO3
Reference Date: 01-JUL-91
Expiration Date: 31-DEC-15
Activity: 635.02 pCi/ml
Total Uncertainty: 2.4
Comments: 10 ML 210PB-090393 DILUTED TO 100 ML

DRAFT

Prepared by: Date: 01/25/05

Approved by: Keith Jeter Date:

Signature on File

Amersham International plc
Amersham Laboratories

NAMAS
CALIBRATION
No. 0146

Certificate of calibration of absolutely standardized radioactive solution

P 30621

Description	Principal radionuclide:	Lead-210	Product code:	RBZ.24
	Daughter radionuclide:	Bismuth-210 + Polonium-210	Solution number:	S1/23/133

Measurement	Reference time:	1200 GMT on 1 July 1991	
	Radioactive concentration of lead-210:	4.426	kilobecquerels per gram of solution
	which is equivalent to:	119.6	nanocuries per gram of solution
	Mass of solution:	5.3634	grams
	Total activity of lead-210:	23.74	kilobecquerels
	which is equivalent to:	642	nanocuries

Method of measurement:
Repeated 4-pi alpha counting over a period of 63 days

Accuracy: Overall uncertainty in the radioactive concentration quoted above: ± 2.4 %

Random uncertainty: ± 0.6 % Systematic uncertainty: ± 1.8 %

Overall uncertainty is defined on the reverse of the certificate.

Radionuclidic Purity: The estimated activities of any radioactive impurities are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Other radionuclides less than 0.02 %

Chemical Composition: 2M HNO_3 containing 100 micrograms of lead and 100 micrograms of bismuth per ml.

Physical Data: Recommended half life: 22.3 ± 0.2 years

Lead-210: 100% beta particle emission.
Bismuth-210: 100% beta particle emission. Half life 5.01 ± 0.01 days.
Polonium-210: 100% alpha particle emission. Half life 138.38 ± 0.01 days.

Remarks: The ratio of the activity of bismuth-210 to the activity of lead-210 = 1.0006
At the reference time polonium-210 was in radioactive equilibrium with lead-210.
The ratio of the activity of polonium-210 to the activity of lead-210 was 1.0179
There is no guarantee that all the polonium-210 will remain in solution.
Tests made over 4 years on standardized solutions of lead-210 stored in glass ampoules have shown that loss of lead-210 from solution is negligible other than by radioactive decay.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving implicit NIST traceability as defined in NCRP 58 (1985).

Approved signatory

B D D Singleton

DRAFT

Amersham

Bismuth Carrier

Carrier ID: BI17-1
Reagent Lot # : 006116
Reagent Manufacturer: Fisher Scientific

Bismuth Carrier preparation:
Weigh 69.6 grams bismuth nitrate - $Bi(NO_3)_3.5H_2O$ - into a 1 liter beaker.
Add 1:19 HNO_3 to the 1 liter mark. Stir with magnetic stirrer until dissolved.
Transfer to the bismuth carrier volumetric flask and standardiz as bimuth phosphate per procedure TBE-2015.

NOTES:
Used 5 beakers containing 15 milliliters of 5N HNO3.
Added one milliliter of carrier to each beaker.
proceeded with steps 9.4.9 - 9.5.7 of procedure TBE-2015.

Precipitate weights	1	2	3	4	5
Gross wgt, grams	0.1082	0.1052	0.1044	0.109	0.1129
Tare wgt, grams	0.0308	0.032	0.0307	0.0312	0.0318
Net wgt, grams	0.0774	0.0732	0.0737	0.0778	0.0811

Average net wgt, grams 0.07553

Ratios	1	2	3	4	5
wgt/avg net wgt	1.0248	0.9692	0.9758	1.0301	1.0738

Acceptable ratio range - 0.95 - 1.05

0.0755 grams BiOCl/1 mL carrier

Preparer Signature: Susan Hoffman
Preparation Date: 3/15/2017

Reviewer Signature: Keith Jett
Reviewed Date: 3/16/17

DRAFT

PERCENT MOISTURE

DRAFT

Run Date: 03/30/2017

Percent Moisture Report

L71890

Sample#	Client ID	Tare Wt	Wet Wt	Dry Wt	Tare Balance/Date		Dry Balance/Date		Analyst	% Moist
L71890-3	MAF-GC-03-3	11.53	175.18	129.96	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	27.63
L71890-6	MAF-GC-03-6	11.62	176.8	114.03	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	38
L71890-9	MAF-GC-03-9	11.57	182.89	118.82	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	37.4
L71890-12	MAF-GC-03-12	11.51	213.95	151.56	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	30.82
L71890-15	MAF-GC-03-15	11.47	213.25	151.8	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	30.45
L71890-18	MAF-GC-03-18	11.53	220.16	161.71	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	28.02
L71890-21	MAF-GC-03-21	11.48	226.36	173.45	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	24.62
L71890-24	MAF-GC-03-24	11.47	243.35	201.82	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	17.91
L71890-27	MAF-GC-03-27	11.4	219.85	169.93	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	23.95
L71890-30	MAF-GC-03-30	11.43	241.83	192.22	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	21.53
L71890-33	MAF-GC-03-33	11.49	233.76	182.62	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	23.01
L71890-36	MAF-GC-03-36	11.49	213.91	166.67	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	23.34
L71890-39	MAF-GC-03-39	11.48	221.55	176.68	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	21.36
L71890-42	MAF-GC-03-42	11.49	238.1	186.66	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	22.7
L71890-42C1	MAF-GC-03-42	11.49	238.1	186.66	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	22.7
L71890-45	MAF-GC-03-45	11.54	242.27	189.96	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	22.67

DRAFT

Daily Balance Tolerance Check Reports

for : L71890

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 14-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod		
NONE	BALANCE 8	14-MAR-17
GELI	BALANCE 8	14-MAR-17

DRAFT

Daily Balance Tolerance Check Reports

for : L71890

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 13-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod

NONE BALANCE 8 13-MAR-17

DRAFT

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

Work Order #: L71920

GeoEngineers

April 13, 2017

DRAFT

This report shall not be reproduced or distributed except in its entirety.

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

Robert Trahan
GeoEngineers, Inc.
600 Stewart Street, Suite 1700
Seattle WA 98101

Case Narrative - L71920
GE002-3EREG-17

04/13/2017 11:31

DRAFT

Sample Receipt

The following samples were received on March 8, 2017 in good condition, unless otherwise noted.

Cross Reference Table

Client ID	Laboratory ID	Station ID(if applicable)
MAF-GC-02-1	L71920-1	MAF-GC-02
MAF-GC-02-2	L71920-2	MAF-GC-02
MAF-GC-02-3	L71920-3	MAF-GC-02
MAF-GC-02-4	L71920-4	MAF-GC-02
MAF-GC-02-5	L71920-5	MAF-GC-02
MAF-GC-02-6	L71920-6	MAF-GC-02
MAF-GC-02-7	L71920-7	MAF-GC-02
MAF-GC-02-8	L71920-8	MAF-GC-02
MAF-GC-02-9	L71920-9	MAF-GC-02
MAF-GC-02-10	L71920-10	MAF-GC-02
MAF-GC-02-11	L71920-11	MAF-GC-02
MAF-GC-02-12	L71920-12	MAF-GC-02
MAF-GC-02-13	L71920-13	MAF-GC-02
MAF-GC-02-14	L71920-14	MAF-GC-02
MAF-GC-02-15	L71920-15	MAF-GC-02
MAF-GC-02-16	L71920-16	MAF-GC-02
MAF-GC-02-17	L71920-17	MAF-GC-02
MAF-GC-02-18	L71920-18	MAF-GC-02
MAF-GC-02-19	L71920-19	MAF-GC-02
MAF-GC-02-20	L71920-20	MAF-GC-02
MAF-GC-02-21	L71920-21	MAF-GC-02
MAF-GC-02-22	L71920-22	MAF-GC-02
MAF-GC-02-23	L71920-23	MAF-GC-02
MAF-GC-02-24	L71920-24	MAF-GC-02
MAF-GC-02-25	L71920-25	MAF-GC-02
MAF-GC-02-26	L71920-26	MAF-GC-02
MAF-GC-02-27	L71920-27	MAF-GC-02
MAF-GC-02-28	L71920-28	MAF-GC-02
MAF-GC-02-29	L71920-29	MAF-GC-02
MAF-GC-02-30	L71920-30	MAF-GC-02
MAF-GC-02-31	L71920-31	MAF-GC-02

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

Case Narrative - L71920
GE002-3EREG-17

04/13/2017 11:31

Client ID	Laboratory ID	Station ID(if applicable)
MAF-GC-02-32	L71920-32	MAF-GC-02
MAF-GC-02-33	L71920-33	MAF-GC-02
MAF-GC-02-34	L71920-34	MAF-GC-02
MAF-GC-02-35	L71920-35	MAF-GC-02
MAF-GC-02-36	L71920-36	MAF-GC-02
MAF-GC-02-37	L71920-37	MAF-GC-02
MAF-GC-02-38	L71920-38	MAF-GC-02
MAF-GC-02-39	L71920-39	MAF-GC-02
MAF-GC-02-40	L71920-40	MAF-GC-02
MAF-GC-02-41	L71920-41	MAF-GC-02
MAF-GC-02-42	L71920-42	MAF-GC-02
MAF-GC-02-43	L71920-43	MAF-GC-02
MAF-GC-02-44	L71920-44	MAF-GC-02
MAF-GC-02-45	L71920-45	MAF-GC-02
MAF-GC-02-46	L71920-46	MAF-GC-02
MAF-GC-02-47	L71920-47	MAF-GC-02
MAF-GC-02-48	L71920-48	MAF-GC-02
MAF-GC-02-49	L71920-49	MAF-GC-02
MAF-GC-02-50	L71920-50	MAF-GC-02
MAF-GC-02-51	L71920-51	MAF-GC-02
MAF-GC-02-52	L71920-52	MAF-GC-02
MAF-GC-02-53	L71920-53	MAF-GC-02
MAF-GC-02-54	L71920-54	MAF-GC-02
MAF-GC-02-55	L71920-55	MAF-GC-02
MAF-GC-02-56	L71920-56	MAF-GC-02
MAF-GC-02-57	L71920-57	MAF-GC-02
MAF-GC-02-58	L71920-58	MAF-GC-02
MAF-GC-02-59	L71920-59	MAF-GC-02
MAF-GC-02-60	L71920-60	MAF-GC-02
MAF-GC-02-61	L71920-61	MAF-GC-02
MAF-GC-02-62	L71920-62	MAF-GC-02
MAF-GC-02-63	L71920-63	MAF-GC-02
MAF-GC-02-64	L71920-64	MAF-GC-02
MAF-GC-02-65	L71920-65	MAF-GC-02
MAF-GC-02-66	L71920-66	MAF-GC-02
MAF-GC-02-67	L71920-67	MAF-GC-02
MAF-GC-02-68	L71920-68	MAF-GC-02

DRAFT

Sample Analysis

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

Case Narrative - L71920
GE002-3EREG-17

04/13/2017 11:31

Instruments used for all analyses were in calibration.
Standard solutions used in analyses were National Institute of Standards and Technology (NIST) traceable.

Analytical Method Cross Reference Table

Radiological Parameter	TBE Knoxville Method	Reference Method

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

Case Narrative - L71920
GE002-3EREG-17

04/13/2017 11:31

Special Considerations

Gamma Spectroscopy

Quality Control

Quality control samples were analyzed as WG24440.

Duplicate Sample

Duplicates were analyzed for the following samples. All duplicate results were within acceptance limits, unless otherwise noted.

Client ID	Laboratory ID	QC Sample #
MAF-GC-02-3	L71920-3	WG24440-1

PB-210

Quality Control

Quality control samples were analyzed as WG24668.

Method Blank

All blanks were within acceptance limits, unless otherwise noted.

Laboratory Control Sample

All laboratory control samples were within acceptance limits, unless otherwise noted.

Duplicate Sample

Duplicates were analyzed for the following samples. All duplicate results were within acceptance limits, unless otherwise noted.

Client ID	Laboratory ID	QC Sample #
MAF-GC-02-3	L71920-3	WG24668-3

Matrix Spike

All matrix spike results were within acceptance limits, unless otherwise noted.

Matrix Spike Duplicate

Matrix spike duplicate result was within acceptance limits, unless otherwise noted.

DRAFT

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

Case Narrative - L71920
GE002-3EREG-17

04/13/2017 11:31

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

DRAFT

ANALYTICAL RESULTS

DRAFT

Report of Analysis

04/13/17 11:32

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71920

GeoEngineers, Inc.

Robert Trahan

GE002-3EREG-17

Sample ID: **MAF-GC-02-1** Collect Start: 02/23/2017 10:30 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:30 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-1

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-02-2** Collect Start: 02/23/2017 10:32 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:32 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-2

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-02-3** Collect Start: 02/23/2017 10:34 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:34 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 45.06
LIMS Number: L71920-3

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
PB-210	2015	**2.90E-01**	4.15E-02	6.03E-02	pCi/gDry		6.0577	g dry	02/23/17 10:34	04/11/17	1300	M	+
CS-137	2007	6.48E-02	5.12E-02	**9.22E-02**	pCi/g Dry		92.23	g dry	02/23/17 10:34	03/14/17	10800	Sec	U No

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-4** Collect Start: 02/23/2017 10:36 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:36 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-4

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

L71920 Page 8 of 321

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/13/17 11:32

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71920

GeoEngineers, Inc.

Robert Trahan

GE002-3EREG-17

Sample ID: **MAF-GC-02-6** Collect Start: 02/23/2017 10:40 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:40 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 51.97
LIMS Number: L71920-6

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**2.65E-01**	4.17E-02	6.17E-02	pCi/gDry		6.0013	g dry	02/23/17 10:40	04/11/17	1300	M	+			
CS-137	2007	**1.85E-01**	8.46E-02	8.10E-02	pCi/g Dry		72.24	g dry	02/23/17 10:40	03/14/17	11384	Sec	+		Yes	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-7** Collect Start: 02/23/2017 10:42 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:42 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-7

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-02-8** Collect Start: 02/23/2017 10:44 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:44 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-8

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

TBE-ROA013

Report of Analysis

04/13/17 11:32

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71920

GeoEngineers, Inc.

Robert Trahan

GE002-3EREG-17

Sample ID: **MAF-GC-02-9** Collect Start: 02/23/2017 10:46 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:46 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 56.63
LIMS Number: L71920-9

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**2.88E-01**	4.32E-02	6.32E-02	pCi/gDry		6.0797	g dry	02/23/17 10:46	04/11/17	1300	M	+			
CS-137	2007	**1.31E-01**	9.15E-02	8.46E-02	pCi/g Dry		64.99	g dry	02/23/17 10:46	03/14/17	9969	Sec	+		Yes	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-10** Collect Start: 02/23/2017 10:48 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:48 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-10

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-02-11** Collect Start: 02/23/2017 10:50 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:50 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-11

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

TBE-ROA013

Report of Analysis

04/13/17 11:32

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71920

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-02-12** Collect Start: 02/23/2017 10:52 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:52 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 48.89
LIMS Number: L71920-12

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.93E-01**	3.78E-02	5.72E-02	pCi/gDry		6.0189	g dry	02/23/17 10:52	04/11/17	1300	M	+			
CS-137	2007	2.10E-02	5.28E-02	**9.01E-02**	pCi/g Dry		81.09	g dry	02/23/17 10:52	03/14/17	8374	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-13** Collect Start: 02/23/2017 10:54 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:54 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-13

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-02-14** Collect Start: 02/23/2017 10:56 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:56 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-14

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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GE002-3EREG-17

Sample ID: **MAF-GC-02-15** Collect Start: 02/23/2017 10:58 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 10:58 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 41.12
LIMS Number: L71920-15

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.49E-01**	3.80E-02	5.88E-02	pCi/gDry		6.0174	g dry	02/23/17 10:58	04/11/17	1300	M	+			
CS-137	2007	-3.39E-02	5.73E-02	**9.01E-02**	pCi/g Dry		105.34	g dry	02/23/17 10:58	03/14/17	8420	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-16** Collect Start: 02/23/2017 11:00 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:00 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-16

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-02-17** Collect Start: 02/23/2017 11:02 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:02 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-17

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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Sample ID: **MAF-GC-02-18** Collect Start: 02/23/2017 11:04 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:04 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 52.07
LIMS Number: L71920-18

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.64E-01**	4.05E-02	6.24E-02	pCi/gDry		6.0043	g dry	02/23/17 11:04	04/11/17	1300	M	+			
CS-137	2007	-3.94E-03	5.93E-02	**9.84E-02**	pCi/g Dry		70.63	g dry	02/23/17 11:04	03/14/17	11522	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-19** Collect Start: 02/23/2017 11:06 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:06 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-19

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-02-20** Collect Start: 02/23/2017 11:08 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:08 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-20

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

TBE-ROA013

Report of Analysis

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Sample ID: **MAF-GC-02-21** Collect Start: 02/23/2017 11:10 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:10 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 45.56
LIMS Number: L71920-21

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.29E-01**	3.70E-02	5.78E-02	pCi/gDry		6.0112	g dry	02/23/17 11:10	04/11/17	1300	M	+			
CS-137	2007	-2.92E-03	6.02E-02	**9.79E-02**	pCi/g Dry		92.59	g dry	02/23/17 11:10	03/14/17	7739	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-22** Collect Start: 02/23/2017 11:12 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:12 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-22

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-02-24** Collect Start: 02/23/2017 11:16 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:16 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 38.27
LIMS Number: L71920-24

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.50E-01**	4.08E-02	6.34E-02	pCi/gDry		6.0068	g dry	02/23/17 11:16	04/11/17	1300	M	+			
CS-137	2007	2.10E-02	5.64E-02	**9.68E-02**	pCi/g Dry		115.8	g dry	02/23/17 11:16	03/14/17	8492	Sec	U		No	

Comment: 1 Gamma for Cs-137

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

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Sample ID: **MAF-GC-02-27** Collect Start: 02/23/2017 11:22 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:22 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 38.74
LIMS Number: L71920-27

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.62E-01**	4.01E-02	6.20E-02	pCi/gDry		6.0255	g dry	02/23/17 11:22	04/11/17	1300	M	+			
CS-137	2007	-2.16E-02	4.50E-02	**7.68E-02**	pCi/g Dry		116.3	g dry	02/23/17 11:22	03/14/17	8504	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-30** Collect Start: 02/23/2017 11:28 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:28 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 35.45
LIMS Number: L71920-30

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.38E-01**	3.91E-02	6.12E-02	pCi/gDry		6.0038	g dry	02/23/17 11:28	04/11/17	1300	M	+			
CS-137	2007	1.89E-03	4.87E-02	**7.99E-02**	pCi/g Dry		126.18	g dry	02/23/17 11:28	03/14/17	11700	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-33** Collect Start: 02/23/2017 11:34 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:34 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 38.63
LIMS Number: L71920-33

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.29E-01**	3.62E-02	5.64E-02	pCi/gDry		6.0972	g dry	02/23/17 11:34	04/11/17	1300	M	+			
CS-137	2007	-2.52E-02	4.42E-02	**6.75E-02**	pCi/g Dry		109	g dry	02/23/17 11:34	03/14/17	6935	Sec	U		No	

Comment: 1 Gamma for Cs-137

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-02-36** Collect Start: 02/23/2017 11:40 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:40 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 32.69
LIMS Number: L71920-36

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**9.14E-02**	3.97E-02	6.40E-02	pCi/gDry		6.071	g dry	02/23/17 11:40	04/11/17	1300	M	+			
CS-137	2007	-1.87E-02	4.52E-02	**7.16E-02**	pCi/g Dry		128.85	g dry	02/23/17 11:40	03/14/17	6978	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-39** Collect Start: 02/23/2017 11:46 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:46 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 24.82
LIMS Number: L71920-39

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	5.57E-02	3.80E-02	**6.21E-02**	pCi/gDry		6.0128	g dry	02/23/17 11:46	04/11/17	1300	M	U			
CS-137	2007	-8.62E-03	5.26E-02	**8.63E-02**	pCi/g Dry		147.13	g dry	02/23/17 11:46	03/14/17	7034	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-42** Collect Start: 02/23/2017 11:52 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:52 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 22.28
LIMS Number: L71920-42

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	2.78E-02	3.53E-02	**5.86E-02**	pCi/gDry		6.0671	g dry	02/23/17 11:52	04/11/17	1300	M	U			
CS-137	2007	-3.58E-03	3.68E-02	**6.50E-02**	pCi/g Dry		144.89	g dry	02/23/17 11:52	03/14/17	7049	Sec	U		No	

Comment: 1 Gamma for Cs-137

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-02-45** Collect Start: 02/23/2017 11:58 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 11:58 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 27.11
LIMS Number: L71920-45

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**8.15E-02**	3.57E-02	5.72E-02	pCi/gDry		6.011	g dry	02/23/17 11:58	04/11/17	1300	M	+			
CS-137	2007	-2.09E-04	5.32E-02	**8.70E-02**	pCi/g Dry		145.53	g dry	02/23/17 11:58	03/14/17	4051	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-48** Collect Start: 02/23/2017 12:04 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 12:04 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-48

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-02-51** Collect Start: 02/23/2017 12:10 Matrix: Sediment/Silt (SS)
Station: MAF-GC-02 Collect Stop: 02/23/2017 12:10 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71920-51

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Comment: 1 Gamma for Cs-137

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/13/17 11:32

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GE002-3EREG-17

Sample ID: **MAF-GC-02-57**
Station: MAF-GC-02
Description:
LIMS Number: L71920-57

Collect Start: 02/23/2017 12:22
Collect Stop: 02/23/2017 12:22
Receive Date: 03/08/2017

Matrix: Sediment/Silt (SS)
Volume:
% Moisture:

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Comment: 1 Gamma for Cs-137

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

TBE-ROA013

QC RESULTS

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QC Summary Report for L71920

GE002-3EREG-17

04/13/2017 11:33

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GAMMA

Duplicate Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Original Result	DUP Result	Units	RPD	Range	Qualifier	P/F
WG24440-1	All non-detects.	SS						<30	U	NE
L71920-3										

GAMMA

Associated Samples for WG24440

Sample #	Client ID
L71920-3	MAF-GC-02-3
L71920-6	MAF-GC-02-6
L71920-9	MAF-GC-02-9
L71920-12	MAF-GC-02-12
L71920-15	MAF-GC-02-15
L71920-18	MAF-GC-02-18
L71920-21	MAF-GC-02-21
L71920-24	MAF-GC-02-24
L71920-27	MAF-GC-02-27
L71920-30	MAF-GC-02-30
L71920-33	MAF-GC-02-33
L71920-36	MAF-GC-02-36
L71920-39	MAF-GC-02-39
L71920-42	MAF-GC-02-42
L71920-45	MAF-GC-02-45

DRAFT

+	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 L71920

GE002-3EREG-17

04/13/2017 11:33

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PB-210

Method Blank Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Blank Result	Units	Qualifier	P/F
WG24668-1	PB-210	WO	04/11/2017 16:21	< 3.520E-01	pCi/Total	U	P

LCS Sample Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Spike Value	LCS Result	Units	Spike Recovery	Range	Qualifier	P/F
WG24668-2	PB-210	WO	04/11/2017 16:21	1.42E+02	3.020E+02	pCi/Total	95.1	70-130	+	P

Spike ID: **210PB-012505**
Spike Conc: **6.35E+02**
Spike Vol: **5.00E-01**

Duplicate Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Original Result	DUP Result	Units	RPD	Range	Qualifier	P/F
WG24668-3	PB-210	SS	04/11/2017 16:08	2.900E-01	3.440E-01	pCi/gDry		<30	*	NE
L71920-3										

Matrix Spike Summary

				Decay Corrected							
TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Spike Value	Original Result	MS Result	Units	Spike Recovery	Range	Qualifier	P/F
WG24668-4	PB-210	SS	04/11/2017 16:21	2.33E+01	1.490E-01	2.440E+01	pCi/gDry	104.2	60-140	+	P
L71920-15											

Spike ID: **210PB-012505**
Spike Conc: **6.35E+02**
Spike Vol: **5.00E-01**

DRAFT

+	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 L71920

GE002-3EREG-17

04/13/2017 11:33

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PB-210

Matrix Spike Duplicate Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Decay Corrected Spike Value	MSD Result	MSD Recovery	Units	RPD	Range	Qualifier	P/F
WG24668-5	PB-210	SS	04/11/2017 16:21	2.34E+01	2.330E+01	99	pCi/gDry	5.2	<30	+	P
WG24668-4											
Spike ID:	**210PB-012505**										
Spike Conc:	**6.35E+02**										
Spike Vol:	**5.00E-01**										

PB-210

Associated Samples for WG24668

Sample #	Client ID
L71920-3	MAF-GC-02-3
L71920-6	MAF-GC-02-6
L71920-9	MAF-GC-02-9
L71920-12	MAF-GC-02-12
L71920-15	MAF-GC-02-15
L71920-18	MAF-GC-02-18
L71920-21	MAF-GC-02-21
L71920-24	MAF-GC-02-24
L71920-27	MAF-GC-02-27
L71920-30	MAF-GC-02-30
L71920-33	MAF-GC-02-33
L71920-36	MAF-GC-02-36
L71920-39	MAF-GC-02-39
L71920-42	MAF-GC-02-42
L71920-45	MAF-GC-02-45

DRAFT

+	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

DRAFT

GeoEngineers

Sample Collection/Receipt Sheet

L71920 5

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-02-1	MAF-GC-02	SS	2/23/2017	10:30	2/23/2017	10:30	4oz		
	MAF-GC-02-2	MAF-GC-02	SS	2/23/2017	10:32	2/23/2017	10:32	4oz		
	MAF-GC-02-3	MAF-GC-02	SS	2/23/2017	10:34	2/23/2017	10:34	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-4	MAF-GC-02	SS	2/23/2017	10:36	2/23/2017	10:36	4oz		
	MAF-GC-02-5	MAF-GC-02	SS	2/23/2017	10:38	2/23/2017	10:38	4oz		
	MAF-GC-02-6	MAF-GC-02	SS	2/23/2017	10:40	2/23/2017	10:40	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-7	MAF-GC-02	SS	2/23/2017	10:42	2/23/2017	10:42	4oz		
	MAF-GC-02-8	MAF-GC-02	SS	2/23/2017	10:44	2/23/2017	10:44	4oz		
	MAF-GC-02-9	MAF-GC-02	SS	2/23/2017	10:46	2/23/2017	10:46	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-10	MAF-GC-02	SS	2/23/2017	10:48	2/23/2017	10:48	4oz		
	MAF-GC-02-11	MAF-GC-02	SS	2/23/2017	10:50	2/23/2017	10:50	4oz		
	MAF-GC-02-12	MAF-GC-02	SS	2/23/2017	10:52	2/23/2017	10:52	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-13	MAF-GC-02	SS	2/23/2017	10:54	2/23/2017	10:54	4oz		
	MAF-GC-02-14	MAF-GC-02	SS	2/23/2017	10:56	2/23/2017	10:56	4oz		
	MAF-GC-02-15	MAF-GC-02	SS	2/23/2017	10:58	2/23/2017	10:58	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-16	MAF-GC-02	SS	2/23/2017	11:00	2/23/2017	11:00	4oz		
	MAF-GC-02-17	MAF-GC-02	SS	2/23/2017	11:02	2/23/2017	11:02	4oz		
	MAF-GC-02-18	MAF-GC-02	SS	2/23/2017	11:04	2/23/2017	11:04	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-19	MAF-GC-02	SS	2/23/2017	11:06	2/23/2017	11:06	4oz		
	MAF-GC-02-20	MAF-GC-02	SS	2/23/2017	11:08	2/23/2017	11:08	4oz		

Relinquished by: _____ Date: 02.27.2017
Received by: _____ Date: 3/1/17
Relinquished by: _____ Date: 3/8/17
Received by: _____ Date: 3/8/17

L71920

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-02-21	MAF-GC-02	SS	2/23/2017	11:10	2/23/2017	11:10	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-22	MAF-GC-02	SS	2/23/2017	11:12	2/23/2017	11:12	4oz		
	MAF-GC-02-23	MAF-GC-02	SS	2/23/2017	11:14	2/23/2017	11:14	4oz		
	MAF-GC-02-24	MAF-GC-02	SS	2/23/2017	11:16	2/23/2017	11:16	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-25	MAF-GC-02	SS	2/23/2017	11:18	2/23/2017	11:18	4oz		
	MAF-GC-02-26	MAF-GC-02	SS	2/23/2017	11:20	2/23/2017	11:20	4oz		
	MAF-GC-02-27	MAF-GC-02	SS	2/23/2017	11:22	2/23/2017	11:22	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-28	MAF-GC-02	SS	2/23/2017	11:24	2/23/2017	11:24	4oz		
	MAF-GC-02-29	MAF-GC-02	SS	2/23/2017	11:26	2/23/2017	11:26	4oz		
	MAF-GC-02-30	MAF-GC-02	SS	2/23/2017	11:28	2/23/2017	11:28	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-31	MAF-GC-02	SS	2/23/2017	11:30	2/23/2017	11:30	4oz		
	MAF-GC-02-32	MAF-GC-02	SS	2/23/2017	11:32	2/23/2017	11:32	4oz		
	MAF-GC-02-33	MAF-GC-02	SS	2/23/2017	11:34	2/23/2017	11:34	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-34	MAF-GC-02	SS	2/23/2017	11:36	2/23/2017	11:36	4oz		
	MAF-GC-02-35	MAF-GC-02	SS	2/23/2017	11:38	2/23/2017	11:38	4oz		
	MAF-GC-02-36	MAF-GC-02	SS	2/23/2017	11:40	2/23/2017	11:40	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-37	MAF-GC-02	SS	2/23/2017	11:42	2/23/2017	11:42	4oz		
	MAF-GC-02-38	MAF-GC-02	SS	2/23/2017	11:44	2/23/2017	11:44	4oz		
	MAF-GC-02-39	MAF-GC-02	SS	2/23/2017	11:46	2/23/2017	11:46	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-40	MAF-GC-02	SS	2/23/2017	11:48	2/23/2017	11:48	4oz		

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: S. Capp Date: 3/8/17 Received by: _____ Date: _____

DRAFT

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-02-41	MAF-GC-02	SS	2/23/2017	11:50	2/23/2017	11:50	4oz		
	MAF-GC-02-42	MAF-GC-02	SS	2/23/2017	11:52	2/23/2017	11:52	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-43	MAF-GC-02	SS	2/23/2017	11:54	2/23/2017	11:54	4oz		
	MAF-GC-02-44	MAF-GC-02	SS	2/23/2017	11:56	2/23/2017	11:56	4oz		
	MAF-GC-02-45	MAF-GC-02	SS	2/23/2017	11:58	2/23/2017	11:58	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-02-46	MAF-GC-02	SS	2/23/2017	12:00	2/23/2017	12:00	4oz		
	MAF-GC-02-47	MAF-GC-02	SS	2/23/2017	12:02	2/23/2017	12:02	4oz		
	MAF-GC-02-48	MAF-GC-02	SS	2/23/2017	12:04	2/23/2017	12:04	4oz		
	MAF-GC-02-49	MAF-GC-02	SS	2/23/2017	12:06	2/23/2017	12:06	4oz		
	MAF-GC-02-50	MAF-GC-02	SS	2/23/2017	12:08	2/23/2017	12:08	4oz		
	MAF-GC-02-51	MAF-GC-02	SS	2/23/2017	12:10	2/23/2017	12:10	4oz		
	MAF-GC-02-52	MAF-GC-02	SS	2/23/2017	12:12	2/23/2017	12:12	4oz		
	MAF-GC-02-53	MAF-GC-02	SS	2/23/2017	12:14	2/23/2017	12:14	4oz		
	MAF-GC-02-54	MAF-GC-02	SS	2/23/2017	12:16	2/23/2017	12:16	4oz		
	MAF-GC-02-55	MAF-GC-02	SS	2/23/2017	12:18	2/23/2017	12:18	4oz		
	MAF-GC-02-56	MAF-GC-02	SS	2/23/2017	12:20	2/23/2017	12:20	4oz		
	MAF-GC-02-57	MAF-GC-02	SS	2/23/2017	12:22	2/23/2017	12:22	4oz		
	MAF-GC-02-58	MAF-GC-02	SS	2/23/2017	12:24	2/23/2017	12:24	4oz		
	MAF-GC-02-59	MAF-GC-02	SS	2/23/2017	12:26	2/23/2017	12:26	4oz		
	MAF-GC-02-60	MAF-GC-02	SS	2/23/2017	12:28	2/23/2017	12:28	4oz		

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: S. Cooper Date: 3/8/17 Received by: _____ Date: _____

L71920

DRAFT

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-02-61	MAF-GC-02	SS	2/23/2017	12:30	2/23/2017	12:30	4oz		
	MAF-GC-02-62	MAF-GC-02	SS	2/23/2017	12:32	2/23/2017	12:32	4oz		
	MAF-GC-02-63	MAF-GC-02	SS	2/23/2017	12:34	2/23/2017	12:34	4oz		
	MAF-GC-02-64	MAF-GC-02	SS	2/23/2017	12:36	2/23/2017	12:36	4oz		
	MAF-GC-02-65	MAF-GC-02	SS	2/23/2017	12:38	2/23/2017	12:38	4oz		
	MAF-GC-02-66	MAF-GC-02	SS	2/23/2017	12:40	2/23/2017	12:40	4oz		
	MAF-GC-02-67	MAF-GC-02	SS	2/23/2017	12:42	2/23/2017	12:42	4oz		
	MAF-GC-02-68	MAF-GC-02	SS	2/23/2017	12:44	2/23/2017	12:44	4oz		

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: S. Cooper Date: 2/28/17 Received by: _____ Date: _____

DRAFT

03/09/17 13:29

SR #: SR51387

Teledyne Brown Engineering
Sample Receipt Verification/Variance Report

Client: GeoEngineers

Project #: GE002-3EREG-17

LIMS #L71920

Initiated By: KNOXLAB
Init Date: 03/09/17 Receive Date: 03/08/17

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 and in appropriate container(s)			NA	
9	Other (Describe)			NA	

DRAFT

INTERNAL CHAIN OF CUSTODY

DRAFT

Internal Chain of Custody

****

Sample # L71920-1 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71920-2 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71920-3 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71920-4 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71920-5 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71920-6 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71920-7 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71920-8 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

DRAFT

****

Sample # L71920-9 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-10 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-11 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-12 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-13 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-14 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-15 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-16 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By

DRAFT

****
Sample # L71920-16 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71920-17 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-18 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-19 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-20 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-21 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-22 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-23 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-24 Containernum 1

DRAFT

****
Sample # L71920-24 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-25 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-26 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-27 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-28 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-29 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-30 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-31 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By

DRAFT

****
Sample # L71920-31 Containernum 1

Relinquish Date Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-32 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-33 Containernum 1

Prod Analyst
GELI MJW
PB-210 SVO

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-34 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-35 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-36 Containernum 1

Prod Analyst
GELI MJW
PB-210 SVO

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-37 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-38 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-39 Containernum 1

DRAFT

****
Sample # L71920-39 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-40 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-41 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-42 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-43 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-44 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-45 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	SVO

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****
Sample # L71920-46 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By

DRAFT

****
Sample # L71920-46 Containernum 1

Relinquish Date Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-47 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-48 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-49 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-50 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-51 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-52 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-53 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By
03/09/2017 00:00 099999 Sample Custodian

****
Sample # L71920-54 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By Received By

DRAFT

****
Sample # L71920-54 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71920-55 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-56 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-57 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-58 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-59 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-60 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-61 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71920-62 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By

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****

Sample # L71920-62 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71920-63 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****

Sample # L71920-64 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****

Sample # L71920-65 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****

Sample # L71920-66 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****

Sample # L71920-67 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****

Sample # L71920-68 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

DRAFT

Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71920

****

L71920-1 SS MAF-GC-02-1

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-2 SS MAF-GC-02-2

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-3 SS MAF-GC-02-3

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-4 SS MAF-GC-02-4

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-5 SS MAF-GC-02-5

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-6 SS MAF-GC-02-6

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-7 SS MAF-GC-02-7

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71920

L71920-8 SS MAF-GC-02-8

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-9 SS MAF-GC-02-9

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-10 SS MAF-GC-02-10

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-11 SS MAF-GC-02-11

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-12 SS MAF-GC-02-12

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-13 SS MAF-GC-02-13

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-14 SS MAF-GC-02-14

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71920-15 SS MAF-GC-02-15

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-16 SS MAF-GC-02-16

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-17 SS MAF-GC-02-17

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-18 SS MAF-GC-02-18

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-19 SS MAF-GC-02-19

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-20 SS MAF-GC-02-20

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-21 SS MAF-GC-02-21

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71920

L71920-21	**SS**	**MAF-GC-02-21**		
Aliquot	PB-210		SVO	03/30/17
Count Room	GELI		BCG	03/14/17
Count Room	PB-210		KPW	04/11/17

****

L71920-22	**SS**	**MAF-GC-02-22**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71920-23	**SS**	**MAF-GC-02-23**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-24	**SS**	**MAF-GC-02-24**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
%Moisture			MJW	03/13/17
Aliquot	GELI		MJW	03/14/17
Aliquot	PB-210		SVO	03/30/17
Count Room	GELI		BCG	03/14/17
Count Room	PB-210		KPW	04/11/17

****

L71920-25	**SS**	**MAF-GC-02-25**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-26	**SS**	**MAF-GC-02-26**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-27	**SS**	**MAF-GC-02-27**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
%Moisture			MJW	03/13/17
Aliquot	GELI		MJW	03/14/17
Aliquot	PB-210		SVO	03/30/17
Count Room	GELI		BCG	03/14/17
Count Room	PB-210		KPW	04/11/17

****

L71920-28	**SS**	**MAF-GC-02-28**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71920-28 SS MAF-GC-02-28

Aliquot	SAMPLE		

****

L71920-29 SS MAF-GC-02-29

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-30 SS MAF-GC-02-30

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-31 SS MAF-GC-02-31

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-32 SS MAF-GC-02-32

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-33 SS MAF-GC-02-33

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-34 SS MAF-GC-02-34

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-35 SS MAF-GC-02-35

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-36 SS MAF-GC-02-36

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Internal Chain of Custody
Supplemental Sheet

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L71920-36 SS MAF-GC-02-36

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-37 SS MAF-GC-02-37

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-38 SS MAF-GC-02-38

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-39 SS MAF-GC-02-39

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-40 SS MAF-GC-02-40

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-41 SS MAF-GC-02-41

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-42 SS MAF-GC-02-42

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71920-43 SS MAF-GC-02-43

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-44 SS MAF-GC-02-44

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-45 SS MAF-GC-02-45

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	SVO	03/30/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/11/17

****

L71920-46 SS MAF-GC-02-46

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-47 SS MAF-GC-02-47

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-48 SS MAF-GC-02-48

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71920-49 SS MAF-GC-02-49

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-50 SS MAF-GC-02-50

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-51 SS MAF-GC-02-51

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71920-51	**SS**	**MAF-GC-02-51**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
??			MJW	03/13/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71920-52	**SS**	**MAF-GC-02-52**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-53	**SS**	**MAF-GC-02-53**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-54	**SS**	**MAF-GC-02-54**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
??			MJW	03/13/17
Aliquot	SAMPLE			

****

L71920-55	**SS**	**MAF-GC-02-55**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-56	**SS**	**MAF-GC-02-56**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-57	**SS**	**MAF-GC-02-57**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
??			MJW	03/13/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71920-58	**SS**	**MAF-GC-02-58**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			

****

L71920-59	**SS**	**MAF-GC-02-59**		
Process step	Prod		Analyst	Date

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71920

L71920-59 SS MAF-GC-02-59

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-60 SS MAF-GC-02-60

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		

****

L71920-61 SS MAF-GC-02-61

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-62 SS MAF-GC-02-62

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-63 SS MAF-GC-02-63

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		

****

L71920-64 SS MAF-GC-02-64

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-65 SS MAF-GC-02-65

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

****

L71920-66 SS MAF-GC-02-66

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		

****

L71920-67 SS MAF-GC-02-67

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71920-68 SS MAF-GC-02-68

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

DRAFT

GAMMA SPECTROSCOPY

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Gamma Spectroscopy

Background

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:42:46.88
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 24-FEB-2017 10:06:58.61

LIMS No., Customer Name, Client ID: 01BG022417MT WO TBE DET01 BKG
Sample ID : 01BG022417MT Smple Date: 24-FEB-2017 10:07:00.00
Sample Type : WO Geometry : 0135L011414
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 1.50000 Real Time : 2 00:00:32.50
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.34	683	3632	0.83	126.89	3.80E-01	3.95E-03	16.3	7.23E-01
2	1	66.73	288	2315	1.25	133.66	4.84E-01	1.67E-03	27.1	7.21E-01
3	2	72.84	819	2460	0.79	145.88	6.87E-01	4.74E-03	9.7	3.26E+00
4	2	75.01	1640	2487	0.80	150.21	7.61E-01	9.49E-03	5.1	
5	1	84.75	1206	2631	1.21	169.68	1.08E+00	6.98E-03	7.6	2.63E+00
6	1	87.28	458	2150	0.84	174.75	1.16E+00	2.65E-03	16.7	1.09E+00
7	1	92.67	2370	3680	1.06	185.50	1.32E+00	1.37E-02	5.2	5.22E+00
8	1	139.84	277	2421	0.82	279.79	1.98E+00	1.60E-03	30.0	2.72E-01
9	1	143.78	446	1974	0.90	287.66	1.99E+00	2.58E-03	16.4	7.19E-01
10	1	163.54	283	2271	1.30	327.16	2.00E+00	1.64E-03	28.6	6.77E-01
11	1	185.75	1803	3323	0.97	371.57	1.96E+00	1.04E-02	6.4	4.99E-01
12	1	198.45	437	2099	1.10	396.96	1.92E+00	2.53E-03	18.0	1.68E+00
13	1	238.60	1216	2068	0.97	477.21	1.77E+00	7.04E-03	6.8	3.15E-01
14	1	295.25	510	1991	1.30	590.48	1.57E+00	2.95E-03	16.4	1.69E+00
15	1	337.99	377	1794	1.57	675.94	1.44E+00	2.18E-03	20.8	3.41E+00
16	1	351.91	876	1785	1.47	703.76	1.41E+00	5.07E-03	9.6	3.55E+00
17	1	510.87	6086	2367	2.76	1021.65	1.10E+00	3.52E-02	2.3	2.54E+00
18	1	569.56	190	1072	2.01	1139.04	1.03E+00	1.10E-03	33.1	1.30E+00
19	1	583.18	579	1152	1.51	1166.29	1.01E+00	3.35E-03	12.4	2.28E+00
20	1	609.30	707	1623	1.62	1218.54	9.80E-01	4.09E-03	12.7	1.61E+00
21	1	802.91	242	639	1.63	1605.89	8.09E-01	1.40E-03	20.6	1.70E+00
22	1	846.73	464	840	1.41	1693.59	7.79E-01	2.69E-03	13.4	5.64E-01
23	1	911.12	415	553	1.67	1822.44	7.39E-01	2.40E-03	12.0	7.28E-01
24	1	968.80	156	435	1.57	1937.88	7.07E-01	9.05E-04	25.4	9.13E-01
25	1	1001.30	143	455	1.90	2002.94	6.90E-01	8.25E-04	29.5	1.99E+00
26	1	1120.20	187	480	2.06	2240.95	6.36E-01	1.08E-03	25.4	2.10E+00
27	1	1460.50	916	423	2.15	2922.45	5.30E-01	5.30E-03	6.1	8.85E-01
28	1	1763.93	245	170	2.93	3530.41	4.77E-01	1.42E-03	13.1	1.29E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	916	10.67*	5.303E-01	2.532E+02	2.532E+02	12.24
RA-226	186.21	1803	3.28*	1.957E+00	4.394E+02	4.394E+02	12.86
AC-228	835.50	------	1.75	7.864E-01	------ Line Not Found		------
	911.07	415	27.70*	7.390E-01	3.175E+01	3.176E+01	23.91
TH-228	238.63	1216	44.60*	1.766E+00	2.415E+01	2.417E+01	13.64

DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:33:24.04
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 24-FEB-2017 10:07:00.43

LIMS No., Customer Name, Client ID: 02BG022417MT WO TBE DET02 BKG
Sample ID : 02BG022417MT Smple Date: 24-FEB-2017 10:08:00.00
Sample Type : WO Geometry : 0235L111411
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:19.79
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.22	195	2427	1.07	76.71	1.03E-01	1.13E-03	42.6	
2	4	63.24	494	1678	0.79	110.95	4.77E-01	2.86E-03	13.3	1.37E+00
3	4	66.35	269	2406	1.08	117.19	5.60E-01	1.56E-03	30.5	
4	4	72.81	957	2233	1.03	130.20	7.32E-01	5.54E-03	8.3	1.14E+00
5	4	74.93	1920	2020	0.93	134.46	7.86E-01	1.11E-02	4.4	
6	4	77.04	240	1577	0.86	138.69	8.38E-01	1.39E-03	26.8	
7	2	84.69	1113	2101	1.18	154.09	1.01E+00	6.44E-03	7.5	9.74E-01
8	2	87.21	437	2089	1.09	159.16	1.06E+00	2.53E-03	18.1	
9	0	92.59	1385	2707	1.12	169.98	1.16E+00	8.02E-03	7.3	
10	0	139.69	219	1813	1.03	264.70	1.48E+00	1.26E-03	31.6	
11	0	144.05	302	2299	0.77	273.48	1.48E+00	1.75E-03	28.1	
12	0	185.58	1067	2499	1.12	357.01	1.39E+00	6.17E-03	9.0	
13	0	198.09	279	1810	1.25	382.17	1.35E+00	1.61E-03	26.0	
14	0	238.74	492	1937	1.07	463.92	1.22E+00	2.85E-03	16.1	
15	0	295.11	413	1808	1.22	577.32	1.06E+00	2.39E-03	20.5	
16	0	351.78	467	1436	1.19	691.30	9.30E-01	2.70E-03	15.9	
17	0	510.95	4419	1678	2.77	1011.45	7.01E-01	2.56E-02	2.7	
18	0	569.44	156	569	1.89	1129.08	6.45E-01	9.02E-04	27.8	
19	0	583.11	271	594	1.20	1156.58	6.33E-01	1.57E-03	17.3	
20	0	609.57	482	961	1.38	1209.81	6.12E-01	2.79E-03	13.7	
21	0	802.58	159	616	1.40	1598.02	4.94E-01	9.19E-04	34.0	
22	0	846.84	419	576	1.81	1687.05	4.74E-01	2.42E-03	12.2	
23	0	911.77	100	458	1.59	1817.65	4.47E-01	5.76E-04	43.0	
24	0	969.06	86	340	1.32	1932.87	4.26E-01	4.97E-04	41.7	
25	0	1000.74	84	339	1.82	1996.59	4.16E-01	4.87E-04	43.7	
26	0	1120.75	238	348	1.41	2238.00	3.80E-01	1.38E-03	18.4	
27	0	1460.65	494	357	2.06	2921.68	3.10E-01	2.86E-03	10.6	
28	0	1729.22	107	109	4.87	3461.90	2.75E-01	6.20E-04	23.8	
29	0	1764.67	217	168	2.15	3533.22	2.71E-01	1.26E-03	15.3	

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	494	10.67*	3.103E-01	2.334E+02	2.334E+02	21.13
RA-226	186.21	1067	3.28*	1.395E+00	3.648E+02	3.648E+02	17.96
AC-228	835.50	------	1.75	4.789E-01	------ Line Not Found		------
	911.07	100	27.70*	4.473E-01	1.257E+01	1.258E+01	86.05

DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:28:45.67
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:10.62

LIMS No., Customer Name, Client ID: 06BG022417MT WO TBE DET06 BKG
Sample ID : 06BG022417MT Smple Date: 24-FEB-2017 10:00:00.00
Sample Type : WO Geometry : 0635L011614
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:35.75
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.20	430	2708	0.77	126.99	2.88E-01	2.49E-03	20.6	6.06E-01
2	4	72.72	822	2133	0.79	146.03	5.22E-01	4.76E-03	9.1	1.49E+00
3	4	74.93	1698	2071	0.82	150.44	5.79E-01	9.83E-03	4.7	
4	2	84.70	1270	2334	1.23	169.99	8.20E-01	7.35E-03	6.9	1.16E+00
5	2	87.39	524	1926	0.95	175.36	8.80E-01	3.03E-03	14.2	
6	1	92.62	1376	3435	1.02	185.83	9.88E-01	7.96E-03	8.4	2.41E+00
7	1	123.15	288	1971	0.98	246.88	1.35E+00	1.67E-03	24.9	8.01E+00
8	1	143.60	172	2499	1.12	287.77	1.40E+00	9.95E-04	48.8	8.40E-01
9	1	185.65	933	2661	0.78	371.84	1.31E+00	5.40E-03	10.1	1.14E+00
10	1	238.56	573	1801	0.90	477.64	1.14E+00	3.31E-03	13.0	9.26E-01
11	1	241.63	256	2019	1.42	483.77	1.13E+00	1.48E-03	31.0	1.08E+00
12	1	295.34	355	1886	1.45	591.16	9.80E-01	2.05E-03	22.7	2.47E+00
13	1	351.93	477	1858	1.33	704.31	8.65E-01	2.76E-03	17.4	2.66E+00
14	1	510.71	3619	2187	2.62	1021.75	6.69E-01	2.09E-02	3.5	2.27E+00
15	1	582.68	310	791	1.54	1165.61	6.12E-01	1.80E-03	17.2	9.43E-01
16	1	609.01	550	913	1.41	1218.26	5.94E-01	3.18E-03	11.2	9.71E-01
17	1	803.53	445	705	1.14	1607.05	4.89E-01	2.57E-03	12.6	8.50E+01
18	1	846.27	242	654	1.67	1692.49	4.71E-01	1.40E-03	21.5	1.86E+00
19	1	910.48	224	447	1.59	1820.82	4.45E-01	1.30E-03	18.9	1.47E+00
20	1	968.22	154	465	1.79	1936.20	4.24E-01	8.92E-04	28.3	7.66E-01
21	1	1119.86	203	430	2.34	2239.24	3.75E-01	1.18E-03	23.7	1.16E+00
22	1	1460.10	1357	241	1.97	2919.03	2.91E-01	7.85E-03	3.8	1.32E+00
23	1	1763.25	227	256	2.46	3524.60	2.37E-01	1.31E-03	18.8	1.91E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1357	10.67*	2.911E-01	6.833E+02	6.833E+02	7.50
RA-226	186.21	933	3.28*	1.310E+00	3.396E+02	3.396E+02	20.24
AC-228	835.50	------	1.75	4.753E-01	------ Line Not Found		------
	911.07	224	27.70*	4.452E-01	2.845E+01	2.846E+01	37.72
TH-228	238.63	573	44.60*	1.135E+00	1.769E+01	1.771E+01	25.94
	240.98	256	3.95	1.126E+00	8.987E+01	8.996E+01	62.06
TH-232	583.14	310	30.25	6.118E-01	2.622E+01	2.622E+01	34.49
	911.07	224	27.70*	4.452E-01	2.845E+01	2.845E+01	37.72
	969.11	154	16.60	4.240E-01	3.427E+01	3.427E+01	56.58
U-235	143.76	172	10.50*	1.395E+00	1.836E+01	1.836E+01	97.61

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:20:04.34
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:12.58

LIMS No., Customer Name, Client ID: 07BG022417MT WO TBE DET07 BKG
Sample ID : 07BG022417MT Smple Date: 24-FEB-2017 10:03:00.00
Sample Type : WO Geometry : 0735L011514
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:19.42
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	5	63.46	655	3475	1.71	127.67	4.44E-01	3.79E-03	17.2	8.15E+00
2	5	66.47	373	2773	1.26	133.68	5.36E-01	2.16E-03	25.1	
3	5	70.20	735	4840	2.37	141.16	6.54E-01	4.26E-03	21.1	
4	5	72.79	1699	3102	1.43	146.35	7.38E-01	9.83E-03	6.8	
5	5	74.97	3058	3093	1.52	150.70	8.08E-01	1.77E-02	3.9	
6	2	84.73	1372	2865	1.33	170.25	1.11E+00	7.94E-03	7.3	8.76E-01
7	2	87.32	503	3052	1.43	175.44	1.18E+00	2.91E-03	21.1	
8	1	92.68	1572	3589	1.71	186.18	1.33E+00	9.10E-03	7.8	5.20E+00
9	1	140.11	545	2629	1.45	281.14	1.93E+00	3.15E-03	16.7	8.96E+00
10	1	143.48	239	2624	1.38	287.88	1.94E+00	1.39E-03	37.6	7.50E-01
11	1	185.65	1075	3734	1.30	372.32	1.91E+00	6.22E-03	11.4	3.34E-01
12	1	198.19	516	2542	1.51	397.44	1.87E+00	2.99E-03	17.4	3.87E+00
13	1	238.46	926	2657	1.26	478.07	1.72E+00	5.36E-03	10.5	1.60E+00
14	1	295.17	415	2385	1.34	591.58	1.52E+00	2.40E-03	22.6	1.24E+00
15	1	338.17	266	2083	1.20	677.67	1.39E+00	1.54E-03	32.6	1.65E+00
16	1	351.87	848	1908	1.63	705.09	1.35E+00	4.91E-03	10.2	2.27E+00
17	1	510.69	6256	2500	2.84	1022.98	1.05E+00	3.62E-02	2.3	1.61E+00
18	1	569.60	309	1096	2.11	1140.88	9.70E-01	1.79E-03	20.8	7.92E-01
19	1	582.96	547	1031	1.73	1167.61	9.54E-01	3.17E-03	11.8	9.88E-01
20	1	608.97	760	1619	1.68	1219.66	9.25E-01	4.40E-03	11.2	1.69E+00
21	1	802.71	177	743	2.04	1607.33	7.60E-01	1.03E-03	29.8	1.54E+00
22	1	846.56	364	917	1.95	1695.05	7.32E-01	2.11E-03	16.9	5.32E-01
23	1	910.65	400	660	2.09	1823.26	6.94E-01	2.32E-03	14.2	3.62E+00
24	1	1120.54	243	529	2.59	2243.10	5.96E-01	1.41E-03	20.2	1.96E+00
25	1	1460.61	1521	622	2.20	2923.08	4.89E-01	8.80E-03	4.9	1.13E+00
26	1	1764.40	371	264	2.71	3530.29	4.27E-01	2.15E-03	11.3	8.12E-01

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1521	10.67*	4.892E-01	4.558E+02	4.558E+02	9.80
RA-226	186.21	1075	3.28*	1.907E+00	2.687E+02	2.687E+02	22.85
AC-228	835.50	------	1.75	7.388E-01	------	Line Not Found	------
	911.07	400	27.70*	6.940E-01	3.255E+01	3.256E+01	28.46
TH-228	238.63	926	44.60*	1.720E+00	1.889E+01	1.891E+01	21.05
	240.98	------	3.95	1.710E+00	------	Line Not Found	------
TH-232	583.14	547	30.25	9.544E-01	2.966E+01	2.966E+01	23.51

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:29:30.68
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 24-FEB-2017 09:53:14.01

LIMS No., Customer Name, Client ID: 08BG022417MT WO TBE DET08 BKG
Sample ID : 08BG022417MT Smple Date: 24-FEB-2017 10:02:00.00
Sample Type : WO Geometry : 0835L010912
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 25 Energy Tol : 2.00000 Real Time : 2 00:00:40.43
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	16.10	797	7811	1.10	39.04	4.65E-01	4.61E-03	19.6	2.18E+00
2	1	24.26	864	5425	2.14	55.39	7.17E-01	5.00E-03	15.8	2.48E+00
3	1	46.51	1398	3863	1.19	99.94	1.42E+00	8.09E-03	8.8	8.57E-01
4	3	63.41	1627	3906	1.67	133.77	1.74E+00	9.42E-03	7.5	2.87E+01
5	3	66.52	593	4675	1.95	140.01	1.78E+00	3.43E-03	23.9	
6	3	70.00	407	4662	1.95	146.97	1.82E+00	2.35E-03	35.3	
7	3	72.78	2498	2712	1.12	152.52	1.84E+00	1.45E-02	4.1	
8	3	75.04	5743	3858	1.68	157.07	1.86E+00	3.32E-02	2.5	
9	4	84.87	2199	2955	1.33	176.74	1.91E+00	1.27E-02	4.8	1.35E+00
10	4	87.46	612	2533	1.12	181.91	1.91E+00	3.54E-03	14.4	
11	1	92.70	1484	3279	1.23	192.41	1.92E+00	8.59E-03	7.4	1.25E+00
12	1	185.91	755	3098	1.20	378.95	1.54E+00	4.37E-03	13.8	5.09E-01
13	1	238.78	592	2486	1.27	484.71	1.29E+00	3.42E-03	15.7	1.16E+00
14	1	296.04	284	2250	1.83	599.20	1.09E+00	1.64E-03	31.7	4.05E+00
15	1	351.88	257	1667	1.37	710.82	9.35E-01	1.49E-03	29.2	4.85E-01
16	1	510.93	4169	2665	3.01	1028.58	6.70E-01	2.41E-02	3.6	1.13E+00
17	1	608.09	608	1461	2.94	1222.55	5.76E-01	3.52E-03	14.6	2.92E+00
18	1	801.66	72	685	1.45	1608.67	4.56E-01	4.16E-04	69.0	2.03E+00
19	1	845.11	248	602	1.64	1695.28	4.37E-01	1.44E-03	19.6	1.11E+00
20	1	909.86	236	530	1.73	1824.32	4.12E-01	1.36E-03	20.7	9.71E-01
21	1	1462.23	1139	245	2.06	2923.13	2.83E-01	6.59E-03	4.1	7.63E-01
22	1	1768.28	173	182	2.27	3530.47	2.40E-01	1.00E-03	17.7	1.47E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1139	10.67*	2.831E-01	5.899E+02	5.899E+02	8.20
RA-226	186.21	755	3.28*	1.538E+00	2.341E+02	2.341E+02	27.57
AC-228	835.50	------	1.75	4.413E-01	------ Line Not Found		------
	911.07	236	27.70*	4.121E-01	3.230E+01	3.231E+01	41.39
TH-228	238.63	592	44.60*	1.292E+00	1.606E+01	1.608E+01	31.37
	240.98	------	3.95	1.283E+00	------ Line Not Found		------

Flag: "*" = Keyline

Summary of Nuclide Activity Page : 2
Sample ID : 08BG022417MT Acquisition date : 24-FEB-2017 09:53:14
Total number of lines in spectrum 22

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:20:52.08
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:08.39

LIMS No., Customer Name, Client ID: 14BG022417MT WO TBE DET14 BKG
Sample ID : 14BG022417MT Smple Date: 24-FEB-2017 09:58:00.00
Sample Type : WO Geometry : 1435L121511
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 2.00000 Real Time : 2 00:00:37.78
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	6	63.14	620	4164	2.02	123.79	2.16E-01	3.59E-03	21.4	9.97E+00
2	6	66.17	570	2790	1.33	129.86	2.80E-01	3.30E-03	16.7	
3	6	70.12	642	5267	2.48	137.76	3.74E-01	3.72E-03	25.7	
4	6	72.48	1172	2470	1.13	142.48	4.34E-01	6.78E-03	7.8	
5	6	74.65	2735	3195	1.57	146.83	4.91E-01	1.58E-02	4.3	
6	1	84.37	1233	3138	1.51	166.29	7.56E-01	7.14E-03	8.7	2.21E+00
7	1	87.08	585	2730	1.29	171.71	8.28E-01	3.38E-03	16.2	
8	1	92.34	1086	3460	1.26	182.25	9.62E-01	6.29E-03	10.6	1.19E+00
9	1	139.40	345	2857	1.16	276.44	1.61E+00	1.99E-03	27.3	1.77E+00
10	1	185.56	838	3116	1.18	368.85	1.62E+00	4.85E-03	12.5	2.16E+00
11	1	198.18	295	3017	1.18	394.11	1.58E+00	1.71E-03	34.1	7.73E-01
12	1	209.59	263	2545	1.58	416.95	1.55E+00	1.52E-03	33.8	1.44E+00
13	1	238.43	1043	2849	1.23	474.69	1.45E+00	6.03E-03	9.7	1.41E+00
14	1	294.98	451	2103	1.22	587.91	1.27E+00	2.61E-03	18.9	1.90E+00
15	1	338.27	354	2275	1.94	674.58	1.16E+00	2.05E-03	26.6	8.13E-01
16	1	351.87	735	2231	1.56	701.81	1.13E+00	4.25E-03	13.0	1.84E+00
17	1	510.94	5244	2605	2.74	1020.29	8.68E-01	3.03E-02	2.7	1.42E+00
18	1	569.51	179	1237	1.71	1137.58	8.04E-01	1.04E-03	38.7	1.20E+00
19	1	583.20	505	1081	1.45	1165.00	7.90E-01	2.92E-03	12.9	9.41E-01
20	1	609.17	854	1520	2.14	1217.00	7.66E-01	4.94E-03	9.6	6.21E+00
21	1	802.78	192	757	1.99	1604.72	6.26E-01	1.11E-03	28.5	7.00E-01
22	1	846.96	405	908	2.18	1693.21	6.01E-01	2.34E-03	16.1	1.66E+00
23	1	911.05	429	711	2.41	1821.59	5.69E-01	2.48E-03	13.7	1.50E+00
24	1	969.27	197	744	1.52	1938.19	5.42E-01	1.14E-03	29.3	1.72E+00
25	1	1001.34	131	531	2.44	2002.44	5.29E-01	7.58E-04	36.5	1.17E+00
26	1	1120.67	315	604	2.70	2241.46	4.85E-01	1.82E-03	18.0	9.80E-01
27	1	1238.17	125	459	2.31	2476.85	4.49E-01	7.24E-04	36.4	8.18E-01
28	1	1461.22	1294	432	2.39	2923.76	3.96E-01	7.49E-03	4.7	2.07E+00
29	1	1765.11	279	237	2.60	3532.73	3.49E-01	1.62E-03	13.1	1.26E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1294	10.67*	3.962E-01	4.786E+02	4.786E+02	9.34
RA-226	186.21	838	3.28*	1.616E+00	2.472E+02	2.472E+02	24.97
AC-228	835.50	------	1.75	6.071E-01	------ Line Not Found		------
	911.07	429	27.70*	5.686E-01	4.256E+01	4.257E+01	27.45

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:19:17.77
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:09.64

LIMS No., Customer Name, Client ID: 15BG022417MT WO TBE DET15 BKG
Sample ID   : 15BG022417MT   Smple Date: 24-FEB-2017 10:01:00.00
Sample Type   : WO   Geometry : 1535L080811
Quantity   : 1.00000E+00 TOTAL   BKGFILE   : NOBKG
Start Channel : 90   Energy Tol : 2.00000 Real Time : 2 00:00:14.12
End Channel   : 4090   Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	63.51	710	2633	1.27	121.07	4.49E-01	4.11E-03	13.0	2.49E+00
2	2	66.26	338	2574	1.35	126.59	5.30E-01	1.96E-03	26.7	
3	7	72.96	1331	3212	1.42	140.01	7.29E-01	7.71E-03	8.5	6.90E+00
4	7	75.17	2439	2036	1.01	144.46	7.94E-01	1.41E-02	3.6	
5	7	77.37	290	1596	0.88	148.87	8.56E-01	1.68E-03	22.7	
6	5	84.95	1291	2479	1.29	164.07	1.06E+00	7.47E-03	7.2	1.07E+00
7	5	87.51	495	1818	1.03	169.20	1.12E+00	2.87E-03	14.5	
8	1	92.85	1651	2924	1.18	179.89	1.23E+00	9.55E-03	6.6	6.59E+00
9	1	185.94	809	2935	0.98	366.53	1.50E+00	4.68E-03	13.0	1.08E+00
10	1	198.08	430	2308	1.78	390.88	1.45E+00	2.49E-03	20.6	6.00E+00
11	1	238.78	461	1655	0.91	472.47	1.30E+00	2.67E-03	15.3	4.98E-01
12	1	295.43	283	1610	1.09	586.03	1.13E+00	1.64E-03	26.1	1.99E+00
13	1	352.04	428	1102	1.07	699.49	9.90E-01	2.48E-03	14.2	1.01E+00
14	1	511.12	3987	1672	2.70	1018.31	7.48E-01	2.31E-02	2.8	1.23E+00
15	1	583.32	225	826	1.42	1162.98	6.75E-01	1.30E-03	25.7	2.12E+00
16	1	609.54	485	929	1.51	1215.50	6.53E-01	2.81E-03	13.0	1.35E+00
17	1	803.14	152	475	2.01	1603.36	5.24E-01	8.80E-04	29.0	4.18E-01
18	1	847.08	454	520	1.75	1691.36	5.02E-01	2.63E-03	10.7	1.18E+00
19	1	911.65	160	456	2.15	1820.68	4.72E-01	9.23E-04	29.9	1.77E+00
20	1	1001.73	56	308	1.36	2001.08	4.36E-01	3.21E-04	58.2	1.54E+00
21	1	1120.73	113	325	1.56	2239.36	3.97E-01	6.56E-04	31.3	1.32E+00
22	1	1461.64	634	223	2.03	2921.77	3.18E-01	3.67E-03	6.6	1.03E+00
23	1	1766.39	227	211	4.62	3531.50	2.76E-01	1.32E-03	19.7	2.13E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	634	10.67*	3.181E-01	2.924E+02	2.924E+02	13.25
RA-226	186.21	809	3.28*	1.497E+00	2.576E+02	2.576E+02	26.03
AC-228	835.50	------	1.75	5.074E-01	------ Line Not Found		------
	911.07	160	27.70*	4.721E-01	1.908E+01	1.909E+01	59.77
TH-228	238.63	461	44.60*	1.302E+00	1.241E+01	1.242E+01	30.69
	240.98	------	3.95	1.294E+00	------ Line Not Found		------
TH-232	583.14	225	30.25	6.754E-01	1.723E+01	1.723E+01	51.41
	911.07	160	27.70*	4.721E-01	1.908E+01	1.908E+01	59.77
	969.11	------	16.60	4.486E-01	------ Line Not Found		------
U-235	143.76	------	10.50*	1.602E+00	------ Line Not Found		------

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Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:32:27.74
TBE23 03017322 HpGe ********** Aquisition Date/Time: 24-FEB-2017 09:53:06.88

LIMS No., Customer Name, Client ID: 23BG022417MT WO TBE DET23 BKG
Sample ID   : 23BG022417MT   Smple Date: 24-FEB-2017 09:54:00.00
Sample Type   : WO   Geometry : 2335L090704
Quantity   : 1.00000E+00 TOTAL   BKGFILE   : NOBKG
Start Channel : 50   Energy Tol : 2.00000 Real Time : 2 00:02:31.23
End Channel   : 4090   Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	5	33.51	1447	211	1.42	67.85	8.98E-02	8.37E-03	5.0	1.52E+02
2	5	35.66	3239	1234	3.87	72.14	1.24E-01	1.87E-02	4.3	
3	5	39.68	1845	2898	3.20	80.15	2.06E-01	1.07E-02	8.4	
4	5	42.42	603	2475	1.95	85.61	2.73E-01	3.49E-03	17.6	
5	5	44.79	1302	5715	3.88	90.35	3.38E-01	7.54E-03	13.9	
6	5	48.07	256	3097	1.67	96.90	4.36E-01	1.48E-03	35.6	
7	0	63.03	1164	5614	2.28	126.76	9.32E-01	6.74E-03	13.6	
8	0	92.44	2644	6652	2.22	185.46	1.69E+00	1.53E-02	6.8	
9	0	143.39	232	4706	1.29	287.16	2.05E+00	1.34E-03	55.8	
10	0	185.47	1773	6274	2.32	371.16	1.95E+00	1.03E-02	10.0	
11	0	238.50	583	4015	1.81	477.04	1.72E+00	3.37E-03	21.5	
12	0	294.85	287	2836	1.94	589.57	1.50E+00	1.66E-03	36.3	
13	0	352.01	763	2901	2.63	703.72	1.32E+00	4.42E-03	15.8	
14	0	510.81	4262	2991	3.29	1020.96	9.85E-01	2.47E-02	3.7	
15	0	569.13	251	1354	2.11	1137.50	9.05E-01	1.45E-03	30.1	
16	0	583.43	510	1563	2.90	1166.08	8.88E-01	2.95E-03	17.9	
17	0	609.29	640	1676	2.32	1217.76	8.59E-01	3.71E-03	13.8	
18	0	911.25	499	904	2.38	1821.50	6.38E-01	2.89E-03	15.5	
19	0	1063.39	163	412	1.41	2125.86	5.73E-01	9.42E-04	24.6	
20	0	1120.96	272	704	2.61	2241.07	5.52E-01	1.58E-03	23.9	
21	0	1460.76	2134	433	2.78	2921.39	4.59E-01	1.24E-02	3.4	
22	0	1763.83	356	211	2.51	3528.67	4.01E-01	2.06E-03	10.7	

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	2134	10.67*	4.595E-01	6.810E+02	6.810E+02	6.73
RA-226	186.21	1773	3.28*	1.948E+00	4.339E+02	4.339E+02	20.07
AC-228	835.50	------	1.75	6.790E-01	------ Line Not Found		------
	911.07	499	27.70*	6.382E-01	4.412E+01	4.414E+01	30.94
TH-228	238.63	583	44.60*	1.725E+00	1.185E+01	1.186E+01	42.90
	240.98	------	3.95	1.714E+00	------ Line Not Found		------
TH-232	583.14	510	30.25	8.880E-01	2.971E+01	2.971E+01	35.84
	911.07	499	27.70*	6.382E-01	4.412E+01	4.412E+01	30.94
	969.11	------	16.60	6.111E-01	------ Line Not Found		------
U-235	143.76	232	10.50*	2.047E+00	1.686E+01	1.686E+01	111.63
	163.35	------	4.70	2.019E+00	------ Line Not Found		------

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GAMMA SPECTROSCOPY

Initial Calibration

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 31-JAN-2012 16:42:57.23
TBE06 P-30563 HpGe ********** Aquisition Date/Time: 19-JAN-2012 17:45:12.85

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA
Sample ID : 06B150011912 Smple Date: 1-JUL-2011 12:00:00.00
Sample Type : CAL Geometry : 06B150011912
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 1.00000 Real Time : 0 15:52:22.09
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 15:50:39.36
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	65429	42879	0.87	119.69	8.75E-01	1.15E+00	0.7	5.47E+01
2	6	72.79	1917	18039	0.68	146.34	1.86E+00	3.36E-02	10.1	4.39E+00
3	6	74.89	2561	22475	0.79	150.53	2.01E+00	4.49E-02	9.0	
4	10	85.90	7813	61801	2.09	172.57	2.75E+00	1.37E-01	8.9	3.36E+01
5	10	88.01	227351	20657	0.85	176.78	2.87E+00	3.99E+00	0.2	
6	1	122.06	131424	30969	0.88	244.94	3.93E+00	2.30E+00	0.4	3.57E+00
7	1	136.48	16627	20063	0.90	273.81	4.01E+00	2.91E-01	1.7	7.26E-01
8	1	165.88	110015	24859	0.92	332.64	3.87E+00	1.93E+00	0.4	2.47E+00
9	1	185.92	595	13408	1.07	372.76	3.67E+00	1.04E-02	32.5	1.82E+00
10	1	255.15	3272	14970	1.17	511.32	2.96E+00	5.74E-02	7.0	1.76E+00
11	1	279.24	23787	15067	1.02	559.52	2.75E+00	4.17E-01	1.2	8.97E-01
12	1	310.05	479	9291	1.37	621.17	2.52E+00	8.39E-03	33.7	1.63E+00
13	1	351.89	637	8741	1.33	704.91	2.26E+00	1.12E-02	24.6	1.60E+00
14	1	391.75	65917	11605	1.13	784.68	2.06E+00	1.16E+00	0.5	1.14E+00
15	1	511.22	2330	11572	2.49	1023.72	1.63E+00	4.08E-02	9.7	1.06E+00
16	1	609.28	670	5445	1.14	1219.92	1.40E+00	1.17E-02	18.7	1.47E+00
17	1	661.63	92365	11119	1.37	1324.65	1.30E+00	1.62E+00	0.4	1.11E+00
18	1	813.98	1320	6062	1.58	1629.43	1.09E+00	2.31E-02	11.4	7.13E-01
19	1	898.00	69933	11193	1.57	1797.51	9.96E-01	1.23E+00	0.5	1.67E+00
20	1	1173.20	95973	5294	1.76	2347.91	7.87E-01	1.68E+00	0.4	2.02E+00
21	5	1324.99	1493	2920	2.96	2651.44	7.08E-01	2.62E-02	9.0	9.17E-01
22	5	1332.48	86099	1826	1.86	2666.42	7.04E-01	1.51E+00	0.4	
23	1	1460.66	388	1702	1.72	2922.70	6.51E-01	6.80E-03	21.2	7.80E-01
24	1	1836.02	40905	815	2.16	3673.05	5.44E-01	7.17E-01	0.5	1.40E+00

Nuclide Line Activity Report
Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	65429	35.90*	8.746E-01	3.653E+02	3.656E+02	1.46
02-CD109	88.03	227351	3.72*	2.867E+00	3.738E+03	5.062E+03	0.46
03-CO57	122.06	131424	85.51*	3.933E+00	6.851E+01	1.150E+02	0.75
04-CE139	165.85	110015	80.35*	3.869E+00	6.204E+01	1.721E+02	0.82
05-HG203	279.20	23787	81.46*	2.752E+00	1.861E+01	3.783E+02	2.33
06-SN113	391.69	65917	64.90*	2.059E+00	8.649E+01	2.929E+02	0.99
08-CS137	661.65	92365	85.12*	1.302E+00	1.461E+02	1.480E+02	0.81
09-Y88	898.02	69933	93.40*	9.959E-01	1.318E+02	4.917E+02	1.02
10-CO60	1173.22	95973	100.00	7.868E-01	2.139E+02	2.300E+02	0.73

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	1332.49	86099	100.00*	7.043E-01	2.143E+02	2.305E+02	0.71
12-Y88	1836.01	40905	99.38*	5.437E-01	1.327E+02	4.952E+02	1.05

Flag: "*" = Keyline

Summary of Nuclide Activity Page : 2

Sample ID : 06B150011912 Acquisition date : 19-JAN-2012 17:45:12

Total number of lines in spectrum 24

Number of unidentified lines 13

Number of lines tentatively identified by NID 11 45.83%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.653E+02	3.656E+02	0.053E+02	1.46	
02-CD109	462.90D	1.35	3.738E+03	5.062E+03	0.023E+03	0.46	
03-CO57	270.90D	1.68	6.851E+01	1.150E+02	0.009E+02	0.75	
04-CE139	137.66D	2.77	6.204E+01	1.721E+02	0.014E+02	0.82	
05-HG203	46.61D	20.3	1.861E+01	3.783E+02	0.088E+02	2.33	
06-SN113	115.10D	3.39	8.649E+01	2.929E+02	0.029E+02	0.99	
08-CS137	30.17Y	1.01	1.461E+02	1.480E+02	0.012E+02	0.81	
09-Y88	106.65D	3.73	1.318E+02	4.917E+02	0.050E+02	1.02	
10-CO60	5.27Y	1.08	2.143E+02	2.305E+02	0.016E+02	0.71	
12-Y88	106.65D	3.73	1.327E+02	4.952E+02	0.052E+02	1.05	
			---------	---------			
	Total Activity :		4.964E+03	7.752E+03			
	Grand Total Activity :		4.964E+03	7.752E+03			

Flags: "K" = Keyline not found "M" = Manually accepted

"E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines Page : 3

Sample ID : 06B150011912 Acquisition date : 19-JAN-2012 17:45:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
6	72.79	1917	18039	0.68	146.34	144	10	3.36E-02	20.3	1.86E+00	
6	74.89	2561	22475	0.79	150.53	144	10	4.49E-02	18.0	2.01E+00	
10	85.90	7813	61801	2.09	172.57	165	19	1.37E-01	17.7	2.75E+00	
1	136.48	16627	20063	0.90	273.81	270	8	2.91E-01	3.3	4.01E+00	
1	185.92	595	13408	1.07	372.76	370	7	1.04E-02	65.0	3.67E+00	
1	255.15	3272	14970	1.17	511.32	507	9	5.74E-02	13.9	2.96E+00	
1	310.05	479	9291	1.37	621.17	619	7	8.39E-03	67.3	2.52E+00	
1	351.89	637	8741	1.33	704.91	702	7	1.12E-02	49.2	2.26E+00	
1	511.22	2330	11572	2.49	1023.72	1018	13	4.08E-02	19.5	1.63E+00	
1	609.28	670	5445	1.14	1219.92	1217	7	1.17E-02	37.3	1.40E+00	
1	813.98	1320	6062	1.58	1629.43	1625	10	2.31E-02	22.7	1.09E+00	
5	1324.99	1493	2920	2.96	2651.44	2642	34	2.62E-02	17.9	7.08E-01	
1	1460.66	388	1702	1.72	2922.70	2918	11	6.80E-03	42.5	6.51E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 24

Number of unidentified lines 13

Number of lines tentatively identified by NID 11 45.83%

Nuclide Type :

Wtd Mean Wtd Mean

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Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.653E+02	3.656E+02	0.053E+02	1.46	
02-CD109	462.90D	1.35	3.738E+03	5.062E+03	0.023E+03	0.46	
03-CO57	270.90D	1.68	6.851E+01	1.150E+02	0.009E+02	0.75	
04-CE139	137.66D	2.77	6.204E+01	1.721E+02	0.014E+02	0.82	
05-HG203	46.61D	20.3	1.861E+01	3.783E+02	0.088E+02	2.33	
06-SN113	115.10D	3.39	8.649E+01	2.929E+02	0.029E+02	0.99	
08-CS137	30.17Y	1.01	1.461E+02	1.480E+02	0.012E+02	0.81	
09-Y88	106.65D	3.73	1.318E+02	4.917E+02	0.050E+02	1.02	
10-CO60	5.27Y	1.08	2.141E+02	2.303E+02	0.012E+02	0.51	
12-Y88	106.65D	3.73	1.327E+02	4.952E+02	0.052E+02	1.05	
			---------	---------			
	Total Activity :		4.963E+03	7.751E+03			
	Grand Total Activity :		4.963E+03	7.751E+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
01-AM241	3.656E+02	5.333E+00	3.423E+00	0.000E+00	106.821
02-CD109	5.062E+03	2.344E+01	1.480E+01	0.000E+00	341.990
03-CO57	1.150E+02	8.576E-01	5.189E-01	0.000E+00	221.718
04-CE139	1.721E+02	1.414E+00	8.222E-01	0.000E+00	209.248
05-HG203	3.783E+02	8.801E+00	7.372E+00	0.000E+00	51.324
06-SN113	2.929E+02	2.904E+00	1.902E+00	0.000E+00	154.050
08-CS137	1.480E+02	1.199E+00	6.319E-01	0.000E+00	234.189
09-Y88	4.917E+02	4.999E+00	2.646E+00	0.000E+00	185.866
10-CO60	2.303E+02	1.172E+00	5.239E-01	0.000E+00	439.594
12-Y88	4.952E+02	5.193E+00	1.246E+00	0.000E+00	397.528

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	4.417E+00		2.570E+00	3.792E+00	0.000E+00	1.165

A,06B150011912 ,01/31/2012 16:42,07/01/2011 12:00, 1.000E+00,150ML POLY BOTTLE MI,CAL
,BQ ,
B,06B150011912 ,CALIBRATION ,01/27/2012 12:57,06B150011912 ,NOBKG

C,01-AM241,YES, 3.656E+02, 5.333E+00, 3.423E+00,, 106.821
C,02-CD109,YES, 5.062E+03, 2.344E+01, 1.480E+01,, 341.990
C,03-CO57 ,YES, 1.150E+02, 8.576E-01, 5.189E-01,, 221.718
C,04-CE139,YES, 1.721E+02, 1.414E+00, 8.222E-01,, 209.248
C,05-HG203,YES, 3.783E+02, 8.801E+00, 7.372E+00,, 51.324
C,06-SN113,YES, 2.929E+02, 2.904E+00, 1.902E+00,, 154.050
C,08-CS137,YES, 1.480E+02, 1.199E+00, 6.319E-01,, 234.189
C,09-Y88 ,YES, 4.917E+02, 4.999E+00, 2.646E+00,, 185.866
C,10-CO60 ,YES, 2.303E+02, 1.172E+00, 5.239E-01,, 439.594
C,12-Y88 ,YES, 4.952E+02, 5.193E+00, 1.246E+00,, 397.528

DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:29:41.63
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 27-FEB-2015 17:04:36.87

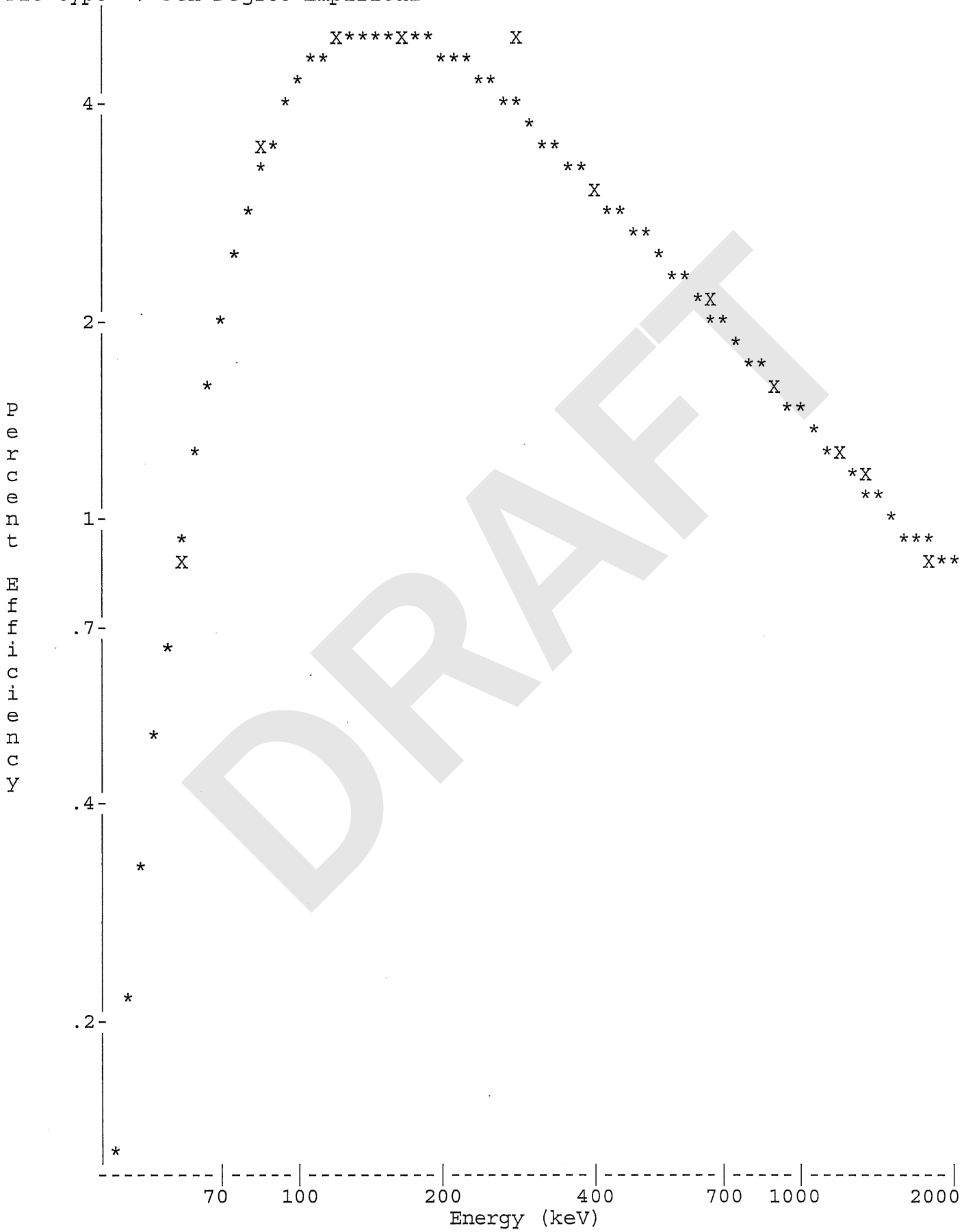
LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 01B150022715 Smple Date: 1-JAN-2014 12:00:00.0
Sample Type : QC Geometry : 01B150022715
Quantity : 1.00000E+00 TOTAL BKGFILE : 01BG013015MT
Start Channel : 90 Energy Tol : 1.00000 Real Time : 0 16:36:40.47
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 16:33:13.16
MDA Multiple : 4.6600 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.61	140132	68186	0.82	119.13	8.86E-01	2.35E+00	0.4	8.78E+01
2	1	66.49	1213	32230	0.82	132.86	1.47E+00	2.04E-02	22.2	2.44E+01
3	1	72.82	1569	36804	0.78	145.49	2.06E+00	2.63E-02	18.5	1.55E+00
4	1	75.00	2845	37880	0.63	149.85	2.26E+00	4.77E-02	10.4	9.87E-01
5	10	84.40	9621	92258	2.12	168.60	3.09E+00	1.61E-01	5.9	1.43E+02
6	10	85.89	10647	78357	1.61	171.56	3.22E+00	1.79E-01	7.3	
7	10	88.07	423098	33652	0.87	175.92	3.39E+00	7.10E+00	0.2	
8	1	122.11	208489	46655	0.87	243.83	4.96E+00	3.50E+00	0.3	3.12E+00
9	1	136.50	26688	36786	0.87	272.55	5.14E+00	4.48E-01	1.5	2.78E-01
10	1	165.88	104305	37605	0.92	331.17	5.10E+00	1.75E+00	0.5	2.16E+00
11	1	186.17	1120	20002	1.74	371.67	4.91E+00	1.88E-02	20.1	4.54E+00
12	1	255.15	2556	24264	1.08	509.32	4.15E+00	4.29E-02	10.7	3.58E-01
13	1	279.07	3456	24986	1.36	557.06	3.92E+00	5.80E-02	8.4	6.56E+00
14	1	310.47	549	15497	1.13	619.72	3.64E+00	9.21E-03	36.1	1.10E-01
15	1	391.58	58425	26029	1.14	781.63	3.08E+00	9.80E-01	0.7	3.23E+00
16	1	510.83	2930	19866	2.42	1019.66	2.53E+00	4.92E-02	9.5	1.87E+00
17	1	661.54	314668	23450	1.40	1320.55	2.06E+00	5.28E+00	0.2	1.08E+01
18	1	813.72	647	10680	1.44	1624.41	1.74E+00	1.08E-02	28.0	5.29E-01
19	1	821.43	1093	13269	1.92	1639.82	1.72E+00	1.83E-02	19.9	1.38E+00
20	1	898.07	58780	22504	1.61	1792.87	1.60E+00	9.86E-01	0.7	2.47E+00
21	1	1173.31	316433	13765	1.85	2342.66	1.27E+00	5.31E+00	0.2	2.45E+01
22	5	1325.85	1286	4577	3.17	2647.45	1.15E+00	2.16E-02	12.8	2.94E+01
23	5	1332.57	289049	2425	1.99	2660.87	1.15E+00	4.85E+00	0.2	
24	1	1835.93	36450	1540	2.37	3667.00	9.23E-01	6.12E-01	0.6	9.40E+00
25	1	1886.02	41	635	2.78	3767.15	9.11E-01	6.89E-04	123.5	1.98E+00

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Spectrum : MCA0:[NDSCOUNT]TBE01$1
Calib Date: 21-JUL-2015 11:29
Detector : Geometry : 01B150022715
Fit type : 5th Degree Empirical



DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:39:29.88
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 27-FEB-2015 17:04:36.87

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 01B150022715 Smple Date: 1-JAN-2014 12:00:00.0
Sample Type : QC Geometry : 01B150022715
Quantity : 1.00000E+00 TOTAL BKGFILE : 01BG013015MT
Start Channel : 90 Energy Tol : 1.00000 Real Time : 0 16:36:40.47
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 16:33:13.16
MDA Multiple : 4.6600 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.61	140132	68186	0.82	119.13	8.86E-01	2.35E+00	0.4	8.78E+01
2	1	66.49*	1086	32230	0.82	132.86	1.47E+00	1.82E-02	25.2	2.44E+01
3	1	72.82*	1214	36804	0.78	145.49	2.06E+00	2.04E-02	24.1	1.55E+00
4	1	75.00*	2146	37880	0.63	149.85	2.26E+00	3.60E-02	14.0	9.87E-01
5	10	84.40*	9241	92258	2.12	168.60	3.09E+00	1.55E-01	6.2	1.43E+02
6	10	85.89	10647	78357	1.61	171.56	3.22E+00	1.79E-01	7.3	
7	10	88.07*	422940	33652	0.87	175.92	3.39E+00	7.10E+00	0.2	
8	1	122.11	208489	46655	0.87	243.83	4.96E+00	3.50E+00	0.3	3.12E+00
9	1	136.50	26688	36786	0.87	272.55	5.14E+00	4.48E-01	1.5	2.78E-01
10	1	165.88	104305	37605	0.92	331.17	5.10E+00	1.75E+00	0.5	2.16E+00
11	1	186.17*	436	20002	1.74	371.67	4.91E+00	7.32E-03	53.5	4.54E+00
12	1	255.15	2556	24264	1.08	509.32	4.15E+00	4.29E-02	10.7	3.58E-01
13	1	279.07	3456	24986	1.36	557.06	3.92E+00	5.80E-02	8.4	6.56E+00
14	1	310.47	549	15497	1.13	619.72	3.64E+00	9.21E-03	36.1	1.10E-01
15	1	391.58	58425	26029	1.14	781.63	3.08E+00	9.80E-01	0.7	3.23E+00
16	1	510.83*	935	19866	2.42	1019.66	2.53E+00	1.57E-02	30.8	1.87E+00
17	1	661.54	314668	23450	1.40	1320.55	2.06E+00	5.28E+00	0.2	1.08E+01
18	1	813.72	647	10680	1.44	1624.41	1.74E+00	1.08E-02	28.0	5.29E-01
19	1	821.43	1093	13269	1.92	1639.82	1.72E+00	1.83E-02	19.9	1.38E+00
20	1	898.07	58780	22504	1.61	1792.87	1.60E+00	9.86E-01	0.7	2.47E+00
21	1	1173.31	316433	13765	1.85	2342.66	1.27E+00	5.31E+00	0.2	2.45E+01
22	5	1325.85	1286	4577	3.17	2647.45	1.15E+00	2.16E-02	12.8	2.94E+01
23	5	1332.57	289049	2425	1.99	2660.87	1.15E+00	4.85E+00	0.2	
24	1	1835.93	36450	1540	2.37	3667.00	9.23E-01	6.12E-01	0.6	9.40E+00
25	1	1886.02	41	635	2.78	3767.15	9.11E-01	6.89E-04	23.5	1.98E+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
01-AM241	59.54	140132	35.90*	8.856E-01	7.396E+02	7.410E+02	0.88
02-CD109	88.03	422940	3.72*	3.386E+00	5.635E+03	1.061E+04	0.33
03-CO57	122.06	208489	85.51*	4.956E+00	8.255E+01	2.434E+02	0.59
04-CE139	165.85	104305	80.35*	5.098E+00	4.273E+01	3.587E+02	0.95
05-HG203	279.20	3456	81.46*	3.917E+00	1.817E+00	9.737E+02	16.80

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06-SN113	391.69	58425	64.90*	3.082E+00	4.901E+01	6.244E+02	1.35
08-CS137	661.65	314668	85.12*	2.061E+00	3.010E+02	3.091E+02	0.42
09-Y88	898.02	58780	93.40*	1.598E+00	6.607E+01	1.030E+03	1.36
10-CO60	1173.22	316433	100.00	1.272E+00	4.175E+02	4.861E+02	0.40
	1332.49	289049	100.00*	1.145E+00	4.235E+02	4.931E+02	0.38
12-Y88	1836.01	36450	99.38*	9.230E-01	6.668E+01	1.039E+03	1.20

Flag: "*" = Keyline

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Sample ID : 01B150022715 Acquisition date : 27-FEB-2015 17:04:36

Total number of lines in spectrum	25	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	11	44.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	7.396E+02	7.410E+02	0.065E+02	0.88	
02-CD109	462.90D	1.88	5.635E+03	1.061E+04	0.004E+04	0.33	
03-CO57	270.90D	2.95	8.255E+01	2.434E+02	0.014E+02	0.59	
04-CE139	137.66D	8.40	4.273E+01	3.587E+02	0.034E+02	0.95	
05-HG203	46.61D	536.	1.817E+00	9.737E+02	1.636E+02	16.80	
06-SN113	115.10D	12.7	4.901E+01	6.244E+02	0.085E+02	1.35	
08-CS137	30.17Y	1.03	3.010E+02	3.091E+02	0.013E+02	0.42	
09-Y88	106.65D	15.6	6.607E+01	1.030E+03	0.014E+03	1.36	
10-CO60	5.27Y	1.16	4.235E+02	4.931E+02	0.019E+02	0.38	
12-Y88	106.65D	15.6	6.668E+01	1.039E+03	0.012E+03	1.20	
			---------	---------			
	Total Activity :		7.408E+03	1.642E+04			

Grand Total Activity : 7.408E+03 1.642E+04

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

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It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	66.49	1086	32230	0.82	132.86	131	5	1.82E-02	50.3	1.47E+00	
1	72.82	1214	36804	0.78	145.49	143	5	2.04E-02	48.2	2.06E+00	
1	75.00	2146	37880	0.63	149.85	148	5	3.60E-02	28.0	2.26E+00	
10	84.40	9241	92258	2.12	168.60	163	19	1.55E-01	12.3	3.09E+00	
10	85.89	10647	78357	1.61	171.56	163	19	1.79E-01	14.7	3.22E+00	
1	136.50	26688	36786	0.87	272.55	268	10	4.48E-01	3.0	5.14E+00	
1	186.17	436	20002	1.74	371.67	369	6	7.32E-03	****	4.91E+00	
1	255.15	2556	24264	1.08	509.32	506	8	4.29E-02	21.5	4.15E+00	
1	310.47	549	15497	1.13	619.72	618	6	9.21E-03	72.2	3.64E+00	
1	510.83	935	19866	2.42	1019.66	1015	11	1.57E-02	61.7	2.53E+00	
1	813.72	647	10680	1.44	1624.41	1621	8	1.08E-02	55.9	1.74E+00	
1	821.43	1093	13269	1.92	1639.82	1635	10	1.83E-02	39.9	1.72E+00	
5	1325.85	1286	4577	3.17	2647.45	2635	44	2.16E-02	25.7	1.15E+00	
1	1886.02	41	635	2.78	3767.15	3761	12	6.89E-04	****	9.11E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	25	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	11	44.00%

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
01-AM241	432.70Y	1.00	7.396E+02	7.410E+02	0.065E+02	0.88	
02-CD109	462.90D	1.88	5.635E+03	1.061E+04	0.004E+04	0.33	
03-CO57	270.90D	2.95	8.255E+01	2.434E+02	0.014E+02	0.59	
04-CE139	137.66D	8.40	4.273E+01	3.587E+02	0.034E+02	0.95	
05-HG203	46.61D	536.	1.817E+00	9.737E+02	1.636E+02	16.80	
06-SN113	115.10D	12.7	4.901E+01	6.244E+02	0.085E+02	1.35	
08-CS137	30.17Y	1.03	3.010E+02	3.091E+02	0.013E+02	0.42	
09-Y88	106.65D	15.6	6.607E+01	1.030E+03	0.014E+03	1.36	
10-CO60	5.27Y	1.16	4.235E+02	4.931E+02	0.019E+02	0.38	
12-Y88	106.65D	15.6	6.668E+01	1.039E+03	0.012E+03	1.20	
	Total Activity :		7.408E+03	1.642E+04			

Grand Total Activity : 7.408E+03 1.642E+04

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 ----

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Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	7.410E+02	6.549E+00	4.348E+00	0.000E+00	170.409
02-CD109	1.061E+04	3.552E+01	2.127E+01	0.000E+00	498.779
03-CO57	2.434E+02	1.429E+00	8.647E-01	0.000E+00	281.463
04-CE139	3.587E+02	3.417E+00	2.273E+00	0.000E+00	157.849
05-HG203	9.737E+02	1.636E+02	1.816E+02	0.000E+00	5.361
06-SN113	6.244E+02	8.454E+00	6.664E+00	0.000E+00	93.702
08-CS137	3.091E+02	1.295E+00	5.231E-01	0.000E+00	590.894
09-Y88	1.030E+03	1.403E+01	1.041E+01	0.000E+00	98.894
10-CO60	4.931E+02	1.869E+00	3.975E-01	0.000E+00	1240.603
12-Y88	1.039E+03	1.244E+01	3.943E+00	0.000E+00	263.555

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	5.148E+01		2.450E+01	3.558E+01	0.000E+00	1.447

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A,01B150022715    ,07/21/2015 11:39,01/01/2014 12:00,   1.000E+00,B150 MIXED GAM
B,01B150022715    ,CALIBRATION         ,07/21/2015 11:29,01B150022715
C,01-AM241,YES,   7.410E+02,   6.549E+00,   4.348E+00,,  170.409
C,02-CD109,YES,   1.061E+04,   3.552E+01,   2.127E+01,,  498.779
C,03-CO57 ,YES,   2.434E+02,   1.429E+00,   8.647E-01,,  281.463
C,04-CE139,YES,   3.587E+02,   3.417E+00,   2.273E+00,,  157.849
C,05-HG203,YES,   9.737E+02,   1.636E+02,   1.816E+02,,    5.361
C,06-SN113,YES,   6.244E+02,   8.454E+00,   6.664E+00,,   93.702
C,08-CS137,YES,   3.091E+02,   1.295E+00,   5.231E-01,,  590.894
C,09-Y88  ,YES,   1.030E+03,   1.403E+01,   1.041E+01,,   98.894
C,10-CO60 ,YES,   4.931E+02,   1.869E+00,   3.975E-01,, 1240.603
C,12-Y88  ,YES,   1.039E+03,   1.244E+01,   3.943E+00,,  263.555
C,07-SR85 ,NO ,   5.148E+01,   2.450E+01,   3.558E+01,,    1.447
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DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-OCT-2011 15:49:45.83
TBE02 P-10712A HpGe ********** Aquisition Date/Time: 17-OCT-2011 16:43:59.80

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA STD

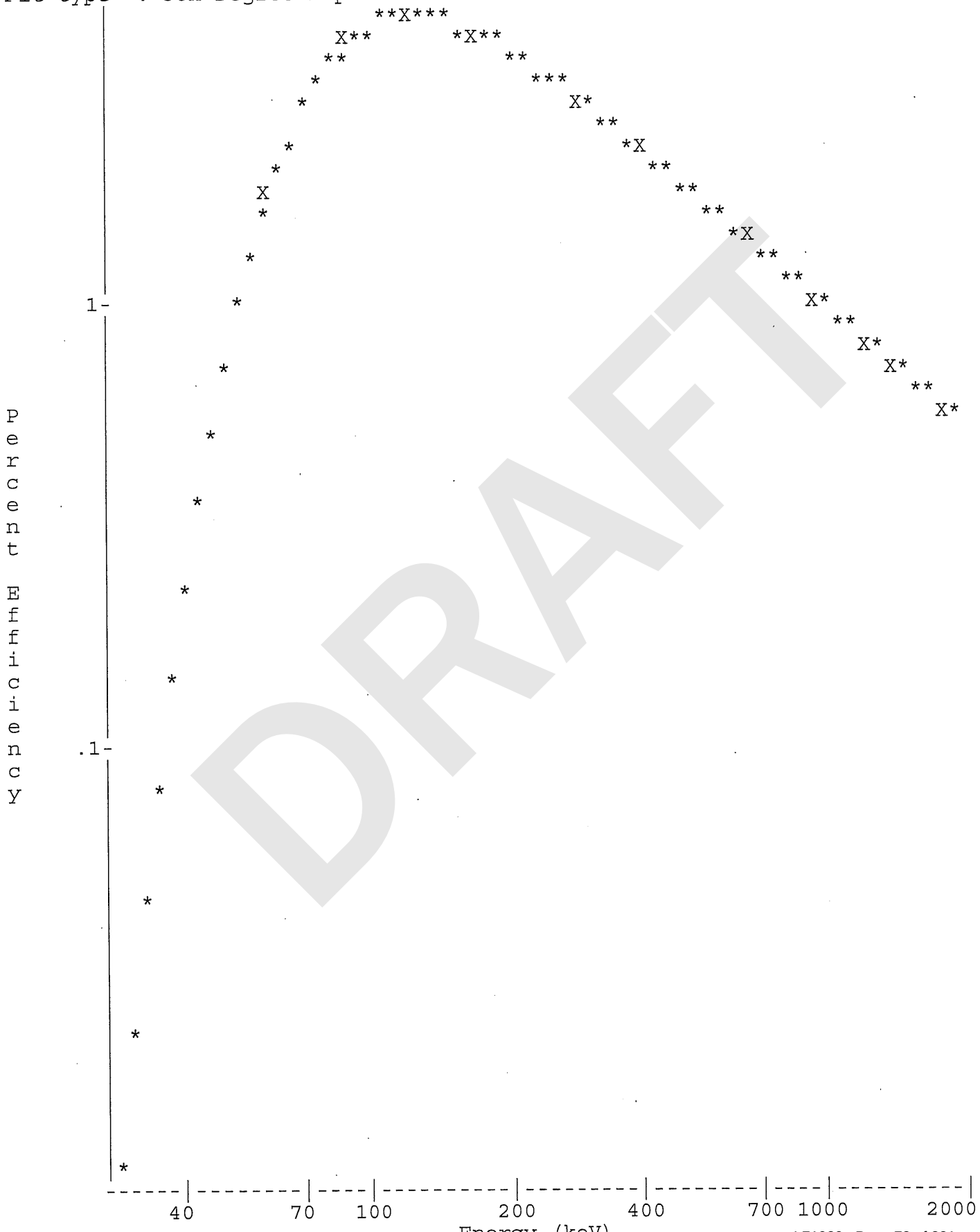
Sample ID : 02B150111711
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 02B150101711
BKGFILE : 02BG091611MT
Real Time : 0 15:33:33.25
Live time : 0 15:16:10.15

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	37.61	827	43862	0.90	58.45	1.55E-01	1.51E-02	40.2	7.35E-01
2	6	58.19	7925	62555	1.56	99.86	1.54E+00	1.44E-01	6.1	3.05E+00
3	6	59.46	119194	47386	0.92	102.43	1.66E+00	2.17E+00	0.4	
4	2	70.76	2590	34502	0.74	125.15	2.61E+00	4.71E-02	10.3	8.72E+00
5	2	72.82	6084	42950	0.77	129.30	2.76E+00	1.11E-01	5.3	
6	10	83.98	14864	130301	2.43	151.74	3.45E+00	2.70E-01	5.3	2.63E+02
7	10	85.82	18187	84209	1.67	155.46	3.54E+00	3.31E-01	3.5	
8	10	87.99	324636	43865	1.05	159.82	3.64E+00	5.91E+00	0.2	
9	1	92.96	2334	40271	1.35	169.82	3.84E+00	4.25E-02	14.5	1.35E+00
10	1	96.51	1170	33179	1.09	176.97	3.95E+00	2.13E-02	24.8	4.39E+00
11	7	117.84	3315	46448	1.91	219.89	4.28E+00	6.03E-02	11.1	1.14E+02
12	7	122.07	175715	32139	1.03	228.39	4.30E+00	3.20E+00	0.3	
13	1	136.49	22075	43383	1.01	257.40	4.27E+00	4.02E-01	1.9	4.40E+00
14	1	165.90	175190	57286	1.07	316.57	4.01E+00	3.19E+00	0.4	9.27E+01
15	1	170.94	1425	25109	1.31	326.73	3.96E+00	2.59E-02	18.7	1.33E+00
16	1	174.59	1093	20091	1.78	334.07	3.92E+00	1.99E-02	20.7	5.60E-01
17	1	255.18	5650	22216	1.23	496.22	3.06E+00	1.03E-01	4.9	4.22E+00
18	6	274.80	1462	22443	1.75	535.71	2.89E+00	2.66E-02	18.6	2.47E+01
19	6	279.24	96630	17346	1.17	544.63	2.86E+00	1.76E+00	0.4	
20	1	352.14	611	12774	1.34	691.32	2.37E+00	1.11E-02	32.3	8.87E-01
21	2	387.55	1383	15399	1.62	762.57	2.18E+00	2.52E-02	15.9	5.30E+01
22	2	391.74	118280	15458	1.29	771.01	2.16E+00	2.15E+00	0.3	
23	1	396.51	653	14308	1.31	780.61	2.14E+00	1.19E-02	32.1	9.26E-01
24	1	400.74	884	14560	1.83	789.12	2.12E+00	1.61E-02	24.9	1.02E+00
25	1	511.26	2843	15749	2.53	1011.50	1.72E+00	5.17E-02	9.3	1.06E+00
26	1	661.67	92901	24979	1.51	1314.17	1.36E+00	1.69E+00	0.5	2.56E+01
27	1	814.13	1931	8629	1.53	1620.98	1.13E+00	3.51E-02	9.6	5.30E-01
28	1	898.02	128112	23984	1.68	1789.79	1.03E+00	2.33E+00	0.4	2.93E+01
29	1	1173.17	97839	14991	1.88	2343.54	8.05E-01	1.78E+00	0.4	1.75E+01
30	5	1178.27	320	2127	1.12	2353.80	8.02E-01	5.83E-03	18.9	2.19E+00
31	5	1182.82	1288	5213	3.07	2362.95	7.99E-01	2.34E-02	11.9	
32	10	1328.11	7012	9934	5.14	2655.35	7.22E-01	1.28E-01	6.1	4.01E+01
33	10	1332.45	88398	3643	1.94	2664.10	7.20E-01	1.61E+00	0.4	
34	10	1335.60	3593	7493	4.26	2670.43	7.18E-01	6.54E-02	11.0	
35	10	1341.73	1524	3828	3.01	2682.76	7.15E-01	2.77E-02	9.5	
36	1	1836.03	75423	7835	2.37	3677.66	5.66E-01	1.37E+00	0.5	3.55E+01
37	1	1858.55	349	873	3.93	3722.98	5.62E-01	6.34E-03	19.2	2.02E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE02$1
Calib Date: 21-OCT-2011 15:49
Detector :
Geometry : 02B150101711
Fit type : 5th Degree Empirical



DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 2-NOV-2011 16:59:51.44
TBE02 P-10712A HpGe ********** Aquisition Date/Time: 17-OCT-2011 16:43:59.80

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA STD

Sample ID : 02B150101711
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 02B150101711
BKGFILE : 02BG101411MT
Real Time : 0 15:33:33.25
Live time : 0 15:16:10.15

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	37.61	827	43862	0.90	58.45	1.55E-01	1.51E-02	40.2	7.35E-01
2	6	58.19	7925	62555	1.56	99.86	1.54E+00	1.44E-01	6.1	3.05E+00
3	6	59.46	119194	47386	0.92	102.43	1.66E+00	2.17E+00	0.4	
4	2	70.76*	2222	34502	0.74	125.15	2.61E+00	4.04E-02	12.1	8.72E+00
5	2	72.82*	5717	42950	0.77	129.30	2.76E+00	1.04E-01	5.6	
6	10	83.98*	14511	130301	2.43	151.74	3.45E+00	2.64E-01	5.4	2.63E+02
7	10	85.82*	17835	84209	1.67	155.46	3.54E+00	3.24E-01	3.6	
8	10	87.99*	324482	43865	1.05	159.82	3.64E+00	5.90E+00	0.2	
9	1	92.96*	1895	40271	1.35	169.82	3.84E+00	3.45E-02	17.9	1.35E+00
10	1	96.51	1170	33179	1.09	176.97	3.95E+00	2.13E-02	24.8	4.39E+00
11	7	117.84	3315	46448	1.91	219.89	4.28E+00	6.03E-02	11.1	1.14E+02
12	7	122.07	175715	32139	1.03	228.39	4.30E+00	3.20E+00	0.3	
13	1	136.49	22075	43383	1.01	257.40	4.27E+00	4.02E-01	1.9	4.40E+00
14	1	165.90	175190	57286	1.07	316.57	4.01E+00	3.19E+00	0.4	9.27E+01
15	1	170.94	1425	25109	1.31	326.73	3.96E+00	2.59E-02	18.7	1.33E+00
16	1	174.59	1093	20091	1.78	334.07	3.92E+00	1.99E-02	20.7	5.60E-01
17	1	255.18	5650	22216	1.23	496.22	3.06E+00	1.03E-01	4.9	4.22E+00
18	6	274.80	1462	22443	1.75	535.71	2.89E+00	2.66E-02	18.6	2.47E+01
19	6	279.24	96630	17346	1.17	544.63	2.86E+00	1.76E+00	0.4	
20	2	387.55	1383	15399	1.62	762.57	2.18E+00	2.52E-02	15.9	5.30E+01
21	2	391.74	118280	15458	1.29	771.01	2.16E+00	2.15E+00	0.3	
22	1	396.51	653	14308	1.31	780.61	2.14E+00	1.19E-02	32.1	9.26E-01
23	1	400.74	884	14560	1.83	789.12	2.12E+00	1.61E-02	24.9	1.02E+00
24	1	511.26*	1562	15749	2.53	1011.50	1.72E+00	2.84E-02	17.1	1.06E+00
25	1	661.67	92901	24979	1.51	1314.17	1.36E+00	1.69E+00	0.5	2.56E+01
26	1	814.13	1931	8629	1.53	1620.98	1.13E+00	3.51E-02	9.6	5.30E-01
27	1	898.02	128112	23984	1.68	1789.79	1.03E+00	2.33E+00	0.4	2.93E+01
28	1	1173.17	97839	14991	1.88	2343.54	8.05E-01	1.78E+00	0.4	1.75E+01
29	5	1178.27	320	2127	1.12	2353.80	8.02E-01	5.83E-03	18.9	2.19E+00
30	5	1182.82	1288	5213	3.07	2362.95	7.99E-01	2.34E-02	11.9	
31	10	1328.11	7012	9934	5.14	2655.35	7.22E-01	1.28E-01	6.1	4.01E+01
32	10	1332.45	88398	3643	1.94	2664.10	7.20E-01	1.61E+00	0.4	
33	10	1335.60	3593	7493	4.26	2670.43	7.18E-01	6.54E-02	11.0	
34	10	1341.73	1524	3828	3.01	2682.76	7.15E-01	2.77E-02	9.5	
35	1	1836.03	75423	7835	2.37	3677.66	5.66E-01	1.37E+00	0.5	3.55E+01
36	1	1858.55	349	873	3.93	3722.98	5.62E-01	6.34E-03	19.2	2.02E+00

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

Nuclide Line Activity Report

DRAFT

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	119194	35.90*	1.656E+00	3.646E+02	3.648E+02	0.83
02-CD109	88.03	324482	3.72*	3.643E+00	4.356E+03	5.125E+03	0.41
03-CO57	122.06	175715	85.51*	4.299E+00	8.695E+01	1.148E+02	0.58
04-CE139	165.85	175190	80.35*	4.014E+00	9.880E+01	1.706E+02	0.74
05-HG203	279.20	96630	81.46*	2.856E+00	7.556E+01	3.794E+02	0.79
06-SN113	391.69	118280	64.90*	2.163E+00	1.533E+02	2.947E+02	0.69
08-CS137	661.65	92901	85.12*	1.363E+00	1.456E+02	1.466E+02	0.99
09-Y88	898.02	128112	93.40*	1.029E+00	2.424E+02	4.908E+02	0.78
10-CO60	1173.22	97839	100.00	8.051E-01	2.211E+02	2.299E+02	0.86
	1332.49	88398	100.00*	7.197E-01	2.234E+02	2.323E+02	0.74
12-Y88	1836.01	75423	99.38*	5.656E-01	2.441E+02	4.941E+02	0.95

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 02B150101711 Acquisition date : 17-OCT-2011 16:43:59

Total number of lines in spectrum	36	
Number of unidentified lines	25	
Number of lines tentatively identified by NID	11	30.56%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.646E+02	3.648E+02	0.030E+02	0.83	
02-CD109	462.90D	1.18	4.356E+03	5.125E+03	0.021E+03	0.41	
03-CO57	270.90D	1.32	8.695E+01	1.148E+02	0.007E+02	0.58	
04-CE139	137.66D	1.73	9.880E+01	1.706E+02	0.013E+02	0.74	
05-HG203	46.61D	5.02	7.556E+01	3.794E+02	0.030E+02	0.79	
06-SN113	115.10D	1.92	1.533E+02	2.947E+02	0.020E+02	0.69	
08-CS137	30.17Y	1.01	1.456E+02	1.466E+02	0.015E+02	0.99	
09-Y88	106.65D	2.02	2.424E+02	4.908E+02	0.038E+02	0.78	
10-CO60	5.27Y	1.04	2.234E+02	2.323E+02	0.017E+02	0.74	
12-Y88	106.65D	2.02	2.441E+02	4.941E+02	0.047E+02	0.95	
			---------	---------			
Total Activity :			5.991E+03	7.813E+03			
Grand Total Activity :			5.991E+03	7.813E+03			

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

DRAFT

Unidentified Energy Lines
Sample ID : 02B150101711 Acquisition date : 17-OCT-2011 16:43:59

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	37.61	827	43862	0.90	58.45	56	6	1.51E-02	80.4	1.55E-01	
6	58.19	7925	62555	1.56	99.86	96	14	1.44E-01	12.2	1.54E+00	
2	70.76	2222	34502	0.74	125.15	122	11	4.04E-02	24.1	2.61E+00	
2	72.82	5717	42950	0.77	129.30	122	11	1.04E-01	11.2	2.76E+00	
10	83.98	14511	130301	2.43	151.74	144	24	2.64E-01	10.8	3.45E+00	
10	85.82	17835	84209	1.67	155.46	144	24	3.24E-01	7.2	3.54E+00	
1	92.96	1895	40271	1.35	169.82	167	7	3.45E-02	35.8	3.84E+00	
1	96.51	1170	33179	1.09	176.97	175	6	2.13E-02	49.5	3.95E+00	
7	117.84	3315	46448	1.91	219.89	216	19	6.03E-02	22.3	4.28E+00	
1	136.49	22075	43383	1.01	257.40	253	10	4.02E-01	3.8	4.27E+00	
1	170.94	1425	25109	1.31	326.73	324	7	2.59E-02	37.4	3.96E+00	
1	174.59	1093	20091	1.78	334.07	332	6	1.99E-02	41.5	3.92E+00	
1	255.18	5650	22216	1.23	496.22	492	9	1.03E-01	9.9	3.06E+00	
6	274.80	1462	22443	1.75	535.71	531	20	2.66E-02	37.2	2.89E+00	
2	387.55	1383	15399	1.62	762.57	759	20	2.52E-02	31.8	2.18E+00	
1	396.51	653	14308	1.31	780.61	778	8	1.19E-02	64.1	2.14E+00	
1	400.74	884	14560	1.83	789.12	785	9	1.61E-02	49.7	2.12E+00	
1	511.26	1562	15749	2.53	1011.50	1005	13	2.84E-02	34.1	1.72E+00	
1	814.13	1931	8629	1.53	1620.98	1616	11	3.51E-02	19.2	1.13E+00	
5	1178.27	320	2127	1.12	2353.80	2352	17	5.83E-03	37.7	8.02E-01	
5	1182.82	1288	5213	3.07	2362.95	2352	17	2.34E-02	23.9	7.99E-01	
10	1328.11	7012	9934	5.14	2655.35	2639	51	1.28E-01	12.2	7.22E-01	
10	1335.60	3593	7493	4.26	2670.43	2639	51	6.54E-02	22.0	7.18E-01	
10	1341.73	1524	3828	3.01	2682.76	2639	51	2.77E-02	19.0	7.15E-01	
1	1858.55	349	873	3.93	3722.98	3717	14	6.34E-03	38.4	5.62E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	36	
Number of unidentified lines	25	
Number of lines tentatively identified by NID	11	30.56%

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
01-AM241	432.70Y	1.00	3.646E+02	3.648E+02	0.030E+02	0.83	
02-CD109	462.90D	1.18	4.356E+03	5.125E+03	0.021E+03	0.41	
03-CO57	270.90D	1.32	8.695E+01	1.148E+02	0.007E+02	0.58	
04-CE139	137.66D	1.73	9.880E+01	1.706E+02	0.013E+02	0.74	
05-HG203	46.61D	5.02	7.556E+01	3.794E+02	0.030E+02	0.79	
06-SN113	115.10D	1.92	1.533E+02	2.947E+02	0.020E+02	0.69	
08-CS137	30.17Y	1.01	1.456E+02	1.466E+02	0.015E+02	0.99	
09-Y88	106.65D	2.02	2.424E+02	4.908E+02	0.038E+02	0.78	
10-CO60	5.27Y	1.04	2.224E+02	2.313E+02	0.013E+02	0.56	
12-Y88	106.65D	2.02	2.441E+02	4.941E+02	0.047E+02	0.95	
			---------	---------			
	Total Activity :		5.990E+03	7.812E+03			
	Grand Total Activity :		5.990E+03	7.812E+03			

Flags: "K" = Keyline not found "M" = Manually accepted

DRAFT

"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
01-AM241	3.648E+02	3.034E+00	2.963E+00	0.000E+00	123.130
02-CD109	5.125E+03	2.093E+01	1.590E+01	0.000E+00	322.340
03-CO57	1.148E+02	6.634E-01	5.501E-01	0.000E+00	208.649
04-CE139	1.706E+02	1.267E+00	7.937E-01	0.000E+00	215.005
05-HG203	3.794E+02	2.992E+00	2.451E+00	0.000E+00	154.786
06-SN113	2.947E+02	2.031E+00	1.454E+00	0.000E+00	202.673
08-CS137	1.466E+02	1.456E+00	9.101E-01	0.000E+00	161.113
09-Y88	4.908E+02	3.828E+00	2.146E+00	0.000E+00	228.678
10-CO60	2.313E+02	1.304E+00	7.374E-01	0.000E+00	313.640
12-Y88	4.941E+02	4.675E+00	1.913E+00	0.000E+00	258.262

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	3.689E+00		1.171E+00	1.692E+00	0.000E+00	2.181

DRAFT

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A,02B150101711    ,11/02/2011 16:59,07/01/2011 12:00,   1.000E+00,B150 MIXED GAM
B,02B150101711    ,CALIBRATION          ,10/21/2011 15:49,02B150101711
C,01-AM241,YES,   3.648E+02,   3.034E+00,   2.963E+00,,  123.130
C,02-CD109,YES,   5.125E+03,   2.093E+01,   1.590E+01,,  322.340
C,03-CO57 ,YES,   1.148E+02,   6.634E-01,   5.501E-01,,  208.649
C,04-CE139,YES,   1.706E+02,   1.267E+00,   7.937E-01,,  215.005
C,05-HG203,YES,   3.794E+02,   2.992E+00,   2.451E+00,,  154.786
C,06-SN113,YES,   2.947E+02,   2.031E+00,   1.454E+00,,  202.673
C,08-CS137,YES,   1.466E+02,   1.456E+00,   9.101E-01,,  161.113
C,09-Y88  ,YES,   4.908E+02,   3.828E+00,   2.146E+00,,  228.678
C,10-CO60 ,YES,   2.313E+02,   1.304E+00,   7.374E-01,,  313.640
C,12-Y88  ,YES,   4.941E+02,   4.675E+00,   1.913E+00,,  258.262
C,07-SR85 ,NO ,   3.689E+00,   1.171E+00,   1.692E+00,,    2.181
```

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 11-NOV-2011 11:30:10.84
TBE07 P-10768B HpGe ********** Aquisition Date/Time: 18-OCT-2011 10:16:05.22

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

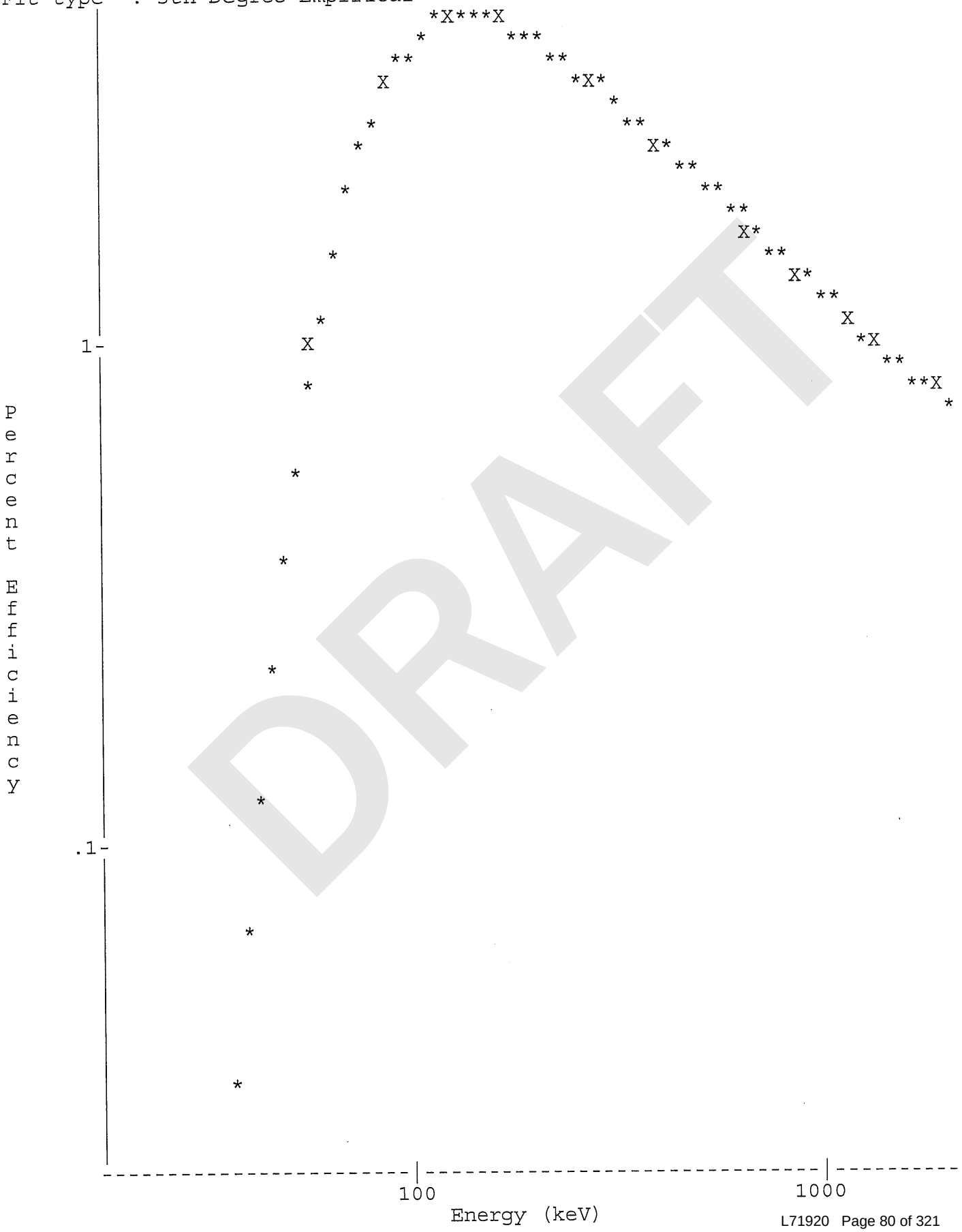
Sample ID : 07B150101811
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 07B150101811
BKGFILE : NOBKG
Real Time : 0 04:14:04.05
Live time : 0 04:13:08.20

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	20110	19589	1.21	119.65	1.01E+00	1.32E+00	1.6	1.35E+01
2	1	72.87	1103	12312	0.78	146.45	2.14E+00	7.26E-02	16.1	3.99E+00
3	1	75.09	745	9518	0.75	150.91	2.33E+00	4.91E-02	20.0	5.56E+00
4	1	88.05	80367	21925	1.19	176.86	3.30E+00	5.29E+00	0.5	2.16E+00
5	1	122.07	51737	15743	1.23	244.99	4.55E+00	3.41E+00	0.7	6.37E+00
6	1	136.49	6853	12354	1.27	273.86	4.67E+00	4.51E-01	3.4	4.84E-01
7	1	165.87	55036	12305	1.25	332.70	4.57E+00	3.62E+00	0.6	2.23E+00
8	1	255.12	1846	6784	1.33	511.41	3.66E+00	1.22E-01	8.7	3.17E-01
9	1	279.19	31790	7138	1.35	559.61	3.44E+00	2.09E+00	0.8	4.34E+00
10	1	391.69	40645	5938	1.44	784.86	2.69E+00	2.68E+00	0.6	2.60E+00
11	1	511.09	1190	4702	2.70	1023.92	2.19E+00	7.84E-02	12.2	1.25E+00
12	1	661.65	33655	5477	1.63	1325.33	1.79E+00	2.22E+00	0.7	1.32E+00
13	1	813.86	630	2245	1.88	1630.04	1.52E+00	4.15E-02	14.6	1.42E+00
14	1	898.03	48212	3990	1.81	1798.51	1.40E+00	3.17E+00	0.5	4.09E+00
15	1	1173.22	37966	2291	2.03	2349.31	1.13E+00	2.50E+00	0.6	5.11E+00
16	6	1325.22	1183	1469	3.80	2653.52	1.03E+00	7.79E-02	9.1	6.06E+00
17	6	1332.48	34658	996	2.16	2668.04	1.02E+00	2.28E+00	0.6	
18	1	1836.01	30490	449	2.56	3675.54	8.30E-01	2.01E+00	0.6	9.69E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE07$1
Calib Date: 11-NOV-2011 11:30
Detector :
Geometry : 07B150101811
Fit type : 5th Degree Empirical



DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 6-DEC-2011 15:51:48.27
TBE07 P-10768B HpGe ********** Aquisition Date/Time: 18-OCT-2011 10:16:05.22

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

Sample ID : 07B150101811
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 07B150101811
BKGFILE : NOBKG
Real Time : 0 04:14:04.05
Live time : 0 04:13:08.20

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	20110	19589	1.21	119.65	1.01E+00	1.32E+00	1.6	1.35E+01
2	1	72.87	1103	12312	0.78	146.45	2.14E+00	7.26E-02	16.1	3.99E+00
3	1	75.09	745	9518	0.75	150.91	2.33E+00	4.91E-02	20.0	5.56E+00
4	1	88.05	80367	21925	1.19	176.86	3.30E+00	5.29E+00	0.5	2.16E+00
5	1	122.07	51737	15743	1.23	244.99	4.55E+00	3.41E+00	0.7	6.37E+00
6	1	136.49	6853	12354	1.27	273.86	4.67E+00	4.51E-01	3.4	4.84E-01
7	1	165.87	55036	12305	1.25	332.70	4.57E+00	3.62E+00	0.6	2.23E+00
8	1	255.12	1846	6784	1.33	511.41	3.66E+00	1.22E-01	8.7	3.17E-01
9	1	279.19	31790	7138	1.35	559.61	3.44E+00	2.09E+00	0.8	4.34E+00
10	1	391.69	40645	5938	1.44	784.86	2.69E+00	2.68E+00	0.6	2.60E+00
11	1	511.09	1190	4702	2.70	1023.92	2.19E+00	7.84E-02	12.2	1.25E+00
12	1	661.65	33655	5477	1.63	1325.33	1.79E+00	2.22E+00	0.7	1.32E+00
13	1	813.86	630	2245	1.88	1630.04	1.52E+00	4.15E-02	14.6	1.42E+00
14	1	898.03	48212	3990	1.81	1798.51	1.40E+00	3.17E+00	0.5	4.09E+00
15	1	1173.22	37966	2291	2.03	2349.31	1.13E+00	2.50E+00	0.6	5.11E+00
16	6	1325.22	1183	1469	3.80	2653.52	1.03E+00	7.79E-02	9.1	6.06E+00
17	6	1332.48	34658	996	2.16	2668.04	1.02E+00	2.28E+00	0.6	
18	1	1836.01	30490	449	2.56	3675.54	8.30E-01	2.01E+00	0.6	9.69E+00

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	20110	35.90*	1.011E+00	3.649E+02	3.651E+02	3.13
02-CD109	88.03	80367	3.72*	3.298E+00	4.312E+03	5.077E+03	1.04
03-CO57	122.06	51737	85.51*	4.554E+00	8.747E+01	1.156E+02	1.31
04-CE139	165.85	55036	80.35*	4.572E+00	9.865E+01	1.708E+02	1.17
05-HG203	279.20	31790	81.46*	3.444E+00	7.461E+01	3.774E+02	1.55
06-SN113	391.69	40645	64.90*	2.688E+00	1.534E+02	2.958E+02	1.26
08-CS137	661.65	33655	85.12*	1.794E+00	1.451E+02	1.461E+02	1.45
09-Y88	898.02	48212	93.40*	1.404E+00	2.421E+02	4.918E+02	1.09
10-CO60	1173.22	37966	100.00	1.131E+00	2.211E+02	2.299E+02	1.19
	1332.49	34658	100.00*	1.024E+00	2.228E+02	2.317E+02	1.14
12-Y88	1836.01	30490	99.38*	8.297E-01	2.435E+02	4.945E+02	1.20

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 07B150101811

Acquisition date : 18-OCT-2011 10:16:05

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.649E+02	3.651E+02	0.114E+02	3.13	
02-CD109	462.90D	1.18	4.312E+03	5.077E+03	0.053E+03	1.04	
03-CO57	270.90D	1.32	8.747E+01	1.156E+02	0.015E+02	1.31	
04-CE139	137.66D	1.73	9.865E+01	1.708E+02	0.020E+02	1.17	
05-HG203	46.61D	5.06	7.461E+01	3.774E+02	0.058E+02	1.55	
06-SN113	115.10D	1.93	1.534E+02	2.958E+02	0.037E+02	1.26	
08-CS137	30.17Y	1.01	1.451E+02	1.461E+02	0.021E+02	1.45	
09-Y88	106.65D	2.03	2.421E+02	4.918E+02	0.053E+02	1.09	
10-CO60	5.27Y	1.04	2.228E+02	2.317E+02	0.026E+02	1.14	
12-Y88	106.65D	2.03	2.435E+02	4.945E+02	0.059E+02	1.20	
			---------	---------			
	Total Activity :		5.945E+03	7.766E+03			

Grand Total Activity : 5.945E+03 7.766E+03

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

DRAFT

Unidentified Energy Lines
Sample ID : 07B150101811 Acquisition date : 18-OCT-2011 10:16:05

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.87	1103	12312	0.78	146.45	144	6	7.26E-02	32.2	2.14E+00	
1	75.09	745	9518	0.75	150.91	149	5	4.91E-02	40.1	2.33E+00	
1	136.49	6853	12354	1.27	273.86	269	11	4.51E-01	6.7	4.67E+00	
1	255.12	1846	6784	1.33	511.41	507	10	1.22E-01	17.3	3.66E+00	
1	511.09	1190	4702	2.70	1023.92	1017	13	7.84E-02	24.5	2.19E+00	
1	813.86	630	2245	1.88	1630.04	1625	10	4.15E-02	29.2	1.52E+00	
6	1325.22	1183	1469	3.80	2653.52	2643	34	7.79E-02	18.1	1.03E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

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
01-AM241	432.70Y	1.00	3.649E+02	3.651E+02	0.114E+02	3.13	
02-CD109	462.90D	1.18	4.312E+03	5.077E+03	0.053E+03	1.04	
03-CO57	270.90D	1.32	8.747E+01	1.156E+02	0.015E+02	1.31	
04-CE139	137.66D	1.73	9.865E+01	1.708E+02	0.020E+02	1.17	
05-HG203	46.61D	5.06	7.461E+01	3.774E+02	0.058E+02	1.55	
06-SN113	115.10D	1.93	1.534E+02	2.958E+02	0.037E+02	1.26	
08-CS137	30.17Y	1.01	1.451E+02	1.461E+02	0.021E+02	1.45	
09-Y88	106.65D	2.03	2.421E+02	4.918E+02	0.053E+02	1.09	
10-CO60	5.27Y	1.04	2.220E+02	2.309E+02	0.019E+02	0.82	
12-Y88	106.65D	2.03	2.435E+02	4.945E+02	0.059E+02	1.20	
			---------	---------			
	Total Activity :		5.944E+03	7.765E+03			

Grand Total Activity : 5.944E+03 7.765E+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
01-AM241	3.651E+02	1.144E+01	8.619E+00	0.000E+00	42.358
02-CD109	5.077E+03	5.272E+01	3.405E+01	0.000E+00	149.106
03-CO57	1.156E+02	1.513E+00	1.009E+00	0.000E+00	114.567

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04-CE139	1.708E+02	2.005E+00	1.252E+00	0.000E+00	136.400
05-HG203	3.774E+02	5.844E+00	3.974E+00	0.000E+00	94.971
06-SN113	2.958E+02	3.741E+00	2.171E+00	0.000E+00	136.269
08-CS137	1.461E+02	2.125E+00	1.246E+00	0.000E+00	117.252
09-Y88	4.918E+02	5.338E+00	2.592E+00	0.000E+00	189.755
10-CO60	2.309E+02	1.897E+00	9.936E-01	0.000E+00	232.343
12-Y88	4.945E+02	5.949E+00	1.383E+00	0.000E+00	357.416

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	4.590E+00		1.896E+00	2.825E+00	0.000E+00	1.625

DRAFT

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A,07B150101811     ,12/06/2011 15:51,07/01/2011 12:00,   1.000E+00,150ML POLY BOT
B,07B150101811     ,CALIBRATION         ,11/11/2011 11:30,07B150101811
C,01-AM241,YES,    3.651E+02,   1.144E+01,   8.619E+00,,    42.358
C,02-CD109,YES,    5.077E+03,   5.272E+01,   3.405E+01,,   149.106
C,03-CO57 ,YES,    1.156E+02,   1.513E+00,   1.009E+00,,   114.567
C,04-CE139,YES,    1.708E+02,   2.005E+00,   1.252E+00,,   136.400
C,05-HG203,YES,    3.774E+02,   5.844E+00,   3.974E+00,,    94.971
C,06-SN113,YES,    2.958E+02,   3.741E+00,   2.171E+00,,   136.269
C,08-CS137,YES,    1.461E+02,   2.125E+00,   1.246E+00,,   117.252
C,09-Y88  ,YES,    4.918E+02,   5.338E+00,   2.592E+00,,   189.755
C,10-CO60 ,YES,    2.309E+02,   1.897E+00,   9.936E-01,,   232.343
C,12-Y88  ,YES,    4.945E+02,   5.949E+00,   1.383E+00,,   357.416
C,07-SR85 ,NO ,    4.590E+00,   1.896E+00,   2.825E+00,,     1.625
```

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:42:17.34
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 27-FEB-2015 10:12:22.89

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 08B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

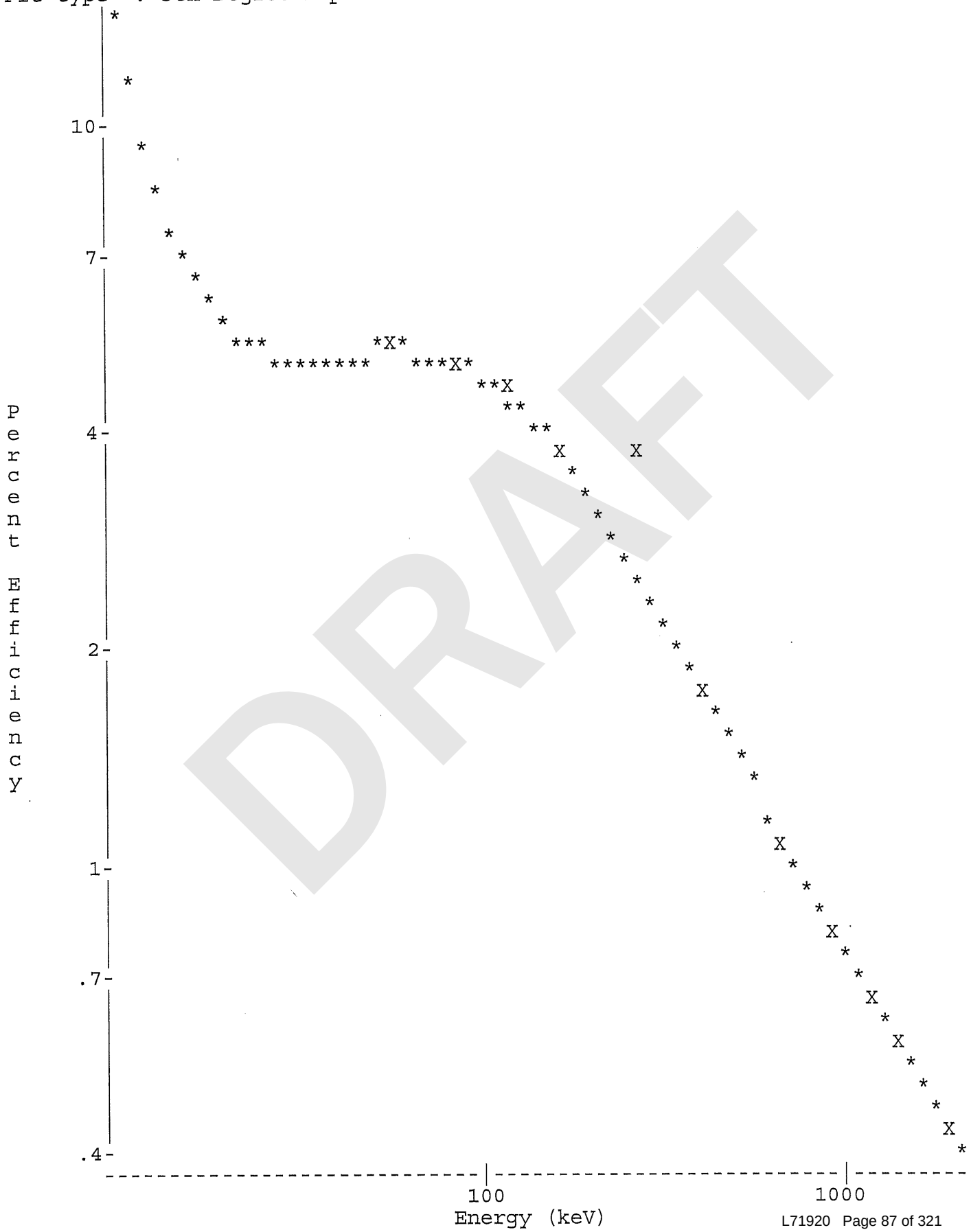
Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 08B150022715
BKGFILE : 08BG013015MT
Real Time : 0 06:44:32.10
Live time : 0 06:41:34.50

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	14.72	17538	63423	1.13	32.92	7.56E+00	7.28E-01	2.5	2.84E+02
2	3	17.58	13828	36461	1.29	38.64	6.13E+00	5.74E-01	2.2	5.13E+03
3	3	21.90	1741709	34446	1.17	47.28	5.28E+00	7.23E+01	0.1	
4	3	24.79	518495	29911	1.33	53.07	5.05E+00	2.15E+01	0.2	
5	1	32.75	37331	25270	2.33	68.99	4.87E+00	1.55E+00	1.0	2.88E+02
6	1	37.25	8012	17030	2.62	77.97	4.88E+00	3.33E-01	3.0	4.50E+01
7	1	43.31	415	15105	0.72	90.09	4.92E+00	1.72E-02	44.3	5.73E+00
8	4	49.48	16504	31173	1.55	102.43	4.95E+00	6.85E-01	2.1	5.02E+02
9	4	51.35	13166	30326	1.55	106.18	4.96E+00	5.46E-01	2.7	
10	4	53.16	12263	29705	1.56	109.80	4.97E+00	5.09E-01	2.8	
11	4	54.97	13665	28891	1.57	113.40	4.97E+00	5.67E-01	2.6	
12	4	57.15	16793	27905	1.57	117.77	4.97E+00	6.97E-01	2.4	
13	4	59.45	310326	17833	1.18	122.37	4.97E+00	1.29E+01	0.2	
14	10	67.51	9118	42128	2.83	138.47	4.95E+00	3.78E-01	5.6	8.23E+01
15	10	72.57	4417	19807	1.15	148.60	4.92E+00	1.83E-01	5.7	
16	10	74.94	8183	39210	2.09	153.34	4.90E+00	3.40E-01	5.0	
17	10	78.11	1121	22581	1.21	159.67	4.87E+00	4.65E-02	21.6	
18	6	85.59	5103	36824	1.99	174.63	4.79E+00	2.12E-01	11.4	3.06E+01
19	6	88.00	228307	14956	1.07	179.46	4.76E+00	9.48E+00	0.2	
20	1	122.05	74607	16842	1.10	247.53	4.27E+00	3.10E+00	0.5	4.02E+00
21	1	136.46	8978	8717	1.15	276.35	4.04E+00	3.73E-01	2.2	3.83E-01
22	1	165.86	29409	10373	1.13	335.13	3.61E+00	1.22E+00	0.9	2.42E+00
23	1	199.24	707	7235	1.16	401.88	3.17E+00	2.94E-02	21.2	4.95E-01
24	1	255.23	805	6977	1.48	513.82	2.60E+00	3.34E-02	19.1	4.62E-01
25	1	279.37	1022	7133	1.69	562.08	2.41E+00	4.24E-02	15.8	1.37E+00
26	1	391.70	13519	6648	1.28	786.68	1.76E+00	5.61E-01	1.5	8.74E-01
27	1	510.97	892	4982	2.35	1025.14	1.36E+00	3.70E-02	15.7	1.97E+00
28	1	661.63	65623	5373	1.49	1326.34	1.07E+00	2.72E+00	0.5	3.63E+00
29	1	814.29	433	3012	1.79	1631.51	8.81E-01	1.80E-02	23.4	5.22E-01
30	1	898.02	12237	5133	1.65	1798.90	8.07E-01	5.08E-01	1.5	6.29E-01
31	1	1173.18	64113	3149	1.85	2348.94	6.40E-01	2.66E+00	0.4	4.46E+00
32	1	1332.45	57699	1001	1.96	2667.29	5.75E-01	2.39E+00	0.4	7.74E+00
33	1	1461.25	156	416	1.62	2924.74	5.32E-01	6.46E-03	26.5	7.37E-01
34	1	1836.03	7064	267	2.27	3673.78	4.38E-01	2.93E-01	1.3	2.37E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE08$1
Calib Date: 21-JUL-2015 11:42
Detector :
Fit type : 5th Degree Empirical

Geometry : 08B150022715



DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:43:51.81
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 27-FEB-2015 10:12:22.89

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 08B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 08B150022715
BKGFILE : 08BG013015MT
Real Time : 0 06:44:32.10
Live time : 0 06:41:34.50

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	14.72	17538	63423	1.13	32.92	7.56E+00	7.28E-01	2.5	2.84E+02
2	3	17.58*	12770	36461	1.29	38.64	6.13E+00	5.30E-01	2.4	5.13E+03
3	3	21.90	1741709	34446	1.17	47.28	5.28E+00	7.23E+01	0.1	
4	3	24.79*	518387	29911	1.33	53.07	5.05E+00	2.15E+01	0.2	
5	1	32.75	37331	25270	2.33	68.99	4.87E+00	1.55E+00	1.0	2.88E+02
6	1	37.25	8012	17030	2.62	77.97	4.88E+00	3.33E-01	3.0	4.50E+01
7	1	43.31	415	15105	0.72	90.09	4.92E+00	1.72E-02	44.3	5.73E+00
8	4	49.48	16504	31173	1.55	102.43	4.95E+00	6.85E-01	2.1	5.02E+02
9	4	51.35	13166	30326	1.55	106.18	4.96E+00	5.46E-01	2.7	
10	4	53.16	12263	29705	1.56	109.80	4.97E+00	5.09E-01	2.8	
11	4	54.97	13665	28891	1.57	113.40	4.97E+00	5.67E-01	2.6	
12	4	57.15	16793	27905	1.57	117.77	4.97E+00	6.97E-01	2.4	
13	4	59.45	310326	17833	1.18	122.37	4.97E+00	1.29E+01	0.2	
14	10	67.51*	9063	42128	2.83	138.47	4.95E+00	3.76E-01	5.6	8.23E+01
15	10	72.57*	4040	19807	1.15	148.60	4.92E+00	1.68E-01	6.2	
16	10	74.94*	7528	39210	2.09	153.34	4.90E+00	3.12E-01	5.5	
17	10	78.11*	1010	22581	1.21	159.67	4.87E+00	4.19E-02	24.0	
18	6	85.59*	4826	36824	1.99	174.63	4.79E+00	2.00E-01	12.0	3.06E+01
19	6	88.00*	228205	14956	1.07	179.46	4.76E+00	9.47E+00	0.2	
20	1	122.05	74607	16842	1.10	247.53	4.27E+00	3.10E+00	0.5	4.02E+00
21	1	136.46	8978	8717	1.15	276.35	4.04E+00	3.73E-01	2.2	3.83E-01
22	1	165.86	29409	10373	1.13	335.13	3.61E+00	1.22E+00	0.9	2.42E+00
23	1	199.24*	670	7235	1.16	401.88	3.17E+00	2.78E-02	22.4	4.95E-01
24	1	255.23	805	6977	1.48	513.82	2.60E+00	3.34E-02	19.1	4.62E-01
25	1	279.37	1022	7133	1.69	562.08	2.41E+00	4.24E-02	15.8	1.37E+00
26	1	391.70	13519	6648	1.28	786.68	1.76E+00	5.61E-01	1.5	8.74E-01
27	1	510.97*	342	4982	2.35	1025.14	1.36E+00	1.42E-02	41.2	1.97E+00
28	1	661.63	65623	5373	1.49	1326.34	1.07E+00	2.72E+00	0.5	3.63E+00
29	1	814.29	433	3012	1.79	1631.51	8.81E-01	1.80E-02	23.4	5.22E-01
30	1	898.02	12237	5133	1.65	1798.90	8.07E-01	5.08E-01	1.5	6.29E-01
31	1	1173.18	64113	3149	1.85	2348.94	6.40E-01	2.66E+00	0.4	4.46E+00
32	1	1332.45	57699	1001	1.96	2667.29	5.75E-01	2.39E+00	0.4	7.74E+00
33	1	1461.25*	4	416	1.62	2924.74	5.32E-01	1.81E-04	956.3	7.37E-01
34	1	1836.03	7064	267	2.27	3673.78	4.38E-01	2.93E-01	1.3	2.37E+00

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

Nuclide Line Activity Report

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Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	310326	35.90*	4.972E+00	7.215E+02	7.228E+02	0.39
02-CD109	88.03	228205	3.72*	4.761E+00	5.348E+03	1.006E+04	0.45
03-CO57	122.06	74607	85.51*	4.265E+00	8.490E+01	2.500E+02	1.04
04-CE139	165.85	29409	80.35*	3.606E+00	4.212E+01	3.528E+02	1.81
05-HG203	279.20	1022	81.46*	2.407E+00	2.164E+00	1.151E+03	31.55
06-SN113	391.69	13519	64.90*	1.762E+00	4.908E+01	6.233E+02	2.90
08-CS137	661.65	65623	85.12*	1.067E+00	2.998E+02	3.078E+02	0.92
09-Y88	898.02	12237	93.40*	8.074E-01	6.735E+01	1.046E+03	2.96
10-CO60	1173.22	64113	100.00	6.403E-01	4.156E+02	4.838E+02	0.90
	1332.49	57699	100.00*	5.750E-01	4.165E+02	4.849E+02	0.87
12-Y88	1836.01	7064	99.38*	4.378E-01	6.738E+01	1.047E+03	2.64

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 08B150022715 Acquisition date : 27-FEB-2015 10:12:22

Total number of lines in spectrum	34	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	11	32.35%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	7.215E+02	7.228E+02	0.028E+02	0.39	
02-CD109	462.90D	1.88	5.348E+03	1.006E+04	0.005E+04	0.45	
03-CO57	270.90D	2.94	8.490E+01	2.500E+02	0.026E+02	1.04	
04-CE139	137.66D	8.37	4.212E+01	3.528E+02	0.064E+02	1.81	
05-HG203	46.61D	532.	2.164E+00	1.151E+03	0.363E+03	31.55	
06-SN113	115.10D	12.7	4.908E+01	6.233E+02	0.181E+02	2.90	
08-CS137	30.17Y	1.03	2.998E+02	3.078E+02	0.028E+02	0.92	
09-Y88	106.65D	15.5	6.735E+01	1.046E+03	0.031E+03	2.96	
10-CO60	5.27Y	1.16	4.165E+02	4.849E+02	0.042E+02	0.87	
12-Y88	106.65D	15.5	6.738E+01	1.047E+03	0.028E+03	2.64	
			---------	---------			
	Total Activity :		7.099E+03	1.605E+04			
	Grand Total Activity :		7.099E+03	1.605E+04			

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

DRAFT

Unidentified Energy Lines
Sample ID : 08B150022715
Acquisition date : 27-FEB-2015 10:12:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	14.72	17538	63423	1.13	32.92	30	7	7.28E-01	5.0	7.56E+00	
3	17.58	12770	36461	1.29	38.64	36	23	5.30E-01	4.8	6.13E+00	
3	21.90	1741709	34446	1.17	47.28	36	23	7.23E+01	0.2	5.28E+00	
3	24.79	518387	29911	1.33	53.07	36	23	2.15E+01	0.3	5.05E+00	
1	32.75	37331	25270	2.33	68.99	62	12	1.55E+00	2.0	4.87E+00	
1	37.25	8012	17030	2.62	77.97	74	8	3.33E-01	6.0	4.88E+00	
1	43.31	415	15105	0.72	90.09	88	5	1.72E-02	88.7	4.92E+00	
4	49.48	16504	31173	1.55	102.43	96	31	6.85E-01	4.2	4.95E+00	
4	51.35	13166	30326	1.55	106.18	96	31	5.46E-01	5.4	4.96E+00	
4	53.16	12263	29705	1.56	109.80	96	31	5.09E-01	5.7	4.97E+00	
4	54.97	13665	28891	1.57	113.40	96	31	5.67E-01	5.1	4.97E+00	
4	57.15	16793	27905	1.57	117.77	96	31	6.97E-01	4.8	4.97E+00	
10	67.51	9063	42128	2.83	138.47	130	35	3.76E-01	11.3	4.95E+00	
10	72.57	4040	19807	1.15	148.60	130	35	1.68E-01	12.4	4.92E+00	
10	74.94	7528	39210	2.09	153.34	130	35	3.12E-01	11.0	4.90E+00	
10	78.11	1010	22581	1.21	159.67	130	35	4.19E-02	48.0	4.87E+00	
6	85.59	4826	36824	1.99	174.63	167	19	2.00E-01	24.1	4.79E+00	
1	136.46	8978	8717	1.15	276.35	272	9	3.73E-01	4.3	4.04E+00	
1	199.24	670	7235	1.16	401.88	398	8	2.78E-02	44.9	3.17E+00	
1	255.23	805	6977	1.48	513.82	510	9	3.34E-02	38.1	2.60E+00	
1	510.97	342	4982	2.35	1025.14	1020	11	1.42E-02	82.3	1.36E+00	
1	814.29	433	3012	1.79	1631.51	1627	9	1.80E-02	46.8	8.81E-01	
1	1461.25	4	416	1.62	2924.74	2920	11	1.81E-04	****	5.32E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	34	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	11	32.35%

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
01-AM241	432.70Y	1.00	7.215E+02	7.228E+02	0.028E+02	0.39	
02-CD109	462.90D	1.88	5.348E+03	1.006E+04	0.005E+04	0.45	
03-CO57	270.90D	2.94	8.490E+01	2.500E+02	0.026E+02	1.04	
04-CE139	137.66D	8.37	4.212E+01	3.528E+02	0.064E+02	1.81	
05-HG203	46.61D	532.	2.164E+00	1.151E+03	0.363E+03	31.55	
06-SN113	115.10D	12.7	4.908E+01	6.233E+02	0.181E+02	2.90	
08-CS137	30.17Y	1.03	2.998E+02	3.078E+02	0.028E+02	0.92	
09-Y88	106.65D	15.5	6.735E+01	1.046E+03	0.031E+03	2.96	
10-CO60	5.27Y	1.16	4.161E+02	4.843E+02	0.030E+02	0.63	
12-Y88	106.65D	15.5	6.738E+01	1.047E+03	0.028E+03	2.64	
			---------	---------			
	Total Activity :		7.099E+03	1.605E+04			

Grand Total Activity : 7.099E+03 1.605E+04

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

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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
01-AM241	7.228E+02	2.787E+00	1.449E+00	0.000E+00	498.806
02-CD109	1.006E+04	4.557E+01	2.567E+01	0.000E+00	391.942
03-CO57	2.500E+02	2.603E+00	1.455E+00	0.000E+00	171.806
04-CE139	3.528E+02	6.402E+00	4.520E+00	0.000E+00	78.046
05-HG203	1.151E+03	3.631E+02	3.998E+02	0.000E+00	2.879
06-SN113	6.233E+02	1.809E+01	1.551E+01	0.000E+00	40.196
08-CS137	3.078E+02	2.817E+00	1.315E+00	0.000E+00	234.021
09-Y88	1.046E+03	3.096E+01	2.685E+01	0.000E+00	38.962
10-CO60	4.843E+02	3.029E+00	1.056E+00	0.000E+00	458.826
12-Y88	1.047E+03	2.762E+01	8.642E+00	0.000E+00	121.140

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	6.034E+01		5.744E+01	8.551E+01	0.000E+00	0.706

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A,08B150022715    ,07/21/2015 11:43,01/01/2014 12:00,   1.000E+00,B150 MIXED GAM
B,08B150022715    ,CALIBRATION         ,07/21/2015 11:42,08B150022715
C,01-AM241,YES,   7.228E+02,   2.787E+00,   1.449E+00,,  498.806
C,02-CD109,YES,   1.006E+04,   4.557E+01,   2.567E+01,,  391.942
C,03-CO57 ,YES,   2.500E+02,   2.603E+00,   1.455E+00,,  171.806
C,04-CE139,YES,   3.528E+02,   6.402E+00,   4.520E+00,,   78.046
C,05-HG203,YES,   1.151E+03,   3.631E+02,   3.998E+02,,    2.879
C,06-SN113,YES,   6.233E+02,   1.809E+01,   1.551E+01,,   40.196
C,08-CS137,YES,   3.078E+02,   2.817E+00,   1.315E+00,,  234.021
C,09-Y88  ,YES,   1.046E+03,   3.096E+01,   2.685E+01,,   38.962
C,10-CO60 ,YES,   4.843E+02,   3.029E+00,   1.056E+00,,  458.826
C,12-Y88  ,YES,   1.047E+03,   2.762E+01,   8.642E+00,,  121.140
C,07-SR85 ,NO ,   6.034E+01,   5.744E+01,   8.551E+01,,    0.706
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DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 26-OCT-2011 15:25:15.26
TBE11 P-20610B HpGe ********** Aquisition Date/Time: 14-OCT-2011 08:57:12.91

LIMS No., Customer Name, Client ID: 150ML POLY MIXED GAMMA CALIBRATION

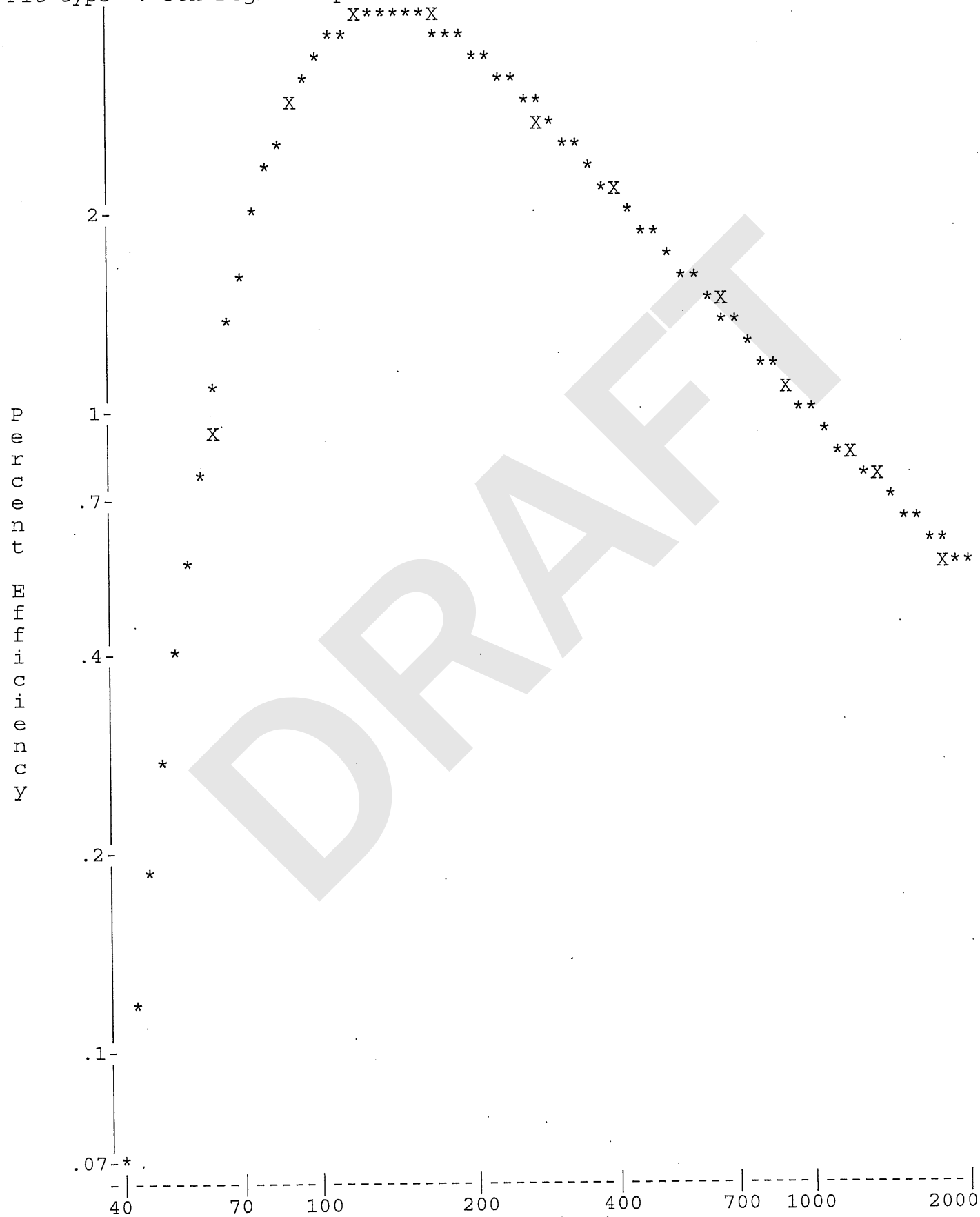
Sample ID : 11B150101411
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 11B150101411
BKGFILE : NOBKG
Real Time : 0 05:55:06.88
Live time : 0 05:51:28.26

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	59.44	24881	29498	1.32	118.93	8.96E-01	1.18E+00	1.6	
2	0	72.78	748	19670	0.97	145.60	1.84E+00	3.55E-02	31.3	
3	0	88.04	93899	37852	1.30	176.13	2.79E+00	4.45E+00	0.5	
4	0	122.06	60058	28219	1.31	244.15	3.80E+00	2.85E+00	0.7	
5	0	136.47	7456	15683	1.28	272.97	3.88E+00	3.54E-01	3.4	
6	0	165.89	65206	24061	1.37	331.80	3.77E+00	3.09E+00	0.7	
7	0	255.22	1684	8501	1.27	510.45	2.93E+00	7.99E-02	10.2	
8	0	279.25	36984	13991	1.41	558.50	2.74E+00	1.75E+00	0.9	
9	0	391.72	44272	11915	1.47	783.41	2.08E+00	2.10E+00	0.7	
10	0	511.10	969	5583	2.18	1022.12	1.66E+00	4.59E-02	15.8	
11	0	661.66	35623	10267	1.66	1323.16	1.33E+00	1.69E+00	0.9	
12	0	813.98	791	3480	1.78	1627.72	1.12E+00	3.75E-02	15.4	
13	0	898.00	49930	8605	1.82	1795.72	1.03E+00	2.37E+00	0.6	
14	0	1173.19	38263	5800	1.94	2345.90	8.20E-01	1.81E+00	0.7	
15	10	1326.52	2241	3138	5.32	2652.44	7.40E-01	1.06E-01	10.2	1.75E+01
16	10	1332.46	36177	1392	2.24	2664.31	7.37E-01	1.72E+00	0.6	
17	10	1338.31	332	1222	2.06	2676.00	7.35E-01	1.58E-02	23.8	
18	0	1836.03	30793	2153	2.35	3670.94	5.78E-01	1.46E+00	0.7	

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Spectrum : MCA0:[NDSCOUNT]TBE11$1
Calib Date: 26-OCT-2011 15:25
Detector :
Geometry : 11B150101411
Fit type : 5th Degree Empirical



DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 2-NOV-2011 17:00:50.91
TBE11 P-20610B HpGe ********** Aquisition Date/Time: 14-OCT-2011 08:57:12.91

LIMS No., Customer Name, Client ID: 150ML POLY MIXED GAMMA CALIBRATION

Sample ID : 11B150101411
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 80 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 11B150101411
BKGFILE : NOBKG
Real Time : 0 05:55:06.88
Live time : 0 05:51:28.26

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	59.44	24881	29498	1.32	118.93	8.96E-01	1.18E+00	1.6	
2	0	72.78	748	19670	0.97	145.60	1.84E+00	3.55E-02	31.3	
3	0	88.04	93899	37852	1.30	176.13	2.79E+00	4.45E+00	0.5	
4	0	122.06	60058	28219	1.31	244.15	3.80E+00	2.85E+00	0.7	
5	0	136.47	7456	15683	1.28	272.97	3.88E+00	3.54E-01	3.4	
6	0	165.89	65206	24061	1.37	331.80	3.77E+00	3.09E+00	0.7	
7	0	255.22	1684	8501	1.27	510.45	2.93E+00	7.99E-02	10.2	
8	0	279.25	36984	13991	1.41	558.50	2.74E+00	1.75E+00	0.9	
9	0	391.72	44272	11915	1.47	783.41	2.08E+00	2.10E+00	0.7	
10	0	511.10	969	5583	2.18	1022.12	1.66E+00	4.59E-02	15.8	
11	0	661.66	35623	10267	1.66	1323.16	1.33E+00	1.69E+00	0.9	
12	0	813.98	791	3480	1.78	1627.72	1.12E+00	3.75E-02	15.4	
13	0	898.00	49930	8605	1.82	1795.72	1.03E+00	2.37E+00	0.6	
14	0	1173.19	38263	5800	1.94	2345.90	8.20E-01	1.81E+00	0.7	
15	10	1326.52	2241	3138	5.32	2652.44	7.40E-01	1.06E-01	10.2	1.75E+01
16	10	1332.46	36177	1392	2.24	2664.31	7.37E-01	1.72E+00	0.6	
17	10	1338.31	332	1222	2.06	2676.00	7.35E-01	1.58E-02	23.8	
18	0	1836.03	30793	2153	2.35	3670.94	5.78E-01	1.46E+00	0.7	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	24881	35.90*	8.963E-01	3.667E+02	3.669E+02	3.12
02-CD109	88.03	93899	3.72*	2.791E+00	4.288E+03	5.018E+03	1.08
03-CO57	122.06	60058	85.51*	3.799E+00	8.768E+01	1.147E+02	1.44
04-CE139	165.85	65206	80.35*	3.767E+00	1.022E+02	1.733E+02	1.32
05-HG203	279.20	36984	81.46*	2.739E+00	7.859E+01	3.745E+02	1.74
06-SN113	391.69	44272	64.90*	2.076E+00	1.558E+02	2.933E+02	1.46
08-CS137	661.65	35623	85.12*	1.332E+00	1.490E+02	1.499E+02	1.70
09-Y88	898.02	49930	93.40*	1.028E+00	2.466E+02	4.880E+02	1.24
10-CO60	1173.22	38263	100.00	8.195E-01	2.214E+02	2.299E+02	1.44
	1332.49	36177	100.00*	7.374E-01	2.326E+02	2.416E+02	1.13
12-Y88	1836.01	30793	99.38*	5.781E-01	2.541E+02	5.029E+02	1.39

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 11B150101411

Acquisition date : 14-OCT-2011 08:57:12

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.667E+02	3.669E+02	0.114E+02	3.12	
02-CD109	462.90D	1.17	4.288E+03	5.018E+03	0.054E+03	1.08	
03-CO57	270.90D	1.31	8.768E+01	1.147E+02	0.017E+02	1.44	
04-CE139	137.66D	1.70	1.022E+02	1.733E+02	0.023E+02	1.32	
05-HG203	46.61D	4.77	7.859E+01	3.745E+02	0.065E+02	1.74	
06-SN113	115.10D	1.88	1.558E+02	2.933E+02	0.043E+02	1.46	
08-CS137	30.17Y	1.01	1.490E+02	1.499E+02	0.026E+02	1.70	
09-Y88	106.65D	1.98	2.466E+02	4.880E+02	0.060E+02	1.24	
10-CO60	5.27Y	1.04	2.326E+02	2.416E+02	0.027E+02	1.13	
12-Y88	106.65D	1.98	2.541E+02	5.029E+02	0.070E+02	1.39	
			---------	---------			
Total Activity :			5.961E+03	7.723E+03			
Grand Total Activity :			5.961E+03	7.723E+03			

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

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Unidentified Energy Lines
Sample ID : 11B150101411 Acquisition date : 14-OCT-2011 08:57:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	72.78	748	19670	0.97	145.60	143	7	3.55E-02	62.6	1.84E+00	
0	136.47	7456	15683	1.28	272.97	268	10	3.54E-01	6.7	3.88E+00	
0	255.22	1684	8501	1.27	510.45	506	9	7.99E-02	20.4	2.93E+00	
0	511.10	969	5583	2.18	1022.12	1017	12	4.59E-02	31.5	1.66E+00	
0	813.98	791	3480	1.78	1627.72	1622	12	3.75E-02	30.7	1.12E+00	
10	1326.52	2241	3138	5.32	2652.44	2638	47	1.06E-01	20.5	7.40E-01	
10	1338.31	332	1222	2.06	2676.00	2638	47	1.58E-02	47.5	7.35E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

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
01-AM241	432.70Y	1.00	3.667E+02	3.669E+02	0.114E+02	3.12	
02-CD109	462.90D	1.17	4.288E+03	5.018E+03	0.054E+03	1.08	
03-CO57	270.90D	1.31	8.768E+01	1.147E+02	0.017E+02	1.44	
04-CE139	137.66D	1.70	1.022E+02	1.733E+02	0.023E+02	1.32	
05-HG203	46.61D	4.77	7.859E+01	3.745E+02	0.065E+02	1.74	
06-SN113	115.10D	1.88	1.558E+02	2.933E+02	0.043E+02	1.46	
08-CS137	30.17Y	1.01	1.490E+02	1.499E+02	0.026E+02	1.70	
09-Y88	106.65D	1.98	2.466E+02	4.880E+02	0.060E+02	1.24	
10-CO60	5.27Y	1.04	2.326E+02	2.416E+02	0.027E+02	1.13	
12-Y88	106.65D	1.98	2.541E+02	5.029E+02	0.070E+02	1.39	
			---------	---------			
Total Activity :			5.961E+03	7.723E+03			
Grand Total Activity :			5.961E+03	7.723E+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
01-AM241	3.669E+02	1.145E+01	5.054E+00	0.000E+00	72.584
02-CD109	5.018E+03	5.434E+01	2.136E+01	0.000E+00	234.933
03-CO57	1.147E+02	1.653E+00	6.386E-01	0.000E+00	179.616

04-CE139	1.733E+02	2.294E+00	7.899E-01	0.000E+00	219.446
05-HG203	3.745E+02	6.517E+00	2.475E+00	0.000E+00	151.329
06-SN113	2.933E+02	4.268E+00	1.463E+00	0.000E+00	200.382
08-CS137	1.499E+02	2.555E+00	8.601E-01	0.000E+00	174.336
09-Y88	4.880E+02	6.032E+00	1.947E+00	0.000E+00	250.633
10-CO60	2.416E+02	2.723E+00	6.764E-01	0.000E+00	357.188
12-Y88	5.029E+02	6.995E+00	1.440E+00	0.000E+00	349.218

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	2.206E-01		9.972E-01	1.608E+00	0.000E+00	0.137

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A,11B150101411    ,11/02/2011 17:00,07/01/2011 12:00,   1.000E+00,150ML POLY MIX
B,11B150101411    ,CALIBRATION         ,10/26/2011 15:25,11B150101411
C,01-AM241,YES,   3.669E+02,   1.145E+01,   5.054E+00,,   72.584
C,02-CD109,YES,   5.018E+03,   5.434E+01,   2.136E+01,,  234.933
C,03-CO57 ,YES,   1.147E+02,   1.653E+00,   6.386E-01,,  179.616
C,04-CE139,YES,   1.733E+02,   2.294E+00,   7.899E-01,,  219.446
C,05-HG203,YES,   3.745E+02,   6.517E+00,   2.475E+00,,  151.329
C,06-SN113,YES,   2.933E+02,   4.268E+00,   1.463E+00,,  200.382
C,08-CS137,YES,   1.499E+02,   2.555E+00,   8.601E-01,,  174.336
C,09-Y88  ,YES,   4.880E+02,   6.032E+00,   1.947E+00,,  250.633
C,10-CO60 ,YES,   2.416E+02,   2.723E+00,   6.764E-01,,  357.188
C,12-Y88  ,YES,   5.029E+02,   6.995E+00,   1.440E+00,,  349.218
C,07-SR85 ,NO ,   2.206E-01,   9.972E-01,   1.608E+00,,    0.137
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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 3-FEB-2012 12:29:58.29
TBE14 P-10933A HpGe ********** Aquisition Date/Time: 20-JAN-2012 11:01:41.32

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA
Sample ID : 14B150012012 Smple Date: 1-JUL-2011 12:00:00.00
Sample Type : CAL Geometry : 14B150012012
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 10:01:42.46
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 10:00:00.00
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.55	13516	20328	1.13	115.98	2.89E-01	3.75E-01	2.2	5.06E+00
2	1	66.67	574	13234	1.00	130.22	5.79E-01	1.59E-02	33.4	2.60E+00
3	3	72.82	909	10935	0.85	142.53	8.96E-01	2.53E-02	17.6	5.97E-01
4	3	75.05	1489	13314	0.98	147.00	1.02E+00	4.14E-02	12.5	
5	1	88.03	88235	24136	1.09	172.97	1.75E+00	2.45E+00	0.5	5.29E+00
6	1	122.05	63148	18884	1.13	241.04	3.00E+00	1.75E+00	0.6	4.03E+00
7	1	136.46	8288	14154	1.14	269.88	3.18E+00	2.30E-01	2.9	2.13E+00
8	1	165.84	56885	18530	1.15	328.69	3.21E+00	1.58E+00	0.7	2.10E+00
9	1	255.11	1570	9137	1.19	507.33	2.59E+00	4.36E-02	11.2	1.46E+00
10	1	279.19	13224	10447	1.27	555.53	2.43E+00	3.67E-01	1.8	1.22E+00
11	1	391.70	38015	8623	1.33	780.70	1.88E+00	1.06E+00	0.7	7.29E-01
12	1	510.82	1877	7615	2.65	1019.12	1.53E+00	5.21E-02	10.1	8.37E-01
13	1	609.14	455	3380	1.51	1215.92	1.34E+00	1.26E-02	21.7	2.85E+00
14	1	661.64	56020	7176	1.54	1321.00	1.25E+00	1.56E+00	0.5	3.82E+00
15	1	813.81	702	4110	1.97	1625.62	1.07E+00	1.95E-02	18.1	2.28E+00
16	1	898.03	42991	7192	1.75	1794.21	9.84E-01	1.19E+00	0.7	7.16E+00
17	1	1173.22	61297	3295	1.96	2345.19	7.91E-01	1.70E+00	0.5	1.55E+01
18	1	1324.67	879	1732	3.10	2648.44	7.19E-01	2.44E-02	10.6	1.77E+00
19	1	1332.48	55410	2162	2.06	2664.08	7.15E-01	1.54E+00	0.5	9.45E+00
20	1	1460.69	352	1118	2.52	2920.80	6.68E-01	9.78E-03	20.2	1.14E+00
21	1	1836.00	27307	679	2.47	3672.46	5.79E-01	7.59E-01	0.6	1.59E+01

Nuclide Line Activity Report
Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	13516	35.90*	2.887E-01	3.622E+02	3.626E+02	4.44
02-CD109	88.03	88235	3.72*	1.752E+00	3.760E+03	5.097E+03	0.94
03-CO57	122.06	63148	85.51*	2.995E+00	6.849E+01	1.152E+02	1.16
04-CE139	165.85	56885	80.35*	3.214E+00	6.118E+01	1.702E+02	1.32
05-HG203	279.20	13224	81.46*	2.427E+00	1.858E+01	3.812E+02	3.56
06-SN113	391.69	38015	64.90*	1.877E+00	8.667E+01	2.946E+02	1.42
08-CS137	661.65	56020	85.12*	1.255E+00	1.457E+02	1.476E+02	1.06
09-Y88	898.02	42991	93.40*	9.840E-01	1.299E+02	4.866E+02	1.31
10-CO60	1173.22	61297	100.00	7.914E-01	2.152E+02	2.315E+02	0.92
	1332.49	55410	100.00*	7.153E-01	2.152E+02	2.315E+02	0.93
12-Y88	1836.01	27307	99.38*	5.787E-01	1.319E+02	4.940E+02	1.30

Flag: "*" = Keyline

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Summary of Nuclide Activity

Sample ID : 14B150012012 Acquisition date : 20-JAN-2012 11:01:41

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.622E+02	3.626E+02	0.161E+02	4.44	
02-CD109	462.90D	1.36	3.760E+03	5.097E+03	0.048E+03	0.94	
03-CO57	270.90D	1.68	6.849E+01	1.152E+02	0.013E+02	1.16	
04-CE139	137.66D	2.78	6.118E+01	1.702E+02	0.022E+02	1.32	
05-HG203	46.61D	20.5	1.858E+01	3.812E+02	0.136E+02	3.56	
06-SN113	115.10D	3.40	8.667E+01	2.946E+02	0.042E+02	1.42	
08-CS137	30.17Y	1.01	1.457E+02	1.476E+02	0.016E+02	1.06	
09-Y88	106.65D	3.75	1.299E+02	4.866E+02	0.064E+02	1.31	
10-CO60	5.27Y	1.08	2.152E+02	2.315E+02	0.022E+02	0.93	
12-Y88	106.65D	3.75	1.319E+02	4.940E+02	0.064E+02	1.30	
			---------	---------			
Total Activity :			4.980E+03	7.781E+03			
Grand Total Activity :			4.980E+03	7.781E+03			

Flags: "K" = Keyline not found "M" = Manually accepted

"E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines

Sample ID : 14B150012012 Acquisition date : 20-JAN-2012 11:01:41

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	66.67	574	13234	1.00	130.22	127	7	1.59E-02	66.8	5.79E-01	
3	72.82	909	10935	0.85	142.53	140	11	2.53E-02	35.2	8.96E-01	
3	75.05	1489	13314	0.98	147.00	140	11	4.14E-02	25.0	1.02E+00	
1	136.46	8288	14154	1.14	269.88	265	10	2.30E-01	5.8	3.18E+00	
1	255.11	1570	9137	1.19	507.33	503	9	4.36E-02	22.5	2.59E+00	
1	510.82	1877	7615	2.65	1019.12	1012	14	5.21E-02	20.2	1.53E+00	
1	609.14	455	3380	1.51	1215.92	1213	7	1.26E-02	43.3	1.34E+00	
1	813.81	702	4110	1.97	1625.62	1621	11	1.95E-02	36.1	1.07E+00	
1	1324.67	879	1732	3.10	2648.44	2642	14	2.44E-02	21.1	7.19E-01	
1	1460.69	352	1118	2.52	2920.80	2915	13	9.78E-03	40.4	6.68E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

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
01-AM241	432.70Y	1.00	3.622E+02	3.626E+02	0.161E+02	4.44	
02-CD109	462.90D	1.36	3.760E+03	5.097E+03	0.048E+03	0.94	
03-CO57	270.90D	1.68	6.849E+01	1.152E+02	0.013E+02	1.16	
04-CE139	137.66D	2.78	6.118E+01	1.702E+02	0.022E+02	1.32	

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05-HG203	46.61D	20.5	1.858E+01	3.812E+02	0.136E+02	3.56
06-SN113	115.10D	3.40	8.667E+01	2.946E+02	0.042E+02	1.42
08-CS137	30.17Y	1.01	1.457E+02	1.476E+02	0.016E+02	1.06
09-Y88	106.65D	3.75	1.299E+02	4.866E+02	0.064E+02	1.31
10-CO60	5.27Y	1.08	2.152E+02	2.315E+02	0.015E+02	0.65
12-Y88	106.65D	3.75	1.319E+02	4.940E+02	0.064E+02	1.30
			---------	---------		
	Total Activity :		4.980E+03	7.781E+03		
	Grand Total Activity :		4.980E+03	7.781E+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
01-AM241	3.626E+02	1.611E+01	1.317E+01	0.000E+00	27.530
02-CD109	5.097E+03	4.816E+01	3.291E+01	0.000E+00	154.865
03-CO57	1.152E+02	1.337E+00	8.999E-01	0.000E+00	127.987
04-CE139	1.702E+02	2.250E+00	1.345E+00	0.000E+00	126.518
05-HG203	3.812E+02	1.356E+01	1.128E+01	0.000E+00	33.804
06-SN113	2.946E+02	4.179E+00	2.840E+00	0.000E+00	103.728
08-CS137	1.476E+02	1.569E+00	8.722E-01	0.000E+00	169.235
09-Y88	4.866E+02	6.367E+00	3.637E+00	0.000E+00	133.799
10-CO60	2.315E+02	1.514E+00	6.928E-01	0.000E+00	334.122
12-Y88	4.940E+02	6.408E+00	1.671E+00	0.000E+00	295.624

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

Nuclide	Activity (BQ/TOTAL)	Key-Line K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	7.322E+00		3.731E+00	5.579E+00	0.000E+00	1.313

A,14B150012012 ,02/03/2012 12:29,07/01/2011 12:00, 1.000E+00,150ML POLY BOTTLE MI,CAL
,BQ ,
B,14B150012012 ,CALIBRATION ,01/27/2012 14:34,14B150012012 ,NOBKG

C,01-AM241,YES, 3.626E+02, 1.611E+01, 1.317E+01,, 27.530
C,02-CD109,YES, 5.097E+03, 4.816E+01, 3.291E+01,, 154.865
C,03-CO57 ,YES, 1.152E+02, 1.337E+00, 8.999E-01,, 127.987
C,04-CE139,YES, 1.702E+02, 2.250E+00, 1.345E+00,, 126.518
C,05-HG203,YES, 3.812E+02, 1.356E+01, 1.128E+01,, 33.804
C,06-SN113,YES, 2.946E+02, 4.179E+00, 2.840E+00,, 103.728
C,08-CS137,YES, 1.476E+02, 1.569E+00, 8.722E-01,, 169.235
C,09-Y88 ,YES, 4.866E+02, 6.367E+00, 3.637E+00,, 133.799
C,10-CO60 ,YES, 2.315E+02, 1.514E+00, 6.928E-01,, 334.122
C,12-Y88 ,YES, 4.940E+02, 6.408E+00, 1.671E+00,, 295.624
C,07-SR85 ,NO , 7.322E+00, 3.731E+00, 5.579E+00,, 1.313

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 1-NOV-2011 14:25:47.58
TBE15 P-10635B HpGe ********** Aquisition Date/Time: 20-OCT-2011 09:22:57.42

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

Sample ID : 15B150102011
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 15B150102011
BKGFILE : 15BG102111MT
Real Time : 0 06:08:57.59
Live time : 0 06:07:47.94

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.56	33028	27838	0.82	113.70	1.15E+00	1.50E+00	1.1	2.77E+01
2	1	72.88*	1813	16972	0.64	140.39	2.43E+00	8.22E-02	10.8	4.75E+01
3	1	74.95*	838	18432	0.79	144.54	2.63E+00	3.80E-02	25.9	2.14E+00
4	10	81.88	1682	36396	1.97	158.42	3.25E+00	7.62E-02	21.9	9.84E+01
5	10	82.98*	2265	29909	1.64	160.62	3.34E+00	1.03E-01	14.1	
6	10	85.34*	6238	34527	1.99	165.35	3.52E+00	2.83E-01	6.8	
7	10	88.03*	134016	12216	0.87	170.74	3.72E+00	6.07E+00	0.3	
8	1	122.06*	81911	20581	0.83	238.93	5.08E+00	3.71E+00	0.5	3.90E+00
9	1	136.47	10684	15782	0.83	267.80	5.18E+00	4.84E-01	2.3	3.19E-01
10	1	165.85	87387	18226	0.88	326.66	4.99E+00	3.96E+00	0.5	2.53E+00
11	1	255.09	2631	8444	0.94	505.46	3.82E+00	1.19E-01	6.4	1.01E+00
12	1	279.17	46200	11047	0.99	553.69	3.56E+00	2.09E+00	0.7	2.11E+00
13	1	391.67	57390	7960	1.09	779.07	2.66E+00	2.60E+00	0.5	2.16E+00
14	1	510.93*	1248	7014	2.75	1018.00	2.09E+00	5.66E-02	14.7	5.27E-01
15	1	661.64	45737	7039	1.30	1319.92	1.65E+00	2.07E+00	0.6	1.74E+00
16	1	814.13	1081	3296	1.39	1625.39	1.36E+00	4.90E-02	10.4	1.56E+00
17	1	898.04	60801	5685	1.51	1793.45	1.24E+00	2.76E+00	0.5	7.53E+00
18	1	1173.23	47327	3489	1.69	2344.67	9.68E-01	2.14E+00	0.6	4.64E+00
19	6	1325.13	1432	1966	3.17	2648.90	8.67E-01	6.49E-02	7.5	7.20E+00
20	6	1332.49	42399	1218	1.82	2663.65	8.62E-01	1.92E+00	0.5	
21	1	1835.99	35108	750	2.15	3671.99	6.66E-01	1.59E+00	0.6	1.09E+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
01-AM241	59.54	33028	35.90*	1.152E+00	3.617E+02	3.619E+02	2.20
02-CD109	88.03	134016	3.72*	3.725E+00	4.383E+03	5.175E+03	0.60
03-CO57	122.06	81911	85.51*	5.079E+00	8.546E+01	1.135E+02	0.96
04-CE139	165.85	87387	80.35*	4.989E+00	9.878E+01	1.728E+02	0.92
05-HG203	279.20	46200	81.46*	3.556E+00	7.227E+01	3.767E+02	1.30
06-SN113	391.69	57390	64.90*	2.657E+00	1.508E+02	2.943E+02	1.04
08-CS137	661.65	45737	85.12*	1.654E+00	1.472E+02	1.483E+02	1.20
09-Y88	898.02	60801	93.40*	1.244E+00	2.371E+02	4.879E+02	0.99
10-CO60	1173.22	47327	100.00	9.685E-01	2.214E+02	2.305E+02	1.10

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	1332.49	42399	100.00*	8.625E-01	2.228E+02	2.319E+02	1.02
12-Y88	1836.01	35108	99.38*	6.663E-01	2.403E+02	4.944E+02	1.14

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15B150102011

Acquisition date : 20-OCT-2011 09:22:57

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.617E+02	3.619E+02	0.080E+02	2.20	
02-CD109	462.90D	1.18	4.383E+03	5.175E+03	0.031E+03	0.60	
03-CO57	270.90D	1.33	8.546E+01	1.135E+02	0.011E+02	0.96	
04-CE139	137.66D	1.75	9.878E+01	1.728E+02	0.016E+02	0.92	
05-HG203	46.61D	5.21	7.227E+01	3.767E+02	0.049E+02	1.30	
06-SN113	115.10D	1.95	1.508E+02	2.943E+02	0.031E+02	1.04	
08-CS137	30.17Y	1.01	1.472E+02	1.483E+02	0.018E+02	1.20	
09-Y88	106.65D	2.06	2.371E+02	4.879E+02	0.048E+02	0.99	
10-CO60	5.27Y	1.04	2.228E+02	2.319E+02	0.024E+02	1.02	
12-Y88	106.65D	2.06	2.403E+02	4.944E+02	0.057E+02	1.14	
			---------	---------			
Total Activity :			5.999E+03	7.857E+03			
Grand Total Activity :			5.999E+03	7.857E+03			

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

DRAFT

Unidentified Energy Lines
Sample ID : 15B150102011 Acquisition date : 20-OCT-2011 09:22:57

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.88	1813	16972	0.64	140.39	138	5	8.22E-02	21.5	2.43E+00	
1	74.95	838	18432	0.79	144.54	143	6	3.80E-02	51.9	2.63E+00	
10	81.88	1682	36396	1.97	158.42	153	24	7.62E-02	43.7	3.25E+00	
10	82.98	2265	29909	1.64	160.62	153	24	1.03E-01	28.2	3.34E+00	
10	85.34	6238	34527	1.99	165.35	153	24	2.83E-01	13.7	3.52E+00	
1	136.47	10684	15782	0.83	267.80	264	9	4.84E-01	4.7	5.18E+00	
1	255.09	2631	8444	0.94	505.46	502	8	1.19E-01	12.7	3.82E+00	
1	510.93	1248	7014	2.75	1018.00	1011	14	5.66E-02	29.3	2.09E+00	
1	814.13	1081	3296	1.39	1625.39	1621	10	4.90E-02	20.7	1.36E+00	
6	1325.13	1432	1966	3.17	2648.90	2640	31	6.49E-02	15.0	8.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

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
01-AM241	432.70Y	1.00	3.617E+02	3.619E+02	0.080E+02	2.20	
02-CD109	462.90D	1.18	4.383E+03	5.175E+03	0.031E+03	0.60	
03-CO57	270.90D	1.33	8.546E+01	1.135E+02	0.011E+02	0.96	
04-CE139	137.66D	1.75	9.878E+01	1.728E+02	0.016E+02	0.92	
05-HG203	46.61D	5.21	7.227E+01	3.767E+02	0.049E+02	1.30	
06-SN113	115.10D	1.95	1.508E+02	2.943E+02	0.031E+02	1.04	
08-CS137	30.17Y	1.01	1.472E+02	1.483E+02	0.018E+02	1.20	
09-Y88	106.65D	2.06	2.371E+02	4.879E+02	0.048E+02	0.99	
10-CO60	5.27Y	1.04	2.221E+02	2.312E+02	0.017E+02	0.75	
12-Y88	106.65D	2.06	2.403E+02	4.944E+02	0.057E+02	1.14	
	Total Activity :		5.999E+03	7.856E+03			
	Grand Total Activity :		5.999E+03	7.856E+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

01-AM241	3.619E+02	7.961E+00	5.614E+00	0.000E+00	64.471
02-CD109	5.175E+03	3.111E+01	1.954E+01	0.000E+00	264.885
03-CO57	1.135E+02	1.092E+00	6.621E-01	0.000E+00	171.479
04-CE139	1.728E+02	1.589E+00	8.403E-01	0.000E+00	205.604
05-HG203	3.767E+02	4.912E+00	2.874E+00	0.000E+00	131.049
06-SN113	2.943E+02	3.069E+00	1.635E+00	0.000E+00	180.030
08-CS137	1.483E+02	1.785E+00	1.002E+00	0.000E+00	148.039
09-Y88	4.879E+02	4.808E+00	2.191E+00	0.000E+00	222.709
10-CO60	2.312E+02	1.733E+00	9.010E-01	0.000E+00	256.626
12-Y88	4.944E+02	5.651E+00	1.302E+00	0.000E+00	379.647

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	2.322E+00		1.445E+00	2.162E+00	0.000E+00	1.074

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A,15B150102011    ,11/01/2011 14:25,07/01/2011 12:00,   1.000E+00,150ML POLY BOT
B,15B150102011    ,CALIBRATION         ,11/01/2011 14:21,15B150102011
C,01-AM241,YES,   3.619E+02,   7.961E+00,   5.614E+00,,   64.471
C,02-CD109,YES,   5.175E+03,   3.111E+01,   1.954E+01,,  264.885
C,03-CO57 ,YES,   1.135E+02,   1.092E+00,   6.621E-01,,  171.479
C,04-CE139,YES,   1.728E+02,   1.589E+00,   8.403E-01,,  205.604
C,05-HG203,YES,   3.767E+02,   4.912E+00,   2.874E+00,,  131.049
C,06-SN113,YES,   2.943E+02,   3.069E+00,   1.635E+00,,  180.030
C,08-CS137,YES,   1.483E+02,   1.785E+00,   1.002E+00,,  148.039
C,09-Y88  ,YES,   4.879E+02,   4.808E+00,   2.191E+00,,  222.709
C,10-CO60 ,YES,   2.312E+02,   1.733E+00,   9.010E-01,,  256.626
C,12-Y88  ,YES,   4.944E+02,   5.651E+00,   1.302E+00,,  379.647
C,07-SR85 ,NO ,   2.322E+00,   1.445E+00,   2.162E+00,,    1.074
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Sec. Review: Analyst: LIMS: ___

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 20-AUG-2004 14:54:55.64
TBE23 03017322 HpGe ********** Aquisition Date/Time: 20-AUG-2004 13:54:22.19

LIMS No., Customer Name, Client ID: DET23 B150ML STD ANALYTICS 1JUL04
Sample ID : 23B150082004 Smple Date: 20-AUG-2004 12:00:00.00
Sample Type : STD Geometry : 23B150061103
Quantity : 1.00000E+00 Total BKGFILE : 23BG081304MT
Start Channel : 50 Energy Tol : 1.00000 Real Time : 0 01:00:17.70
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:00:00.00
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	10	33.76*	1898	297	1.05	67.69	2.35E-01	5.27E-01	4.2	2.39E+01
2	10	35.42*	2903	1268	2.19	71.01	3.22E-01	8.07E-01	4.6	
3	10	37.88	2223	3160	2.01	75.92	4.82E-01	6.17E-01	6.7	
4	10	40.75	977	3695	1.53	81.67	7.14E-01	2.71E-01	12.1	
5	10	42.77	1044	7384	2.26	85.69	9.02E-01	2.90E-01	16.0	
6	0	59.57	14738	9715	1.07	119.27	2.86E+00	4.09E+00	1.5	
7	1	70.92	1369	5386	1.04	141.96	4.06E+00	3.80E-01	8.9	1.49E+00
8	1	72.94	2174	5190	1.04	145.99	4.25E+00	6.04E-01	5.7	
9	9	82.67	1633	9265	1.65	165.43	4.97E+00	4.54E-01	10.8	1.09E+01
10	9	85.27*	2081	12080	2.29	170.63	5.12E+00	5.78E-01	14.5	
11	9	88.10	40267	4581	1.08	176.28	5.27E+00	1.12E+01	0.6	
12	0	122.13	22824	6852	1.09	244.30	5.98E+00	6.34E+00	1.0	
13	0	136.50	2877	6059	1.00	273.01	5.93E+00	7.99E-01	5.6	
14	0	165.95	26436	5926	1.12	331.87	5.60E+00	7.34E+00	0.9	
15	0	255.23	941	3128	1.26	510.34	4.37E+00	2.61E-01	12.0	
16	0	279.28	27412	3183	1.21	558.41	4.09E+00	7.61E+00	0.7	
17	0	391.82	19160	2503	1.28	783.43	3.14E+00	5.32E+00	0.9	
18	0	510.97*	392	1411	2.94	1021.72	2.51E+00	1.09E-01	19.4	
19	0	661.78	10936	2340	1.48	1323.41	2.01E+00	3.04E+00	1.4	
20	0	814.56	309	913	1.28	1629.11	1.67E+00	8.57E-02	19.9	
21	0	898.25	22777	1335	1.65	1796.63	1.53E+00	6.33E+00	0.8	
22	0	1173.51	12551	930	1.83	2347.76	1.21E+00	3.49E+00	1.1	
23	0	1325.20	497	514	2.75	2651.60	1.09E+00	1.38E-01	10.6	
24	0	1332.74	11486	689	1.89	2666.71	1.09E+00	3.19E+00	1.1	
25	0	1835.88	13494	214	2.19	3675.20	8.53E-01	3.75E+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
01-AM241	59.54	14738	35.90*	2.857E+00	3.991E+02	3.991E+02	3.08
02-CD109	88.03	40267	3.72*	5.270E+00	5.706E+03	5.706E+03	1.13
03-CO57	122.06	22824	85.51*	5.980E+00	1.240E+02	1.240E+02	1.94
04-CE139	165.85	26436	80.35*	5.602E+00	1.631E+02	1.632E+02	1.73
05-HG203	279.20	27412	81.46*	4.093E+00	2.284E+02	2.287E+02	1.46
06-SN113	391.69	19160	64.90*	3.141E+00	2.611E+02	2.612E+02	1.82
08-CS137	661.65	10936	85.12*	2.009E+00	1.777E+02	1.777E+02	2.71

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09-Y88	898.02	22777	93.40*	1.531E+00	4.424E+02	4.427E+02	1.51
10-CO60	1173.22	12551	100.00	1.209E+00	2.883E+02	2.883E+02	2.12
	1332.49	11486	100.00*	1.085E+00	2.940E+02	2.940E+02	2.15
12-Y88	1836.01	13494	99.38*	8.527E-01	4.423E+02	4.426E+02	1.81

Flag: "*" = Keyline

Summary of Nuclide Activity

Sample ID : 23B150082004 Acquisition date : 20-AUG-2004 13:54:22

Total number of lines in spectrum 25

Number of unidentified lines 14

Number of lines tentatively identified by NID 11 44.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/Total	Decay Corr BQ/Total	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.991E+02	3.991E+02	0.123E+02	3.08	
02-CD109	462.90D	1.00	5.706E+03	5.706E+03	0.065E+03	1.13	
03-CO57	270.90D	1.00	1.240E+02	1.240E+02	0.024E+02	1.94	
04-CE139	137.66D	1.00	1.631E+02	1.632E+02	0.028E+02	1.73	
05-HG203	46.61D	1.00	2.284E+02	2.287E+02	0.033E+02	1.46	
06-SN113	115.10D	1.00	2.611E+02	2.612E+02	0.048E+02	1.82	
08-CS137	30.17Y	1.00	1.777E+02	1.777E+02	0.048E+02	2.71	
09-Y88	106.65D	1.00	4.424E+02	4.427E+02	0.067E+02	1.51	
10-CO60	5.27Y	1.00	2.940E+02	2.940E+02	0.063E+02	2.15	
12-Y88	106.65D	1.00	4.423E+02	4.426E+02	0.080E+02	1.81	
			---------	---------			
	Total Activity :		8.238E+03	8.240E+03			
	Grand Total Activity :		8.238E+03	8.240E+03			

Flags: "K" = Keyline not found "M" = Manually accepted

"E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines

Sample ID : 23B150082004 Acquisition date : 20-AUG-2004 13:54:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
10	33.76	1898	297	1.05	67.69	65	29	5.27E-01	8.4	2.35E-01	
10	35.42	2903	1268	2.19	71.01	65	29	8.07E-01	9.2	3.22E-01	
10	37.88	2223	3160	2.01	75.92	65	29	6.17E-01	13.4	4.82E-01	
10	40.75	977	3695	1.53	81.67	65	29	2.71E-01	24.1	7.14E-01	
10	42.77	1044	7384	2.26	85.69	65	29	2.90E-01	31.9	9.02E-01	
1	70.92	1369	5386	1.04	141.96	138	13	3.80E-01	17.8	4.06E+00	
1	72.94	2174	5190	1.04	145.99	138	13	6.04E-01	11.5	4.25E+00	
9	82.67	1633	9265	1.65	165.43	160	24	4.54E-01	21.6	4.97E+00	
9	85.27	2081	12080	2.29	170.63	160	24	5.78E-01	29.1	5.12E+00	
0	136.50	2877	6059	1.00	273.01	268	11	7.99E-01	11.1	5.93E+00	
0	255.23	941	3128	1.26	510.34	505	11	2.61E-01	23.9	4.37E+00	
0	510.97	392	1411	2.94	1021.72	1016	11	1.09E-01	38.7	2.51E+00	
0	814.56	309	913	1.28	1629.11	1624	11	8.57E-02	39.8	1.67E+00	
0	1325.20	497	514	2.75	2651.60	2645	14	1.38E-01	21.3	1.09E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 25

Number of unidentified lines 14

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Number of lines tentatively identified by NID 11 44.00%

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
01-AM241	432.70Y	1.00	3.991E+02	3.991E+02	0.123E+02	3.08	
02-CD109	462.90D	1.00	5.706E+03	5.706E+03	0.065E+03	1.13	
03-CO57	270.90D	1.00	1.240E+02	1.240E+02	0.024E+02	1.94	
04-CE139	137.66D	1.00	1.631E+02	1.632E+02	0.028E+02	1.73	
05-HG203	46.61D	1.00	2.284E+02	2.287E+02	0.033E+02	1.46	
06-SN113	115.10D	1.00	2.611E+02	2.612E+02	0.048E+02	1.82	
08-CS137	30.17Y	1.00	1.777E+02	1.777E+02	0.048E+02	2.71	
09-Y88	106.65D	1.00	4.424E+02	4.427E+02	0.067E+02	1.51	
10-CO60	5.27Y	1.00	2.911E+02	2.911E+02	0.044E+02	1.51	
12-Y88	106.65D	1.00	4.423E+02	4.426E+02	0.080E+02	1.81	
			---------	---------			
	Total Activity :		8.235E+03	8.237E+03			
	Grand Total Activity :		8.235E+03	8.237E+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
01-AM241	3.991E+02	1.230E+01	8.833E+00	0.000E+00	45.185
02-CD109	5.706E+03	6.466E+01	4.507E+01	0.000E+00	126.601
03-CO57	1.240E+02	2.400E+00	1.585E+00	0.000E+00	78.219
04-CE139	1.632E+02	2.817E+00	1.625E+00	0.000E+00	100.430
05-HG203	2.287E+02	3.348E+00	1.766E+00	0.000E+00	129.489
06-SN113	2.612E+02	4.753E+00	2.404E+00	0.000E+00	108.671
08-CS137	1.777E+02	4.820E+00	2.915E+00	0.000E+00	60.936
09-Y88	4.427E+02	6.690E+00	2.937E+00	0.000E+00	150.729
10-CO60	2.911E+02	4.397E+00	2.402E+00	0.000E+00	121.163
12-Y88	4.426E+02	7.996E+00	1.979E+00	0.000E+00	223.662

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

Nuclide	Key-Line Activity (BQ/Total)	K.L. Ided	Act error	MDA (BQ/Total)	MDA error	Act/MDA
07-SR85	2.408E+00		1.245E+00	1.954E+00	0.000E+00	1.232

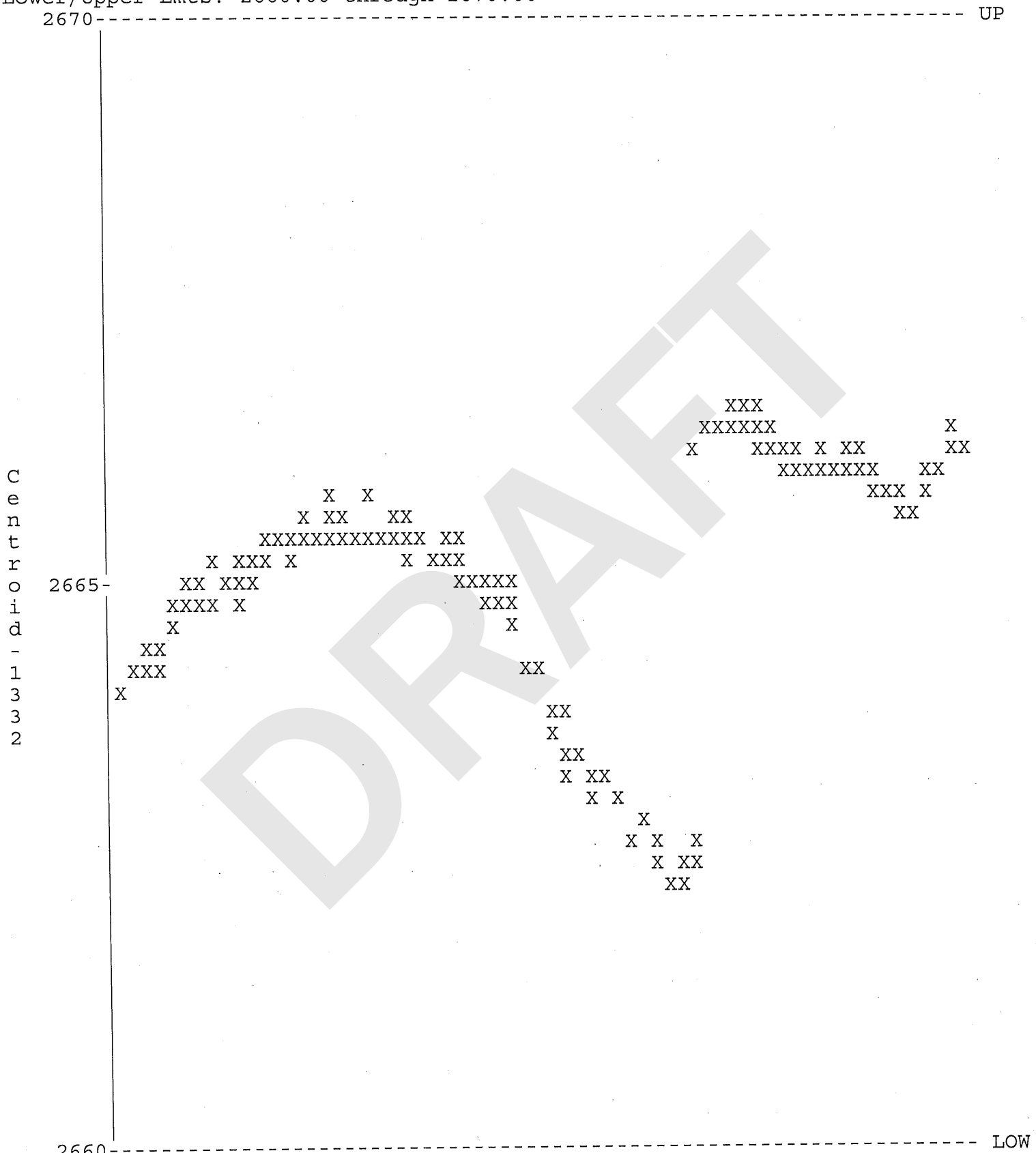
DRAFT

GAMMA SPECTROSCOPY

Daily Source and Background Checks

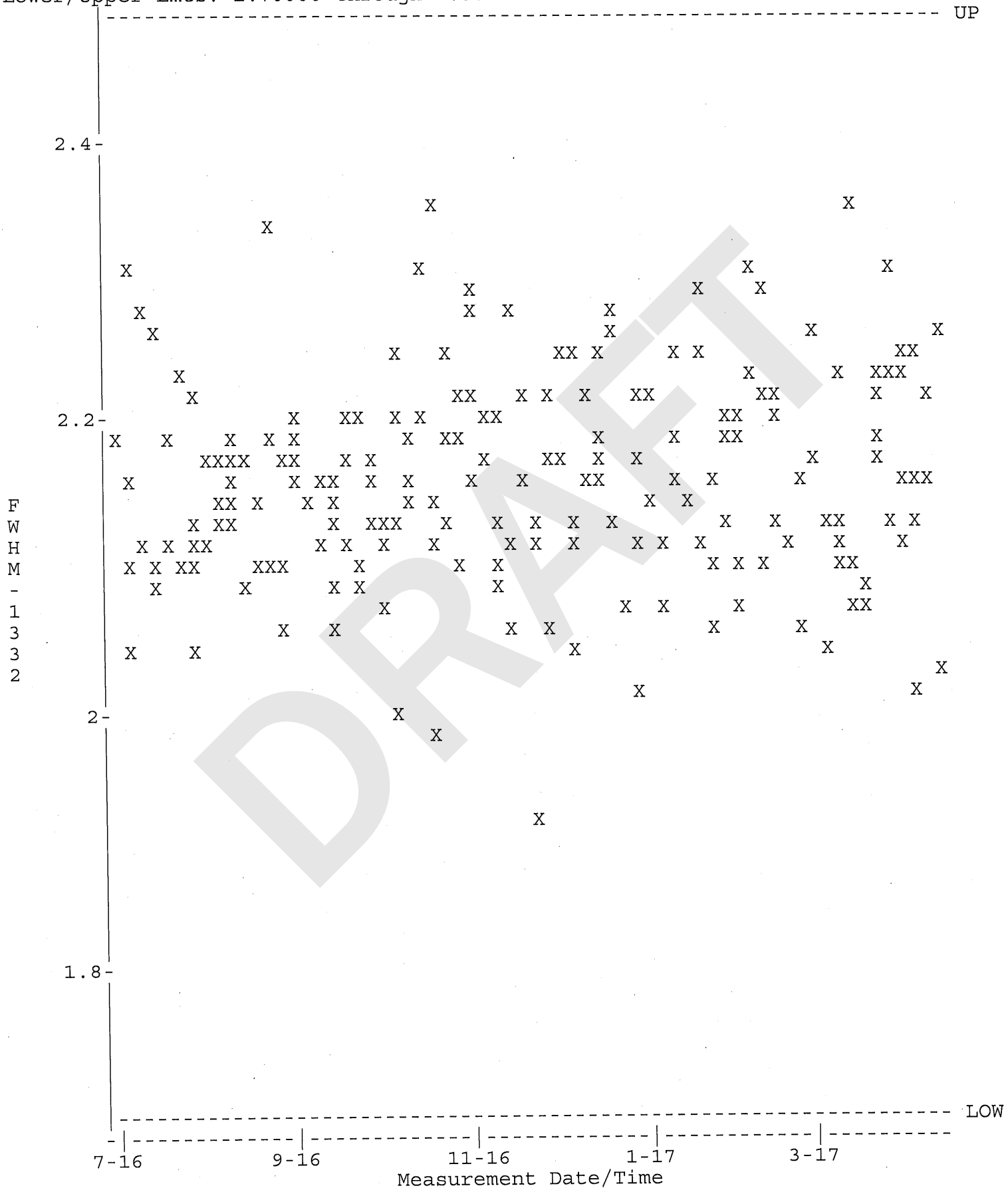
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



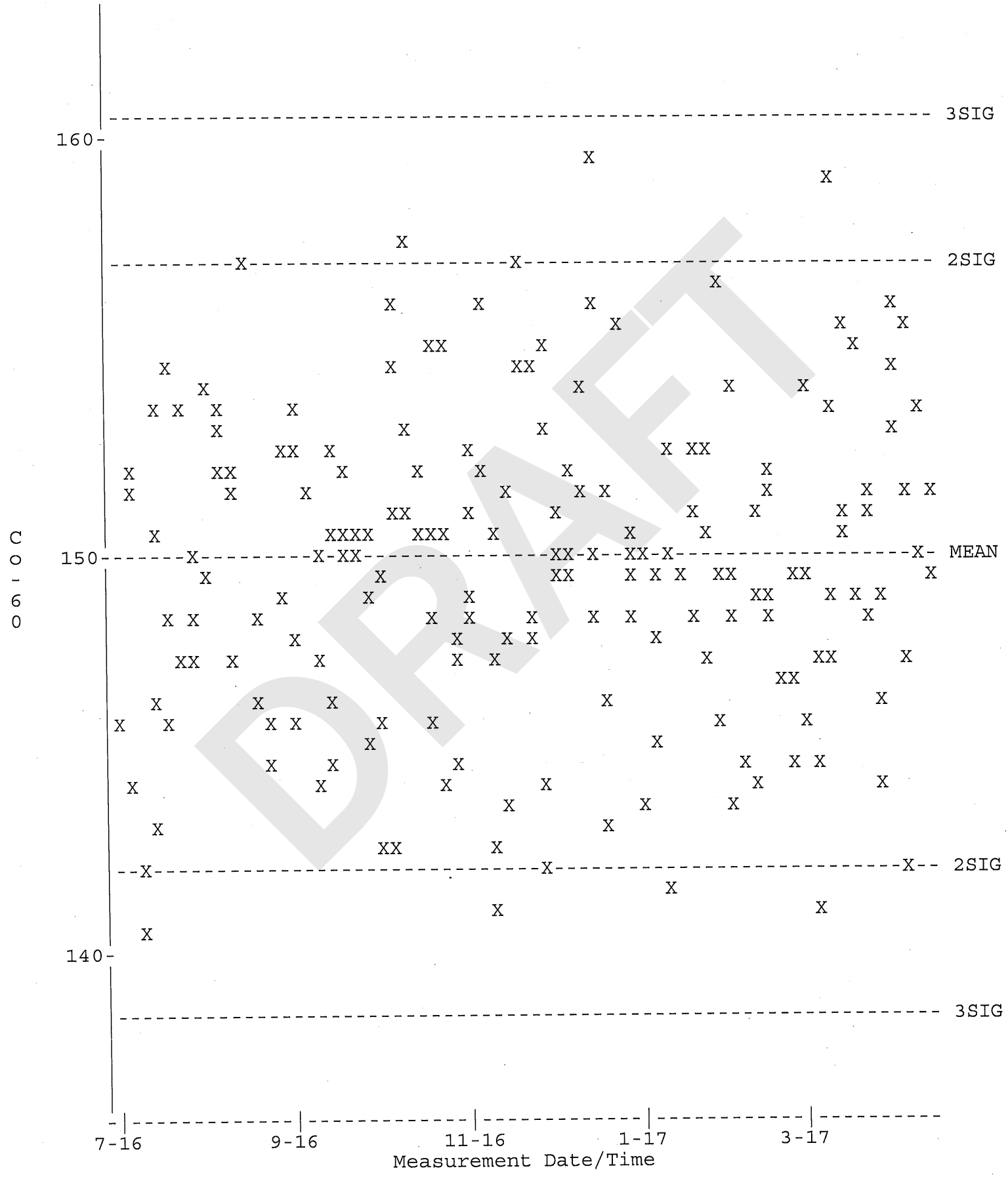
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.70000 through 2.50000



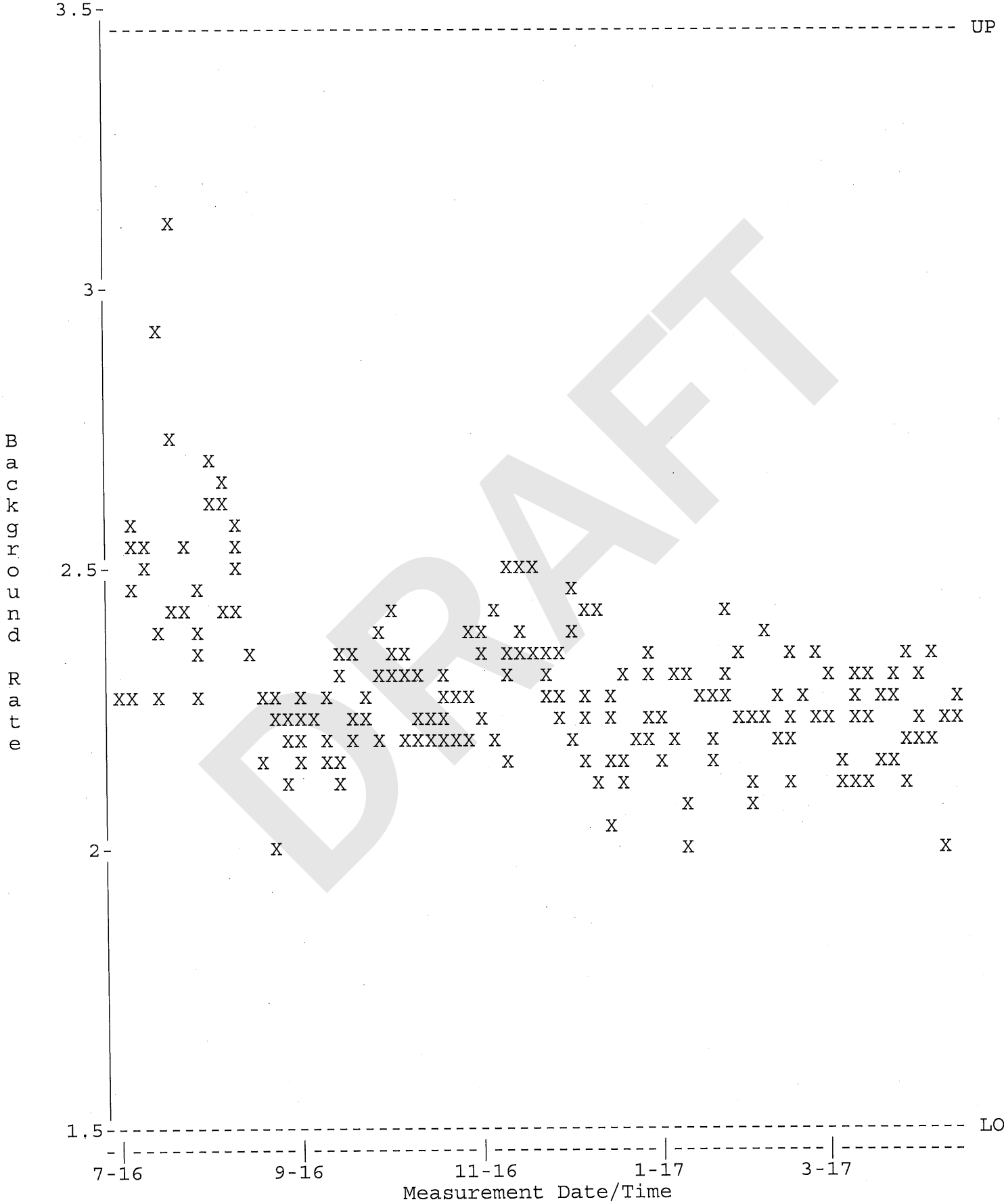
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Mean +- Std Dev : 149.844 +- 3.70149 (2.47 %)



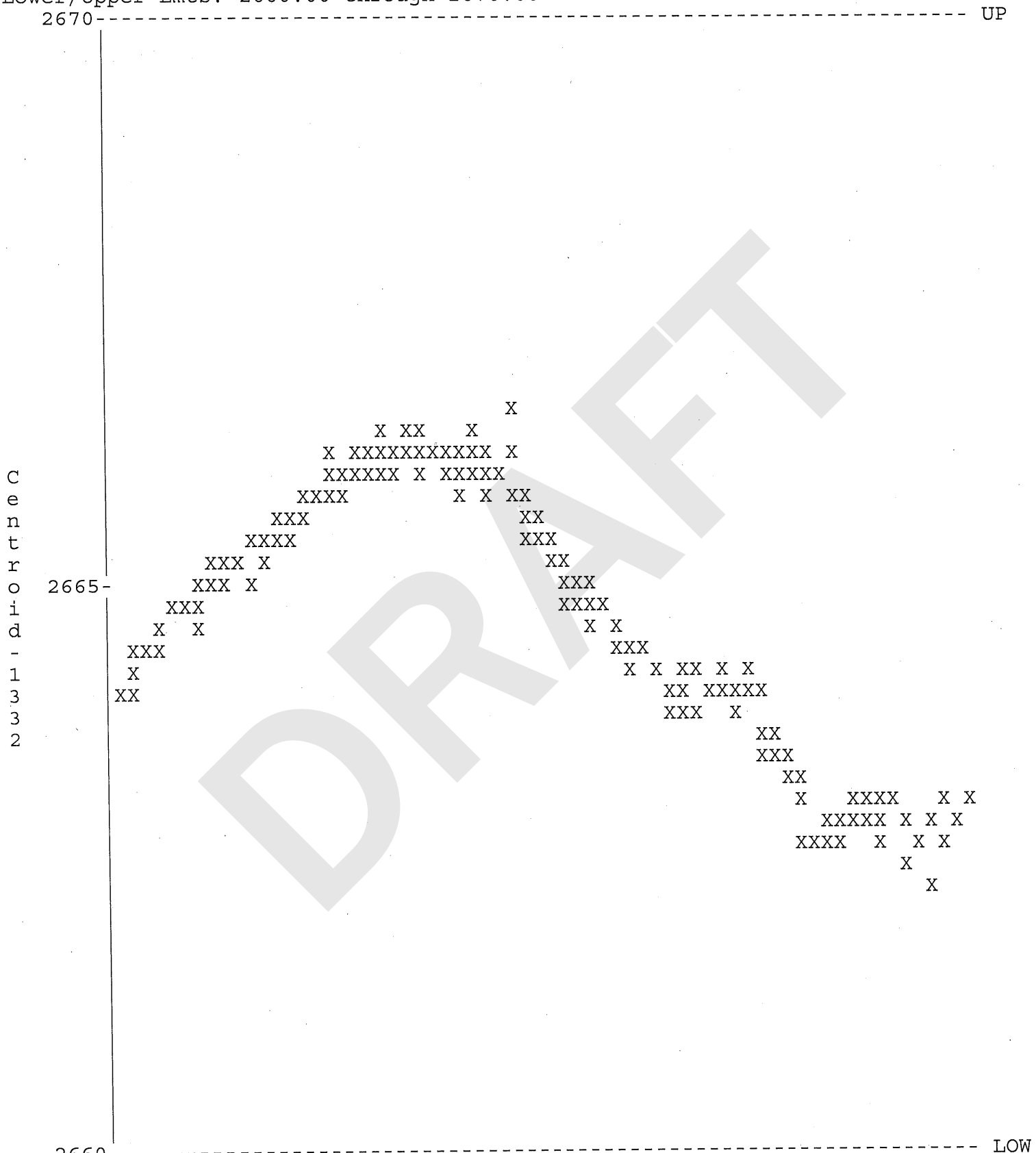
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE01_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.50000 through 3.50000



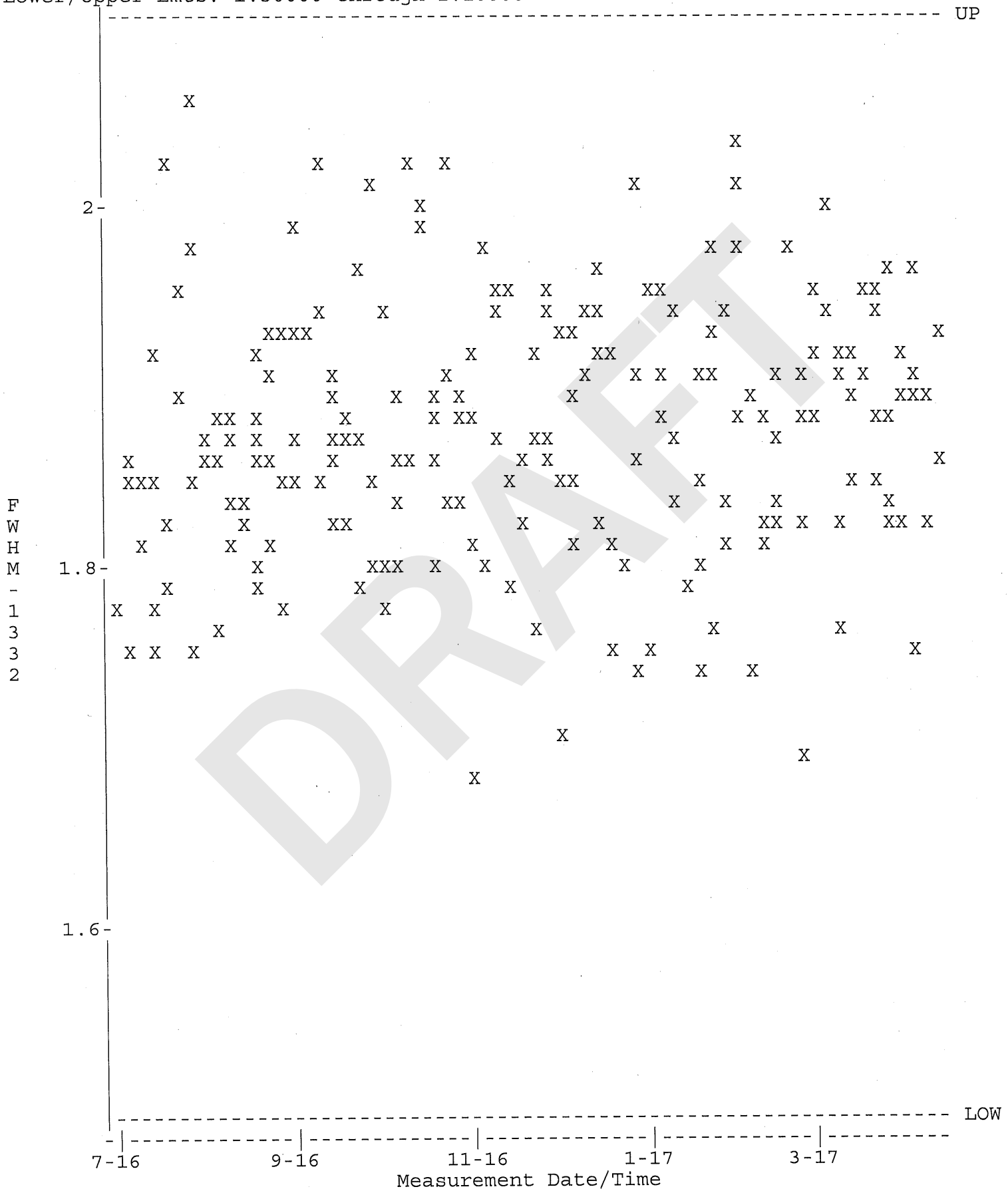
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



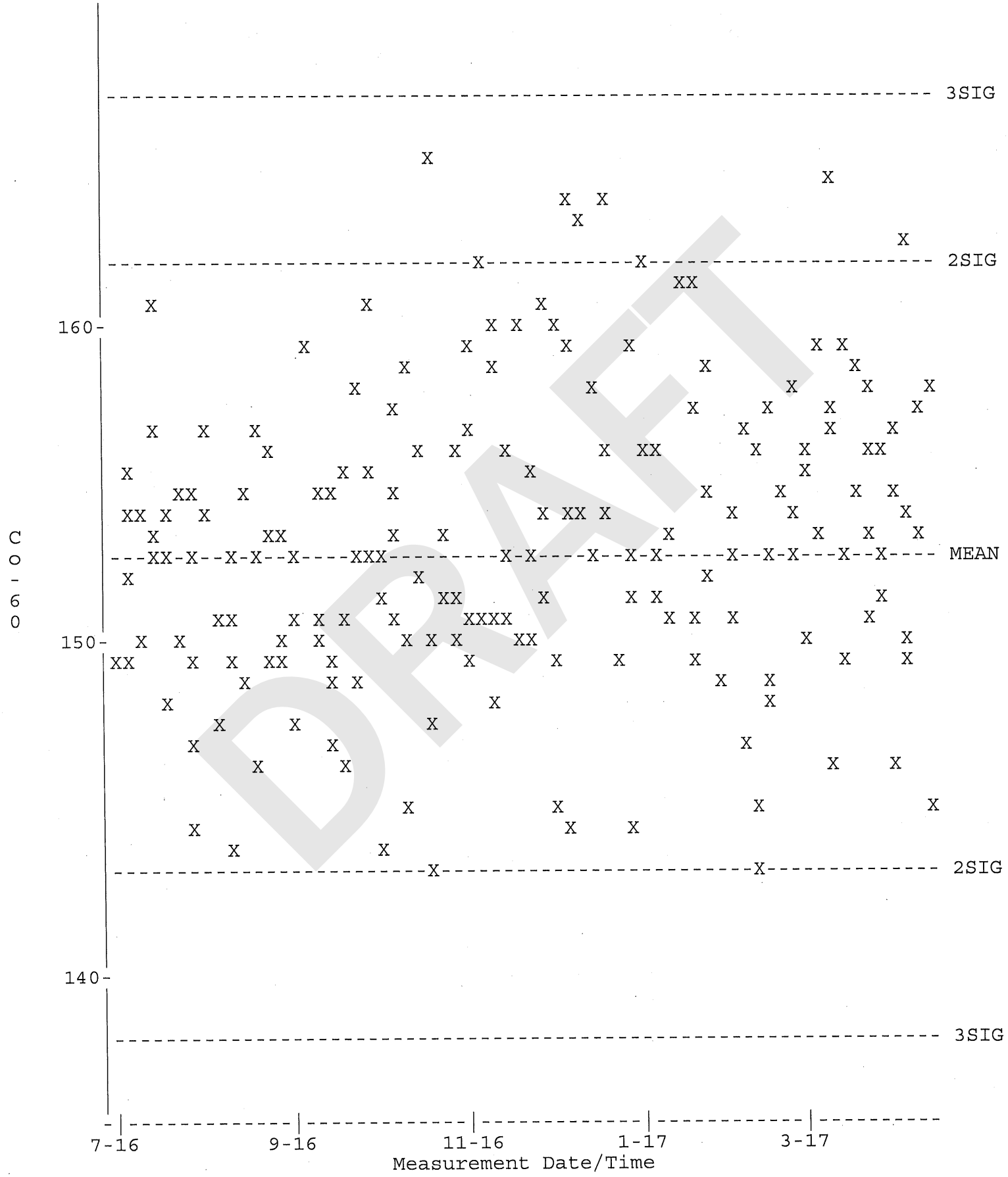
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.10000



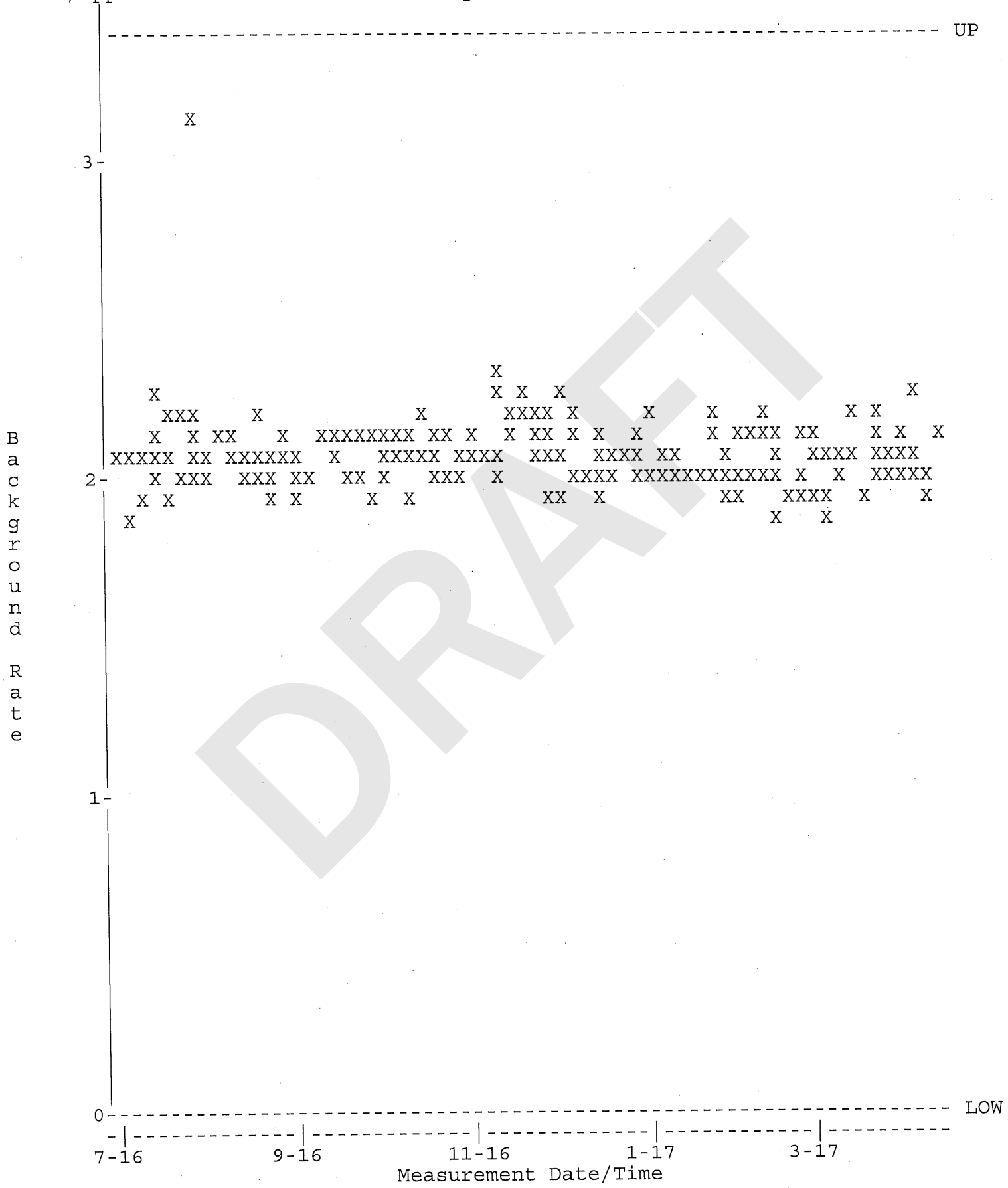
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Mean +- Std Dev : 152.759 +- 4.77464 (3.13 %)



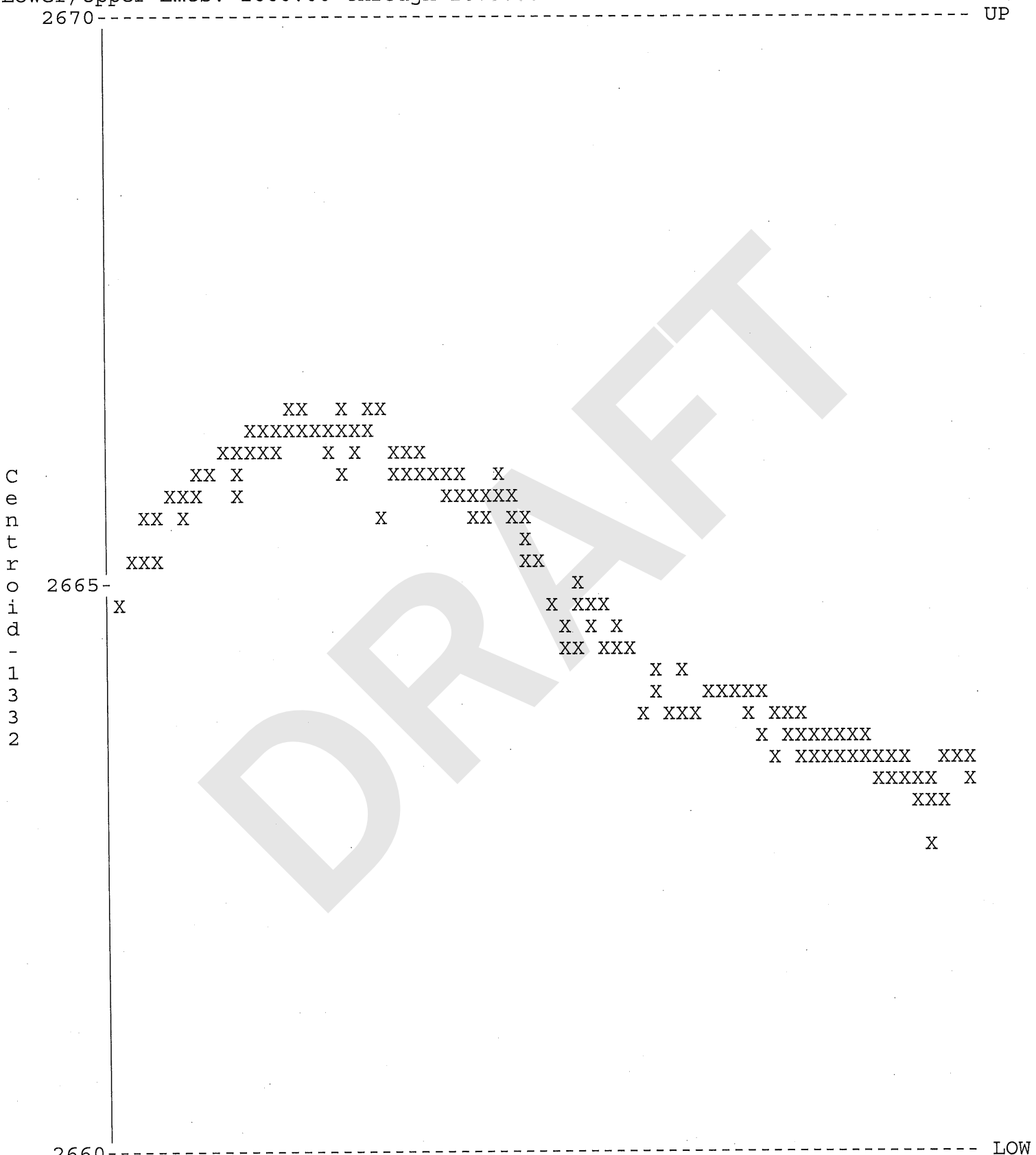
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE06_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:13 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



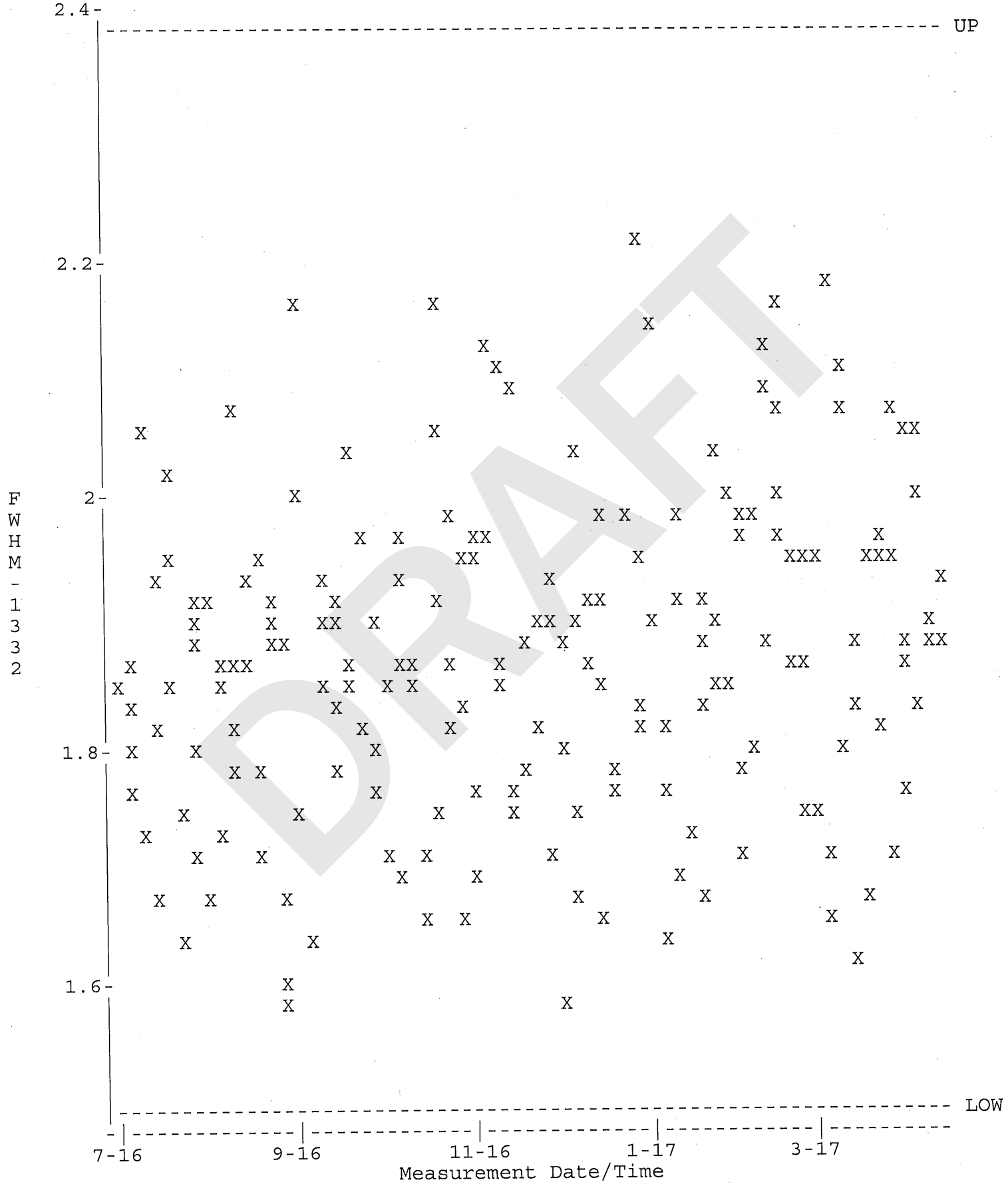
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



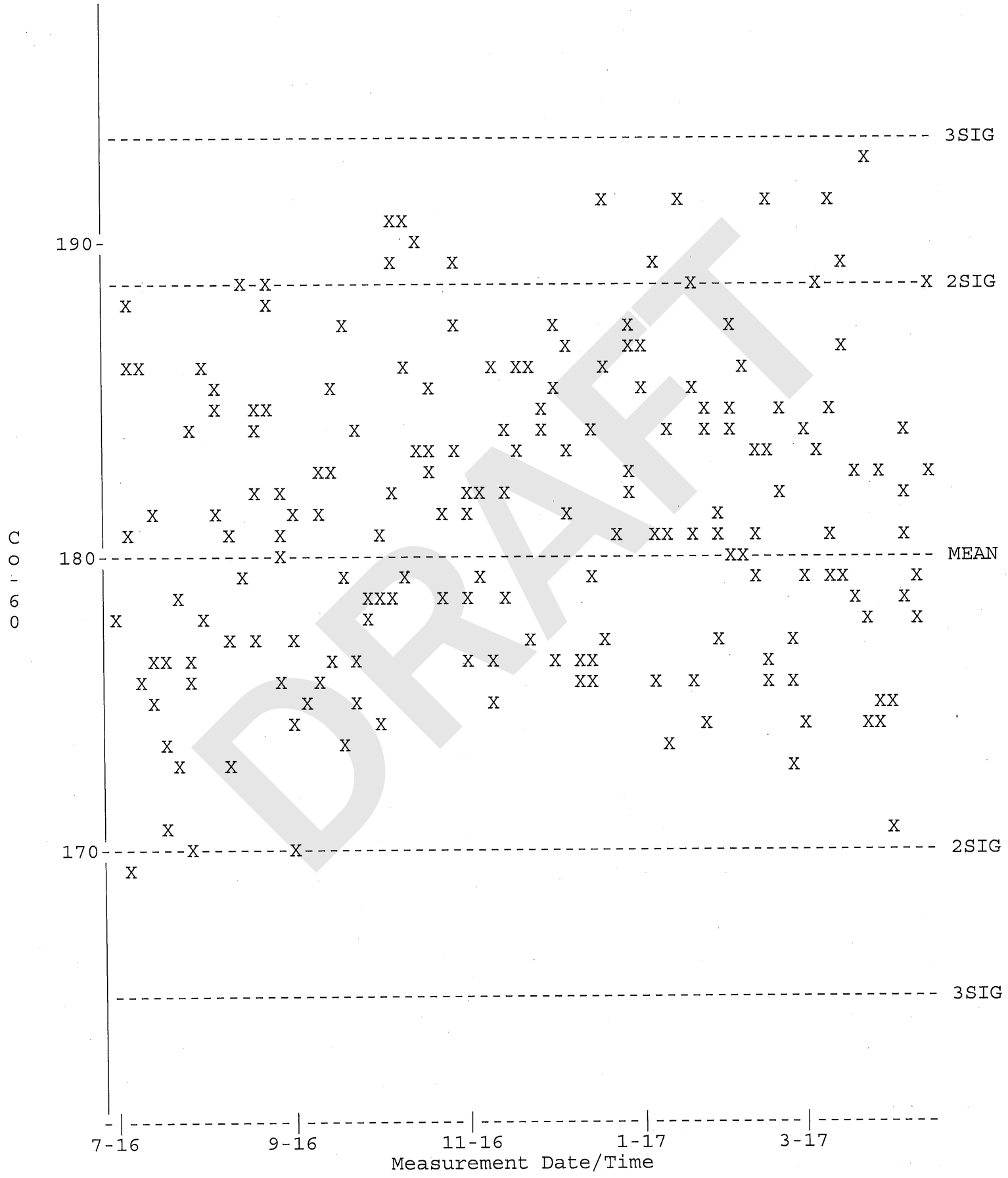
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.40000



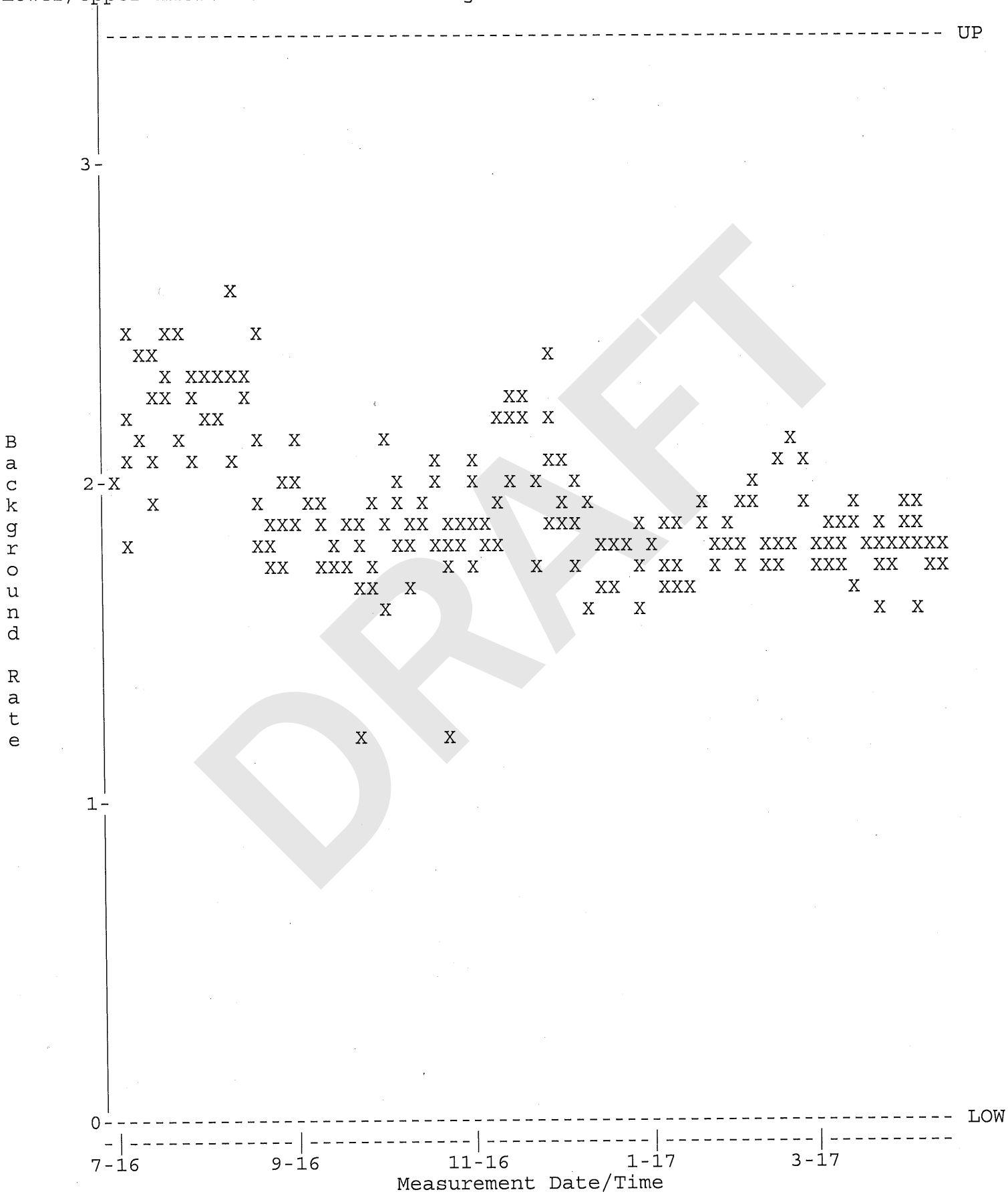
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Mean +- Std Dev : 179.682 +- 4.81309 (2.68 %)



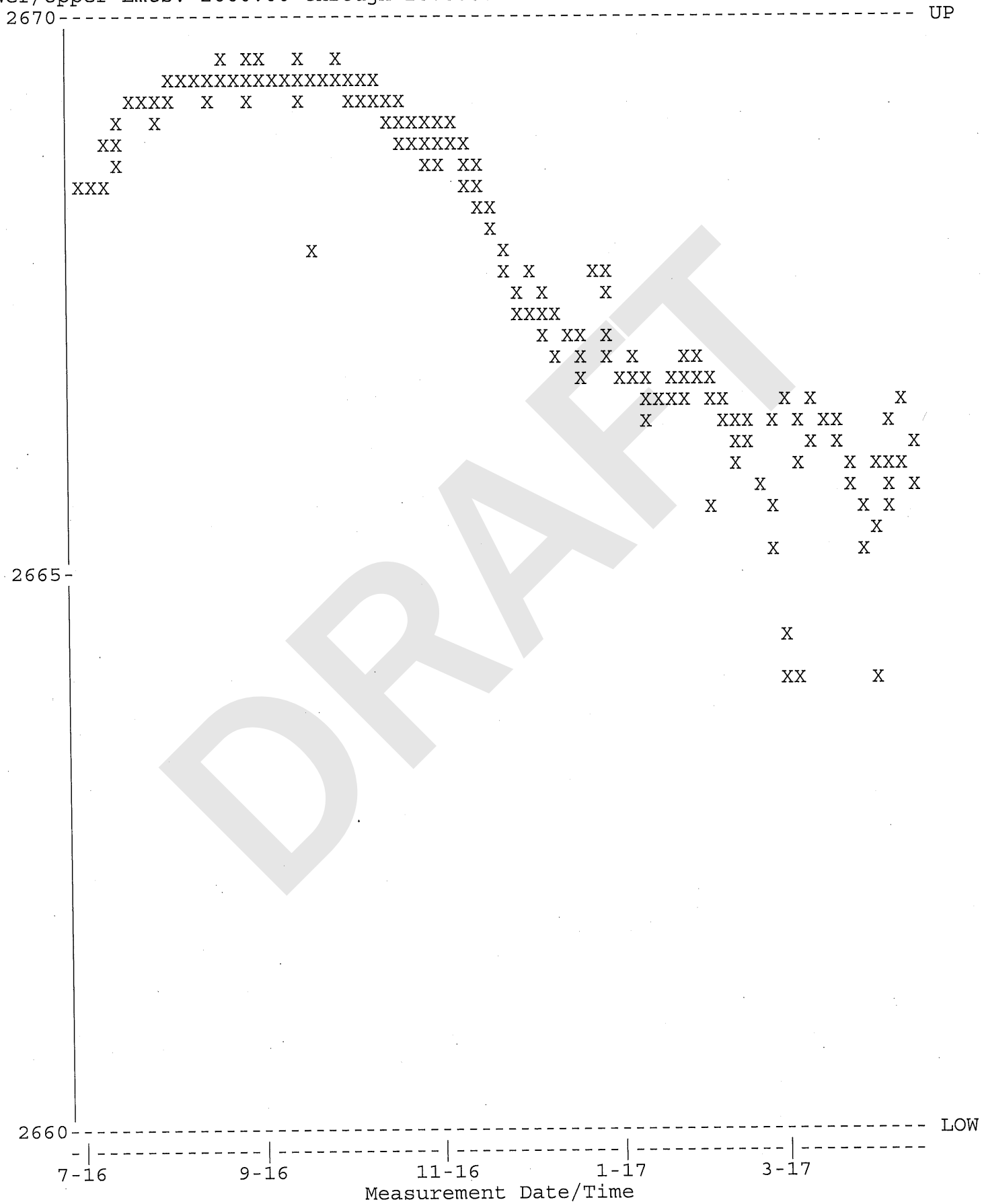
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE02_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



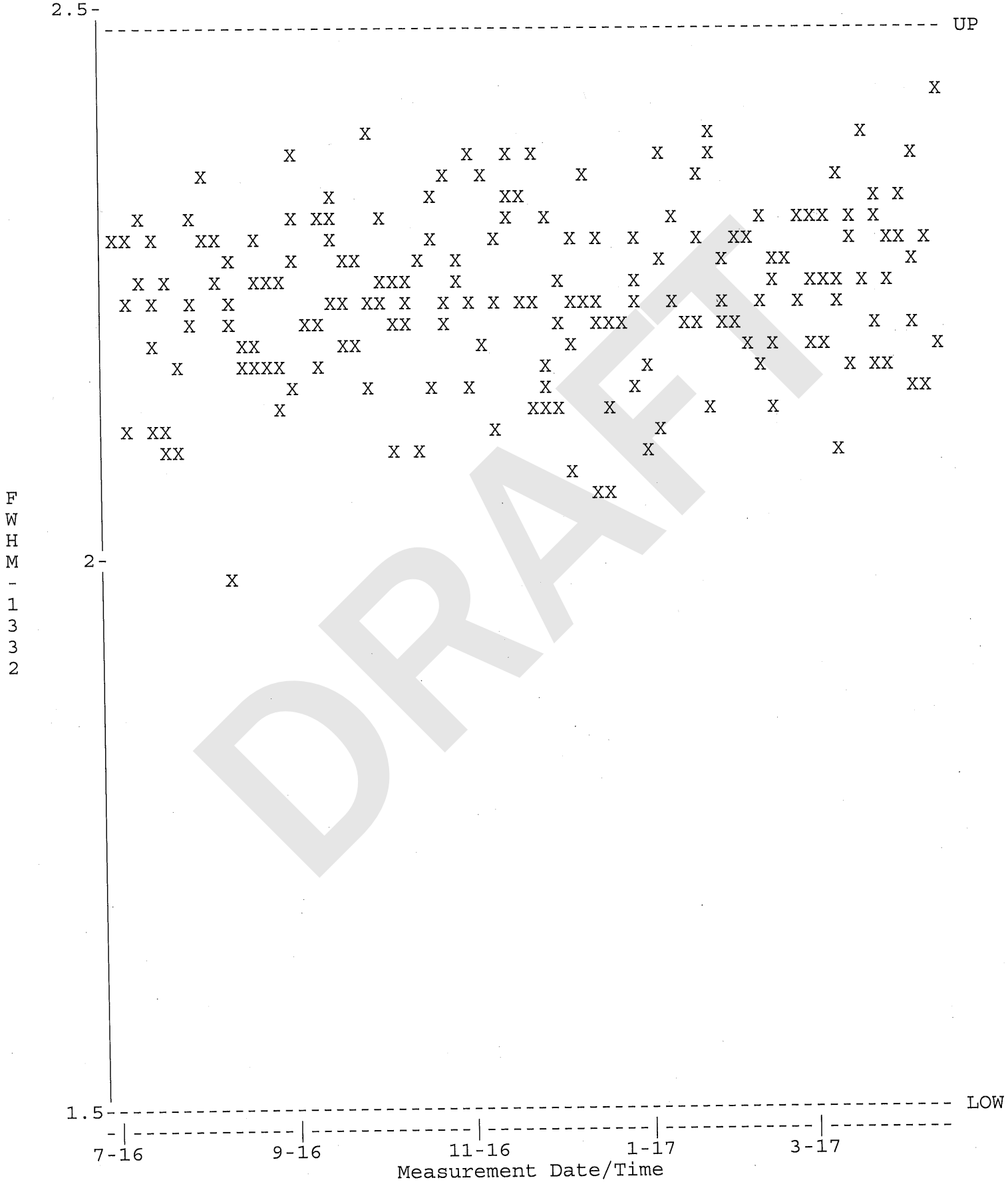
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



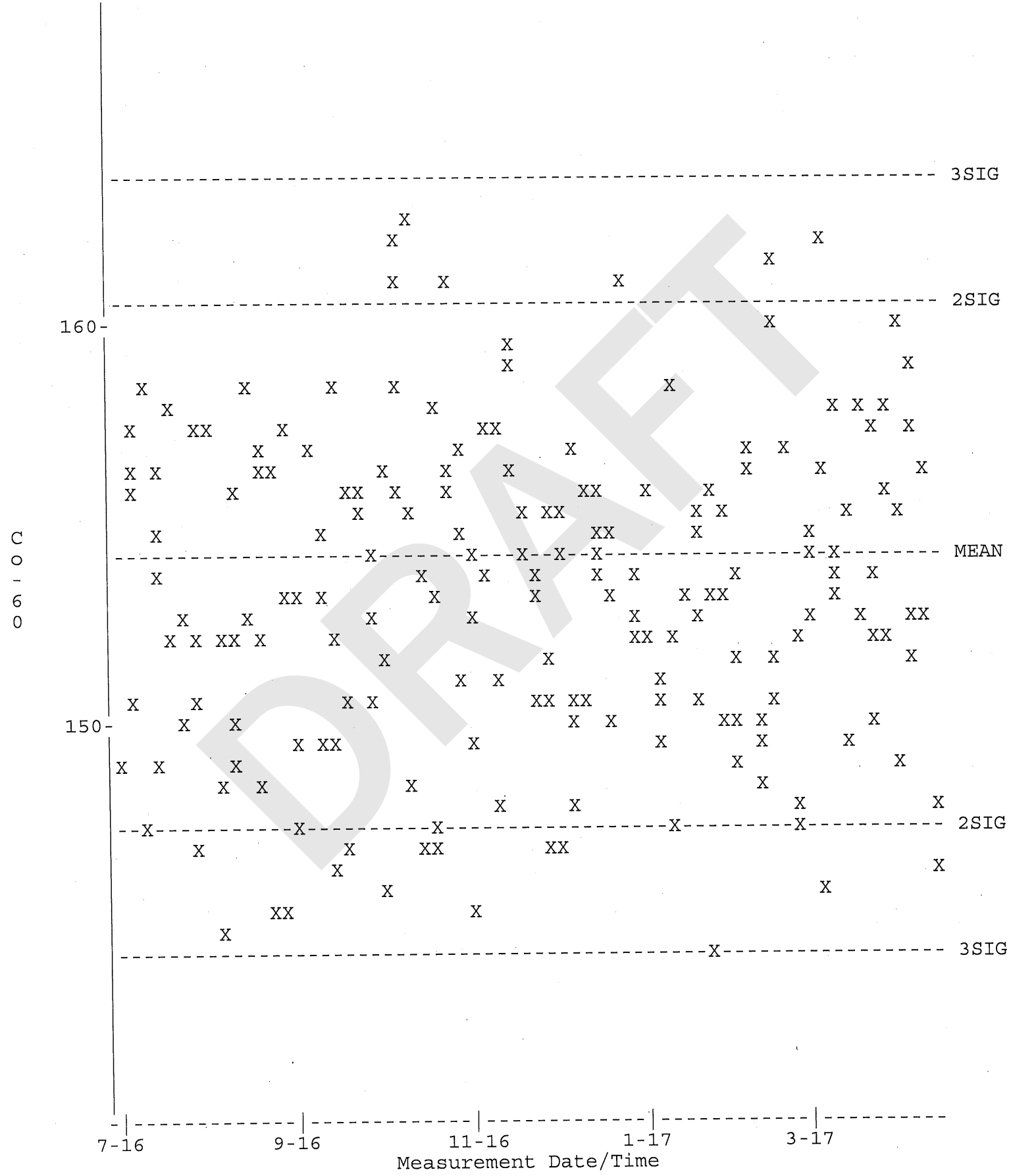
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.50000



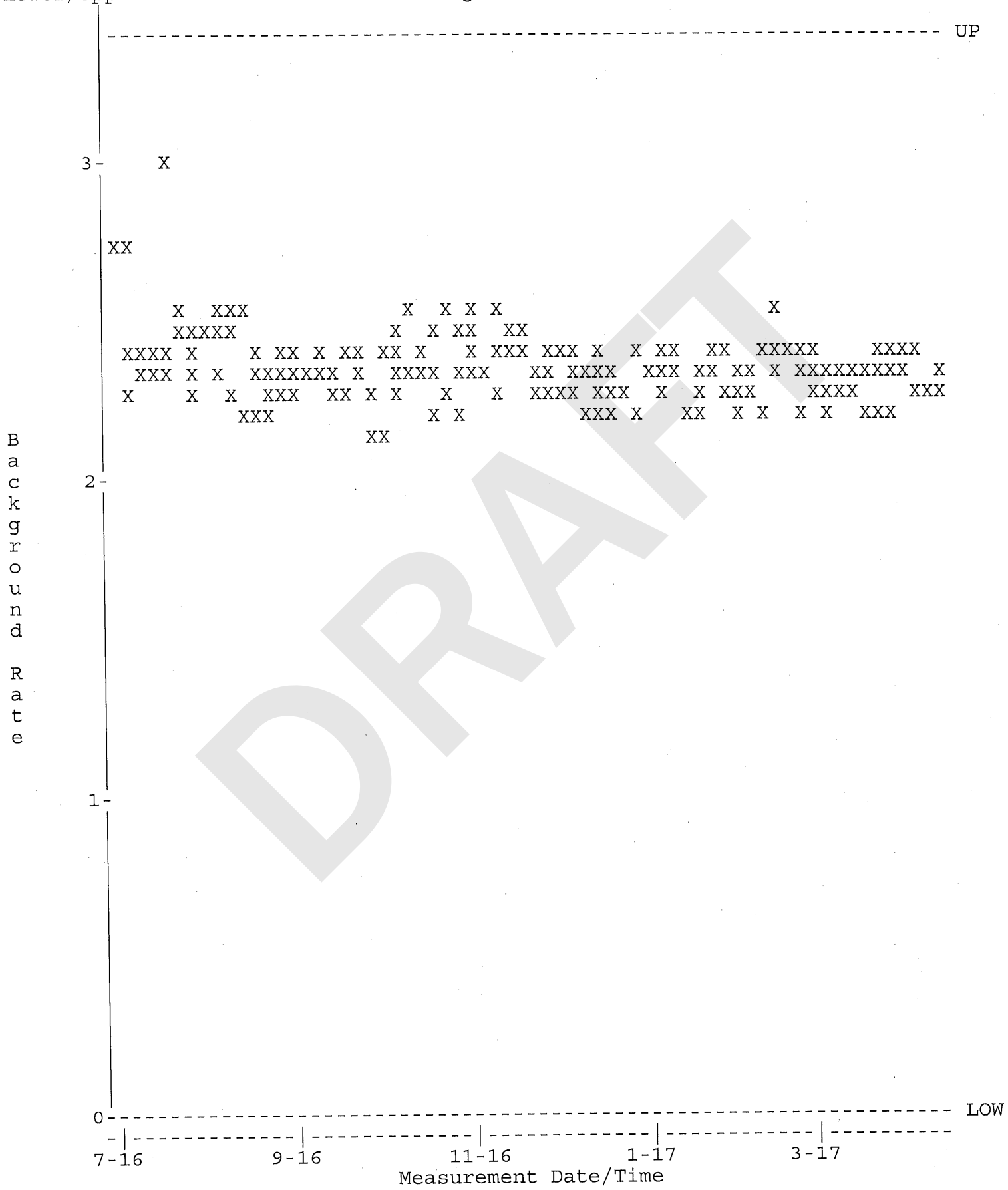
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Mean +- Std Dev : 154.048 +- 3.18076 (2.06 %)



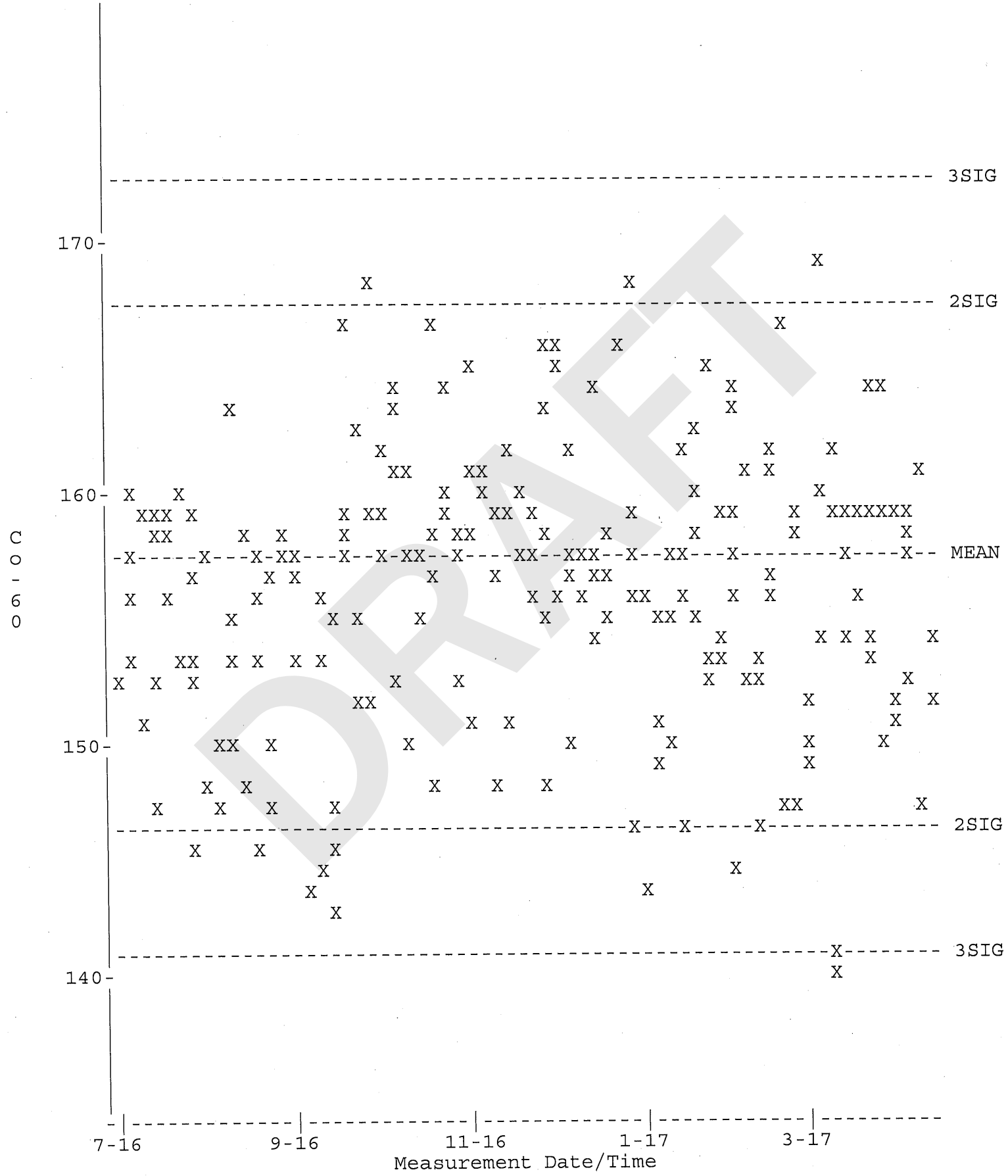
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE07_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:10 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



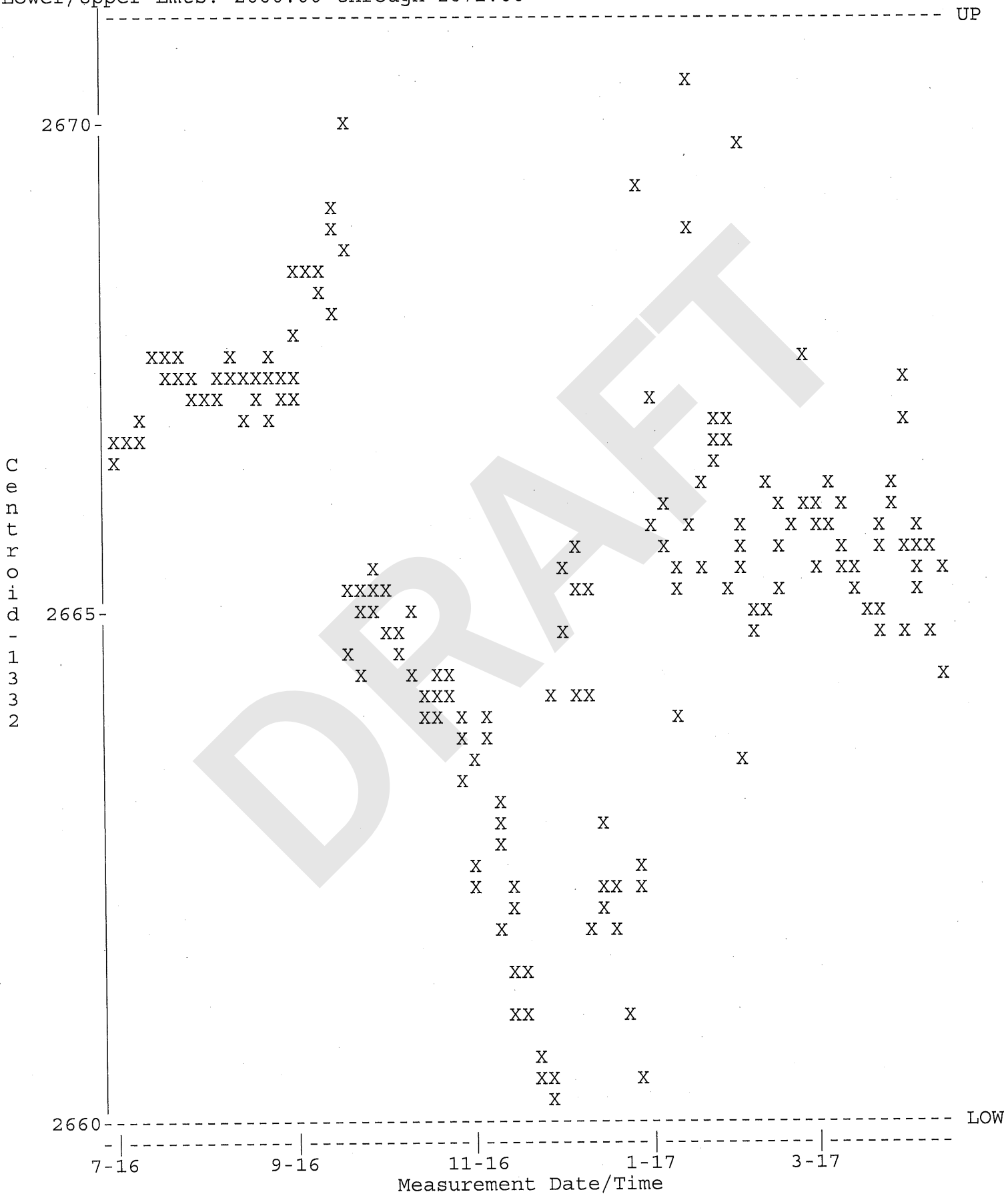
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:09 through 13-APR-2017 00:00
Mean +- Std Dev : 157.358 +- 5.24507 (3.33 %)



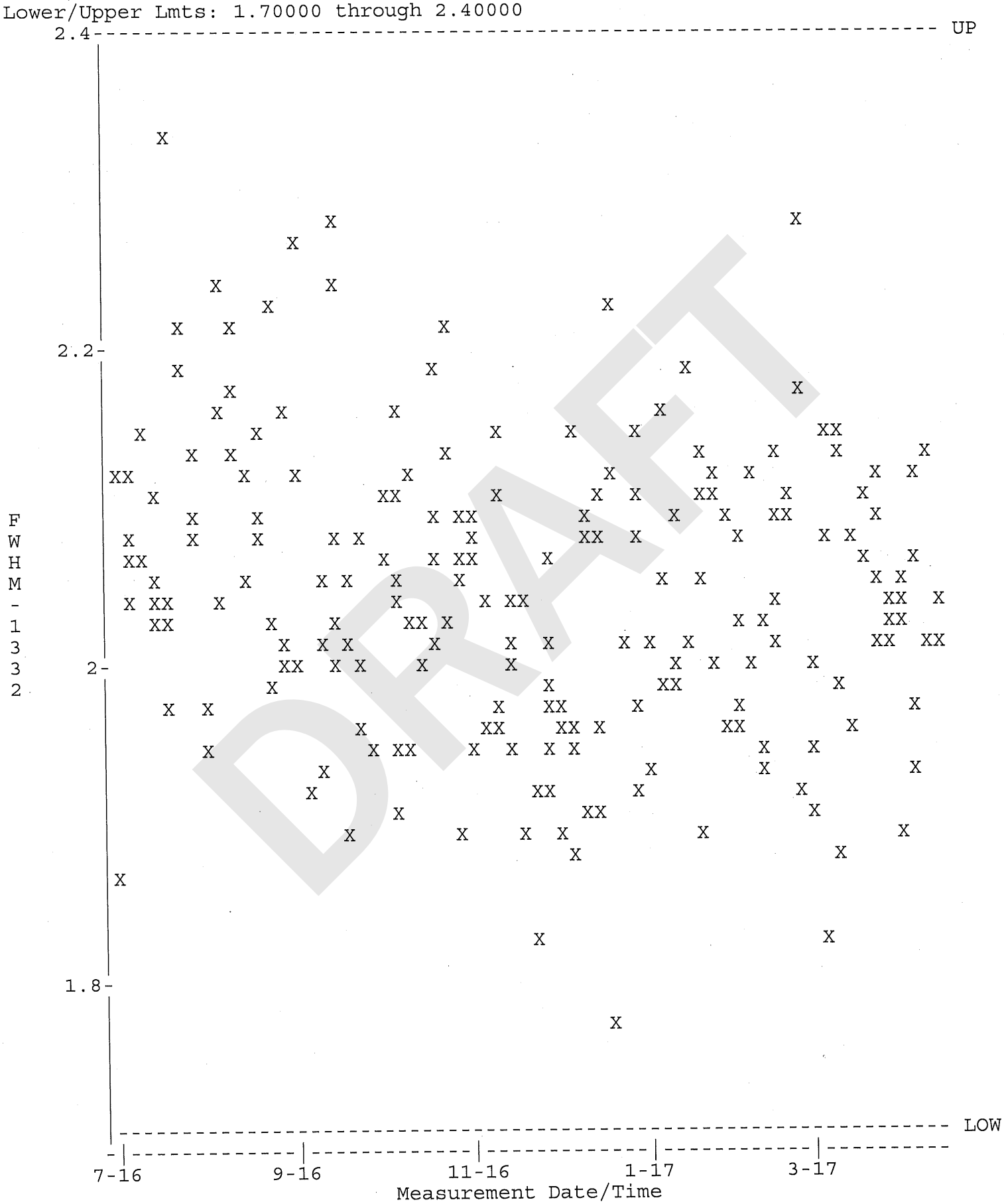
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2671.00



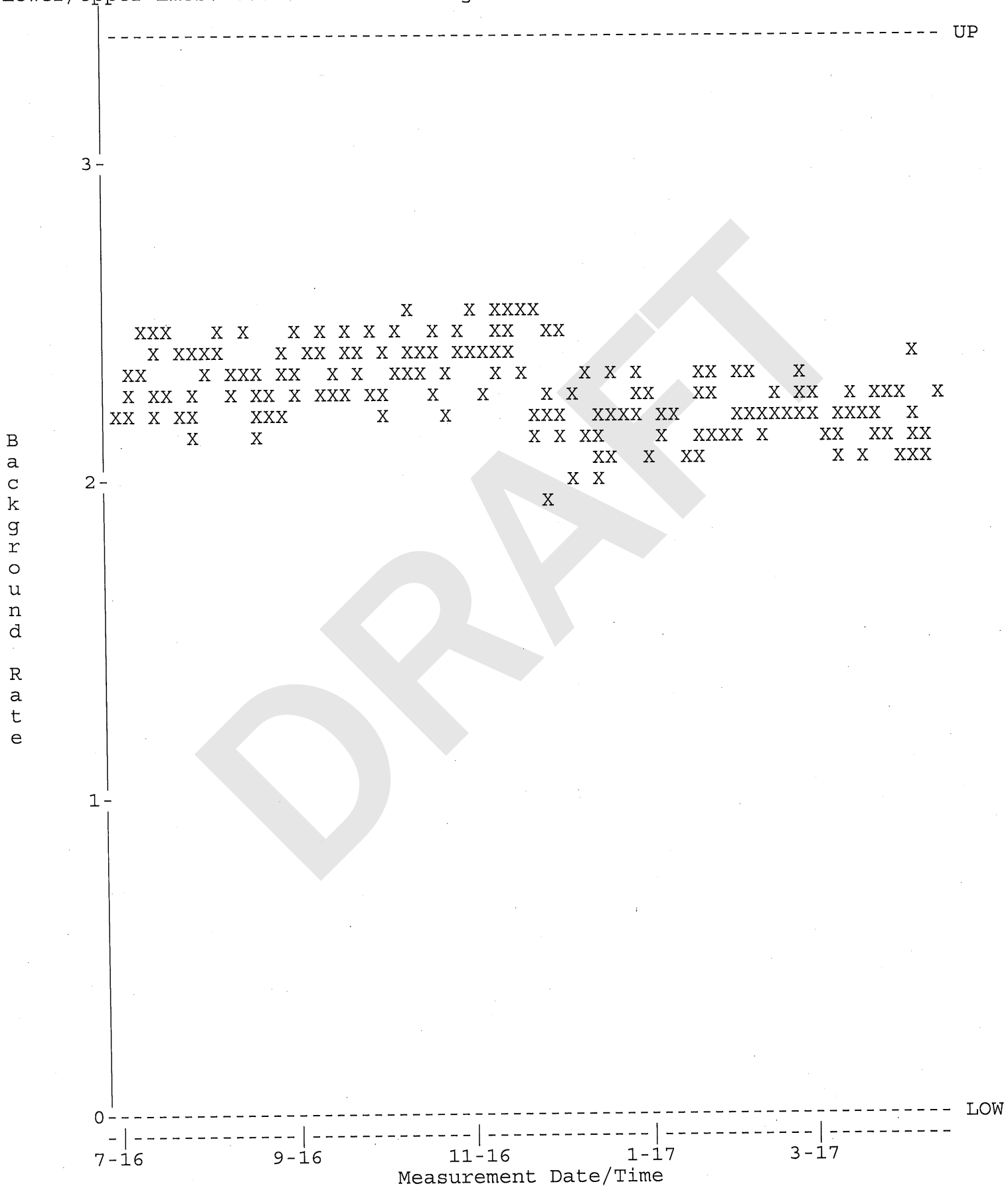
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.70000 through 2.40000



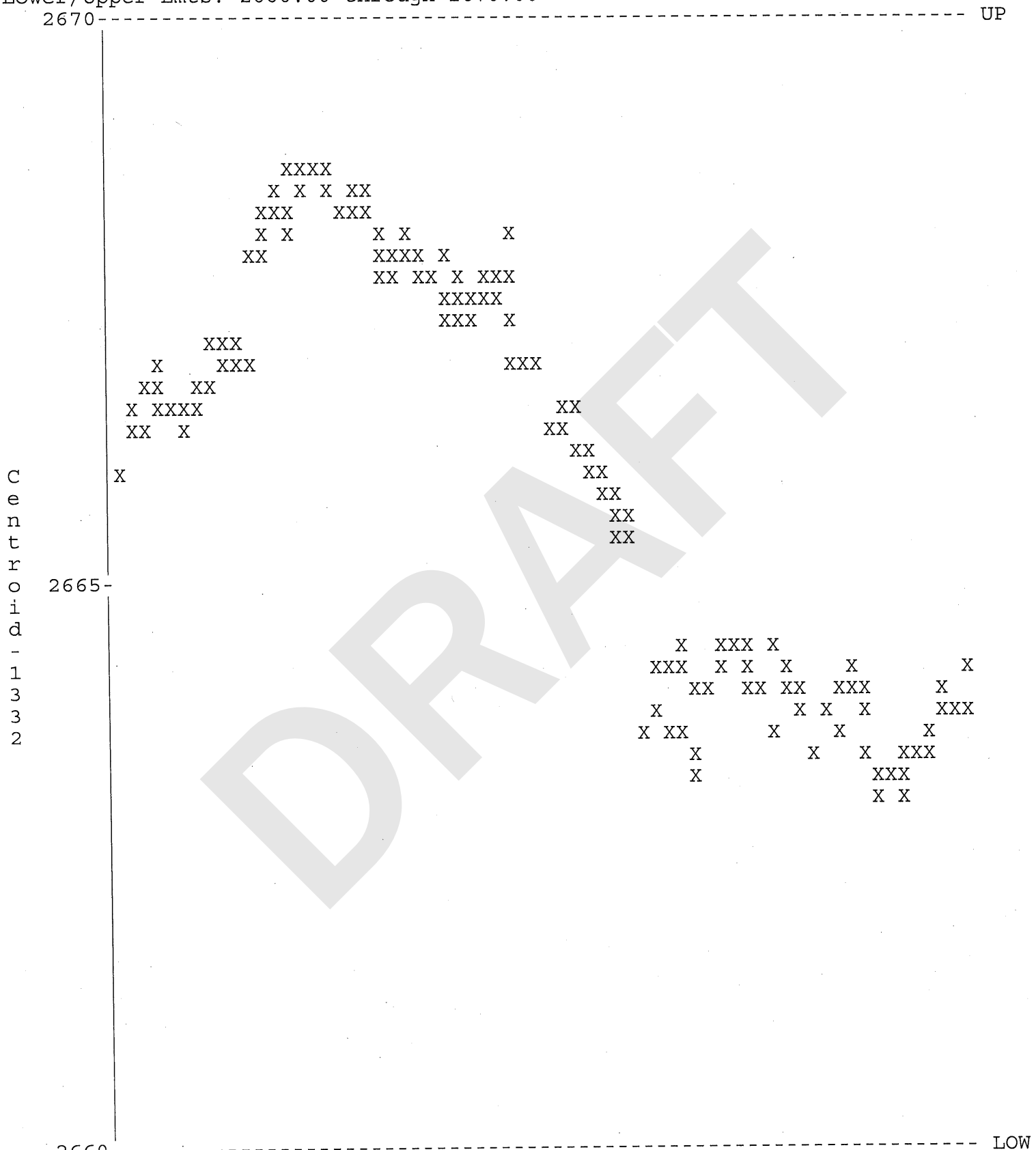
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE08_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:25 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



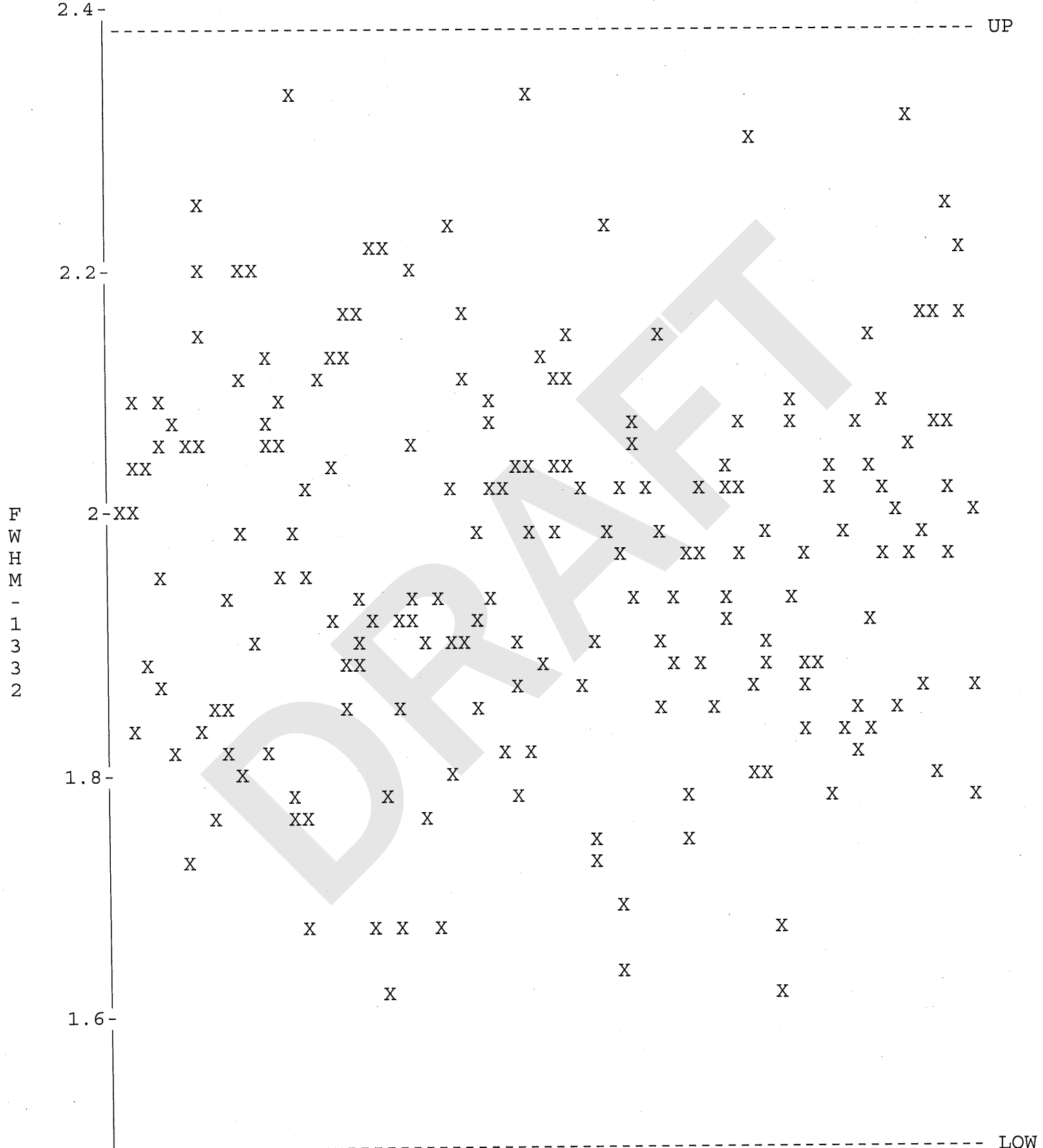
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



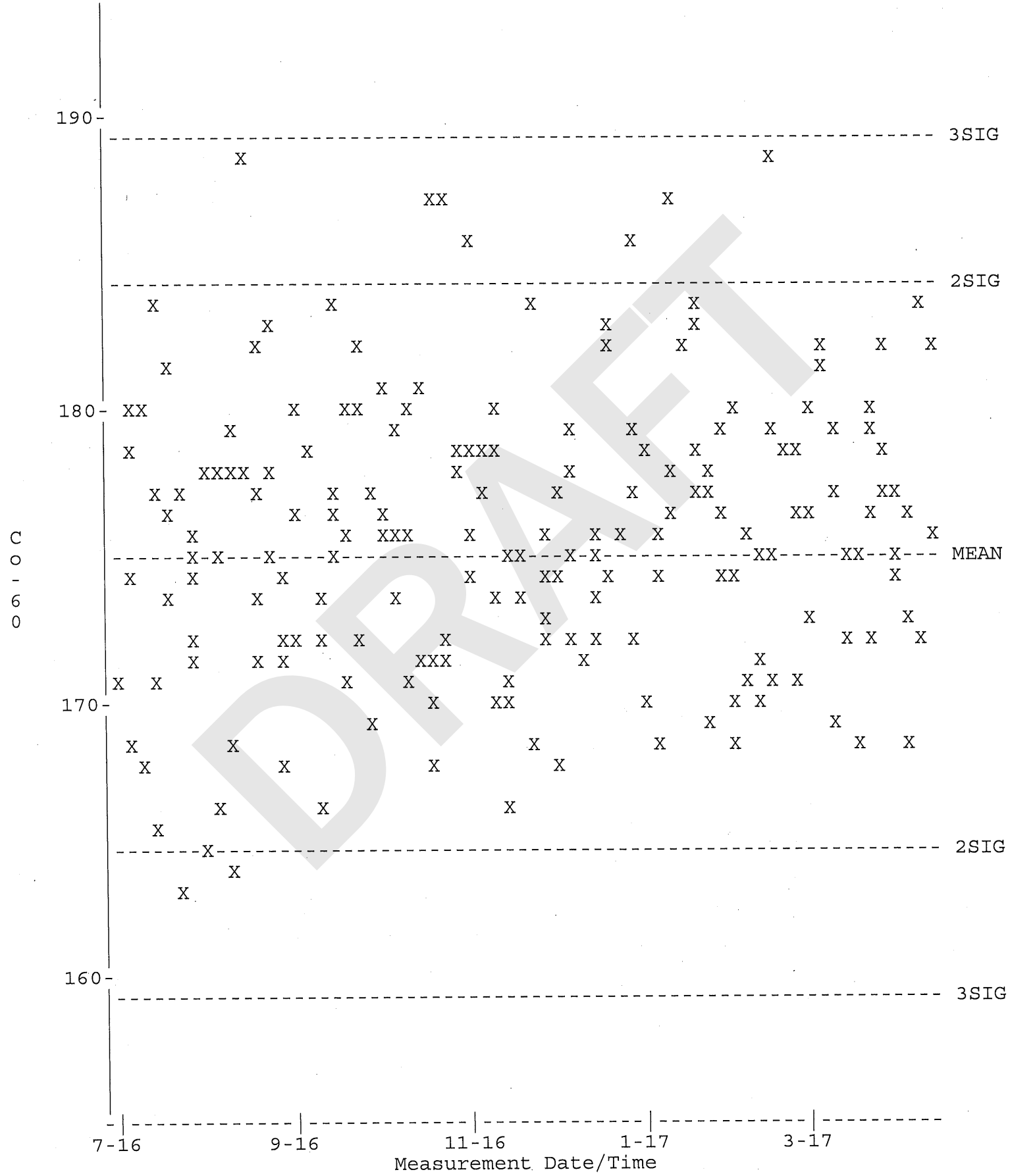
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.40000



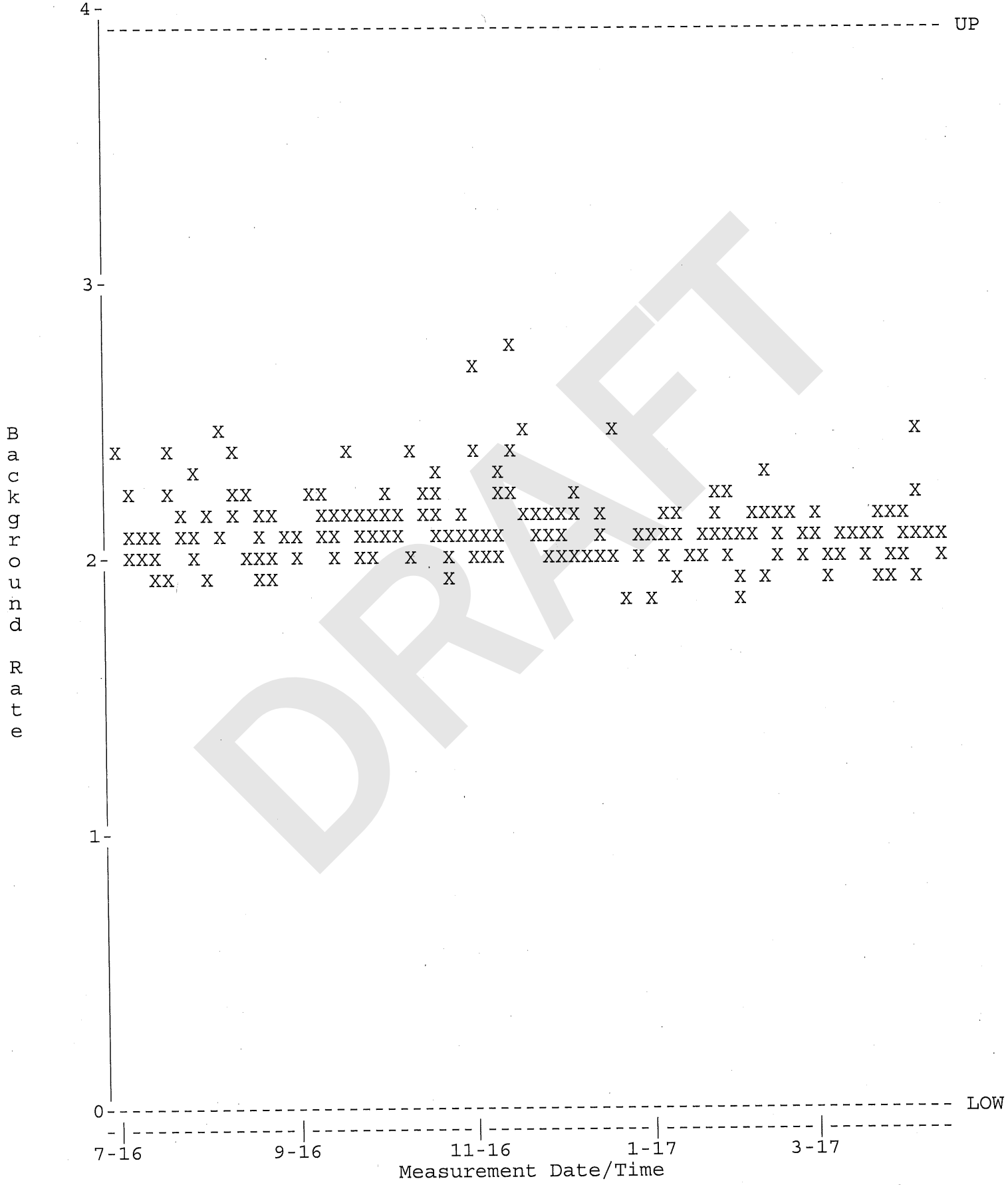
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE11_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Mean +- Std Dev : 174.786 +- 5.07535 (2.90 %)



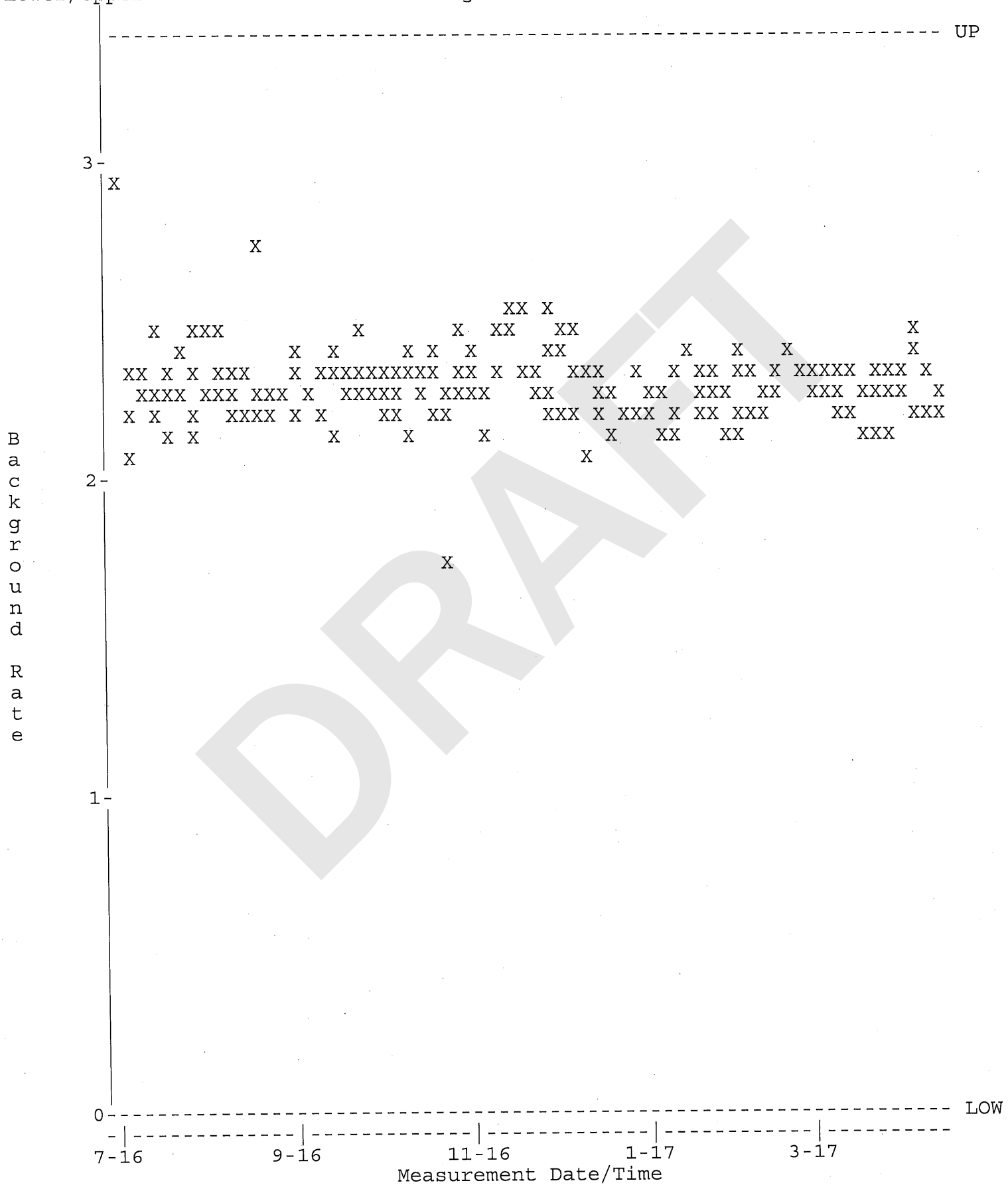
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE11_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:45 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 4.00000



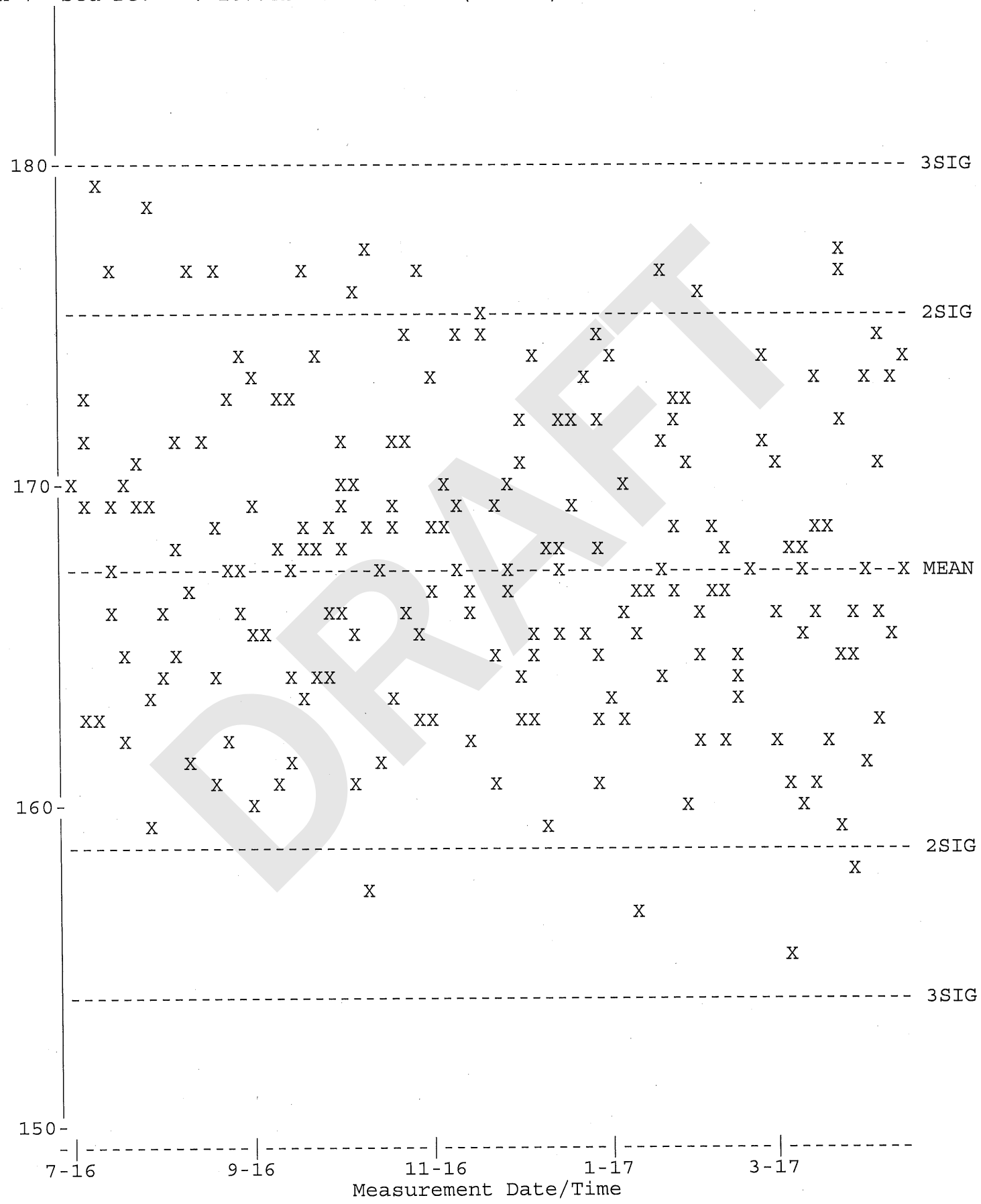
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE14_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:45 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



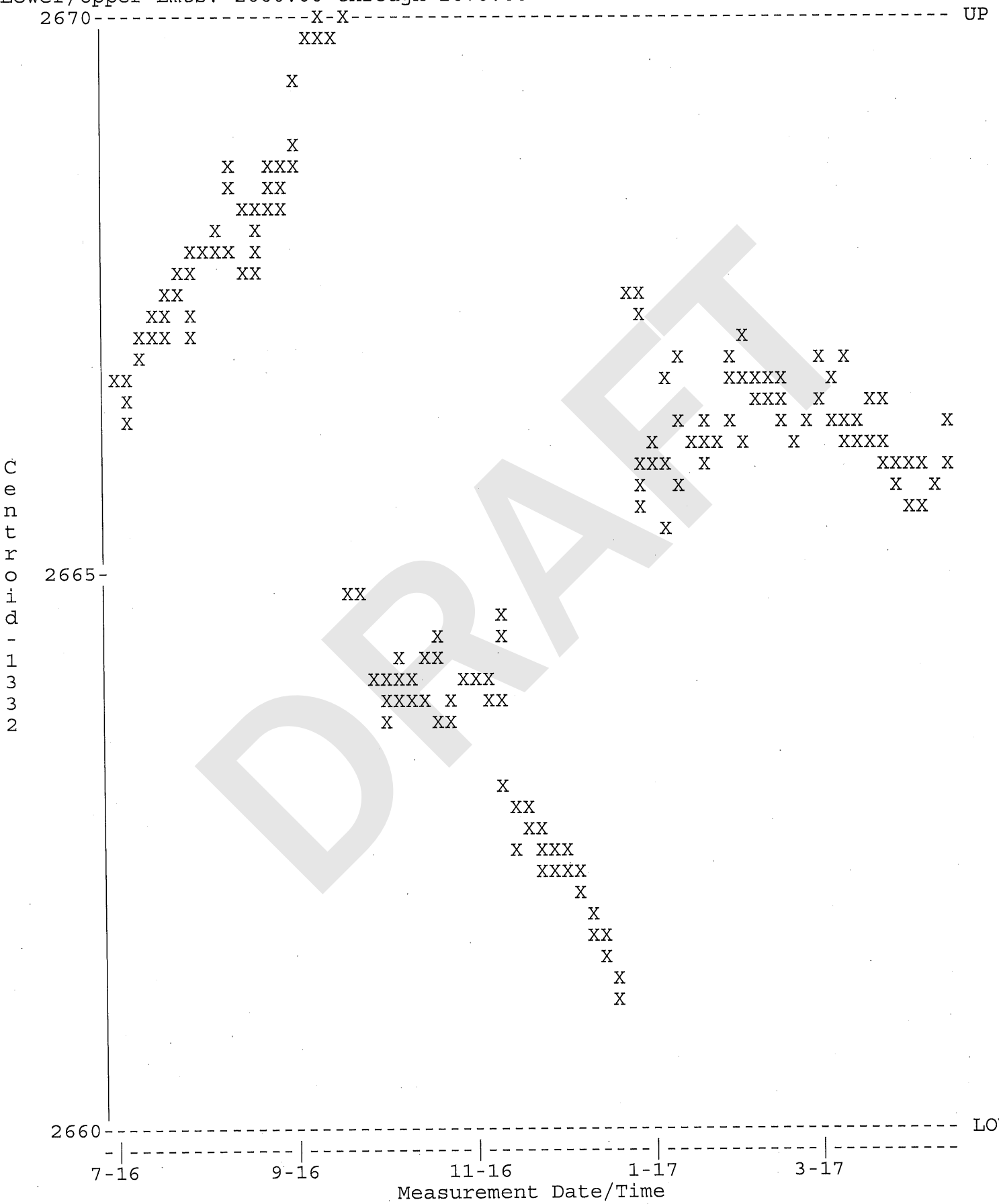
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Mean +- Std Dev : 167.424 +- 4.31182 (2.58 %)



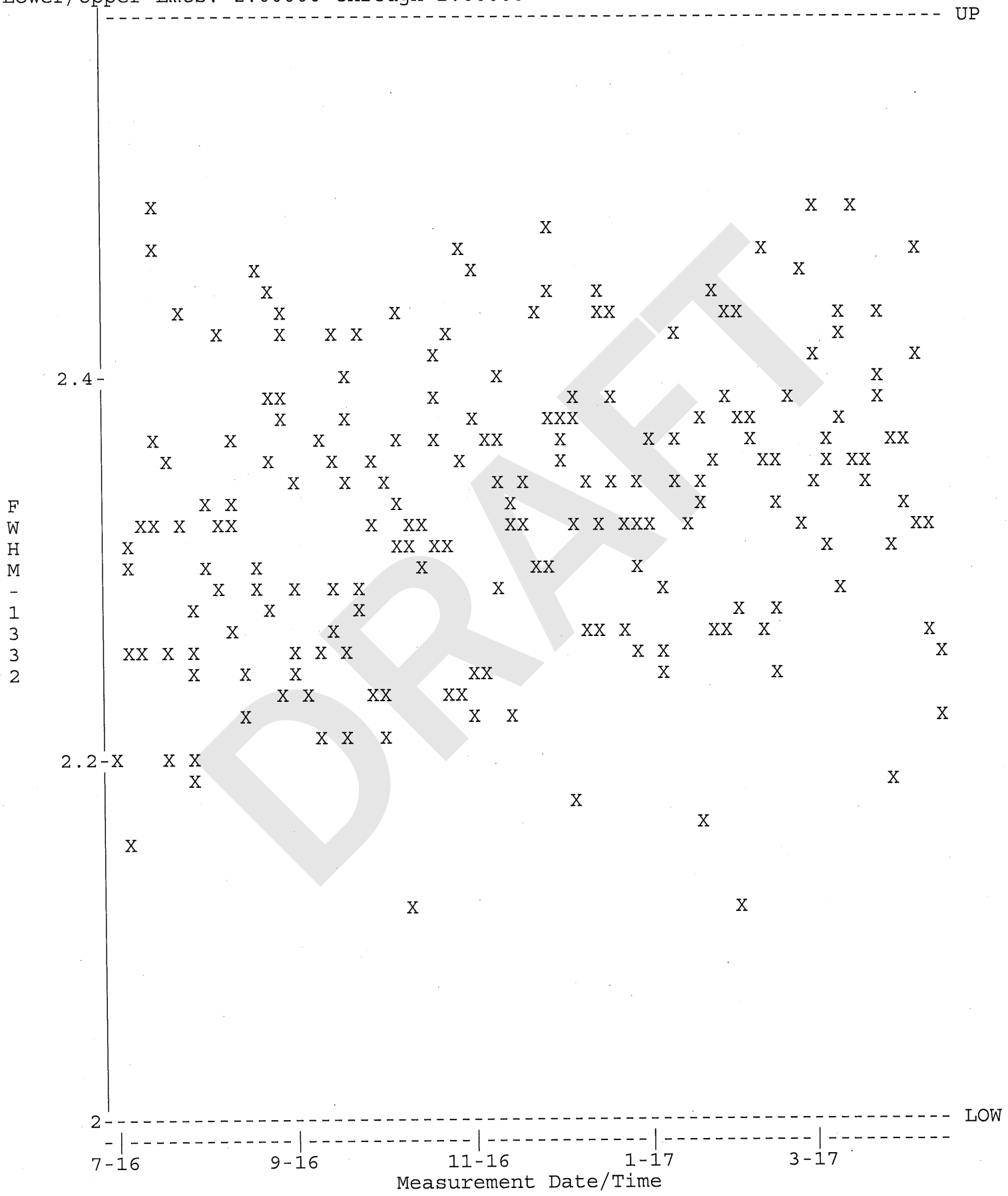
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 2.00000 through 2.60000



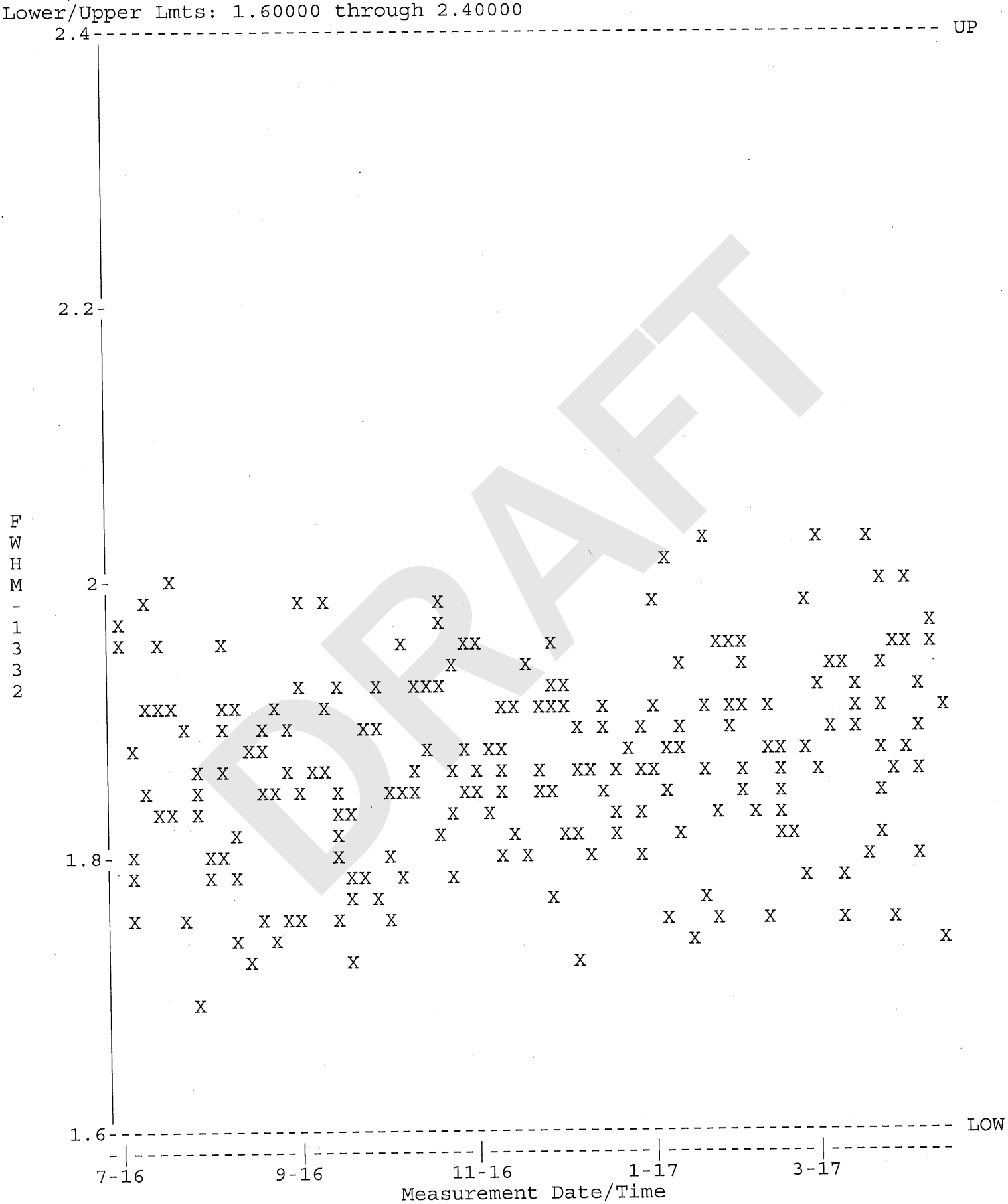
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



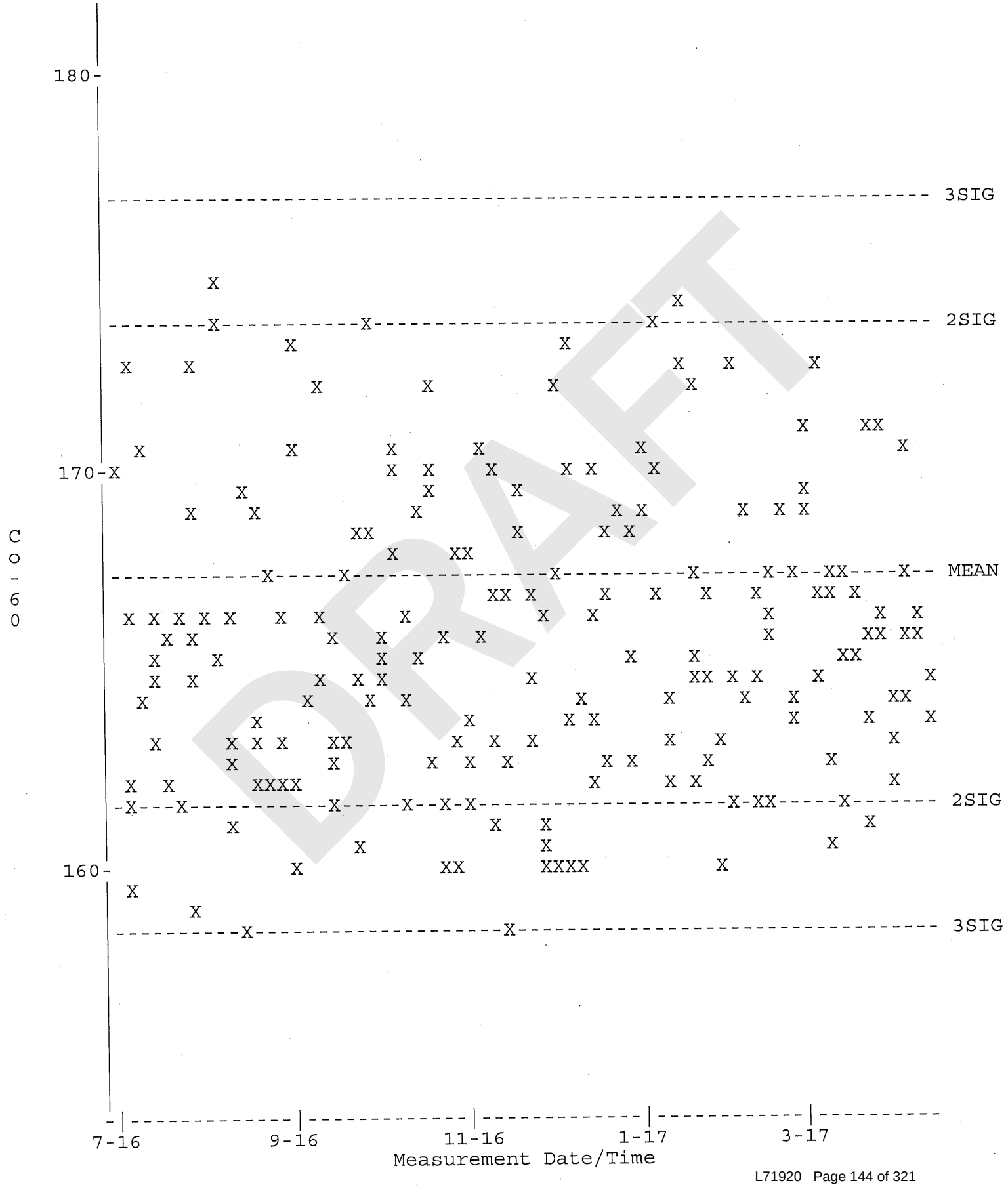
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.60000 through 2.40000



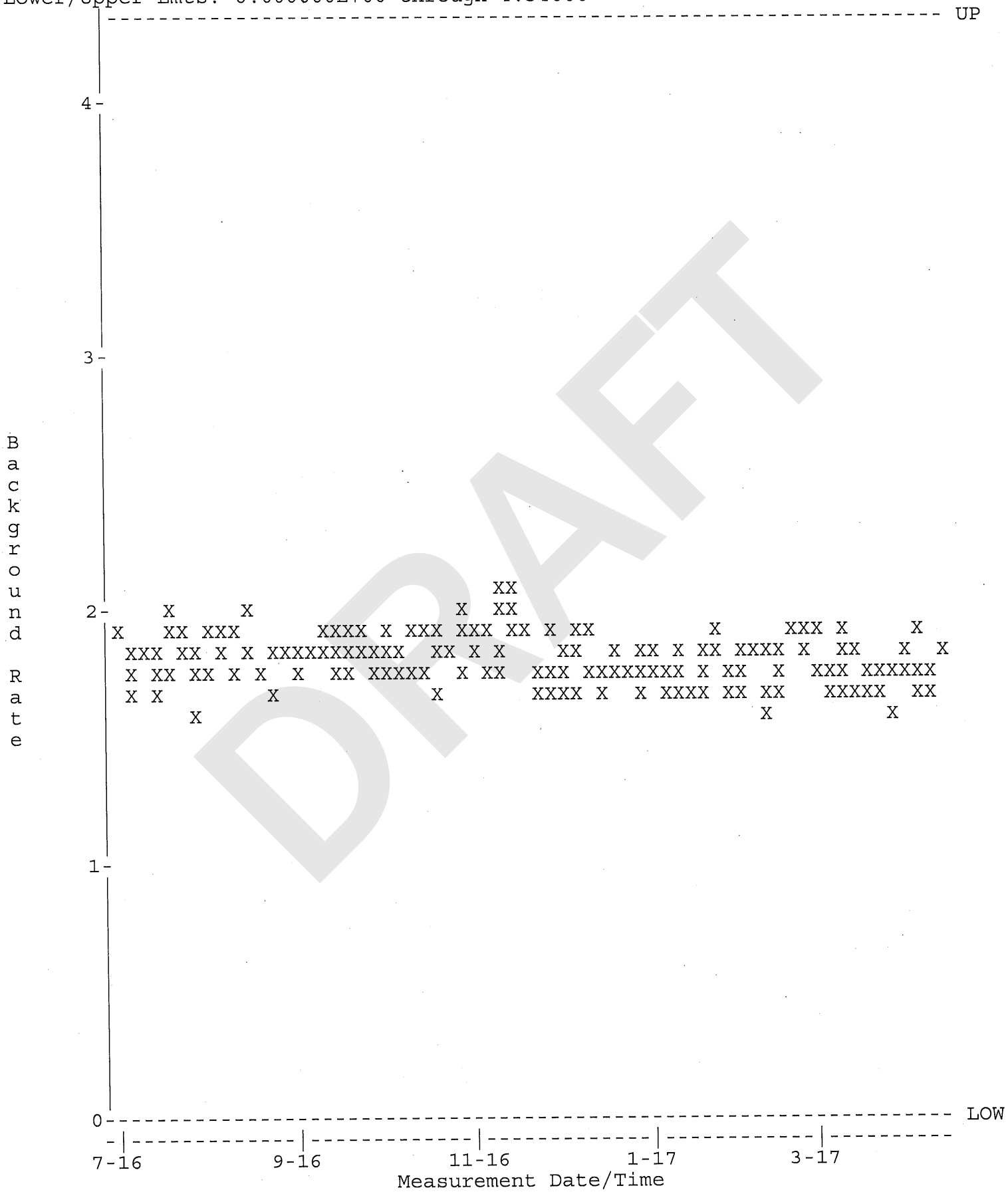
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:09 through 13-APR-2017 00:00
Mean +- Std Dev : 167.933 +- 3.08657 (1.84 %)



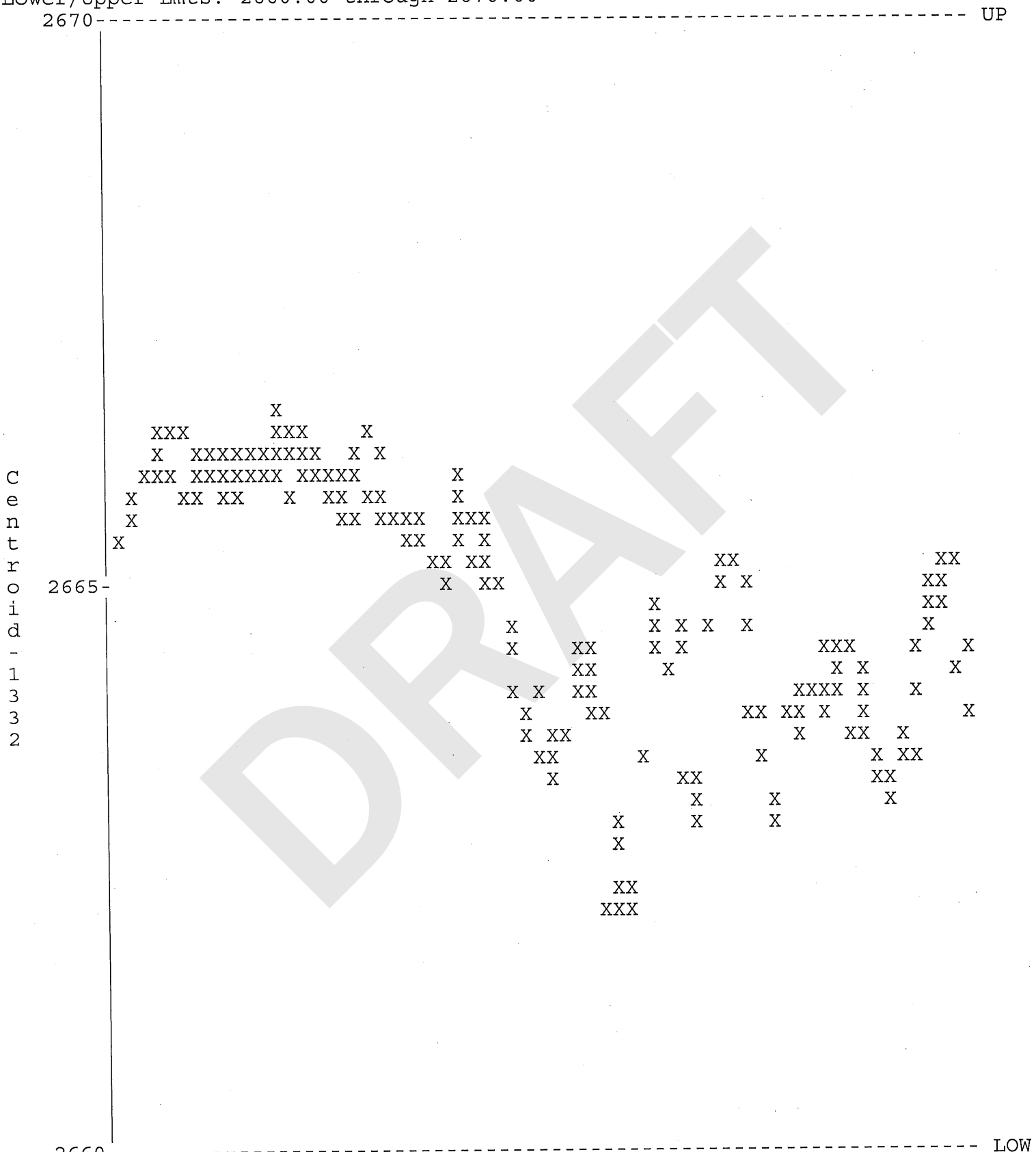
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE15_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:26 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 4.34000



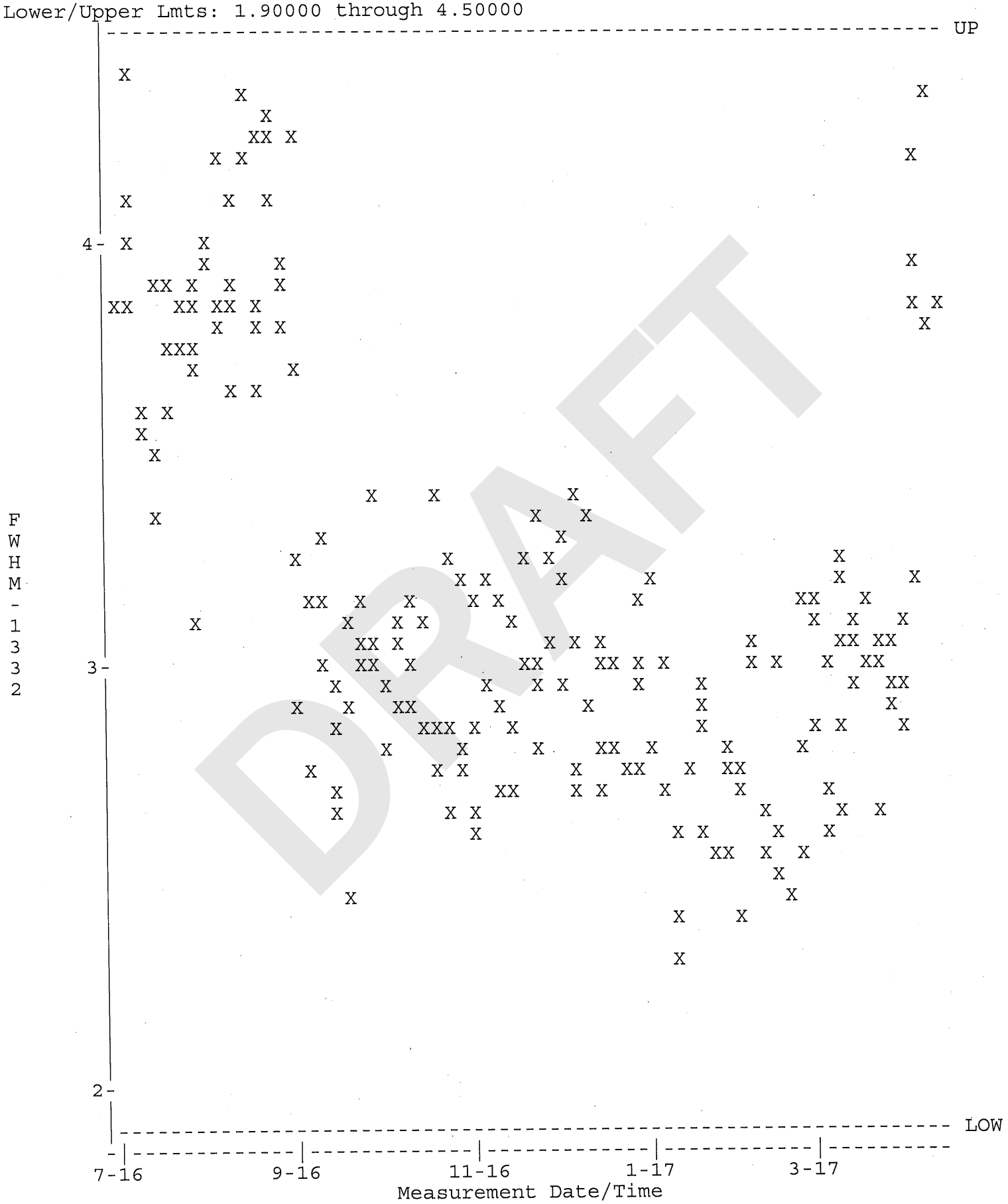
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:45 through 13-APR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



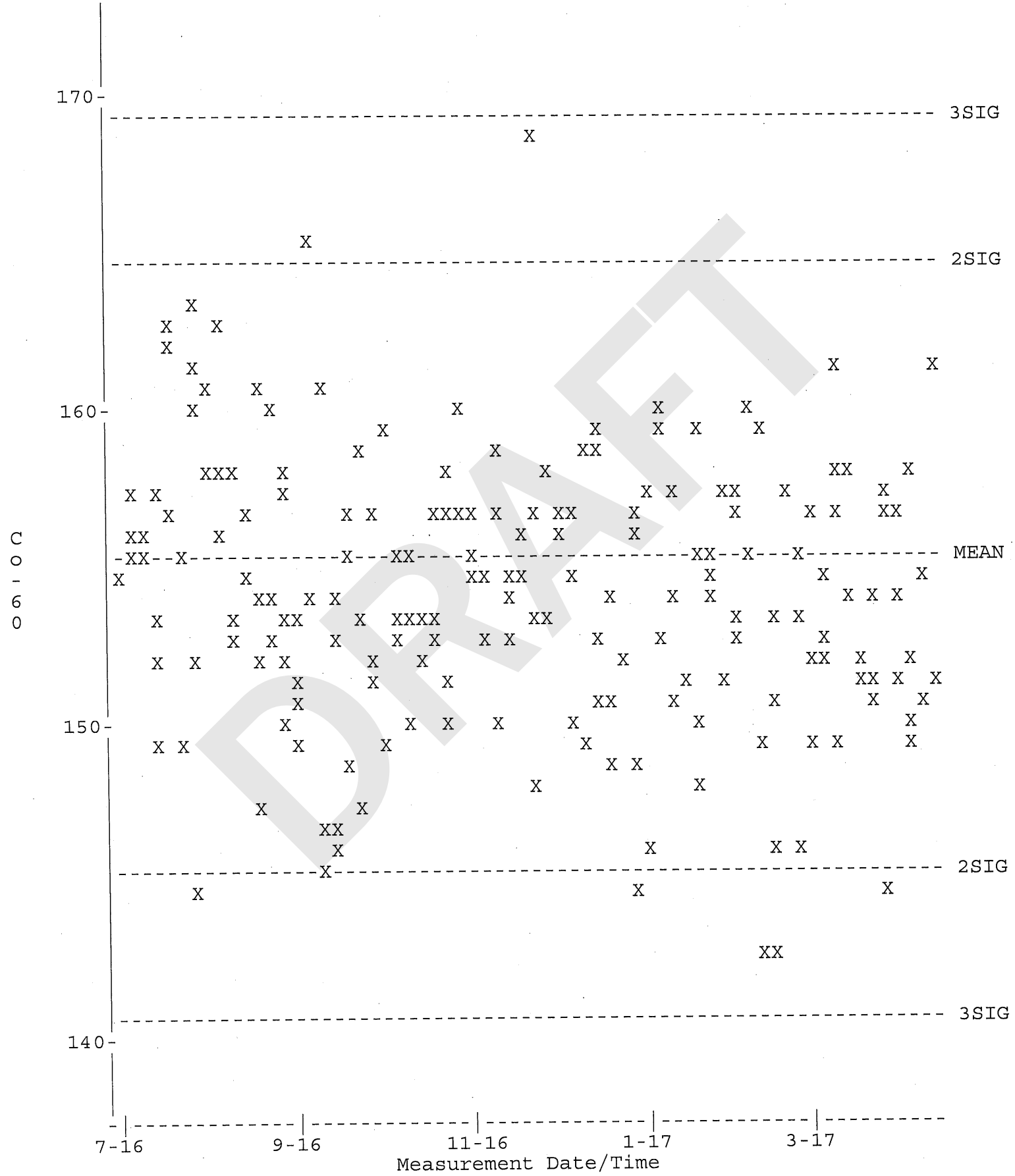
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:45 through 13-APR-2017 00:00
Lower/Upper Lmts: 1.90000 through 4.50000



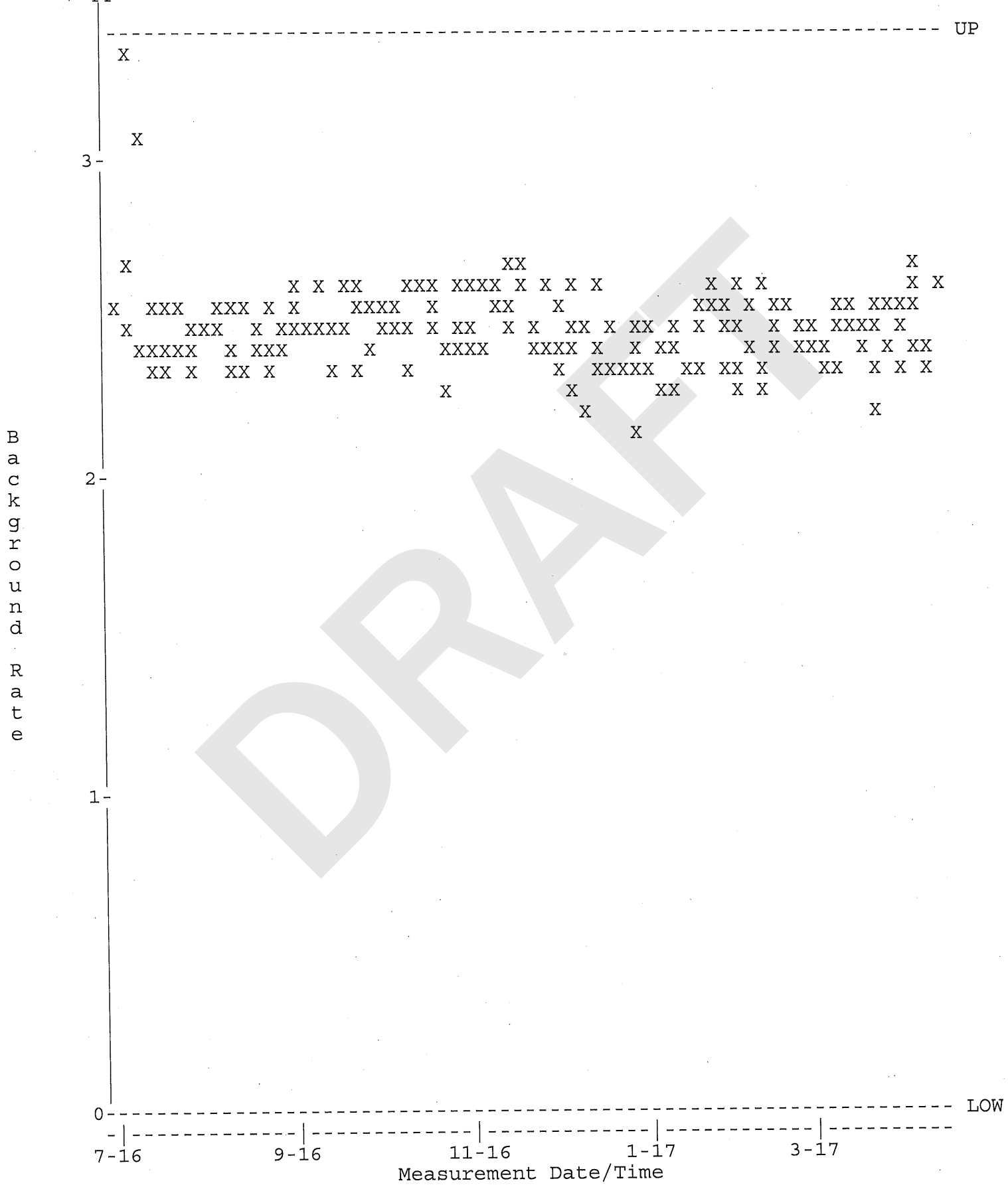
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:45 through 13-APR-2017 00:00
Mean +- Std Dev : 155.329 +- 4.74159 (3.05 %)



DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE23_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:12 through 13-APR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



DRAFT

GAMMA SPECTROSCOPY

Sample and QC Raw Data

DRAFT

Sec. Review: 3 Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 10:41:18.37
TBE11 31-TP20610B HpGe ******* Aquisition Date/Time: 15-MAR-2017 06:45:57.14

LIMS No., Customer Name, Client ID: WG24440-1 SS GEOENGINEERS SEDIMENT

Sample ID : 11WG24440-1 Smple Date: 23-FEB-2017 10:34:00.
Sample Type : SS Geometry : 11B150101411
Quantity : 9.22300E+01 g Dry BKGFILE : 11BG022417MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 03:55:10.16
End Channel : 4090 Pk Srch Sens: 7.00000 Live time : 0 03:55:03.96
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.66*	185	417	1.57	148.71	1.97E+00	1.31E-02	22.8	3.05E+00
2	1	77.30	142	390	1.43	154.00	2.15E+00	1.01E-02	27.6	
3	0	92.83*	108	410	1.22	185.05	3.03E+00	7.65E-03	37.1	
4	0	185.54*	152	391	1.44	370.47	3.60E+00	1.08E-02	28.1	
5	4	238.53*	311	221	1.33	476.46	3.08E+00	2.21E-02	10.5	1.06E+00
6	4	241.66*	122	229	1.85	482.72	3.05E+00	8.62E-03	30.1	
7	0	294.89*	130	230	1.16	589.17	2.62E+00	9.20E-03	26.3	
8	0	351.72*	224	198	1.65	702.82	2.27E+00	1.59E-02	14.5	
9	0	583.10*	107	77	1.57	1165.50	1.48E+00	7.58E-03	20.4	
10	0	609.12*	139	150	1.73	1217.54	1.43E+00	9.84E-03	22.1	
11	0	911.35*	78	69	2.37	1821.82	1.02E+00	5.54E-03	29.6	
12	0	1460.28*	436	20	2.01	2919.17	6.85E-01	3.09E-02	5.9	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.140E+00	------	Line Not Found	------
	911.07	78	27.70*	1.015E+00	5.779E-01	5.817E-01	59.27

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 11WG24440-1 Acquisition date : 15-MAR-2017 06:45:57

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	5.779E-01	5.817E-01	3.447E-01	59.27	
		Total Activity :	5.779E-01	5.817E-01			
		Grand Total Activity :	5.779E-01	5.817E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 11WG24440-1 Acquisition date : 15-MAR-2017 06:45:57

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.66	185	417	1.57	148.71	140	22	1.31E-02	45.6	1.97E+00	
1	77.30	142	390	1.43	154.00	140	22	1.01E-02	55.2	2.15E+00	
0	92.83	108	410	1.22	185.05	180	9	7.65E-03	74.2	3.03E+00	
0	185.54	152	391	1.44	370.47	365	12	1.08E-02	56.1	3.60E+00	
4	238.53	311	221	1.33	476.46	472	16	2.21E-02	21.0	3.08E+00	
4	241.66	122	229	1.85	482.72	472	16	8.62E-03	60.1	3.05E+00	
0	294.89	130	230	1.16	589.17	584	12	9.20E-03	52.6	2.62E+00	
0	351.72	224	198	1.65	702.82	696	11	1.59E-02	29.0	2.27E+00	
0	583.10	107	77	1.57	1165.50	1159	12	7.58E-03	40.9	1.48E+00	
0	609.12	139	150	1.73	1217.54	1210	15	9.84E-03	44.3	1.43E+00	
0	1460.28	436	20	2.01	2919.17	2909	20	3.09E-02	11.9	6.85E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	5.779E-01	5.817E-01	3.447E-01	59.27	
			---	---			
Total Activity :			5.779E-01	5.817E-01			
Grand Total Activity :			5.779E-01	5.817E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	5.817E-01	3.447E-01	2.521E-01	0.000E+00	2.307

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

DRAFT

CS-134	-2.283E-03	5.118E-02	7.233E-02	0.000E+00	-0.032
CS-137	8.379E-02	5.428E-02	9.778E-02	0.000E+00	0.857

DRAFT

```
A,11WG24440-1     ,03/15/2017 10:41,02/23/2017 10:34,   9.223E+01,WG24440-1 SS G
B,11WG24440-1     ,CS134_137          ,01/03/2017 08:01,11B150101411
C,AC-228  ,YES,   5.817E-01,   3.447E-01,   2.521E-01,,    2.307
C,CS-134  ,NO ,  -2.283E-03,   5.118E-02,   7.233E-02,,   -0.032
C,CS-137  ,NO ,   8.379E-02,   5.428E-02,   9.778E-02,,    0.857
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 10:42:46.04
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 14-MAR-2017 14:03:14.54

LIMS No., Customer Name, Client ID: L71920-3 SS GEOENGINEERS SEDIMENT

Sample ID : 07L71920-3
Sample Type : SS
Quantity : 9.22300E+01 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 10:34:00.
Geometry : 07B150101811
BKGFILE : 07BG022417MT
Real Time : 0 03:00:01.49
Live time : 0 03:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	74.60*	93	349	1.79	149.97	2.29E+00	8.60E-03	45.2	4.31E+00
2	2	77.11	146	229	1.28	155.00	2.50E+00	1.35E-02	21.4	
3	1	92.86*	105	405	2.16	186.54	3.59E+00	9.72E-03	44.1	1.82E+00
4	1	238.82*	314	245	2.18	478.78	3.82E+00	2.91E-02	12.3	6.29E+00
5	1	295.18*	111	156	1.90	591.60	3.31E+00	1.03E-02	24.4	4.94E-01
6	1	338.05*	67	136	1.59	677.44	3.00E+00	6.20E-03	36.2	9.39E-01
7	1	351.74*	128	205	1.65	704.84	2.91E+00	1.18E-02	25.9	1.13E+00
8	1	582.40*	111	81	2.81	1166.50	1.98E+00	1.03E-02	22.3	2.37E+00
9	1	609.22*	126	77	1.47	1220.18	1.91E+00	1.17E-02	17.9	1.93E+00
10	1	910.64*	79	43	3.44	1823.26	1.39E+00	7.29E-03	22.3	1.91E+00
11	1	968.85	55	49	1.57	1939.69	1.32E+00	5.08E-03	28.3	1.05E+00
12	1	1460.38*	417	63	2.31	2922.62	9.57E-01	3.86E-02	7.6	1.23E+00

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.550E+00	------	Line Not Found	------
	911.07	79	27.70*	1.388E+00	5.557E-01	5.592E-01	44.68

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 07L71920-3 Acquisition date : 14-MAR-2017 14:03:14

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	5.557E-01	5.592E-01	2.499E-01	44.68	
	Total Activity :		5.557E-01	5.592E-01			
	Grand Total Activity :		5.557E-01	5.592E-01			

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

DRAFT

Sample ID : 07L71920-3 Acquisition date : 14-MAR-2017 14:03:14

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
2	74.60	93	349	1.79	149.97	145	14	8.60E-03	90.3	2.29E+00	
2	77.11	146	229	1.28	155.00	145	14	1.35E-02	42.8	2.50E+00	
1	92.86	105	405	2.16	186.54	180	14	9.72E-03	88.2	3.59E+00	
1	238.82	314	245	2.18	478.78	474	13	2.91E-02	24.6	3.82E+00	
1	295.18	111	156	1.90	591.60	587	10	1.03E-02	48.7	3.31E+00	
1	338.05	67	136	1.59	677.44	672	10	6.20E-03	72.3	3.00E+00	
1	351.74	128	205	1.65	704.84	698	13	1.18E-02	51.8	2.91E+00	
1	582.40	111	81	2.81	1166.50	1158	17	1.03E-02	44.6	1.98E+00	
1	609.22	126	77	1.47	1220.18	1216	11	1.17E-02	35.8	1.91E+00	
1	968.85	55	49	1.57	1939.69	1932	12	5.08E-03	56.6	1.32E+00	
1	1460.38	417	63	2.31	2922.62	2911	25	3.86E-02	15.1	9.57E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	5.557E-01	5.592E-01	2.499E-01	44.68	
			---	---			
Total Activity :			5.557E-01	5.592E-01			
Grand Total Activity :			5.557E-01	5.592E-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
AC-228	5.592E-01	2.499E-01	2.575E-01	0.000E+00	2.172

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

CS-134	3.224E-04	5.113E-02	7.386E-02	0.000E+00	0.004
CS-137	6.480E-02	5.118E-02	9.218E-02	0.000E+00	0.703

DRAFT

```
A,07L71920-3       ,03/15/2017 10:42,02/23/2017 10:34,   9.223E+01,L71920-3 SS GE
B,07L71920-3       ,CS134_137           ,01/05/2017 07:18,07B150101811
C,AC-228  ,YES,    5.592E-01,   2.499E-01,   2.575E-01,,    2.172
C,CS-134  ,NO ,    3.224E-04,   5.113E-02,   7.386E-02,,    0.004
C,CS-137  ,NO ,    6.480E-02,   5.118E-02,   9.218E-02,,    0.703
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:50:15.30
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 14-MAR-2017 10:40:18.73

LIMS No., Customer Name, Client ID: L71920-6 SS GEOENGINEERS SEDIMENT

Sample ID : 02L71920-6
Sample Type : SS
Quantity : 7.22400E+01 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 10:40:00.
Geometry : 02B150101711
BKGFILE : 02BG022417MT
Real Time : 0 03:09:45.65
Live time : 0 03:09:43.97

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	63.10*	70	335	0.83	110.65	1.98E+00	6.19E-03	51.0	
2	0	77.33*	141	259	1.04	139.27	3.07E+00	1.24E-02	21.3	0.00E+00
3	0	92.85*	143	353	1.26	170.50	3.83E+00	1.25E-02	28.3	
4	0	185.88*	82	221	0.92	357.61	3.79E+00	7.18E-03	37.0	
5	6	238.51*	244	108	0.93	463.48	3.22E+00	2.15E-02	9.8	4.98E-01
6	6	241.55	89	140	1.54	469.58	3.19E+00	7.85E-03	27.4	
7	0	295.01*	96	106	1.03	577.10	2.73E+00	8.48E-03	22.5	
8	0	351.77*	156	113	1.03	691.28	2.37E+00	1.37E-02	15.4	
9	0	583.06*	75	70	1.31	1156.49	1.53E+00	6.62E-03	25.9	
10	0	609.15*	140	58	1.41	1208.96	1.47E+00	1.23E-02	14.8	
11	0	661.42	65	45	1.38	1314.09	1.36E+00	5.73E-03	22.9	
12	0	910.82*	77	41	3.58	1815.73	1.02E+00	6.74E-03	23.0	
13	0	1120.36*	23	22	1.42	2237.20	8.39E-01	2.00E-03	49.0	
14	0	1133.56	29	8	1.30	2263.76	8.30E-01	2.53E-03	26.8	
15	0	1460.56*	325	16	2.21	2921.50	6.67E-01	2.86E-02	6.5	
16	0	1764.41*	18	2	1.93	3532.70	5.80E-01	1.62E-03	36.8	

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

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
CS-137	661.65	65	85.12*	1.364E+00	1.847E-01	1.850E-01	45.72

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.153E+00	------	Line Not Found	------
	911.07	77	27.70*	1.016E+00	8.968E-01	9.024E-01	46.06

Flag: "*" = Keyline

DRAFT

Sample ID : 02L71920-6 Acquisition date : 14-MAR-2017 10:40:18

Total number of lines in spectrum	16	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	2	12.50%

Nuclide Type : fission

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.17Y	1.00	1.847E-01	1.850E-01	0.846E-01	45.72	
			---------	---------			
	Total Activity :		1.847E-01	1.850E-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	8.968E-01	9.024E-01	4.156E-01	46.06	
			---------	---------			
	Total Activity :		8.968E-01	9.024E-01			
	Grand Total Activity :		1.082E+00	1.087E+00			

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

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It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	63.10	70	335	0.83	110.65	106	10	6.19E-03	****	1.98E+00	
0	77.33	141	259	1.04	139.27	137	7	1.24E-02	42.5	3.07E+00	
0	92.85	143	353	1.26	170.50	166	11	1.25E-02	56.5	3.83E+00	
0	185.88	82	221	0.92	357.61	354	9	7.18E-03	74.0	3.79E+00	
6	238.51	244	108	0.93	463.48	460	14	2.15E-02	19.5	3.22E+00	
6	241.55	89	140	1.54	469.58	460	14	7.85E-03	54.8	3.19E+00	
0	295.01	96	106	1.03	577.10	573	8	8.48E-03	45.1	2.73E+00	
0	351.77	156	113	1.03	691.28	686	9	1.37E-02	30.8	2.37E+00	
0	583.06	75	70	1.31	1156.49	1149	12	6.62E-03	51.7	1.53E+00	
0	609.15	140	58	1.41	1208.96	1204	12	1.23E-02	29.6	1.47E+00	
0	1120.36	23	22	1.42	2237.20	2232	10	2.00E-03	98.0	8.39E-01	
0	1133.56	29	8	1.30	2263.76	2258	11	2.53E-03	53.6	8.30E-01	
0	1460.56	325	16	2.21	2921.50	2914	16	2.86E-02	13.0	6.67E-01	
0	1764.41	18	2	1.93	3532.70	3528	10	1.62E-03	73.6	5.80E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	2	12.50%

Nuclide Type : fission

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
CS-137	30.17Y	1.00	1.847E-01	1.850E-01	0.846E-01	45.72	
	Total Activity :		1.847E-01	1.850E-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	8.968E-01	9.024E-01	4.156E-01	46.06	
	Total Activity :		8.968E-01	9.024E-01			
	Grand Total Activity :		1.082E+00	1.087E+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 ----

DRAFT

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-137	1.850E-01	8.456E-02	8.104E-02	0.000E+00	2.282
AC-228	9.024E-01	4.156E-01	3.346E-01	0.000E+00	2.697

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-7.367E-03		7.054E-02	9.700E-02	0.000E+00	-0.076

DRAFT

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A,02L71920-6       ,03/14/2017 13:50,02/23/2017 10:40,   7.224E+01,L71920-6 SS GE
B,02L71920-6       ,CS134_137           ,01/03/2017 08:02,02B150101711
C,CS-137  ,YES,    1.850E-01,   8.456E-02,   8.104E-02,,    2.282
C,AC-228  ,YES,    9.024E-01,   4.156E-01,   3.346E-01,,    2.697
C,CS-134  ,NO ,   -7.367E-03,   7.054E-02,   9.700E-02,,   -0.076
```

DRAFT

Sec. ~~Review~~: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:49:50.95
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 14-MAR-2017 11:03:22.10

LIMS No., Customer Name, Client ID: L71920-9 SS GEOENGINEERS SEDIMENT

Sample ID : 01L71920-9 Smple Date: 23-FEB-2017 10:46:00.
Sample Type : SS Geometry : 01B150022715
Quantity : 6.49900E+01 g Dry BKGFILE : 01BG022417MT
Start Channel : 90 Energy Tol : 1.50000 Real Time : 0 02:46:10.76
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 02:46:08.70
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.32*	30	211	1.60	126.86	1.19E+00	3.03E-03	91.4	4.76E+00
2	4	75.17*	18	250	1.01	150.54	2.28E+00	1.82E-03	147.2	6.07E+00
3	4	77.43	131	250	1.26	155.04	2.49E+00	1.32E-02	24.3	
4	1	86.26*	55	379	4.48	172.70	3.24E+00	5.50E-03	75.8	5.41E+00
5	1	92.83*	93	244	1.15	185.83	3.73E+00	9.33E-03	35.4	2.40E+00
6	1	144.17*	36	217	2.49	288.45	5.17E+00	3.58E-03	82.5	2.02E+00
7	1	185.79*	75	231	1.41	371.64	4.92E+00	7.55E-03	44.5	3.44E+00
8	4	238.65*	200	130	1.01	477.32	4.33E+00	2.01E-02	12.0	1.86E+00
9	4	241.76	99	186	1.85	483.53	4.30E+00	9.88E-03	31.6	
10	4	245.00	49	159	1.85	490.01	4.26E+00	4.90E-03	58.7	
11	1	295.30*	73	155	0.96	590.58	3.77E+00	7.29E-03	35.0	2.16E+00
12	1	338.47*	53	168	1.76	676.89	3.43E+00	5.34E-03	56.5	1.56E+00
13	1	351.81*	110	126	1.38	703.56	3.33E+00	1.11E-02	23.6	2.01E+00
14	1	510.80*	16	102	2.68	1021.52	2.53E+00	1.62E-03	194.3	1.37E+00
15	1	583.15*	80	54	2.09	1166.23	2.28E+00	8.01E-03	22.4	6.53E+00
16	1	609.24*	102	80	1.51	1218.41	2.20E+00	1.02E-02	22.6	1.04E+00
17	1	661.74	55	71	1.73	1323.43	2.06E+00	5.53E-03	34.9	2.02E+00
18	1	860.41	27	28	1.35	1720.96	1.66E+00	2.69E-03	41.7	4.78E-01
19	1	913.12	46	81	2.31	1826.44	1.58E+00	4.57E-03	52.1	2.00E+01
20	1	968.56*	20	43	2.02	1937.40	1.50E+00	2.00E-03	64.7	1.83E+00
21	1	1120.15*	17	33	1.46	2240.86	1.32E+00	1.74E-03	76.2	5.25E-01
22	1	1460.43*	323	14	2.38	2922.31	1.07E+00	3.24E-02	6.7	1.13E+00

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

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
CS-137	661.65	55	85.12*	2.060E+00	1.311E-01	1.312E-01	69.77

Flag: "*" = Keyline

DRAFT

Total number of lines in spectrum	22	
Number of unidentified lines	21	
Number of lines tentatively identified by NID	1	4.55%

Nuclide Type : fission

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.17Y	1.00	1.311E-01	1.312E-01	0.915E-01	69.77	
			---------	---------			
	Total Activity :		1.311E-01	1.312E-01			
Grand Total Activity :			1.311E-01	1.312E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.32	30	211	1.60	126.86	123	8	3.03E-03	****	1.19E+00	
4	75.17	18	250	1.01	150.54	147	12	1.82E-03	****	2.28E+00	
4	77.43	131	250	1.26	155.04	147	12	1.32E-02	48.6	2.49E+00	
1	86.26	55	379	4.48	172.70	166	13	5.50E-03	****	3.24E+00	
1	92.83	93	244	1.15	185.83	181	9	9.33E-03	70.9	3.73E+00	
1	144.17	36	217	2.49	288.45	284	10	3.58E-03	****	5.17E+00	
1	185.79	75	231	1.41	371.64	366	11	7.55E-03	89.0	4.92E+00	
4	238.65	200	130	1.01	477.32	473	22	2.01E-02	24.0	4.33E+00	
4	241.76	99	186	1.85	483.53	473	22	9.88E-03	63.1	4.30E+00	
4	245.00	49	159	1.85	490.01	473	22	4.90E-03	****	4.26E+00	
1	295.30	73	155	0.96	590.58	587	9	7.29E-03	70.1	3.77E+00	
1	338.47	53	168	1.76	676.89	671	15	5.34E-03	****	3.43E+00	
1	351.81	110	126	1.38	703.56	698	11	1.11E-02	47.2	3.33E+00	
1	510.80	16	102	2.68	1021.52	1013	17	1.62E-03	****	2.53E+00	
1	583.15	80	54	2.09	1166.23	1161	10	8.01E-03	44.9	2.28E+00	
1	609.24	102	80	1.51	1218.41	1212	13	1.02E-02	45.1	2.20E+00	
1	860.41	27	28	1.35	1720.96	1716	10	2.69E-03	83.4	1.66E+00	
1	913.12	46	81	2.31	1826.44	1817	21	4.57E-03	****	1.58E+00	
1	968.56	20	43	2.02	1937.40	1934	9	2.00E-03	****	1.50E+00	
1	1120.15	17	33	1.46	2240.86	2235	12	1.74E-03	****	1.32E+00	
1	1460.43	323	14	2.38	2922.31	2915	16	3.24E-02	13.5	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 22
Number of unidentified lines 21
Number of lines tentatively identified by NID 1 4.55%

Nuclide Type : fission

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
CS-137	30.17Y	1.00	1.311E-01	1.312E-01	0.915E-01	69.77	
	Total Activity :		1.311E-01	1.312E-01			
	Grand Total Activity :		1.311E-01	1.312E-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 ----

Activity	Act error	MDA	MDA error	Act/MDA

DRAFT

Nuclide	(pCi/g Dry)		(pCi/g Dry)		
CS-137	1.312E-01	9.154E-02	8.455E-02	0.000E+00	1.552

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-1.188E-02		5.939E-02	8.359E-02	0.000E+00	-0.142
AC-228	2.751E-01		2.278E-01	4.341E-01	0.000E+00	0.634

DRAFT

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A,01L71920-9      ,03/14/2017 13:49,02/23/2017 10:46,   6.499E+01,L71920-9 SS GE
B,01L71920-9      ,CS134_137           ,01/05/2017 07:18,01B150022715
C,CS-137  ,YES,   1.312E-01,   9.154E-02,   8.455E-02,,    1.552
C,CS-134  ,NO ,  -1.188E-02,   5.939E-02,   8.359E-02,,   -0.142
C,AC-228  ,NO ,   2.751E-01,   2.278E-01,   4.341E-01,,    0.634
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 11:55:06.50
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 14-MAR-2017 09:35:27.75

LIMS No., Customer Name, Client ID: L71920-12 SS GEOENGINEERS SEDIMENT

Sample ID : 15L71920-12 Smple Date: 23-FEB-2017 10:52:00.
Sample Type : SS Geometry : 15B150102011
Quantity : 8.10900E+01 g Dry BKGFILE : 15BG022417MT
Start Channel : 90 Energy Tol : 1.00000 Real Time : 0 02:19:35.22
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 02:19:34.35
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.18*	6	257	1.98	120.40	1.49E+00	7.58E-04	526.4	2.41E+00
2	1	75.10*	185	229	1.72	144.31	2.64E+00	2.21E-02	18.2	1.17E+01
3	1	77.44*	120	191	1.56	149.00	2.86E+00	1.43E-02	25.8	
4	1	84.54*	8	170	1.35	163.24	3.46E+00	9.02E-04	327.0	3.46E+00
5	1	92.98*	80	279	1.38	180.15	4.05E+00	9.50E-03	46.6	2.82E+00
6	1	185.80*	125	157	1.39	366.25	4.74E+00	1.49E-02	21.9	1.48E+00
7	1	238.65*	198	130	1.12	472.20	4.02E+00	2.37E-02	12.7	1.72E+00
8	1	295.17*	74	106	1.38	585.50	3.40E+00	8.85E-03	30.3	7.63E-01
9	1	339.30	62	136	0.97	673.96	3.01E+00	7.38E-03	42.3	1.18E+01
10	1	351.83*	92	90	1.19	699.07	2.92E+00	1.10E-02	22.8	4.18E-01
11	1	510.76*	29	97	3.32	1017.59	2.09E+00	3.51E-03	100.7	1.39E+00
12	1	583.24*	45	56	1.42	1162.82	1.86E+00	5.41E-03	38.4	1.26E+00
13	1	609.30*	83	64	1.50	1215.04	1.78E+00	9.91E-03	24.5	1.80E+00
14	1	911.11*	46	34	2.54	1819.60	1.23E+00	5.44E-03	34.5	1.75E+00
15	1	1460.74*	238	8	1.91	2919.96	7.96E-01	2.85E-02	7.5	8.55E-01
16	1	1764.17	19	12	2.18	3527.06	6.85E-01	2.31E-03	41.3	1.60E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.395E+00	------	Line Not Found	------
	911.07	46	27.70*	1.227E+00	5.336E-01	5.370E-01	68.94

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15L71920-12

Acquisition date : 14-MAR-2017 09:35:27

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	5.336E-01	5.370E-01	3.702E-01	68.94	
	Total Activity :		5.336E-01	5.370E-01			
	Grand Total Activity :		5.336E-01	5.370E-01			

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

DRAFT

Sample ID : 15L71920-12 Acquisition date : 14-MAR-2017 09:35:27

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.18	6	257	1.98	120.40	117	12	7.58E-04	****	1.49E+00	
1	75.10	185	229	1.72	144.31	138	16	2.21E-02	36.3	2.64E+00	
1	77.44	120	191	1.56	149.00	138	16	1.43E-02	51.7	2.86E+00	
1	84.54	8	170	1.35	163.24	159	8	9.02E-04	****	3.46E+00	
1	92.98	80	279	1.38	180.15	176	12	9.50E-03	93.2	4.05E+00	
1	185.80	125	157	1.39	366.25	361	10	1.49E-02	43.8	4.74E+00	
1	238.65	198	130	1.12	472.20	468	8	2.37E-02	25.5	4.02E+00	
1	295.17	74	106	1.38	585.50	581	11	8.85E-03	60.6	3.40E+00	
1	339.30	62	136	0.97	673.96	666	14	7.38E-03	84.6	3.01E+00	
1	351.83	92	90	1.19	699.07	695	10	1.10E-02	45.6	2.92E+00	
1	510.76	29	97	3.32	1017.59	1010	20	3.51E-03	****	2.09E+00	
1	583.24	45	56	1.42	1162.82	1157	13	5.41E-03	76.8	1.86E+00	
1	609.30	83	64	1.50	1215.04	1210	14	9.91E-03	49.0	1.78E+00	
1	1460.74	238	8	1.91	2919.96	2912	15	2.85E-02	15.0	7.96E-01	
1	1764.17	19	12	2.18	3527.06	3520	11	2.31E-03	82.6	6.85E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	5.336E-01	5.370E-01	3.702E-01	68.94	
	Total Activity :		5.336E-01	5.370E-01			
	Grand Total Activity :		5.336E-01	5.370E-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
AC-228	5.370E-01	3.702E-01	2.424E-01	0.000E+00	2.215

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	4.606E-03		5.586E-02	8.026E-02	0.000E+00	0.057
CS-137	2.101E-02		5.275E-02	9.014E-02	0.000E+00	0.233

DRAFT

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A,15L71920-12     ,03/14/2017 11:55,02/23/2017 10:52,   8.109E+01,L71920-12 SS G
B,15L71920-12     ,CS134_137           ,01/10/2017 07:46,15B150102011
C,AC-228  ,YES,   5.370E-01,   3.702E-01,   2.424E-01,,    2.215
C,CS-134  ,NO ,   4.606E-03,   5.586E-02,   8.026E-02,,    0.057
C,CS-137  ,NO ,   2.101E-02,   5.275E-02,   9.014E-02,,    0.233
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 11:56:05.02
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 14-MAR-2017 09:35:28.33

LIMS No., Customer Name, Client ID: L71920-15 SS GEOENGINEERS SEDIMENT

Sample ID : 06L71920-15
Sample Type : SS
Quantity : 1.05340E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 10:58:00.
Geometry : 06B150011912
BKGFILE : 06BG022417MT
Real Time : 0 02:20:21.88
Live time : 0 02:20:19.93

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	77.30	119	228	1.24	155.18	2.18E+00	1.42E-02	24.3	8.35E+00
2	1	87.14*	45	193	0.92	174.87	2.82E+00	5.40E-03	51.6	1.46E+00
3	1	92.75*	72	193	1.22	186.08	3.11E+00	8.61E-03	37.9	8.55E-01
4	1	185.93*	69	171	1.49	372.41	3.67E+00	8.18E-03	38.4	1.65E+00
5	1	238.54*	185	170	0.96	477.60	3.12E+00	2.20E-02	14.7	1.68E+00
6	1	294.97*	84	114	1.17	590.44	2.63E+00	1.00E-02	26.2	1.32E+00
7	1	338.45	62	116	1.13	677.37	2.34E+00	7.41E-03	34.5	2.93E+00
8	1	351.68*	144	117	1.45	703.82	2.26E+00	1.71E-02	17.7	9.98E-01
9	1	583.36*	47	70	2.03	1166.98	1.45E+00	5.57E-03	40.5	2.69E+00
10	1	609.09*	95	81	1.16	1218.42	1.40E+00	1.13E-02	23.1	1.63E+00
11	1	859.77	39	27	2.39	1719.45	1.03E+00	4.60E-03	29.6	6.09E-01
12	1	910.74*	53	41	2.01	1821.32	9.84E-01	6.29E-03	30.4	1.37E+00
13	1	968.31*	59	65	7.81	1936.39	9.32E-01	7.01E-03	39.8	2.92E+00
14	1	1119.79*	37	45	2.52	2239.09	8.20E-01	4.40E-03	45.1	1.21E+00
15	1	1460.19*	253	9	2.17	2919.21	6.52E-01	3.00E-02	7.7	1.41E+00
16	1	1763.90*	18	12	2.57	3525.88	5.60E-01	2.18E-03	49.8	4.40E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.109E+00	------	Line Not Found	------
	911.07	53	27.70*	9.836E-01	5.922E-01	5.959E-01	60.82

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 06L71920-15

Acquisition date : 14-MAR-2017 09:35:28

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	5.922E-01	5.959E-01	3.624E-01	60.82	
	Total Activity :		5.922E-01	5.959E-01			
	Grand Total Activity :		5.922E-01	5.959E-01			

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

DRAFT

Sample ID : 06L71920-15 Acquisition date : 14-MAR-2017 09:35:28

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	77.30	119	228	1.24	155.18	147	13	1.42E-02	48.6	2.18E+00	
1	87.14	45	193	0.92	174.87	173	6	5.40E-03	****	2.82E+00	
1	92.75	72	193	1.22	186.08	183	8	8.61E-03	75.8	3.11E+00	
1	185.93	69	171	1.49	372.41	368	9	8.18E-03	76.9	3.67E+00	
1	238.54	185	170	0.96	477.60	474	8	2.20E-02	29.3	3.12E+00	
1	294.97	84	114	1.17	590.44	586	9	1.00E-02	52.3	2.63E+00	
1	338.45	62	116	1.13	677.37	674	10	7.41E-03	69.0	2.34E+00	
1	351.68	144	117	1.45	703.82	699	12	1.71E-02	35.5	2.26E+00	
1	583.36	47	70	2.03	1166.98	1161	12	5.57E-03	80.9	1.45E+00	
1	609.09	95	81	1.16	1218.42	1213	13	1.13E-02	46.2	1.40E+00	
1	859.77	39	27	2.39	1719.45	1714	10	4.60E-03	59.3	1.03E+00	
1	968.31	59	65	7.81	1936.39	1927	25	7.01E-03	79.5	9.32E-01	
1	1119.79	37	45	2.52	2239.09	2232	17	4.40E-03	90.1	8.20E-01	
1	1460.19	253	9	2.17	2919.21	2913	14	3.00E-02	15.3	6.52E-01	
1	1763.90	18	12	2.57	3525.88	3517	15	2.18E-03	99.6	5.60E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	5.922E-01	5.959E-01	3.624E-01	60.82	
			---	---			
Total Activity :			5.922E-01	5.959E-01			
Grand Total Activity :			5.922E-01	5.959E-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
AC-228	5.959E-01	3.624E-01	3.546E-01	0.000E+00	1.681

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	1.377E-02		5.592E-02	8.380E-02	0.000E+00	0.164
CS-137	-3.393E-02		5.731E-02	9.007E-02	0.000E+00	-0.377

DRAFT

```
A,06L71920-15      ,03/14/2017 11:56,02/23/2017 10:58,   1.053E+02,L71920-15 SS G
B,06L71920-15      ,CS134_137           ,01/05/2017 07:18,06B150011912
C,AC-228   ,YES,    5.959E-01,    3.624E-01,    3.546E-01,,     1.681
C,CS-134   ,NO ,    1.377E-02,    5.592E-02,    8.380E-02,,     0.164
C,CS-137   ,NO ,   -3.393E-02,    5.731E-02,    9.007E-02,,    -0.377
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:52:31.43
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 14-MAR-2017 10:40:15.97

LIMS No., Customer Name, Client ID: L71920-18 SS GEOENGINEERS SEDIMENT

Sample ID : 07L71920-18 Smple Date: 23-FEB-2017 11:04:00.
Sample Type : SS Geometry : 07B150101811
Quantity : 7.06300E+01 g Dry BKGFILE : 07BG022417MT
Start Channel : 40 Energy Tol : 2.00000 Real Time : 0 03:12:03.93
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 03:12:02.40
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	77.47	85	303	1.41	155.72	2.53E+00	7.36E-03	39.9	3.18E+00
2	1	92.87*	102	394	1.83	186.56	3.59E+00	8.89E-03	43.8	2.01E+00
3	1	185.84*	113	262	1.49	372.71	4.39E+00	9.81E-03	31.3	8.70E-01
4	1	238.43*	223	272	1.16	478.00	3.83E+00	1.94E-02	16.5	9.83E-01
5	1	241.84	58	187	1.38	484.83	3.79E+00	5.02E-03	43.1	2.89E+00
6	1	295.31*	99	164	1.92	591.87	3.31E+00	8.55E-03	27.5	1.23E+00
7	1	351.58*	159	158	2.13	704.50	2.91E+00	1.38E-02	20.2	1.62E+00
8	1	608.90*	124	88	2.08	1219.53	1.91E+00	1.07E-02	20.0	1.00E+00
9	1	910.89*	56	56	1.94	1823.75	1.39E+00	4.90E-03	34.8	1.24E+00
10	1	1460.46*	332	28	2.34	2922.77	9.57E-01	2.88E-02	7.5	1.64E+00

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.550E+00	------ Line Not Found		------
	911.07	56	27.70*	1.387E+00	4.879E-01	4.910E-01	69.54

Flag: "*" = Keyline

DRAFT

Sample ID : 07L71920-18 Acquisition date : 14-MAR-2017 10:40:15

Total number of lines in spectrum	10	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	1	10.00%

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	4.879E-01	4.910E-01	3.414E-01	69.54	
	Total Activity :		4.879E-01	4.910E-01			
	Grand Total Activity :		4.879E-01	4.910E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 07L71920-18
Acquisition date : 14-MAR-2017 10:40:15

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	77.47	85	303	1.41	155.72	142	18	7.36E-03	79.9	2.53E+00	
1	92.87	102	394	1.83	186.56	181	13	8.89E-03	87.7	3.59E+00	
1	185.84	113	262	1.49	372.71	367	11	9.81E-03	62.6	4.39E+00	
1	238.43	223	272	1.16	478.00	472	11	1.94E-02	33.0	3.83E+00	
1	241.84	58	187	1.38	484.83	482	8	5.02E-03	86.2	3.79E+00	
1	295.31	99	164	1.92	591.87	587	10	8.55E-03	54.9	3.31E+00	
1	351.58	159	158	2.13	704.50	696	15	1.38E-02	40.4	2.91E+00	
1	608.90	124	88	2.08	1219.53	1212	14	1.07E-02	40.1	1.91E+00	
1	1460.46	332	28	2.34	2922.77	2915	18	2.88E-02	15.0	9.57E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	10	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	1	10.00%

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	4.879E-01	4.910E-01	3.414E-01	69.54	
	Total Activity :		4.879E-01	4.910E-01			
	Grand Total Activity :		4.879E-01	4.910E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	4.910E-01	3.414E-01	3.376E-01	0.000E+00	1.454

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-2.365E-02		6.117E-02	8.505E-02	0.000E+00	-0.278
CS-137	-3.940E-03		5.925E-02	9.838E-02	0.000E+00	-0.040

DRAFT

```
A,07L71920-18     ,03/14/2017 13:52,02/23/2017 11:04,   7.063E+01,L71920-18 SS G
B,07L71920-18     ,CS134_137          ,01/05/2017 07:18,07B150101811
C,AC-228  ,YES,   4.910E-01,   3.414E-01,   3.376E-01,,    1.454
C,CS-134  ,NO ,  -2.365E-02,   6.117E-02,   8.505E-02,,   -0.278
C,CS-137  ,NO ,  -3.940E-03,   5.925E-02,   9.838E-02,,   -0.040
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 12:49:35.80
TBE11 31-TP20610B HpGe ******* Aquisition Date/Time: 14-MAR-2017 10:40:21.48

LIMS No., Customer Name, Client ID: L71920-21 SS GEOENGINEERS SEDIMENT

Sample ID : 11L71920-21 Smple Date: 23-FEB-2017 11:10:00.
Sample Type : SS Geometry : 11B150101411
Quantity : 9.25900E+01 g Dry BKGFILE : 11BG022417MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 02:09:02.09
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 02:08:58.62
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	84.75*	50	190	1.00	168.89	2.61E+00	6.46E-03	53.9	
2	0	93.35*	145	281	1.51	186.10	3.05E+00	1.87E-02	26.0	
3	0	185.63*	53	199	1.28	370.66	3.59E+00	6.82E-03	57.3	
4	2	238.57*	193	128	1.28	476.54	3.08E+00	2.50E-02	12.8	1.87E+00
5	2	242.13*	60	141	1.86	483.65	3.05E+00	7.81E-03	44.5	
6	0	294.82*	100	108	1.67	589.03	2.62E+00	1.30E-02	24.0	
7	0	351.53*	63	166	1.43	702.43	2.27E+00	8.14E-03	45.2	
8	0	511.04*	89	57	2.19	1021.40	1.66E+00	1.15E-02	28.4	
9	0	583.56*	56	69	1.52	1166.42	1.48E+00	7.23E-03	36.2	
10	0	609.26*	75	65	2.04	1217.81	1.43E+00	9.74E-03	25.3	
11	0	911.74*	70	31	1.83	1822.60	1.01E+00	9.01E-03	23.5	
12	0	1460.38*	235	7	2.15	2919.35	6.85E-01	3.03E-02	7.7	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.140E+00	------	Line Not Found	------
	911.07	70	27.70*	1.015E+00	9.353E-01	9.412E-01	46.96

Flag: "*" = Keyline

DRAFT

Sample ID : 11L71920-21 Acquisition date : 14-MAR-2017 10:40:21

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	9.353E-01	9.412E-01	4.420E-01	46.96	
			---	---			
Total Activity :			9.353E-01	9.412E-01			
Grand Total Activity :			9.353E-01	9.412E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	84.75	50	190	1.00	168.89	164	9	6.46E-03	****	2.61E+00	
0	93.35	145	281	1.51	186.10	181	13	1.87E-02	52.1	3.05E+00	
0	185.63	53	199	1.28	370.66	364	12	6.82E-03	****	3.59E+00	
2	238.57	193	128	1.28	476.54	472	19	2.50E-02	25.6	3.08E+00	
2	242.13	60	141	1.86	483.65	472	19	7.81E-03	89.1	3.05E+00	
0	294.82	100	108	1.67	589.03	583	12	1.30E-02	47.9	2.62E+00	
0	351.53	63	166	1.43	702.43	697	13	8.14E-03	90.4	2.27E+00	
0	511.04	89	57	2.19	1021.40	1015	18	1.15E-02	56.7	1.66E+00	
0	583.56	56	69	1.52	1166.42	1161	14	7.23E-03	72.3	1.48E+00	
0	609.26	75	65	2.04	1217.81	1212	11	9.74E-03	50.6	1.43E+00	
0	1460.38	235	7	2.15	2919.35	2912	15	3.03E-02	15.4	6.85E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	9.353E-01	9.412E-01	4.420E-01	46.96	
	Total Activity :		9.353E-01	9.412E-01			
	Grand Total Activity :		9.353E-01	9.412E-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
AC-228	9.412E-01	4.420E-01	3.362E-01	0.000E+00	2.799

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

DRAFT

CS-134	-3.981E-03	6.549E-02	9.216E-02	0.000E+00	-0.043
CS-137	-2.915E-03	6.017E-02	9.787E-02	0.000E+00	-0.030

DRAFT

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A,11L71920-21     ,03/14/2017 12:49,02/23/2017 11:10,   9.259E+01,L71920-21 SS G
B,11L71920-21     ,CS134_137          ,01/03/2017 08:01,11B150101411
C,AC-228  ,YES,   9.412E-01,   4.420E-01,   3.362E-01,,    2.799
C,CS-134  ,NO ,  -3.981E-03,   6.549E-02,   9.216E-02,,   -0.043
C,CS-137  ,NO ,  -2.915E-03,   6.017E-02,   9.787E-02,,   -0.030
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 11:57:11.32
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 14-MAR-2017 09:35:29.88

LIMS No., Customer Name, Client ID: L71920-24 SS GEOENGINEERS SEDIMENT

Sample ID : 14L71920-24 Smple Date: 23-FEB-2017 11:16:00.
Sample Type : SS Geometry : 14B150012012
Quantity : 1.15800E+02 g Dry BKGFILE : 14BG022417MT
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 02:21:33.84
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 02:21:31.66
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	92.45*	29	246	1.19	182.47	1.98E+00	3.47E-03	103.0	2.03E-01
2	1	185.58*	34	193	1.43	368.90	3.11E+00	3.95E-03	81.1	8.32E-01
3	3	238.30*	245	129	1.40	474.44	2.71E+00	2.88E-02	10.8	6.02E-01
4	3	241.93	77	195	2.15	481.71	2.68E+00	9.10E-03	42.7	
5	1	295.10*	64	170	2.31	588.15	2.33E+00	7.49E-03	46.3	3.09E+00
6	1	351.65*	68	139	1.36	701.37	2.04E+00	8.00E-03	36.2	1.30E+00
7	1	510.77*	35	159	3.01	1019.97	1.53E+00	4.11E-03	104.6	1.03E+00
8	1	583.44*	73	92	2.73	1165.47	1.38E+00	8.65E-03	33.2	1.43E+00
9	1	609.23*	109	124	1.57	1217.11	1.34E+00	1.28E-02	24.5	1.13E+00
10	1	805.80	59	60	10.17	1610.77	1.07E+00	6.97E-03	33.2	2.95E+00
11	1	911.26*	68	45	2.07	1822.00	9.72E-01	7.96E-03	22.1	1.89E+00
12	1	1461.09*	305	36	2.69	2923.50	6.67E-01	3.60E-02	8.3	8.70E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.086E+00	------	Line Not Found	------
	911.07	68	27.70*	9.724E-01	6.897E-01	6.941E-01	44.20

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 14L71920-24

Acquisition date : 14-MAR-2017 09:35:29

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	6.897E-01	6.941E-01	3.067E-01	44.20	
	Total Activity :		6.897E-01	6.941E-01			
	Grand Total Activity :		6.897E-01	6.941E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	92.45	29	246	1.19	182.47	179	9	3.47E-03	****	1.98E+00	
1	185.58	34	193	1.43	368.90	365	9	3.95E-03	****	3.11E+00	
3	238.30	245	129	1.40	474.44	469	19	2.88E-02	21.7	2.71E+00	
3	241.93	77	195	2.15	481.71	469	19	9.10E-03	85.4	2.68E+00	
1	295.10	64	170	2.31	588.15	583	13	7.49E-03	92.7	2.33E+00	
1	351.65	68	139	1.36	701.37	697	10	8.00E-03	72.5	2.04E+00	
1	510.77	35	159	3.01	1019.97	1011	21	4.11E-03	****	1.53E+00	
1	583.44	73	92	2.73	1165.47	1155	17	8.65E-03	66.5	1.38E+00	
1	609.23	109	124	1.57	1217.11	1212	14	1.28E-02	49.0	1.34E+00	
1	805.80	59	60	10.17	1610.77	1601	19	6.97E-03	66.3	1.07E+00	
1	1461.09	305	36	2.69	2923.50	2913	24	3.60E-02	16.6	6.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	6.897E-01	6.941E-01	3.067E-01	44.20	
			---	---			
Total Activity :			6.897E-01	6.941E-01			
Grand Total Activity :			6.897E-01	6.941E-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
AC-228	6.941E-01	3.067E-01	3.257E-01	0.000E+00	2.131

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

CS-134	1.075E-02	6.590E-02	9.645E-02	0.000E+00	0.111
CS-137	2.099E-02	5.637E-02	9.678E-02	0.000E+00	0.217

DRAFT

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A,14L71920-24      ,03/14/2017 11:57,02/23/2017 11:16,   1.158E+02,L71920-24 SS G
B,14L71920-24      ,CS134_137           ,01/03/2017 08:02,14B150012012
C,AC-228  ,YES,    6.941E-01,   3.067E-01,   3.257E-01,,    2.131
C,CS-134  ,NO ,    1.075E-02,   6.590E-02,   9.645E-02,,    0.111
C,CS-137  ,NO ,    2.099E-02,   5.637E-02,   9.678E-02,,    0.217
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 11:57:34.65
TBE23 03017322 HpGe ********** Aquisition Date/Time: 14-MAR-2017 09:35:31.63

LIMS No., Customer Name, Client ID: L71920-27 SS GEOENGINEERS SEDIMENT

Sample ID : 23L71920-27
Sample Type : SS
Quantity : 1.16300E+02 g Dry
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 11:22:00.
Geometry : 23B150082004
BKGFILE : 23BG022417MT
Real Time : 0 02:21:52.15
Live time : 0 02:21:44.09

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	4	34.03*	76	14	1.93	68.87	3.83E-01	8.95E-03	29.8	2.47E+00
2	4	37.49*	30	94	3.52	75.77	6.14E-01	3.58E-03	141.1	
3	4	40.12*	66	142	3.37	81.03	8.27E-01	7.76E-03	63.8	
4	4	44.26*	73	211	3.12	89.30	1.22E+00	8.55E-03	55.8	
5	4	47.86*	115	305	3.53	96.49	1.59E+00	1.35E-02	38.0	
6	4	50.24	119	357	3.53	101.23	1.86E+00	1.40E-02	36.3	
7	4	53.81	61	144	1.58	108.35	2.26E+00	7.17E-03	31.0	
8	0	92.42*	165	566	1.95	185.42	5.56E+00	1.95E-02	32.8	
9	0	184.92*	134	395	1.51	370.07	5.72E+00	1.58E-02	33.8	
10	0	238.54*	433	546	2.19	477.12	4.88E+00	5.09E-02	14.9	
11	0	295.02*	123	159	2.35	589.91	4.13E+00	1.45E-02	22.4	
12	0	352.02*	249	184	2.35	703.73	3.55E+00	2.92E-02	14.6	
13	0	582.82*	119	109	2.93	1164.87	2.27E+00	1.40E-02	23.6	
14	0	609.18*	149	138	2.60	1217.55	2.19E+00	1.75E-02	20.6	
15	0	911.12*	76	61	2.87	1821.24	1.56E+00	8.90E-03	27.9	
16	0	1459.79*	490	11	3.11	2919.45	1.07E+00	5.77E-02	5.3	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.747E+00	------	Line Not Found	------
	911.07	76	27.70*	1.563E+00	4.774E-01	4.804E-01	55.86

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 23L71920-27

Acquisition date : 14-MAR-2017 09:35:31

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	4.774E-01	4.804E-01	2.683E-01	55.86	
			---	---			
Total Activity :			4.774E-01	4.804E-01			
Grand Total Activity :			4.774E-01	4.804E-01			

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

DRAFT

Sample ID : 23L71920-27
Acquisition date : 14-MAR-2017 09:35:31

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	34.03	76	14	1.93	68.87	64	48	8.95E-03	59.6	3.83E-01	
4	37.49	30	94	3.52	75.77	64	48	3.58E-03	****	6.14E-01	
4	40.12	66	142	3.37	81.03	64	48	7.76E-03	****	8.27E-01	
4	44.26	73	211	3.12	89.30	64	48	8.55E-03	****	1.22E+00	
4	47.86	115	305	3.53	96.49	64	48	1.35E-02	76.0	1.59E+00	
4	50.24	119	357	3.53	101.23	64	48	1.40E-02	72.6	1.86E+00	
4	53.81	61	144	1.58	108.35	64	48	7.17E-03	61.9	2.26E+00	
0	92.42	165	566	1.95	185.42	178	14	1.95E-02	65.7	5.56E+00	
0	184.92	134	395	1.51	370.07	364	14	1.58E-02	67.7	5.72E+00	
0	238.54	433	546	2.19	477.12	465	23	5.09E-02	29.9	4.88E+00	
0	295.02	123	159	2.35	589.91	585	11	1.45E-02	44.9	4.13E+00	
0	352.02	249	184	2.35	703.73	698	18	2.92E-02	29.2	3.55E+00	
0	582.82	119	109	2.93	1164.87	1155	19	1.40E-02	47.2	2.27E+00	
0	609.18	149	138	2.60	1217.55	1206	18	1.75E-02	41.3	2.19E+00	
0	1459.79	490	11	3.11	2919.45	2909	21	5.77E-02	10.6	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	4.774E-01	4.804E-01	2.683E-01	55.86	
	Total Activity :		4.774E-01	4.804E-01			
	Grand Total Activity :		4.774E-01	4.804E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	4.804E-01	2.683E-01	2.511E-01	0.000E+00	1.913

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	1.010E-01		5.159E-02	8.808E-02	0.000E+00	1.146
CS-137	-2.159E-02		4.497E-02	7.684E-02	0.000E+00	-0.281

DRAFT

```
A,23L71920-27      ,03/14/2017 11:57,02/23/2017 11:22,   1.163E+02,L71920-27 SS G
B,23L71920-27      ,CS134_137           ,01/05/2017 07:18,23B150082004
C,AC-228   ,YES,    4.804E-01,   2.683E-01,   2.511E-01,,     1.913
C,CS-134   ,NO ,    1.010E-01,   5.159E-02,   8.808E-02,,     1.146
C,CS-137   ,NO ,   -2.159E-02,   4.497E-02,   7.684E-02,,    -0.281
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:55:28.03
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 14-MAR-2017 10:40:17.54

LIMS No., Customer Name, Client ID: L71920-30 SS GEOENGINEERS SEDIMENT

Sample ID : 08L71920-30 Smple Date: 23-FEB-2017 11:28:00.
Sample Type : SS Geometry : 08B150022715
Quantity : 1.26180E+02 g Dry BKGFILE : 08BG022417MT
Start Channel : 25 Energy Tol : 2.00000 Real Time : 0 03:15:03.51
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 03:15:00.19
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.89*	19	448	2.32	100.79	4.94E+00	1.61E-03	246.3	3.14E+00
2	1	63.24*	50	405	1.40	133.40	4.96E+00	4.30E-03	78.0	2.12E+00
3	1	77.31	268	414	0.95	161.44	4.88E+00	2.29E-02	14.4	6.65E+00
4	4	84.80*	51	346	1.49	176.39	4.80E+00	4.39E-03	73.0	9.35E-01
5	4	87.26*	98	265	1.19	181.28	4.77E+00	8.40E-03	31.3	
6	1	93.14*	173	319	1.50	193.02	4.69E+00	1.47E-02	21.6	4.19E+00
7	1	186.57*	113	264	1.41	379.36	3.33E+00	9.64E-03	30.0	1.49E+00
8	1	239.14*	217	324	1.32	484.21	2.75E+00	1.85E-02	18.0	2.34E+00
9	1	295.89*	43	212	1.49	597.39	2.29E+00	3.72E-03	67.1	7.05E-01
10	1	338.57	87	182	1.99	682.53	2.02E+00	7.43E-03	32.8	1.31E+00
11	1	352.69*	189	133	1.89	710.70	1.95E+00	1.61E-02	14.5	2.62E+00
12	1	511.42*	32	208	3.08	1027.34	1.36E+00	2.72E-03	132.8	9.03E-01
13	1	582.98	119	131	2.81	1170.10	1.20E+00	1.02E-02	23.9	1.35E+00
14	1	608.90*	80	112	1.82	1221.81	1.15E+00	6.85E-03	32.6	3.27E+00
15	1	909.93*	61	67	2.79	1822.50	7.98E-01	5.23E-03	30.5	6.42E+00
16	1	1119.69	56	53	3.68	2241.15	6.66E-01	4.75E-03	33.7	3.11E+00
17	1	1460.77*	325	33	1.99	2922.07	5.32E-01	2.78E-02	7.4	5.77E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	9.012E-01	------	Line Not Found	------
	911.07	61	27.70*	7.980E-01	5.066E-01	5.098E-01	61.02

Flag: "*" = Keyline

DRAFT

Sample ID : 08L71920-30 Acquisition date : 14-MAR-2017 10:40:17

Total number of lines in spectrum	17	
Number of unidentified lines	16	
Number of lines tentatively identified by NID	1	5.88%

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	5.066E-01	5.098E-01	3.111E-01	61.02	
	Total Activity :		5.066E-01	5.098E-01			
	Grand Total Activity :		5.066E-01	5.098E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.89	19	448	2.32	100.79	94	13	1.61E-03	****	4.94E+00	
1	63.24	50	405	1.40	133.40	130	9	4.30E-03	****	4.96E+00	
1	77.31	268	414	0.95	161.44	159	7	2.29E-02	28.9	4.88E+00	
4	84.80	51	346	1.49	176.39	172	13	4.39E-03	****	4.80E+00	
4	87.26	98	265	1.19	181.28	172	13	8.40E-03	62.7	4.77E+00	
1	93.14	173	319	1.50	193.02	189	9	1.47E-02	43.3	4.69E+00	
1	186.57	113	264	1.41	379.36	374	10	9.64E-03	60.0	3.33E+00	
1	239.14	217	324	1.32	484.21	478	11	1.85E-02	36.0	2.75E+00	
1	295.89	43	212	1.49	597.39	592	10	3.72E-03	****	2.29E+00	
1	338.57	87	182	1.99	682.53	678	12	7.43E-03	65.6	2.02E+00	
1	352.69	189	133	1.89	710.70	706	11	1.61E-02	29.1	1.95E+00	
1	511.42	32	208	3.08	1027.34	1018	22	2.72E-03	****	1.36E+00	
1	582.98	119	131	2.81	1170.10	1163	17	1.02E-02	47.9	1.20E+00	
1	608.90	80	112	1.82	1221.81	1215	14	6.85E-03	65.3	1.15E+00	
1	1119.69	56	53	3.68	2241.15	2234	19	4.75E-03	67.4	6.66E-01	
1	1460.77	325	33	1.99	2922.07	2913	16	2.78E-02	14.7	5.32E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	17	
Number of unidentified lines	16	
Number of lines tentatively identified by NID	1	5.88%

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	5.066E-01	5.098E-01	3.111E-01	61.02	
Total Activity :			5.066E-01	5.098E-01			
Grand Total Activity :			5.066E-01	5.098E-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
AC-228	5.098E-01	3.111E-01	2.893E-01	0.000E+00	1.763

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-1.147E-02		5.630E-02	7.836E-02	0.000E+00	-0.146
CS-137	1.887E-03		4.872E-02	7.988E-02	0.000E+00	0.024

DRAFT

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A,08L71920-30     ,03/14/2017 13:55,02/23/2017 11:28,   1.262E+02,L71920-30 SS G
B,08L71920-30     ,CS134_137           ,03/03/2017 07:12,08B150022715
C,AC-228  ,YES,   5.098E-01,   3.111E-01,   2.893E-01,,    1.763
C,CS-134  ,NO ,  -1.147E-02,   5.630E-02,   7.836E-02,,   -0.146
C,CS-137  ,NO ,   1.887E-03,   4.872E-02,   7.988E-02,,    0.024
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:55:51.39
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 14-MAR-2017 12:00:04.36

LIMS No., Customer Name, Client ID: L71920-33 SS GEOENGINEERS SEDIMENT

Sample ID : 15L71920-33 Smple Date: 23-FEB-2017 11:34:00.
Sample Type : SS Geometry : 15B150102011
Quantity : 1.09000E+02 g Dry BKGFILE : 15BG022417MT
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 01:55:35.44
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:55:34.69
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	72.60*	27	196	1.61	139.29	2.40E+00	3.90E-03	105.2	4.27E+00
2	1	75.10*	92	185	1.72	144.31	2.64E+00	1.32E-02	33.4	
3	1	77.28*	90	140	1.41	148.69	2.84E+00	1.30E-02	28.7	
4	1	93.20*	52	187	1.47	180.60	4.07E+00	7.53E-03	52.6	1.76E+00
5	1	185.50*	22	149	1.82	365.64	4.74E+00	3.20E-03	107.6	1.95E+00
6	4	238.59*	186	106	1.13	472.08	4.02E+00	2.68E-02	11.9	2.59E+00
7	4	242.11	78	168	2.29	479.13	3.98E+00	1.12E-02	42.9	
8	1	294.91*	63	96	1.57	584.98	3.40E+00	9.06E-03	34.7	2.48E+00
9	1	338.01	55	77	1.65	671.37	3.02E+00	7.91E-03	34.0	1.19E+00
10	1	351.75*	134	74	1.41	698.91	2.92E+00	1.93E-02	16.1	1.99E+00
11	1	511.00*	68	41	3.61	1018.06	2.09E+00	9.77E-03	33.6	1.89E+00
12	1	582.86*	66	30	2.57	1162.06	1.86E+00	9.51E-03	23.1	1.23E+00
13	1	609.06*	89	32	2.09	1214.55	1.78E+00	1.29E-02	18.6	2.60E+00
14	1	911.00*	42	21	2.22	1819.39	1.23E+00	6.12E-03	27.4	8.60E-01
15	1	968.53	36	15	3.01	1934.61	1.16E+00	5.26E-03	26.3	1.07E+00
16	1	1460.68*	247	19	2.02	2919.85	7.96E-01	3.57E-02	7.7	3.86E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.395E+00	------	Line Not Found	------
	911.07	42	27.70*	1.227E+00	4.460E-01	4.488E-01	54.78

Flag: "*" = Keyline

DRAFT

Sample ID : 15L71920-33 Acquisition date : 14-MAR-2017 12:00:04

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	4.460E-01	4.488E-01	2.459E-01	54.78	
	Total Activity :		4.460E-01	4.488E-01			
	Grand Total Activity :		4.460E-01	4.488E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.60	27	196	1.61	139.29	134	20	3.90E-03	****	2.40E+00	
1	75.10	92	185	1.72	144.31	134	20	1.32E-02	66.8	2.64E+00	
1	77.28	90	140	1.41	148.69	134	20	1.30E-02	57.3	2.84E+00	
1	93.20	52	187	1.47	180.60	176	9	7.53E-03	****	4.07E+00	
1	185.50	22	149	1.82	365.64	362	9	3.20E-03	****	4.74E+00	
4	238.59	186	106	1.13	472.08	463	24	2.68E-02	23.8	4.02E+00	
4	242.11	78	168	2.29	479.13	463	24	1.12E-02	85.8	3.98E+00	
1	294.91	63	96	1.57	584.98	578	12	9.06E-03	69.5	3.40E+00	
1	338.01	55	77	1.65	671.37	666	11	7.91E-03	68.0	3.02E+00	
1	351.75	134	74	1.41	698.91	694	12	1.93E-02	32.3	2.92E+00	
1	511.00	68	41	3.61	1018.06	1011	19	9.77E-03	67.2	2.09E+00	
1	582.86	66	30	2.57	1162.06	1154	15	9.51E-03	46.3	1.86E+00	
1	609.06	89	32	2.09	1214.55	1208	14	1.29E-02	37.1	1.78E+00	
1	968.53	36	15	3.01	1934.61	1931	12	5.26E-03	52.6	1.16E+00	
1	1460.68	247	19	2.02	2919.85	2912	15	3.57E-02	15.5	7.96E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	4.460E-01	4.488E-01	2.459E-01	54.78	
	Total Activity :		4.460E-01	4.488E-01			
	Grand Total Activity :		4.460E-01	4.488E-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
AC-228	4.488E-01	2.459E-01	2.885E-01	0.000E+00	1.556

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-3.012E-02		4.727E-02	6.051E-02	0.000E+00	-0.498
CS-137	-2.523E-02		4.422E-02	6.750E-02	0.000E+00	-0.374

DRAFT

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A,15L71920-33      ,03/14/2017 13:55,02/23/2017 11:34,   1.090E+02,L71920-33 SS G
B,15L71920-33      ,CS134_137           ,01/10/2017 07:46,15B150102011
C,AC-228   ,YES,   4.488E-01,   2.459E-01,   2.885E-01,,    1.556
C,CS-134   ,NO ,  -3.012E-02,   4.727E-02,   6.051E-02,,   -0.498
C,CS-137   ,NO ,  -2.523E-02,   4.422E-02,   6.750E-02,,   -0.374
```

DRAFT

Sec. Review: Analyst: BKG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:56:33.17
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 14-MAR-2017 12:00:05.05

LIMS No., Customer Name, Client ID: L71920-36 SS GEOENGINEERS SEDIMENT

Sample ID : 06L71920-36 Smple Date: 23-FEB-2017 11:40:00.
Sample Type : SS Geometry : 06B150011912
Quantity : 1.28850E+02 g Dry BKGFILE : 06BG022417MT
Start Channel : 40 Energy Tol : 2.00000 Real Time : 0 01:56:19.47
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:56:17.83
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	77.02	74	157	0.92	154.62	2.16E+00	1.06E-02	30.1	5.73E+00
2	1	92.70*	73	176	1.94	185.99	3.11E+00	1.05E-02	37.1	1.57E+00
3	1	185.95*	66	142	1.14	372.46	3.67E+00	9.39E-03	36.9	2.51E+00
4	5	238.58*	219	68	1.03	477.67	3.12E+00	3.13E-02	9.4	1.41E+00
5	1	294.55*	85	73	2.18	589.59	2.63E+00	1.22E-02	23.9	2.04E+00
6	1	338.15	44	61	1.19	676.77	2.34E+00	6.27E-03	29.4	8.38E+00
7	1	351.87*	113	93	1.61	704.19	2.26E+00	1.61E-02	20.3	3.82E+00
8	1	583.09*	52	53	1.76	1166.43	1.45E+00	7.39E-03	32.2	9.19E-01
9	1	608.89*	75	49	1.72	1218.01	1.40E+00	1.07E-02	22.9	1.27E+00
10	1	910.94*	64	16	2.30	1821.72	9.83E-01	9.16E-03	20.6	2.24E+00
11	1	1460.21*	257	20	1.88	2919.26	6.52E-01	3.69E-02	7.8	5.32E-01
12	1	1764.25*	14	0	2.20	3526.59	5.60E-01	2.05E-03	37.6	6.67E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.109E+00	------ Line Not Found		------
	911.07	64	27.70*	9.834E-01	7.055E-01	7.100E-01	41.17

Flag: "*" = Keyline

DRAFT

Sample ID : 06L71920-36 Acquisition date : 14-MAR-2017 12:00:05

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	7.055E-01	7.100E-01	2.923E-01	41.17	
	Total Activity :		7.055E-01	7.100E-01			
	Grand Total Activity :		7.055E-01	7.100E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 06L71920-36 Acquisition date : 14-MAR-2017 12:00:05

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	77.02	74	157	0.92	154.62	147	11	1.06E-02	60.1	2.16E+00	
1	92.70	73	176	1.94	185.99	182	9	1.05E-02	74.1	3.11E+00	
1	185.95	66	142	1.14	372.46	368	9	9.39E-03	73.8	3.67E+00	
5	238.58	219	68	1.03	477.67	471	21	3.13E-02	18.7	3.12E+00	
1	294.55	85	73	2.18	589.59	584	12	1.22E-02	47.9	2.63E+00	
1	338.15	44	61	1.19	676.77	674	6	6.27E-03	58.7	2.34E+00	
1	351.87	113	93	1.61	704.19	698	12	1.61E-02	40.6	2.26E+00	
1	583.09	52	53	1.76	1166.43	1161	11	7.39E-03	64.3	1.45E+00	
1	608.89	75	49	1.72	1218.01	1213	12	1.07E-02	45.8	1.40E+00	
1	1460.21	257	20	1.88	2919.26	2910	15	3.69E-02	15.6	6.52E-01	
1	1764.25	14	0	2.20	3526.59	3520	12	2.05E-03	75.2	5.60E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	7.055E-01	7.100E-01	2.923E-01	41.17	
			---	---			
Total Activity :			7.055E-01	7.100E-01			
Grand Total Activity :			7.055E-01	7.100E-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
AC-228	7.100E-01	2.923E-01	2.808E-01	0.000E+00	2.528

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

CS-134	-3.000E-02	5.304E-02	7.120E-02	0.000E+00	-0.421
CS-137	-1.865E-02	4.520E-02	7.159E-02	0.000E+00	-0.261

DRAFT

```
A,06L71920-36     ,03/14/2017 13:56,02/23/2017 11:40,   1.289E+02,L71920-36 SS G
B,06L71920-36     ,CS134_137           ,01/05/2017 07:18,06B150011912
C,AC-228  ,YES,   7.100E-01,   2.923E-01,   2.808E-01,,    2.528
C,CS-134  ,NO ,  -3.000E-02,   5.304E-02,   7.120E-02,,   -0.421
C,CS-137  ,NO ,  -1.865E-02,   4.520E-02,   7.159E-02,,   -0.261
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:57:36.59
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 14-MAR-2017 12:00:07.46

LIMS No., Customer Name, Client ID: L71920-39 SS GEOENGINEERS SEDIMENT

Sample ID : 14L71920-39 Smple Date: 23-FEB-2017 11:46:00.
Sample Type : SS Geometry : 14B150012012
Quantity : 1.47130E+02 g Dry BKGFILE : 14BG022417MT
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 01:57:15.33
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:57:13.53
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	75.48*	118	328	3.94	148.50	1.04E+00	1.68E-02	29.9	1.18E+01
2	1	92.32*	28	214	1.38	182.20	1.98E+00	3.95E-03	104.2	1.56E+00
3	1	185.69*	40	170	1.69	369.10	3.11E+00	5.70E-03	65.0	6.07E-01
4	1	238.61*	110	262	1.51	475.05	2.71E+00	1.56E-02	32.0	4.48E+00
5	1	242.56	40	195	2.20	482.96	2.68E+00	5.65E-03	71.1	2.40E+00
6	1	295.01*	43	110	1.39	587.97	2.33E+00	6.10E-03	48.4	9.43E-01
7	1	337.89*	28	129	2.69	673.81	2.10E+00	3.92E-03	86.7	1.56E+00
8	1	351.75*	105	101	1.48	701.56	2.04E+00	1.49E-02	22.9	1.45E+00
9	1	510.76*	0	128	2.46	1019.94	1.53E+00	4.84E-05	*****	7.26E-01
10	1	583.46*	64	51	3.06	1165.52	1.38E+00	9.05E-03	28.7	2.18E+00
11	1	609.11*	89	65	2.24	1216.88	1.34E+00	1.26E-02	23.1	1.92E+00
12	1	911.43*	33	33	1.99	1822.35	9.72E-01	4.72E-03	41.1	1.39E+00
13	1	970.07*	15	54	0.92	1939.79	9.24E-01	2.18E-03	109.8	3.62E+00
14	1	1460.94*	287	27	2.94	2923.20	6.68E-01	4.09E-02	7.6	2.92E+00

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.086E+00	------	Line Not Found	------
	911.07	33	27.70*	9.722E-01	3.223E-01	3.243E-01	82.24

Flag: "*" = Keyline

DRAFT

Sample ID : 14L71920-39 Acquisition date : 14-MAR-2017 12:00:07

Total number of lines in spectrum	14	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	1	7.14%

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	3.223E-01	3.243E-01	2.667E-01	82.24	
	Total Activity :		3.223E-01	3.243E-01			
	Grand Total Activity :		3.223E-01	3.243E-01			

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

DRAFT

Sample ID : 14L71920-39 Acquisition date : 14-MAR-2017 12:00:07

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	75.48	118	328	3.94	148.50	139	11	1.68E-02	59.8	1.04E+00	
1	92.32	28	214	1.38	182.20	178	10	3.95E-03	****	1.98E+00	
1	185.69	40	170	1.69	369.10	365	10	5.70E-03	****	3.11E+00	
1	238.61	110	262	1.51	475.05	468	12	1.56E-02	64.0	2.71E+00	
1	242.56	40	195	2.20	482.96	479	11	5.65E-03	****	2.68E+00	
1	295.01	43	110	1.39	587.97	583	9	6.10E-03	96.8	2.33E+00	
1	337.89	28	129	2.69	673.81	667	12	3.92E-03	****	2.10E+00	
1	351.75	105	101	1.48	701.56	697	12	1.49E-02	45.8	2.04E+00	
1	510.76	0	128	2.46	1019.94	1011	16	4.84E-05	****	1.53E+00	
1	583.46	64	51	3.06	1165.52	1160	14	9.05E-03	57.3	1.38E+00	
1	609.11	89	65	2.24	1216.88	1210	13	1.26E-02	46.2	1.34E+00	
1	970.07	15	54	0.92	1939.79	1930	14	2.18E-03	****	9.24E-01	
1	1460.94	287	27	2.94	2923.20	2913	17	4.09E-02	15.3	6.68E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	14	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	1	7.14%

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	3.223E-01	3.243E-01	2.667E-01	82.24	
			---	---			
Total Activity :			3.223E-01	3.243E-01			
Grand Total Activity :			3.223E-01	3.243E-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
AC-228	3.243E-01	2.667E-01	2.844E-01	0.000E+00	1.140

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

	Key-Line Activity	K.L.	Act error	MDA	MDA error	Act/MDA

DRAFT

Nuclide	(pCi/g Dry)	Ided	(pCi/g Dry)		
CS-134	-2.027E-03	5.590E-02	8.010E-02	0.000E+00	-0.025
CS-137	-8.624E-03	5.264E-02	8.625E-02	0.000E+00	-0.100

DRAFT

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A,14L71920-39     ,03/14/2017 13:57,02/23/2017 11:46,   1.471E+02,L71920-39 SS G
B,14L71920-39     ,CS134_137          ,01/03/2017 08:02,14B150012012
C,AC-228  ,YES,   3.243E-01,   2.667E-01,   2.844E-01,,    1.140
C,CS-134  ,NO ,  -2.027E-03,   5.590E-02,   8.010E-02,,   -0.025
C,CS-137  ,NO ,  -8.624E-03,   5.264E-02,   8.625E-02,,   -0.100
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:58:04.12
TBE23 03017322 HpGe ********** Aquisition Date/Time: 14-MAR-2017 12:00:07.85

LIMS No., Customer Name, Client ID: L71920-42 SS GEOENGINEERS SEDIMENT

Sample ID : 23L71920-42 Smple Date: 23-FEB-2017 11:52:00.
Sample Type : SS Geometry : 23B150082004
Quantity : 1.44890E+02 g Dry BKGFILE : 23BG022417MT
Start Channel : 50 Energy Tol : 2.00000 Real Time : 0 01:57:35.96
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:57:29.43
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	5	33.99*	50	20	1.59	68.80	3.81E-01	7.13E-03	37.8	1.11E+00
2	5	36.78*	16	115	2.74	74.36	5.63E-01	2.30E-03	201.1	
3	0	92.75*	83	464	1.86	186.08	5.57E+00	1.17E-02	61.8	
4	0	238.96*	367	338	2.04	477.96	4.87E+00	5.20E-02	13.8	
5	0	351.47*	119	229	3.10	702.64	3.56E+00	1.69E-02	31.8	
6	0	510.73*	77	120	3.10	1020.79	2.55E+00	1.10E-02	41.2	
7	0	582.73*	73	87	2.17	1164.67	2.27E+00	1.04E-02	30.5	
8	0	608.81*	125	131	2.14	1216.81	2.19E+00	1.77E-02	23.0	
9	0	1459.89*	429	11	3.35	2919.65	1.07E+00	6.08E-02	5.7	

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

Nuclide Line Activity Report

Flag: "*" = Keyline

DRAFT

Sample ID : 23L71920-42
Acquisition date : 14-MAR-2017 12:00:07

Total number of lines in spectrum	9	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
5	33.99	50	20	1.59	68.80	61	27	7.13E-03	75.5	3.81E-01	
5	36.78	16	115	2.74	74.36	61	27	2.30E-03	****	5.63E-01	
0	92.75	83	464	1.86	186.08	177	16	1.17E-02	****	5.57E+00	
0	238.96	367	338	2.04	477.96	468	21	5.20E-02	27.5	4.87E+00	
0	351.47	119	229	3.10	702.64	693	18	1.69E-02	63.7	3.56E+00	
0	510.73	77	120	3.10	1020.79	1010	20	1.10E-02	82.4	2.55E+00	
0	582.73	73	87	2.17	1164.67	1157	14	1.04E-02	60.9	2.27E+00	
0	608.81	125	131	2.14	1216.81	1208	16	1.77E-02	46.1	2.19E+00	
0	1459.89	429	11	3.35	2919.65	2911	22	6.08E-02	11.4	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 9
Number of unidentified lines 9
Number of lines tentatively identified by NID 0 0.00%
**** There are no nuclides meeting summary criteria ****

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

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	6.098E-02		4.718E-02	7.780E-02	0.000E+00	0.784
CS-137	-3.576E-03		3.675E-02	6.495E-02	0.000E+00	-0.055
AC-228	2.877E-01		1.613E-01	3.243E-01	0.000E+00	0.887

DRAFT

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A,23L71920-42     ,03/14/2017 13:58,02/23/2017 11:52,   1.449E+02,L71920-42 SS G
B,23L71920-42     ,CS134_137           ,01/05/2017 07:18,23B150082004
C,CS-134  ,NO ,   6.098E-02,   4.718E-02,   7.780E-02,,    0.784
C,CS-137  ,NO ,  -3.576E-03,   3.675E-02,   6.495E-02,,   -0.055
C,AC-228  ,NO ,   2.877E-01,   1.613E-01,   3.243E-01,,    0.887
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 13:58:30.49
TBE11 31-TP20610B HpGe ******* Aquisition Date/Time: 14-MAR-2017 12:50:54.67

LIMS No., Customer Name, Client ID: L71920-45 SS GEOENGINEERS SEDIMENT

Sample ID : 11L71920-45 Smple Date: 23-FEB-2017 11:58:00.
Sample Type : SS Geometry : 11B150101411
Quantity : 1.45530E+02 g Dry BKGFILE : 11BG022417MT
Start Channel : 80 Energy Tol : 2.00000 Real Time : 0 01:07:32.45
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:07:30.56
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	92.69*	21	165	0.65	184.78	3.02E+00	5.27E-03	117.7	
2	2	238.51*	154	46	1.38	476.42	3.08E+00	3.79E-02	11.7	1.96E+00
3	2	242.03*	39	57	1.86	483.46	3.05E+00	9.51E-03	46.4	
4	0	301.22	30	80	0.65	601.82	2.58E+00	7.40E-03	61.2	
5	0	338.83*	17	75	1.45	677.03	2.34E+00	4.19E-03	103.2	
6	0	351.98*	80	62	1.95	703.34	2.27E+00	1.99E-02	24.3	
7	0	511.65*	25	63	2.65	1022.63	1.66E+00	6.23E-03	94.8	
8	0	583.04*	42	25	2.26	1165.38	1.48E+00	1.03E-02	28.6	
9	0	609.74*	31	62	0.72	1218.77	1.43E+00	7.75E-03	61.1	
10	0	911.15*	20	21	1.73	1821.43	1.02E+00	4.85E-03	56.8	
11	0	968.79*	31	12	1.57	1936.66	9.64E-01	7.54E-03	30.0	
12	0	1460.23*	198	0	2.02	2919.06	6.85E-01	4.89E-02	7.6	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.140E+00	------	Line Not Found	------
	911.07	20	27.70*	1.015E+00	3.202E-01	3.223E-01	113.55

Flag: "*" = Keyline

DRAFT

Sample ID : 11L71920-45 Acquisition date : 14-MAR-2017 12:50:54

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	3.202E-01	3.223E-01	3.659E-01	113.55	
		Total Activity :	3.202E-01	3.223E-01			
		Grand Total Activity :	3.202E-01	3.223E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	92.69	21	165	0.65	184.78	180	10	5.27E-03	****	3.02E+00	
2	238.51	154	46	1.38	476.42	472	19	3.79E-02	23.3	3.08E+00	
2	242.03	39	57	1.86	483.46	472	19	9.51E-03	92.8	3.05E+00	
0	301.22	30	80	0.65	601.82	595	11	7.40E-03	****	2.58E+00	
0	338.83	17	75	1.45	677.03	670	11	4.19E-03	****	2.34E+00	
0	351.98	80	62	1.95	703.34	696	14	1.99E-02	48.6	2.27E+00	
0	511.65	25	63	2.65	1022.63	1015	20	6.23E-03	****	1.66E+00	
0	583.04	42	25	2.26	1165.38	1160	10	1.03E-02	57.1	1.48E+00	
0	609.74	31	62	0.72	1218.77	1212	16	7.75E-03	****	1.43E+00	
0	968.79	31	12	1.57	1936.66	1930	12	7.54E-03	60.1	9.64E-01	
0	1460.23	198	0	2.02	2919.06	2914	12	4.89E-02	15.2	6.85E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	3.202E-01	3.223E-01	3.659E-01	113.55	
			---	---			
	Total Activity :		3.202E-01	3.223E-01			
	Grand Total Activity :		3.202E-01	3.223E-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
AC-228	3.223E-01	3.659E-01	3.429E-01	0.000E+00	0.940

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

CS-134	1.720E-02	6.348E-02	9.432E-02	0.000E+00	0.182
CS-137	-2.093E-04	5.324E-02	8.703E-02	0.000E+00	-0.002

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```
A,11L71920-45     ,03/14/2017 13:58,02/23/2017 11:58,   1.455E+02,L71920-45 SS G
B,11L71920-45     ,CS134_137          ,01/03/2017 08:01,11B150101411
C,AC-228  ,YES,   3.223E-01,   3.659E-01,   3.429E-01,,    0.940
C,CS-134  ,NO ,   1.720E-02,   6.348E-02,   9.432E-02,,    0.182
C,CS-137  ,NO ,  -2.093E-04,   5.324E-02,   8.703E-02,,   -0.002
```

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GAMMA SPECTROSCOPY

Prep and Run Logs

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Logbook Page

L71920

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
WG24440-1	SS	DUP	GELI	92.23 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-3	SS		GELI	92.23 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-6	SS		GELI	72.24 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-9	SS		GELI	64.99 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-12	SS		GELI	81.09 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-15	SS		GELI	105.34 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-18	SS		GELI	70.63 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-21	SS		GELI	92.59 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-24	SS		GELI	115.8 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-27	SS		GELI	116.3 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-30	SS		GELI	126.18 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-33	SS		GELI	109 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-36	SS		GELI	128.85 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-39	SS		GELI	147.13 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-42	SS		GELI	144.89 g dry	03/14/17	MJW	BALANCE 8							WG24440
L71920-45	SS		GELI	145.53 g dry	03/14/17	MJW	BALANCE 8							WG24440

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GAMMA SPECTROSCOPY

Balance and Pipette Check

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Daily Balance Tolerance Check Reports

for : L71920

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 14-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod		
NONE	BALANCE 8	14-MAR-17
GELI	BALANCE 8	14-MAR-17

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Daily Pipette Tolerance Check

for: L71920

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LEAD 210

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LEAD 210

Initial Calibration

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X COUNTER PB-210/BI-210 CALIBRATION											
Detector Number		Eff. STD	Alpha	Beta		Min Ctd	HV Value	Beta CPM	BI-210 D.F.	BI-210 DPM	BI-210 Beta Eff.
1	a	BIPO4 #5	940	18658	2/13/2015 10:10	30	1580	621.93	0.7749	1998	0.3112
1	b	#6	896	17727	2/13/2015 10:10	30	1580	590.90	0.7749	1998	0.2957
1	c	#7	42	16503	2/13/2015 10:10	30	1580	550.10	0.7749	1998	0.2753
1	d	#8	793	16949	2/13/2015 10:10	30	1580	564.97	0.7749	1998	0.2827
2	a	#9	5	15909	2/13/2015 10:10	30	1580	530.30	0.7749	1998	0.2654
2	b	#10	336	14247	2/13/2015 10:10	30	1580	474.90	0.7749	1998	0.2377
2	c	BIPO4 #5	868	18598	2/13/2015 10:52	30	1580	619.93	0.7719	1990	0.3115
2	d	#6	880	13022	2/13/2015 10:52	30	1580	434.07	0.7719	1990	0.2181
3	a	#7	5	15919	2/13/2015 10:52	30	1580	530.63	0.7718	1990	0.2666
3	b	#8	669	16745	2/13/2015 10:52	30	1580	558.17	0.7718	1990	0.2805
3	c	#9	3	15677	2/13/2015 10:52	30	1580	522.57	0.7718	1990	0.2626
3	d	#10	696	17488	2/13/2015 10:52	30	1580	582.93	0.7718	1990	0.2929
4	a	BIPO4 #5	861	18350	2/13/2015 12:00	30	1580	611.67	0.7668	1977	0.3094
4	b	#6	920	17425	2/13/2015 12:00	30	1580	580.83	0.7668	1977	0.2938
4	c	#7	2	16382	2/13/2015 12:00	30	1580	546.07	0.7668	1977	0.2762
4	d	#8	609	16975	2/13/2015 12:00	30	1580	565.83	0.7668	1977	0.2862

210PB-061014	Activity		MILK DATE/TIME								
	pCi/ml	BI YIELD			Standards Prepared by:					2/21/15	
210PB-061014-1	2013	0.577	2/11/2015 13:55								
210PB-061014-2	2013	0.577	2/11/2015 13:55		Calibration by:	Keith Jett				2/21/15	
210PB-061014-3	2013	0.577	2/11/2015 13:55								
210PB-061014-4	2013	0.577	2/11/2015 13:55								
210PB-061014-5	2013	0.577	2/11/2015 13:55								
210PB-061014-6	2013	0.577	2/11/2015 13:55								

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Y COUNTER PB-210/BI-210 CALIBRATION

Detector Number		Eff. STD	Alpha	Beta		Min Ctd	HV Value	Beta CPM	BI-210 D.F.	BI-210 DPM	BI-210 Beta Eff.
1	a	BIPO4 #5	927	17714	2/13/2015 15:55	30	1650	590.47	0.7497	1933	0.3054
1	b	#6	882	16925	2/13/2015 15:55	30	1650	564.17	0.7497	1933	0.2918
1	c	#7	121	16119	2/13/2015 15:55	30	1650	537.30	0.7497	1933	0.2779
1	d	#8	856	16581	2/13/2015 15:55	30	1650	552.70	0.7497	1933	0.2859
2	a	#9	6	15238	2/13/2015 15:55	30	1650	507.93	0.7497	1933	0.2627
2	b	#10	756	17135	2/13/2015 15:55	30	1650	571.17	0.7497	1933	0.2955
2	c	BIPO4 #5	1657	18377	2/18/2015 10:24	60	1650	306.28	0.3877	1000	0.3064
2	d	#6	2017	17684	2/18/2015 10:24	60	1650	294.73	0.3877	1000	0.2948
3	a	#7	90	16259	2/18/2015 10:24	60	1650	270.98	0.3877	1000	0.2711
3	b	#8	1726	17225	2/18/2015 10:24	60	1650	287.08	0.3877	1000	0.2872
3	c	#9	16	15783	2/18/2015 10:24	60	1650	263.05	0.3877	1000	0.2631
3	d	#10	1502	17714	2/18/2015 10:24	60	1650	295.23	0.3877	1000	0.2953
4	a	BIPO4 #5	3108	13982	2/20/2015 12:38	60	1650	233.03	0.2903	749	0.3113
4	b	#6	3099	13105	2/20/2015 12:38	60	1650	218.42	0.2903	749	0.2918
4	c	#7	3	12270	2/20/2015 12:38	60	1650	204.50	0.2903	749	0.2732
4	d	#8	2476	12496	2/20/2015 12:38	60	1650	208.27	0.2903	749	0.2782

210PB-061014	Activity		MILK DATE/TIME
	pCi/ml	BI YIELD	
210PB-061014-1	2013	0.577	2/11/2015 13:55
210PB-061014-2	2013	0.577	2/11/2015 13:55
210PB-061014-3	2013	0.577	2/11/2015 13:55
210PB-061014-4	2013	0.577	2/11/2015 13:55
210PB-061014-5	2013	0.577	2/11/2015 13:55
210PB-061014-6	2013	0.577	2/11/2015 13:55

Standards Prepared by: [signature] 2/21/15

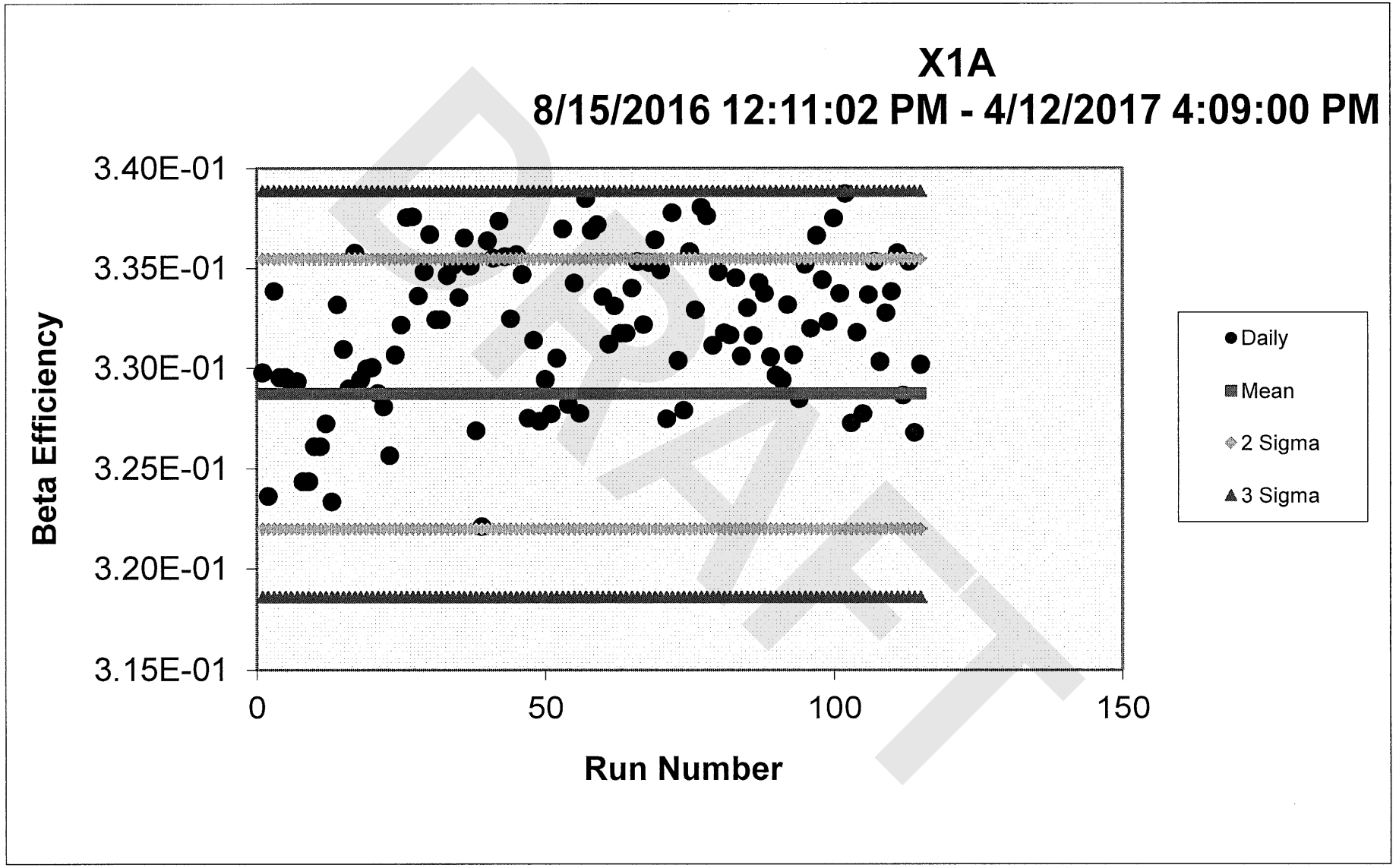
Calibration by: Keith Jett 2/21/15

DRAFT

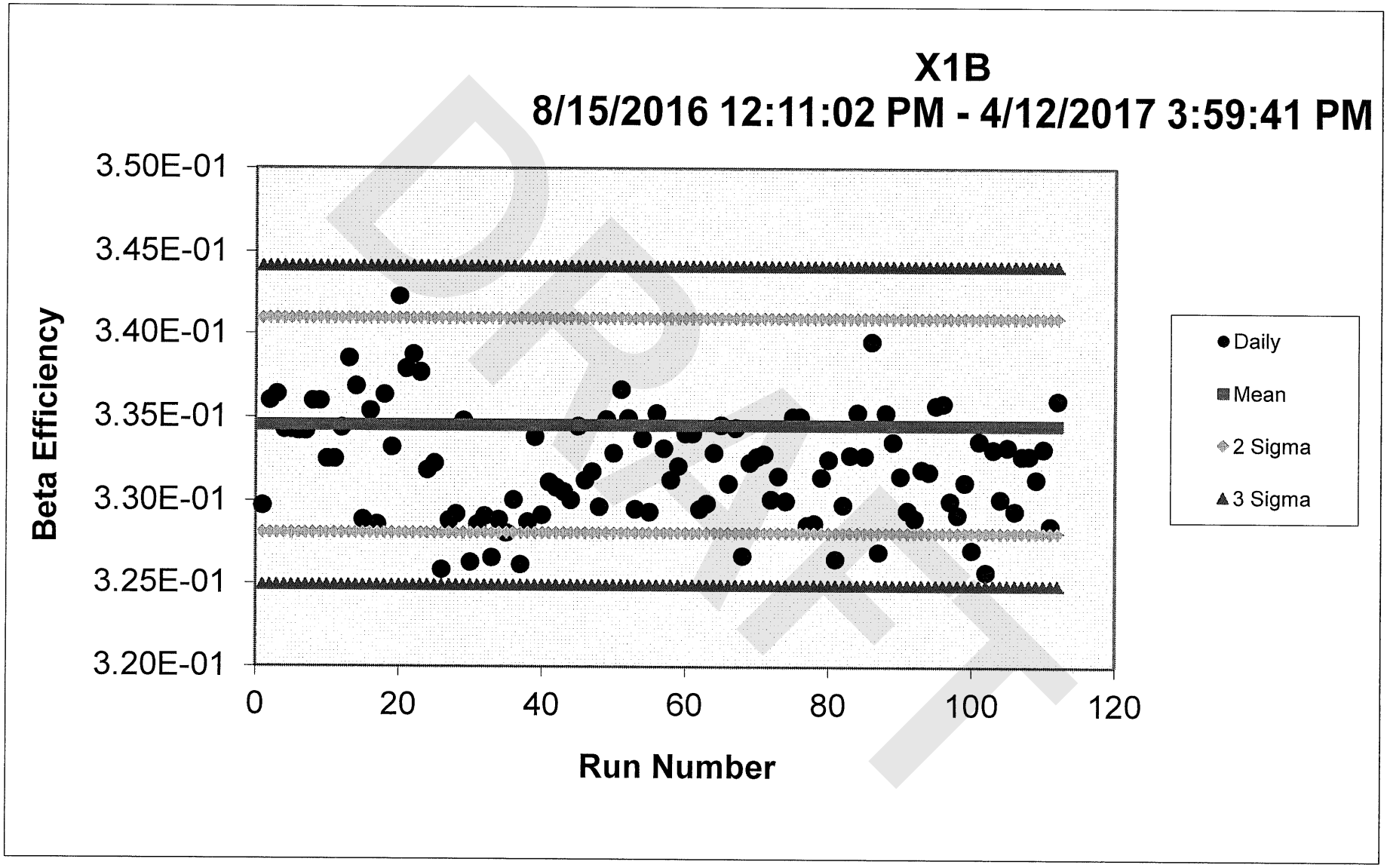
LEAD 210

Daily Source and Background Checks

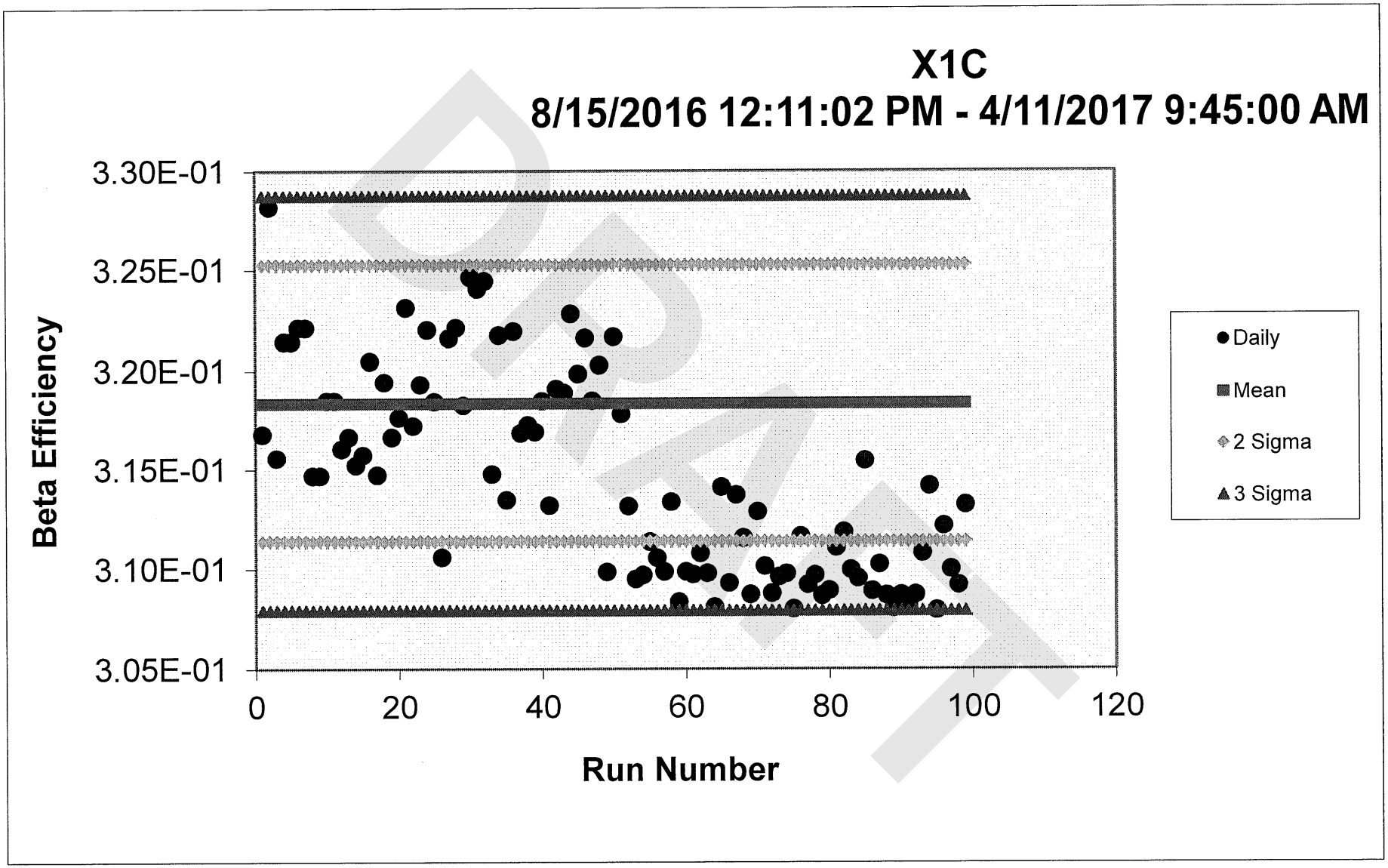
DRAFT


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3.30E-01
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3.20E-01
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100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

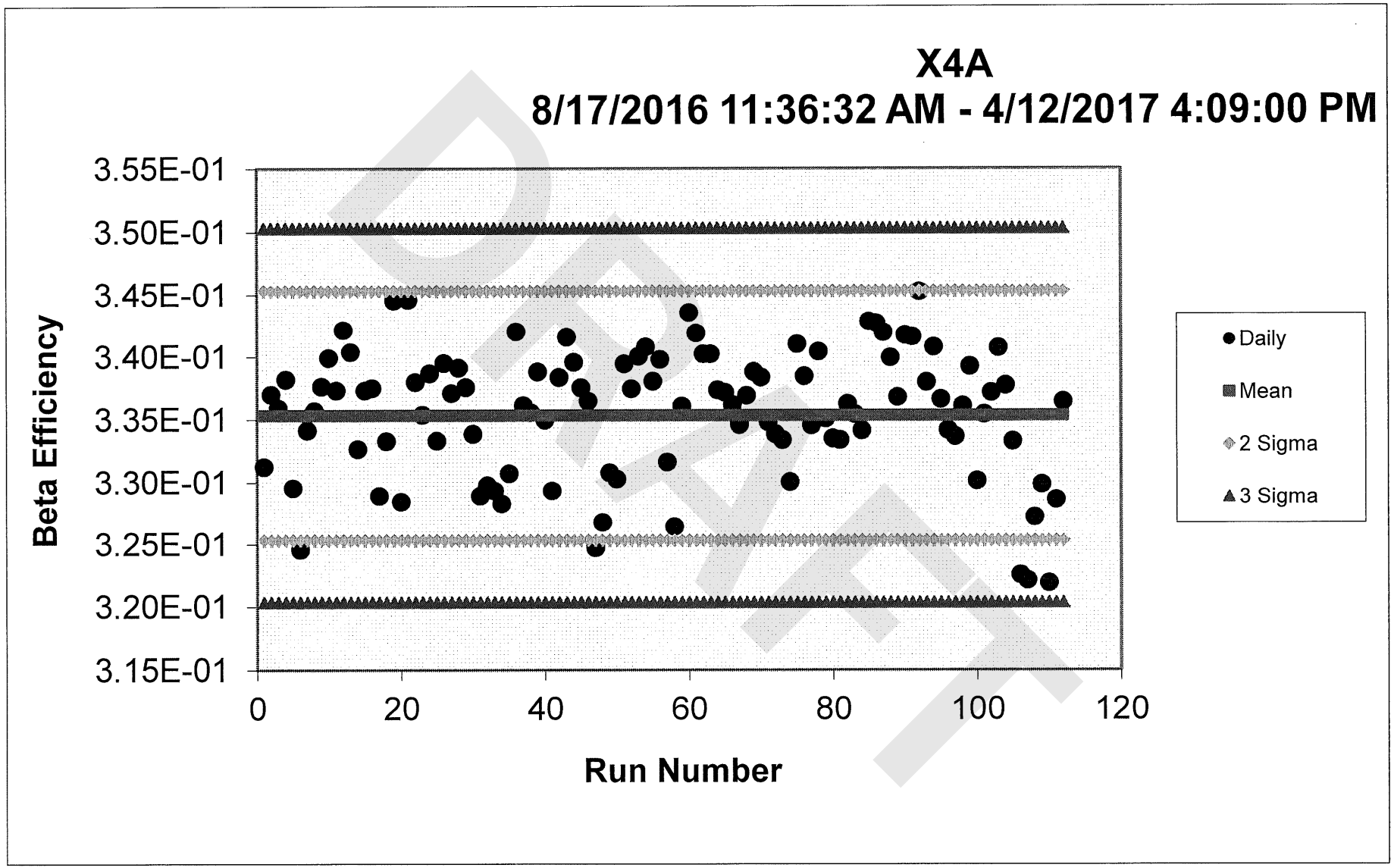
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Run Number
Daily
Mean
2 Sigma
3 Sigma

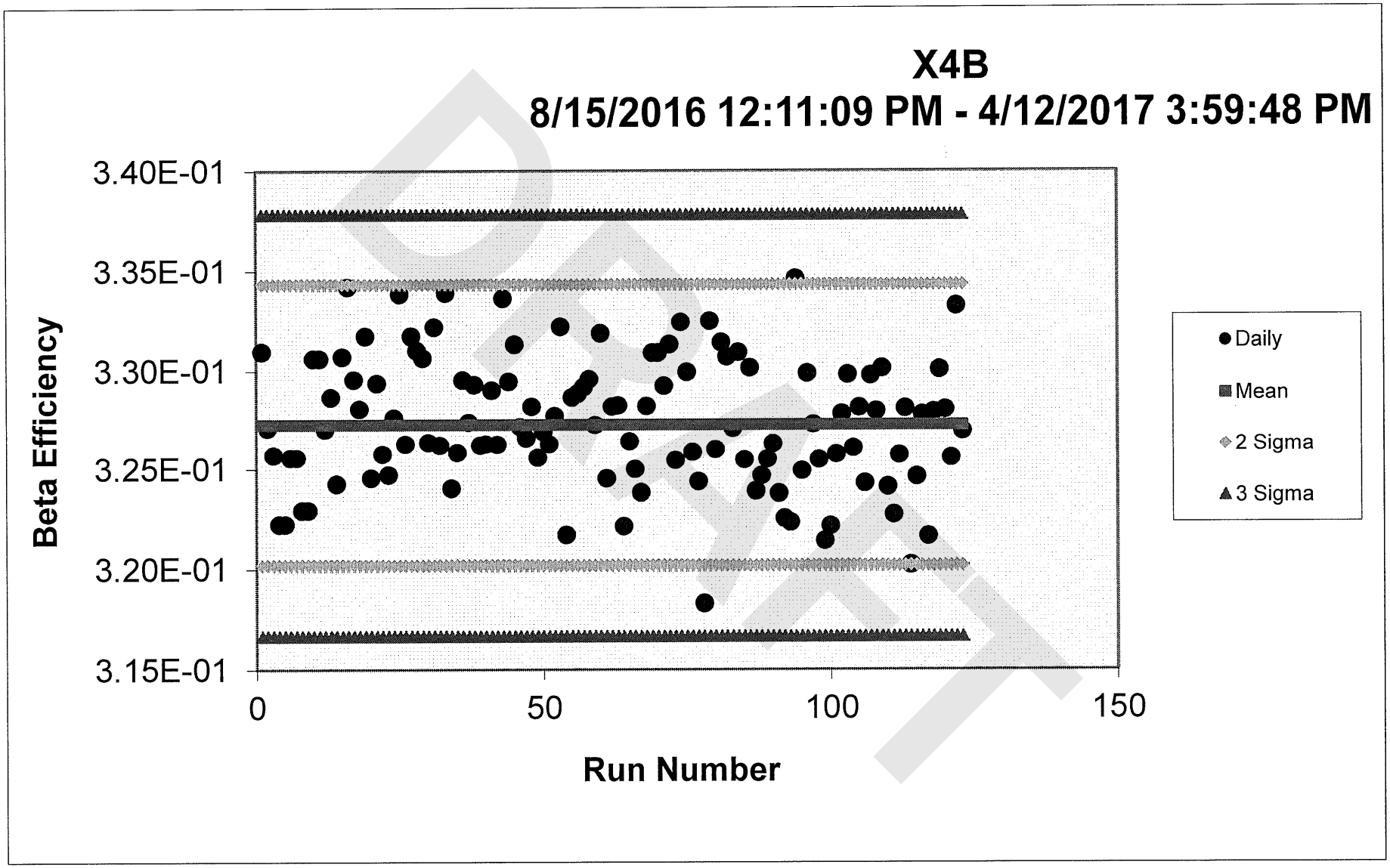
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120
Run Number
Daily
Mean
2 Sigma
3 Sigma

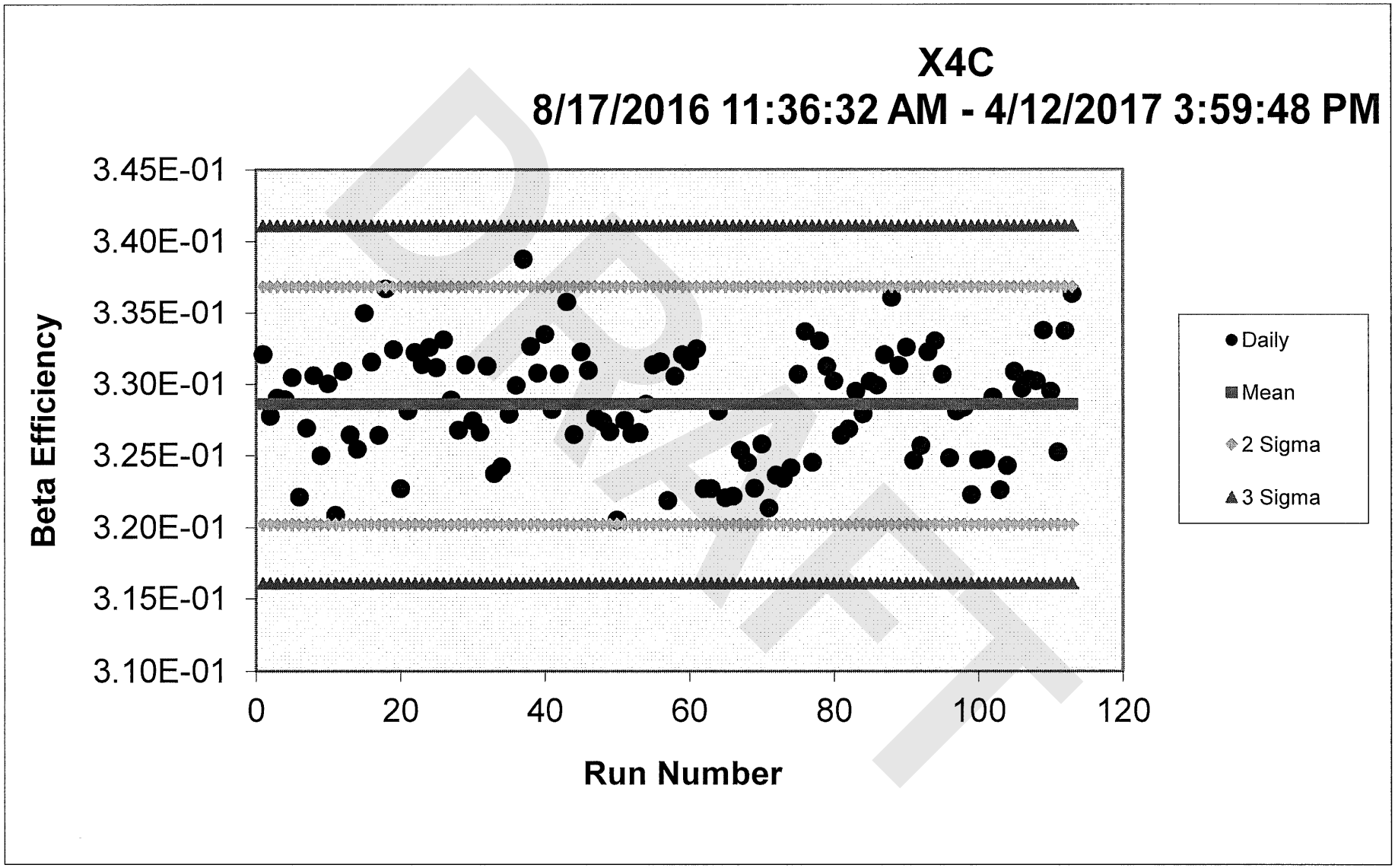
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0
20
40
60
80
100
120
Run Number
Daily
Mean
2 Sigma
3 Sigma

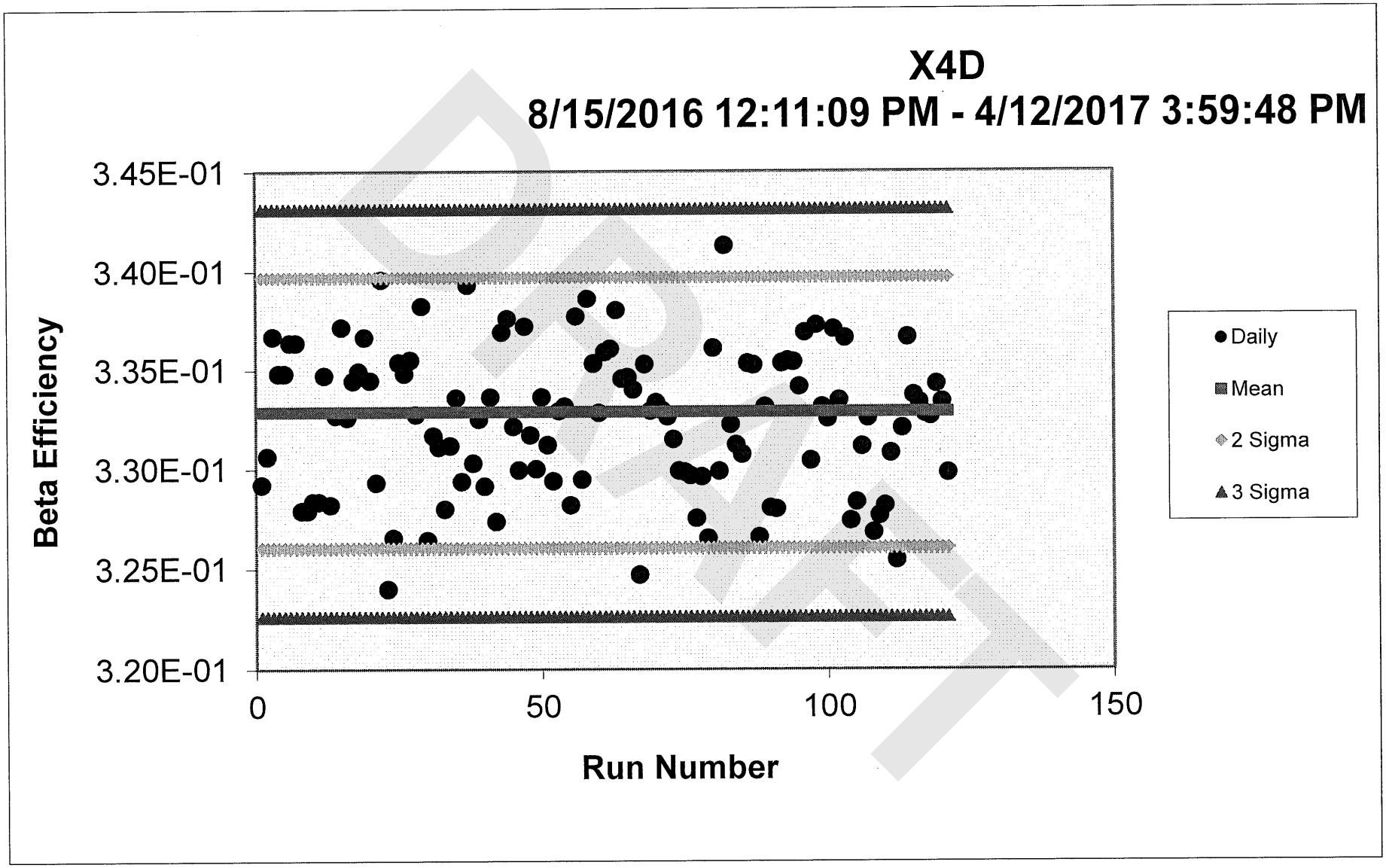
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Run Number
Daily
Mean
2 Sigma
3 Sigma

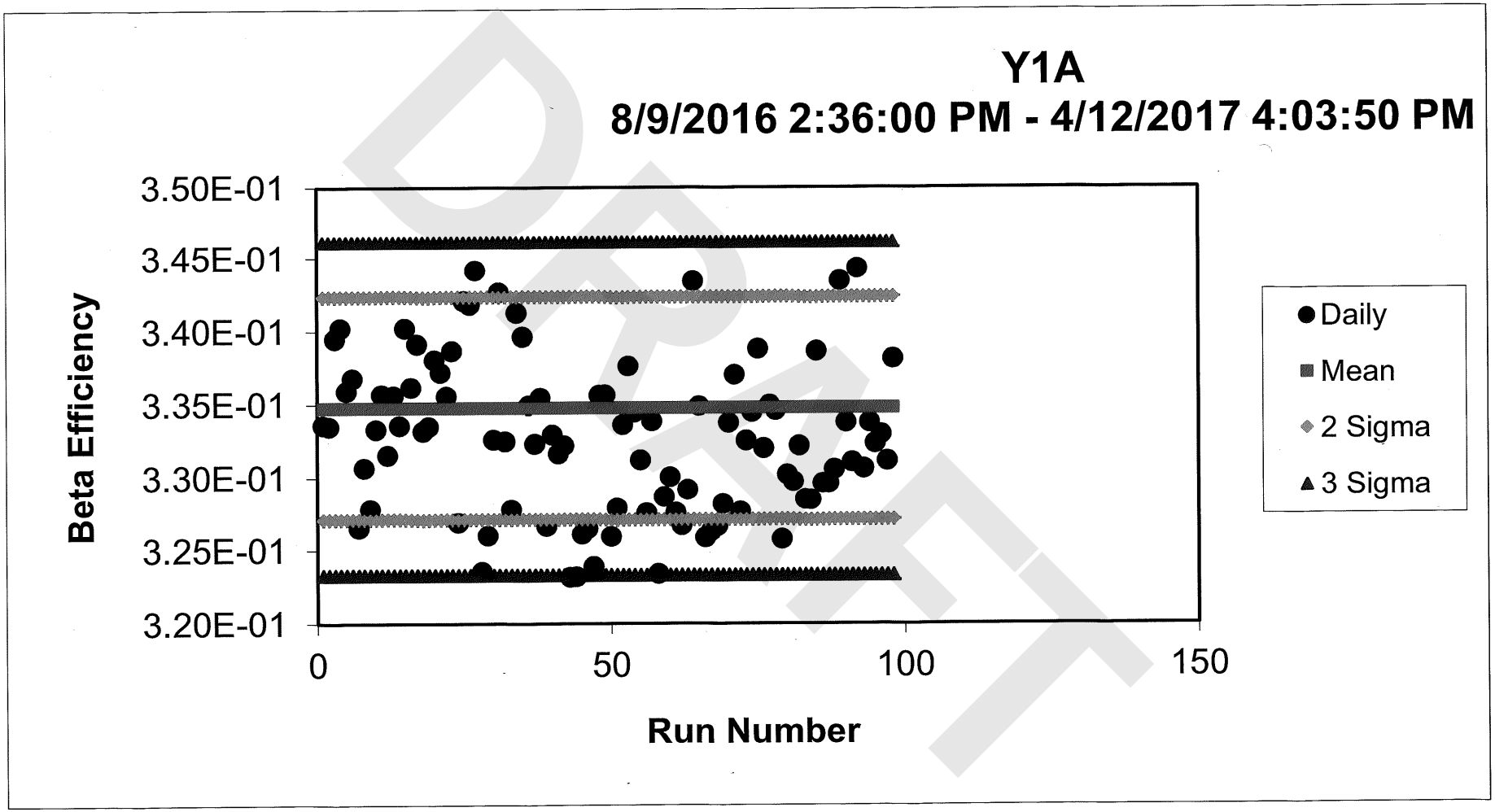
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20
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100
120
Run Number
Daily
Mean
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3 Sigma

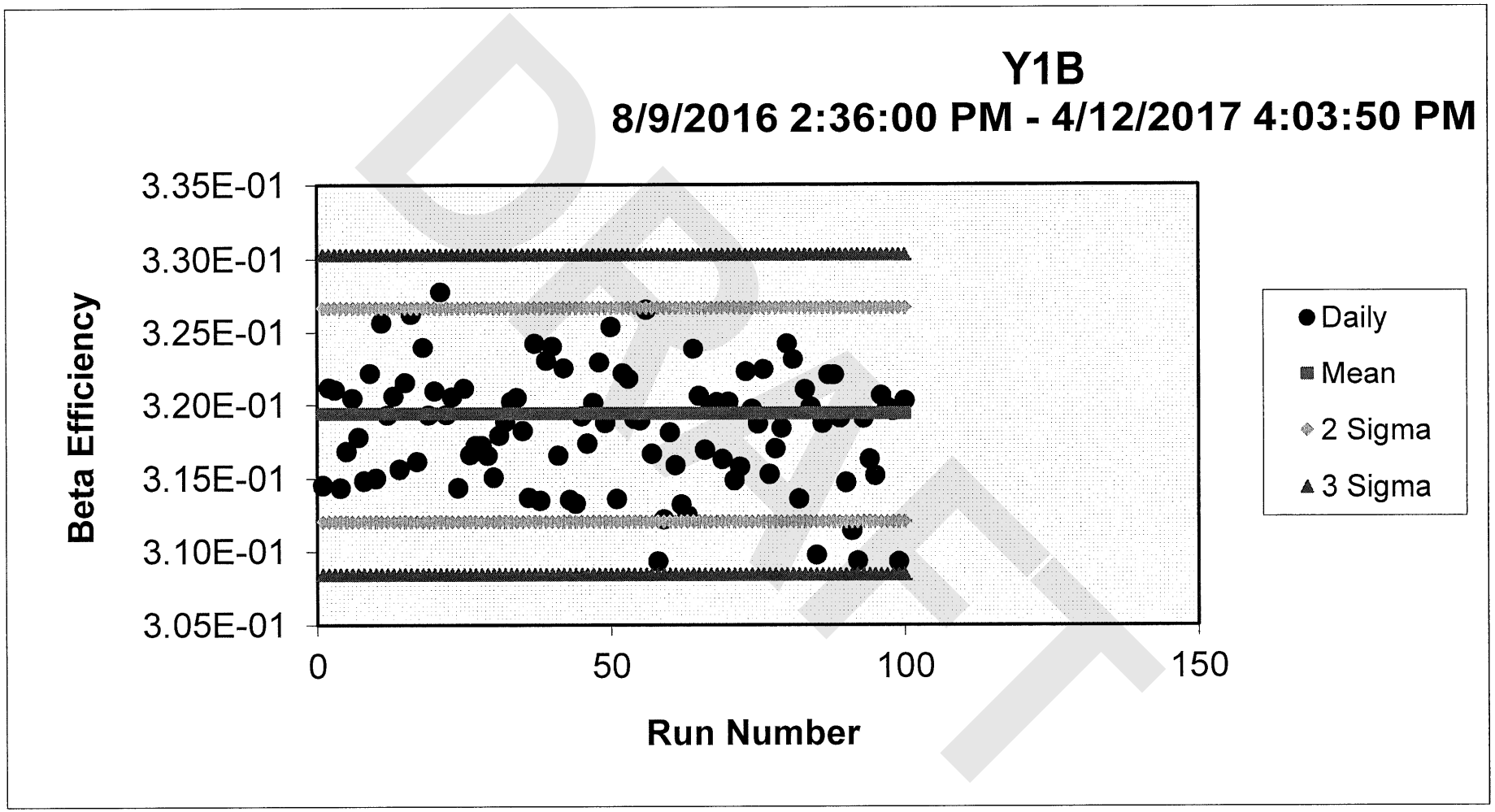
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100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

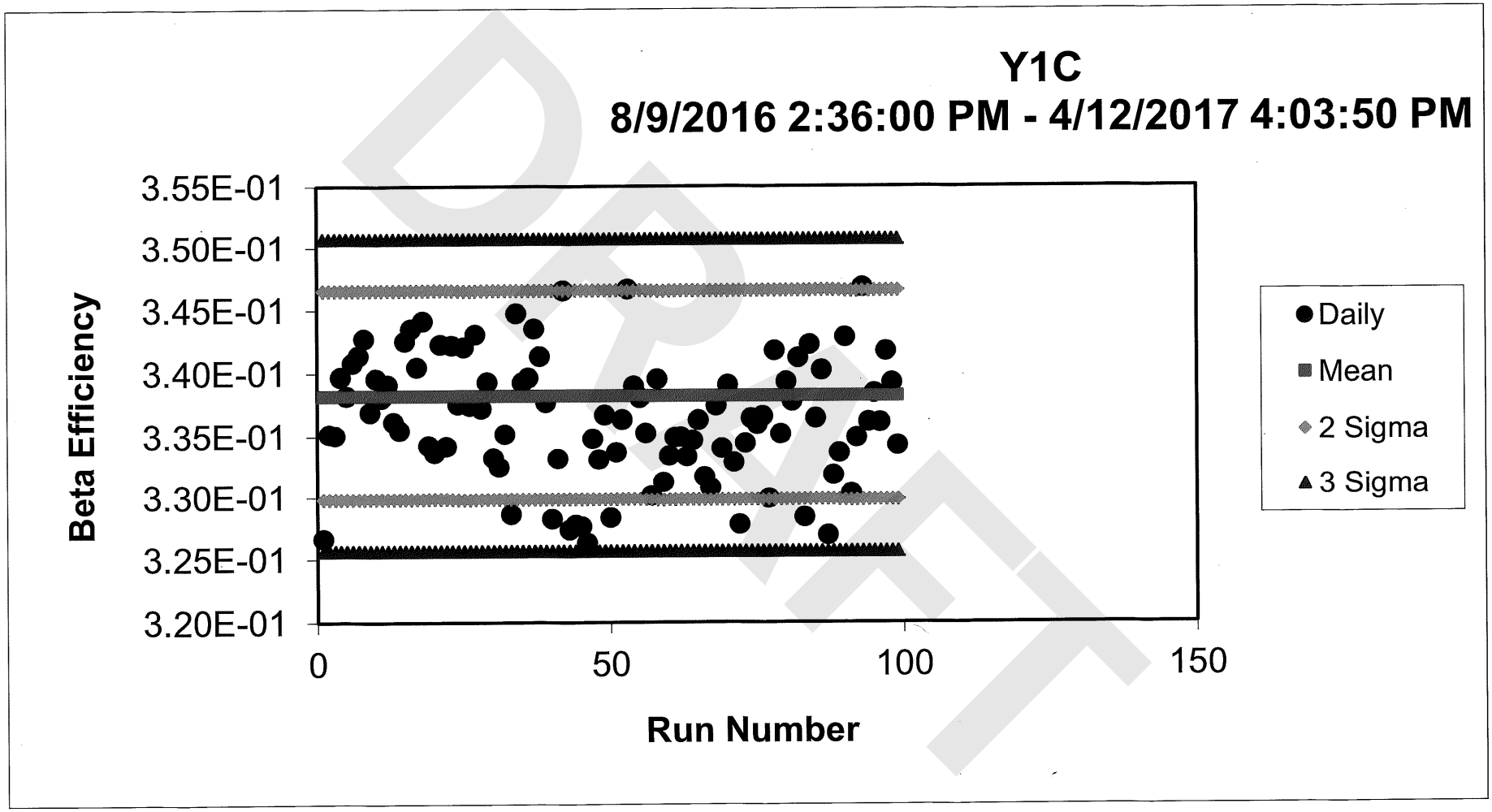
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Run Number
Daily
Mean
2 Sigma
3 Sigma

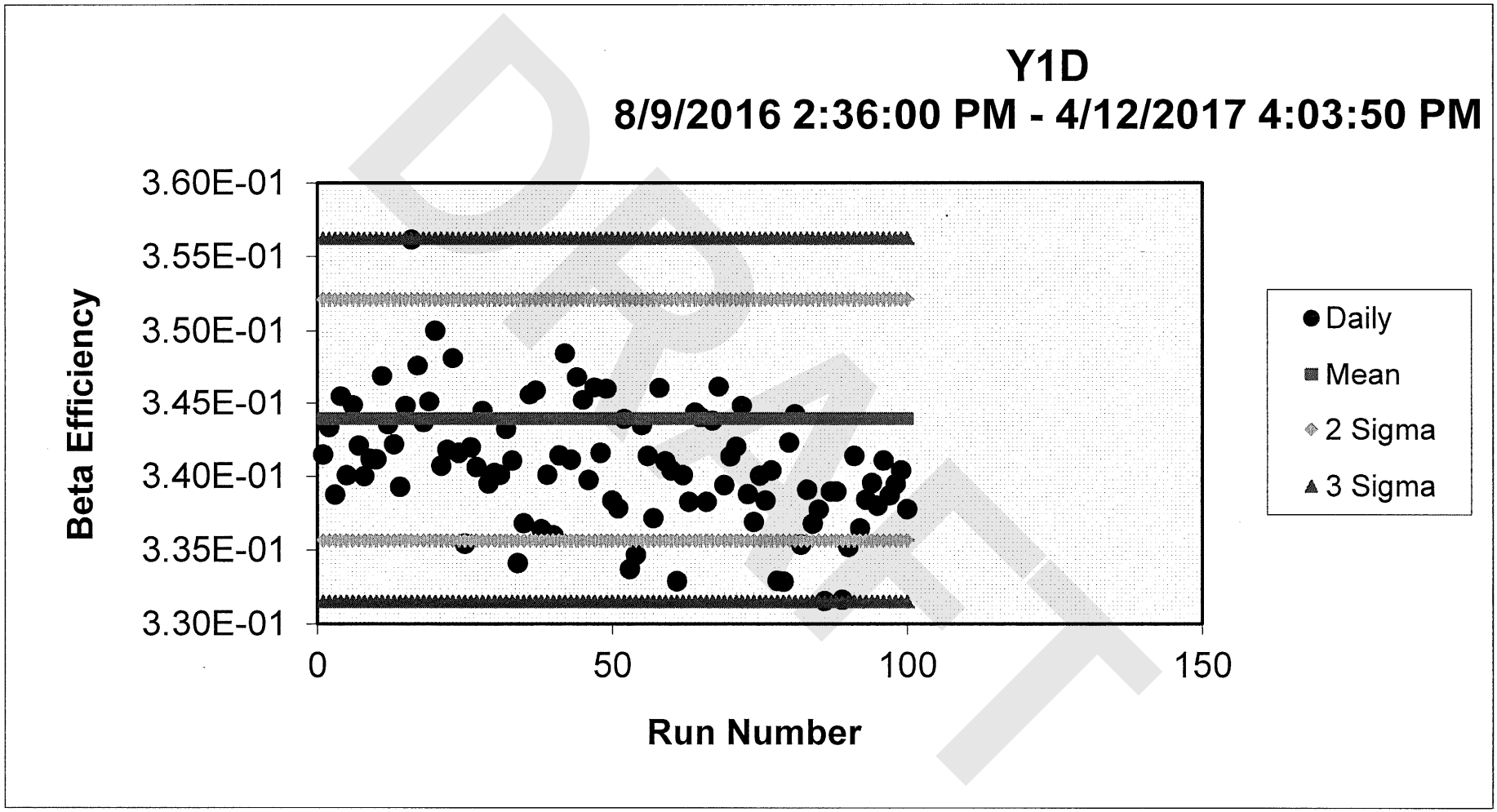
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100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

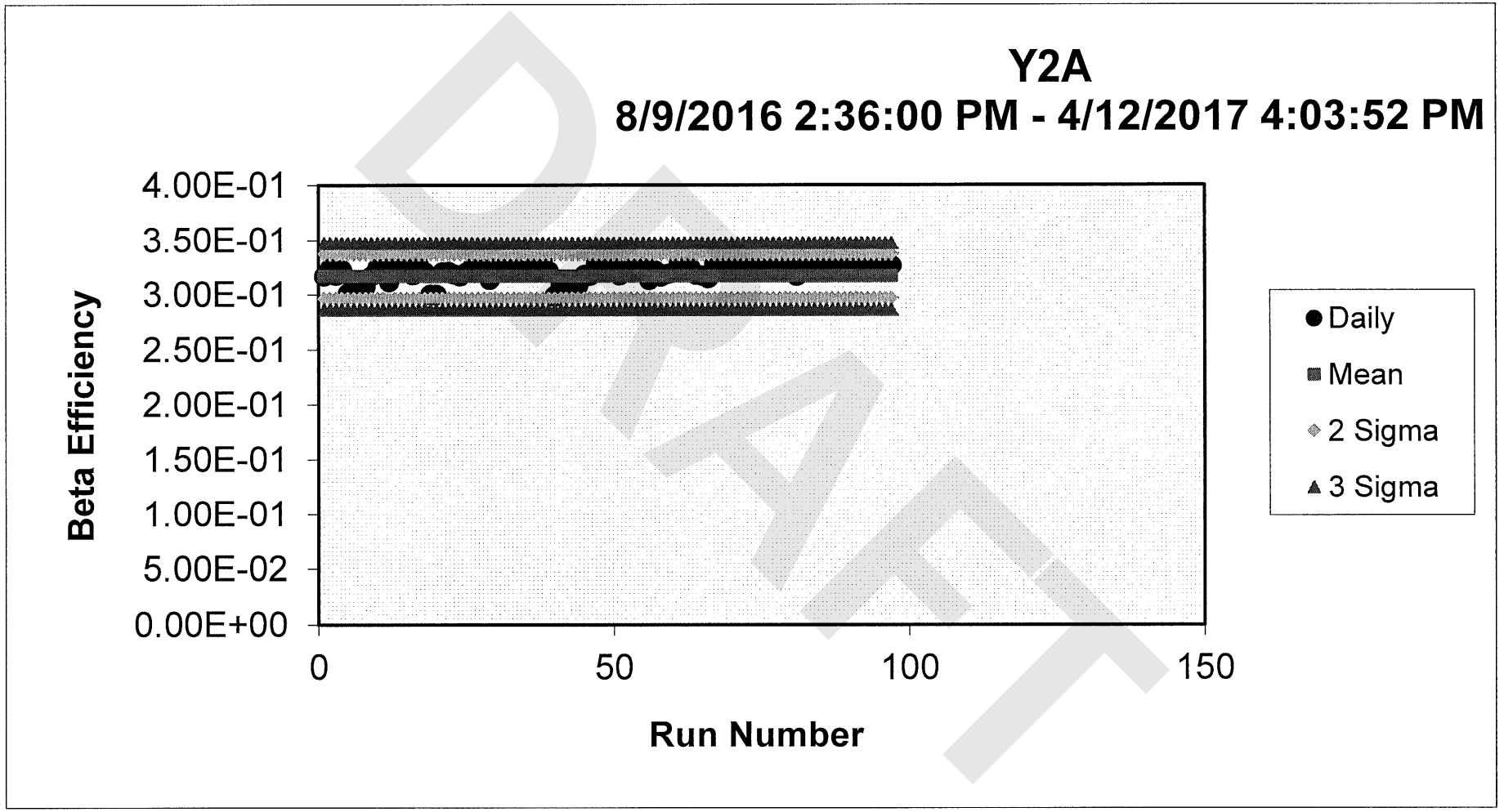
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100
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Run Number
Daily
Mean
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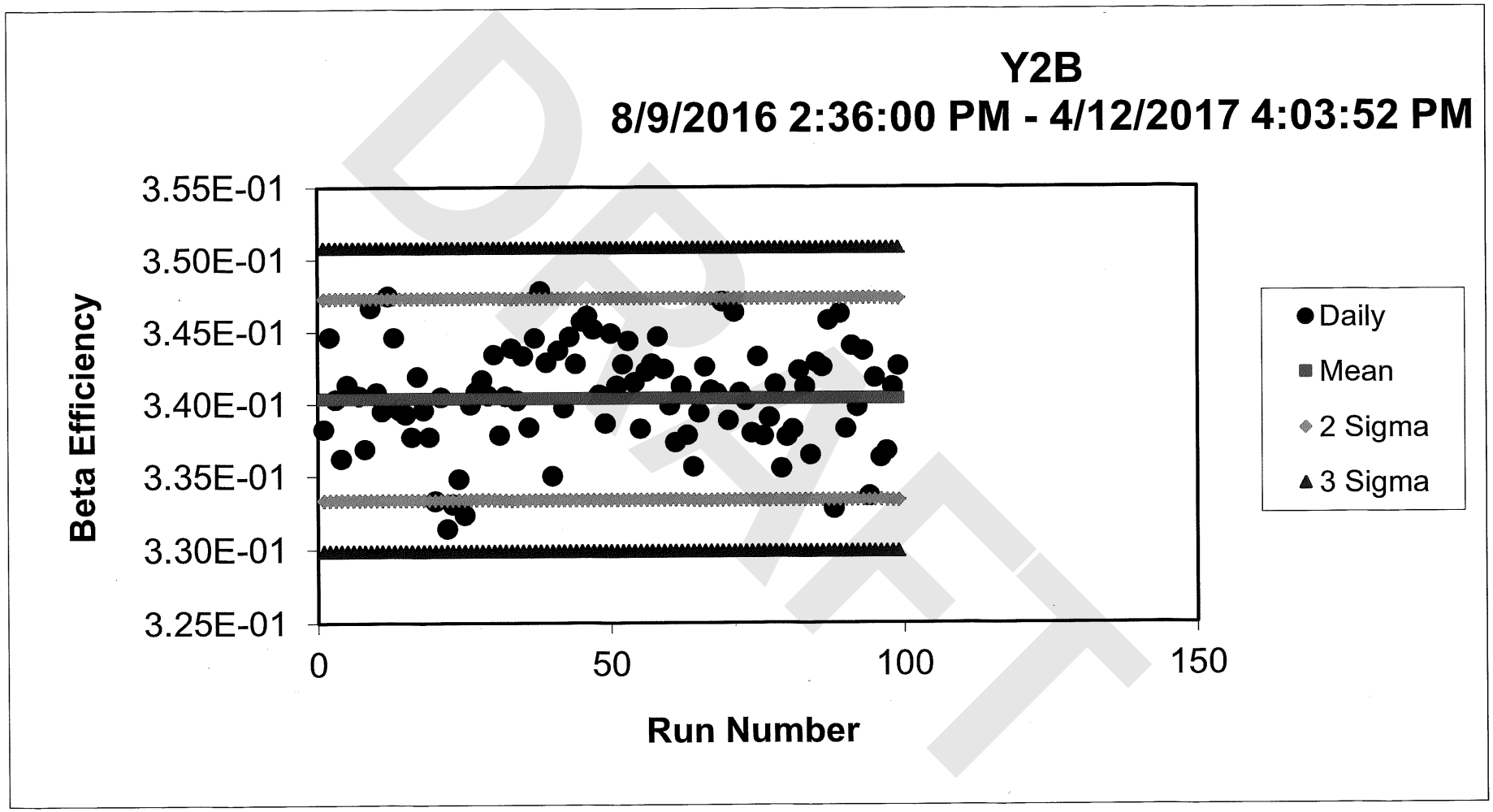
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100
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Run Number
Daily
Mean
2 Sigma
3 Sigma

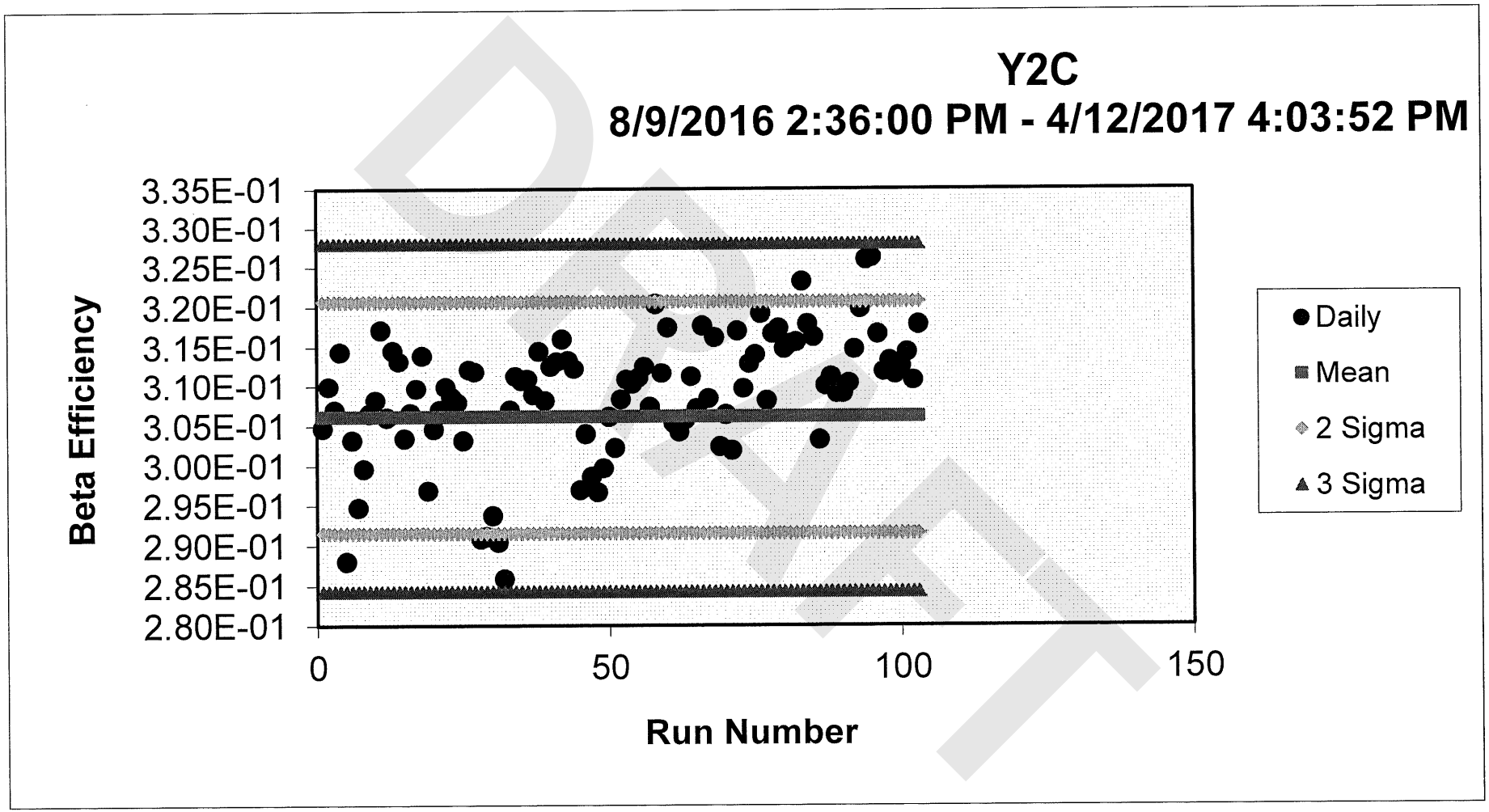
DRAFT


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2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

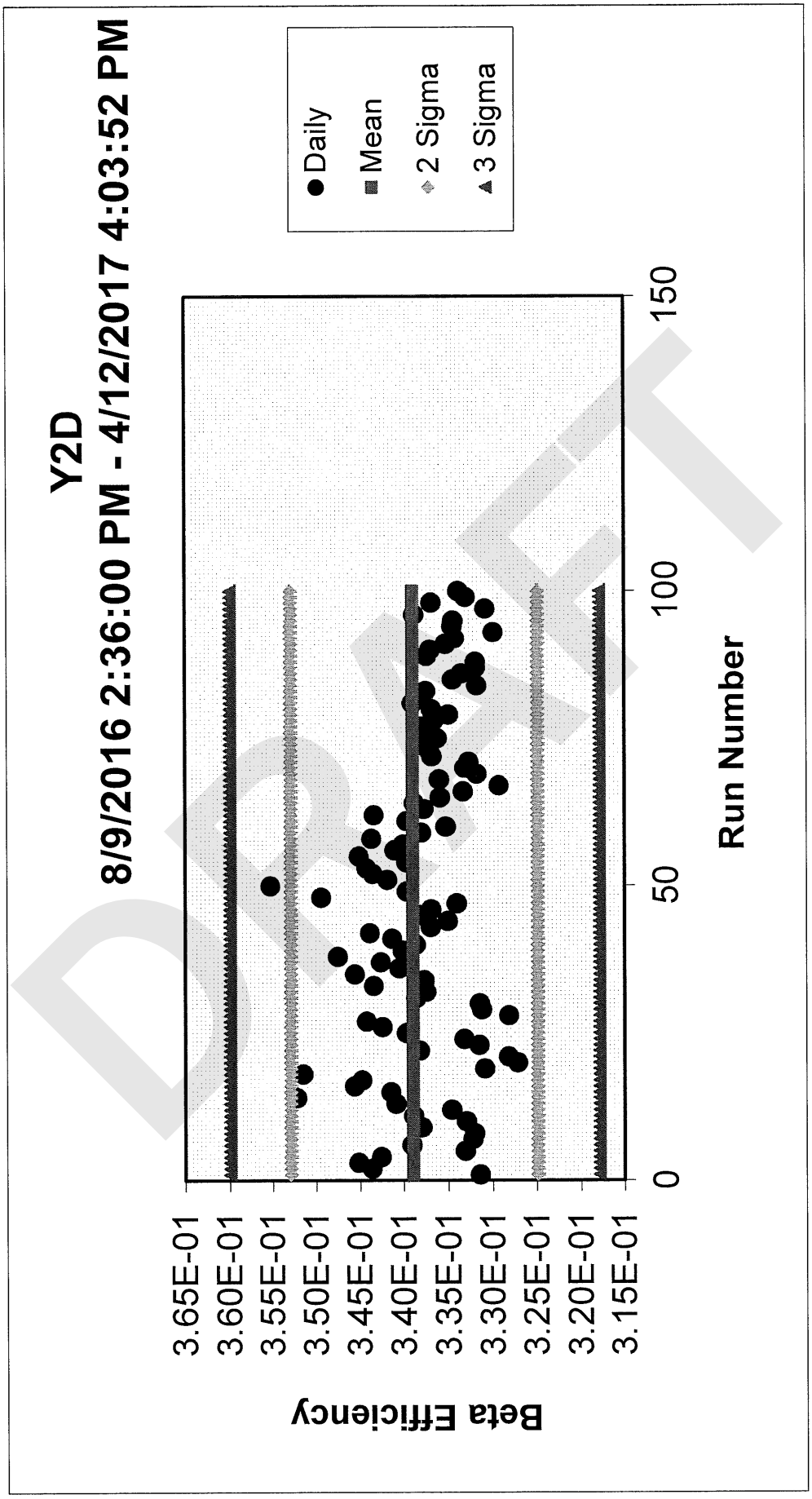
DRAFT


Y2B
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3.45E-01
3.40E-01
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3.30E-01
3.25E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

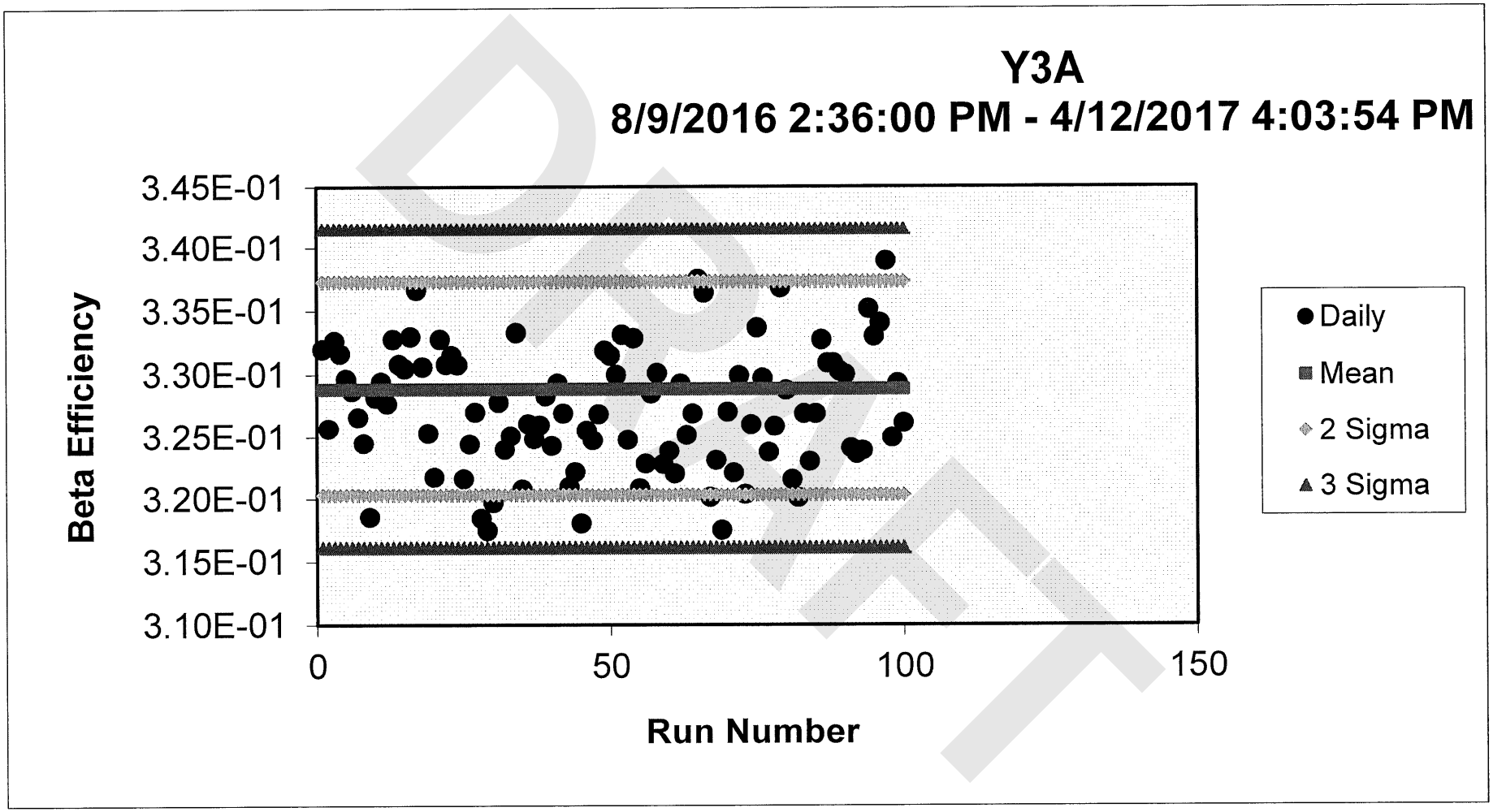
DRAFT


Y2C
8/9/2016 2:36:00 PM - 4/12/2017 4:03:52 PM
Beta Efficiency
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3.25E-01
3.20E-01
3.15E-01
3.10E-01
3.05E-01
3.00E-01
2.95E-01
2.90E-01
2.85E-01
2.80E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

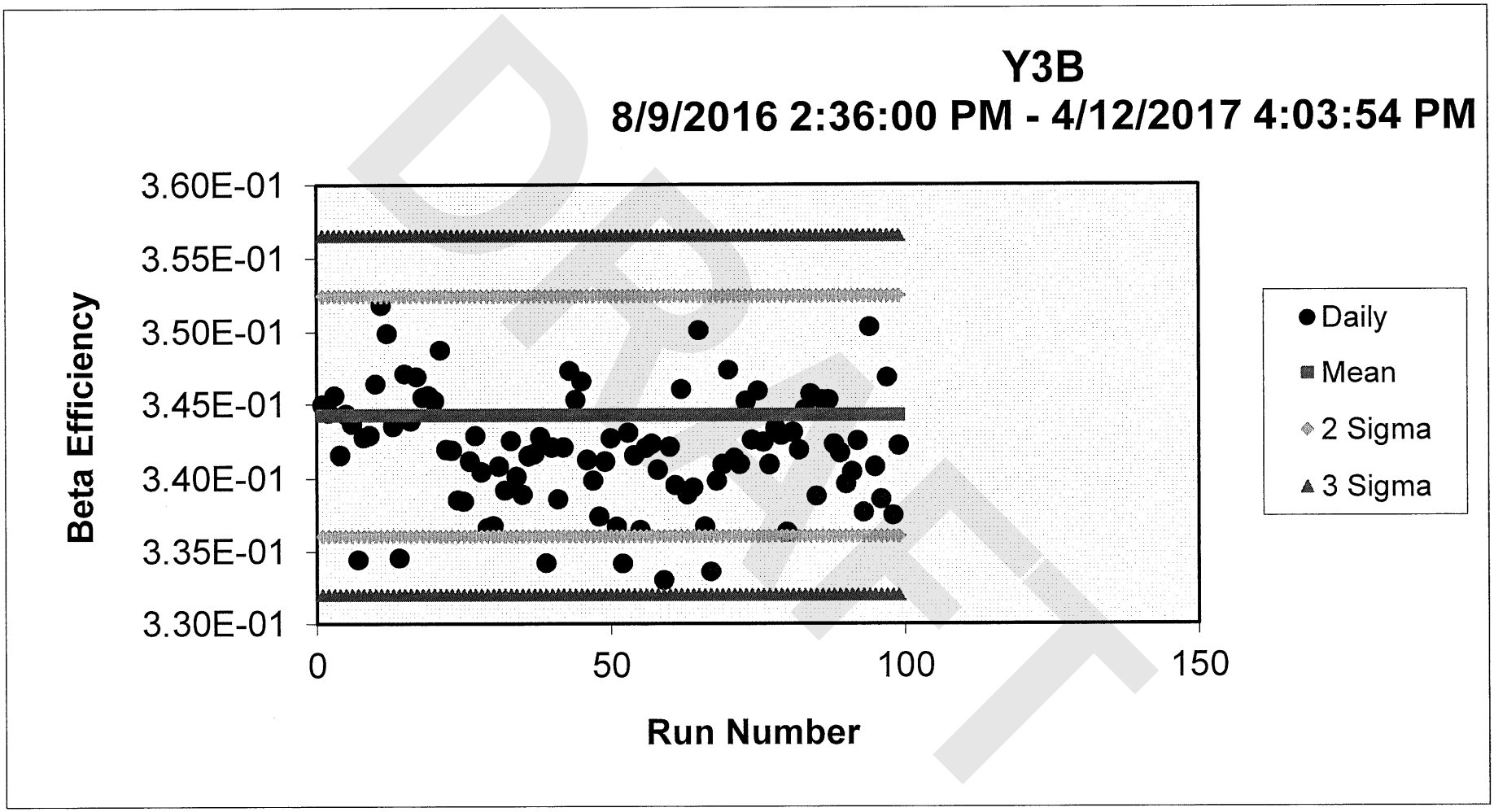
DRAFT


Y2D
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Daily
Mean
2 Sigma
3 Sigma
Beta Efficiency
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3.55E-01
3.50E-01
3.45E-01
3.40E-01
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Run Number

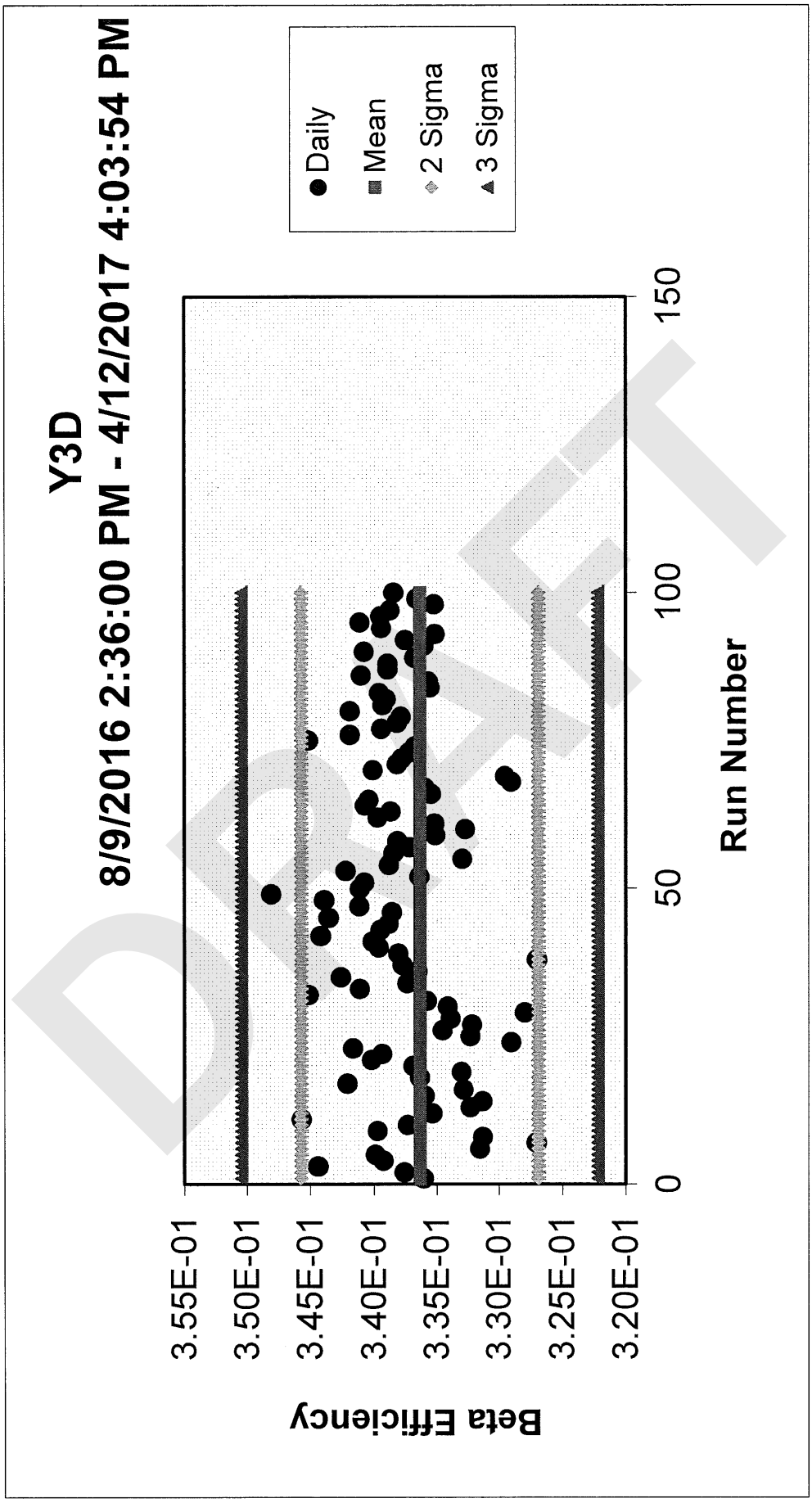
DRAFT


Y3A
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3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
3.10E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

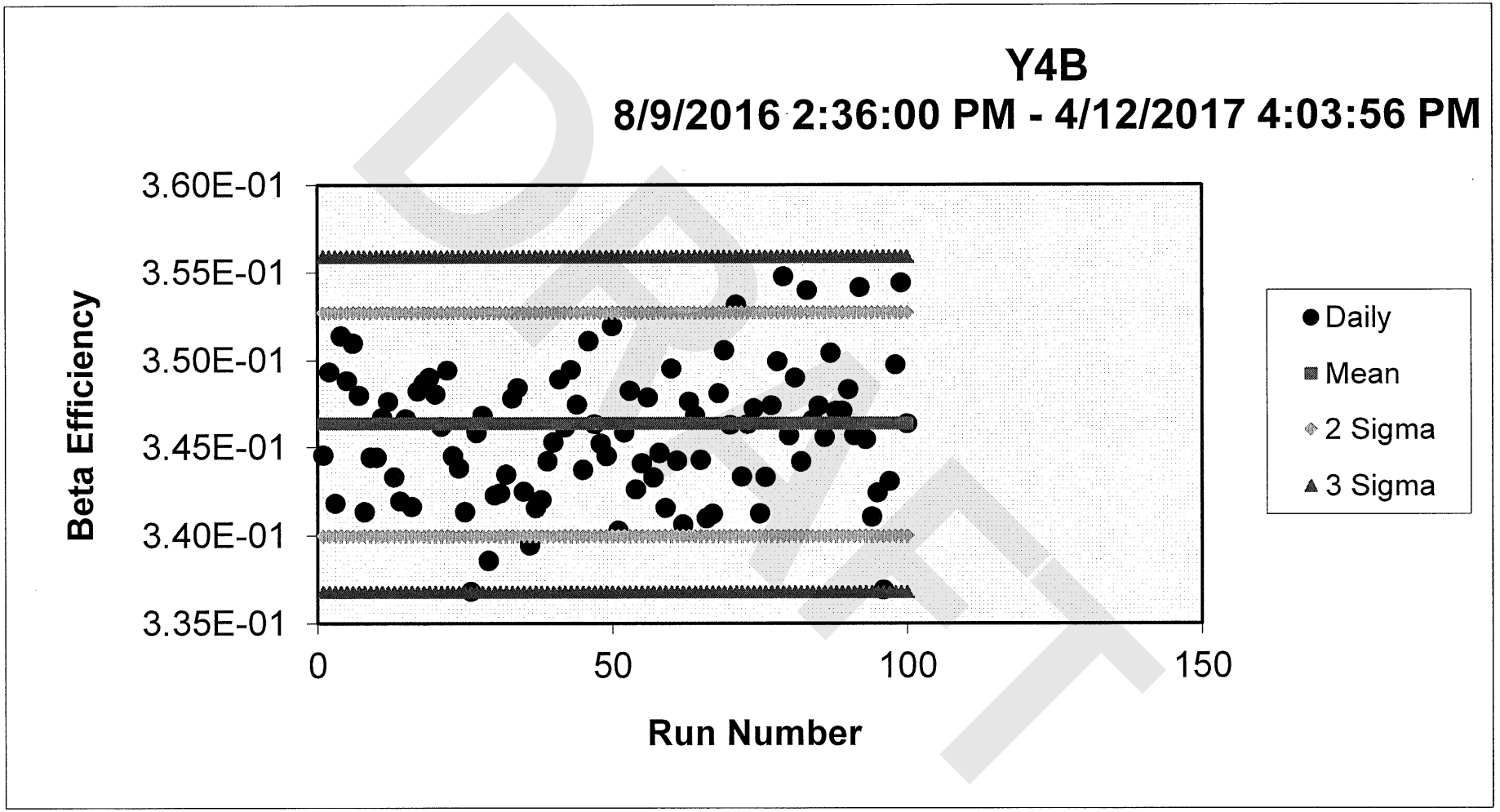
DRAFT


Y3B
8/9/2016 2:36:00 PM - 4/12/2017 4:03:54 PM
Beta Efficiency
3.60E-01
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

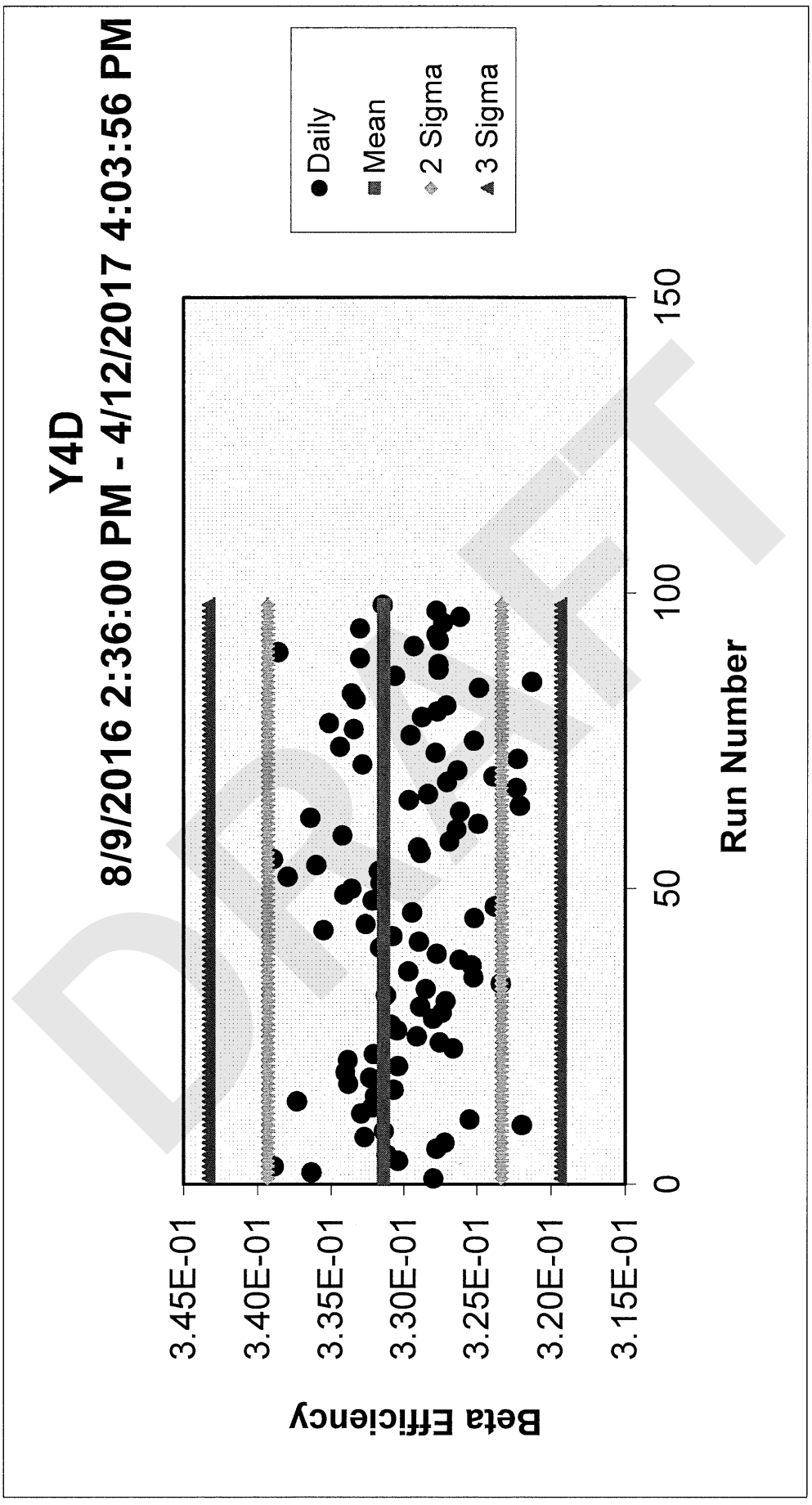
DRAFT


Y3D
8/9/2016 2:36:00 PM - 4/12/2017 4:03:54 PM
Daily
Mean
2 Sigma
3 Sigma
Beta Efficiency
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
0
50
100
150
Run Number

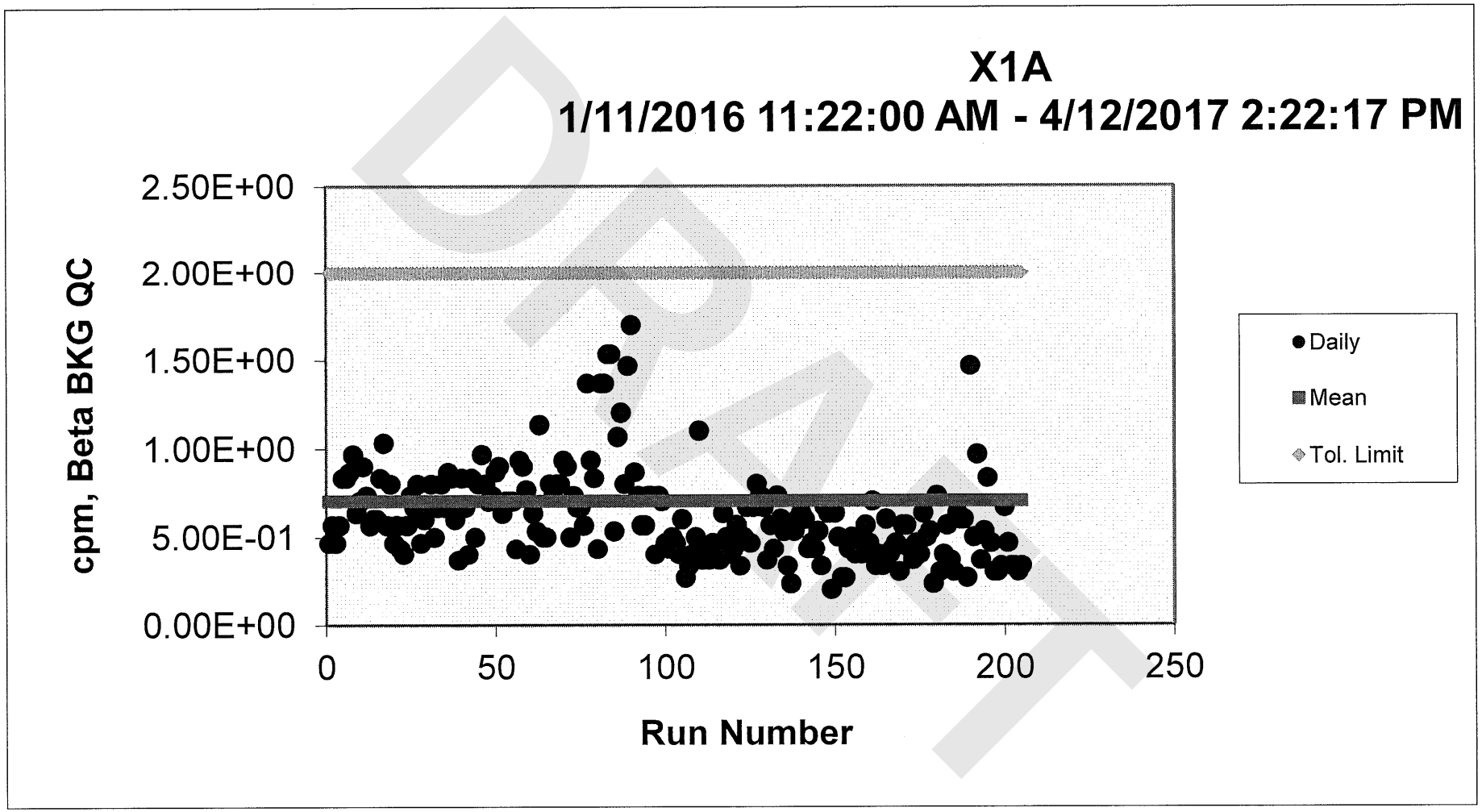
DRAFT


Y4B
8/9/2016 2:36:00 PM - 4/12/2017 4:03:56 PM
Beta Efficiency
3.60E-01
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

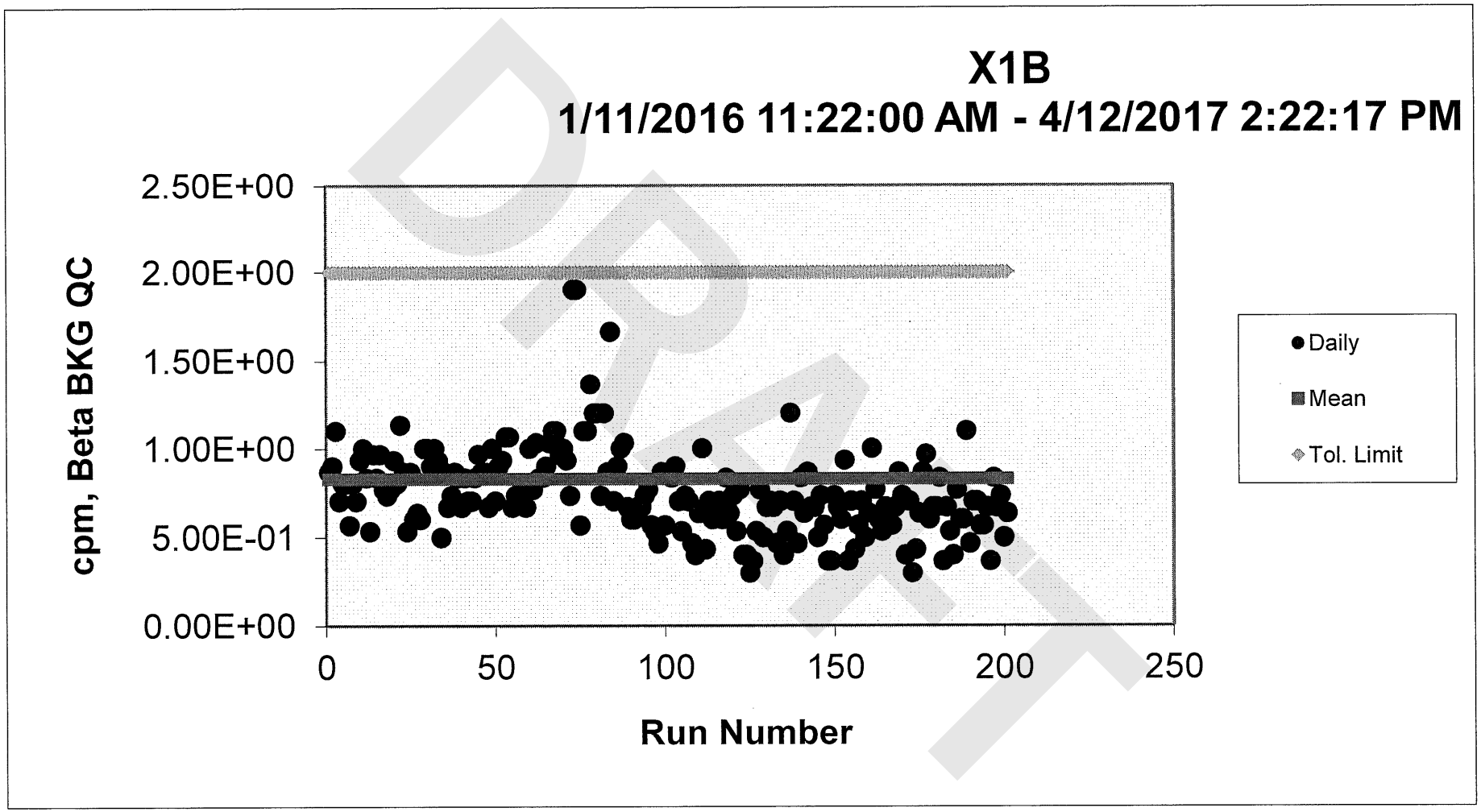
DRAFT


Y4D
8/9/2016 2:36:00 PM - 4/12/2017 4:03:56 PM
Daily
Mean
2 Sigma
3 Sigma
Beta Efficiency
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
50
100
150
Run Number

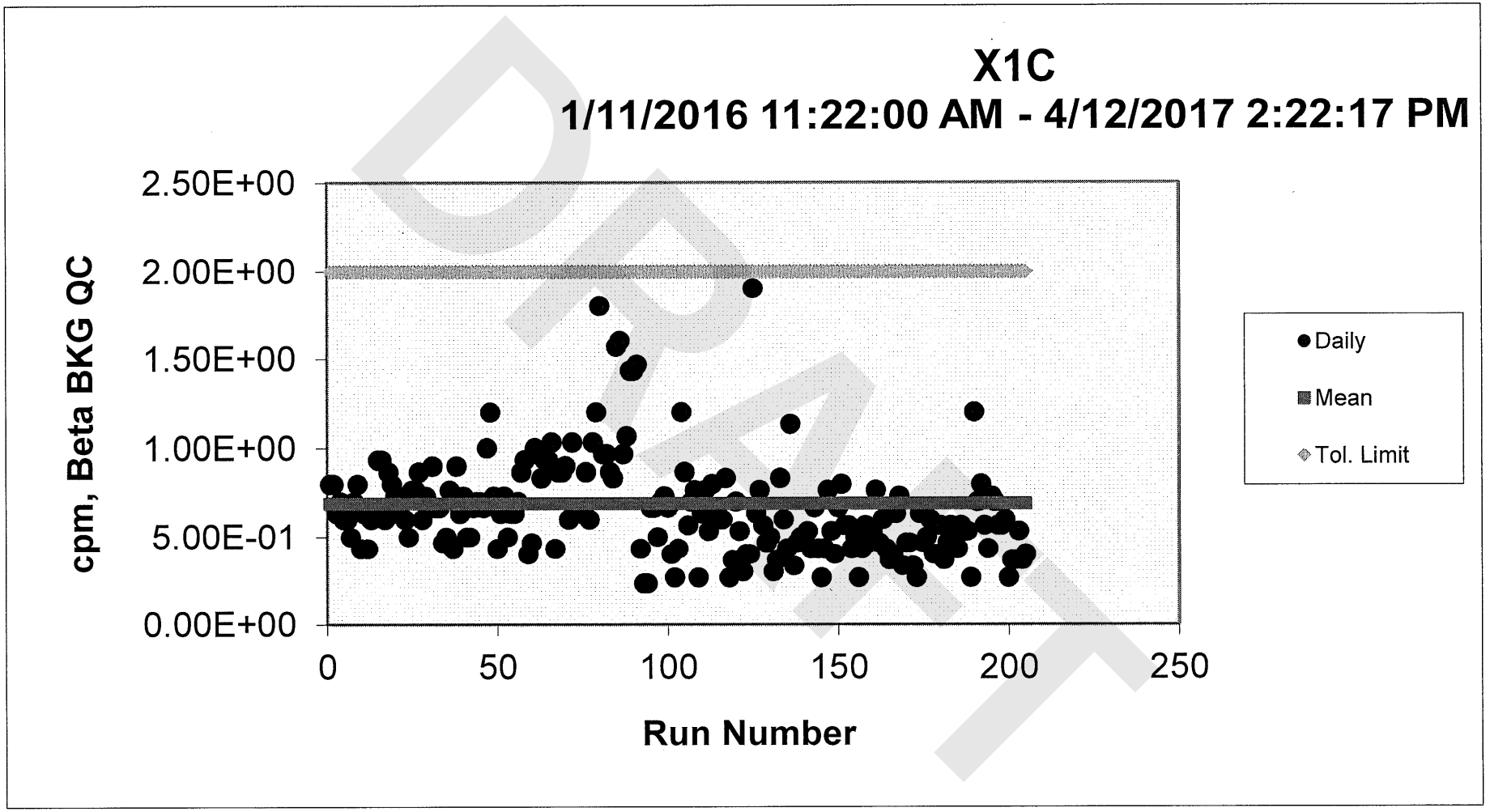
DRAFT


X1A
1/11/2016 11:22:00 AM - 4/12/2017 2:22:17 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

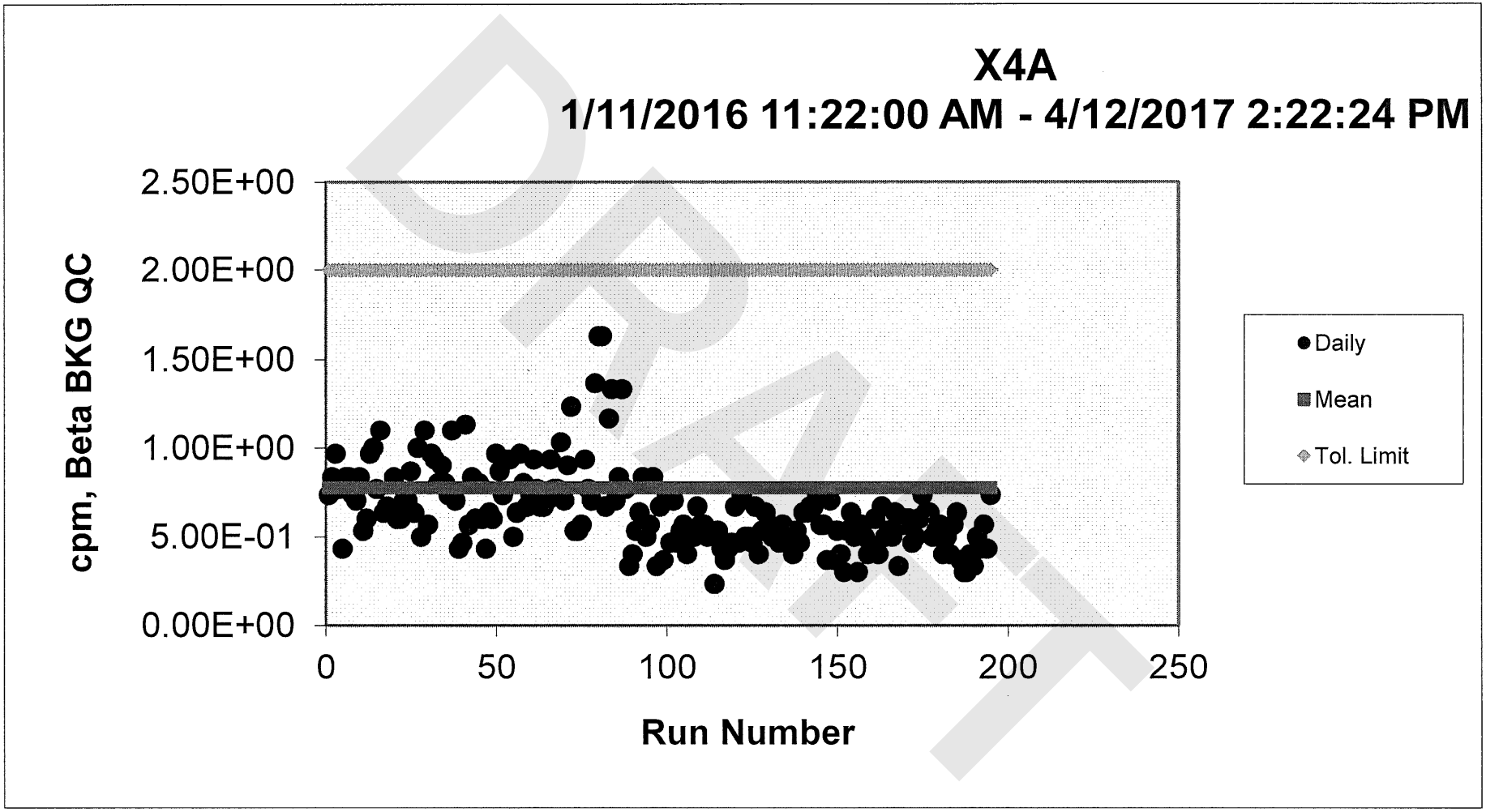
DRAFT


X1B
1/11/2016 11:22:00 AM - 4/12/2017 2:22:17 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

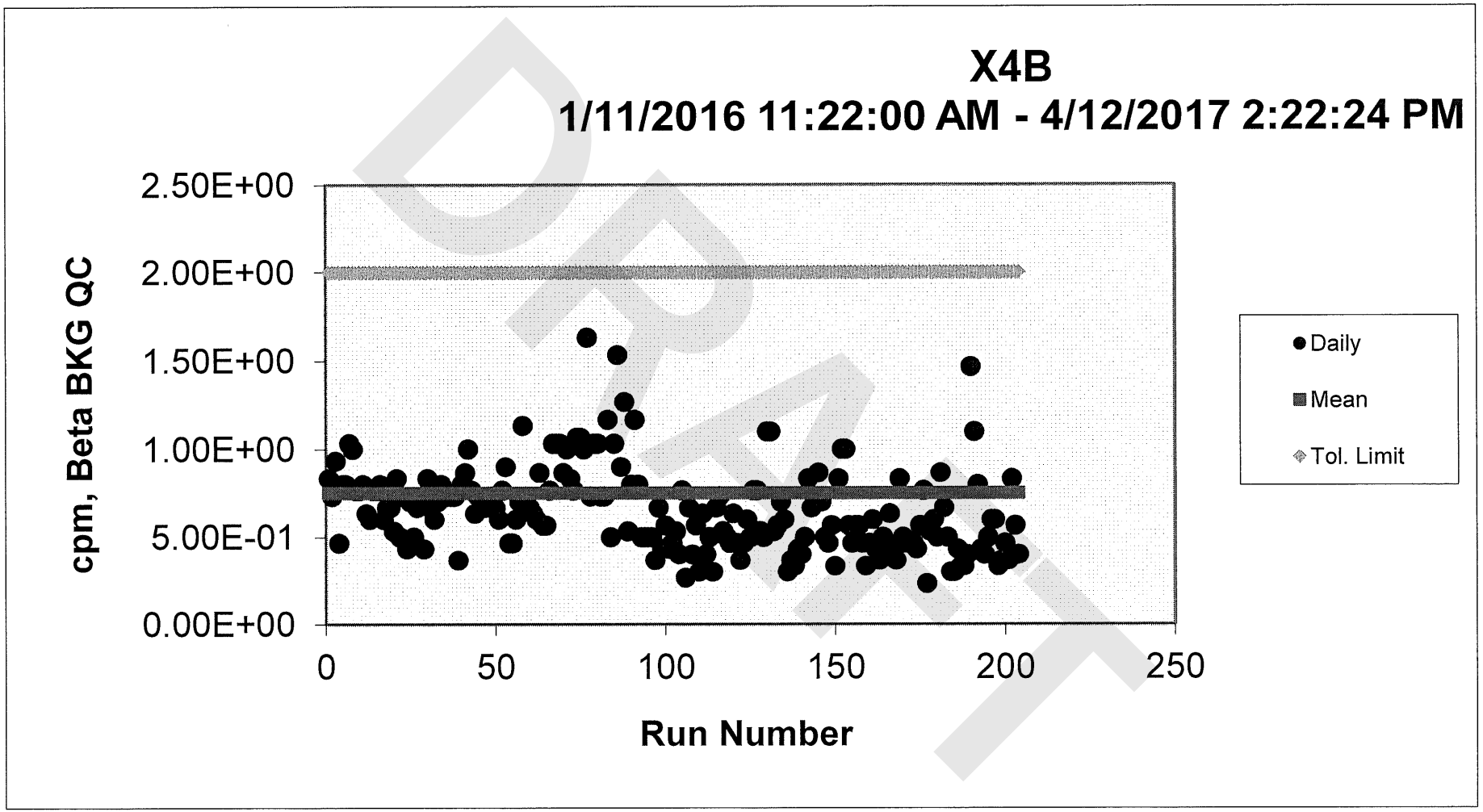
DRAFT


X1C
1/11/2016 11:22:00 AM - 4/12/2017 2:22:17 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

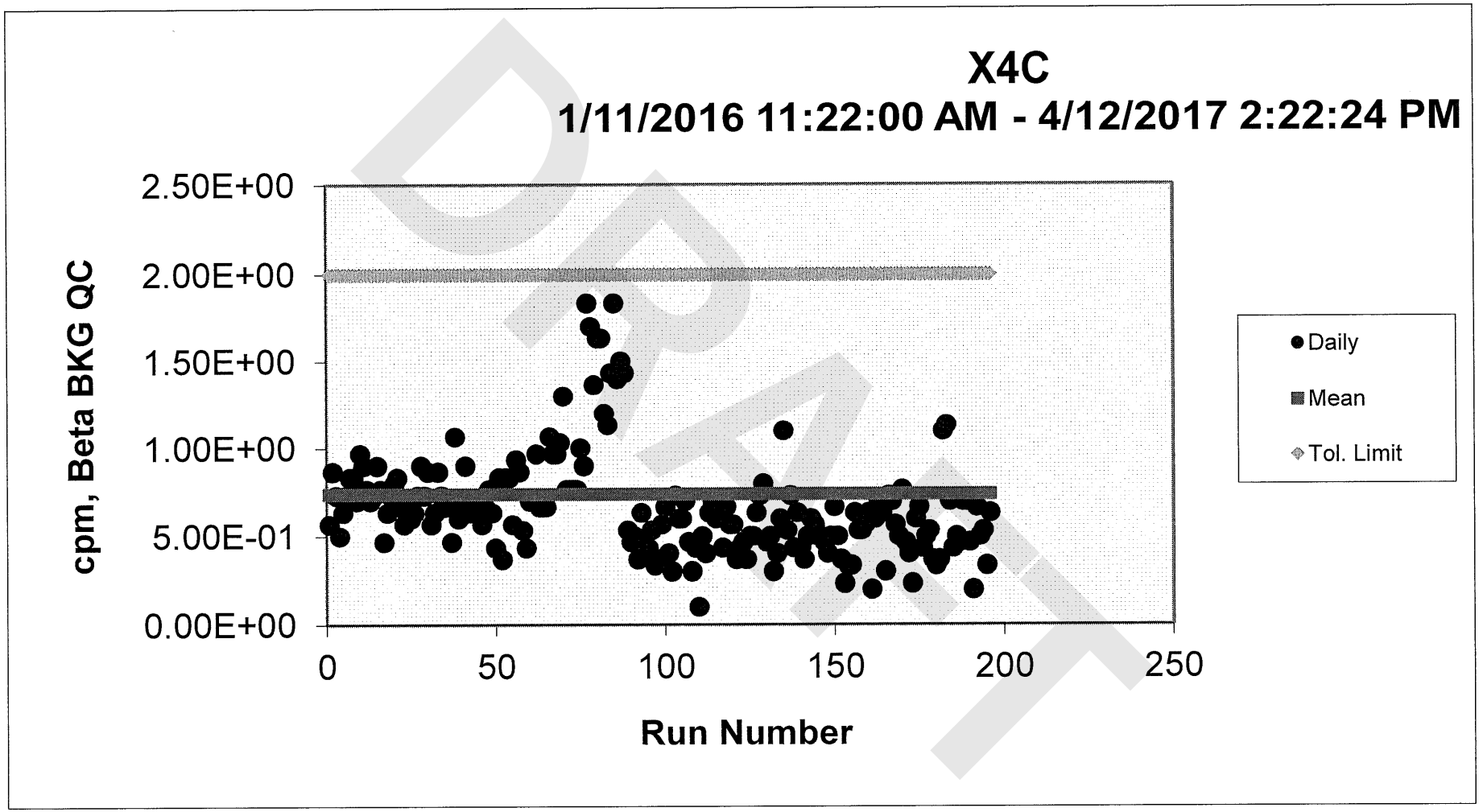
DRAFT


X4A
1/11/2016 11:22:00 AM - 4/12/2017 2:22:24 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

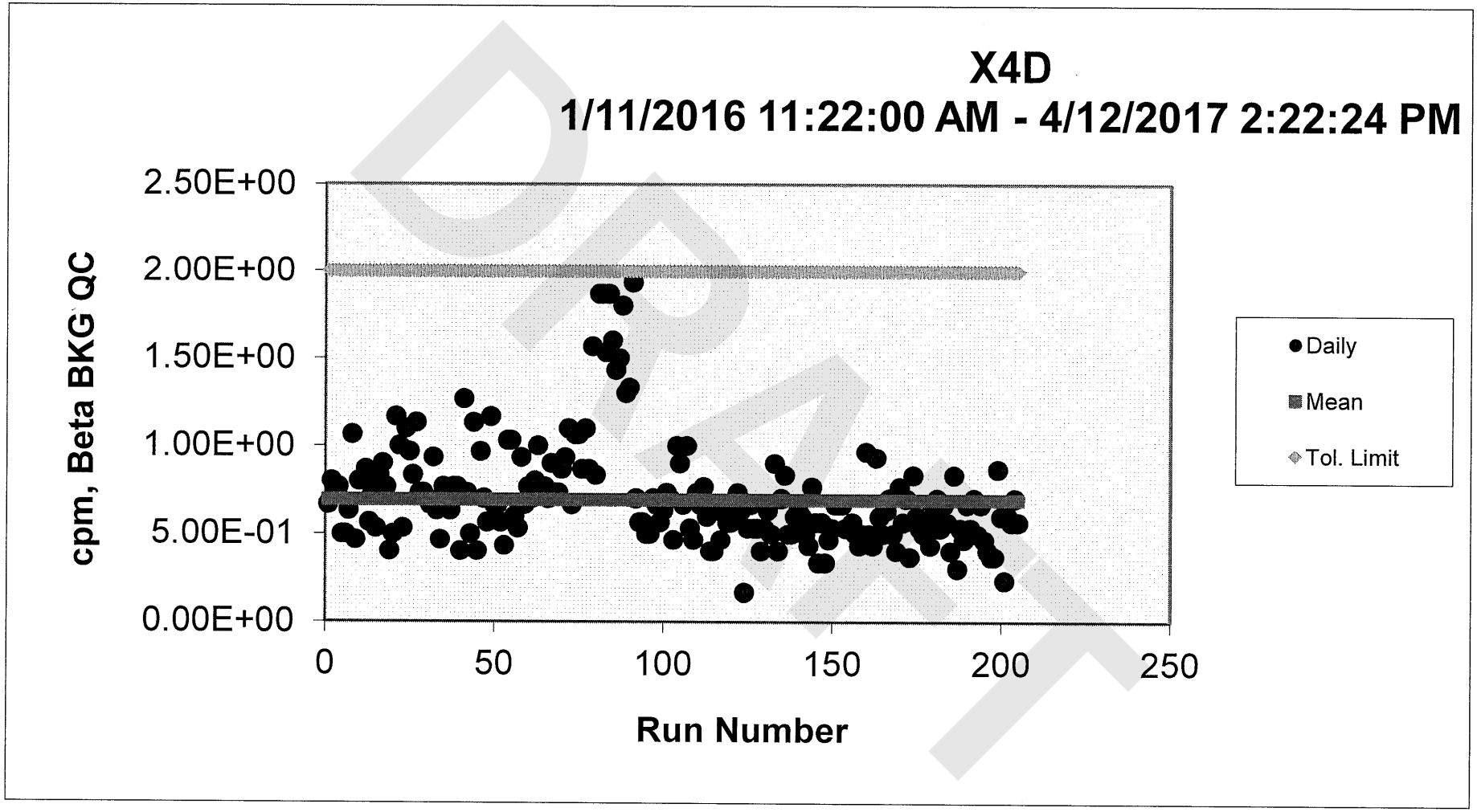
DRAFT


X4B
1/11/2016 11:22:00 AM - 4/12/2017 2:22:24 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

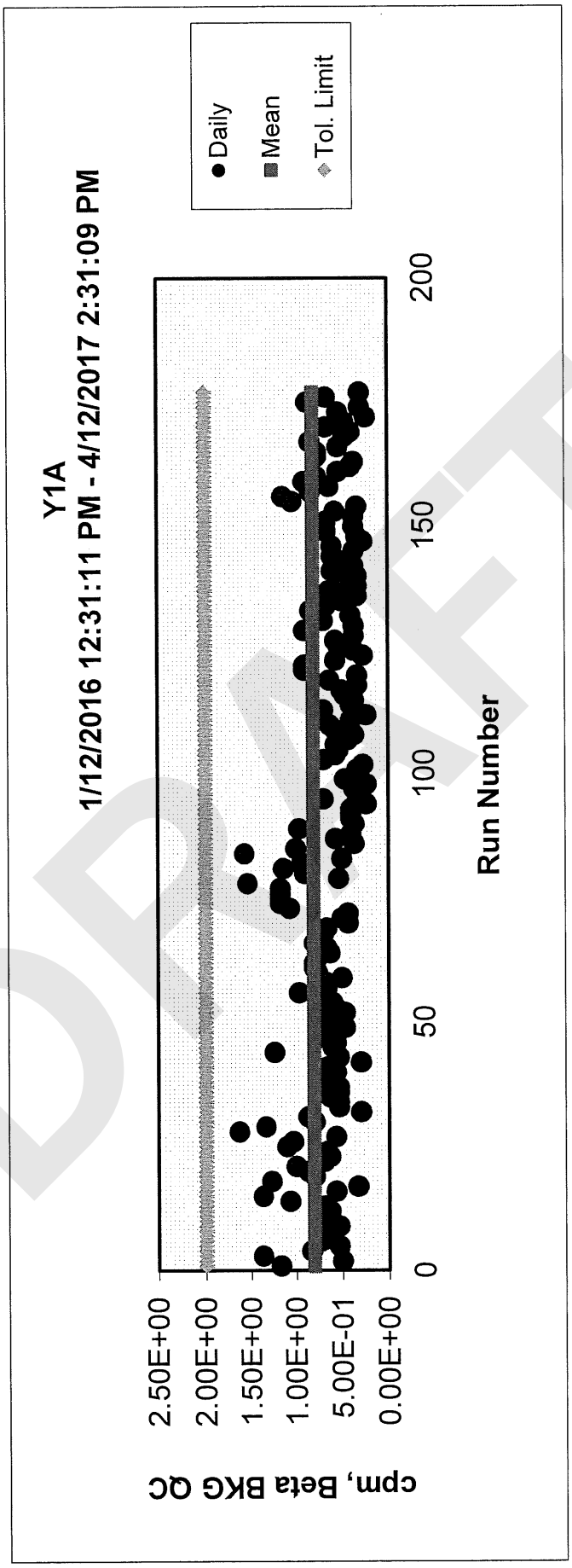
DRAFT


X4C
1/11/2016 11:22:00 AM - 4/12/2017 2:22:24 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

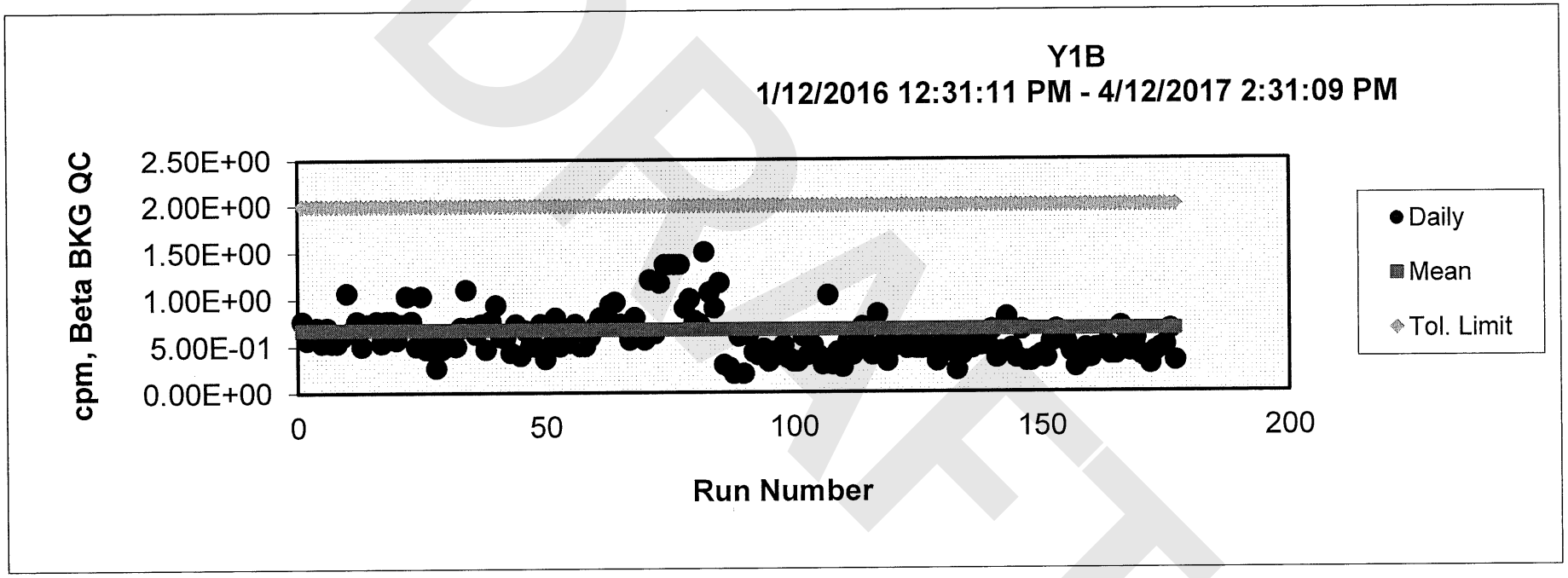
DRAFT


X4D
1/11/2016 11:22:00 AM - 4/12/2017 2:22:24 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

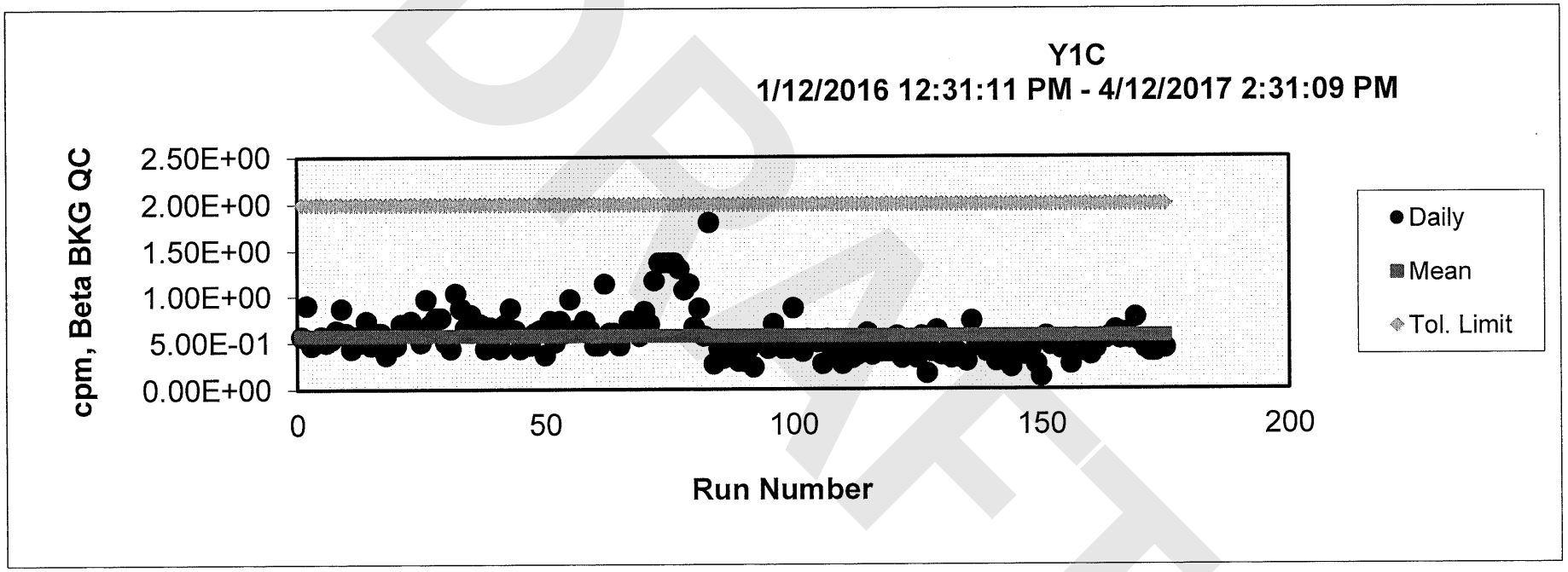
DRAFT


Y1A
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

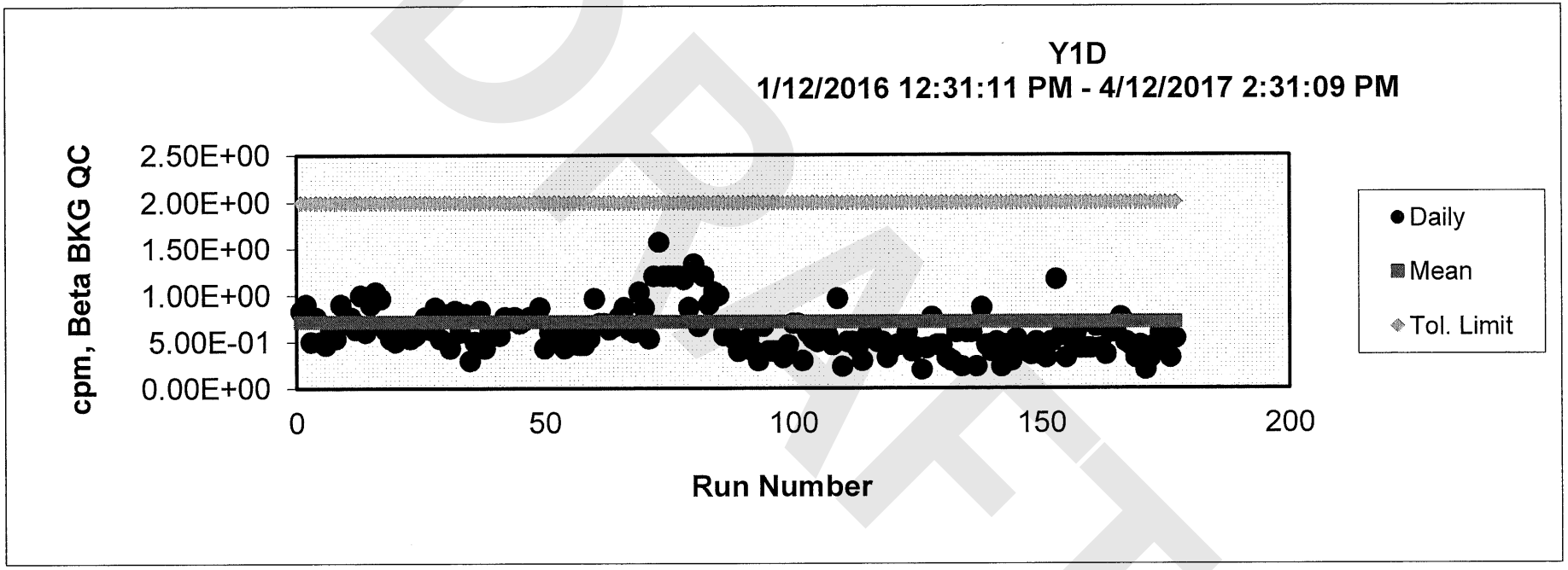
DRAFT


Y1B
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

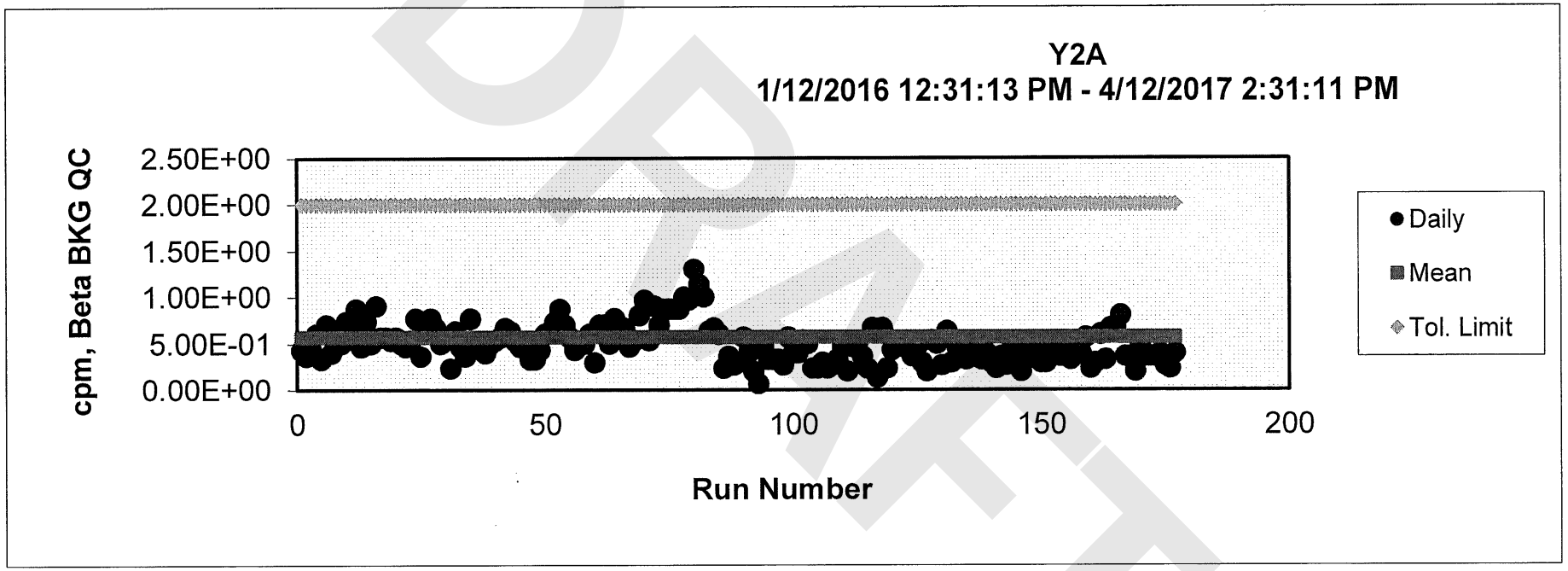
DRAFT


Y1C
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

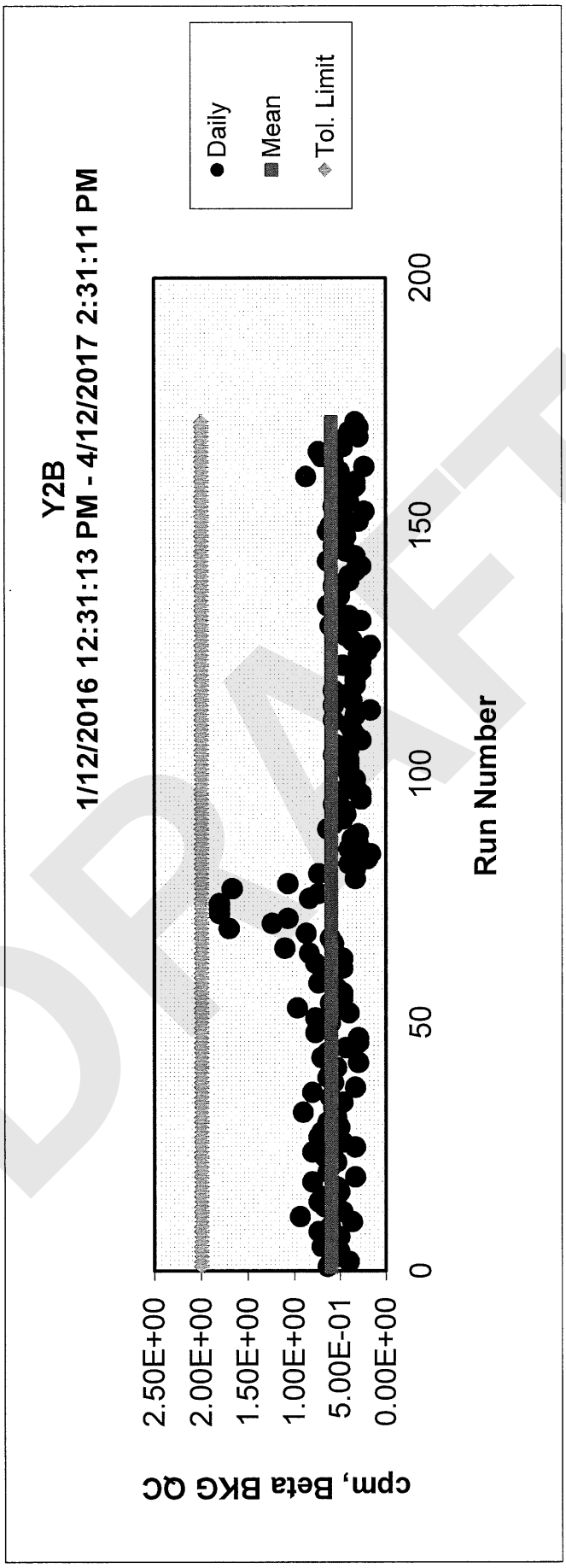
DRAFT


Y1D
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

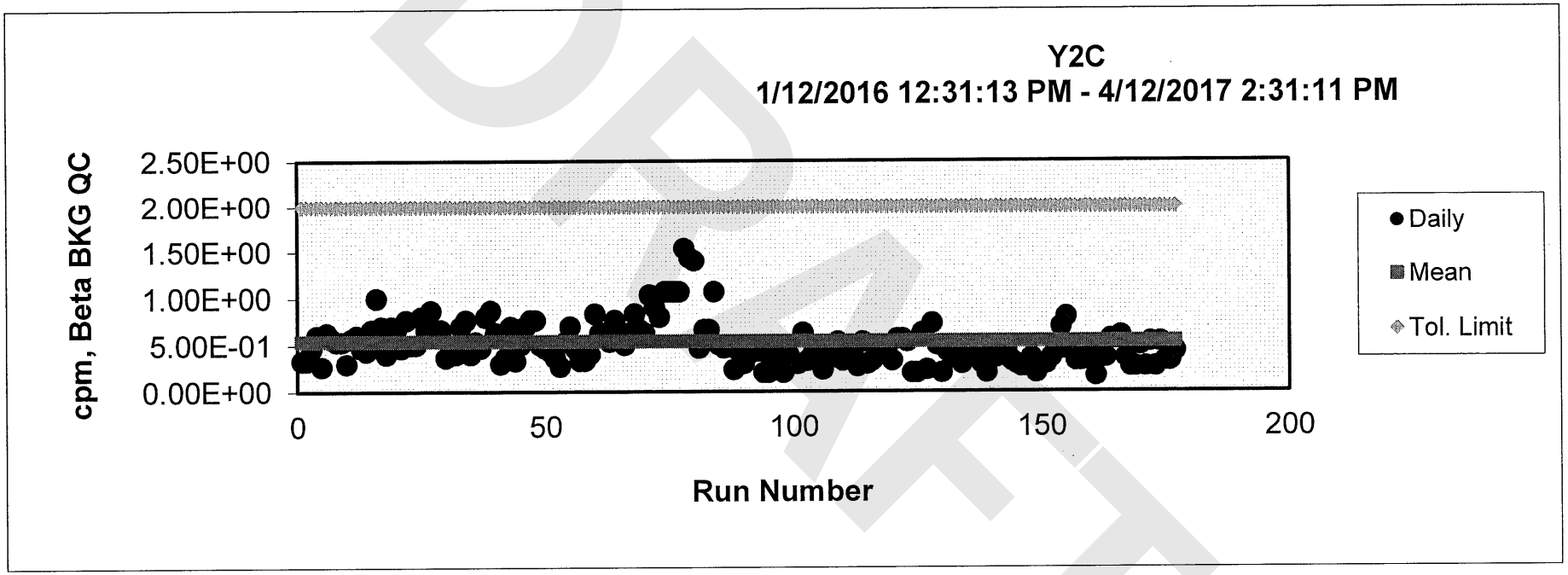
DRAFT


Y2A
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

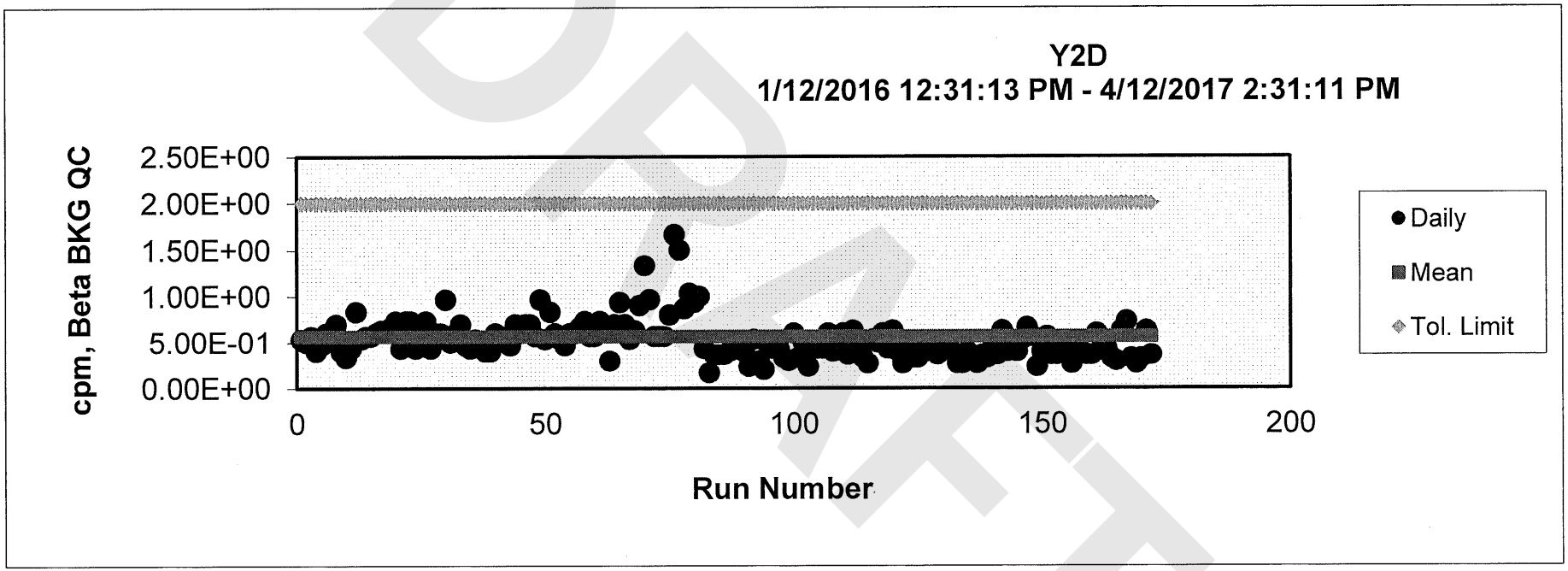
DRAFT


Y2B
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

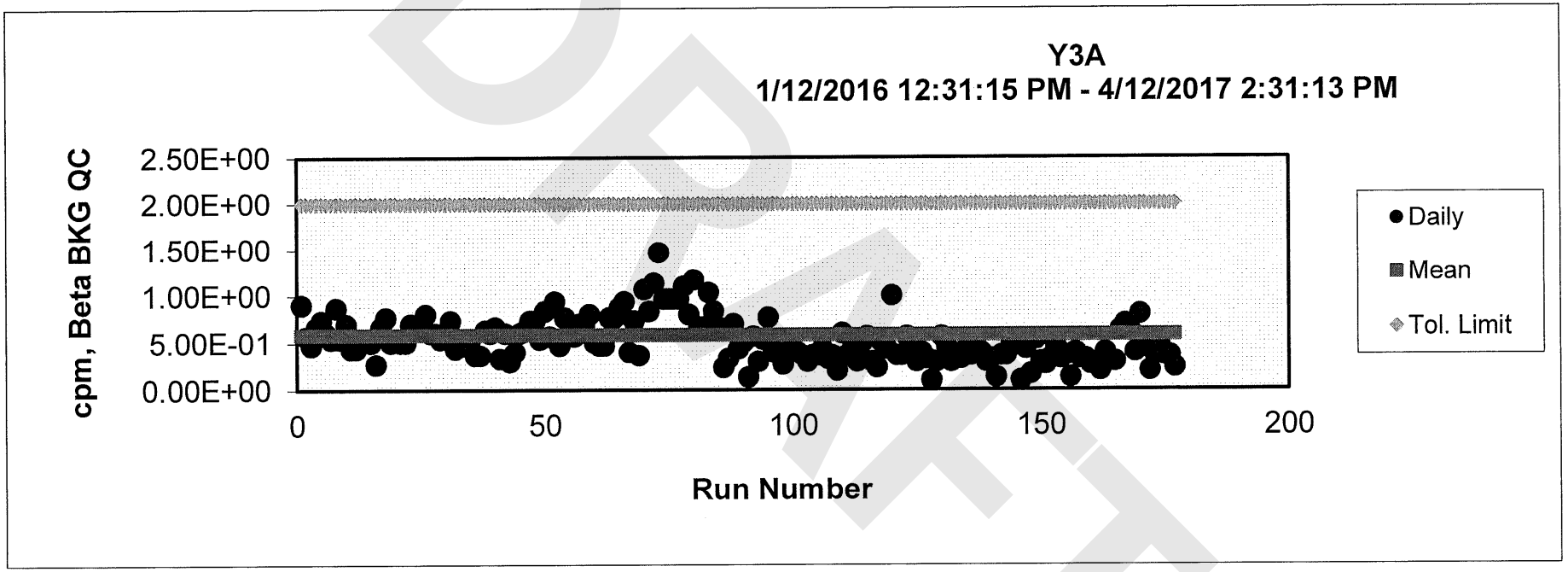
DRAFT


Y2C
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

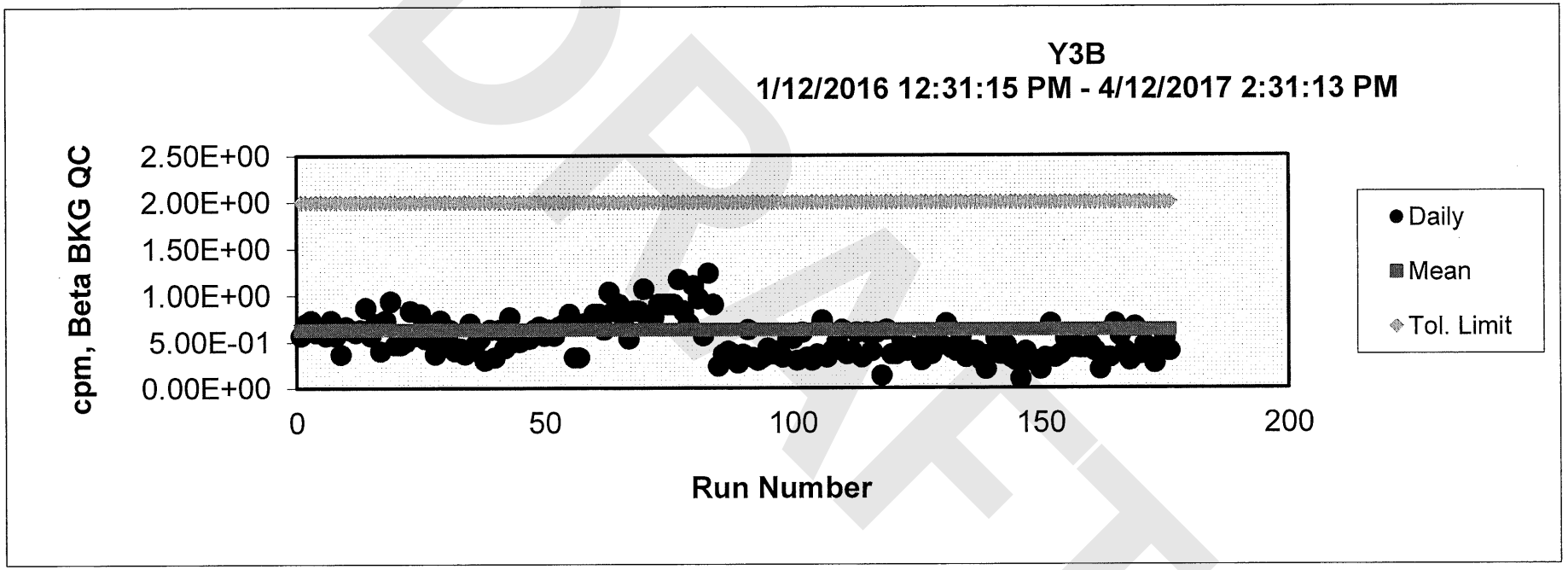
DRAFT


Y2D
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

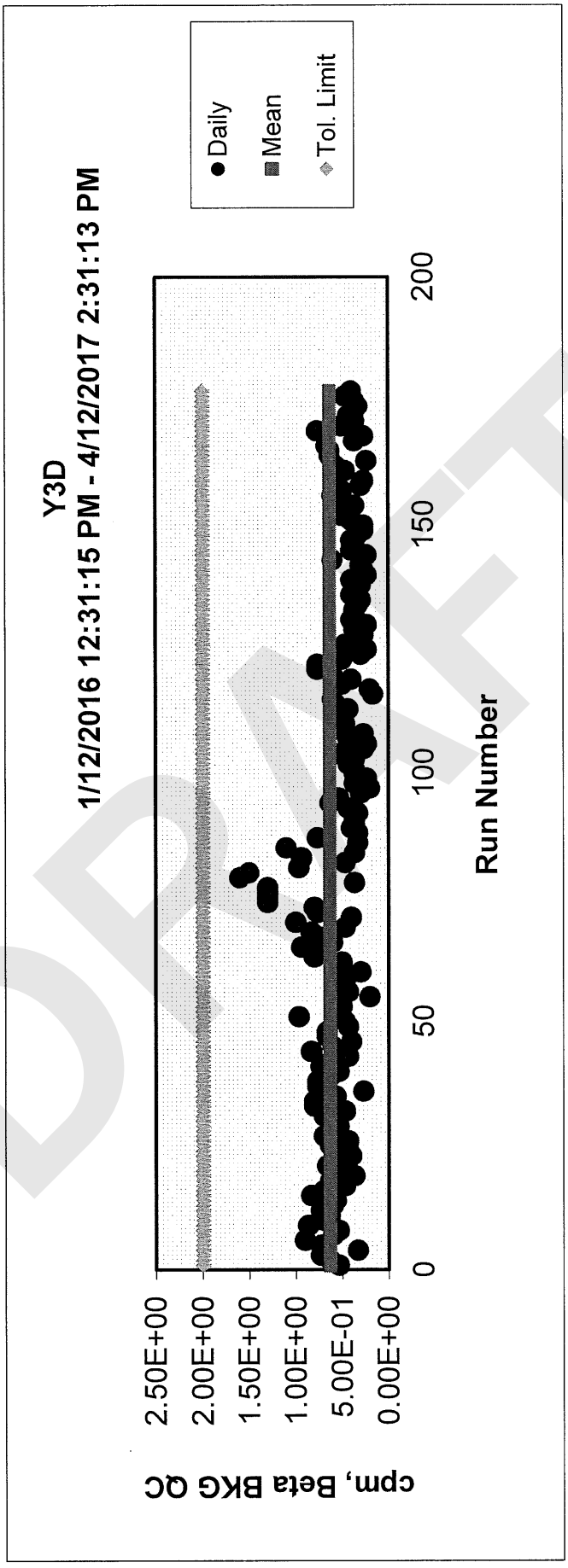
DRAFT


Y3A
1/12/2016 12:31:15 PM - 4/12/2017 2:31:13 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

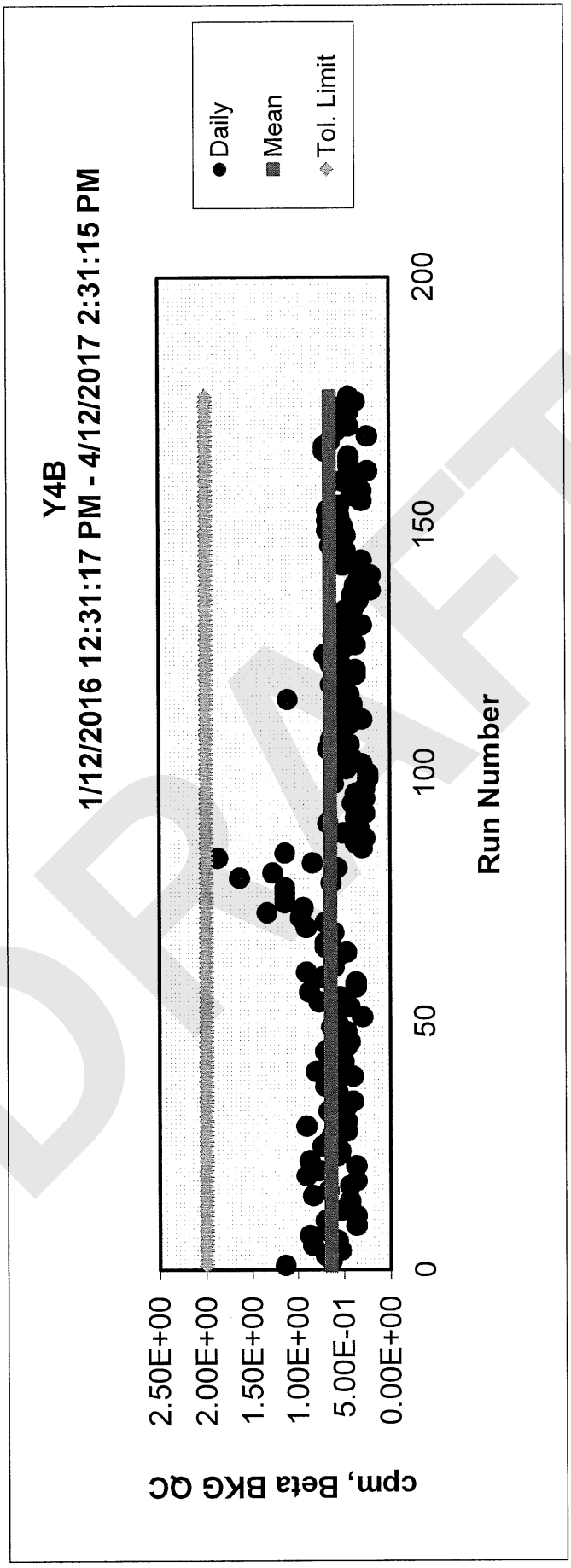
DRAFT


Y3B
1/12/2016 12:31:15 PM - 4/12/2017 2:31:13 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

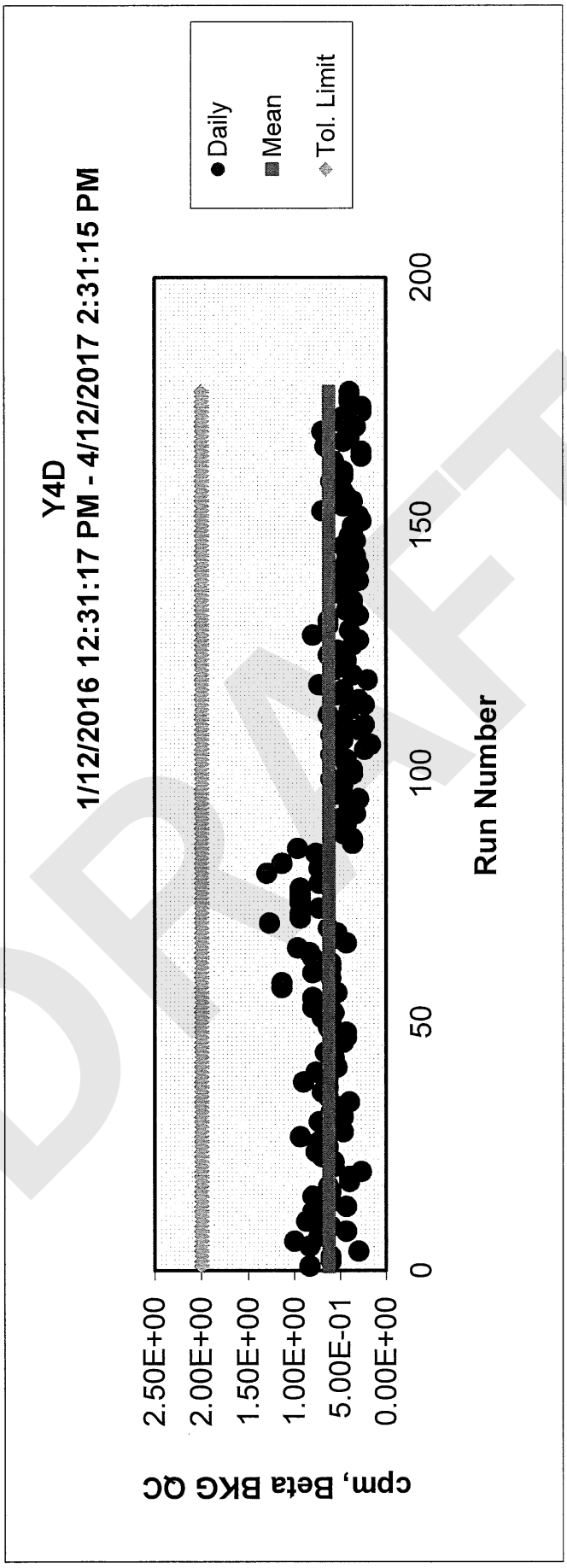
DRAFT


Y3D
1/12/2016 12:31:15 PM - 4/12/2017 2:31:13 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

DRAFT


Y4B
1/12/2016 12:31:17 PM - 4/12/2017 2:31:15 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

DRAFT


Y4D
1/12/2016 12:31:17 PM - 4/12/2017 2:31:15 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

DRAFT

LEAD 210

RECOVERY

DRAFT

WG24668

Pb-210 Recovery (Bi-210)

Bi-207 Tracer	
recovery 1	59.27
recovery 2	58.73
recovery 3	51.72
Average	56.57
2 sigma	8.42
RPD highest and lowest	13.60
< 30	Yes

DRAFT

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

RADIOCHEMICAL WORK SHEET (radchemws-wg01)

Apr 11 2017, 01:55 pm

WG24668

Mount Date: 04/10/17 Scavenge Date: N/A Milk Date: 04/10/17 11:50 am Analyst: SVO

Duplicate: L71920-3 Spike Data

ID	Nuclide	Ref Date	Conc Amt/Units	Amt Used	Activity:
210PB-012505	PB-210	07/01/1991 12:00	635.02 pCi/ml	.5	3.18E+02

Det ID/ verify	LIMS Sample ID (*DUP)	Analysis	Mat	Site	Due Date	Ref. Date	Project	Target MDA	Aliquot Volume	Gamma Normalized Aliquot	Yield 1 PB-210	Yield 2 N/A	Est. Count Time	Tech Note
	L71920-27	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:22 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.026E+00	3.5206E+00	58.43%	N/A		1
	L71920-30	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:28 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.004E+00	3.9339E+00	65.52%	N/A		1
	L71920-33	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:34 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.097E+00	1.8874E+00	30.96%	N/A		1
	L71920-36	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:40 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.071E+00	5.3482E+00	88.09%	N/A		1
23 ✓	L71920-39 Bi:207	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:46 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.013E+00	4.8549E+00	80.74%	N/A		1
23 ✓	L71920-42 Bi:207	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:52 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.067E+00	3.6154E+00	59.59%	N/A		1
23 ✓	L71920-45 Bi:207	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:58 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.011E+00	1.9228E+00	31.99%	N/A		1

Avg Bi:207 Yield
56.57%

10/8/2014

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 12-APR-2017 08:31:23.44
TBE23 03017322 HpGe ********** Aquisition Date/Time: 12-APR-2017 08:01:09.02

LIMS No., Customer Name, Client ID: L71920-39BI BI-207

Sample ID : 23L71920-39BI
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: BI207

Smple Date: 8-OCT-2014 00:00:00.0
Geometry : 2325MM093004
BKGFILE : 23BG033117MT
Real Time : 0 00:30:02.07
Live time : 0 00:30:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	34.78*	135	171	2.32	69.60	4.25E-01	7.51E-02	21.3	
2	0	74.07	3357	886	4.67	148.09	1.64E+01	1.87E+00	2.7	
3	0	85.42	1086	495	3.51	170.77	2.00E+01	6.04E-01	5.6	
4	0	569.52	2469	104	3.78	1138.33	7.90E+00	1.37E+00	2.2	
5	0	644.40	57	88	2.57	1288.06	6.93E+00	3.14E-02	36.5	
6	0	1063.65	1087	56	3.50	2126.83	3.93E+00	6.04E-01	3.5	
7	1	1630.18	50	0	3.75	3261.28	2.59E+00	2.78E-02	19.6	2.05E+00
8	1	1633.03	146	0	3.60	3267.00	2.59E+00	8.11E-02	8.2	
9	0	1769.45	71	4	2.99	3540.35	2.46E+00	3.96E-02	13.0	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1087	74.50*	3.933E+00	5.568E+02	5.883E+02	7.04
	1770.24	71	6.87	2.459E+00	6.339E+02	6.698E+02	26.02

Flag: "*" = Keyline

59.27%

DRAFT

Sample ID : 23L71920-39BI Acquisition date : 12-APR-2017 08:01:09

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.568E+02	5.883E+02	0.414E+02	7.04	
	Total Activity :		5.568E+02	5.883E+02			
	Grand Total Activity :		5.568E+02	5.883E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	34.78	135	171	2.32	69.60	63	15	7.51E-02	42.6	4.25E-01	
0	74.07	3357	886	4.67	148.09	132	29	1.87E+00	5.5	1.64E+01	
0	85.42	1086	495	3.51	170.77	161	25	6.04E-01	11.2	2.00E+01	
0	569.52	2469	104	3.78	1138.33	1123	28	1.37E+00	4.5	7.90E+00	
0	644.40	57	88	2.57	1288.06	1277	19	3.14E-02	72.9	6.93E+00	
1	1630.18	50	0	3.75	3261.28	3254	23	2.78E-02	39.2	2.59E+00	
1	1633.03	146	0	3.60	3267.00	3254	23	8.11E-02	16.5	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.609E+02	5.927E+02	0.403E+02	6.80	
	Total Activity :		5.609E+02	5.927E+02			
	Grand Total Activity :		5.609E+02	5.927E+02			

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/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	5.927E+02	4.031E+01	1.733E+01	0.000E+00	34.207

DRAFT

```
A,23L71920-39BI    ,04/12/2017 08:31,10/08/2014 00:00,   1.000E+00,L71920-39BI BI
B,23L71920-39BI    ,BI207              ,04/03/2017 07:06,2325MM093004
C,BI-207   ,YES,    5.927E+02,    4.031E+01,    1.733E+01,,    34.207
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 12-APR-2017 09:02:43.26
TBE23 03017322 HpGe ********** Aquisition Date/Time: 12-APR-2017 08:32:25.97

LIMS No., Customer Name, Client ID: L71920-42BI BI-207

Sample ID : 23L71920-42BI
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: BI207

Smple Date: 8-OCT-2014 00:00:00.0
Geometry : 2325MM093004
BKGFILE : 23BG033117MT
Real Time : 0 00:30:02.18
Live time : 0 00:30:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	34.26*	125	56	2.77	68.55	3.68E-01	6.95E-02	17.2	4.82E+00
2	0	74.00	3671	826	4.24	147.94	1.63E+01	2.04E+00	2.5	
3	0	85.53	1165	416	3.87	170.97	2.00E+01	6.47E-01	4.9	
4	0	569.56	2408	100	3.82	1138.41	7.90E+00	1.34E+00	2.3	
5	0	1063.58	1086	18	3.52	2126.69	3.93E+00	6.04E-01	3.2	
6	0	1632.56	134	0	4.19	3266.05	2.59E+00	7.44E-02	8.6	
7	0	1770.38	60	11	0.82	3542.21	2.46E+00	3.33E-02	16.8	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1086	74.50*	3.933E+00	5.566E+02	5.882E+02	6.32
	1770.24	60	6.87	2.458E+00	5.329E+02	5.632E+02	33.54

Flag: "*" = Keyline

58.73 %

DRAFT

Sample ID : 23L71920-42BI
Acquisition date : 12-APR-2017 08:32:25

Total number of lines in spectrum	7	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	2	28.57%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.566E+02	5.882E+02	0.372E+02	6.32	
	Total Activity :		5.566E+02	5.882E+02			
	Grand Total Activity :		5.566E+02	5.882E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	34.26	125	56	2.77	68.55	63	17	6.95E-02	34.5	3.68E-01	
0	74.00	3671	826	4.24	147.94	130	31	2.04E+00	5.1	1.63E+01	
0	85.53	1165	416	3.87	170.97	161	24	6.47E-01	9.9	2.00E+01	
0	569.56	2408	100	3.82	1138.41	1126	26	1.34E+00	4.5	7.90E+00	
0	1632.56	134	0	4.19	3266.05	3254	22	7.44E-02	17.3	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	7	
Number of unidentified lines	5	
Number of lines tentatively identified by NID	2	28.57%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.557E+02	5.873E+02	0.365E+02	6.21	
			---	---			
	Total Activity :		5.557E+02	5.873E+02			
	Grand Total Activity :		5.557E+02	5.873E+02			

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/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	5.873E+02	3.646E+01	1.672E+01	0.000E+00	35.122

DRAFT

```
A,23L71920-42BI    ,04/12/2017 09:02,10/08/2014 00:00,   1.000E+00,L71920-42BI BI
B,23L71920-42BI    ,BI207              ,04/03/2017 07:06,2325MM093004
C,BI-207   ,YES,    5.873E+02,   3.646E+01,   1.672E+01,,   35.122
```

DRAFT

Sec. Review: 12 Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 12-APR-2017 09:34:34.01
TBE23 03017322 HpGe ********** Aquisition Date/Time: 12-APR-2017 09:04:16.51

LIMS No., Customer Name, Client ID: L71920-45BI BI-207

Sample ID : 23L71920-45BI
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: BI207

Smple Date: 8-OCT-2014 00:00:00.0
Geometry : 2325MM093004
BKGFILE : 23BG033117MT
Real Time : 0 00:30:01.99
Live time : 0 00:30:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	34.90*	120	156	3.39	69.83	4.37E-01	6.64E-02	23.2	
2	0	41.37*	33	365	4.77	82.77	1.68E+00	1.84E-02	112.7	
3	0	74.28	2995	783	3.77	148.51	1.64E+01	1.66E+00	2.8	
4	0	85.48	904	344	3.84	170.89	2.00E+01	5.02E-01	5.4	
5	0	569.54	2245	79	3.91	1138.37	7.90E+00	1.25E+00	2.3	
6	0	1063.65	964	46	3.69	2126.83	3.93E+00	5.36E-01	3.7	
7	3	1631.85	89	6	3.92	3264.64	2.59E+00	4.97E-02	13.9	2.87E+00
8	3	1634.35	85	4	3.24	3269.64	2.59E+00	4.72E-02	12.8	
9	0	1769.67	45	9	3.33	3540.79	2.46E+00	2.50E-02	20.0	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	964	74.50*	3.933E+00	4.942E+02	5.223E+02	7.43
	1770.24	45	6.87	2.459E+00	3.995E+02	4.222E+02	40.05

Flag: "*" = Keyline

51.72%

DRAFT

Sample ID : 23L71920-45BI Acquisition date : 12-APR-2017 09:04:16

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	4.942E+02	5.223E+02	0.388E+02	7.43	
	Total Activity :		4.942E+02	5.223E+02			
	Grand Total Activity :		4.942E+02	5.223E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	34.90	120	156	3.39	69.83	63	15	6.64E-02	46.4	4.37E-01	
0	41.37	33	365	4.77	82.77	77	16	1.84E-02	****	1.68E+00	
0	74.28	2995	783	3.77	148.51	135	26	1.66E+00	5.7	1.64E+01	
0	85.48	904	344	3.84	170.89	161	20	5.02E-01	10.9	2.00E+01	
0	569.54	2245	79	3.91	1138.37	1123	27	1.25E+00	4.6	7.90E+00	
3	1631.85	89	6	3.92	3264.64	3256	19	4.97E-02	27.8	2.59E+00	
3	1634.35	85	4	3.24	3269.64	3256	19	4.72E-02	25.6	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	4.895E+02	5.172E+02	0.378E+02	7.31	
			---	---			
	Total Activity :		4.895E+02	5.172E+02			
	Grand Total Activity :		4.895E+02	5.172E+02			

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/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	5.172E+02	3.780E+01	1.733E+01	0.000E+00	29.853

DRAFT

```
A,23L71920-45BI    ,04/12/2017 09:34,10/08/2014 00:00,   1.000E+00,L71920-45BI BI
B,23L71920-45BI    ,BI207              ,04/03/2017 07:06,2325MM093004
C,BI-207   ,YES,    5.172E+02,   3.780E+01,   1.733E+01,,   29.853
```

DRAFT

LEAD 210

Sample and QC Raw Data

DRAFT

Raw Data Sheet (rawdata)

04/13/17 11:46

Work Order: **L71920** Customer: **GeoEngineers**

Analysis: **PB-210** Project: **GE002-3EREG-17**

N/A DKE 4/13/17

Sample ID / Client ID	Run #	Analysis	Reference Date/Time	Volume/ Aliquot	Scavenge Date/Time	Milking Date/Time	Mount Weight	Recovery	Count Date/Time	Detector ID	Total Counts	Sample dt	Bkg Counts	Bkg dt	Eff.	Decay & Ingrowth Factor	Analy
L71920-3		PB-210	23-feb-17 10:34	6.0577 g dry		04-10-17 11:50	.0629	81.13	04-11-17 16:08	Y4B	1885	1300 M	1254	1440 M	.292	.901	SVO
MAF-GC-02-3																	
Activity: **2.90E-01**	Error:	4.15E-02	MDC: 6.03E-02	pCi/gDry		**L71920-3**			**PB-210**								
L71920-6		PB-210	23-feb-17 10:40	6.0013 g dry		04-10-17 11:50	.07	90.29	04-11-17 16:21	X4B	1860	1300 M	1301	1440 M	.294	.9	SVO
MAF-GC-02-6																	
Activity: **2.65E-01**	Error:	4.17E-02	MDC: 6.17E-02	pCi/gDry		**L71920-6**			**PB-210**								
L71920-9		PB-210	23-feb-17 10:46	6.0797 g dry		04-10-17 11:50	.0662	85.39	04-11-17 16:21	X4C	1829	1300 M	1239	1440 M	.276	.9	SVO
MAF-GC-02-9																	
Activity: **2.88E-01**	Error:	4.32E-02	MDC: 6.32E-02	pCi/gDry		**L71920-9**			**PB-210**								
L71920-12		PB-210	23-feb-17 10:52	6.0189 g dry		04-10-17 11:50	.0233	30.05	04-11-17 16:08	Y2C	1629	1300 M	1226	1440 M	.306	.901	SVO
MAF-GC-02-12																	
Activity: **1.93E-01**	Error:	3.78E-02	MDC: 5.72E-02	pCi/gDry		**L71920-12**			**PB-210**								
L71920-15		PB-210	23-feb-17 10:58	6.0174 g dry		04-10-17 11:50	.0252	32.5	04-11-17 16:08	Y3B	1406	1300 M	1137	1440 M	.287	.901	SVO
MAF-GC-02-15																	
Activity: **1.49E-01**	Error:	3.80E-02	MDC: 5.88E-02	pCi/gDry		**L71920-15**			**PB-210**								
L71920-18		PB-210	23-feb-17 11:04	6.0043 g dry		04-10-17 11:50	.0258	33.28	04-11-17 16:08	Y3A	1420	1300 M	1138	1440 M	.271	.901	SVO
MAF-GC-02-18																	
Activity: **1.64E-01**	Error:	4.05E-02	MDC: 6.24E-02	pCi/gDry		**L71920-18**			**PB-210**								
L71920-21		PB-210	23-feb-17 11:10	6.0112 g dry		04-10-17 11:50	.0248	31.99	04-11-17 16:08	Y3D	1387	1300 M	1163	1440 M	.295	.901	SVO
MAF-GC-02-21																	
Activity: **1.29E-01**	Error:	3.70E-02	MDC: 5.78E-02	pCi/gDry		**L71920-21**			**PB-210**								
L71920-24		PB-210	23-feb-17 11:16	6.0068 g dry		04-10-17 11:50	.0261	33.66	04-11-17 16:08	Y2A	1343	1300 M	1103	1440 M	.263	.901	SVO
MAF-GC-02-24																	

DRAFT

Raw Data Sheet (rawdata)

04/13/17 11:46

Work Order: **L71920** Customer: **GeoEngineers**

PB-210 **GE002-3EREG-17**

DA 4/13/17

L71920-24	PB-210	23-feb-17 11:16	6.0068 g dry	04-10-17 11:50	.0261	33.66	04-11-17 16:08	Y2A	1343	1300 M	1103	1440 M	.263	.901	SVO
MAF-GC-02-24															
Activity: **1.50E-01**	Error: 4.08E-02	MDC: 6.34E-02	pCi/gDry	**L71920-24**			**PB-210**								
L71920-27	PB-210	23-feb-17 11:22	6.0255 g dry	04-10-17 11:50	.0453	58.43	04-11-17 16:08	Y1C	1472	1300 M	1189	1440 M	.278	.901	SVO
MAF-GC-02-27															
Activity: **1.62E-01**	Error: 4.01E-02	MDC: 6.20E-02	pCi/gDry	**L71920-27**			**PB-210**								
L71920-30	PB-210	23-feb-17 11:28	6.0038 g dry	04-10-17 11:50	.0508	65.52	04-11-17 16:08	Y1D	1446	1300 M	1217	1440 M	.286	.901	SVO
MAF-GC-02-30															
Activity: **1.38E-01**	Error: 3.91E-02	MDC: 6.12E-02	pCi/gDry	**L71920-30**			**PB-210**								
L71920-33	PB-210	23-feb-17 11:34	6.0972 g dry	04-10-17 11:50	.024	30.96	04-11-17 16:08	Y2B	1368	1300 M	1138	1440 M	.296	.901	SVO
MAF-GC-02-33															
Activity: **1.29E-01**	Error: 3.62E-02	MDC: 5.64E-02	pCi/gDry	**L71920-33**			**PB-210**								
L71920-36	PB-210	23-feb-17 11:40	6.071 g dry	04-10-17 11:50	.0683	88.09	04-11-17 16:21	X4D	1461	1300 M	1360	1440 M	.286	.9	SVO
MAF-GC-02-36															
Activity: **9.14E-02**	Error: 3.97E-02	MDC: 6.40E-02	pCi/gDry	**L71920-36**			**PB-210**								
L71920-39	PB-210	23-feb-17 11:46	6.0128 g dry	04-10-17 11:50	.0626	80.74	04-11-17 16:08	Y4D	1213	1300 M	1192	1440 M	.278	.901	SVO
MAF-GC-02-39															
Activity: 5.57E-02	Error: 3.80E-02	MDC: **6.21E-02**	pCi/gDry	L71920-39			PB-210								
L71920-42	PB-210	23-feb-17 11:52	6.0671 g dry	04-10-17 11:50	.0462	59.59	04-11-17 16:08	Y1B	1143	1300 M	1186	1440 M	.292	.901	SVO
MAF-GC-02-42															
Activity: 2.78E-02	Error: 3.53E-02	MDC: **5.86E-02**	pCi/gDry	L71920-42			PB-210								
L71920-45	PB-210	23-feb-17 11:58	6.011 g dry	04-10-17 11:50	.0248	31.99	04-11-17 16:08	Y2D	1236	1300 M	1134	1440 M	.295	.901	SVO
MAF-GC-02-45															

DRAFT

Raw Data Sheet (rawdata)

04/13/17 11:46

Work Order: **L71920** Customer: **GeoEngineers**

PB-210 **GE002-3EREG-17**

NA RKG 4/13/17

L71920-45	PB-210	23-feb-17 11:58	6.011 g dry		04-10-17 11:50	.0248	31.99	04-11-17 16:08	Y2D	1236	1300 M	1134	1440 M	.295	.901	SVO
MAF-GC-02-45																

Activity: **8.15E-02** Error: 3.57E-02 MDC: 5.72E-02 pCi/gDry **L71920-45** **PB-210**

DRAFT

Raw Data Sheet (rawdata)

04/13/17 11:46

Work Order: **WG24668** Customer: **Teledyne Brown Engineering**

Analysis: **PB-210** Project: **TE511-LABQC**

NM RSK 4/13/17

Sample ID / Client ID	Run #	Analysis	Reference Date/Time	Volume/ Aliquot	Scavenge Date/Time	Milking Date/Time	Mount Weight	Recovery	Count Date/Time	Detector ID	Total Counts	Sample dt	Bkg Counts	Bkg dt	Eff.	Decay & Ingrowth Factor	Analy
WG24668-1		PB-210	30-mar-17 00:00	100 %		04-10-17 11:50	.0504	65.01	04-11-17 16:21	X4A	1029	1300 M	1313	1440 M	.309	.902	SVO
Blank Samples																	
Activity: -3.43E-01	Error:	2.01E-01	MDC: **3.52E-01**	pCi/Total		WG24668-1			PB-210								
WG24668-2		PB-210	01-jul-91 12:00	100 %		04-10-17 11:50	.0265	34.18	04-11-17 16:21	X1A	4599	100 M	1243	1440 M	.311	.383	SVO
Laboratory Control Samples																	
Activity: **3.02E+02**	Error:	9.08E+00	MDC: 2.90E+00	pCi/Total		**WG24668-2**			**PB-210**								
WG24668-3		PB-210	23-feb-17 10:34	6.0113 g dry		04-10-17 11:50	.033	42.56	04-11-17 16:08	Y1A	2075	1300 M	1270	1440 M	.305	.901	SVO
MAF-GC-02-3																	
Activity: **3.44E-01**	Error:	4.13E-02	MDC: 5.85E-02	pCi/gDry		**WG24668-3**			**PB-210**								
WG24668-4		PB-210	23-feb-17 10:58	6.137 g dry		04-10-17 11:50	.0426	54.95	04-11-17 16:21	X1B	4811	100 M	1413	1440 M	.296	.849	SVO
MAF-GC-02-15MS																	
Activity: **2.44E+01**	Error:	7.17E-01	MDC: 2.39E-01	pCi/gDry		**WG24668-4**			**PB-210**								
WG24668-5		PB-210	23-feb-17 10:58	6.1044 g dry		04-10-17 11:50	.0636	82.03	04-11-17 16:21	X1C	4268	100 M	1245	1440 M	.275	.849	SVO
MS																	
Activity: **2.33E+01**	Error:	7.30E-01	MDC: 2.42E-01	pCi/gDry		**WG24668-5**			**PB-210**								

DRAFT

Counter ID: X Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
WG24668-2	4599	4.66	100.00	04/11/2017 16:21		1.0000	%	pCi	PB-210	0.311	3.02E+02	9.08E+00	2.90E+00	Total	0.566	0.3826	1243.	1440.0	
WG24668-4	4811	4.66	100.00	04/11/2017 16:21		6.1370	g	pCi	PB-210	0.296	2.44E+01	7.17E-01	2.39E-01	g Dry	0.566	0.8492	1413.	1440.0	
WG24668-5	4268	4.66	100.00	04/11/2017 16:21		6.1044	g	pCi	PB-210	0.275	2.33E+01	7.30E-01	2.42E-01	g Dry	0.566	0.8492	1245.	1440.0	

DRAFT

Reviewed 4/13/17 Date

Data Filename: X041117Q.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

KW 4/13/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

1 a	WG24668-2		162	4599	########	100 100MIN	1580
1 b	-4PB		14	4811	########	100 100MIN	1580
1 c	-5PB		31	4268	########	100 100MIN	1580
1 d			2	97	########	100 100MIN	1580
2 a			3	72	########	100 100MIN	1580
2 b			5	55	########	100 100MIN	1580
2 c			1	60	########	100 100MIN	1580
2 d			3	60	########	100 100MIN	1580

DRAFT

Counter ID: Y Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
WG24668-3	2075	4.66	1300.00	04/11/2017 16:08		6.0113	g	pCi	PB-210	0.305	3.44E-01	4.13E-02	5.85E-02	g Dry	0.566	0.9007	1270.	1440.0	
L71920-42	1143	4.66	1300.00	04/11/2017 16:08		6.0671	g	pCi	PB-210	0.292	2.78E-02	3.53E-02	5.86E-02	g Dry	0.566	0.9007	1186.	1440.0	
L71920-27	1472	4.66	1300.00	04/11/2017 16:08		6.0255	g	pCi	PB-210	0.278	1.62E-01	4.01E-02	6.20E-02	g Dry	0.566	0.9007	1189.	1440.0	
L71920-30	1446	4.66	1300.00	04/11/2017 16:08		6.0038	g	pCi	PB-210	0.286	1.38E-01	3.91E-02	6.12E-02	g Dry	0.566	0.9007	1217.	1440.0	
L71920-24	1343	4.66	1300.00	04/11/2017 16:08		6.0068	g	pCi	PB-210	0.263	1.50E-01	4.08E-02	6.34E-02	g Dry	0.566	0.9007	1103.	1440.0	
L71920-33	1368	4.66	1300.00	04/11/2017 16:08		6.0972	g	pCi	PB-210	0.296	1.29E-01	3.62E-02	5.64E-02	g Dry	0.566	0.9007	1138.	1440.0	
L71920-12	1629	4.66	1300.00	04/11/2017 16:08		6.0189	g	pCi	PB-210	0.306	1.93E-01	3.78E-02	5.72E-02	g Dry	0.566	0.9007	1226.	1440.0	
L71920-45	1236	4.66	1300.00	04/11/2017 16:08		6.0110	g	pCi	PB-210	0.295	8.15E-02	3.57E-02	5.72E-02	g Dry	0.566	0.9007	1134.	1440.0	
L71920-18	1420	4.66	1300.00	04/11/2017 16:08		6.0043	g	pCi	PB-210	0.271	1.64E-01	4.05E-02	6.24E-02	g Dry	0.566	0.9007	1138.	1440.0	
L71920-15	1406	4.66	1300.00	04/11/2017 16:08		6.0174	g	pCi	PB-210	0.287	1.49E-01	3.80E-02	5.88E-02	g Dry	0.566	0.9007	1137.	1440.0	
L71920-21	1387	4.66	1300.00	04/11/2017 16:08		6.0112	g	pCi	PB-210	0.295	1.29E-01	3.70E-02	5.78E-02	g Dry	0.566	0.9007	1163.	1440.0	
L71920-3	1885	4.66	1300.00	04/11/2017 16:08		6.0577	g	pCi	PB-210	0.292	2.90E-01	4.15E-02	6.03E-02	g Dry	0.566	0.9007	1254.	1440.0	
L71920-39	1213	4.66	1300.00	04/11/2017 16:08		6.0128	g	pCi	PB-210	0.278	5.57E-02	3.80E-02	6.21E-02	g Dry	0.566	0.9007	1192.	1440.0	

Reviewed [signature] Date 4/13/17

Data Filename: Y041117PB.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

KS 4/13/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

DRAFT

1 a	WG24668-3PB	70	2075	########	1300 800MIN	1650
1 b	L71920-42PB	66	1143	########	1300 800MIN	1650
1 c	-27PB	77	1472	########	1300 800MIN	1650
1 d	-30PB	56	1446	########	1300 800MIN	1650
2 a	L71920-24PB	58	1343	########	1300 800MIN	1650
2 b	-33PB	63	1368	########	1300 800MIN	1650
2 c	-12PB	85	1629	########	1300 800MIN	1650
2 d	-45PB	49	1236	########	1300 800MIN	1650
3 a	L71920-18PB	64	1420	########	1300 800MIN	1650
3 b	-15PB	62	1406	########	1300 800MIN	1650
3 c		47	949	########	1300 800MIN	1650
3 d	-21PB	70	1387	########	1300 800MIN	1650
4 a		32	1112	########	1300 800MIN	1650
4 b	L71920-3PB	41	1885	########	1300 800MIN	1650
4 c		66	1123	########	1300 800MIN	1650
4 d	-39PB	54	1213	########	1300 800MIN	1650

DRAFT

Counter ID: X Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
WG24668-1	1029	4.66	1300.00	04/11/2017 16:21		1.0000	%	pCi	PB-210	0.309	-3.43E-01	2.01E-01	3.52E-01	Total	0.566	0.9022	1313.	1440.0	
L71920-6	1860	4.66	1300.00	04/11/2017 16:21		6.0013	g	pCi	PB-210	0.294	2.65E-01	4.17E-02	6.17E-02	g Dry	0.566	0.8996	1301.	1440.0	
L71920-9	1829	4.66	1300.00	04/11/2017 16:21		6.0797	g	pCi	PB-210	0.276	2.88E-01	4.32E-02	6.32E-02	g Dry	0.566	0.8996	1239.	1440.0	
L71920-36	1461	4.66	1300.00	04/11/2017 16:21		6.0710	g	pCi	PB-210	0.286	9.14E-02	3.97E-02	6.40E-02	g Dry	0.566	0.8996	1360.	1440.0	

DRAFT

Reviewed Date 4/13/17

Data Filename: X041117PB.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

4/13/17

Calculated using BetaProp.XLS Workbook, V042106

3 a		22	1043 ########	1300 800MIN	1580
3 b		49	1177 ########	1300 800MIN	1580
3 c		33	942 ########	1300 800MIN	1580
3 d		49	1060 ########	1300 800MIN	1580
4 a	WG24668-1PB	37	1029 ########	1300 800MIN	1580
4 b	L71920-6PB	37	1860 ########	1300 800MIN	1580
4 c	-9PB	38	1829 ########	1300 800MIN	1580
4 d	-36PB	58	1461 ########	1300 800MIN	1580

DRAFT

LEAD 210

Prep and Run Logs

DRAFT

Logbook Page

L71920

PB-210

Sample#	Matrix	QC	Analysis	Spike Id	Spike Volume		Spike Conc
WG24668-2	WO	LCS	PB-210	210PB-012505	.5	mls	635.02
WG24668-4	SS	MS	PB-210	210PB-012505	.5	mls	635.02
WG24668-5	SS	MSD	PB-210	210PB-012505	.5	mls	635.02

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
WG24668-1	WO	BLK	PB-210	100 %	03/30/17	SVO	CYLINDER - GRADUATED	.0312	BALANCE 7	.0816	BALANCE 7	.0504	04/10/17	WG24668
WG24668-2	WO	LCS	PB-210	100 %	03/30/17	SVO	CYLINDER - GRADUATED	.0315	BALANCE 7	.0580	BALANCE 7	.0265	04/10/17	WG24668
WG24668-3	SS	DUP	PB-210	6.0113 g dry	03/30/17	SVO	BALANCE 7	.0313	BALANCE 7	.0643	BALANCE 7	.0330	04/10/17	WG24668
WG24668-4	SS	MS	PB-210	6.137 g dry	03/30/17	SVO	BALANCE 7	.0314	BALANCE 7	.0740	BALANCE 7	.0426	04/10/17	WG24668
WG24668-5	SS	MSD	PB-210	6.1044 g dry	03/30/17	SVO	BALANCE 7	.0309	BALANCE 7	.0945	BALANCE 7	.0636	04/10/17	WG24668
L71920-3	SS		PB-210	6.0577 g dry	03/30/17	SVO	BALANCE 7	.0308	BALANCE 7	.0937	BALANCE 7	.0629	04/10/17	WG24668
L71920-6	SS		PB-210	6.0013 g dry	03/30/17	SVO	BALANCE 7	.0313	BALANCE 7	.1013	BALANCE 7	.0700	04/10/17	WG24668
L71920-9	SS		PB-210	6.0797 g dry	03/30/17	SVO	BALANCE 7	.0312	BALANCE 7	.0974	BALANCE 7	.0662	04/10/17	WG24668
L71920-12	SS		PB-210	6.0189 g dry	03/30/17	SVO	BALANCE 7	.0328	BALANCE 7	.0561	BALANCE 7	.0233	04/10/17	WG24668
L71920-15	SS		PB-210	6.0174 g dry	03/30/17	SVO	BALANCE 7	.0320	BALANCE 7	.0572	BALANCE 7	.0252	04/10/17	WG24668
L71920-18	SS		PB-210	6.0043 g dry	03/30/17	SVO	BALANCE 7	.0326	BALANCE 7	.0584	BALANCE 7	.0258	04/10/17	WG24668
L71920-21	SS		PB-210	6.0112 g dry	03/30/17	SVO	BALANCE 7	.0316	BALANCE 7	.0564	BALANCE 7	.0248	04/10/17	WG24668
L71920-24	SS		PB-210	6.0068 g dry	03/30/17	SVO	BALANCE 7	.0319	BALANCE 7	.0580	BALANCE 7	.0261	04/10/17	WG24668
L71920-27	SS		PB-210	6.0255 g dry	03/30/17	SVO	BALANCE 7	.0328	BALANCE 7	.0781	BALANCE 7	.0453	04/10/17	WG24668
L71920-30	SS		PB-210	6.0038 g dry	03/30/17	SVO	BALANCE 7	.0318	BALANCE 7	.0826	BALANCE 7	.0508	04/10/17	WG2466

DRAFT

Logbook Page

L71920

PB-210

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
L71920-33	SS		PB-210	6.0972 g dry	03/30/17	SVO	BALANCE 7	.0320	BALANCE 7	.0560	BALANCE 7	.0240	04/10/17	WG2466 8
L71920-36	SS		PB-210	6.071 g dry	03/30/17	SVO	BALANCE 7	.0322	BALANCE 7	.1005	BALANCE 7	.0683	04/10/17	WG2466 8
L71920-39	SS		PB-210	6.0128 g dry	03/30/17	SVO	BALANCE 7	.0316	BALANCE 7	.0942	BALANCE 7	.0626	04/10/17	WG2466 8
L71920-42	SS		PB-210	6.0671 g dry	03/30/17	SVO	BALANCE 7	.0319	BALANCE 7	.0781	BALANCE 7	.0462	04/10/17	WG2466 8
L71920-45	SS		PB-210	6.011 g dry	03/30/17	SVO	BALANCE 7	.0322	BALANCE 7	.0570	BALANCE 7	.0248	04/10/17	WG2466 8

DRAFT

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

RADIOCHEMICAL WORK SHEET (radchemws-wg01)

Apr 11 2017, 01:55 pm

WG24668

Mount Date: 04/10/17 Scavenge Date: N/A Milk Date: 04/10/17 11:50 am Analyst: SVO

Duplicate: L71920-3 **Spike Data**

ID	Nuclide	Ref Date	Conc Amt/Units	Amt Used	Activity:
210PB-012505	PB-210	07/01/1991 12:00	635.02 pCi/ml	.5	3.18E+02

Carrier limits: L71920(30-120)

Tracer limits: L71920(20-125)

Technical Notes:

1) Prior to accepting the raw data, check for radon deposition.

Det. ID/ verify	LIMS Sample ID (*DUP)	Analysis	Mat	Site	Due Date	Ref. Date	Project	Target MDA	Aliquot Volume	Gamma Normalized Aliquot	Yield 1 PB-210	Yield 2 N/A	Est. Count Time	Tech Note
	WG24668-1 X4A	PB-210	WO	Blank	05-10	04/10/17 0000	TE511LABQC		100.00 %	6.5007E-01	65.01%	N/A		1
	WG24668-2 X1A	PB-210	WO	LCS	05-10	07/01/1991 12:00	TE511LABQC		100.00 %	3.4180E-01	34.18%	N/A		1
	WG24668-3 Y1A	PB-210	SS	MAF-GC-02	05-10	02/23/2017 10:34 (F/M)	TE511LABQC	1.00E-01 pCi/g Dry	6.01 g dry	2.5587E+00	42.56%	N/A		1
	WG24668-4 X2B1	PB-210	SS	MAF-GC-02	05-10	02/23/2017 10:58 (P/)	TE511LABQC		6.137E+00	3.3721E+00	54.95%	N/A		1
	WG24668-5 X1C	PB-210	SS	MS	05-10	NOT IN FLAG VALUES ***	TE511LABQC		6.104E+00	5.0076E+00	82.03%	N/A		1
	L71920-3 * Y4B	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 10:34 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.058E+00**	**4.9146E+00**	**81.13%**	**N/A**		**1**
	L71920-6 X4B	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 10:40 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.001E+00**	**5.4184E+00**	**90.29%**	**N/A**		**1**
	L71920-9 X4C	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 10:46 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.080E+00**	**5.1912E+00**	**85.39%**	**N/A**		**1**
	L71920-12 Y2C	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 10:52 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.019E+00**	**1.8089E+00**	**30.05%**	**N/A**		**1**
	L71920-15 Y3B	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 10:58 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.017E+00**	**1.9559E+00**	**32.50%**	**N/A**		**1**
	L71920-18 Y3A	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 11:04 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.004E+00**	**1.9981E+00**	**33.28%**	**N/A**		**1**
	L71920-21 Y3D	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 11:10 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.011E+00**	**1.9228E+00**	**31.99%**	**N/A**		**1**
	L71920-24 Y2A	**PB-210**	**SS**	**MAF-GC-02**	**04-07**	**02/23/2017 11:16 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.007E+00**	**2.0222E+00**	**33.66%**	**N/A**		**1**

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

RADIOCHEMICAL WORK SHEET (radchemws-wg01)

Apr 11 2017, 01:55 pm

WG24668

Mount Date: 04/10/17 Scavenge Date: N/A Milk Date: 04/10/17 11:50 am Analyst: SVO

Duplicate: L71920-3 **Spike Data**

ID	Nuclide	Ref Date	Conc Amt/Units	Amt Used	Activity:
210PB-012505	PB-210	07/01/1991 12:00	635.02 pCi/ml	.5	3.18E+02

Det ID/ verify	LIMS Sample ID (*DUP)	Analysis	Mat	Site	Due Date	Ref. Date	Project	Target MDA	Aliquot Volume	Gamma Normalized Aliquot	Yield 1 PB-210	Yield 2 N/A	Est. Count Time	Tech Note
	L71920-27 Y1C	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:22 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.026E+00	3.5206E+00	58.43%	N/A		1
	L71920-30 Y1D	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:28 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.004E+00	3.9339E+00	65.52%	N/A		1
	L71920-33 Y2B	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:34 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.097E+00	1.8874E+00	30.96%	N/A		1
	L71920-36 X4D	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:40 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.071E+00	5.3482E+00	88.09%	N/A		1
	L71920-39 Y4D	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:46 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.013E+00	4.8549E+00	80.74%	N/A		1
	L71920-42 Y1B	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:52 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.067E+00	3.6154E+00	59.59%	N/A		1
	L71920-45 Y2D	PB-210	SS	MAF-GC-02	04-07	02/23/2017 11:58 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.011E+00	1.9228E+00	31.99%	N/A		1

DRAFT

LEAD 210

Balance and Pipette Check

DRAFT

Daily Balance Tolerance Check Reports

for : L71920

Instrument: BALANCE 7

Model: A&D HR200

Serial Number: 12103994

Description: 4 Place Analytical Balance

Known Weight	Result Weight
.0050	.0050
1.0000	1.0000
100.0000	100.0000

Check Date: 30-MAR-17

Analyst: DW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod

PB-210 BALANCE 7 30-MAR-17

DRAFT

Daily Balance Tolerance Check Reports

for : L71920

Instrument: BALANCE 7

Model: A&D HR200

Serial Number: 12103994

Description: 4 Place Analytical Balance

Known Weight	Result Weight
.0050	.0050
1.0000	1.0000
100.0000	100.0001

Check Date: 10-APR-17

Analyst: DW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod

PB-210 BALANCE 7 10-APR-17

DRAFT

Daily Pipette Tolerance Check
for: L71920

Instrument: PIP ENV #6
Model: EPPENDORF
Serial #: 3317499
Description: 100 - 1000 uL

Known	Result
.2	.2005
1	1.0006

Check Date: 30-MAR-17
Analyst: DW
Balance: BALANCE 7
Room Temp: 23
Tolerance: 1%
Out of range: N

Prod	Instrument	Check Date
PB-210	PIP ENV #6	30-MAR-17

DRAFT

LEAD 210

Standard Certificates

DRAFT

%PB-
210%

Teledyne Brown Engineering

Source Certificate

Spike Id 210PB-012505

Nuclide: PB-210
Half Life: 22.26 YEARS
Original Std Id: P30621
Chemical Form: 1 M HNO3
Reference Date: 01-JUL-91
Expiration Date: 31-DEC-18
Activity: 635.02 pCi/ml
Total Uncertainty: 2.4
Comments: 10 ML 210PB-090393 DILUTED TO 100 ML

DRAFT

Prepared by: Date: 01/25/05

Approved by: Keith Jeter Date:

Signature on File

Amersham International plc
Amersham Laboratories

Certificate of calibration of absolutely standardized radioactive solution

P 30621

NAMAS
CALIBRATION
No. 0146

Description	Principal radionuclide:	Lead-210	Product code:	RBZ.24
	Daughter radionuclide:	Bismuth-210 + Polonium-210	Solution number:	S1/23/133

Measurement	Reference time:	1200 GMT on 1 July 1991	
	Radioactive concentration of lead-210:	4.426	kilobecquerels per gram of solution
	which is equivalent to:	119.6	nanocuries per gram of solution
	Mass of solution:	5.3634	grams
	Total activity of lead-210:	23.74	kilobecquerels
	which is equivalent to:	642	nanocuries

Method of measurement:
Repeated 4-pi alpha counting over a period of 63 days

Accuracy: Overall uncertainty in the radioactive concentration quoted above: ± 2.4 %

Random uncertainty: ± 0.6 % Systematic uncertainty: ± 1.8 %

Overall uncertainty is defined on the reverse of the certificate.

Radionuclidic Purity: The estimated activities of any radioactive impurities are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Other radionuclides less than 0.02 %

Chemical Composition: 2M HNO_3 containing 100 micrograms of lead and 100 micrograms of bismuth per ml.

Physical Data: Recommended half life: 22.3 ± 0.2 years

Lead-210: 100% beta particle emission.
Bismuth-210: 100% beta particle emission. Half life 5.01 ± 0.01 days.
Polonium-210: 100% alpha particle emission. Half life 138.38 ± 0.01 days.

Remarks

The ratio of the activity of bismuth-210 to the activity of lead-210 = 1.0006
At the reference time polonium-210 was in radioactive equilibrium with lead-210.
The ratio of the activity of polonium-210 to the activity of lead-210 was 1.0179
There is no guarantee that all the polonium-210 will remain in solution.
Tests made over 4 years on standardized solutions of lead-210 stored in glass ampoules have shown that loss of lead-210 from solution is negligible other than by radioactive decay.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving implicit NIST traceability as defined in NCRP 58 (1985).

Approved signatory

B D D Singleton

Amersham

DRAFT

Bismuth Carrier

Carrier ID:	BI17-1
Reagent Lot # :	006116
Reagent Manufacturer:	Fisher Scientific

Bismuth Carrier preparation:
Weigh 69.6 grams bismuth nitrate - $Bi(NO_3)_3.5H_2O$ - into a 1 liter beaker.
Add 1:19 HNO_3 to the 1 liter mark. Stir with magnetic stirrer until dissolved.
Transfer to the bismuth carrier volumetric flask and standardiz as bimuth phosphate per procedure TBE-2015.

NOTES:
Used 5 beakers containing 15 milliliters of 5N HNO3.
Added one milliliter of carrier to each beaker.
proceeded with steps 9.4.9 - 9.5.7 of procedure TBE-2015.

Precipitate weights	1	2	3	4	5
Gross wgt, grams	0.1082	0.1052	0.1044	0.109	0.1129
Tare wgt, grams	0.0308	0.032	0.0307	0.0312	0.0318
Net wgt, grams	0.0774	0.0732	0.0737	0.0778	0.0811

Average net wgt, grams 0.07553

Ratios	1	2	3	4	5
wgt/avg net wgt	1.0248	0.9692	0.9758	1.0301	1.0738

Acceptable ratio range - 0.95 - 1.05

0.0755 grams BiOCl/1 mL carrier

DRAFT

Preparer Signature: [signature]

Preparation Date: 3/15/2017

Reviewer Signature: [signature]

Reviewed Date: 3/16/17

PERCENT MOISTURE

DRAFT

Run Date: 04/13/2017

Percent Moisture Report

L71920

Sample#	Client ID	Tare Wt	Wet Wt	Dry Wt	Tare Balance/Date		Dry Balance/Date		Analyst	% Moist
L71920-3	MAF-GC-02-3	13.43	182.6	106.37	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	45.06
L71920-6	MAF-GC-02-6	13.42	164.73	86.09	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	51.97
L71920-9	MAF-GC-02-9	13.42	164.25	78.83	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	56.63
L71920-12	MAF-GC-02-12	13.43	172.88	94.93	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	48.89
L71920-15	MAF-GC-02-15	13.46	193.99	119.75	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	41.12
L71920-18	MAF-GC-02-18	13.47	161.38	84.36	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	52.07
L71920-21	MAF-GC-02-21	13.47	184.57	106.61	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	45.56
L71920-24	MAF-GC-02-24	13.43	201.85	129.74	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	38.27
L71920-27	MAF-GC-02-27	13.46	203.75	130.04	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	38.74
L71920-30	MAF-GC-02-30	13.41	208.97	139.65	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	35.45
L71920-33	MAF-GC-02-33	13.44	192.25	123.17	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	38.63
L71920-36	MAF-GC-02-36	13.47	205.5	142.72	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	32.69
L71920-39	MAF-GC-02-39	13.41	209.91	161.13	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	24.82
L71920-42	MAF-GC-02-42	13.44	200.46	158.8	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	22.28
L71920-45	MAF-GC-02-45	13.39	217.06	161.85	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	27.11

DRAFT

Daily Balance Tolerance Check Reports

for : L71920

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 14-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod		
NONE	BALANCE 8	14-MAR-17
GELI	BALANCE 8	14-MAR-17

DRAFT

Daily Balance Tolerance Check Reports

for : L71920

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 13-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod		
NONE	BALANCE 8	13-MAR-17

DRAFT

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

Work Order #: L71921

GeoEngineers

April 17, 2017

DRAFT

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

Robert Trahan
GeoEngineers, Inc.
600 Stewart Street, Suite 1700
Seattle WA 98101

Case Narrative - L71921
GE002-3EREG-17

04/17/2017 12:41

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Sample Receipt

The following samples were received on March 8, 2017 in good condition, unless otherwise noted.

Cross Reference Table

Client ID	Laboratory ID	Station ID(if applicable)
MAF-GC-01-1	L71921-1	MAF-GC-01
MAF-GC-01-2	L71921-2	MAF-GC-01
MAF-GC-01-3	L71921-3	MAF-GC-01
MAF-GC-01-4	L71921-4	MAF-GC-01
MAF-GC-01-5	L71921-5	MAF-GC-01
MAF-GC-01-6	L71921-6	MAF-GC-01
MAF-GC-01-7	L71921-7	MAF-GC-01
MAF-GC-01-8	L71921-8	MAF-GC-01
MAF-GC-01-9	L71921-9	MAF-GC-01
MAF-GC-01-10	L71921-10	MAF-GC-01
MAF-GC-01-11	L71921-11	MAF-GC-01
MAF-GC-01-12	L71921-12	MAF-GC-01
MAF-GC-01-13	L71921-13	MAF-GC-01
MAF-GC-01-14	L71921-14	MAF-GC-01
MAF-GC-01-15	L71921-15	MAF-GC-01
MAF-GC-01-16	L71921-16	MAF-GC-01
MAF-GC-01-17	L71921-17	MAF-GC-01
MAF-GC-01-18	L71921-18	MAF-GC-01
MAF-GC-01-19	L71921-19	MAF-GC-01
MAF-GC-01-20	L71921-20	MAF-GC-01
MAF-GC-01-21	L71921-21	MAF-GC-01
MAF-GC-01-22	L71921-22	MAF-GC-01
MAF-GC-01-23	L71921-23	MAF-GC-01
MAF-GC-01-24	L71921-24	MAF-GC-01
MAF-GC-01-25	L71921-25	MAF-GC-01
MAF-GC-01-26	L71921-26	MAF-GC-01
MAF-GC-01-27	L71921-27	MAF-GC-01
MAF-GC-01-28	L71921-28	MAF-GC-01
MAF-GC-01-29	L71921-29	MAF-GC-01
MAF-GC-01-30	L71921-30	MAF-GC-01
MAF-GC-01-31	L71921-31	MAF-GC-01

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

Case Narrative - L71921
GE002-3EREG-17

04/17/2017 12:41

Client ID	Laboratory ID	Station ID(if applicable)
MAF-GC-01-32	L71921-32	MAF-GC-01
MAF-GC-01-33	L71921-33	MAF-GC-01
MAF-GC-01-34	L71921-34	MAF-GC-01
MAF-GC-01-35	L71921-35	MAF-GC-01
MAF-GC-01-36	L71921-36	MAF-GC-01
MAF-GC-01-37	L71921-37	MAF-GC-01
MAF-GC-01-38	L71921-38	MAF-GC-01
MAF-GC-01-39	L71921-39	MAF-GC-01
MAF-GC-01-40	L71921-40	MAF-GC-01
MAF-GC-01-41	L71921-41	MAF-GC-01
MAF-GC-01-42	L71921-42	MAF-GC-01
MAF-GC-01-43	L71921-43	MAF-GC-01
MAF-GC-01-44	L71921-44	MAF-GC-01
MAF-GC-01-45	L71921-45	MAF-GC-01
MAF-GC-01-46	L71921-46	MAF-GC-01
MAF-GC-01-47	L71921-47	MAF-GC-01
MAF-GC-01-48	L71921-48	MAF-GC-01
MAF-GC-01-49	L71921-49	MAF-GC-01
MAF-GC-01-50	L71921-50	MAF-GC-01
MAF-GC-01-51	L71921-51	MAF-GC-01
MAF-GC-01-52	L71921-52	MAF-GC-01
MAF-GC-01-53	L71921-53	MAF-GC-01
MAF-GC-01-54	L71921-54	MAF-GC-01
MAF-GC-01-55	L71921-55	MAF-GC-01
MAF-GC-01-56	L71921-56	MAF-GC-01
MAF-GC-01-57	L71921-57	MAF-GC-01
MAF-GC-01-58	L71921-58	MAF-GC-01
MAF-GC-01-59	L71921-59	MAF-GC-01
MAF-GC-01-60	L71921-60	MAF-GC-01
MAF-GC-01-61	L71921-61	MAF-GC-01
MAF-GC-01-62	L71921-62	MAF-GC-01
MAF-GC-01-63	L71921-63	MAF-GC-01
MAF-GC-01-64	L71921-64	MAF-GC-01

DRAFT

Sample Analysis

Instruments used for all analyses were in calibration.
Standard solutions used in analyses were National Institute of Standards and Technology (NIST) traceable.

Analytical Method Cross Reference Table

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

Case Narrative - L71921
GE002-3EREG-17

04/17/2017 12:41

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Radiological Parameter	TBE Knoxville Method	Reference Method

TELEDYNE
BROWN ENGINEERING, INC.
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2508 Quality Lane
Knoxville, TN 37931-3133

Case Narrative - L71921
GE002-3EREG-17

04/17/2017 12:41

Special Considerations

Gamma Spectroscopy

Quality Control

Quality control samples were analyzed as WG24441.

Duplicate Sample

Duplicates were analyzed for the following samples. All duplicate results were within acceptance limits, unless otherwise noted.

Client ID	Laboratory ID	QC Sample #
MAF-GC-01-3	L71921-3	WG24441-1

PB-210

Quality Control

Quality control samples were analyzed as WG24683.

Method Blank

All blanks were within acceptance limits, unless otherwise noted.

Laboratory Control Sample

All laboratory control samples were within acceptance limits, unless otherwise noted.

Duplicate Sample

Duplicates were analyzed for the following samples. All duplicate results were within acceptance limits, unless otherwise noted.

Client ID	Laboratory ID	QC Sample #
MAF-GC-01-45	L71921-45	WG24683-3

Matrix Spike

All matrix spike results were within acceptance limits, unless otherwise noted.

Matrix Spike Duplicate

Matrix spike duplicate result was within acceptance limits, unless otherwise noted.

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

Case Narrative - L71921
GE002-3EREG-17

04/17/2017 12:41

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

DRAFT

ANALYTICAL RESULTS

DRAFT

Report of Analysis

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-1** Collect Start: 02/23/2017 08:00 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:00 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-1

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-2** Collect Start: 02/23/2017 08:02 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:02 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-2

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-3** Collect Start: 02/23/2017 08:04 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:04 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 42.96
LIMS Number: L71921-3

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
PB-210	2015	**5.05E-01**	4.39E-02	5.78E-02	pCi/gDry		6.0565	g dry	02/23/17 08:04	04/12/17	1300	M	+
CS-137	2007	**1.65E-01**	7.97E-02	7.07E-02	pCi/g Dry		84.73	g dry	02/23/17 08:04	03/14/17	10800	Sec	+ Yes

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-4** Collect Start: 02/23/2017 08:06 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:06 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-4

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

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Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

TBE-ROA013

Report of Analysis

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-5** Collect Start: 02/23/2017 08:08 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:08 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-5

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-6** Collect Start: 02/23/2017 08:10 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:10 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 56.43
LIMS Number: L71921-6

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
PB-210	2015	**2.78E-01**	3.89E-02	5.60E-02	pCi/gDry		6.0179	g dry	02/23/17 08:10	04/12/17	1300	M	+
CS-137	2007	**1.69E-01**	8.66E-02	1.03E-01	pCi/g Dry		67.75	g dry	02/23/17 08:10	03/20/17	8206	Sec	+ Yes

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-7** Collect Start: 02/23/2017 08:12 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:12 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-7

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-8** Collect Start: 02/23/2017 08:14 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:14 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-8

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Page 10 of 318 L71921

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-9** Collect Start: 02/23/2017 08:16 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:16 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 45.6
LIMS Number: L71921-9

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.52E-01**	3.67E-02	5.67E-02	pCi/gDry		6.1373	g dry	02/23/17 08:16	04/12/17	1300	M	+			
CS-137	2007	-1.35E-02	5.35E-02	**8.80E-02**	pCi/g Dry		96.19	g dry	02/23/17 08:16	03/14/17	10800	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-10** Collect Start: 02/23/2017 08:18 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:18 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-10

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-11** Collect Start: 02/23/2017 08:20 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:20 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-11

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-12** Collect Start: 02/23/2017 08:22 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:22 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 36.82
LIMS Number: L71921-12

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.08E-01**	3.54E-02	5.58E-02	pCi/gDry		6.0676	g dry	02/23/17 08:22	04/12/17	1300	M	+			
CS-137	2007	-1.43E-04	5.11E-02	**8.41E-02**	pCi/g Dry		122.08	g dry	02/23/17 08:22	03/15/17	3638	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-13** Collect Start: 02/23/2017 08:24 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:24 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-13

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-14** Collect Start: 02/23/2017 08:26 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:26 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-14

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
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GeoEngineers, Inc.

Robert Trahan

GE002-3EREG-17

Sample ID: **MAF-GC-01-15** Collect Start: 02/23/2017 08:28 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:28 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 30.87
LIMS Number: L71921-15

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.09E-01**	3.66E-02	5.80E-02	pCi/gDry		6.1421	g dry	02/23/17 08:28	04/12/17	1300	M	+			
CS-137	2007	1.02E-02	5.50E-02	**9.44E-02**	pCi/g Dry		142.19	g dry	02/23/17 08:28	03/15/17	4587	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-16** Collect Start: 02/23/2017 08:30 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:30 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-16

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-17** Collect Start: 02/23/2017 08:32 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:32 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-17

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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Sample ID: **MAF-GC-01-18** Collect Start: 02/23/2017 08:34 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:34 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 26.85
LIMS Number: L71921-18

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**8.09E-02**	3.68E-02	5.91E-02	pCi/gDry		6.0439	g dry	02/23/17 08:34	04/12/17	1300	M	+			
CS-137	2007	1.26E-02	5.42E-02	**9.27E-02**	pCi/g Dry		156.13	g dry	02/23/17 08:34	03/15/17	3638	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-19** Collect Start: 02/23/2017 08:36 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:36 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-19

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-20** Collect Start: 02/23/2017 08:38 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:38 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-20

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

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Sample ID: **MAF-GC-01-21** Collect Start: 02/23/2017 08:40 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:40 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 24.72
LIMS Number: L71921-21

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.11E-01**	3.32E-02	5.20E-02	pCi/gDry		6.2963	g dry	02/23/17 08:40	04/12/17	1300	M	+			
CS-137	2007	7.00E-02	5.16E-02	**9.81E-02**	pCi/g Dry		169.16	g dry	02/23/17 08:40	03/15/17	5439	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-22** Collect Start: 02/23/2017 08:42 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:42 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-22

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-23** Collect Start: 02/23/2017 08:44 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:44 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-23

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

TBE-ROA013

Report of Analysis

04/17/17 12:42

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GE002-3EREG-17

Sample ID: **MAF-GC-01-24** Collect Start: 02/23/2017 08:46 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:46 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 20.54
LIMS Number: L71921-24

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**7.25E-02**	3.73E-02	6.02E-02	pCi/gDry		6.0272	g dry	02/23/17 08:46	04/12/17	1300	M	+			
CS-137	2007	-1.02E-02	4.67E-02	**7.43E-02**	pCi/g Dry		172.18	g dry	02/23/17 08:46	03/15/17	3698	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-25** Collect Start: 02/23/2017 08:48 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:48 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-25

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-26** Collect Start: 02/23/2017 08:50 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:50 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-26

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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GE002-3EREG-17

Sample ID: **MAF-GC-01-27** Collect Start: 02/23/2017 08:52 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:52 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 17.94
LIMS Number: L71921-27

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	1.24E-02	3.28E-02	**5.50E-02**	pCi/gDry		6.0838	g dry	02/23/17 08:52	04/12/17	1300	M	U			
CS-137	2007	-4.39E-02	4.61E-02	**6.42E-02**	pCi/g Dry		173.59	g dry	02/23/17 08:52	03/15/17	3697	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-28** Collect Start: 02/23/2017 08:54 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:54 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-28

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-29** Collect Start: 02/23/2017 08:56 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:56 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-29

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

04/17/17 12:42

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Robert Trahan

Sample ID: **MAF-GC-01-30** Collect Start: 02/23/2017 08:58 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 08:58 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 21.2
LIMS Number: L71921-30

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.04E-01**	3.39E-02	5.36E-02	pCi/gDry		6.1217	g dry	02/23/17 08:58	04/12/17	1300	M	+			
CS-137	2007	-9.58E-02	6.68E-02	**8.96E-02**	pCi/g Dry		161.02	g dry	02/23/17 08:58	03/15/17	3722	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-31** Collect Start: 02/23/2017 09:00 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:00 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-31

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-32** Collect Start: 02/23/2017 09:02 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:02 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-32

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-01-33** Collect Start: 02/23/2017 09:04 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:04 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 17.77
LIMS Number: L71921-33

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	**1.16E-01**	3.50E-02	5.48E-02	pCi/gDry		6.0406	g dry	02/23/17 09:04	04/12/17	1300	M	+			
CS-137	2007	3.42E-03	4.06E-02	**7.44E-02**	pCi/g Dry		185.49	g dry	02/23/17 09:04	03/15/17	3718	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-34** Collect Start: 02/23/2017 09:06 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:06 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-34

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-35** Collect Start: 02/23/2017 09:08 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:08 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-35

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

TBE-ROA013

Report of Analysis

04/17/17 12:42

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GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-36** Collect Start: 02/23/2017 09:10 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:10 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 17.54
LIMS Number: L71921-36

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	1.66E-02	3.22E-02	**5.38E-02**	pCi/gDry		6.2464	g dry	02/23/17 09:10	04/12/17	1300	M	U			
CS-137	2007	-5.58E-03	3.90E-02	**6.26E-02**	pCi/g Dry		185.33	g dry	02/23/17 09:10	03/15/17	3872	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-37** Collect Start: 02/23/2017 09:12 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:12 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-37

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-38** Collect Start: 02/23/2017 09:14 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:14 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-38

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

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MDC - Minimum Detectable Concentration

Report of Analysis

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Sample ID: **MAF-GC-01-39** (SS)
Station: MAF-GC-01
Description:
LIMS Number: L71921-39

Collect Start: 02/23/2017 09:16
Collect Stop: 02/23/2017 09:16
Receive Date: 03/08/2017

Matrix: Sediment/Silt
Volume:
% Moisture: 19.59

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	3.91E-02	3.49E-02	**5.75E-02**	pCi/gDry		6.1193	g dry	02/23/17 09:16	04/12/17	1300	M	U			
CS-137	2007	8.87E-03	4.86E-02	**8.30E-02**	pCi/g Dry		166.12	g dry	02/23/17 09:16	03/15/17	3889	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-40** (SS)
Station: MAF-GC-01
Description:
LIMS Number: L71921-40

Collect Start: 02/23/2017 09:18
Collect Stop: 02/23/2017 09:18
Receive Date: 03/08/2017

Matrix: Sediment/Silt
Volume:
% Moisture:

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-41** (SS)
Station: MAF-GC-01
Description:
LIMS Number: L71921-41

Collect Start: 02/23/2017 09:20
Collect Stop: 02/23/2017 09:20
Receive Date: 03/08/2017

Matrix: Sediment/Silt
Volume:
% Moisture:

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-42** Collect Start: 02/23/2017 09:22 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:22 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 20.33
LIMS Number: L71921-42

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	3.77E-02	3.65E-02	**6.03E-02**	pCi/gDry		6.063	g dry	02/23/17 09:22	04/12/17	1300	M	U			H
CS-137	2007	-3.68E-02	5.94E-02	**9.12E-02**	pCi/g Dry		176.92	g dry	02/23/17 09:22	03/15/17	3906	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-43** Collect Start: 02/23/2017 09:24 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:24 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-43

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-44** Collect Start: 02/23/2017 09:26 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:26 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-44

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-45** Collect Start: 02/23/2017 09:28 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:28 Volume:
Description: Receive Date: 03/08/2017 % Moisture: 19.32
LIMS Number: L71921-45

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
PB-210	2015	2.76E-02	3.60E-02	**5.99E-02**	pCi/gDry		6.1699	g dry	02/23/17 09:28	04/12/17	1300	M	U			H
CS-137	2007	5.21E-02	3.92E-02	**7.98E-02**	pCi/g Dry		181.6	g dry	02/23/17 09:28	03/15/17	3943	Sec	U		No	

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-46** Collect Start: 02/23/2017 09:30 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:30 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-46

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-47** Collect Start: 02/23/2017 09:32 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:32 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-47

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

Sample ID: **MAF-GC-01-49** Collect Start: 02/23/2017 09:36 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:36 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-49

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values			
SAMPLE																

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Sample ID: **MAF-GC-01-50** Collect Start: 02/23/2017 09:38 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:38 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-50

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-51** Collect Start: 02/23/2017 09:40 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:40 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-51

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-52** Collect Start: 02/23/2017 09:42 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:42 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-52

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-53** Collect Start: 02/23/2017 09:44 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:44 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-53

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-55** Collect Start: 02/23/2017 09:48 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:48 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-55

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-56** Collect Start: 02/23/2017 09:50 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:50 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-56

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-57** Collect Start: 02/23/2017 09:52 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:52 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-57

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-58** Collect Start: 02/23/2017 09:54 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:54 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-58

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.
GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-59** Collect Start: 02/23/2017 09:56 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:56 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-59

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-60** Collect Start: 02/23/2017 09:58 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 09:58 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-60

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-61** Collect Start: 02/23/2017 10:00 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 10:00 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-61

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Sample ID: **MAF-GC-01-62** Collect Start: 02/23/2017 10:02 Matrix: Sediment/Silt (SS)
Station: MAF-GC-01 Collect Stop: 02/23/2017 10:02 Volume:
Description: Receive Date: 03/08/2017 % Moisture:
LIMS Number: L71921-62

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

04/17/17 12:42

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

L71921

GeoEngineers, Inc.

GE002-3EREG-17

Robert Trahan

Sample ID: **MAF-GC-01-63**
Station: MAF-GC-01
Description:
LIMS Number: L71921-63

Collect Start: 02/23/2017 10:04
Collect Stop: 02/23/2017 10:04
Receive Date: 03/08/2017

Matrix: Sediment/Silt (SS)
Volume:
% Moisture:

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

Comment: 1 Gamma for Cs-137

Sample ID: **MAF-GC-01-64**
Station: MAF-GC-01
Description:
LIMS Number: L71921-64

Collect Start: 02/23/2017 10:06
Collect Stop: 02/23/2017 10:06
Receive Date: 03/08/2017

Matrix: Sediment/Silt (SS)
Volume:
% Moisture:

Radionuclide	SOP#	Activity Conc	Uncertainty 2 Sigma	MDC	Units	Run #	Aliquot Volume	Aliquot Units	Reference Date	Count Date	Count Time	Count Units	Flag Values
SAMPLE													

DRAFT

Flag Values
U = Compound/Analyte not detected (< MDC) or less than 2 sigma
\+ = Activity concentration exceeds MDC and 2 sigma; peak identified(gamma only)
U* = Compound/Analyte not detected. Peak not identified, but forced activity concentration exceeds MDC and 2 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

TBE-ROA013

QC RESULTS

DRAFT

QC Summary Report for L71921

GE002-3EREG-17

04/17/2017 12:45

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
WG24441-1	CS-137	SS	03/16/2017 09:49	1.647E-01	1.083E-01	pCi/g Dry		<30	*	NE
L71921-3										

GAMMA

Associated Samples for WG24441

Sample #	Client ID
L71921-3	MAF-GC-01-3
L71921-6	MAF-GC-01-6
L71921-9	MAF-GC-01-9
L71921-12	MAF-GC-01-12
L71921-15	MAF-GC-01-15
L71921-18	MAF-GC-01-18
L71921-21	MAF-GC-01-21
L71921-24	MAF-GC-01-24
L71921-27	MAF-GC-01-27
L71921-30	MAF-GC-01-30
L71921-33	MAF-GC-01-33
L71921-36	MAF-GC-01-36
L71921-39	MAF-GC-01-39
L71921-42	MAF-GC-01-42
L71921-45	MAF-GC-01-45

DRAFT

+	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 L71921

GE002-3EREG-17

04/17/2017 12:45

TELEDYNE BROWN ENGINEERING
Everywhereyoulook™

PB-210

Method Blank Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Blank Result	Units	Qualifier	P/F
WG24683-1	PB-210	WO	04/12/2017 17:31	< 3.550E-01	pCi/Total	U	P

LCS Sample Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Spike Value	LCS Result	Units	Spike Recovery	Range	Qualifier	P/F
WG24683-2	PB-210	WO	04/12/2017 17:27	1.42E+02	3.100E+02	pCi/Total	97.6	70-130	+	P

Spike ID: **210PB-012505**
Spike Conc: **6.35E+02**
Spike Vol: **5.00E-01**

Duplicate Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Original Result	DUP Result	Units	RPD	Range	Qualifier	P/F
WG24683-3	PB-210	SS	04/12/2017 17:30	< 5.990E-02	9.070E-02	pCi/gDry		<30	*	NE
L71921-45										

Matrix Spike Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Decay Corrected Spike Value	Original Result	MS Result	Units	Spike Recovery	Range	Qualifier	P/F
WG24683-4	PB-210	SS	04/12/2017 17:27	2.38E+01	< 5.990E-02	2.100E+01	pCi/gDry	88.3	60-140	+	P
L71921-45											

Spike ID: **210PB-012505**
Spike Conc: **6.35E+02**
Spike Vol: **5.00E-01**

DRAFT

+	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 L71921

GE002-3EREG-17

04/17/2017 12:45

TELEDYNE BROWN ENGINEERING
Everywhereyoulook™

PB-210

Matrix Spike Duplicate Summary

TBE Sample ID	Radionuclide	Matrix	Count Date/Time	Decay Corrected Spike Value	MSD Result	MSD Recovery	Units	RPD	Range	Qualifier	P/F
WG24683-5	PB-210	SS	04/12/2017 17:27	2.37E+01	2.710E+01	114.3	pCi/gDry	25.6	<30	+	P
WG24683-4											
Spike ID:	**210PB-012505**										
Spike Conc:	**6.35E+02**										
Spike Vol:	**5.00E-01**										

PB-210

Associated Samples for WG24683

Sample #	Client ID
L71921-3	MAF-GC-01-3
L71921-6	MAF-GC-01-6
L71921-9	MAF-GC-01-9
L71921-12	MAF-GC-01-12
L71921-15	MAF-GC-01-15
L71921-18	MAF-GC-01-18
L71921-21	MAF-GC-01-21
L71921-24	MAF-GC-01-24
L71921-27	MAF-GC-01-27
L71921-30	MAF-GC-01-30
L71921-33	MAF-GC-01-33
L71921-36	MAF-GC-01-36
L71921-39	MAF-GC-01-39
L71921-42	MAF-GC-01-42
L71921-45	MAF-GC-01-45

DRAFT

+	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

DRAFT

GeoEngineers

Sample Collection/Receipt Sheet

L71921

5

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-01-1	MAF-GC-01	SS	2/23/2017	8:00	2/23/2017	8:00	4oz		
	MAF-GC-01-2	MAF-GC-01	SS	2/23/2017	8:02	2/23/2017	8:02	4oz		
	MAF-GC-01-3	MAF-GC-01	SS	2/23/2017	8:04	2/23/2017	8:04	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-4	MAF-GC-01	SS	2/23/2017	8:06	2/23/2017	8:06	4oz		
	MAF-GC-01-5	MAF-GC-01	SS	2/23/2017	8:08	2/23/2017	8:08	4oz		
	MAF-GC-01-6	MAF-GC-01	SS	2/23/2017	8:10	2/23/2017	8:10	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-7	MAF-GC-01	SS	2/23/2017	8:12	2/23/2017	8:12	4oz		
	MAF-GC-01-8	MAF-GC-01	SS	2/23/2017	8:14	2/23/2017	8:14	4oz		
	MAF-GC-01-9	MAF-GC-01	SS	2/23/2017	8:16	2/23/2017	8:16	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-10	MAF-GC-01	SS	2/23/2017	8:18	2/23/2017	8:18	4oz		
	MAF-GC-01-11	MAF-GC-01	SS	2/23/2017	8:20	2/23/2017	8:20	4oz		
	MAF-GC-01-12	MAF-GC-01	SS	2/23/2017	8:22	2/23/2017	8:22	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-13	MAF-GC-01	SS	2/23/2017	8:24	2/23/2017	8:24	4oz		
	MAF-GC-01-14	MAF-GC-01	SS	2/23/2017	8:26	2/23/2017	8:26	4oz		
	MAF-GC-01-15	MAF-GC-01	SS	2/23/2017	8:28	2/23/2017	8:28	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-16	MAF-GC-01	SS	2/23/2017	8:30	2/23/2017	8:30	4oz		
	MAF-GC-01-17	MAF-GC-01	SS	2/23/2017	8:32	2/23/2017	8:32	4oz		
	MAF-GC-01-18	MAF-GC-01	SS	2/23/2017	8:34	2/23/2017	8:34	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-19	MAF-GC-01	SS	2/23/2017	8:36	2/23/2017	8:36	4oz		
	MAF-GC-01-20	MAF-GC-01	SS	2/23/2017	8:38	2/23/2017	8:38	4oz		

Relinquished by: [signature] Date: 02.27.2017

Received by: [signature] Date: 3/1/17

Relinquished by: _____ Date: _____

Received by: Shannon Cooper Date: 3/8/17

DRAFT

GeoEngineers

Sample Collection/Receipt Sheet

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-01-21	MAF-GC-01	SS	2/23/2017	8:40	2/23/2017	8:40	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-22	MAF-GC-01	SS	2/23/2017	8:42	2/23/2017	8:42	4oz		
	MAF-GC-01-23	MAF-GC-01	SS	2/23/2017	8:44	2/23/2017	8:44	4oz		
	MAF-GC-01-24	MAF-GC-01	SS	2/23/2017	8:46	2/23/2017	8:46	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-25	MAF-GC-01	SS	2/23/2017	8:48	2/23/2017	8:48	4oz		
	MAF-GC-01-26	MAF-GC-01	SS	2/23/2017	8:50	2/23/2017	8:50	4oz		
	MAF-GC-01-27	MAF-GC-01	SS	2/23/2017	8:52	2/23/2017	8:52	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-28	MAF-GC-01	SS	2/23/2017	8:54	2/23/2017	8:54	4oz		
	MAF-GC-01-29	MAF-GC-01	SS	2/23/2017	8:56	2/23/2017	8:56	4oz		
	MAF-GC-01-30	MAF-GC-01	SS	2/23/2017	8:58	2/23/2017	8:58	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-31	MAF-GC-01	SS	2/23/2017	9:00	2/23/2017	9:00	4oz		
	MAF-GC-01-32	MAF-GC-01	SS	2/23/2017	9:02	2/23/2017	9:02	4oz		
	MAF-GC-01-33	MAF-GC-01	SS	2/23/2017	9:04	2/23/2017	9:04	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-34	MAF-GC-01	SS	2/23/2017	9:06	2/23/2017	9:06	4oz		
	MAF-GC-01-35	MAF-GC-01	SS	2/23/2017	9:08	2/23/2017	9:08	4oz		
	MAF-GC-01-36	MAF-GC-01	SS	2/23/2017	9:10	2/23/2017	9:10	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-37	MAF-GC-01	SS	2/23/2017	9:12	2/23/2017	9:12	4oz		
	MAF-GC-01-38	MAF-GC-01	SS	2/23/2017	9:14	2/23/2017	9:14	4oz		
	MAF-GC-01-39	MAF-GC-01	SS	2/23/2017	9:16	2/23/2017	9:16	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-40	MAF-GC-01	SS	2/23/2017	9:18	2/23/2017	9:18	4oz		

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: Shannon Cooper Date: 3/8/17 Received by: _____ Date: _____

DRAFT

Sample Collection/Receipt Sheet

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-01-41	MAF-GC-01	SS	2/23/2017	9:20	2/23/2017	9:20	4oz		
	MAF-GC-01-42	MAF-GC-01	SS	2/23/2017	9:22	2/23/2017	9:22	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-43	MAF-GC-01	SS	2/23/2017	9:24	2/23/2017	9:24	4oz		
	MAF-GC-01-44	MAF-GC-01	SS	2/23/2017	9:26	2/23/2017	9:26	4oz		
	MAF-GC-01-45	MAF-GC-01	SS	2/23/2017	9:28	2/23/2017	9:28	4oz	Pb-210,Gamma	Gamma for Cs-137
	MAF-GC-01-46	MAF-GC-01	SS	2/23/2017	9:30	2/23/2017	9:30	4oz		
	MAF-GC-01-47	MAF-GC-01	SS	2/23/2017	9:32	2/23/2017	9:32	4oz		
	MAF-GC-01-48	MAF-GC-01	SS	2/23/2017	9:34	2/23/2017	9:34	4oz		
	MAF-GC-01-49	MAF-GC-01	SS	2/23/2017	9:36	2/23/2017	9:36	4oz		
	MAF-GC-01-50	MAF-GC-01	SS	2/23/2017	9:38	2/23/2017	9:38	4oz		
	MAF-GC-01-51	MAF-GC-01	SS	2/23/2017	9:40	2/23/2017	9:40	4oz		
	MAF-GC-01-52	MAF-GC-01	SS	2/23/2017	9:42	2/23/2017	9:42	4oz		
	MAF-GC-01-53	MAF-GC-01	SS	2/23/2017	9:44	2/23/2017	9:44	4oz		
	MAF-GC-01-54	MAF-GC-01	SS	2/23/2017	9:46	2/23/2017	9:46	4oz		
	MAF-GC-01-55	MAF-GC-01	SS	2/23/2017	9:48	2/23/2017	9:48	4oz		
	MAF-GC-01-56	MAF-GC-01	SS	2/23/2017	9:50	2/23/2017	9:50	4oz		
	MAF-GC-01-57	MAF-GC-01	SS	2/23/2017	9:52	2/23/2017	9:52	4oz		
	MAF-GC-01-58	MAF-GC-01	SS	2/23/2017	9:54	2/23/2017	9:54	4oz		
	MAF-GC-01-59	MAF-GC-01	SS	2/23/2017	9:56	2/23/2017	9:56	4oz		
	MAF-GC-01-60	MAF-GC-01	SS	2/23/2017	9:58	2/23/2017	9:58	4oz		

Relinquished by: _____ Date: _____
Received by: Shannon Cooper Date: 3/8/17

Relinquished by: _____ Date: _____
Received by: _____ Date: _____

DRAFT

GeoEngineers

Sample Collection/Receipt Sheet

TELEDYNE BROWN ENGINEERING, INC.
A Teledyne Technologies Company

Name Robert Trahan
Phone 206-239-3253
email rtrahan@geoengineers.com

Turn-around Days: 30

Lab. No.	Client ID	Station Code	Sample Medium	Start date	Start time	Stop date	Stop time	Sample Size	Analysis	Comments
	MAF-GC-01-61	MAF-GC-01	SS	2/23/2017	10:00	2/23/2017	10:00	4oz		
	MAF-GC-01-62	MAF-GC-01	SS	2/23/2017	10:02	2/23/2017	10:02	4oz		
	MAF-GC-01-63	MAF-GC-01	SS	2/23/2017	10:04	2/23/2017	10:04	4oz		
	MAF-GC-01-64	MAF-GC-01	SS	2/23/2017	10:06	2/23/2017	10:06	4oz		

DRAFT

Relinquished by: _____ Date: _____ Relinquished by: _____ Date: _____

Received by: Shannon Copy Date: 3/8/17 Received by: _____ Date: _____

04/17/17 12:45

SR #: SR51388

Client: GeoEngineers

Teledyne Brown Engineering
Sample Receipt Verification/Variance Report

Project #: GE002-3EREG-17

LIMS #L71921

Initiated By: KNOXLAB
Init Date: 03/09/17 Receive Date: 03/08/17

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 and in appropriate container(s)			NA	
9	Other (Describe)			NA	

DRAFT

INTERNAL CHAIN OF CUSTODY

DRAFT

Internal Chain of Custody

****

Sample # L71921-1 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-2 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-3 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-4 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-5 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-6 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-7 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-8 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

DRAFT

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Sample # L71921-9 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-10 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-11 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-12 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-13 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-14 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-15 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date	Relinquish By	Received By	
03/09/2017 00:00		099999	Sample Custodian

****

Sample # L71921-16 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date	Relinquish By	Received By

DRAFT

****
Sample # L71921-16 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-17 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-18 Containernum 1

Prod | Analyst
GELI | MJW
PB-210 | KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-19 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-20 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-21 Containernum 1

Prod | Analyst
GELI | MJW
PB-210 | KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-22 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-23 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-24 Containernum 1

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****
Sample # L71921-24 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-25 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-26 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-27 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-28 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-29 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-30 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-31 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By

DRAFT

****
Sample # L71921-31 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-32 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-33 Containernum 1

Prod | Analyst
GELI | MJW
PB-210 | KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-34 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-35 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-36 Containernum 1

Prod | Analyst
GELI | MJW
PB-210 | KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-37 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-38 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-39 Containernum 1

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Sample # L71921-39 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-40 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-41 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-42 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-43 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-44 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-45 Containernum 1

Prod	Analyst
GELI	MJW
PB-210	KSC

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-46 Containernum 1

Prod	Analyst
SAMPLE	

Relinquish Date Relinquish By | Received By

DRAFT

****
Sample # L71921-46 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-47 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-48 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-49 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-50 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-51 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-52 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-53 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-54 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By

DRAFT

****
Sample # L71921-54 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****
Sample # L71921-55 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-56 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-57 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-58 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-59 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-60 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-61 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By
03/09/2017 00:00 | | 099999 Sample Custodian

****
Sample # L71921-62 Containernum 1

Prod | Analyst
SAMPLE

Relinquish Date | Relinquish By | Received By

DRAFT

****

Sample # L71921-62 Containernum 1

Relinquish Date | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-63 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

****

Sample # L71921-64 Containernum 1

Prod Analyst
SAMPLE

Relinquish Date Relinquish By | Received By
03/09/2017 00:00 | 099999 Sample Custodian

DRAFT

Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71921

****

L71921-1 **SS** **MAF-GC-01-1**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-2 **SS** **MAF-GC-01-2**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-3 **SS** **MAF-GC-01-3**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/12/17

****

L71921-4 **SS** **MAF-GC-01-4**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-5 **SS** **MAF-GC-01-5**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-6 **SS** **MAF-GC-01-6**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/20/17
Count Room	PB-210	KPW	04/12/17

****

L71921-7 **SS** **MAF-GC-01-7**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

DRAFT

Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71921

****

L71921-8 **SS** **MAF-GC-01-8**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-9 **SS** **MAF-GC-01-9**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/14/17
Count Room	PB-210	KPW	04/12/17

****

L71921-10 **SS** **MAF-GC-01-10**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-11 **SS** **MAF-GC-01-11**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-12 **SS** **MAF-GC-01-12**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-13 **SS** **MAF-GC-01-13**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-14 **SS** **MAF-GC-01-14**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71921

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L71921-15 SS MAF-GC-01-15

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-16 SS MAF-GC-01-16

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-17 SS MAF-GC-01-17

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-18 SS MAF-GC-01-18

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-19 SS MAF-GC-01-19

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-20 SS MAF-GC-01-20

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-21 SS MAF-GC-01-21

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

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L71921-21	**SS**	**MAF-GC-01-21**		
Aliquot	PB-210		KSC	04/05/17
Count Room	GELI		BCG	03/15/17
Count Room	PB-210		KPW	04/12/17

****

L71921-22	**SS**	**MAF-GC-01-22**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71921-23	**SS**	**MAF-GC-01-23**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71921-24	**SS**	**MAF-GC-01-24**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
%Moisture			MJW	03/13/17
Aliquot	GELI		MJW	03/14/17
Aliquot	PB-210		KSC	04/05/17
Count Room	GELI		BCG	03/15/17
Count Room	PB-210		KPW	04/12/17

****

L71921-25	**SS**	**MAF-GC-01-25**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71921-26	**SS**	**MAF-GC-01-26**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
Aliquot	SAMPLE			
Count Room	SAMPLE			

****

L71921-27	**SS**	**MAF-GC-01-27**		
Process step	Prod		Analyst	Date
Login			RCHARLES	03/08/17
%Moisture			MJW	03/13/17
Aliquot	GELI		MJW	03/14/17
Aliquot	PB-210		KSC	04/05/17
Count Room	GELI		BCG	03/15/17
Count Room	PB-210		KPW	04/12/17

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Internal Chain of Custody
Supplemental Sheet

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L71921-28 SS MAF-GC-01-28

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-29 SS MAF-GC-01-29

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-30 SS MAF-GC-01-30

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-31 SS MAF-GC-01-31

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-32 SS MAF-GC-01-32

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-33 SS MAF-GC-01-33

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-34 SS MAF-GC-01-34

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Teledyne Brown Engineering
Internal Chain of Custody
Supplemental Sheet

L71921

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L71921-35 SS MAF-GC-01-35

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-36 SS MAF-GC-01-36

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-37 SS MAF-GC-01-37

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-38 SS MAF-GC-01-38

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-39 SS MAF-GC-01-39

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-40 SS MAF-GC-01-40

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-41 SS MAF-GC-01-41

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Internal Chain of Custody
Supplemental Sheet

L71921

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L71921-42 **SS** **MAF-GC-01-42**

Process step	Prod	Analyst	Date
Login		KTHURMAN	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-43 **SS** **MAF-GC-01-43**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-44 **SS** **MAF-GC-01-44**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-45 **SS** **MAF-GC-01-45**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
%Moisture		MJW	03/13/17
Aliquot	GELI	MJW	03/14/17
Aliquot	PB-210	KSC	04/05/17
Count Room	GELI	BCG	03/15/17
Count Room	PB-210	KPW	04/12/17

****

L71921-46 **SS** **MAF-GC-01-46**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-47 **SS** **MAF-GC-01-47**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-48 **SS** **MAF-GC-01-48**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		

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L71921-49 **SS** **MAF-GC-01-49**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-50 **SS** **MAF-GC-01-50**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-51 **SS** **MAF-GC-01-51**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-52 **SS** **MAF-GC-01-52**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-53 **SS** **MAF-GC-01-53**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-54 **SS** **MAF-GC-01-54**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		

****

L71921-55 **SS** **MAF-GC-01-55**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-56 **SS** **MAF-GC-01-56**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		

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Supplemental Sheet

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L71921-56 **SS** **MAF-GC-01-56**
Count Room SAMPLE

****

L71921-57 **SS** **MAF-GC-01-57**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-58 **SS** **MAF-GC-01-58**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-59 **SS** **MAF-GC-01-59**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-60 **SS** **MAF-GC-01-60**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-61 **SS** **MAF-GC-01-61**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-62 **SS** **MAF-GC-01-62**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

****

L71921-63 **SS** **MAF-GC-01-63**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
??		MJW	03/13/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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Internal Chain of Custody
Supplemental Sheet

L71921

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L71921-64 **SS** **MAF-GC-01-64**

Process step	Prod	Analyst	Date
Login		RCHARLES	03/08/17
Aliquot	SAMPLE		
Count Room	SAMPLE		

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GAMMA SPECTROSCOPY

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Gamma Spectroscopy

Background

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:42:46.88
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 24-FEB-2017 10:06:58.61

LIMS No., Customer Name, Client ID: 01BG022417MT WO TBE DET01 BKG
Sample ID : 01BG022417MT Smple Date: 24-FEB-2017 10:07:00.00
Sample Type : WO Geometry : 0135L011414
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 1.50000 Real Time : 2 00:00:32.50
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.34	683	3632	0.83	126.89	3.80E-01	3.95E-03	16.3	7.23E-01
2	1	66.73	288	2315	1.25	133.66	4.84E-01	1.67E-03	27.1	7.21E-01
3	2	72.84	819	2460	0.79	145.88	6.87E-01	4.74E-03	9.7	3.26E+00
4	2	75.01	1640	2487	0.80	150.21	7.61E-01	9.49E-03	5.1	
5	1	84.75	1206	2631	1.21	169.68	1.08E+00	6.98E-03	7.6	2.63E+00
6	1	87.28	458	2150	0.84	174.75	1.16E+00	2.65E-03	16.7	1.09E+00
7	1	92.67	2370	3680	1.06	185.50	1.32E+00	1.37E-02	5.2	5.22E+00
8	1	139.84	277	2421	0.82	279.79	1.98E+00	1.60E-03	30.0	2.72E-01
9	1	143.78	446	1974	0.90	287.66	1.99E+00	2.58E-03	16.4	7.19E-01
10	1	163.54	283	2271	1.30	327.16	2.00E+00	1.64E-03	28.6	6.77E-01
11	1	185.75	1803	3323	0.97	371.57	1.96E+00	1.04E-02	6.4	4.99E-01
12	1	198.45	437	2099	1.10	396.96	1.92E+00	2.53E-03	18.0	1.68E+00
13	1	238.60	1216	2068	0.97	477.21	1.77E+00	7.04E-03	6.8	3.15E-01
14	1	295.25	510	1991	1.30	590.48	1.57E+00	2.95E-03	16.4	1.69E+00
15	1	337.99	377	1794	1.57	675.94	1.44E+00	2.18E-03	20.8	3.41E+00
16	1	351.91	876	1785	1.47	703.76	1.41E+00	5.07E-03	9.6	3.55E+00
17	1	510.87	6086	2367	2.76	1021.65	1.10E+00	3.52E-02	2.3	2.54E+00
18	1	569.56	190	1072	2.01	1139.04	1.03E+00	1.10E-03	33.1	1.30E+00
19	1	583.18	579	1152	1.51	1166.29	1.01E+00	3.35E-03	12.4	2.28E+00
20	1	609.30	707	1623	1.62	1218.54	9.80E-01	4.09E-03	12.7	1.61E+00
21	1	802.91	242	639	1.63	1605.89	8.09E-01	1.40E-03	20.6	1.70E+00
22	1	846.73	464	840	1.41	1693.59	7.79E-01	2.69E-03	13.4	5.64E-01
23	1	911.12	415	553	1.67	1822.44	7.39E-01	2.40E-03	12.0	7.28E-01
24	1	968.80	156	435	1.57	1937.88	7.07E-01	9.05E-04	25.4	9.13E-01
25	1	1001.30	143	455	1.90	2002.94	6.90E-01	8.25E-04	29.5	1.99E+00
26	1	1120.20	187	480	2.06	2240.95	6.36E-01	1.08E-03	25.4	2.10E+00
27	1	1460.50	916	423	2.15	2922.45	5.30E-01	5.30E-03	6.1	8.85E-01
28	1	1763.93	245	170	2.93	3530.41	4.77E-01	1.42E-03	13.1	1.29E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	916	10.67*	5.303E-01	2.532E+02	2.532E+02	12.24
RA-226	186.21	1803	3.28*	1.957E+00	4.394E+02	4.394E+02	12.86
AC-228	835.50	------	1.75	7.864E-01	------ Line Not Found		------
	911.07	415	27.70*	7.390E-01	3.175E+01	3.176E+01	23.91
TH-228	238.63	1216	44.60*	1.766E+00	2.415E+01	2.417E+01	13.64

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:33:24.04
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 24-FEB-2017 10:07:00.43

LIMS No., Customer Name, Client ID: 02BG022417MT WO TBE DET02 BKG
Sample ID : 02BG022417MT Smple Date: 24-FEB-2017 10:08:00.00
Sample Type : WO Geometry : 0235L111411
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:19.79
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	46.22	195	2427	1.07	76.71	1.03E-01	1.13E-03	42.6	
2	4	63.24	494	1678	0.79	110.95	4.77E-01	2.86E-03	13.3	1.37E+00
3	4	66.35	269	2406	1.08	117.19	5.60E-01	1.56E-03	30.5	
4	4	72.81	957	2233	1.03	130.20	7.32E-01	5.54E-03	8.3	1.14E+00
5	4	74.93	1920	2020	0.93	134.46	7.86E-01	1.11E-02	4.4	
6	4	77.04	240	1577	0.86	138.69	8.38E-01	1.39E-03	26.8	
7	2	84.69	1113	2101	1.18	154.09	1.01E+00	6.44E-03	7.5	9.74E-01
8	2	87.21	437	2089	1.09	159.16	1.06E+00	2.53E-03	18.1	
9	0	92.59	1385	2707	1.12	169.98	1.16E+00	8.02E-03	7.3	
10	0	139.69	219	1813	1.03	264.70	1.48E+00	1.26E-03	31.6	
11	0	144.05	302	2299	0.77	273.48	1.48E+00	1.75E-03	28.1	
12	0	185.58	1067	2499	1.12	357.01	1.39E+00	6.17E-03	9.0	
13	0	198.09	279	1810	1.25	382.17	1.35E+00	1.61E-03	26.0	
14	0	238.74	492	1937	1.07	463.92	1.22E+00	2.85E-03	16.1	
15	0	295.11	413	1808	1.22	577.32	1.06E+00	2.39E-03	20.5	
16	0	351.78	467	1436	1.19	691.30	9.30E-01	2.70E-03	15.9	
17	0	510.95	4419	1678	2.77	1011.45	7.01E-01	2.56E-02	2.7	
18	0	569.44	156	569	1.89	1129.08	6.45E-01	9.02E-04	27.8	
19	0	583.11	271	594	1.20	1156.58	6.33E-01	1.57E-03	17.3	
20	0	609.57	482	961	1.38	1209.81	6.12E-01	2.79E-03	13.7	
21	0	802.58	159	616	1.40	1598.02	4.94E-01	9.19E-04	34.0	
22	0	846.84	419	576	1.81	1687.05	4.74E-01	2.42E-03	12.2	
23	0	911.77	100	458	1.59	1817.65	4.47E-01	5.76E-04	43.0	
24	0	969.06	86	340	1.32	1932.87	4.26E-01	4.97E-04	41.7	
25	0	1000.74	84	339	1.82	1996.59	4.16E-01	4.87E-04	43.7	
26	0	1120.75	238	348	1.41	2238.00	3.80E-01	1.38E-03	18.4	
27	0	1460.65	494	357	2.06	2921.68	3.10E-01	2.86E-03	10.6	
28	0	1729.22	107	109	4.87	3461.90	2.75E-01	6.20E-04	23.8	
29	0	1764.67	217	168	2.15	3533.22	2.71E-01	1.26E-03	15.3	

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	494	10.67*	3.103E-01	2.334E+02	2.334E+02	21.13
RA-226	186.21	1067	3.28*	1.395E+00	3.648E+02	3.648E+02	17.96
AC-228	835.50	------	1.75	4.789E-01	------ Line Not Found		------
	911.07	100	27.70*	4.473E-01	1.257E+01	1.258E+01	86.05

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:28:45.67
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:10.62

LIMS No., Customer Name, Client ID: 06BG022417MT WO TBE DET06 BKG
Sample ID : 06BG022417MT Smple Date: 24-FEB-2017 10:00:00.00
Sample Type : WO Geometry : 0635L011614
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 2.00000 Real Time : 2 00:00:35.75
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.20	430	2708	0.77	126.99	2.88E-01	2.49E-03	20.6	6.06E-01
2	4	72.72	822	2133	0.79	146.03	5.22E-01	4.76E-03	9.1	1.49E+00
3	4	74.93	1698	2071	0.82	150.44	5.79E-01	9.83E-03	4.7	
4	2	84.70	1270	2334	1.23	169.99	8.20E-01	7.35E-03	6.9	1.16E+00
5	2	87.39	524	1926	0.95	175.36	8.80E-01	3.03E-03	14.2	
6	1	92.62	1376	3435	1.02	185.83	9.88E-01	7.96E-03	8.4	2.41E+00
7	1	123.15	288	1971	0.98	246.88	1.35E+00	1.67E-03	24.9	8.01E+00
8	1	143.60	172	2499	1.12	287.77	1.40E+00	9.95E-04	48.8	8.40E-01
9	1	185.65	933	2661	0.78	371.84	1.31E+00	5.40E-03	10.1	1.14E+00
10	1	238.56	573	1801	0.90	477.64	1.14E+00	3.31E-03	13.0	9.26E-01
11	1	241.63	256	2019	1.42	483.77	1.13E+00	1.48E-03	31.0	1.08E+00
12	1	295.34	355	1886	1.45	591.16	9.80E-01	2.05E-03	22.7	2.47E+00
13	1	351.93	477	1858	1.33	704.31	8.65E-01	2.76E-03	17.4	2.66E+00
14	1	510.71	3619	2187	2.62	1021.75	6.69E-01	2.09E-02	3.5	2.27E+00
15	1	582.68	310	791	1.54	1165.61	6.12E-01	1.80E-03	17.2	9.43E-01
16	1	609.01	550	913	1.41	1218.26	5.94E-01	3.18E-03	11.2	9.71E-01
17	1	803.53	445	705	1.14	1607.05	4.89E-01	2.57E-03	12.6	8.50E+01
18	1	846.27	242	654	1.67	1692.49	4.71E-01	1.40E-03	21.5	1.86E+00
19	1	910.48	224	447	1.59	1820.82	4.45E-01	1.30E-03	18.9	1.47E+00
20	1	968.22	154	465	1.79	1936.20	4.24E-01	8.92E-04	28.3	7.66E-01
21	1	1119.86	203	430	2.34	2239.24	3.75E-01	1.18E-03	23.7	1.16E+00
22	1	1460.10	1357	241	1.97	2919.03	2.91E-01	7.85E-03	3.8	1.32E+00
23	1	1763.25	227	256	2.46	3524.60	2.37E-01	1.31E-03	18.8	1.91E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1357	10.67*	2.911E-01	6.833E+02	6.833E+02	7.50
RA-226	186.21	933	3.28*	1.310E+00	3.396E+02	3.396E+02	20.24
AC-228	835.50	------	1.75	4.753E-01	------	Line Not Found	------
	911.07	224	27.70*	4.452E-01	2.845E+01	2.846E+01	37.72
TH-228	238.63	573	44.60*	1.135E+00	1.769E+01	1.771E+01	25.94
	240.98	256	3.95	1.126E+00	8.987E+01	8.996E+01	62.06
TH-232	583.14	310	30.25	6.118E-01	2.622E+01	2.622E+01	34.49
	911.07	224	27.70*	4.452E-01	2.845E+01	2.845E+01	37.72
	969.11	154	16.60	4.240E-01	3.427E+01	3.427E+01	56.58
U-235	143.76	172	10.50*	1.395E+00	1.836E+01	1.836E+01	97.61

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:20:04.34
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:12.58

LIMS No., Customer Name, Client ID: 07BG022417MT WO TBE DET07 BKG

Sample ID : 07BG022417MT
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: LIBD

Smple Date: 24-FEB-2017 10:03:00.00
Geometry : 0735L011514
BKGFILE : NOBKG
Real Time : 2 00:00:19.42
Live time : 2 00:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	5	63.46	655	3475	1.71	127.67	4.44E-01	3.79E-03	17.2	8.15E+00
2	5	66.47	373	2773	1.26	133.68	5.36E-01	2.16E-03	25.1	
3	5	70.20	735	4840	2.37	141.16	6.54E-01	4.26E-03	21.1	
4	5	72.79	1699	3102	1.43	146.35	7.38E-01	9.83E-03	6.8	
5	5	74.97	3058	3093	1.52	150.70	8.08E-01	1.77E-02	3.9	
6	2	84.73	1372	2865	1.33	170.25	1.11E+00	7.94E-03	7.3	8.76E-01
7	2	87.32	503	3052	1.43	175.44	1.18E+00	2.91E-03	21.1	
8	1	92.68	1572	3589	1.71	186.18	1.33E+00	9.10E-03	7.8	5.20E+00
9	1	140.11	545	2629	1.45	281.14	1.93E+00	3.15E-03	16.7	8.96E+00
10	1	143.48	239	2624	1.38	287.88	1.94E+00	1.39E-03	37.6	7.50E-01
11	1	185.65	1075	3734	1.30	372.32	1.91E+00	6.22E-03	11.4	3.34E-01
12	1	198.19	516	2542	1.51	397.44	1.87E+00	2.99E-03	17.4	3.87E+00
13	1	238.46	926	2657	1.26	478.07	1.72E+00	5.36E-03	10.5	1.60E+00
14	1	295.17	415	2385	1.34	591.58	1.52E+00	2.40E-03	22.6	1.24E+00
15	1	338.17	266	2083	1.20	677.67	1.39E+00	1.54E-03	32.6	1.65E+00
16	1	351.87	848	1908	1.63	705.09	1.35E+00	4.91E-03	10.2	2.27E+00
17	1	510.69	6256	2500	2.84	1022.98	1.05E+00	3.62E-02	2.3	1.61E+00
18	1	569.60	309	1096	2.11	1140.88	9.70E-01	1.79E-03	20.8	7.92E-01
19	1	582.96	547	1031	1.73	1167.61	9.54E-01	3.17E-03	11.8	9.88E-01
20	1	608.97	760	1619	1.68	1219.66	9.25E-01	4.40E-03	11.2	1.69E+00
21	1	802.71	177	743	2.04	1607.33	7.60E-01	1.03E-03	29.8	1.54E+00
22	1	846.56	364	917	1.95	1695.05	7.32E-01	2.11E-03	16.9	5.32E-01
23	1	910.65	400	660	2.09	1823.26	6.94E-01	2.32E-03	14.2	3.62E+00
24	1	1120.54	243	529	2.59	2243.10	5.96E-01	1.41E-03	20.2	1.96E+00
25	1	1460.61	1521	622	2.20	2923.08	4.89E-01	8.80E-03	4.9	1.13E+00
26	1	1764.40	371	264	2.71	3530.29	4.27E-01	2.15E-03	11.3	8.12E-01

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1521	10.67*	4.892E-01	4.558E+02	4.558E+02	9.80
RA-226	186.21	1075	3.28*	1.907E+00	2.687E+02	2.687E+02	22.85
AC-228	835.50	------	1.75	7.388E-01	------ Line Not Found		------
	911.07	400	27.70*	6.940E-01	3.255E+01	3.256E+01	28.46
TH-228	238.63	926	44.60*	1.720E+00	1.889E+01	1.891E+01	21.05
	240.98	------	3.95	1.710E+00	------ Line Not Found		------
TH-232	583.14	547	30.25	9.544E-01	2.966E+01	2.966E+01	23.51

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Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:29:30.68
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 24-FEB-2017 09:53:14.01

LIMS No., Customer Name, Client ID: 08BG022417MT WO TBE DET08 BKG
Sample ID : 08BG022417MT
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: LIBD
Smple Date: 24-FEB-2017 10:02:00.00
Geometry : 0835L010912
BKGFILE : NOBKG
Real Time : 2 00:00:40.43
Live time : 2 00:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	16.10	797	7811	1.10	39.04	4.65E-01	4.61E-03	19.6	2.18E+00
2	1	24.26	864	5425	2.14	55.39	7.17E-01	5.00E-03	15.8	2.48E+00
3	1	46.51	1398	3863	1.19	99.94	1.42E+00	8.09E-03	8.8	8.57E-01
4	3	63.41	1627	3906	1.67	133.77	1.74E+00	9.42E-03	7.5	2.87E+01
5	3	66.52	593	4675	1.95	140.01	1.78E+00	3.43E-03	23.9	
6	3	70.00	407	4662	1.95	146.97	1.82E+00	2.35E-03	35.3	
7	3	72.78	2498	2712	1.12	152.52	1.84E+00	1.45E-02	4.1	
8	3	75.04	5743	3858	1.68	157.07	1.86E+00	3.32E-02	2.5	
9	4	84.87	2199	2955	1.33	176.74	1.91E+00	1.27E-02	4.8	1.35E+00
10	4	87.46	612	2533	1.12	181.91	1.91E+00	3.54E-03	14.4	
11	1	92.70	1484	3279	1.23	192.41	1.92E+00	8.59E-03	7.4	1.25E+00
12	1	185.91	755	3098	1.20	378.95	1.54E+00	4.37E-03	13.8	5.09E-01
13	1	238.78	592	2486	1.27	484.71	1.29E+00	3.42E-03	15.7	1.16E+00
14	1	296.04	284	2250	1.83	599.20	1.09E+00	1.64E-03	31.7	4.05E+00
15	1	351.88	257	1667	1.37	710.82	9.35E-01	1.49E-03	29.2	4.85E-01
16	1	510.93	4169	2665	3.01	1028.58	6.70E-01	2.41E-02	3.6	1.13E+00
17	1	608.09	608	1461	2.94	1222.55	5.76E-01	3.52E-03	14.6	2.92E+00
18	1	801.66	72	685	1.45	1608.67	4.56E-01	4.16E-04	69.0	2.03E+00
19	1	845.11	248	602	1.64	1695.28	4.37E-01	1.44E-03	19.6	1.11E+00
20	1	909.86	236	530	1.73	1824.32	4.12E-01	1.36E-03	20.7	9.71E-01
21	1	1462.23	1139	245	2.06	2923.13	2.83E-01	6.59E-03	4.1	7.63E-01
22	1	1768.28	173	182	2.27	3530.47	2.40E-01	1.00E-03	17.7	1.47E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1139	10.67*	2.831E-01	5.899E+02	5.899E+02	8.20
RA-226	186.21	755	3.28*	1.538E+00	2.341E+02	2.341E+02	27.57
AC-228	835.50	------	1.75	4.413E-01	------	Line Not Found	------
	911.07	236	27.70*	4.121E-01	3.230E+01	3.231E+01	41.39
TH-228	238.63	592	44.60*	1.292E+00	1.606E+01	1.608E+01	31.37
	240.98	------	3.95	1.283E+00	------	Line Not Found	------

Flag: "*" = Keyline

Summary of Nuclide Activity
Sample ID : 08BG022417MT
Total number of lines in spectrum

Acquisition date : 24-FEB-2017 09:53:14
22

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:20:52.08
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:08.39

LIMS No., Customer Name, Client ID: 14BG022417MT WO TBE DET14 BKG
Sample ID : 14BG022417MT
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 90 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: LIBD
Smple Date: 24-FEB-2017 09:58:00.00
Geometry : 1435L121511
BKGFILE : NOBKG
Real Time : 2 00:00:37.78
Live time : 2 00:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	6	63.14	620	4164	2.02	123.79	2.16E-01	3.59E-03	21.4	9.97E+00
2	6	66.17	570	2790	1.33	129.86	2.80E-01	3.30E-03	16.7	
3	6	70.12	642	5267	2.48	137.76	3.74E-01	3.72E-03	25.7	
4	6	72.48	1172	2470	1.13	142.48	4.34E-01	6.78E-03	7.8	
5	6	74.65	2735	3195	1.57	146.83	4.91E-01	1.58E-02	4.3	
6	1	84.37	1233	3138	1.51	166.29	7.56E-01	7.14E-03	8.7	2.21E+00
7	1	87.08	585	2730	1.29	171.71	8.28E-01	3.38E-03	16.2	
8	1	92.34	1086	3460	1.26	182.25	9.62E-01	6.29E-03	10.6	1.19E+00
9	1	139.40	345	2857	1.16	276.44	1.61E+00	1.99E-03	27.3	1.77E+00
10	1	185.56	838	3116	1.18	368.85	1.62E+00	4.85E-03	12.5	2.16E+00
11	1	198.18	295	3017	1.18	394.11	1.58E+00	1.71E-03	34.1	7.73E-01
12	1	209.59	263	2545	1.58	416.95	1.55E+00	1.52E-03	33.8	1.44E+00
13	1	238.43	1043	2849	1.23	474.69	1.45E+00	6.03E-03	9.7	1.41E+00
14	1	294.98	451	2103	1.22	587.91	1.27E+00	2.61E-03	18.9	1.90E+00
15	1	338.27	354	2275	1.94	674.58	1.16E+00	2.05E-03	26.6	8.13E-01
16	1	351.87	735	2231	1.56	701.81	1.13E+00	4.25E-03	13.0	1.84E+00
17	1	510.94	5244	2605	2.74	1020.29	8.68E-01	3.03E-02	2.7	1.42E+00
18	1	569.51	179	1237	1.71	1137.58	8.04E-01	1.04E-03	38.7	1.20E+00
19	1	583.20	505	1081	1.45	1165.00	7.90E-01	2.92E-03	12.9	9.41E-01
20	1	609.17	854	1520	2.14	1217.00	7.66E-01	4.94E-03	9.6	6.21E+00
21	1	802.78	192	757	1.99	1604.72	6.26E-01	1.11E-03	28.5	7.00E-01
22	1	846.96	405	908	2.18	1693.21	6.01E-01	2.34E-03	16.1	1.66E+00
23	1	911.05	429	711	2.41	1821.59	5.69E-01	2.48E-03	13.7	1.50E+00
24	1	969.27	197	744	1.52	1938.19	5.42E-01	1.14E-03	29.3	1.72E+00
25	1	1001.34	131	531	2.44	2002.44	5.29E-01	7.58E-04	36.5	1.17E+00
26	1	1120.67	315	604	2.70	2241.46	4.85E-01	1.82E-03	18.0	9.80E-01
27	1	1238.17	125	459	2.31	2476.85	4.49E-01	7.24E-04	36.4	8.18E-01
28	1	1461.22	1294	432	2.39	2923.76	3.96E-01	7.49E-03	4.7	2.07E+00
29	1	1765.11	279	237	2.60	3532.73	3.49E-01	1.62E-03	13.1	1.26E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	1294	10.67*	3.962E-01	4.786E+02	4.786E+02	9.34
RA-226	186.21	838	3.28*	1.616E+00	2.472E+02	2.472E+02	24.97
AC-228	835.50	------	1.75	6.071E-01	------	Line Not Found	------
	911.07	429	27.70*	5.686E-01	4.256E+01	4.257E+01	27.45

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:19:17.77
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 24-FEB-2017 09:53:09.64

LIMS No., Customer Name, Client ID: 15BG022417MT WO TBE DET15 BKG
Sample ID : 15BG022417MT Smple Date: 24-FEB-2017 10:01:00.00
Sample Type : WO Geometry : 1535L080811
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 2.00000 Real Time : 2 00:00:14.12
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 2 00:00:00.00
MDA Multiple : 4.6600 Library Used: LIBD

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	2	63.51	710	2633	1.27	121.07	4.49E-01	4.11E-03	13.0	2.49E+00
2	2	66.26	338	2574	1.35	126.59	5.30E-01	1.96E-03	26.7	
3	7	72.96	1331	3212	1.42	140.01	7.29E-01	7.71E-03	8.5	6.90E+00
4	7	75.17	2439	2036	1.01	144.46	7.94E-01	1.41E-02	3.6	
5	7	77.37	290	1596	0.88	148.87	8.56E-01	1.68E-03	22.7	
6	5	84.95	1291	2479	1.29	164.07	1.06E+00	7.47E-03	7.2	1.07E+00
7	5	87.51	495	1818	1.03	169.20	1.12E+00	2.87E-03	14.5	
8	1	92.85	1651	2924	1.18	179.89	1.23E+00	9.55E-03	6.6	6.59E+00
9	1	185.94	809	2935	0.98	366.53	1.50E+00	4.68E-03	13.0	1.08E+00
10	1	198.08	430	2308	1.78	390.88	1.45E+00	2.49E-03	20.6	6.00E+00
11	1	238.78	461	1655	0.91	472.47	1.30E+00	2.67E-03	15.3	4.98E-01
12	1	295.43	283	1610	1.09	586.03	1.13E+00	1.64E-03	26.1	1.99E+00
13	1	352.04	428	1102	1.07	699.49	9.90E-01	2.48E-03	14.2	1.01E+00
14	1	511.12	3987	1672	2.70	1018.31	7.48E-01	2.31E-02	2.8	1.23E+00
15	1	583.32	225	826	1.42	1162.98	6.75E-01	1.30E-03	25.7	2.12E+00
16	1	609.54	485	929	1.51	1215.50	6.53E-01	2.81E-03	13.0	1.35E+00
17	1	803.14	152	475	2.01	1603.36	5.24E-01	8.80E-04	29.0	4.18E-01
18	1	847.08	454	520	1.75	1691.36	5.02E-01	2.63E-03	10.7	1.18E+00
19	1	911.65	160	456	2.15	1820.68	4.72E-01	9.23E-04	29.9	1.77E+00
20	1	1001.73	56	308	1.36	2001.08	4.36E-01	3.21E-04	58.2	1.54E+00
21	1	1120.73	113	325	1.56	2239.36	3.97E-01	6.56E-04	31.3	1.32E+00
22	1	1461.64	634	223	2.03	2921.77	3.18E-01	3.67E-03	6.6	1.03E+00
23	1	1766.39	227	211	4.62	3531.50	2.76E-01	1.32E-03	19.7	2.13E+00

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	634	10.67*	3.181E-01	2.924E+02	2.924E+02	13.25
RA-226	186.21	809	3.28*	1.497E+00	2.576E+02	2.576E+02	26.03
AC-228	835.50	------	1.75	5.074E-01	------ Line Not Found		------
	911.07	160	27.70*	4.721E-01	1.908E+01	1.909E+01	59.77
TH-228	238.63	461	44.60*	1.302E+00	1.241E+01	1.242E+01	30.69
	240.98	------	3.95	1.294E+00	------ Line Not Found		------
TH-232	583.14	225	30.25	6.754E-01	1.723E+01	1.723E+01	51.41
	911.07	160	27.70*	4.721E-01	1.908E+01	1.908E+01	59.77
	969.11	------	16.60	4.486E-01	------ Line Not Found		------
U-235	143.76	------	10.50*	1.602E+00	------ Line Not Found		------

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 27-FEB-2017 07:32:27.74
TBE23 03017322 HpGe ********** Aquisition Date/Time: 24-FEB-2017 09:53:06.88

LIMS No., Customer Name, Client ID: 23BG022417MT WO TBE DET23 BKG
Sample ID : 23BG022417MT
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: LIBD
Smple Date: 24-FEB-2017 09:54:00.00
Geometry : 2335L090704
BKGFILE : NOBKG
Real Time : 2 00:02:31.23
Live time : 2 00:00:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	5	33.51	1447	211	1.42	67.85	8.98E-02	8.37E-03	5.0	1.52E+02
2	5	35.66	3239	1234	3.87	72.14	1.24E-01	1.87E-02	4.3	
3	5	39.68	1845	2898	3.20	80.15	2.06E-01	1.07E-02	8.4	
4	5	42.42	603	2475	1.95	85.61	2.73E-01	3.49E-03	17.6	
5	5	44.79	1302	5715	3.88	90.35	3.38E-01	7.54E-03	13.9	
6	5	48.07	256	3097	1.67	96.90	4.36E-01	1.48E-03	35.6	
7	0	63.03	1164	5614	2.28	126.76	9.32E-01	6.74E-03	13.6	
8	0	92.44	2644	6652	2.22	185.46	1.69E+00	1.53E-02	6.8	
9	0	143.39	232	4706	1.29	287.16	2.05E+00	1.34E-03	55.8	
10	0	185.47	1773	6274	2.32	371.16	1.95E+00	1.03E-02	10.0	
11	0	238.50	583	4015	1.81	477.04	1.72E+00	3.37E-03	21.5	
12	0	294.85	287	2836	1.94	589.57	1.50E+00	1.66E-03	36.3	
13	0	352.01	763	2901	2.63	703.72	1.32E+00	4.42E-03	15.8	
14	0	510.81	4262	2991	3.29	1020.96	9.85E-01	2.47E-02	3.7	
15	0	569.13	251	1354	2.11	1137.50	9.05E-01	1.45E-03	30.1	
16	0	583.43	510	1563	2.90	1166.08	8.88E-01	2.95E-03	17.9	
17	0	609.29	640	1676	2.32	1217.76	8.59E-01	3.71E-03	13.8	
18	0	911.25	499	904	2.38	1821.50	6.38E-01	2.89E-03	15.5	
19	0	1063.39	163	412	1.41	2125.86	5.73E-01	9.42E-04	24.6	
20	0	1120.96	272	704	2.61	2241.07	5.52E-01	1.58E-03	23.9	
21	0	1460.76	2134	433	2.78	2921.39	4.59E-01	1.24E-02	3.4	
22	0	1763.83	356	211	2.51	3528.67	4.01E-01	2.06E-03	10.7	

Nuclide Line Activity Report
Nuclide Type: natural

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
K-40	1460.81	2134	10.67*	4.595E-01	6.810E+02	6.810E+02	6.73
RA-226	186.21	1773	3.28*	1.948E+00	4.339E+02	4.339E+02	20.07
AC-228	835.50	------	1.75	6.790E-01	------ Line Not Found		------
	911.07	499	27.70*	6.382E-01	4.412E+01	4.414E+01	30.94
TH-228	238.63	583	44.60*	1.725E+00	1.185E+01	1.186E+01	42.90
	240.98	------	3.95	1.714E+00	------ Line Not Found		------
TH-232	583.14	510	30.25	8.880E-01	2.971E+01	2.971E+01	35.84
	911.07	499	27.70*	6.382E-01	4.412E+01	4.412E+01	30.94
	969.11	------	16.60	6.111E-01	------ Line Not Found		------
U-235	143.76	232	10.50*	2.047E+00	1.686E+01	1.686E+01	111.63
	163.35	------	4.70	2.019E+00	------ Line Not Found		------

DRAFT

GAMMA SPECTROSCOPY

Initial Calibration

DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:29:41.63
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 27-FEB-2015 17:04:36.87

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

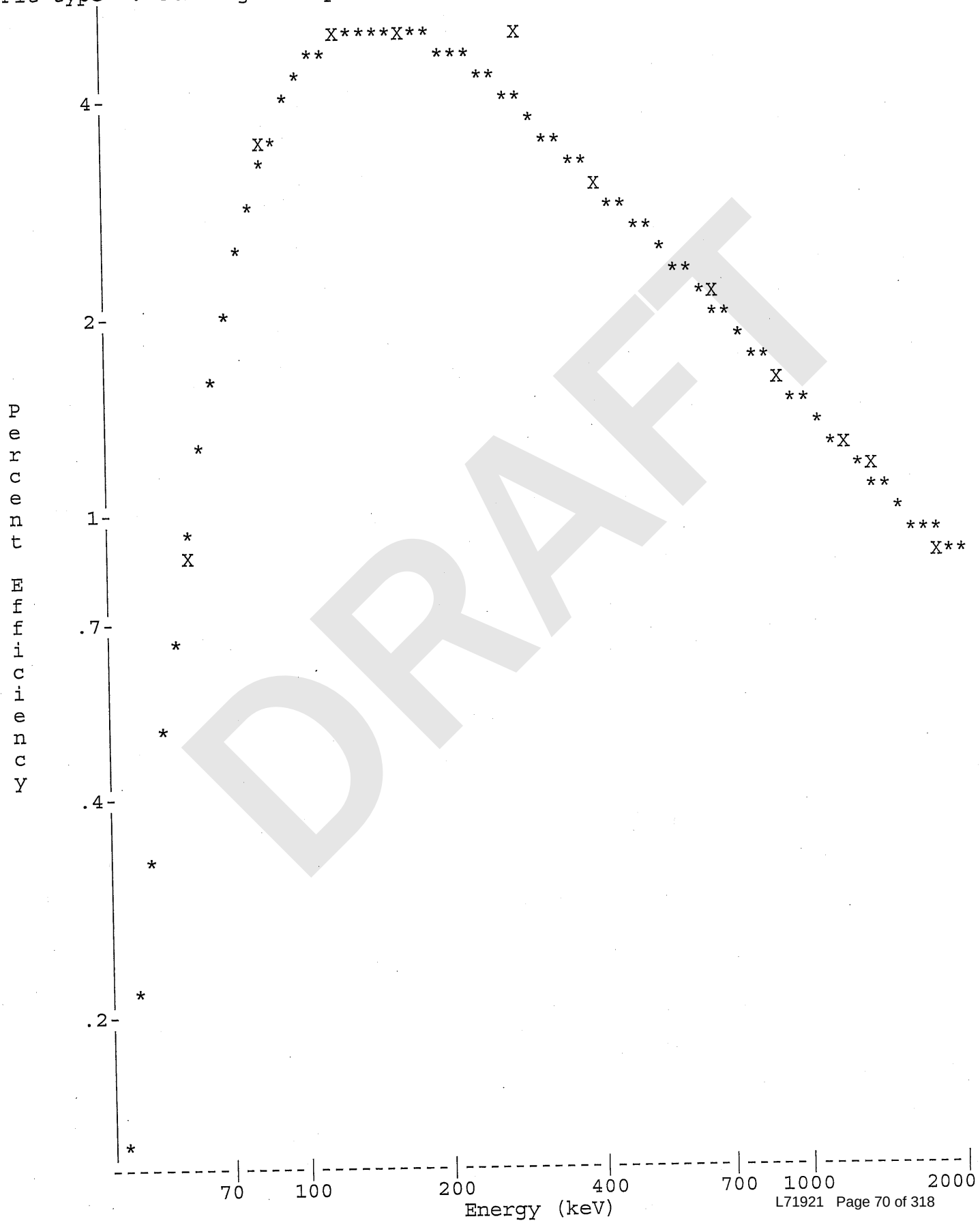
Sample ID : 01B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 90 Energy Tol : 1.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 01B150022715
BKGFILE : 01BG013015MT
Real Time : 0 16:36:40.47
Live time : 0 16:33:13.16

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.61	140132	68186	0.82	119.13	8.86E-01	2.35E+00	0.4	8.78E+01
2	1	66.49	1213	32230	0.82	132.86	1.47E+00	2.04E-02	22.2	2.44E+01
3	1	72.82	1569	36804	0.78	145.49	2.06E+00	2.63E-02	18.5	1.55E+00
4	1	75.00	2845	37880	0.63	149.85	2.26E+00	4.77E-02	10.4	9.87E-01
5	10	84.40	9621	92258	2.12	168.60	3.09E+00	1.61E-01	5.9	1.43E+02
6	10	85.89	10647	78357	1.61	171.56	3.22E+00	1.79E-01	7.3	
7	10	88.07	423098	33652	0.87	175.92	3.39E+00	7.10E+00	0.2	
8	1	122.11	208489	46655	0.87	243.83	4.96E+00	3.50E+00	0.3	3.12E+00
9	1	136.50	26688	36786	0.87	272.55	5.14E+00	4.48E-01	1.5	2.78E-01
10	1	165.88	104305	37605	0.92	331.17	5.10E+00	1.75E+00	0.5	2.16E+00
11	1	186.17	1120	20002	1.74	371.67	4.91E+00	1.88E-02	20.1	4.54E+00
12	1	255.15	2556	24264	1.08	509.32	4.15E+00	4.29E-02	10.7	3.58E-01
13	1	279.07	3456	24986	1.36	557.06	3.92E+00	5.80E-02	8.4	6.56E+00
14	1	310.47	549	15497	1.13	619.72	3.64E+00	9.21E-03	36.1	1.10E-01
15	1	391.58	58425	26029	1.14	781.63	3.08E+00	9.80E-01	0.7	3.23E+00
16	1	510.83	2930	19866	2.42	1019.66	2.53E+00	4.92E-02	9.5	1.87E+00
17	1	661.54	314668	23450	1.40	1320.55	2.06E+00	5.28E+00	0.2	1.08E+01
18	1	813.72	647	10680	1.44	1624.41	1.74E+00	1.08E-02	28.0	5.29E-01
19	1	821.43	1093	13269	1.92	1639.82	1.72E+00	1.83E-02	19.9	1.38E+00
20	1	898.07	58780	22504	1.61	1792.87	1.60E+00	9.86E-01	0.7	2.47E+00
21	1	1173.31	316433	13765	1.85	2342.66	1.27E+00	5.31E+00	0.2	2.45E+01
22	5	1325.85	1286	4577	3.17	2647.45	1.15E+00	2.16E-02	12.8	2.94E+01
23	5	1332.57	289049	2425	1.99	2660.87	1.15E+00	4.85E+00	0.2	
24	1	1835.93	36450	1540	2.37	3667.00	9.23E-01	6.12E-01	0.6	9.40E+00
25	1	1886.02	41	635	2.78	3767.15	9.11E-01	6.89E-04	123.5	1.98E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE01$1
Calib Date: 21-JUL-2015 11:29
Detector :
Fit type : 5th Degree Empirical
Geometry : 01B150022715



DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:39:29.88
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 27-FEB-2015 17:04:36.87

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 01B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 90 Energy Tol : 1.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 01B150022715
BKGFILE : 01BG013015MT
Real Time : 0 16:36:40.47
Live time : 0 16:33:13.16

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.61	140132	68186	0.82	119.13	8.86E-01	2.35E+00	0.4	8.78E+01
2	1	66.49*	1086	32230	0.82	132.86	1.47E+00	1.82E-02	25.2	2.44E+01
3	1	72.82*	1214	36804	0.78	145.49	2.06E+00	2.04E-02	24.1	1.55E+00
4	1	75.00*	2146	37880	0.63	149.85	2.26E+00	3.60E-02	14.0	9.87E-01
5	10	84.40*	9241	92258	2.12	168.60	3.09E+00	1.55E-01	6.2	1.43E+02
6	10	85.89	10647	78357	1.61	171.56	3.22E+00	1.79E-01	7.3	
7	10	88.07*	422940	33652	0.87	175.92	3.39E+00	7.10E+00	0.2	
8	1	122.11	208489	46655	0.87	243.83	4.96E+00	3.50E+00	0.3	3.12E+00
9	1	136.50	26688	36786	0.87	272.55	5.14E+00	4.48E-01	1.5	2.78E-01
10	1	165.88	104305	37605	0.92	331.17	5.10E+00	1.75E+00	0.5	2.16E+00
11	1	186.17*	436	20002	1.74	371.67	4.91E+00	7.32E-03	53.5	4.54E+00
12	1	255.15	2556	24264	1.08	509.32	4.15E+00	4.29E-02	10.7	3.58E-01
13	1	279.07	3456	24986	1.36	557.06	3.92E+00	5.80E-02	8.4	6.56E+00
14	1	310.47	549	15497	1.13	619.72	3.64E+00	9.21E-03	36.1	1.10E-01
15	1	391.58	58425	26029	1.14	781.63	3.08E+00	9.80E-01	0.7	3.23E+00
16	1	510.83*	935	19866	2.42	1019.66	2.53E+00	1.57E-02	30.8	1.87E+00
17	1	661.54	314668	23450	1.40	1320.55	2.06E+00	5.28E+00	0.2	1.08E+01
18	1	813.72	647	10680	1.44	1624.41	1.74E+00	1.08E-02	28.0	5.29E-01
19	1	821.43	1093	13269	1.92	1639.82	1.72E+00	1.83E-02	19.9	1.38E+00
20	1	898.07	58780	22504	1.61	1792.87	1.60E+00	9.86E-01	0.7	2.47E+00
21	1	1173.31	316433	13765	1.85	2342.66	1.27E+00	5.31E+00	0.2	2.45E+01
22	5	1325.85	1286	4577	3.17	2647.45	1.15E+00	2.16E-02	12.8	2.94E+01
23	5	1332.57	289049	2425	1.99	2660.87	1.15E+00	4.85E+00	0.2	
24	1	1835.93	36450	1540	2.37	3667.00	9.23E-01	6.12E-01	0.6	9.40E+00
25	1	1886.02	41	635	2.78	3767.15	9.11E-01	6.89E-04	123.5	1.98E+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
01-AM241	59.54	140132	35.90*	8.856E-01	7.396E+02	7.410E+02	0.88
02-CD109	88.03	422940	3.72*	3.386E+00	5.635E+03	1.061E+04	0.33
03-CO57	122.06	208489	85.51*	4.956E+00	8.255E+01	2.434E+02	0.59
04-CE139	165.85	104305	80.35*	5.098E+00	4.273E+01	3.587E+02	0.95
05-HG203	279.20	3456	81.46*	3.917E+00	1.817E+00	9.175E+01	16.80

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06-SN113	391.69	58425	64.90*	3.082E+00	4.901E+01	6.244E+02	1.35
08-CS137	661.65	314668	85.12*	2.061E+00	3.010E+02	3.091E+02	0.42
09-Y88	898.02	58780	93.40*	1.598E+00	6.607E+01	1.030E+03	1.36
10-CO60	1173.22	316433	100.00	1.272E+00	4.175E+02	4.861E+02	0.40
	1332.49	289049	100.00*	1.145E+00	4.235E+02	4.931E+02	0.38
12-Y88	1836.01	36450	99.38*	9.230E-01	6.668E+01	1.039E+03	1.20

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 01B150022715

Acquisition date : 27-FEB-2015 17:04:36

Total number of lines in spectrum	25	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	11	44.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	7.396E+02	7.410E+02	0.065E+02	0.88	
02-CD109	462.90D	1.88	5.635E+03	1.061E+04	0.004E+04	0.33	
03-CO57	270.90D	2.95	8.255E+01	2.434E+02	0.014E+02	0.59	
04-CE139	137.66D	8.40	4.273E+01	3.587E+02	0.034E+02	0.95	
05-HG203	46.61D	536.	1.817E+00	9.737E+02	1.636E+02	16.80	
06-SN113	115.10D	12.7	4.901E+01	6.244E+02	0.085E+02	1.35	
08-CS137	30.17Y	1.03	3.010E+02	3.091E+02	0.013E+02	0.42	
09-Y88	106.65D	15.6	6.607E+01	1.030E+03	0.014E+03	1.36	
10-CO60	5.27Y	1.16	4.235E+02	4.931E+02	0.019E+02	0.38	
12-Y88	106.65D	15.6	6.668E+01	1.039E+03	0.012E+03	1.20	
			---------	---------			
	Total Activity :		7.408E+03	1.642E+04			

Grand Total Activity : 7.408E+03 1.642E+04

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

DRAFT

Unidentified Energy Lines
Sample ID : 01B150022715

Acquisition date : 27-FEB-2015 17:04:36

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	66.49	1086	32230	0.82	132.86	131	5	1.82E-02	50.3	1.47E+00	
1	72.82	1214	36804	0.78	145.49	143	5	2.04E-02	48.2	2.06E+00	
1	75.00	2146	37880	0.63	149.85	148	5	3.60E-02	28.0	2.26E+00	
10	84.40	9241	92258	2.12	168.60	163	19	1.55E-01	12.3	3.09E+00	
10	85.89	10647	78357	1.61	171.56	163	19	1.79E-01	14.7	3.22E+00	
1	136.50	26688	36786	0.87	272.55	268	10	4.48E-01	3.0	5.14E+00	
1	186.17	436	20002	1.74	371.67	369	6	7.32E-03	****	4.91E+00	
1	255.15	2556	24264	1.08	509.32	506	8	4.29E-02	21.5	4.15E+00	
1	310.47	549	15497	1.13	619.72	618	6	9.21E-03	72.2	3.64E+00	
1	510.83	935	19866	2.42	1019.66	1015	11	1.57E-02	61.7	2.53E+00	
1	813.72	647	10680	1.44	1624.41	1621	8	1.08E-02	55.9	1.74E+00	
1	821.43	1093	13269	1.92	1639.82	1635	10	1.83E-02	39.9	1.72E+00	
5	1325.85	1286	4577	3.17	2647.45	2635	44	2.16E-02	25.7	1.15E+00	
1	1886.02	41	635	2.78	3767.15	3761	12	6.89E-04	****	9.11E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	25	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	11	44.00%

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
01-AM241	432.70Y	1.00	7.396E+02	7.410E+02	0.065E+02	0.88	
02-CD109	462.90D	1.88	5.635E+03	1.061E+04	0.004E+04	0.33	
03-CO57	270.90D	2.95	8.255E+01	2.434E+02	0.014E+02	0.59	
04-CE139	137.66D	8.40	4.273E+01	3.587E+02	0.034E+02	0.95	
05-HG203	46.61D	536.	1.817E+00	9.737E+02	1.636E+02	16.80	
06-SN113	115.10D	12.7	4.901E+01	6.244E+02	0.085E+02	1.35	
08-CS137	30.17Y	1.03	3.010E+02	3.091E+02	0.013E+02	0.42	
09-Y88	106.65D	15.6	6.607E+01	1.030E+03	0.014E+03	1.36	
10-CO60	5.27Y	1.16	4.235E+02	4.931E+02	0.019E+02	0.38	
12-Y88	106.65D	15.6	6.668E+01	1.039E+03	0.012E+03	1.20	
			---------	---------			
	Total Activity :		7.408E+03	1.642E+04			

Grand Total Activity : 7.408E+03 1.642E+04

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

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

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Nuclide	Activity (BQ/TOTAL)	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
01-AM241	7.410E+02	6.549E+00	4.348E+00	0.000E+00	170.409
02-CD109	1.061E+04	3.552E+01	2.127E+01	0.000E+00	498.779
03-CO57	2.434E+02	1.429E+00	8.647E-01	0.000E+00	281.463
04-CE139	3.587E+02	3.417E+00	2.273E+00	0.000E+00	157.849
05-HG203	9.737E+02	1.636E+02	1.816E+02	0.000E+00	5.361
06-SN113	6.244E+02	8.454E+00	6.664E+00	0.000E+00	93.702
08-CS137	3.091E+02	1.295E+00	5.231E-01	0.000E+00	590.894
09-Y88	1.030E+03	1.403E+01	1.041E+01	0.000E+00	98.894
10-CO60	4.931E+02	1.869E+00	3.975E-01	0.000E+00	1240.603
12-Y88	1.039E+03	1.244E+01	3.943E+00	0.000E+00	263.555

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	5.148E+01		2.450E+01	3.558E+01	0.000E+00	1.447

DRAFT

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A,01B150022715    ,07/21/2015 11:39,01/01/2014 12:00,   1.000E+00,B150 MIXED GAM
B,01B150022715    ,CALIBRATION         ,07/21/2015 11:29,01B150022715
C,01-AM241,YES,   7.410E+02,   6.549E+00,   4.348E+00,,  170.409
C,02-CD109,YES,   1.061E+04,   3.552E+01,   2.127E+01,,  498.779
C,03-CO57 ,YES,   2.434E+02,   1.429E+00,   8.647E-01,,  281.463
C,04-CE139,YES,   3.587E+02,   3.417E+00,   2.273E+00,,  157.849
C,05-HG203,YES,   9.737E+02,   1.636E+02,   1.816E+02,,    5.361
C,06-SN113,YES,   6.244E+02,   8.454E+00,   6.664E+00,,   93.702
C,08-CS137,YES,   3.091E+02,   1.295E+00,   5.231E-01,,  590.894
C,09-Y88  ,YES,   1.030E+03,   1.403E+01,   1.041E+01,,   98.894
C,10-CO60 ,YES,   4.931E+02,   1.869E+00,   3.975E-01,, 1240.603
C,12-Y88  ,YES,   1.039E+03,   1.244E+01,   3.943E+00,,  263.555
C,07-SR85 ,NO ,   5.148E+01,   2.450E+01,   3.558E+01,,    1.447
```

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-OCT-2011 15:49:45.83
TBE02 P-10712A HpGe ********** Aquisition Date/Time: 17-OCT-2011 16:43:59.80

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA STD

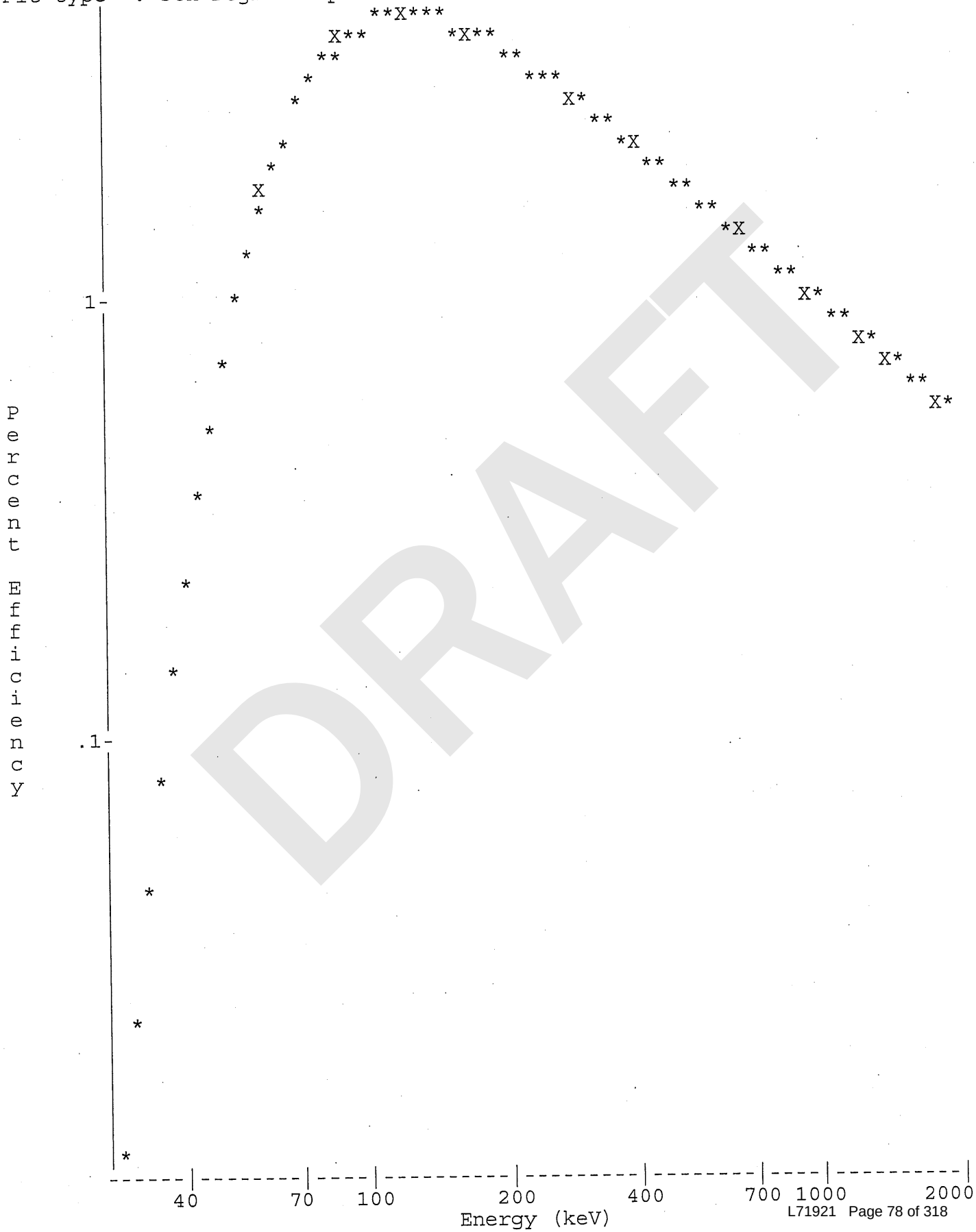
Sample ID : 02B150111711
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 02B150101711
BKGFILE : 02BG091611MT
Real Time : 0 15:33:33.25
Live time : 0 15:16:10.15

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	37.61	827	43862	0.90	58.45	1.55E-01	1.51E-02	40.2	7.35E-01
2	6	58.19	7925	62555	1.56	99.86	1.54E+00	1.44E-01	6.1	3.05E+00
3	6	59.46	119194	47386	0.92	102.43	1.66E+00	2.17E+00	0.4	
4	2	70.76	2590	34502	0.74	125.15	2.61E+00	4.71E-02	10.3	8.72E+00
5	2	72.82	6084	42950	0.77	129.30	2.76E+00	1.11E-01	5.3	
6	10	83.98	14864	130301	2.43	151.74	3.45E+00	2.70E-01	5.3	2.63E+02
7	10	85.82	18187	84209	1.67	155.46	3.54E+00	3.31E-01	3.5	
8	10	87.99	324636	43865	1.05	159.82	3.64E+00	5.91E+00	0.2	
9	1	92.96	2334	40271	1.35	169.82	3.84E+00	4.25E-02	14.5	1.35E+00
10	1	96.51	1170	33179	1.09	176.97	3.95E+00	2.13E-02	24.8	4.39E+00
11	7	117.84	3315	46448	1.91	219.89	4.28E+00	6.03E-02	11.1	1.14E+02
12	7	122.07	175715	32139	1.03	228.39	4.30E+00	3.20E+00	0.3	
13	1	136.49	22075	43383	1.01	257.40	4.27E+00	4.02E-01	1.9	4.40E+00
14	1	165.90	175190	57286	1.07	316.57	4.01E+00	3.19E+00	0.4	9.27E+01
15	1	170.94	1425	25109	1.31	326.73	3.96E+00	2.59E-02	18.7	1.33E+00
16	1	174.59	1093	20091	1.78	334.07	3.92E+00	1.99E-02	20.7	5.60E-01
17	1	255.18	5650	22216	1.23	496.22	3.06E+00	1.03E-01	4.9	4.22E+00
18	6	274.80	1462	22443	1.75	535.71	2.89E+00	2.66E-02	18.6	2.47E+01
19	6	279.24	96630	17346	1.17	544.63	2.86E+00	1.76E+00	0.4	
20	1	352.14	611	12774	1.34	691.32	2.37E+00	1.11E-02	32.3	8.87E-01
21	2	387.55	1383	15399	1.62	762.57	2.18E+00	2.52E-02	15.9	5.30E+01
22	2	391.74	118280	15458	1.29	771.01	2.16E+00	2.15E+00	0.3	
23	1	396.51	653	14308	1.31	780.61	2.14E+00	1.19E-02	32.1	9.26E-01
24	1	400.74	884	14560	1.83	789.12	2.12E+00	1.61E-02	24.9	1.02E+00
25	1	511.26	2843	15749	2.53	1011.50	1.72E+00	5.17E-02	9.3	1.06E+00
26	1	661.67	92901	24979	1.51	1314.17	1.36E+00	1.69E+00	0.5	2.56E+01
27	1	814.13	1931	8629	1.53	1620.98	1.13E+00	3.51E-02	9.6	5.30E-01
28	1	898.02	128112	23984	1.68	1789.79	1.03E+00	2.33E+00	0.4	2.93E+01
29	1	1173.17	97839	14991	1.88	2343.54	8.05E-01	1.78E+00	0.4	1.75E+01
30	5	1178.27	320	2127	1.12	2353.80	8.02E-01	5.83E-03	18.9	2.19E+00
31	5	1182.82	1288	5213	3.07	2362.95	7.99E-01	2.34E-02	11.9	
32	10	1328.11	7012	9934	5.14	2655.35	7.22E-01	1.28E-01	6.1	4.01E+01
33	10	1332.45	88398	3643	1.94	2664.10	7.20E-01	1.61E+00	0.4	
34	10	1335.60	3593	7493	4.26	2670.43	7.18E-01	6.54E-02	11.0	
35	10	1341.73	1524	3828	3.01	2682.76	7.15E-01	2.77E-02	9.5	
36	1	1836.03	75423	7835	2.37	3677.66	5.66E-01	1.37E+00	0.5	3.55E+01
37	1	1858.55	349	873	3.93	3722.98	5.62E-01	6.34E-03	19.2	2.02E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE02$1
Calib Date: 21-OCT-2011 15:49
Detector :
Geometry : 02B150101711
Fit type : 5th Degree Empirical



DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 2-NOV-2011 16:59:51.44
TBE02 P-10712A HpGe ********** Aquisition Date/Time: 17-OCT-2011 16:43:59.80

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA STD

Sample ID : 02B150101711
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 02B150101711
BKGFILE : 02BG101411MT
Real Time : 0 15:33:33.25
Live time : 0 15:16:10.15

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	37.61	827	43862	0.90	58.45	1.55E-01	1.51E-02	40.2	7.35E-01
2	6	58.19	7925	62555	1.56	99.86	1.54E+00	1.44E-01	6.1	3.05E+00
3	6	59.46	119194	47386	0.92	102.43	1.66E+00	2.17E+00	0.4	
4	2	70.76*	2222	34502	0.74	125.15	2.61E+00	4.04E-02	12.1	8.72E+00
5	2	72.82*	5717	42950	0.77	129.30	2.76E+00	1.04E-01	5.6	
6	10	83.98*	14511	130301	2.43	151.74	3.45E+00	2.64E-01	5.4	2.63E+02
7	10	85.82*	17835	84209	1.67	155.46	3.54E+00	3.24E-01	3.6	
8	10	87.99*	324482	43865	1.05	159.82	3.64E+00	5.90E+00	0.2	
9	1	92.96*	1895	40271	1.35	169.82	3.84E+00	3.45E-02	17.9	1.35E+00
10	1	96.51	1170	33179	1.09	176.97	3.95E+00	2.13E-02	24.8	4.39E+00
11	7	117.84	3315	46448	1.91	219.89	4.28E+00	6.03E-02	11.1	1.14E+02
12	7	122.07	175715	32139	1.03	228.39	4.30E+00	3.20E+00	0.3	
13	1	136.49	22075	43383	1.01	257.40	4.27E+00	4.02E-01	1.9	4.40E+00
14	1	165.90	175190	57286	1.07	316.57	4.01E+00	3.19E+00	0.4	9.27E+01
15	1	170.94	1425	25109	1.31	326.73	3.96E+00	2.59E-02	18.7	1.33E+00
16	1	174.59	1093	20091	1.78	334.07	3.92E+00	1.99E-02	20.7	5.60E-01
17	1	255.18	5650	22216	1.23	496.22	3.06E+00	1.03E-01	4.9	4.22E+00
18	6	274.80	1462	22443	1.75	535.71	2.89E+00	2.66E-02	18.6	2.47E+01
19	6	279.24	96630	17346	1.17	544.63	2.86E+00	1.76E+00	0.4	
20	2	387.55	1383	15399	1.62	762.57	2.18E+00	2.52E-02	15.9	5.30E+01
21	2	391.74	118280	15458	1.29	771.01	2.16E+00	2.15E+00	0.3	
22	1	396.51*	653	14308	1.31	780.61	2.14E+00	1.19E-02	32.1	9.26E-01
23	1	400.74	884	14560	1.83	789.12	2.12E+00	1.61E-02	24.9	1.02E+00
24	1	511.26*	1562	15749	2.53	1011.50	1.72E+00	2.84E-02	17.1	1.06E+00
25	1	661.67	92901	24979	1.51	1314.17	1.36E+00	1.69E+00	0.5	2.56E+01
26	1	814.13	1931	8629	1.53	1620.98	1.13E+00	3.51E-02	9.6	5.30E-01
27	1	898.02	128112	23984	1.68	1789.79	1.03E+00	2.33E+00	0.4	2.93E+01
28	1	1173.17	97839	14991	1.88	2343.54	8.05E-01	1.78E+00	0.4	1.75E+01
29	5	1178.27	320	2127	1.12	2353.80	8.02E-01	5.83E-03	18.9	2.19E+00
30	5	1182.82	1288	5213	3.07	2362.95	7.99E-01	2.34E-02	11.9	
31	10	1328.11	7012	9934	5.14	2655.35	7.22E-01	1.28E-01	6.1	4.01E+01
32	10	1332.45	88398	3643	1.94	2664.10	7.20E-01	1.61E+00	0.4	
33	10	1335.60	3593	7493	4.26	2670.43	7.18E-01	6.54E-02	11.0	
34	10	1341.73	1524	3828	3.01	2682.76	7.15E-01	2.77E-02	9.5	
35	1	1836.03	75423	7835	2.37	3677.66	5.66E-01	1.37E+00	0.5	3.55E+01
36	1	1858.55	349	873	3.93	3722.98	5.62E-01	6.34E-03	19.2	2.02E+00

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

Nuclide Line Activity Report

DRAFT

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	119194	35.90*	1.656E+00	3.646E+02	3.648E+02	0.83
02-CD109	88.03	324482	3.72*	3.643E+00	4.356E+03	5.125E+03	0.41
03-CO57	122.06	175715	85.51*	4.299E+00	8.695E+01	1.148E+02	0.58
04-CE139	165.85	175190	80.35*	4.014E+00	9.880E+01	1.706E+02	0.74
05-HG203	279.20	96630	81.46*	2.856E+00	7.556E+01	3.794E+02	0.79
06-SN113	391.69	118280	64.90*	2.163E+00	1.533E+02	2.947E+02	0.69
08-CS137	661.65	92901	85.12*	1.363E+00	1.456E+02	1.466E+02	0.99
09-Y88	898.02	128112	93.40*	1.029E+00	2.424E+02	4.908E+02	0.78
10-CO60	1173.22	97839	100.00	8.051E-01	2.211E+02	2.299E+02	0.86
	1332.49	88398	100.00*	7.197E-01	2.234E+02	2.323E+02	0.74
12-Y88	1836.01	75423	99.38*	5.656E-01	2.441E+02	4.941E+02	0.95

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 02B150101711

Acquisition date : 17-OCT-2011 16:43:59

Total number of lines in spectrum	36	
Number of unidentified lines	25	
Number of lines tentatively identified by NID	11	30.56%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.646E+02	3.648E+02	0.030E+02	0.83	
02-CD109	462.90D	1.18	4.356E+03	5.125E+03	0.021E+03	0.41	
03-CO57	270.90D	1.32	8.695E+01	1.148E+02	0.007E+02	0.58	
04-CE139	137.66D	1.73	9.880E+01	1.706E+02	0.013E+02	0.74	
05-HG203	46.61D	5.02	7.556E+01	3.794E+02	0.030E+02	0.79	
06-SN113	115.10D	1.92	1.533E+02	2.947E+02	0.020E+02	0.69	
08-CS137	30.17Y	1.01	1.456E+02	1.466E+02	0.015E+02	0.99	
09-Y88	106.65D	2.02	2.424E+02	4.908E+02	0.038E+02	0.78	
10-CO60	5.27Y	1.04	2.234E+02	2.323E+02	0.017E+02	0.74	
12-Y88	106.65D	2.02	2.441E+02	4.941E+02	0.047E+02	0.95	
			---------	---------			
Total Activity :			5.991E+03	7.813E+03			

Grand Total Activity : 5.991E+03 7.813E+03

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

DRAFT

Unidentified Energy Lines
Sample ID : 02B150101711

Acquisition date : 17-OCT-2011 16:43:59

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	37.61	827	43862	0.90	58.45	56	6	1.51E-02	80.4	1.55E-01	
6	58.19	7925	62555	1.56	99.86	96	14	1.44E-01	12.2	1.54E+00	
2	70.76	2222	34502	0.74	125.15	122	11	4.04E-02	24.1	2.61E+00	
2	72.82	5717	42950	0.77	129.30	122	11	1.04E-01	11.2	2.76E+00	
10	83.98	14511	130301	2.43	151.74	144	24	2.64E-01	10.8	3.45E+00	
10	85.82	17835	84209	1.67	155.46	144	24	3.24E-01	7.2	3.54E+00	
1	92.96	1895	40271	1.35	169.82	167	7	3.45E-02	35.8	3.84E+00	
1	96.51	1170	33179	1.09	176.97	175	6	2.13E-02	49.5	3.95E+00	
7	117.84	3315	46448	1.91	219.89	216	19	6.03E-02	22.3	4.28E+00	
1	136.49	22075	43383	1.01	257.40	253	10	4.02E-01	3.8	4.27E+00	
1	170.94	1425	25109	1.31	326.73	324	7	2.59E-02	37.4	3.96E+00	
1	174.59	1093	20091	1.78	334.07	332	6	1.99E-02	41.5	3.92E+00	
1	255.18	5650	22216	1.23	496.22	492	9	1.03E-01	9.9	3.06E+00	
6	274.80	1462	22443	1.75	535.71	531	20	2.66E-02	37.2	2.89E+00	
2	387.55	1383	15399	1.62	762.57	759	20	2.52E-02	31.8	2.18E+00	
1	396.51	653	14308	1.31	780.61	778	8	1.19E-02	64.1	2.14E+00	
1	400.74	884	14560	1.83	789.12	785	9	1.61E-02	49.7	2.12E+00	
1	511.26	1562	15749	2.53	1011.50	1005	13	2.84E-02	34.1	1.72E+00	
1	814.13	1931	8629	1.53	1620.98	1616	11	3.51E-02	19.2	1.13E+00	
5	1178.27	320	2127	1.12	2353.80	2352	17	5.83E-03	37.7	8.02E-01	
5	1182.82	1288	5213	3.07	2362.95	2352	17	2.34E-02	23.9	7.99E-01	
10	1328.11	7012	9934	5.14	2655.35	2639	51	1.28E-01	12.2	7.22E-01	
10	1335.60	3593	7493	4.26	2670.43	2639	51	6.54E-02	22.0	7.18E-01	
10	1341.73	1524	3828	3.01	2682.76	2639	51	2.77E-02	19.0	7.15E-01	
1	1858.55	349	873	3.93	3722.98	3717	14	6.34E-03	38.4	5.62E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	36	
Number of unidentified lines	25	
Number of lines tentatively identified by NID	11	30.56%

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
01-AM241	432.70Y	1.00	3.646E+02	3.648E+02	0.030E+02	0.83	
02-CD109	462.90D	1.18	4.356E+03	5.125E+03	0.021E+03	0.41	
03-CO57	270.90D	1.32	8.695E+01	1.148E+02	0.007E+02	0.58	
04-CE139	137.66D	1.73	9.880E+01	1.706E+02	0.013E+02	0.74	
05-HG203	46.61D	5.02	7.556E+01	3.794E+02	0.030E+02	0.79	
06-SN113	115.10D	1.92	1.533E+02	2.947E+02	0.020E+02	0.69	
08-CS137	30.17Y	1.01	1.456E+02	1.466E+02	0.015E+02	0.99	
09-Y88	106.65D	2.02	2.424E+02	4.908E+02	0.038E+02	0.78	
10-CO60	5.27Y	1.04	2.224E+02	2.313E+02	0.013E+02	0.56	
12-Y88	106.65D	2.02	2.441E+02	4.941E+02	0.047E+02	0.95	
	Total Activity :		5.990E+03	7.812E+03			
	Grand Total Activity :		5.990E+03	7.812E+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
01-AM241	3.648E+02	3.034E+00	2.963E+00	0.000E+00	123.130
02-CD109	5.125E+03	2.093E+01	1.590E+01	0.000E+00	322.340
03-CO57	1.148E+02	6.634E-01	5.501E-01	0.000E+00	208.649
04-CE139	1.706E+02	1.267E+00	7.937E-01	0.000E+00	215.005
05-HG203	3.794E+02	2.992E+00	2.451E+00	0.000E+00	154.786
06-SN113	2.947E+02	2.031E+00	1.454E+00	0.000E+00	202.673
08-CS137	1.466E+02	1.456E+00	9.101E-01	0.000E+00	161.113
09-Y88	4.908E+02	3.828E+00	2.146E+00	0.000E+00	228.678
10-CO60	2.313E+02	1.304E+00	7.374E-01	0.000E+00	313.640
12-Y88	4.941E+02	4.675E+00	1.913E+00	0.000E+00	258.262

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	3.689E+00		1.171E+00	1.692E+00	0.000E+00	2.181

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A,02B150101711    ,11/02/2011 16:59,07/01/2011 12:00,   1.000E+00,B150 MIXED GAM
B,02B150101711    ,CALIBRATION          ,10/21/2011 15:49,02B150101711
C,01-AM241,YES,   3.648E+02,   3.034E+00,   2.963E+00,,  123.130
C,02-CD109,YES,   5.125E+03,   2.093E+01,   1.590E+01,,  322.340
C,03-CO57 ,YES,   1.148E+02,   6.634E-01,   5.501E-01,,  208.649
C,04-CE139,YES,   1.706E+02,   1.267E+00,   7.937E-01,,  215.005
C,05-HG203,YES,   3.794E+02,   2.992E+00,   2.451E+00,,  154.786
C,06-SN113,YES,   2.947E+02,   2.031E+00,   1.454E+00,,  202.673
C,08-CS137,YES,   1.466E+02,   1.456E+00,   9.101E-01,,  161.113
C,09-Y88  ,YES,   4.908E+02,   3.828E+00,   2.146E+00,,  228.678
C,10-CO60 ,YES,   2.313E+02,   1.304E+00,   7.374E-01,,  313.640
C,12-Y88  ,YES,   4.941E+02,   4.675E+00,   1.913E+00,,  258.262
C,07-SR85 ,NO ,   3.689E+00,   1.171E+00,   1.692E+00,,    2.181
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DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 31-JAN-2012 16:42:57.23
TBE06 P-30563 HpGe ********** Aquisition Date/Time: 19-JAN-2012 17:45:12.85

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA
Sample ID : 06B150011912 Smple Date: 1-JUL-2011 12:00:00.00
Sample Type : CAL Geometry : 06B150011912
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 40 Energy Tol : 1.00000 Real Time : 0 15:52:22.09
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 15:50:39.36
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	65429	42879	0.87	119.69	8.75E-01	1.15E+00	0.7	5.47E+01
2	6	72.79	1917	18039	0.68	146.34	1.86E+00	3.36E-02	10.1	4.39E+00
3	6	74.89	2561	22475	0.79	150.53	2.01E+00	4.49E-02	9.0	
4	10	85.90	7813	61801	2.09	172.57	2.75E+00	1.37E-01	8.9	3.36E+01
5	10	88.01	227351	20657	0.85	176.78	2.87E+00	3.99E+00	0.2	
6	1	122.06	131424	30969	0.88	244.94	3.93E+00	2.30E+00	0.4	3.57E+00
7	1	136.48	16627	20063	0.90	273.81	4.01E+00	2.91E-01	1.7	7.26E-01
8	1	165.88	110015	24859	0.92	332.64	3.87E+00	1.93E+00	0.4	2.47E+00
9	1	185.92	595	13408	1.07	372.76	3.67E+00	1.04E-02	32.5	1.82E+00
10	1	255.15	3272	14970	1.17	511.32	2.96E+00	5.74E-02	7.0	1.76E+00
11	1	279.24	23787	15067	1.02	559.52	2.75E+00	4.17E-01	1.2	8.97E-01
12	1	310.05	479	9291	1.37	621.17	2.52E+00	8.39E-03	33.7	1.63E+00
13	1	351.89	637	8741	1.33	704.91	2.26E+00	1.12E-02	24.6	1.60E+00
14	1	391.75	65917	11605	1.13	784.68	2.06E+00	1.16E+00	0.5	1.14E+00
15	1	511.22	2330	11572	2.49	1023.72	1.63E+00	4.08E-02	9.7	1.06E+00
16	1	609.28	670	5445	1.14	1219.92	1.40E+00	1.17E-02	18.7	1.47E+00
17	1	661.63	92365	11119	1.37	1324.65	1.30E+00	1.62E+00	0.4	1.11E+00
18	1	813.98	1320	6062	1.58	1629.43	1.09E+00	2.31E-02	11.4	7.13E-01
19	1	898.00	69933	11193	1.57	1797.51	9.96E-01	1.23E+00	0.5	1.67E+00
20	1	1173.20	95973	5294	1.76	2347.91	7.87E-01	1.68E+00	0.4	2.02E+00
21	5	1324.99	1493	2920	2.96	2651.44	7.08E-01	2.62E-02	9.0	9.17E-01
22	5	1332.48	86099	1826	1.86	2666.42	7.04E-01	1.51E+00	0.4	
23	1	1460.66	388	1702	1.72	2922.70	6.51E-01	6.80E-03	21.2	7.80E-01
24	1	1836.02	40905	815	2.16	3673.05	5.44E-01	7.17E-01	0.5	1.40E+00

Nuclide Line Activity Report
Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	65429	35.90*	8.746E-01	3.653E+02	3.656E+02	1.46
02-CD109	88.03	227351	3.72*	2.867E+00	3.738E+03	5.062E+03	0.46
03-CO57	122.06	131424	85.51*	3.933E+00	6.851E+01	1.150E+02	0.75
04-CE139	165.85	110015	80.35*	3.869E+00	6.204E+01	1.721E+02	0.82
05-HG203	279.20	23787	81.46*	2.752E+00	1.861E+01	3.783E+02	2.33
06-SN113	391.69	65917	64.90*	2.059E+00	8.649E+01	2.929E+02	0.99
08-CS137	661.65	92365	85.12*	1.302E+00	1.461E+02	1.480E+02	0.81
09-Y88	898.02	69933	93.40*	9.959E-01	1.318E+02	4.917E+02	1.02
10-CO60	1173.22	95973	100.00	7.868E-01	2.139E+02	2.300E+02	0.73

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	1332.49	86099	100.00*	7.043E-01	2.143E+02	2.305E+02	0.71
12-Y88	1836.01	40905	99.38*	5.437E-01	1.327E+02	4.952E+02	1.05

Flag: "*" = Keyline

Summary of Nuclide Activity
Sample ID : 06B150011912 Acquisition date : 19-JAN-2012 17:45:12

Total number of lines in spectrum	24	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	11	45.83%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.653E+02	3.656E+02	0.053E+02	1.46	
02-CD109	462.90D	1.35	3.738E+03	5.062E+03	0.023E+03	0.46	
03-CO57	270.90D	1.68	6.851E+01	1.150E+02	0.009E+02	0.75	
04-CE139	137.66D	2.77	6.204E+01	1.721E+02	0.014E+02	0.82	
05-HG203	46.61D	20.3	1.861E+01	3.783E+02	0.088E+02	2.33	
06-SN113	115.10D	3.39	8.649E+01	2.929E+02	0.029E+02	0.99	
08-CS137	30.17Y	1.01	1.461E+02	1.480E+02	0.012E+02	0.81	
09-Y88	106.65D	3.73	1.318E+02	4.917E+02	0.050E+02	1.02	
10-CO60	5.27Y	1.08	2.143E+02	2.305E+02	0.016E+02	0.71	
12-Y88	106.65D	3.73	1.327E+02	4.952E+02	0.052E+02	1.05	
			---------	---------			
	Total Activity :		4.964E+03	7.752E+03			
	Grand Total Activity :		4.964E+03	7.752E+03			

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

Unidentified Energy Lines
Sample ID : 06B150011912 Acquisition date : 19-JAN-2012 17:45:12

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
6	72.79	1917	18039	0.68	146.34	144	10	3.36E-02	20.3	1.86E+00	
6	74.89	2561	22475	0.79	150.53	144	10	4.49E-02	18.0	2.01E+00	
10	85.90	7813	61801	2.09	172.57	165	19	1.37E-01	17.7	2.75E+00	
1	136.48	16627	20063	0.90	273.81	270	8	2.91E-01	3.3	4.01E+00	
1	185.92	595	13408	1.07	372.76	370	7	1.04E-02	65.0	3.67E+00	
1	255.15	3272	14970	1.17	511.32	507	9	5.74E-02	13.9	2.96E+00	
1	310.05	479	9291	1.37	621.17	619	7	8.39E-03	67.3	2.52E+00	
1	351.89	637	8741	1.33	704.91	702	7	1.12E-02	49.2	2.26E+00	
1	511.22	2330	11572	2.49	1023.72	1018	13	4.08E-02	19.5	1.63E+00	
1	609.28	670	5445	1.14	1219.92	1217	7	1.17E-02	37.3	1.40E+00	
1	813.98	1320	6062	1.58	1629.43	1625	10	2.31E-02	22.7	1.09E+00	
5	1324.99	1493	2920	2.96	2651.44	2642	34	2.62E-02	17.9	7.08E-01	
1	1460.66	388	1702	1.72	2922.70	2918	11	6.80E-03	42.5	6.51E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	24	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	11	45.83%

Nuclide Type :

Wtd Mean Wtd Mean

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Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.653E+02	3.656E+02	0.053E+02	1.46	
02-CD109	462.90D	1.35	3.738E+03	5.062E+03	0.023E+03	0.46	
03-CO57	270.90D	1.68	6.851E+01	1.150E+02	0.009E+02	0.75	
04-CE139	137.66D	2.77	6.204E+01	1.721E+02	0.014E+02	0.82	
05-HG203	46.61D	20.3	1.861E+01	3.783E+02	0.088E+02	2.33	
06-SN113	115.10D	3.39	8.649E+01	2.929E+02	0.029E+02	0.99	
08-CS137	30.17Y	1.01	1.461E+02	1.480E+02	0.012E+02	0.81	
09-Y88	106.65D	3.73	1.318E+02	4.917E+02	0.050E+02	1.02	
10-CO60	5.27Y	1.08	2.141E+02	2.303E+02	0.012E+02	0.51	
12-Y88	106.65D	3.73	1.327E+02	4.952E+02	0.052E+02	1.05	
			---------	---------			
	Total Activity :		4.963E+03	7.751E+03			
	Grand Total Activity :		4.963E+03	7.751E+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
01-AM241	3.656E+02	5.333E+00	3.423E+00	0.000E+00	106.821
02-CD109	5.062E+03	2.344E+01	1.480E+01	0.000E+00	341.990
03-CO57	1.150E+02	8.576E-01	5.189E-01	0.000E+00	221.718
04-CE139	1.721E+02	1.414E+00	8.222E-01	0.000E+00	209.248
05-HG203	3.783E+02	8.801E+00	7.372E+00	0.000E+00	51.324
06-SN113	2.929E+02	2.904E+00	1.902E+00	0.000E+00	154.050
08-CS137	1.480E+02	1.199E+00	6.319E-01	0.000E+00	234.189
09-Y88	4.917E+02	4.999E+00	2.646E+00	0.000E+00	185.866
10-CO60	2.303E+02	1.172E+00	5.239E-01	0.000E+00	439.594
12-Y88	4.952E+02	5.193E+00	1.246E+00	0.000E+00	397.528

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	4.417E+00		2.570E+00	3.792E+00	0.000E+00	1.165

A,06B150011912 ,01/31/2012 16:42,07/01/2011 12:00, 1.000E+00,150ML POLY BOTTLE MI,CAL
,BQ ,
B,06B150011912 ,CALIBRATION ,01/27/2012 12:57,06B150011912 ,NOBKG

C,01-AM241,YES, 3.656E+02, 5.333E+00, 3.423E+00,, 106.821
C,02-CD109,YES, 5.062E+03, 2.344E+01, 1.480E+01,, 341.990
C,03-CO57 ,YES, 1.150E+02, 8.576E-01, 5.189E-01,, 221.718
C,04-CE139,YES, 1.721E+02, 1.414E+00, 8.222E-01,, 209.248
C,05-HG203,YES, 3.783E+02, 8.801E+00, 7.372E+00,, 51.324
C,06-SN113,YES, 2.929E+02, 2.904E+00, 1.902E+00,, 154.050
C,08-CS137,YES, 1.480E+02, 1.199E+00, 6.319E-01,, 234.189
C,09-Y88 ,YES, 4.917E+02, 4.999E+00, 2.646E+00,, 185.866
C,10-CO60 ,YES, 2.303E+02, 1.172E+00, 5.239E-01,, 439.594
C,12-Y88 ,YES, 4.952E+02, 5.193E+00, 1.246E+00,, 397.528

DRAFT

ANALYTICS 85679-396 Mixed Gamma
7/1/11 12:00 PM

B150101011

		Orig. Wt	5.3103	Volume	50				
		Wt Diluted	5.2792	Aliquot	2.0000	Certificate	Aliquoted	Actual	Percent
Nuclide	Half-Life	Energy(KeV)	Rate	%err	%abn	Bq/Tot	G/S	Bq/Tot	Diff
Am-241	432.2y	59.5	3288		35.90%	364.20	130.75	365.0	0.22%
Cd-109	462.9d	88.0	4677		3.72%	4999.54	185.98	5077.0	1.55%
Co-57	271.8d	122.1	2499		85.51%	116.21	99.37	116.0	-0.18%
Ce-139	137.64d	165.9	3476		80.35%	172.03	138.22	171.0	-0.60%
Hg-203	46.6d	279.2	7682		77.30%	395.19	305.48	377.0	-4.60%
Sn-113	115.09d	391.7	4825		64.90%	295.64	191.87	296.0	0.12%
Cs-137	30.17y	661.6	3119		85.12%	145.71	124.03	146.0	0.20%
Y-88	106.65d	898.0	11710		93.40%	498.56	465.65	492.0	-1.32%
Co-60	5.27y	1173.2	5770		100.00%	229.45	229.45	230.0	0.24%
Co-60	5.27y	1332.5	5770		100.00%	229.45	229.45	232.0	1.11%
Y-88	106.65d	1836.0	12400		99.38%	496.17	493.09	494.0	-0.44%

Eff. Name: **07B150101811**

Analyst: KOJ

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 11-NOV-2011 11:30:10.84
TBE07 P-10768B HpGe ********** Aquisition Date/Time: 18-OCT-2011 10:16:05.22

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

Sample ID : 07B150101811
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

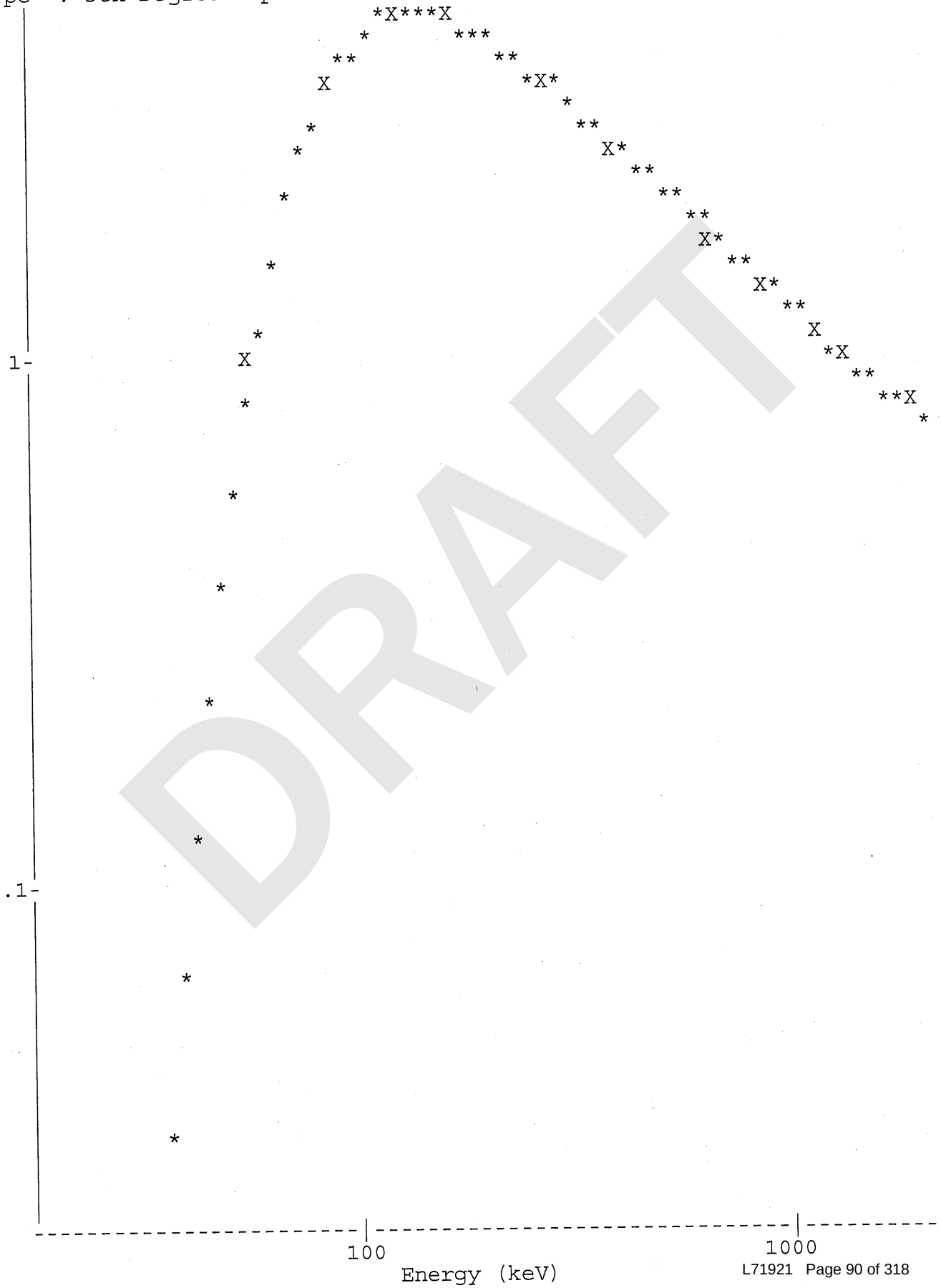
Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 07B150101811
BKGFILE : NOBKG
Real Time : 0 04:14:04.05
Live time : 0 04:13:08.20

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	20110	19589	1.21	119.65	1.01E+00	1.32E+00	1.6	1.35E+01
2	1	72.87	1103	12312	0.78	146.45	2.14E+00	7.26E-02	16.1	3.99E+00
3	1	75.09	745	9518	0.75	150.91	2.33E+00	4.91E-02	20.0	5.56E+00
4	1	88.05	80367	21925	1.19	176.86	3.30E+00	5.29E+00	0.5	2.16E+00
5	1	122.07	51737	15743	1.23	244.99	4.55E+00	3.41E+00	0.7	6.37E+00
6	1	136.49	6853	12354	1.27	273.86	4.67E+00	4.51E-01	3.4	4.84E-01
7	1	165.87	55036	12305	1.25	332.70	4.57E+00	3.62E+00	0.6	2.23E+00
8	1	255.12	1846	6784	1.33	511.41	3.66E+00	1.22E-01	8.7	3.17E-01
9	1	279.19	31790	7138	1.35	559.61	3.44E+00	2.09E+00	0.8	4.34E+00
10	1	391.69	40645	5938	1.44	784.86	2.69E+00	2.68E+00	0.6	2.60E+00
11	1	511.09	1190	4702	2.70	1023.92	2.19E+00	7.84E-02	12.2	1.25E+00
12	1	661.65	33655	5477	1.63	1325.33	1.79E+00	2.22E+00	0.7	1.32E+00
13	1	813.86	630	2245	1.88	1630.04	1.52E+00	4.15E-02	14.6	1.42E+00
14	1	898.03	48212	3990	1.81	1798.51	1.40E+00	3.17E+00	0.5	4.09E+00
15	1	1173.22	37966	2291	2.03	2349.31	1.13E+00	2.50E+00	0.6	5.11E+00
16	6	1325.22	1183	1469	3.80	2653.52	1.03E+00	7.79E-02	9.1	6.06E+00
17	6	1332.48	34658	996	2.16	2668.04	1.02E+00	2.28E+00	0.6	
18	1	1836.01	30490	449	2.56	3675.54	8.30E-01	2.01E+00	0.6	9.69E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE07$1
Calib Date: 11-NOV-2011 11:30
Detector :
Fit type : 5th Degree Empirical

Geometry : 07B150101811



DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 6-DEC-2011 15:51:48.27
TBE07 P-10768B HpGe ********** Aquisition Date/Time: 18-OCT-2011 10:16:05.22

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

Sample ID : 07B150101811
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 07B150101811
BKGFILE : NOBKG
Real Time : 0 04:14:04.05
Live time : 0 04:13:08.20

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.48	20110	19589	1.21	119.65	1.01E+00	1.32E+00	1.6	1.35E+01
2	1	72.87	1103	12312	0.78	146.45	2.14E+00	7.26E-02	16.1	3.99E+00
3	1	75.09	745	9518	0.75	150.91	2.33E+00	4.91E-02	20.0	5.56E+00
4	1	88.05	80367	21925	1.19	176.86	3.30E+00	5.29E+00	0.5	2.16E+00
5	1	122.07	51737	15743	1.23	244.99	4.55E+00	3.41E+00	0.7	6.37E+00
6	1	136.49	6853	12354	1.27	273.86	4.67E+00	4.51E-01	3.4	4.84E-01
7	1	165.87	55036	12305	1.25	332.70	4.57E+00	3.62E+00	0.6	2.23E+00
8	1	255.12	1846	6784	1.33	511.41	3.66E+00	1.22E-01	8.7	3.17E-01
9	1	279.19	31790	7138	1.35	559.61	3.44E+00	2.09E+00	0.8	4.34E+00
10	1	391.69	40645	5938	1.44	784.86	2.69E+00	2.68E+00	0.6	2.60E+00
11	1	511.09	1190	4702	2.70	1023.92	2.19E+00	7.84E-02	12.2	1.25E+00
12	1	661.65	33655	5477	1.63	1325.33	1.79E+00	2.22E+00	0.7	1.32E+00
13	1	813.86	630	2245	1.88	1630.04	1.52E+00	4.15E-02	14.6	1.42E+00
14	1	898.03	48212	3990	1.81	1798.51	1.40E+00	3.17E+00	0.5	4.09E+00
15	1	1173.22	37966	2291	2.03	2349.31	1.13E+00	2.50E+00	0.6	5.11E+00
16	6	1325.22	1183	1469	3.80	2653.52	1.03E+00	7.79E-02	9.1	6.06E+00
17	6	1332.48	34658	996	2.16	2668.04	1.02E+00	2.28E+00	0.6	
18	1	1836.01	30490	449	2.56	3675.54	8.30E-01	2.01E+00	0.6	9.69E+00

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	20110	35.90*	1.011E+00	3.649E+02	3.651E+02	3.13
02-CD109	88.03	80367	3.72*	3.298E+00	4.312E+03	5.077E+03	1.04
03-CO57	122.06	51737	85.51*	4.554E+00	8.747E+01	1.156E+02	1.31
04-CE139	165.85	55036	80.35*	4.572E+00	9.865E+01	1.708E+02	1.17
05-HG203	279.20	31790	81.46*	3.444E+00	7.461E+01	3.774E+02	1.55
06-SN113	391.69	40645	64.90*	2.688E+00	1.534E+02	2.958E+02	1.26
08-CS137	661.65	33655	85.12*	1.794E+00	1.451E+02	1.461E+02	1.45
09-Y88	898.02	48212	93.40*	1.404E+00	2.421E+02	4.918E+02	1.09
10-CO60	1173.22	37966	100.00	1.131E+00	2.211E+02	2.299E+02	1.19
	1332.49	34658	100.00*	1.024E+00	2.228E+02	2.317E+02	1.14
12-Y88	1836.01	30490	99.38*	8.297E-01	2.435E+02	4.945E+02	1.20

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 07B150101811

Acquisition date : 18-OCT-2011 10:16:05

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.649E+02	3.651E+02	0.114E+02	3.13	
02-CD109	462.90D	1.18	4.312E+03	5.077E+03	0.053E+03	1.04	
03-CO57	270.90D	1.32	8.747E+01	1.156E+02	0.015E+02	1.31	
04-CE139	137.66D	1.73	9.865E+01	1.708E+02	0.020E+02	1.17	
05-HG203	46.61D	5.06	7.461E+01	3.774E+02	0.058E+02	1.55	
06-SN113	115.10D	1.93	1.534E+02	2.958E+02	0.037E+02	1.26	
08-CS137	30.17Y	1.01	1.451E+02	1.461E+02	0.021E+02	1.45	
09-Y88	106.65D	2.03	2.421E+02	4.918E+02	0.053E+02	1.09	
10-CO60	5.27Y	1.04	2.228E+02	2.317E+02	0.026E+02	1.14	
12-Y88	106.65D	2.03	2.435E+02	4.945E+02	0.059E+02	1.20	
			---------	---------			
	Total Activity :		5.945E+03	7.766E+03			

Grand Total Activity : 5.945E+03 7.766E+03

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

DRAFT

Unidentified Energy Lines
Sample ID : 07B150101811 Acquisition date : 18-OCT-2011 10:16:05

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.87	1103	12312	0.78	146.45	144	6	7.26E-02	32.2	2.14E+00	
1	75.09	745	9518	0.75	150.91	149	5	4.91E-02	40.1	2.33E+00	
1	136.49	6853	12354	1.27	273.86	269	11	4.51E-01	6.7	4.67E+00	
1	255.12	1846	6784	1.33	511.41	507	10	1.22E-01	17.3	3.66E+00	
1	511.09	1190	4702	2.70	1023.92	1017	13	7.84E-02	24.5	2.19E+00	
1	813.86	630	2245	1.88	1630.04	1625	10	4.15E-02	29.2	1.52E+00	
6	1325.22	1183	1469	3.80	2653.52	2643	34	7.79E-02	18.1	1.03E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	18	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	11	61.11%

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
01-AM241	432.70Y	1.00	3.649E+02	3.651E+02	0.114E+02	3.13	
02-CD109	462.90D	1.18	4.312E+03	5.077E+03	0.053E+03	1.04	
03-CO57	270.90D	1.32	8.747E+01	1.156E+02	0.015E+02	1.31	
04-CE139	137.66D	1.73	9.865E+01	1.708E+02	0.020E+02	1.17	
05-HG203	46.61D	5.06	7.461E+01	3.774E+02	0.058E+02	1.55	
06-SN113	115.10D	1.93	1.534E+02	2.958E+02	0.037E+02	1.26	
08-CS137	30.17Y	1.01	1.451E+02	1.461E+02	0.021E+02	1.45	
09-Y88	106.65D	2.03	2.421E+02	4.918E+02	0.053E+02	1.09	
10-CO60	5.27Y	1.04	2.220E+02	2.309E+02	0.019E+02	0.82	
12-Y88	106.65D	2.03	2.435E+02	4.945E+02	0.059E+02	1.20	
			---------	---------			
	Total Activity :		5.944E+03	7.765E+03			

Grand Total Activity : 5.944E+03 7.765E+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
01-AM241	3.651E+02	1.144E+01	8.619E+00	0.000E+00	42.358
02-CD109	5.077E+03	5.272E+01	3.405E+01	0.000E+00	149.106
03-CO57	1.156E+02	1.513E+00	1.009E+00	0.000E+00	114.567

04-CE139	1.708E+02	2.005E+00	1.252E+00	0.000E+00	136.400
05-HG203	3.774E+02	5.844E+00	3.974E+00	0.000E+00	94.971
06-SN113	2.958E+02	3.741E+00	2.171E+00	0.000E+00	136.269
08-CS137	1.461E+02	2.125E+00	1.246E+00	0.000E+00	117.252
09-Y88	4.918E+02	5.338E+00	2.592E+00	0.000E+00	189.755
10-CO60	2.309E+02	1.897E+00	9.936E-01	0.000E+00	232.343
12-Y88	4.945E+02	5.949E+00	1.383E+00	0.000E+00	357.416

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	4.590E+00		1.896E+00	2.825E+00	0.000E+00	1.625

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A,07B150101811     ,12/06/2011 15:51,07/01/2011 12:00,   1.000E+00,150ML POLY BOT
B,07B150101811     ,CALIBRATION         ,11/11/2011 11:30,07B150101811
C,01-AM241,YES,    3.651E+02,   1.144E+01,   8.619E+00,,   42.358
C,02-CD109,YES,    5.077E+03,   5.272E+01,   3.405E+01,,  149.106
C,03-CO57 ,YES,    1.156E+02,   1.513E+00,   1.009E+00,,  114.567
C,04-CE139,YES,    1.708E+02,   2.005E+00,   1.252E+00,,  136.400
C,05-HG203,YES,    3.774E+02,   5.844E+00,   3.974E+00,,   94.971
C,06-SN113,YES,    2.958E+02,   3.741E+00,   2.171E+00,,  136.269
C,08-CS137,YES,    1.461E+02,   2.125E+00,   1.246E+00,,  117.252
C,09-Y88  ,YES,    4.918E+02,   5.338E+00,   2.592E+00,,  189.755
C,10-CO60 ,YES,    2.309E+02,   1.897E+00,   9.936E-01,,  232.343
C,12-Y88  ,YES,    4.945E+02,   5.949E+00,   1.383E+00,,  357.416
C,07-SR85 ,NO ,    4.590E+00,   1.896E+00,   2.825E+00,,    1.625
```

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:42:17.34
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 27-FEB-2015 10:12:22.89

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 08B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

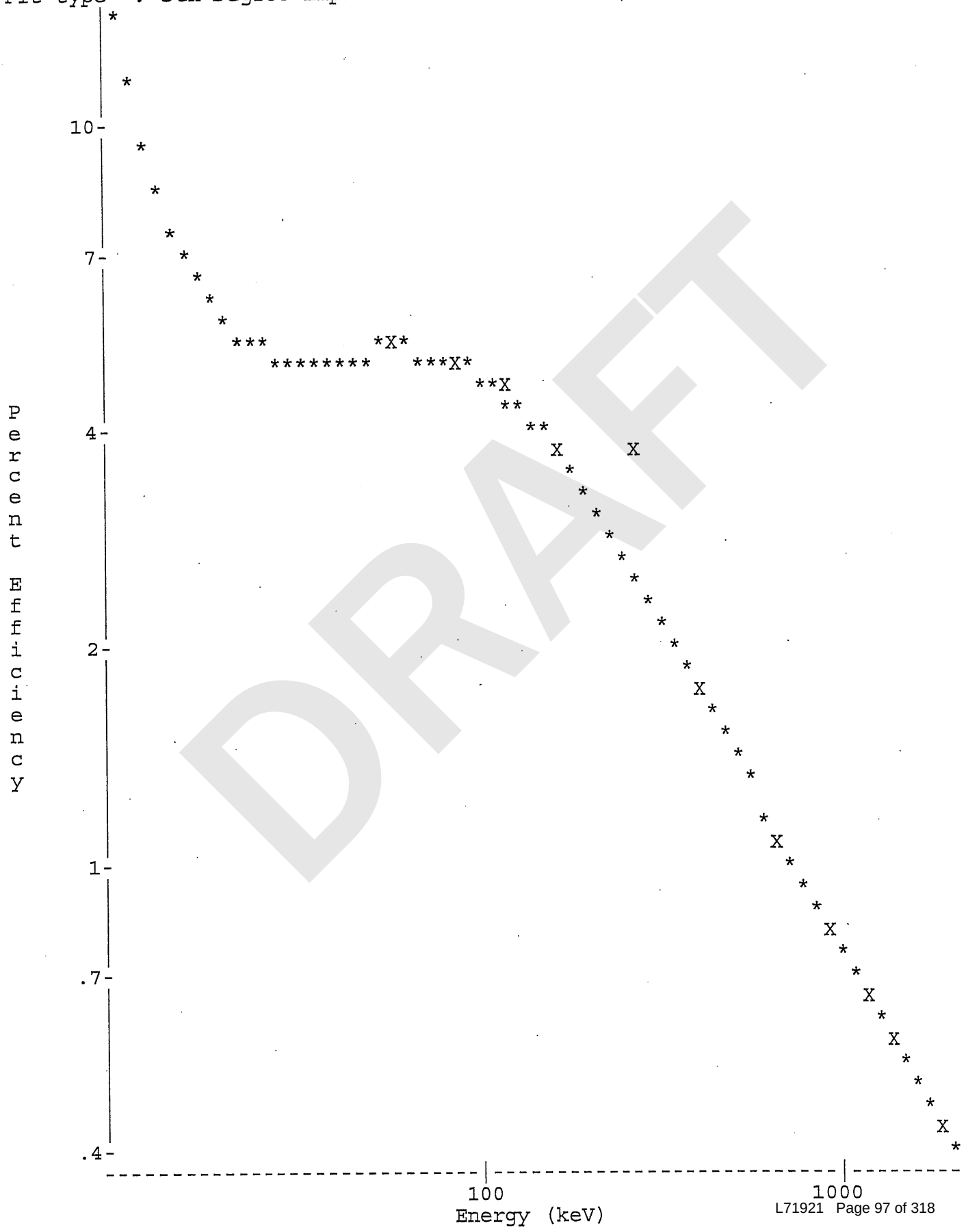
Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 08B150022715
BKGFILE : 08BG013015MT
Real Time : 0 06:44:32.10
Live time : 0 06:41:34.50

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	14.72	17538	63423	1.13	32.92	7.56E+00	7.28E-01	2.5	2.84E+02
2	3	17.58	13828	36461	1.29	38.64	6.13E+00	5.74E-01	2.2	5.13E+03
3	3	21.90	1741709	34446	1.17	47.28	5.28E+00	7.23E+01	0.1	
4	3	24.79	518495	29911	1.33	53.07	5.05E+00	2.15E+01	0.2	
5	1	32.75	37331	25270	2.33	68.99	4.87E+00	1.55E+00	1.0	2.88E+02
6	1	37.25	8012	17030	2.62	77.97	4.88E+00	3.33E-01	3.0	4.50E+01
7	1	43.31	415	15105	0.72	90.09	4.92E+00	1.72E-02	44.3	5.73E+00
8	4	49.48	16504	31173	1.55	102.43	4.95E+00	6.85E-01	2.1	5.02E+02
9	4	51.35	13166	30326	1.55	106.18	4.96E+00	5.46E-01	2.7	
10	4	53.16	12263	29705	1.56	109.80	4.97E+00	5.09E-01	2.8	
11	4	54.97	13665	28891	1.57	113.40	4.97E+00	5.67E-01	2.6	
12	4	57.15	16793	27905	1.57	117.77	4.97E+00	6.97E-01	2.4	
13	4	59.45	310326	17833	1.18	122.37	4.97E+00	1.29E+01	0.2	
14	10	67.51	9118	42128	2.83	138.47	4.95E+00	3.78E-01	5.6	8.23E+01
15	10	72.57	4417	19807	1.15	148.60	4.92E+00	1.83E-01	5.7	
16	10	74.94	8183	39210	2.09	153.34	4.90E+00	3.40E-01	5.0	
17	10	78.11	1121	22581	1.21	159.67	4.87E+00	4.65E-02	21.6	
18	6	85.59	5103	36824	1.99	174.63	4.79E+00	2.12E-01	11.4	3.06E+01
19	6	88.00	228307	14956	1.07	179.46	4.76E+00	9.48E+00	0.2	
20	1	122.05	74607	16842	1.10	247.53	4.27E+00	3.10E+00	0.5	4.02E+00
21	1	136.46	8978	8717	1.15	276.35	4.04E+00	3.73E-01	2.2	3.83E-01
22	1	165.86	29409	10373	1.13	335.13	3.61E+00	1.22E+00	0.9	2.42E+00
23	1	199.24	707	7235	1.16	401.88	3.17E+00	2.94E-02	21.2	4.95E-01
24	1	255.23	805	6977	1.48	513.82	2.60E+00	3.34E-02	19.1	4.62E-01
25	1	279.37	1022	7133	1.69	562.08	2.41E+00	4.24E-02	15.8	1.37E+00
26	1	391.70	13519	6648	1.28	786.68	1.76E+00	5.61E-01	1.5	8.74E-01
27	1	510.97	892	4982	2.35	1025.14	1.36E+00	3.70E-02	15.7	1.97E+00
28	1	661.63	65623	5373	1.49	1326.34	1.07E+00	2.72E+00	0.5	3.63E+00
29	1	814.29	433	3012	1.79	1631.51	8.81E-01	1.80E-02	23.4	5.22E-01
30	1	898.02	12237	5133	1.65	1798.90	8.07E-01	5.08E-01	1.5	6.29E-01
31	1	1173.18	64113	3149	1.85	2348.94	6.40E-01	2.66E+00	0.4	4.46E+00
32	1	1332.45	57699	1001	1.96	2667.29	5.75E-01	2.39E+00	0.4	7.74E+00
33	1	1461.25	156	416	1.62	2924.74	5.32E-01	6.46E-03	26.5	7.37E-01
34	1	1836.03	7064	267	2.27	3673.78	4.38E-01	2.93E-01	1.3	2.37E+00

DRAFT

Spectrum : MCA0:[NDSCOUNT]TBE08$1
Calib Date: 21-JUL-2015 11:42
Detector :
Fit type : 5th Degree Empirical

Geometry : 08B150022715



DRAFT

Sec. Review: Analyst:

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VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 21-JUL-2015 11:43:51.81
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 27-FEB-2015 10:12:22.89

LIMS No., Customer Name, Client ID: B150 MIXED GAMMA

Sample ID : 08B150022715
Sample Type : QC
Quantity : 1.00000E+00 TOTAL
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CALIBRATION

Smple Date: 1-JAN-2014 12:00:00.0
Geometry : 08B150022715
BKGFILE : 08BG013015MT
Real Time : 0 06:44:32.10
Live time : 0 06:41:34.50

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	14.72	17538	63423	1.13	32.92	7.56E+00	7.28E-01	2.5	2.84E+02
2	3	17.58*	12770	36461	1.29	38.64	6.13E+00	5.30E-01	2.4	5.13E+03
3	3	21.90	1741709	34446	1.17	47.28	5.28E+00	7.23E+01	0.1	
4	3	24.79*	518387	29911	1.33	53.07	5.05E+00	2.15E+01	0.2	
5	1	32.75	37331	25270	2.33	68.99	4.87E+00	1.55E+00	1.0	2.88E+02
6	1	37.25	8012	17030	2.62	77.97	4.88E+00	3.33E-01	3.0	4.50E+01
7	1	43.31	415	15105	0.72	90.09	4.92E+00	1.72E-02	44.3	5.73E+00
8	4	49.48	16504	31173	1.55	102.43	4.95E+00	6.85E-01	2.1	5.02E+02
9	4	51.35	13166	30326	1.55	106.18	4.96E+00	5.46E-01	2.7	
10	4	53.16	12263	29705	1.56	109.80	4.97E+00	5.09E-01	2.8	
11	4	54.97	13665	28891	1.57	113.40	4.97E+00	5.67E-01	2.6	
12	4	57.15	16793	27905	1.57	117.77	4.97E+00	6.97E-01	2.4	
13	4	59.45	310326	17833	1.18	122.37	4.97E+00	1.29E+01	0.2	
14	10	67.51*	9063	42128	2.83	138.47	4.95E+00	3.76E-01	5.6	8.23E+01
15	10	72.57*	4040	19807	1.15	148.60	4.92E+00	1.68E-01	6.2	
16	10	74.94*	7528	39210	2.09	153.34	4.90E+00	3.12E-01	5.5	
17	10	78.11*	1010	22581	1.21	159.67	4.87E+00	4.19E-02	24.0	
18	6	85.59*	4826	36824	1.99	174.63	4.79E+00	2.00E-01	12.0	3.06E+01
19	6	88.00*	228205	14956	1.07	179.46	4.76E+00	9.47E+00	0.2	
20	1	122.05	74607	16842	1.10	247.53	4.27E+00	3.10E+00	0.5	4.02E+00
21	1	136.46	8978	8717	1.15	276.35	4.04E+00	3.73E-01	2.2	3.83E-01
22	1	165.86	29409	10373	1.13	335.13	3.61E+00	1.22E+00	0.9	2.42E+00
23	1	199.24*	670	7235	1.16	401.88	3.17E+00	2.78E-02	22.4	4.95E-01
24	1	255.23	805	6977	1.48	513.82	2.60E+00	3.34E-02	19.1	4.62E-01
25	1	279.37	1022	7133	1.69	562.08	2.41E+00	4.24E-02	15.8	1.37E+00
26	1	391.70	13519	6648	1.28	786.68	1.76E+00	5.61E-01	1.5	8.74E-01
27	1	510.97*	342	4982	2.35	1025.14	1.36E+00	1.42E-02	41.2	1.97E+00
28	1	661.63	65623	5373	1.49	1326.34	1.07E+00	2.72E+00	0.5	3.63E+00
29	1	814.29	433	3012	1.79	1631.51	8.81E-01	1.80E-02	23.4	5.22E-01
30	1	898.02	12237	5133	1.65	1798.90	8.07E-01	5.08E-01	1.5	6.29E-01
31	1	1173.18	64113	3149	1.85	2348.94	6.40E-01	2.66E+00	0.4	4.46E+00
32	1	1332.45	57699	1001	1.96	2667.29	5.75E-01	2.39E+00	0.4	7.74E+00
33	1	1461.25*	4	416	1.62	2924.74	5.32E-01	1.81E-04	956.3	7.37E-01
34	1	1836.03	7064	267	2.27	3673.78	4.38E-01	2.93E-01	1.3	2.37E+00

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

Nuclide Line Activity Report

DRAFT

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	310326	35.90*	4.972E+00	7.215E+02	7.228E+02	0.39
02-CD109	88.03	228205	3.72*	4.761E+00	5.348E+03	1.006E+04	0.45
03-CO57	122.06	74607	85.51*	4.265E+00	8.490E+01	2.500E+02	1.04
04-CE139	165.85	29409	80.35*	3.606E+00	4.212E+01	3.528E+02	1.81
05-HG203	279.20	1022	81.46*	2.407E+00	2.164E+00	1.151E+03	31.55
06-SN113	391.69	13519	64.90*	1.762E+00	4.908E+01	6.233E+02	2.90
08-CS137	661.65	65623	85.12*	1.067E+00	2.998E+02	3.078E+02	0.92
09-Y88	898.02	12237	93.40*	8.074E-01	6.735E+01	1.046E+03	2.96
10-CO60	1173.22	64113	100.00	6.403E-01	4.156E+02	4.838E+02	0.90
	1332.49	57699	100.00*	5.750E-01	4.165E+02	4.849E+02	0.87
12-Y88	1836.01	7064	99.38*	4.378E-01	6.738E+01	1.047E+03	2.64

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 08B150022715

Acquisition date : 27-FEB-2015 10:12:22

Total number of lines in spectrum	34	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	11	32.35%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	7.215E+02	7.228E+02	0.028E+02	0.39	
02-CD109	462.90D	1.88	5.348E+03	1.006E+04	0.005E+04	0.45	
03-CO57	270.90D	2.94	8.490E+01	2.500E+02	0.026E+02	1.04	
04-CE139	137.66D	8.37	4.212E+01	3.528E+02	0.064E+02	1.81	
05-HG203	46.61D	532.	2.164E+00	1.151E+03	0.363E+03	31.55	
06-SN113	115.10D	12.7	4.908E+01	6.233E+02	0.181E+02	2.90	
08-CS137	30.17Y	1.03	2.998E+02	3.078E+02	0.028E+02	0.92	
09-Y88	106.65D	15.5	6.735E+01	1.046E+03	0.031E+03	2.96	
10-CO60	5.27Y	1.16	4.165E+02	4.849E+02	0.042E+02	0.87	
12-Y88	106.65D	15.5	6.738E+01	1.047E+03	0.028E+03	2.64	
			---------	---------			
	Total Activity :		7.099E+03	1.605E+04			

Grand Total Activity : 7.099E+03 1.605E+04

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

DRAFT

Unidentified Energy Lines
Sample ID : 08B150022715

Acquisition date : 27-FEB-2015 10:12:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	14.72	17538	63423	1.13	32.92	30	7	7.28E-01	5.0	7.56E+00	
3	17.58	12770	36461	1.29	38.64	36	23	5.30E-01	4.8	6.13E+00	
3	21.90	1741709	34446	1.17	47.28	36	23	7.23E+01	0.2	5.28E+00	
3	24.79	518387	29911	1.33	53.07	36	23	2.15E+01	0.3	5.05E+00	
1	32.75	37331	25270	2.33	68.99	62	12	1.55E+00	2.0	4.87E+00	
1	37.25	8012	17030	2.62	77.97	74	8	3.33E-01	6.0	4.88E+00	
1	43.31	415	15105	0.72	90.09	88	5	1.72E-02	88.7	4.92E+00	
4	49.48	16504	31173	1.55	102.43	96	31	6.85E-01	4.2	4.95E+00	
4	51.35	13166	30326	1.55	106.18	96	31	5.46E-01	5.4	4.96E+00	
4	53.16	12263	29705	1.56	109.80	96	31	5.09E-01	5.7	4.97E+00	
4	54.97	13665	28891	1.57	113.40	96	31	5.67E-01	5.1	4.97E+00	
4	57.15	16793	27905	1.57	117.77	96	31	6.97E-01	4.8	4.97E+00	
10	67.51	9063	42128	2.83	138.47	130	35	3.76E-01	11.3	4.95E+00	
10	72.57	4040	19807	1.15	148.60	130	35	1.68E-01	12.4	4.92E+00	
10	74.94	7528	39210	2.09	153.34	130	35	3.12E-01	11.0	4.90E+00	
10	78.11	1010	22581	1.21	159.67	130	35	4.19E-02	48.0	4.87E+00	
6	85.59	4826	36824	1.99	174.63	167	19	2.00E-01	24.1	4.79E+00	
1	136.46	8978	8717	1.15	276.35	272	9	3.73E-01	4.3	4.04E+00	
1	199.24	670	7235	1.16	401.88	398	8	2.78E-02	44.9	3.17E+00	
1	255.23	805	6977	1.48	513.82	510	9	3.34E-02	38.1	2.60E+00	
1	510.97	342	4982	2.35	1025.14	1020	11	1.42E-02	82.3	1.36E+00	
1	814.29	433	3012	1.79	1631.51	1627	9	1.80E-02	46.8	8.81E-01	
1	1461.25	4	416	1.62	2924.74	2920	11	1.81E-04	****	5.32E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	34	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	11	32.35%

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
01-AM241	432.70Y	1.00	7.215E+02	7.228E+02	0.028E+02	0.39	
02-CD109	462.90D	1.88	5.348E+03	1.006E+04	0.005E+04	0.45	
03-CO57	270.90D	2.94	8.490E+01	2.500E+02	0.026E+02	1.04	
04-CE139	137.66D	8.37	4.212E+01	3.528E+02	0.064E+02	1.81	
05-HG203	46.61D	532.	2.164E+00	1.151E+03	0.363E+03	31.55	
06-SN113	115.10D	12.7	4.908E+01	6.233E+02	0.181E+02	2.90	
08-CS137	30.17Y	1.03	2.998E+02	3.078E+02	0.028E+02	0.92	
09-Y88	106.65D	15.5	6.735E+01	1.046E+03	0.031E+03	2.96	
10-CO60	5.27Y	1.16	4.161E+02	4.843E+02	0.030E+02	0.63	
12-Y88	106.65D	15.5	6.738E+01	1.047E+03	0.028E+03	2.64	
			---------	---------			
	Total Activity :		7.099E+03	1.605E+04			

Grand Total Activity : 7.099E+03 1.605E+04

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

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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
01-AM241	7.228E+02	2.787E+00	1.449E+00	0.000E+00	498.806
02-CD109	1.006E+04	4.557E+01	2.567E+01	0.000E+00	391.942
03-CO57	2.500E+02	2.603E+00	1.455E+00	0.000E+00	171.806
04-CE139	3.528E+02	6.402E+00	4.520E+00	0.000E+00	78.046
05-HG203	1.151E+03	3.631E+02	3.998E+02	0.000E+00	2.879
06-SN113	6.233E+02	1.809E+01	1.551E+01	0.000E+00	40.196
08-CS137	3.078E+02	2.817E+00	1.315E+00	0.000E+00	234.021
09-Y88	1.046E+03	3.096E+01	2.685E+01	0.000E+00	38.962
10-CO60	4.843E+02	3.029E+00	1.056E+00	0.000E+00	458.826
12-Y88	1.047E+03	2.762E+01	8.642E+00	0.000E+00	121.140

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	6.034E+01		5.744E+01	8.551E+01	0.000E+00	0.706

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A,08B150022715     ,07/21/2015 11:43,01/01/2014 12:00,   1.000E+00,B150 MIXED GAM
B,08B150022715     ,CALIBRATION          ,07/21/2015 11:42,08B150022715
C,01-AM241,YES,   7.228E+02,   2.787E+00,   1.449E+00,,  498.806
C,02-CD109,YES,   1.006E+04,   4.557E+01,   2.567E+01,,  391.942
C,03-CO57 ,YES,   2.500E+02,   2.603E+00,   1.455E+00,,  171.806
C,04-CE139,YES,   3.528E+02,   6.402E+00,   4.520E+00,,   78.046
C,05-HG203,YES,   1.151E+03,   3.631E+02,   3.998E+02,,    2.879
C,06-SN113,YES,   6.233E+02,   1.809E+01,   1.551E+01,,   40.196
C,08-CS137,YES,   3.078E+02,   2.817E+00,   1.315E+00,,  234.021
C,09-Y88  ,YES,   1.046E+03,   3.096E+01,   2.685E+01,,   38.962
C,10-CO60 ,YES,   4.843E+02,   3.029E+00,   1.056E+00,,  458.826
C,12-Y88  ,YES,   1.047E+03,   2.762E+01,   8.642E+00,,  121.140
C,07-SR85 ,NO ,   6.034E+01,   5.744E+01,   8.551E+01,,    0.706
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DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 3-FEB-2012 12:29:58.29
TBE14 P-10933A HpGe ********** Aquisition Date/Time: 20-JAN-2012 11:01:41.32

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA
Sample ID : 14B150012012 Smple Date: 1-JUL-2011 12:00:00.00
Sample Type : CAL Geometry : 14B150012012
Quantity : 1.00000E+00 TOTAL BKGFILE : NOBKG
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 10:01:42.46
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 10:00:00.00
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.55	13516	20328	1.13	115.98	2.89E-01	3.75E-01	2.2	5.06E+00
2	1	66.67	574	13234	1.00	130.22	5.79E-01	1.59E-02	33.4	2.60E+00
3	3	72.82	909	10935	0.85	142.53	8.96E-01	2.53E-02	17.6	5.97E-01
4	3	75.05	1489	13314	0.98	147.00	1.02E+00	4.14E-02	12.5	
5	1	88.03	88235	24136	1.09	172.97	1.75E+00	2.45E+00	0.5	5.29E+00
6	1	122.05	63148	18884	1.13	241.04	3.00E+00	1.75E+00	0.6	4.03E+00
7	1	136.46	8288	14154	1.14	269.88	3.18E+00	2.30E-01	2.9	2.13E+00
8	1	165.84	56885	18530	1.15	328.69	3.21E+00	1.58E+00	0.7	2.10E+00
9	1	255.11	1570	9137	1.19	507.33	2.59E+00	4.36E-02	11.2	1.46E+00
10	1	279.19	13224	10447	1.27	555.53	2.43E+00	3.67E-01	1.8	1.22E+00
11	1	391.70	38015	8623	1.33	780.70	1.88E+00	1.06E+00	0.7	7.29E-01
12	1	510.82	1877	7615	2.65	1019.12	1.53E+00	5.21E-02	10.1	8.37E-01
13	1	609.14	455	3380	1.51	1215.92	1.34E+00	1.26E-02	21.7	2.85E+00
14	1	661.64	56020	7176	1.54	1321.00	1.25E+00	1.56E+00	0.5	3.82E+00
15	1	813.81	702	4110	1.97	1625.62	1.07E+00	1.95E-02	18.1	2.28E+00
16	1	898.03	42991	7192	1.75	1794.21	9.84E-01	1.19E+00	0.7	7.16E+00
17	1	1173.22	61297	3295	1.96	2345.19	7.91E-01	1.70E+00	0.5	1.55E+01
18	1	1324.67	879	1732	3.10	2648.44	7.19E-01	2.44E-02	10.6	1.77E+00
19	1	1332.48	55410	2162	2.06	2664.08	7.15E-01	1.54E+00	0.5	9.45E+00
20	1	1460.69	352	1118	2.52	2920.80	6.68E-01	9.78E-03	20.2	1.14E+00
21	1	1836.00	27307	679	2.47	3672.46	5.79E-01	7.59E-01	0.6	1.59E+01

Nuclide Line Activity Report
Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	2-Sigma %Error
01-AM241	59.54	13516	35.90*	2.887E-01	3.622E+02	3.626E+02	4.44
02-CD109	88.03	88235	3.72*	1.752E+00	3.760E+03	5.097E+03	0.94
03-CO57	122.06	63148	85.51*	2.995E+00	6.849E+01	1.152E+02	1.16
04-CE139	165.85	56885	80.35*	3.214E+00	6.118E+01	1.702E+02	1.32
05-HG203	279.20	13224	81.46*	2.427E+00	1.858E+01	3.812E+02	3.56
06-SN113	391.69	38015	64.90*	1.877E+00	8.667E+01	2.946E+02	1.42
08-CS137	661.65	56020	85.12*	1.255E+00	1.457E+02	1.476E+02	1.06
09-Y88	898.02	42991	93.40*	9.840E-01	1.299E+02	4.866E+02	1.31
10-CO60	1173.22	61297	100.00	7.914E-01	2.152E+02	2.315E+02	0.92
	1332.49	55410	100.00*	7.153E-01	2.152E+02	2.315E+02	0.93
12-Y88	1836.01	27307	99.38*	5.787E-01	1.319E+02	4.940E+02	1.30

Flag: "*" = Keyline

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Summary of Nuclide Activity

Sample ID : 14B150012012 Acquisition date : 20-JAN-2012 11:01:41

Total number of lines in spectrum 21

Number of unidentified lines 10

Number of lines tentatively identified by NID 11 52.38%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.622E+02	3.626E+02	0.161E+02	4.44	
02-CD109	462.90D	1.36	3.760E+03	5.097E+03	0.048E+03	0.94	
03-CO57	270.90D	1.68	6.849E+01	1.152E+02	0.013E+02	1.16	
04-CE139	137.66D	2.78	6.118E+01	1.702E+02	0.022E+02	1.32	
05-HG203	46.61D	20.5	1.858E+01	3.812E+02	0.136E+02	3.56	
06-SN113	115.10D	3.40	8.667E+01	2.946E+02	0.042E+02	1.42	
08-CS137	30.17Y	1.01	1.457E+02	1.476E+02	0.016E+02	1.06	
09-Y88	106.65D	3.75	1.299E+02	4.866E+02	0.064E+02	1.31	
10-CO60	5.27Y	1.08	2.152E+02	2.315E+02	0.022E+02	0.93	
12-Y88	106.65D	3.75	1.319E+02	4.940E+02	0.064E+02	1.30	
			---------	---------			
	Total Activity :		4.980E+03	7.781E+03			
	Grand Total Activity :		4.980E+03	7.781E+03			

Flags: "K" = Keyline not found "M" = Manually accepted

"E" = Manually edited "A" = Nuclide specific abn. limit

Unidentified Energy Lines

Sample ID : 14B150012012 Acquisition date : 20-JAN-2012 11:01:41

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	66.67	574	13234	1.00	130.22	127	7	1.59E-02	66.8	5.79E-01	
3	72.82	909	10935	0.85	142.53	140	11	2.53E-02	35.2	8.96E-01	
3	75.05	1489	13314	0.98	147.00	140	11	4.14E-02	25.0	1.02E+00	
1	136.46	8288	14154	1.14	269.88	265	10	2.30E-01	5.8	3.18E+00	
1	255.11	1570	9137	1.19	507.33	503	9	4.36E-02	22.5	2.59E+00	
1	510.82	1877	7615	2.65	1019.12	1012	14	5.21E-02	20.2	1.53E+00	
1	609.14	455	3380	1.51	1215.92	1213	7	1.26E-02	43.3	1.34E+00	
1	813.81	702	4110	1.97	1625.62	1621	11	1.95E-02	36.1	1.07E+00	
1	1324.67	879	1732	3.10	2648.44	2642	14	2.44E-02	21.1	7.19E-01	
1	1460.69	352	1118	2.52	2920.80	2915	13	9.78E-03	40.4	6.68E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 21

Number of unidentified lines 10

Number of lines tentatively identified by NID 11 52.38%

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
01-AM241	432.70Y	1.00	3.622E+02	3.626E+02	0.161E+02	4.44	
02-CD109	462.90D	1.36	3.760E+03	5.097E+03	0.048E+03	0.94	
03-CO57	270.90D	1.68	6.849E+01	1.152E+02	0.013E+02	1.16	
04-CE139	137.66D	2.78	6.118E+01	1.702E+02	0.022E+02	1.32	

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05-HG203	46.61D	20.5	1.858E+01	3.812E+02	0.136E+02	3.56
06-SN113	115.10D	3.40	8.667E+01	2.946E+02	0.042E+02	1.42
08-CS137	30.17Y	1.01	1.457E+02	1.476E+02	0.016E+02	1.06
09-Y88	106.65D	3.75	1.299E+02	4.866E+02	0.064E+02	1.31
10-CO60	5.27Y	1.08	2.152E+02	2.315E+02	0.015E+02	0.65
12-Y88	106.65D	3.75	1.319E+02	4.940E+02	0.064E+02	1.30
			---------	---------		
	Total Activity :		4.980E+03	7.781E+03		
	Grand Total Activity :		4.980E+03	7.781E+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
01-AM241	3.626E+02	1.611E+01	1.317E+01	0.000E+00	27.530
02-CD109	5.097E+03	4.816E+01	3.291E+01	0.000E+00	154.865
03-CO57	1.152E+02	1.337E+00	8.999E-01	0.000E+00	127.987
04-CE139	1.702E+02	2.250E+00	1.345E+00	0.000E+00	126.518
05-HG203	3.812E+02	1.356E+01	1.128E+01	0.000E+00	33.804
06-SN113	2.946E+02	4.179E+00	2.840E+00	0.000E+00	103.728
08-CS137	1.476E+02	1.569E+00	8.722E-01	0.000E+00	169.235
09-Y88	4.866E+02	6.367E+00	3.637E+00	0.000E+00	133.799
10-CO60	2.315E+02	1.514E+00	6.928E-01	0.000E+00	334.122
12-Y88	4.940E+02	6.408E+00	1.671E+00	0.000E+00	295.624

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	7.322E+00		3.731E+00	5.579E+00	0.000E+00	1.313

A,14B150012012 ,02/03/2012 12:29,07/01/2011 12:00, 1.000E+00,150ML POLY BOTTLE MI,CAL
,BQ ,
B,14B150012012 ,CALIBRATION ,01/27/2012 14:34,14B150012012 ,NOBKG

C,01-AM241,YES,	3.626E+02,	1.611E+01,	1.317E+01,,	27.530
C,02-CD109,YES,	5.097E+03,	4.816E+01,	3.291E+01,,	154.865
C,03-CO57 ,YES,	1.152E+02,	1.337E+00,	8.999E-01,,	127.987
C,04-CE139,YES,	1.702E+02,	2.250E+00,	1.345E+00,,	126.518
C,05-HG203,YES,	3.812E+02,	1.356E+01,	1.128E+01,,	33.804
C,06-SN113,YES,	2.946E+02,	4.179E+00,	2.840E+00,,	103.728
C,08-CS137,YES,	1.476E+02,	1.569E+00,	8.722E-01,,	169.235
C,09-Y88 ,YES,	4.866E+02,	6.367E+00,	3.637E+00,,	133.799
C,10-CO60 ,YES,	2.315E+02,	1.514E+00,	6.928E-01,,	334.122
C,12-Y88 ,YES,	4.940E+02,	6.408E+00,	1.671E+00,,	295.624
C,07-SR85 ,NO ,	7.322E+00,	3.731E+00,	5.579E+00,,	1.313

DRAFT

Sec. Review: Analyst:

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 1-NOV-2011 14:25:47.58
TBE15 P-10635B HpGe ********** Aquisition Date/Time: 20-OCT-2011 09:22:57.42

LIMS No., Customer Name, Client ID: 150ML POLY BOTTLE MIXED GAMMA

Sample ID : 15B150102011
Sample Type : CAL
Quantity : 1.00000E+00 TOTAL
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Constant : 0.00 Library Used: CALIBRATION

Smple Date: 1-JUL-2011 12:00:00.0
Geometry : 15B150102111MT
BKGFILE : 15BG102111MT
Real Time : 0 06:08:57.59
Live time : 0 06:07:47.94

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	59.56	33028	27838	0.82	113.70	1.15E+00	1.50E+00	1.1	2.77E+01
2	1	72.88*	1813	16972	0.64	140.39	2.43E+00	8.22E-02	10.8	4.75E+01
3	1	74.95*	838	18432	0.79	144.54	2.63E+00	3.80E-02	25.9	2.14E+00
4	10	81.88	1682	36396	1.97	158.42	3.25E+00	7.62E-02	21.9	9.84E+01
5	10	82.98*	2265	29909	1.64	160.62	3.34E+00	1.03E-01	14.1	
6	10	85.34*	6238	34527	1.99	165.35	3.52E+00	2.83E-01	6.8	
7	10	88.03*	134016	12216	0.87	170.74	3.72E+00	6.07E+00	0.3	
8	1	122.06*	81911	20581	0.83	238.93	5.08E+00	3.71E+00	0.5	3.90E+00
9	1	136.47	10684	15782	0.83	267.80	5.18E+00	4.84E-01	2.3	3.19E-01
10	1	165.85	87387	18226	0.88	326.66	4.99E+00	3.96E+00	0.5	2.53E+00
11	1	255.09	2631	8444	0.94	505.46	3.82E+00	1.19E-01	6.4	1.01E+00
12	1	279.17	46200	11047	0.99	553.69	3.56E+00	2.09E+00	0.7	2.11E+00
13	1	391.67	57390	7960	1.09	779.07	2.66E+00	2.60E+00	0.5	2.16E+00
14	1	510.93*	1248	7014	2.75	1018.00	2.09E+00	5.66E-02	14.7	5.27E-01
15	1	661.64	45737	7039	1.30	1319.92	1.65E+00	2.07E+00	0.6	1.74E+00
16	1	814.13	1081	3296	1.39	1625.39	1.36E+00	4.90E-02	10.4	1.56E+00
17	1	898.04	60801	5685	1.51	1793.45	1.24E+00	2.76E+00	0.5	7.53E+00
18	1	1173.23	47327	3489	1.69	2344.67	9.68E-01	2.14E+00	0.6	4.64E+00
19	6	1325.13	1432	1966	3.17	2648.90	8.67E-01	6.49E-02	7.5	7.20E+00
20	6	1332.49	42399	1218	1.82	2663.65	8.62E-01	1.92E+00	0.5	
21	1	1835.99	35108	750	2.15	3671.99	6.66E-01	1.59E+00	0.6	1.09E+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
01-AM241	59.54	33028	35.90*	1.152E+00	3.617E+02	3.619E+02	2.20
02-CD109	88.03	134016	3.72*	3.725E+00	4.383E+03	5.175E+03	0.60
03-CO57	122.06	81911	85.51*	5.079E+00	8.546E+01	1.135E+02	0.96
04-CE139	165.85	87387	80.35*	4.989E+00	9.878E+01	1.728E+02	0.92
05-HG203	279.20	46200	81.46*	3.556E+00	7.227E+01	3.767E+02	1.30
06-SN113	391.69	57390	64.90*	2.657E+00	1.508E+02	2.943E+02	1.04
08-CS137	661.65	45737	85.12*	1.654E+00	1.472E+02	1.483E+02	1.20
09-Y88	898.02	60801	93.40*	1.244E+00	2.371E+02	4.879E+02	0.99
10-CO60	1173.22	47327	100.00	9.685E-01	2.214E+02	2.213E+02	1.10

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	1332.49	42399	100.00*	8.625E-01	2.228E+02	2.319E+02	1.02
12-Y88	1836.01	35108	99.38*	6.663E-01	2.403E+02	4.944E+02	1.14

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15B150102011

Acquisition date : 20-OCT-2011 09:22:57

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/TOTAL	Decay Corr BQ/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.617E+02	3.619E+02	0.080E+02	2.20	
02-CD109	462.90D	1.18	4.383E+03	5.175E+03	0.031E+03	0.60	
03-CO57	270.90D	1.33	8.546E+01	1.135E+02	0.011E+02	0.96	
04-CE139	137.66D	1.75	9.878E+01	1.728E+02	0.016E+02	0.92	
05-HG203	46.61D	5.21	7.227E+01	3.767E+02	0.049E+02	1.30	
06-SN113	115.10D	1.95	1.508E+02	2.943E+02	0.031E+02	1.04	
08-CS137	30.17Y	1.01	1.472E+02	1.483E+02	0.018E+02	1.20	
09-Y88	106.65D	2.06	2.371E+02	4.879E+02	0.048E+02	0.99	
10-CO60	5.27Y	1.04	2.228E+02	2.319E+02	0.024E+02	1.02	
12-Y88	106.65D	2.06	2.403E+02	4.944E+02	0.057E+02	1.14	
			---------	---------			
Total Activity :			5.999E+03	7.857E+03			
Grand Total Activity :			5.999E+03	7.857E+03			

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

DRAFT

Unidentified Energy Lines
Sample ID : 15B150102011

Acquisition date : 20-OCT-2011 09:22:57

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	72.88	1813	16972	0.64	140.39	138	5	8.22E-02	21.5	2.43E+00	
1	74.95	838	18432	0.79	144.54	143	6	3.80E-02	51.9	2.63E+00	
10	81.88	1682	36396	1.97	158.42	153	24	7.62E-02	43.7	3.25E+00	
10	82.98	2265	29909	1.64	160.62	153	24	1.03E-01	28.2	3.34E+00	
10	85.34	6238	34527	1.99	165.35	153	24	2.83E-01	13.7	3.52E+00	
1	136.47	10684	15782	0.83	267.80	264	9	4.84E-01	4.7	5.18E+00	
1	255.09	2631	8444	0.94	505.46	502	8	1.19E-01	12.7	3.82E+00	
1	510.93	1248	7014	2.75	1018.00	1011	14	5.66E-02	29.3	2.09E+00	
1	814.13	1081	3296	1.39	1625.39	1621	10	4.90E-02	20.7	1.36E+00	
6	1325.13	1432	1966	3.17	2648.90	2640	31	6.49E-02	15.0	8.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	21	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	11	52.38%

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
01-AM241	432.70Y	1.00	3.617E+02	3.619E+02	0.080E+02	2.20	
02-CD109	462.90D	1.18	4.383E+03	5.175E+03	0.031E+03	0.60	
03-CO57	270.90D	1.33	8.546E+01	1.135E+02	0.011E+02	0.96	
04-CE139	137.66D	1.75	9.878E+01	1.728E+02	0.016E+02	0.92	
05-HG203	46.61D	5.21	7.227E+01	3.767E+02	0.049E+02	1.30	
06-SN113	115.10D	1.95	1.508E+02	2.943E+02	0.031E+02	1.04	
08-CS137	30.17Y	1.01	1.472E+02	1.483E+02	0.018E+02	1.20	
09-Y88	106.65D	2.06	2.371E+02	4.879E+02	0.048E+02	0.99	
10-CO60	5.27Y	1.04	2.221E+02	2.312E+02	0.017E+02	0.75	
12-Y88	106.65D	2.06	2.403E+02	4.944E+02	0.057E+02	1.14	
	Total Activity :		5.999E+03	7.856E+03			
	Grand Total Activity :		5.999E+03	7.856E+03			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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

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01-AM241	3.619E+02	7.961E+00	5.614E+00	0.000E+00	64.471
02-CD109	5.175E+03	3.111E+01	1.954E+01	0.000E+00	264.885
03-CO57	1.135E+02	1.092E+00	6.621E-01	0.000E+00	171.479
04-CE139	1.728E+02	1.589E+00	8.403E-01	0.000E+00	205.604
05-HG203	3.767E+02	4.912E+00	2.874E+00	0.000E+00	131.049
06-SN113	2.943E+02	3.069E+00	1.635E+00	0.000E+00	180.030
08-CS137	1.483E+02	1.785E+00	1.002E+00	0.000E+00	148.039
09-Y88	4.879E+02	4.808E+00	2.191E+00	0.000E+00	222.709
10-CO60	2.312E+02	1.733E+00	9.010E-01	0.000E+00	256.626
12-Y88	4.944E+02	5.651E+00	1.302E+00	0.000E+00	379.647

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

Nuclide	Key-Line Activity (BQ/TOTAL)	K.L. Ided	Act error	MDA (BQ/TOTAL)	MDA error	Act/MDA
07-SR85	2.322E+00		1.445E+00	2.162E+00	0.000E+00	1.074

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A,15B150102011    ,11/01/2011 14:25,07/01/2011 12:00,   1.000E+00,150ML POLY BOT
B,15B150102011    ,CALIBRATION          ,11/01/2011 14:21,15B150102011
C,01-AM241,YES,   3.619E+02,   7.961E+00,   5.614E+00,,    64.471
C,02-CD109,YES,   5.175E+03,   3.111E+01,   1.954E+01,,   264.885
C,03-CO57 ,YES,   1.135E+02,   1.092E+00,   6.621E-01,,   171.479
C,04-CE139,YES,   1.728E+02,   1.589E+00,   8.403E-01,,   205.604
C,05-HG203,YES,   3.767E+02,   4.912E+00,   2.874E+00,,   131.049
C,06-SN113,YES,   2.943E+02,   3.069E+00,   1.635E+00,,   180.030
C,08-CS137,YES,   1.483E+02,   1.785E+00,   1.002E+00,,   148.039
C,09-Y88  ,YES,   4.879E+02,   4.808E+00,   2.191E+00,,   222.709
C,10-CO60 ,YES,   2.312E+02,   1.733E+00,   9.010E-01,,   256.626
C,12-Y88  ,YES,   4.944E+02,   5.651E+00,   1.302E+00,,   379.647
C,07-SR85 ,NO ,   2.322E+00,   1.445E+00,   2.162E+00,,     1.074
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Sec. Review: Analyst: LIMS: ___

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 20-AUG-2004 14:54:55.64
TBE23 03017322 HpGe ********** Aquisition Date/Time: 20-AUG-2004 13:54:22.19

LIMS No., Customer Name, Client ID: DET23 B150ML STD ANALYTICS 1JUL04
Sample ID : 23B150082004 Smple Date: 20-AUG-2004 12:00:00.00
Sample Type : STD Geometry : 23B150061103
Quantity : 1.00000E+00 Total BKGFILE : 23BG081304MT
Start Channel : 50 Energy Tol : 1.00000 Real Time : 0 01:00:17.70
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:00:00.00
MDA Constant : 0.00 Library Used: CALIBRATION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	10	33.76*	1898	297	1.05	67.69	2.35E-01	5.27E-01	4.2	2.39E+01
2	10	35.42*	2903	1268	2.19	71.01	3.22E-01	8.07E-01	4.6	
3	10	37.88	2223	3160	2.01	75.92	4.82E-01	6.17E-01	6.7	
4	10	40.75	977	3695	1.53	81.67	7.14E-01	2.71E-01	12.1	
5	10	42.77	1044	7384	2.26	85.69	9.02E-01	2.90E-01	16.0	
6	0	59.57	14738	9715	1.07	119.27	2.86E+00	4.09E+00	1.5	
7	1	70.92	1369	5386	1.04	141.96	4.06E+00	3.80E-01	8.9	1.49E+00
8	1	72.94	2174	5190	1.04	145.99	4.25E+00	6.04E-01	5.7	
9	9	82.67	1633	9265	1.65	165.43	4.97E+00	4.54E-01	10.8	1.09E+01
10	9	85.27*	2081	12080	2.29	170.63	5.12E+00	5.78E-01	14.5	
11	9	88.10	40267	4581	1.08	176.28	5.27E+00	1.12E+01	0.6	
12	0	122.13	22824	6852	1.09	244.30	5.98E+00	6.34E+00	1.0	
13	0	136.50	2877	6059	1.00	273.01	5.93E+00	7.99E-01	5.6	
14	0	165.95	26436	5926	1.12	331.87	5.60E+00	7.34E+00	0.9	
15	0	255.23	941	3128	1.26	510.34	4.37E+00	2.61E-01	12.0	
16	0	279.28	27412	3183	1.21	558.41	4.09E+00	7.61E+00	0.7	
17	0	391.82	19160	2503	1.28	783.43	3.14E+00	5.32E+00	0.9	
18	0	510.97*	392	1411	2.94	1021.72	2.51E+00	1.09E-01	19.4	
19	0	661.78	10936	2340	1.48	1323.41	2.01E+00	3.04E+00	1.4	
20	0	814.56	309	913	1.28	1629.11	1.67E+00	8.57E-02	19.9	
21	0	898.25	22777	1335	1.65	1796.63	1.53E+00	6.33E+00	0.8	
22	0	1173.51	12551	930	1.83	2347.76	1.21E+00	3.49E+00	1.1	
23	0	1325.20	497	514	2.75	2651.60	1.09E+00	1.38E-01	10.6	
24	0	1332.74	11486	689	1.89	2666.71	1.09E+00	3.19E+00	1.1	
25	0	1835.88	13494	214	2.19	3675.20	8.53E-01	3.75E+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
01-AM241	59.54	14738	35.90*	2.857E+00	3.991E+02	3.991E+02	3.08
02-CD109	88.03	40267	3.72*	5.270E+00	5.706E+03	5.706E+03	1.13
03-CO57	122.06	22824	85.51*	5.980E+00	1.240E+02	1.240E+02	1.94
04-CE139	165.85	26436	80.35*	5.602E+00	1.631E+02	1.632E+02	1.73
05-HG203	279.20	27412	81.46*	4.093E+00	2.284E+02	2.287E+02	1.46
06-SN113	391.69	19160	64.90*	3.141E+00	2.611E+02	2.612E+02	1.82
08-CS137	661.65	10936	85.12*	2.009E+00	1.777E+02	1.777E+02	2.71

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09-Y88	898.02	22777	93.40*	1.531E+00	4.424E+02	4.427E+02	1.51
10-CO60	1173.22	12551	100.00	1.209E+00	2.883E+02	2.883E+02	2.12
	1332.49	11486	100.00*	1.085E+00	2.940E+02	2.940E+02	2.15
12-Y88	1836.01	13494	99.38*	8.527E-01	4.423E+02	4.426E+02	1.81

Flag: "*" = Keyline

Summary of Nuclide Activity
Sample ID : 23B150082004 Acquisition date : 20-AUG-2004 13:54:22

Total number of lines in spectrum	25	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	11	44.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected BQ/Total	Decay Corr BQ/Total	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
01-AM241	432.70Y	1.00	3.991E+02	3.991E+02	0.123E+02	3.08	
02-CD109	462.90D	1.00	5.706E+03	5.706E+03	0.065E+03	1.13	
03-CO57	270.90D	1.00	1.240E+02	1.240E+02	0.024E+02	1.94	
04-CE139	137.66D	1.00	1.631E+02	1.632E+02	0.028E+02	1.73	
05-HG203	46.61D	1.00	2.284E+02	2.287E+02	0.033E+02	1.46	
06-SN113	115.10D	1.00	2.611E+02	2.612E+02	0.048E+02	1.82	
08-CS137	30.17Y	1.00	1.777E+02	1.777E+02	0.048E+02	2.71	
09-Y88	106.65D	1.00	4.424E+02	4.427E+02	0.067E+02	1.51	
10-CO60	5.27Y	1.00	2.940E+02	2.940E+02	0.063E+02	2.15	
12-Y88	106.65D	1.00	4.423E+02	4.426E+02	0.080E+02	1.81	
			---------	---------			
Total Activity :			8.238E+03	8.240E+03			
Grand Total Activity :			8.238E+03	8.240E+03			

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

Unidentified Energy Lines
Sample ID : 23B150082004 Acquisition date : 20-AUG-2004 13:54:22

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
10	33.76	1898	297	1.05	67.69	65	29	5.27E-01	8.4	2.35E-01	
10	35.42	2903	1268	2.19	71.01	65	29	8.07E-01	9.2	3.22E-01	
10	37.88	2223	3160	2.01	75.92	65	29	6.17E-01	13.4	4.82E-01	
10	40.75	977	3695	1.53	81.67	65	29	2.71E-01	24.1	7.14E-01	
10	42.77	1044	7384	2.26	85.69	65	29	2.90E-01	31.9	9.02E-01	
1	70.92	1369	5386	1.04	141.96	138	13	3.80E-01	17.8	4.06E+00	
1	72.94	2174	5190	1.04	145.99	138	13	6.04E-01	11.5	4.25E+00	
9	82.67	1633	9265	1.65	165.43	160	24	4.54E-01	21.6	4.97E+00	
9	85.27	2081	12080	2.29	170.63	160	24	5.78E-01	29.1	5.12E+00	
0	136.50	2877	6059	1.00	273.01	268	11	7.99E-01	11.1	5.93E+00	
0	255.23	941	3128	1.26	510.34	505	11	2.61E-01	23.9	4.37E+00	
0	510.97	392	1411	2.94	1021.72	1016	11	1.09E-01	38.7	2.51E+00	
0	814.56	309	913	1.28	1629.11	1624	11	8.57E-02	39.8	1.67E+00	
0	1325.20	497	514	2.75	2651.60	2645	14	1.38E-01	21.3	1.09E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	25
Number of unidentified lines	14

DRAFT

Number of lines tentatively identified by NID 11 44.00%

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
01-AM241	432.70Y	1.00	3.991E+02	3.991E+02	0.123E+02	3.08	
02-CD109	462.90D	1.00	5.706E+03	5.706E+03	0.065E+03	1.13	
03-CO57	270.90D	1.00	1.240E+02	1.240E+02	0.024E+02	1.94	
04-CE139	137.66D	1.00	1.631E+02	1.632E+02	0.028E+02	1.73	
05-HG203	46.61D	1.00	2.284E+02	2.287E+02	0.033E+02	1.46	
06-SN113	115.10D	1.00	2.611E+02	2.612E+02	0.048E+02	1.82	
08-CS137	30.17Y	1.00	1.777E+02	1.777E+02	0.048E+02	2.71	
09-Y88	106.65D	1.00	4.424E+02	4.427E+02	0.067E+02	1.51	
10-CO60	5.27Y	1.00	2.911E+02	2.911E+02	0.044E+02	1.51	
12-Y88	106.65D	1.00	4.423E+02	4.426E+02	0.080E+02	1.81	
			---------	---------			
	Total Activity :		8.235E+03	8.237E+03			
	Grand Total Activity :		8.235E+03	8.237E+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
01-AM241	3.991E+02	1.230E+01	8.833E+00	0.000E+00	45.185
02-CD109	5.706E+03	6.466E+01	4.507E+01	0.000E+00	126.601
03-CO57	1.240E+02	2.400E+00	1.585E+00	0.000E+00	78.219
04-CE139	1.632E+02	2.817E+00	1.625E+00	0.000E+00	100.430
05-HG203	2.287E+02	3.348E+00	1.766E+00	0.000E+00	129.489
06-SN113	2.612E+02	4.753E+00	2.404E+00	0.000E+00	108.671
08-CS137	1.777E+02	4.820E+00	2.915E+00	0.000E+00	60.936
09-Y88	4.427E+02	6.690E+00	2.937E+00	0.000E+00	150.729
10-CO60	2.911E+02	4.397E+00	2.402E+00	0.000E+00	121.163
12-Y88	4.426E+02	7.996E+00	1.979E+00	0.000E+00	223.662

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

Nuclide	Key-Line Activity (BQ/Total)	K.L. Ided	Act error	MDA (BQ/Total)	MDA error	Act/MDA
07-SR85	2.408E+00		1.245E+00	1.954E+00	0.000E+00	1.232

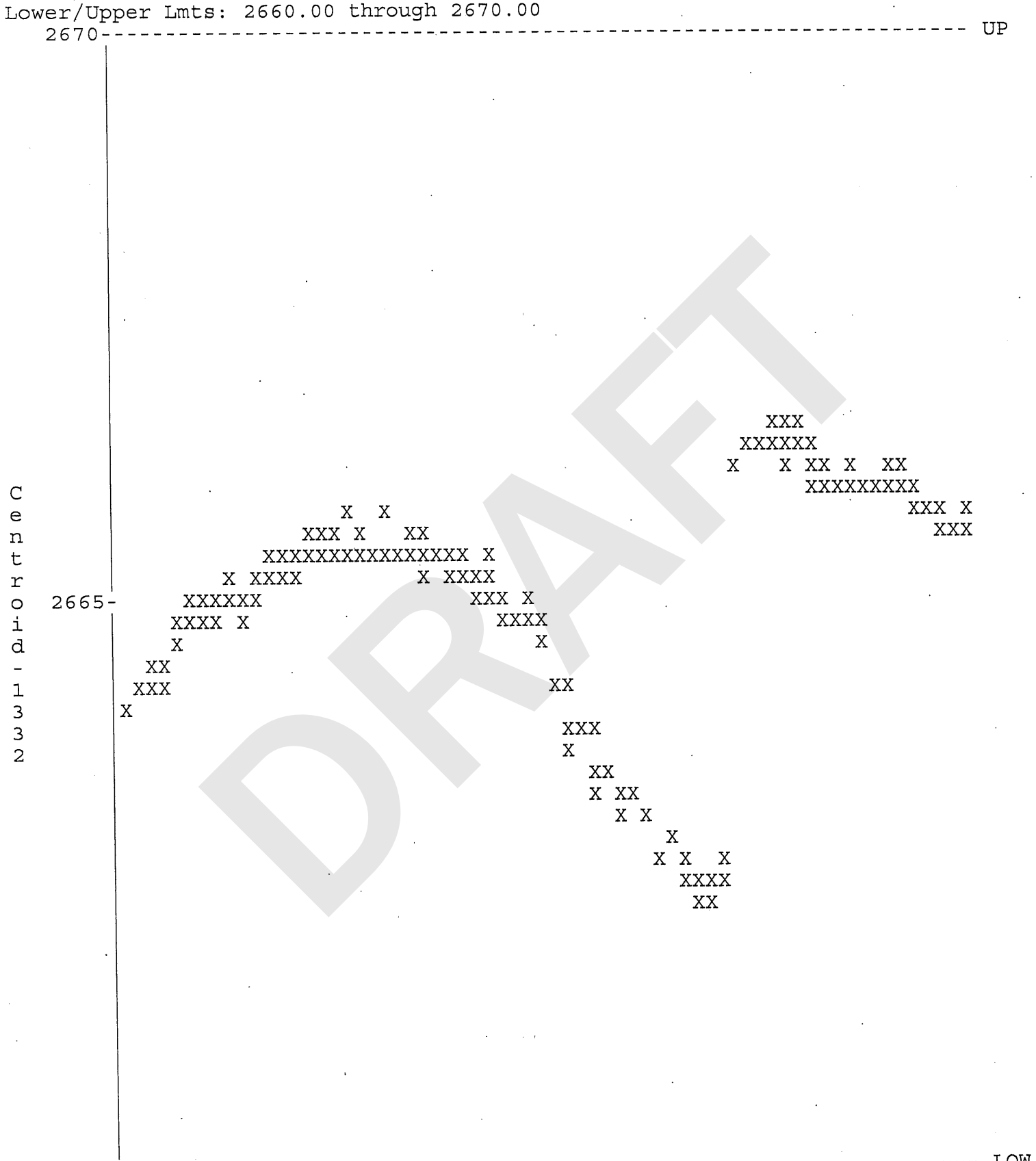
DRAFT

GAMMA SPECTROSCOPY

Daily Source and Background Checks

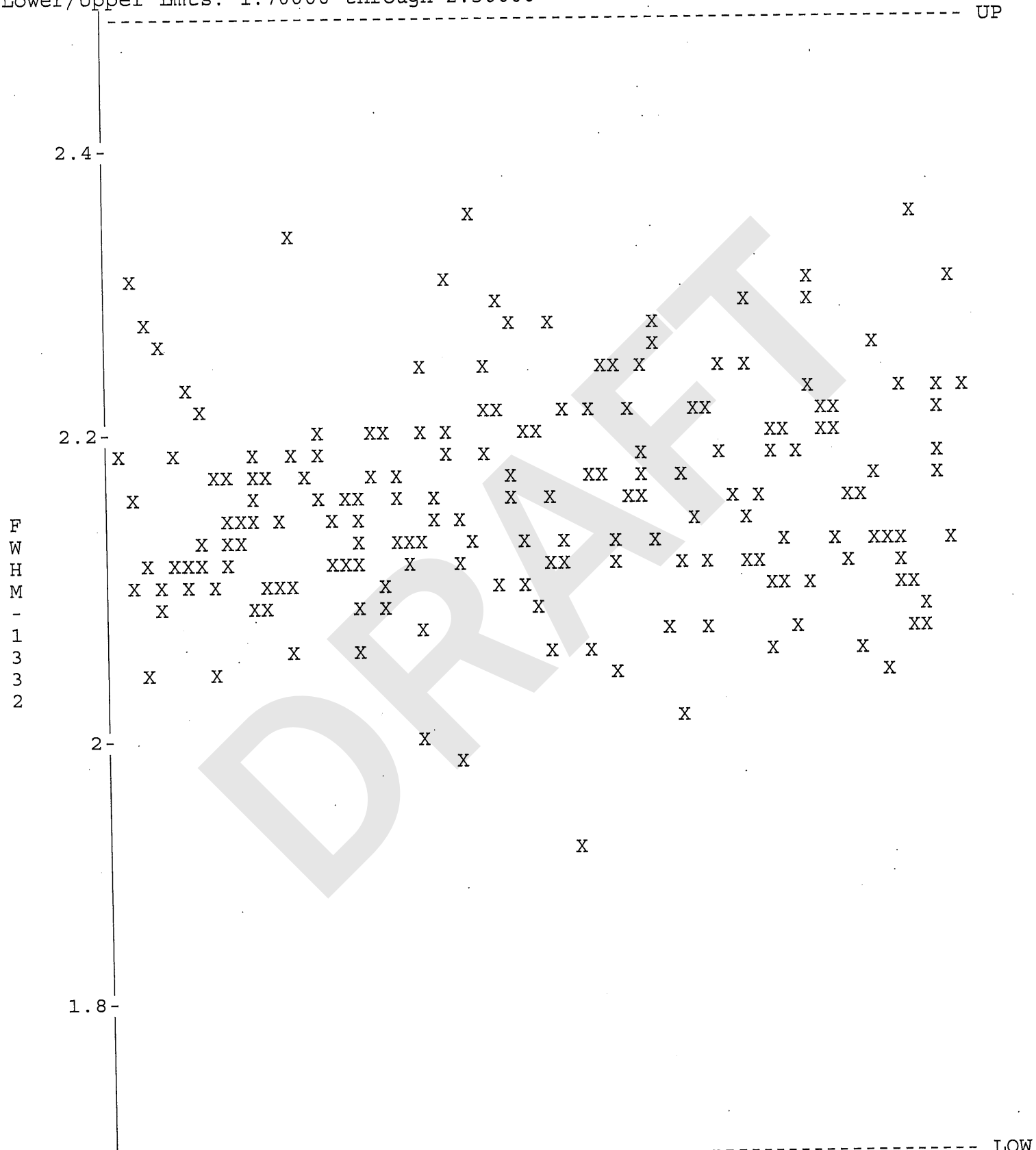
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



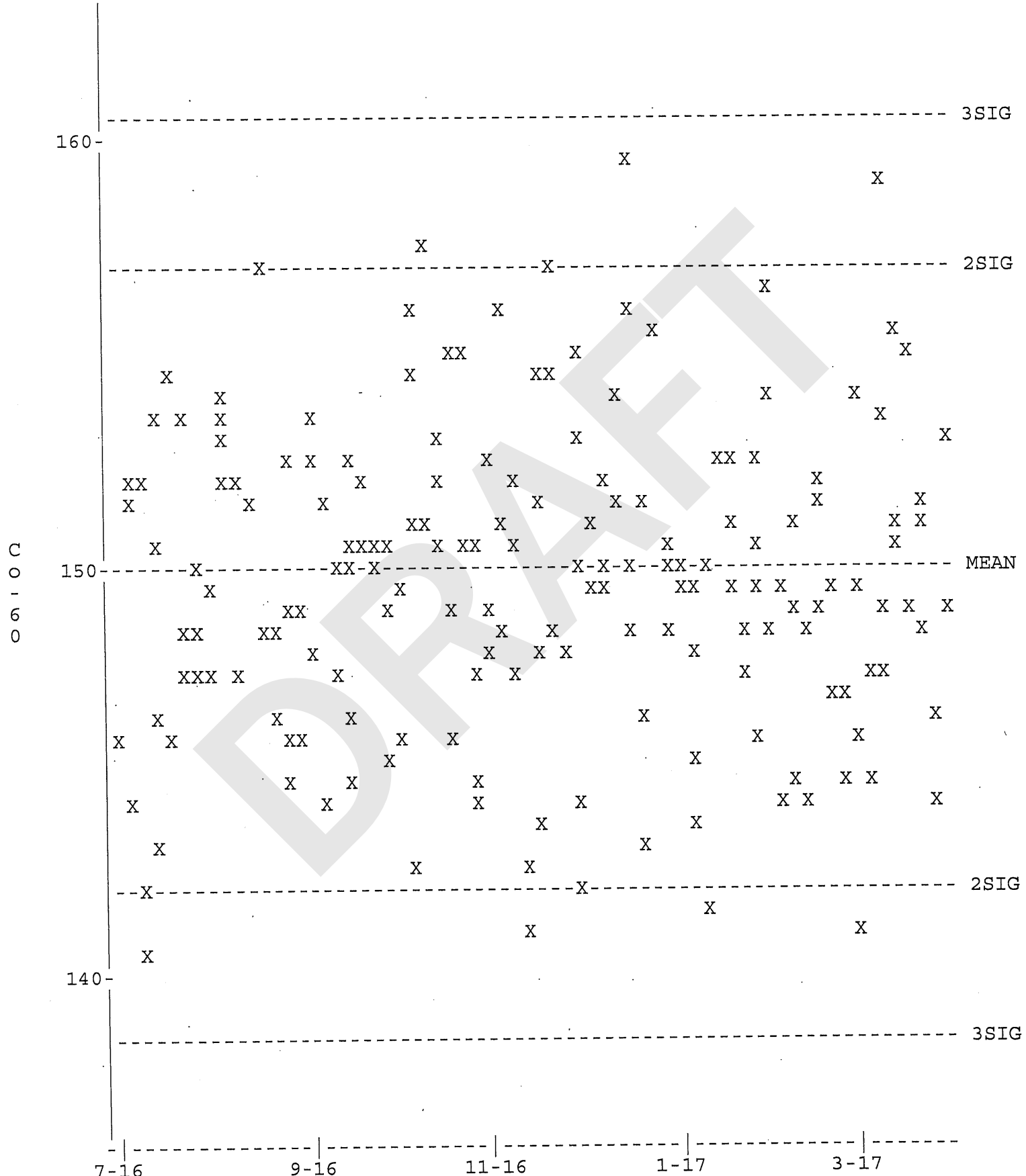
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.70000 through 2.50000



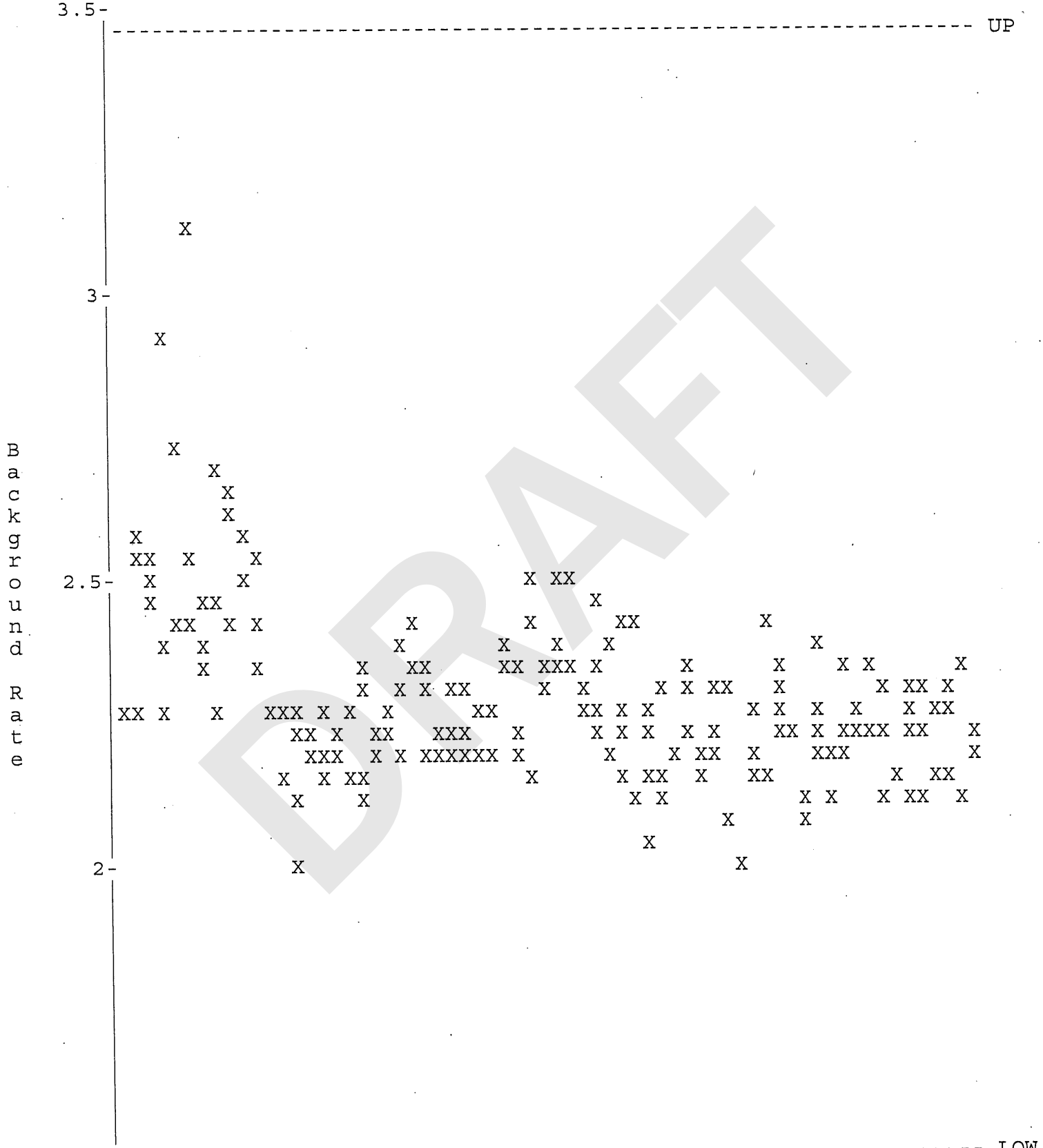
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE01_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Mean +- Std Dev : 149.834 +- 3.69888 (2.47 %)



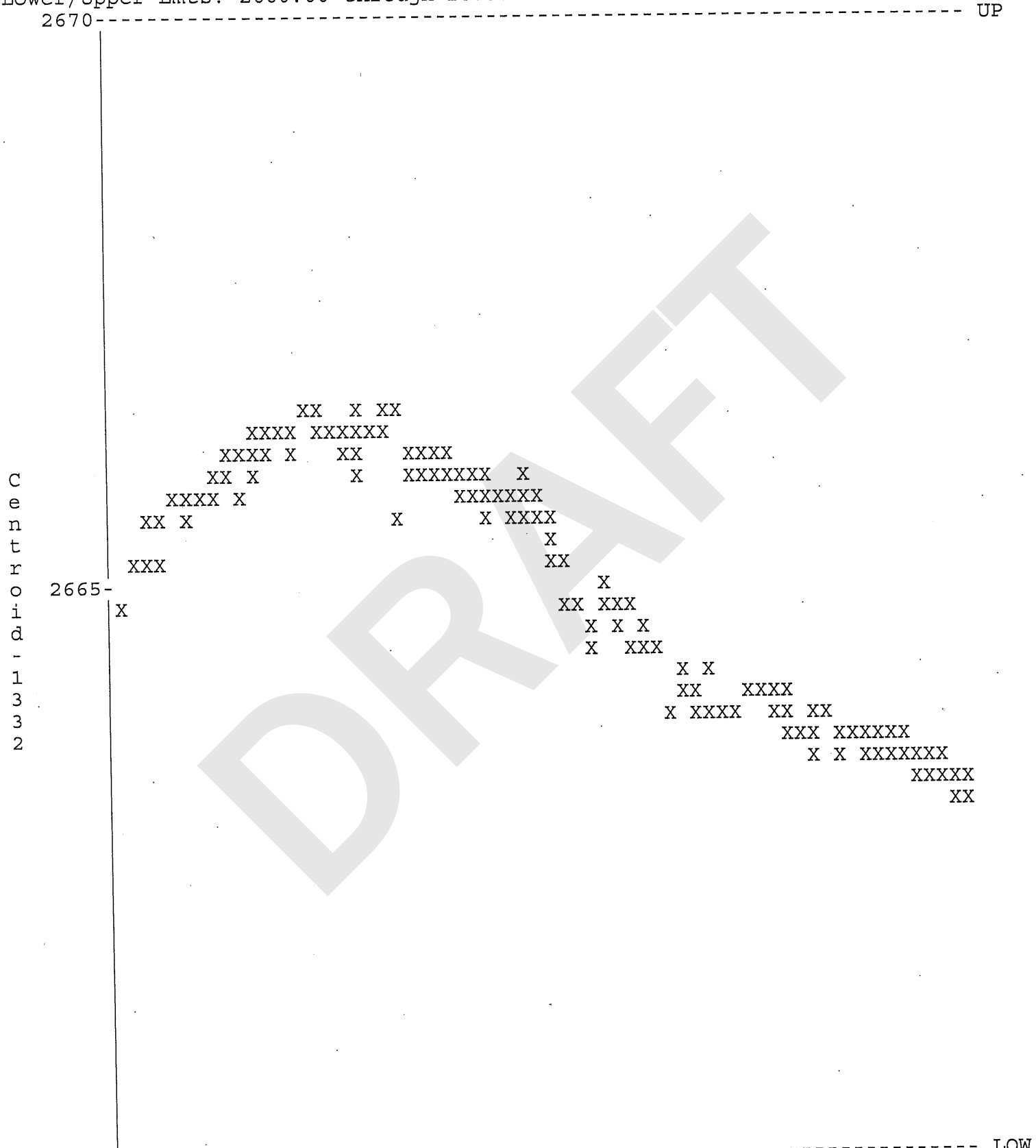
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE01_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 3.50000



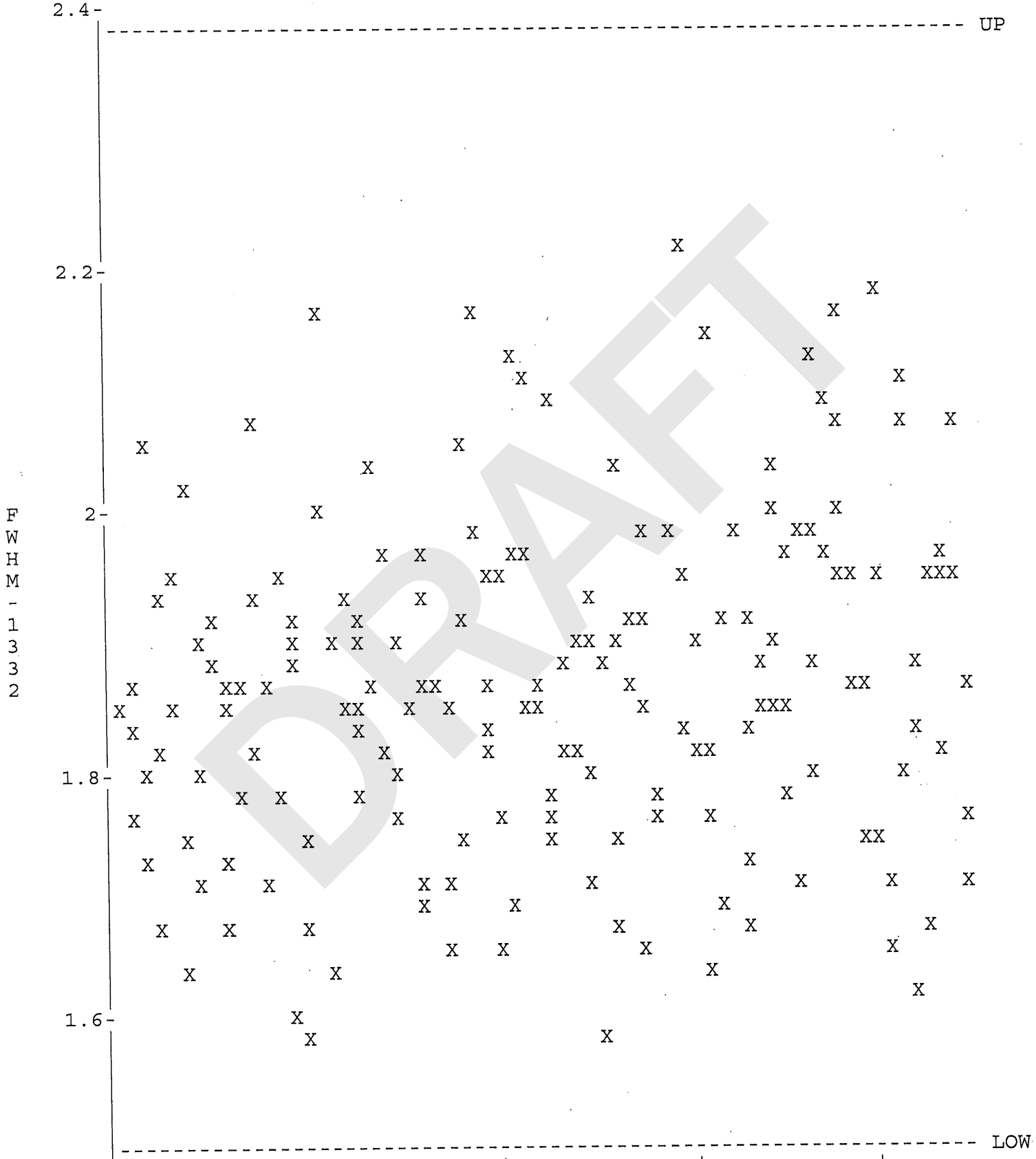
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



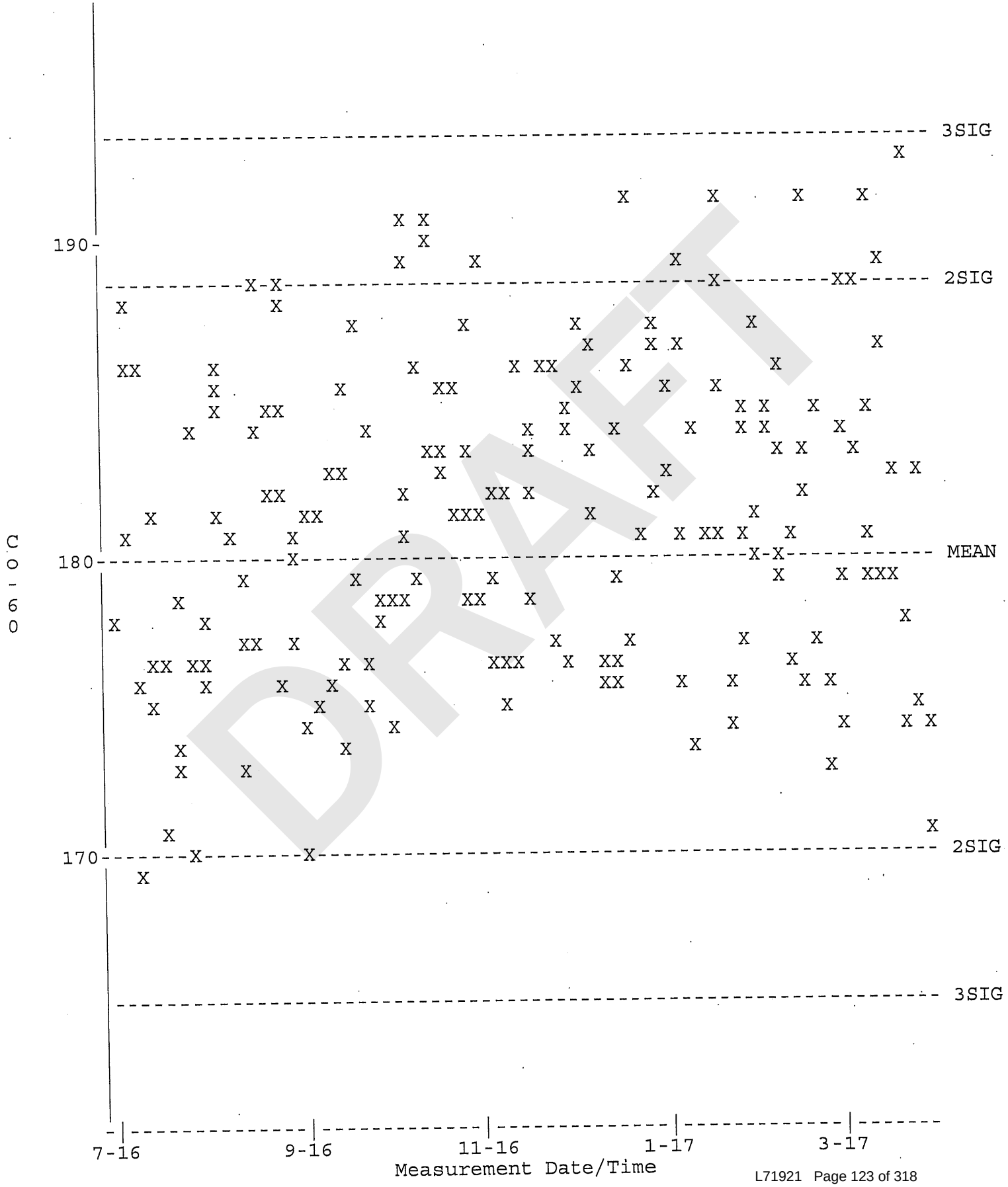
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.40000



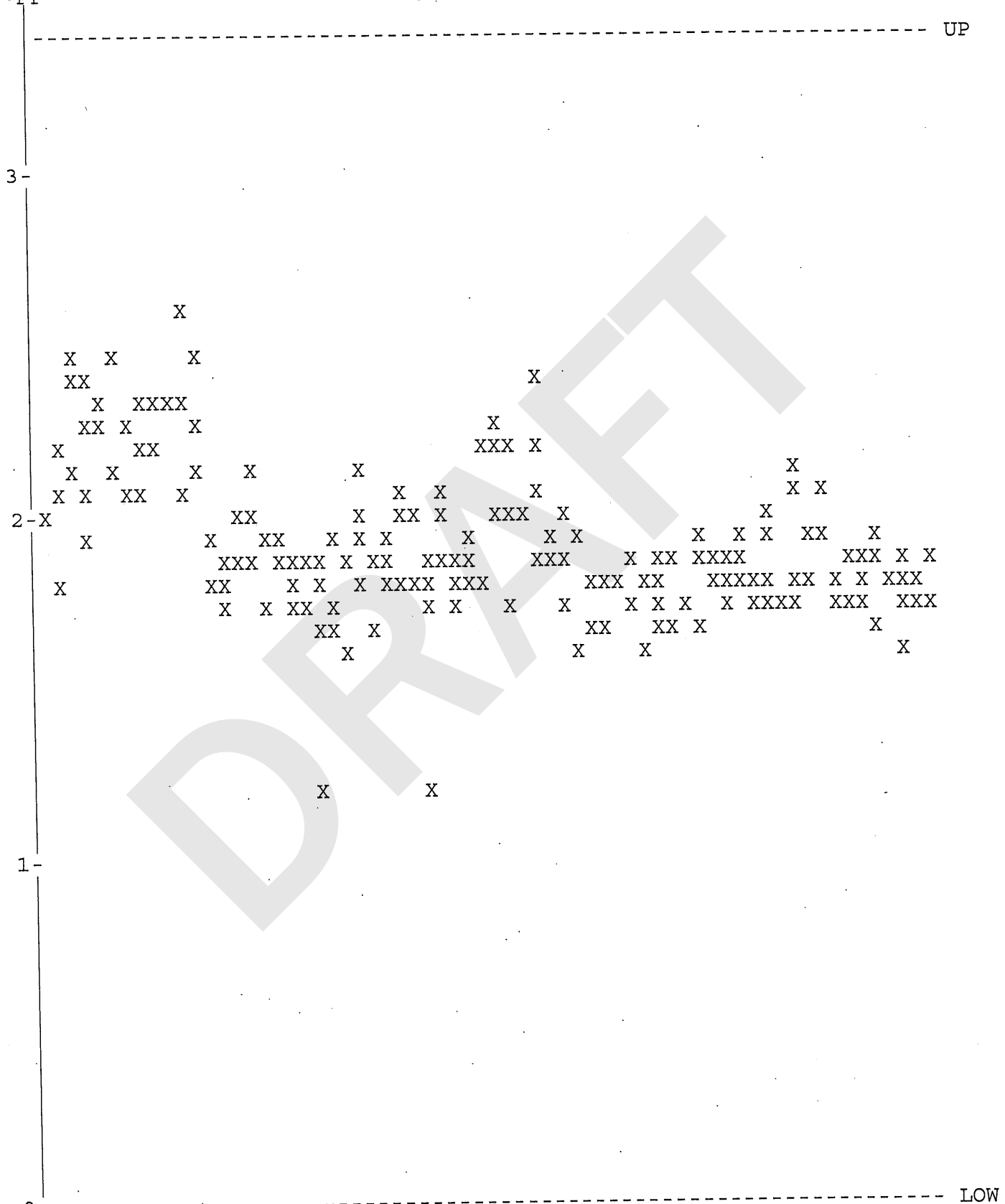
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE02_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Mean +- Std Dev : 179.674 +- 4.81923 (2.68 %)



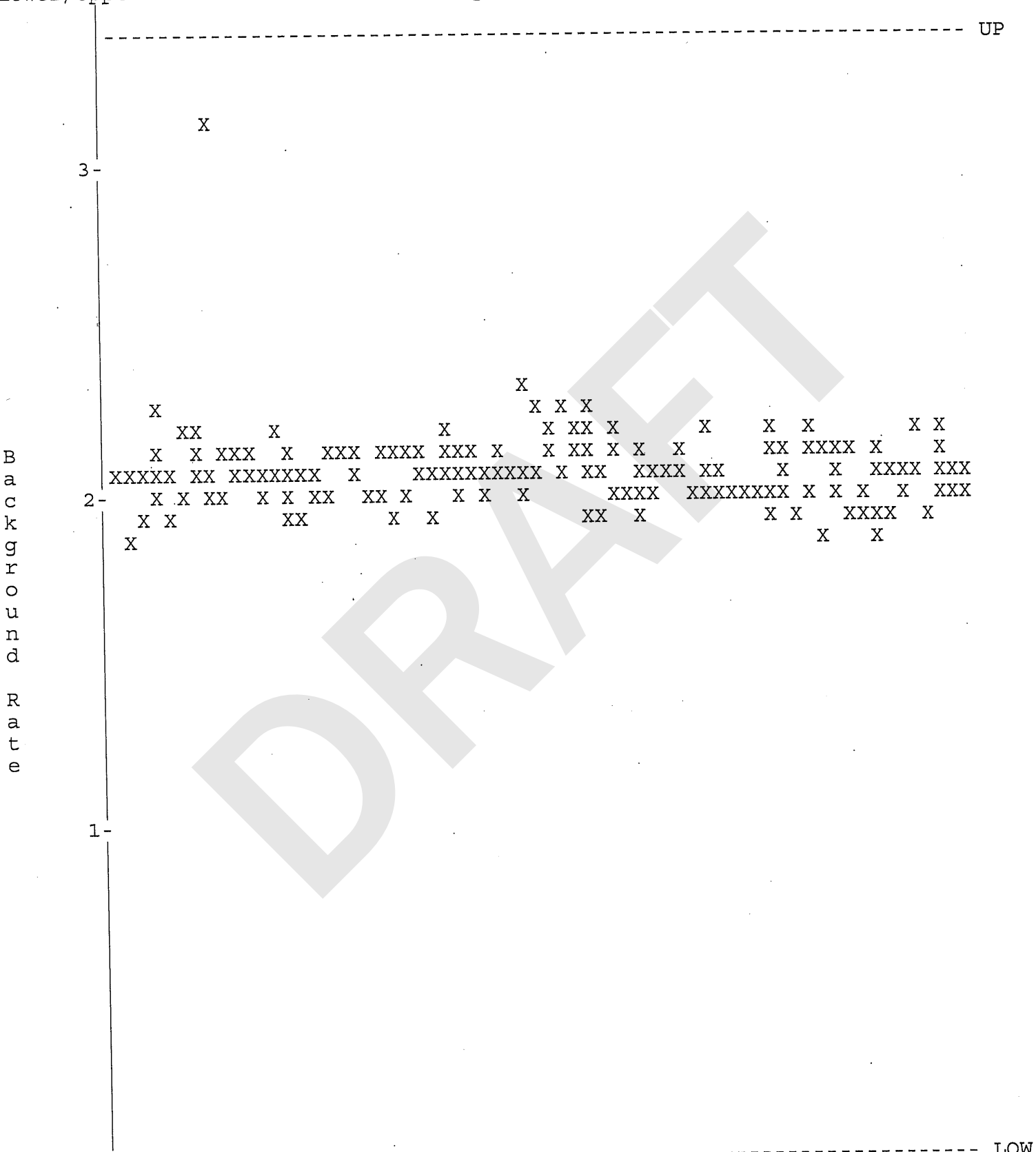
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QA filename : DKB100:[GAMMA.QUALITY]TBE02_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



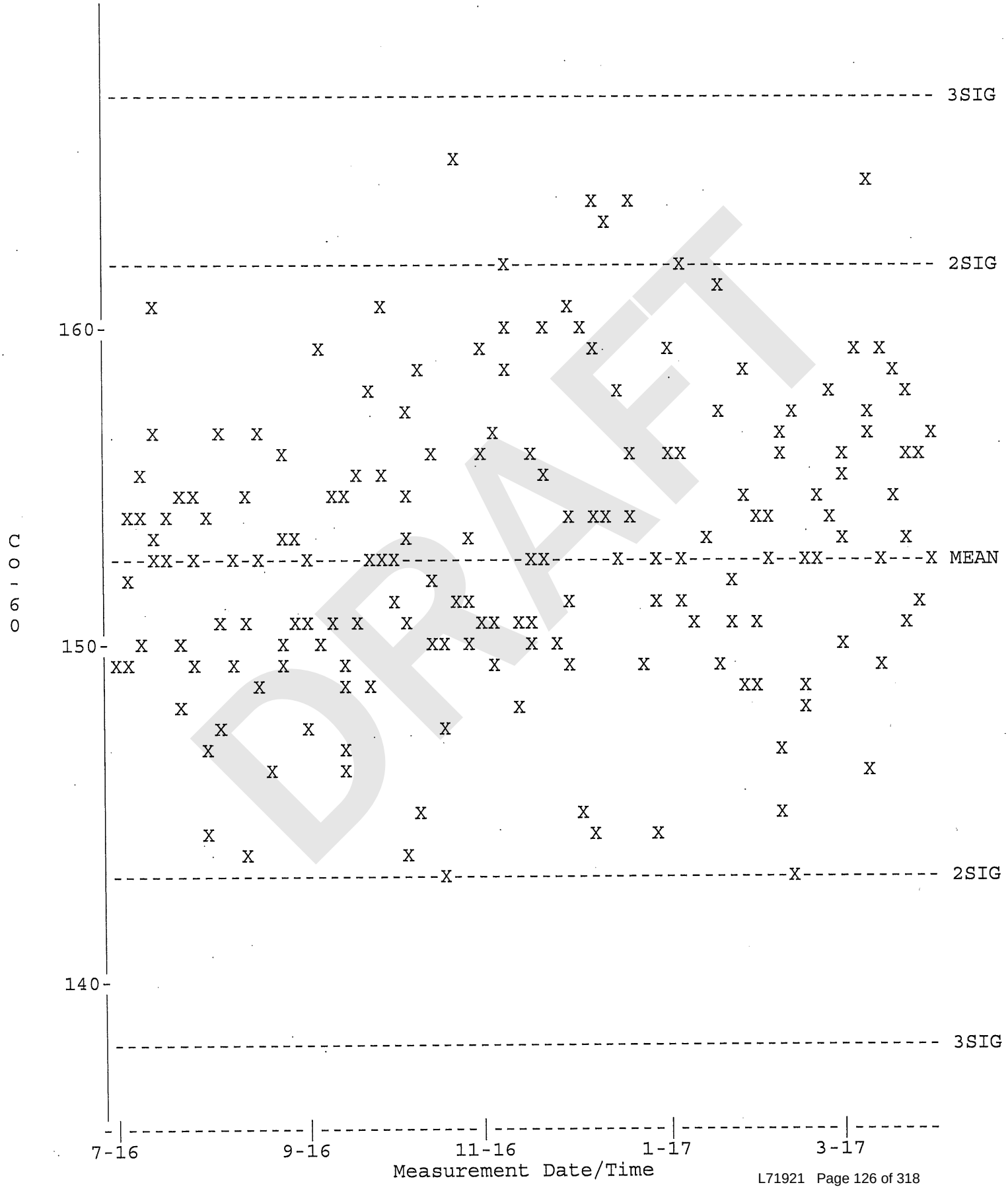
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE06_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:13 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



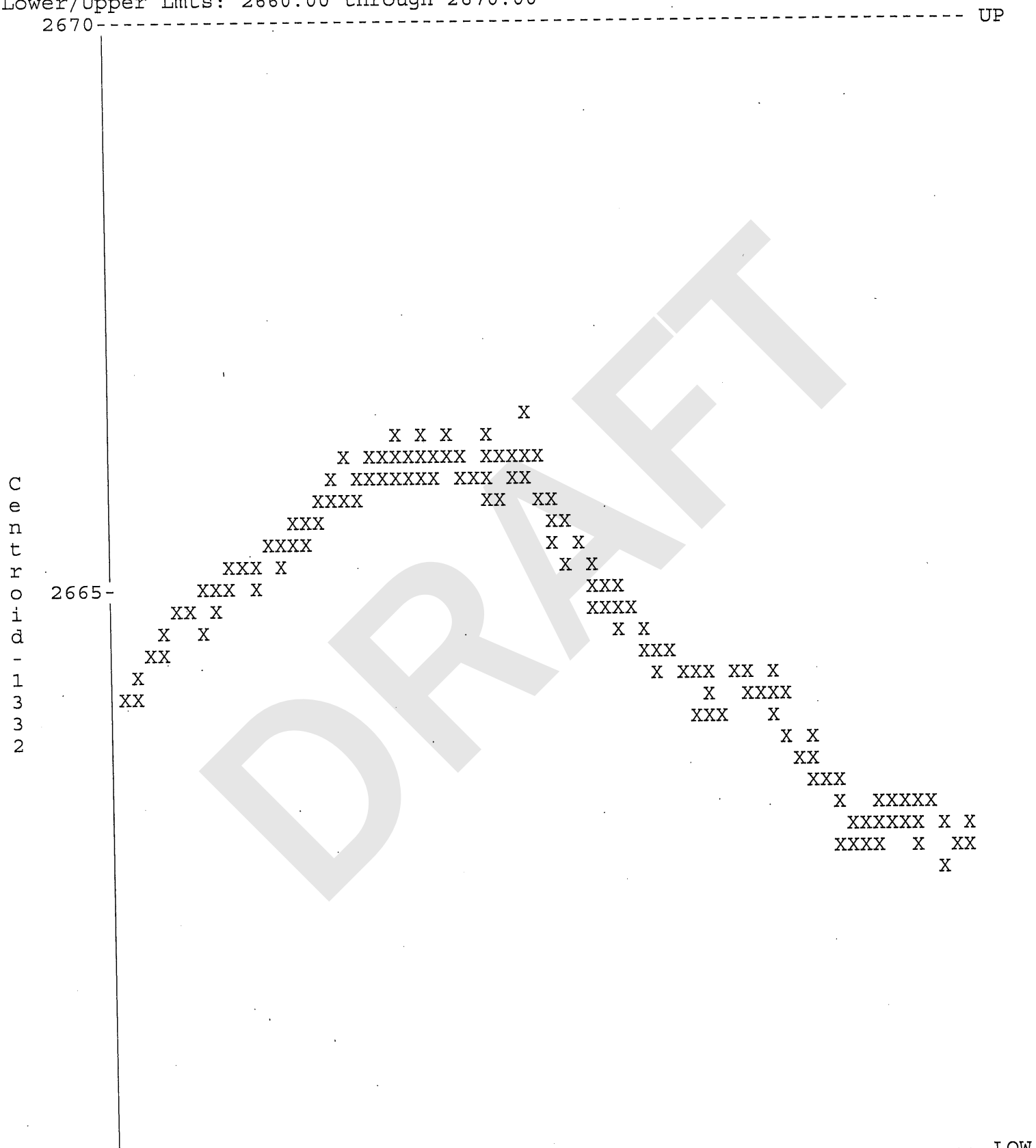
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Mean +- Std Dev : 152.759 +- 4.77464 (3.13 %)



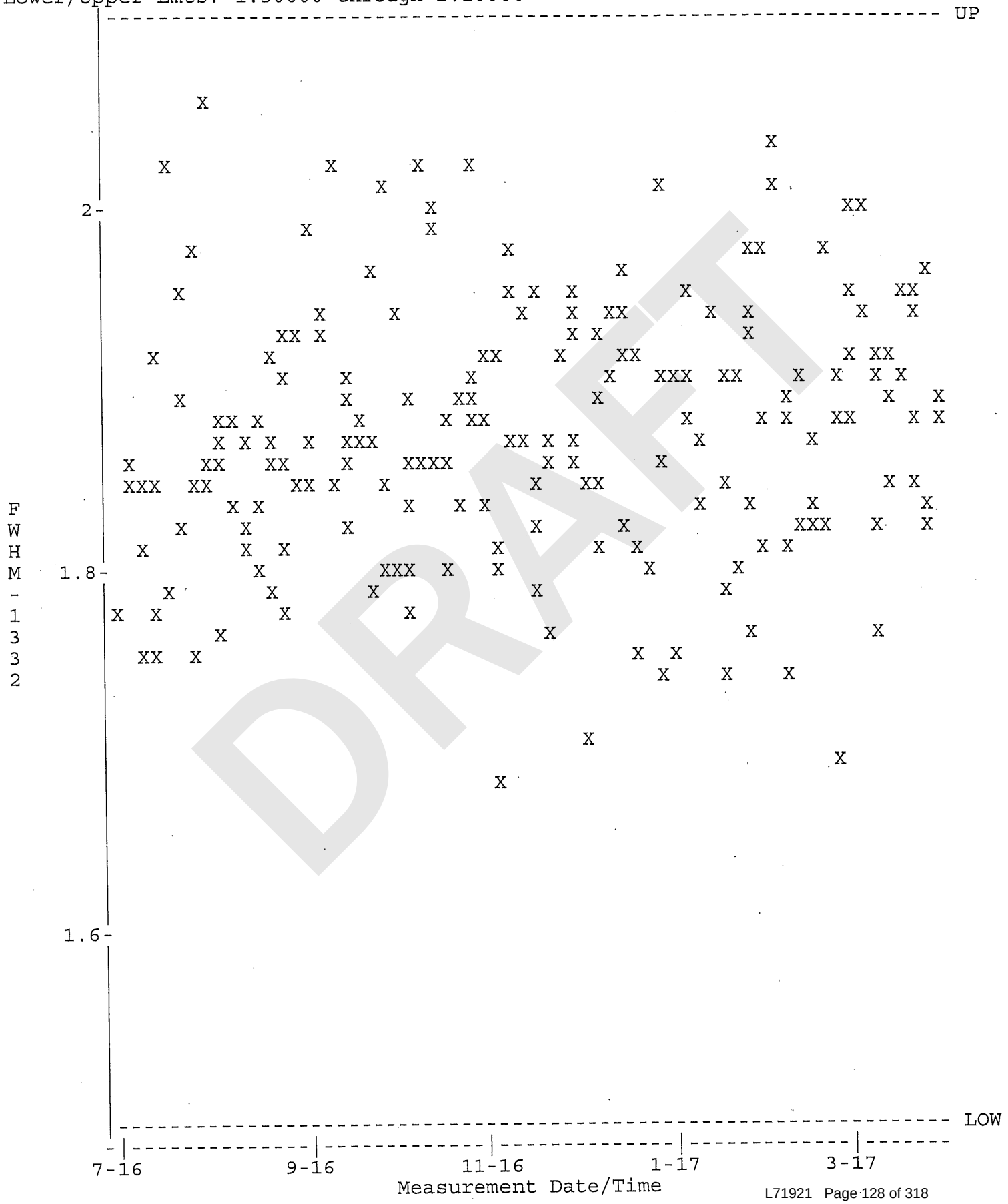
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



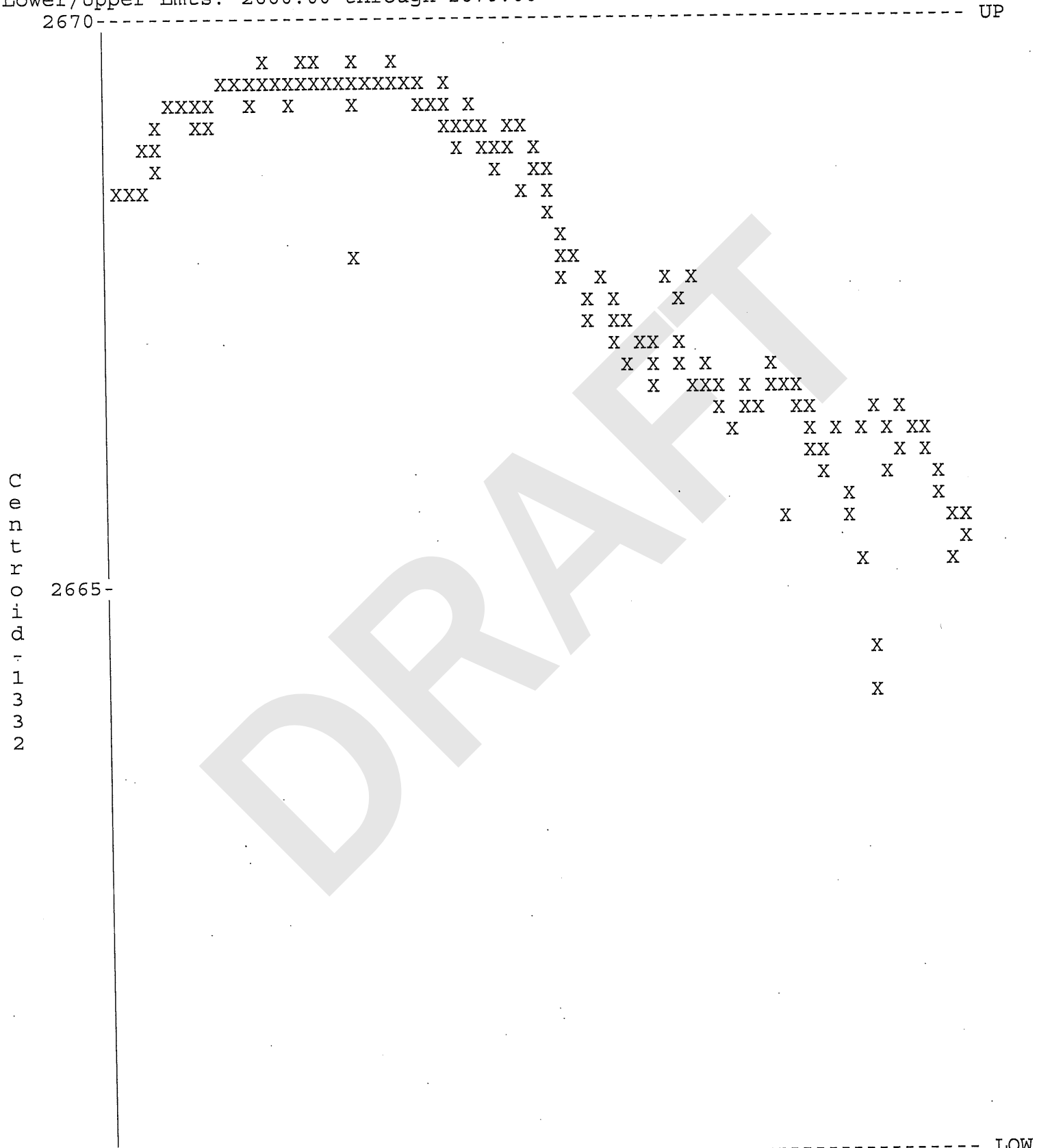
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE06_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.10000



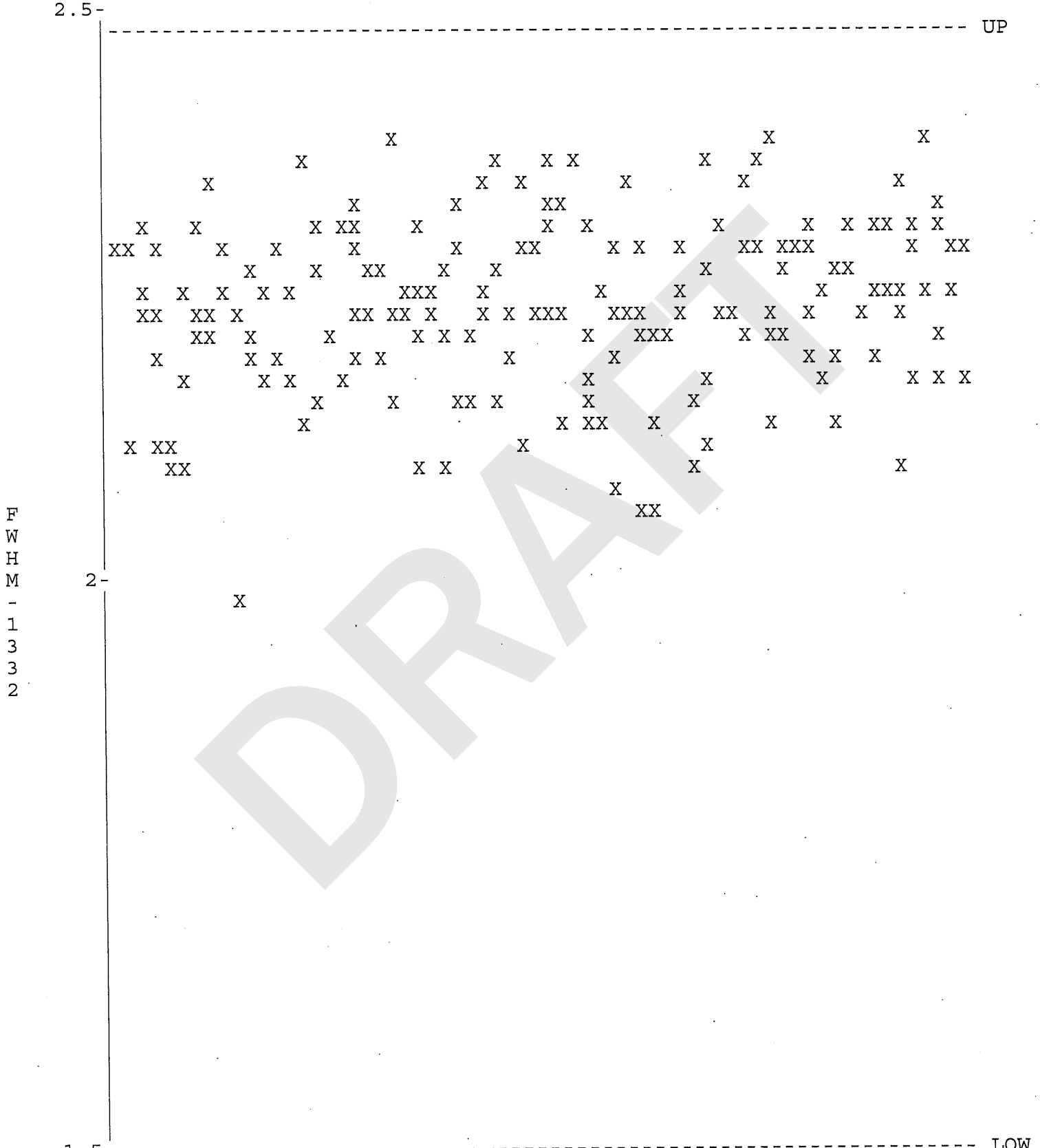
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



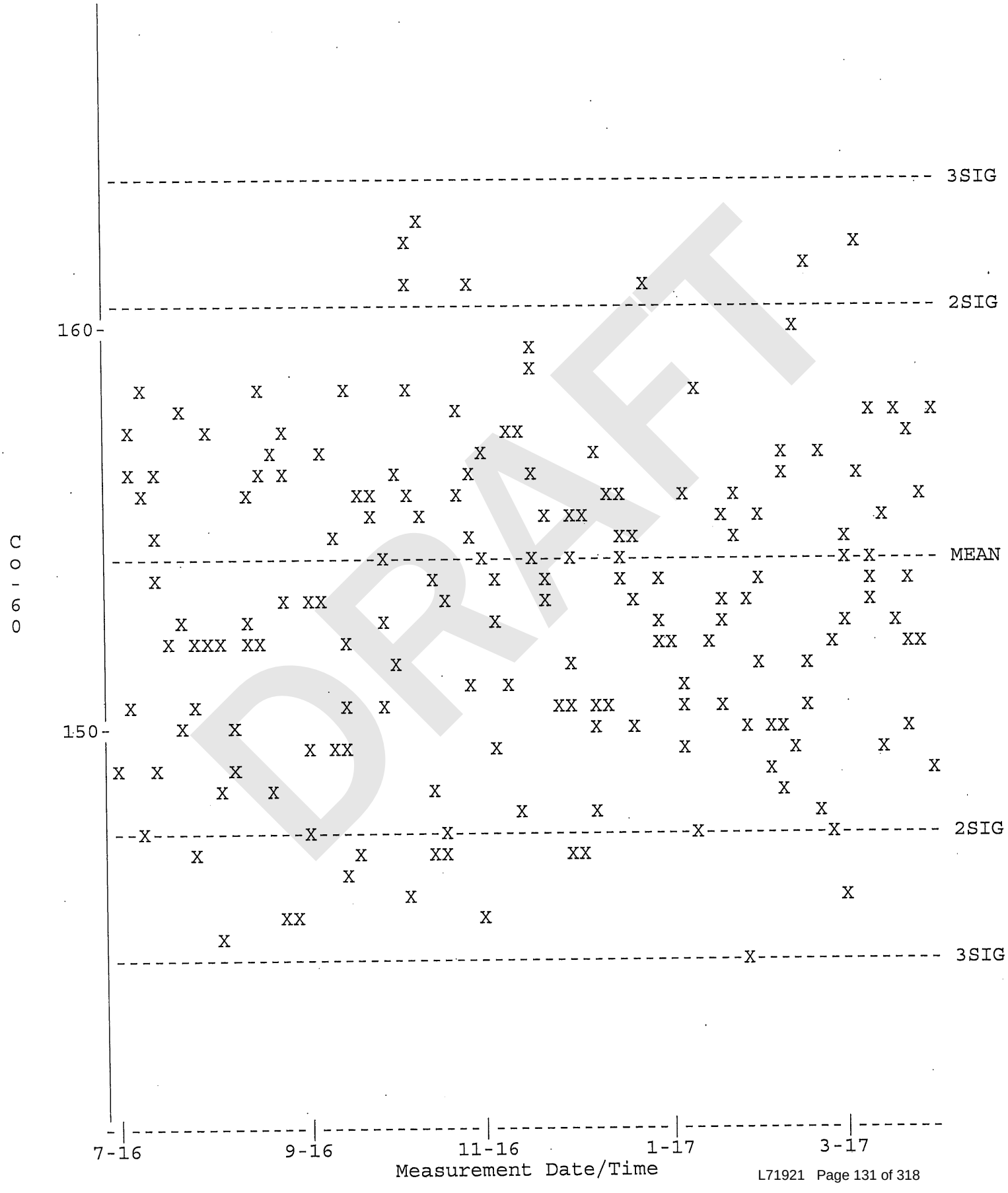
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.50000 through 2.50000



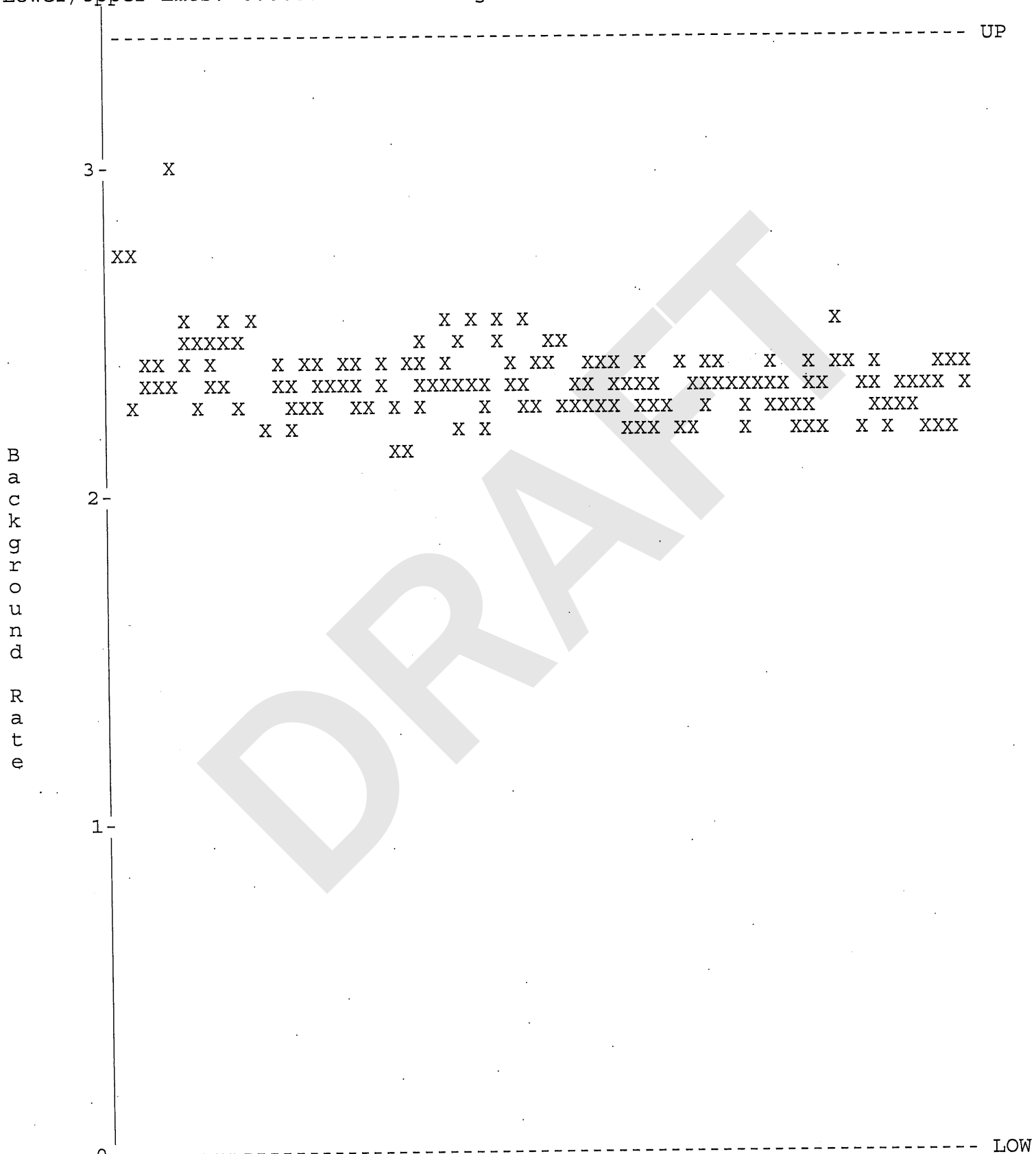
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE07_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Mean +- Std Dev : 154.048 +- 3.18076 (2.06 %)



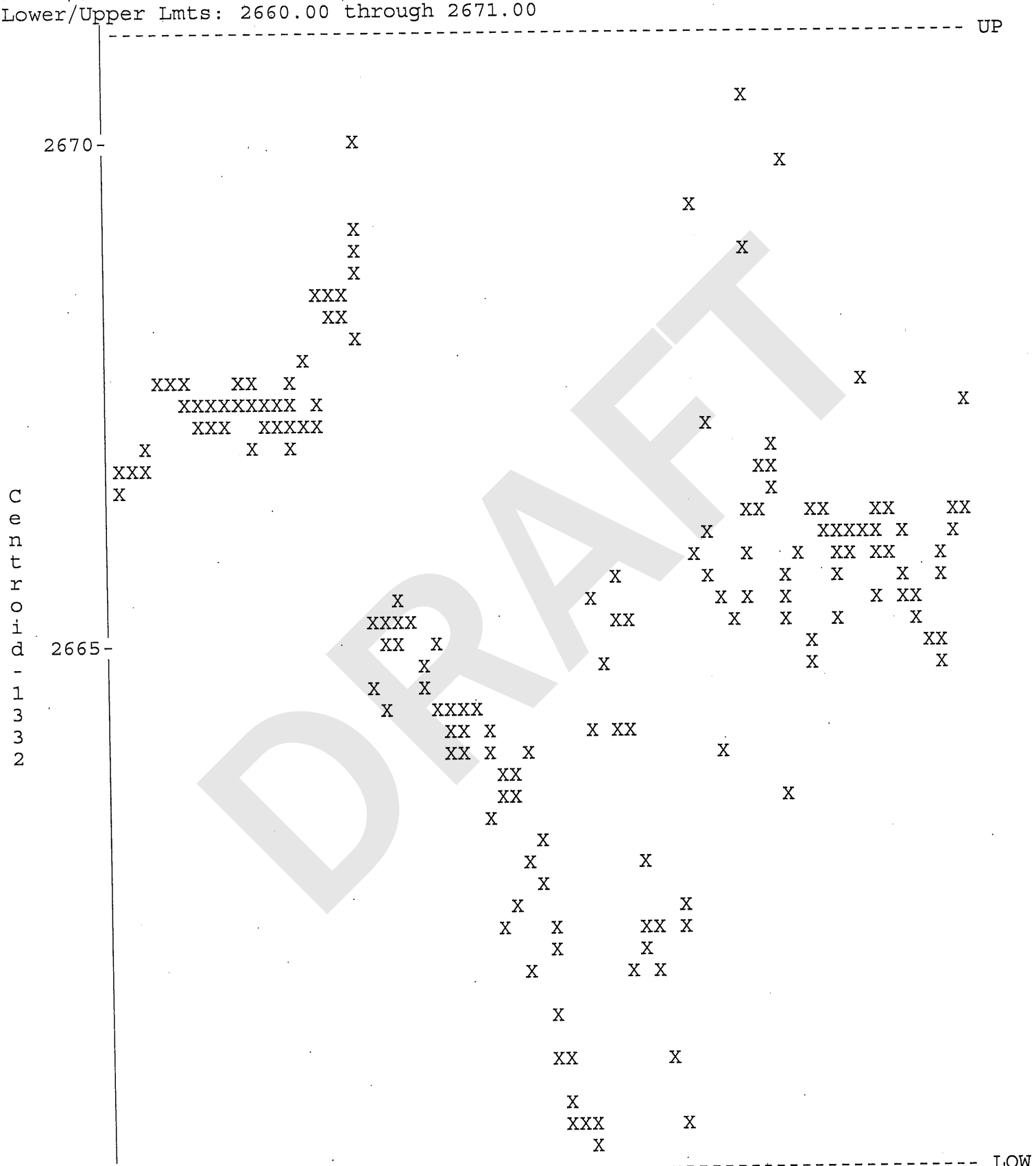
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE07_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:10 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



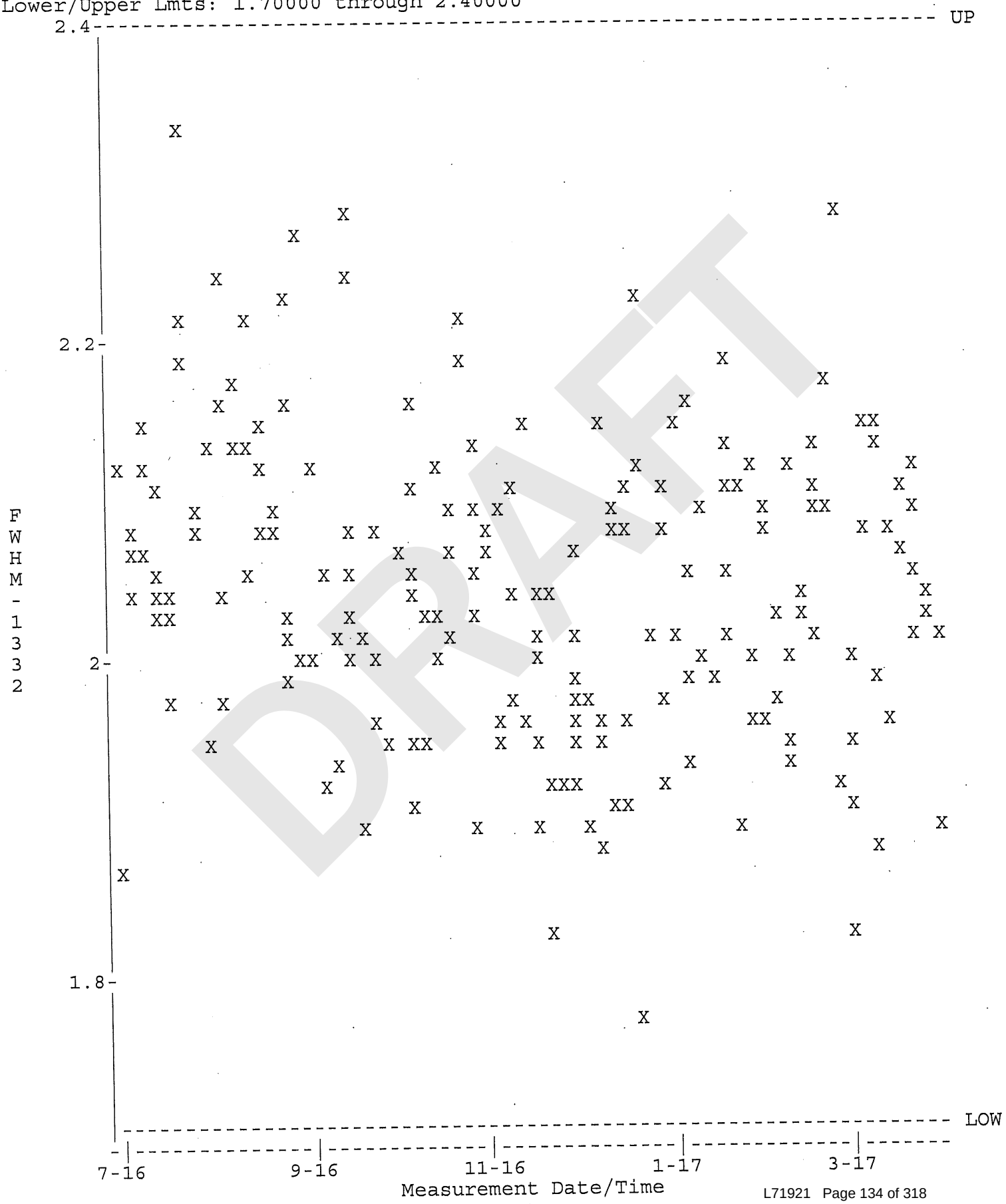
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2671.00



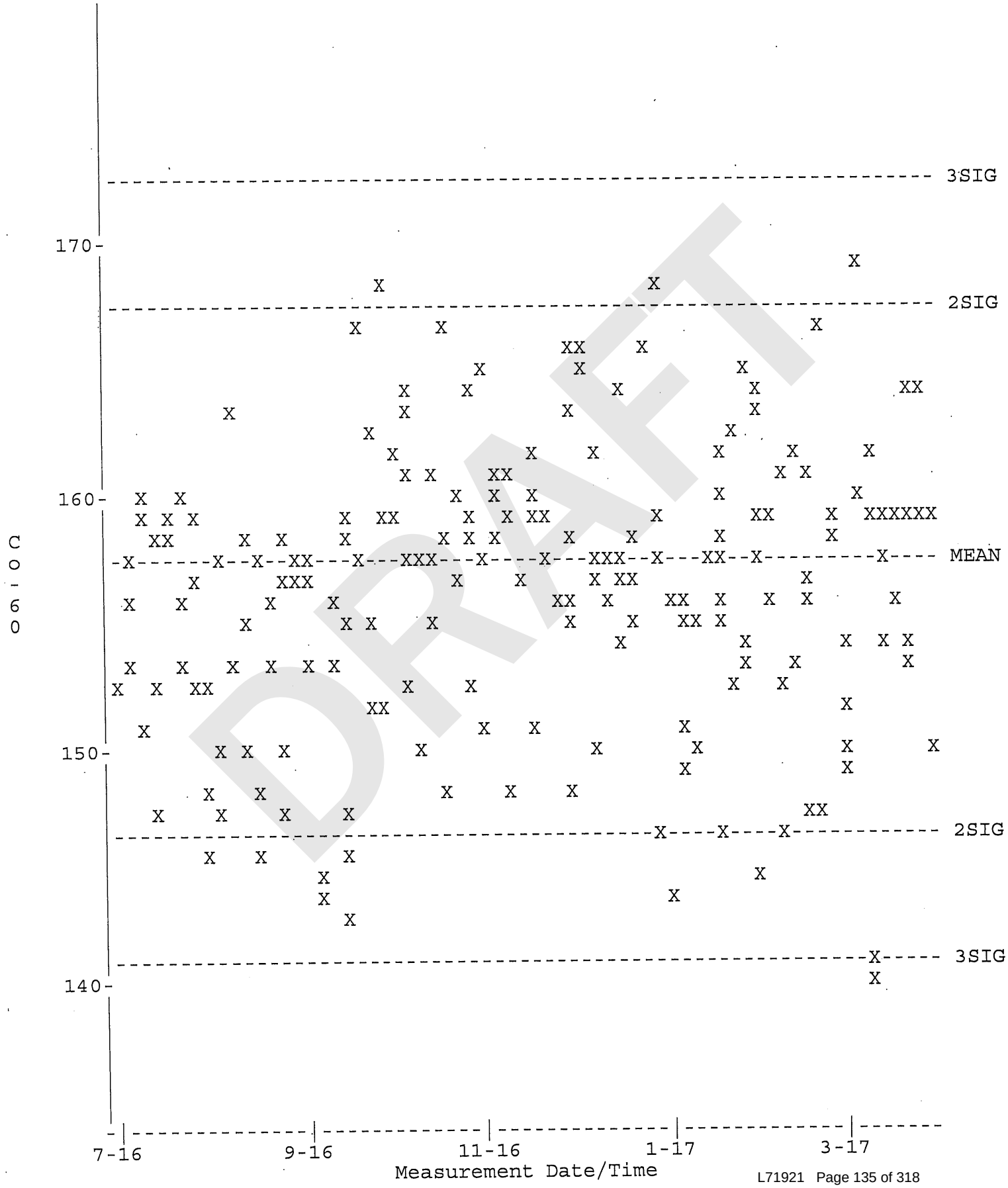
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.70000 through 2.40000



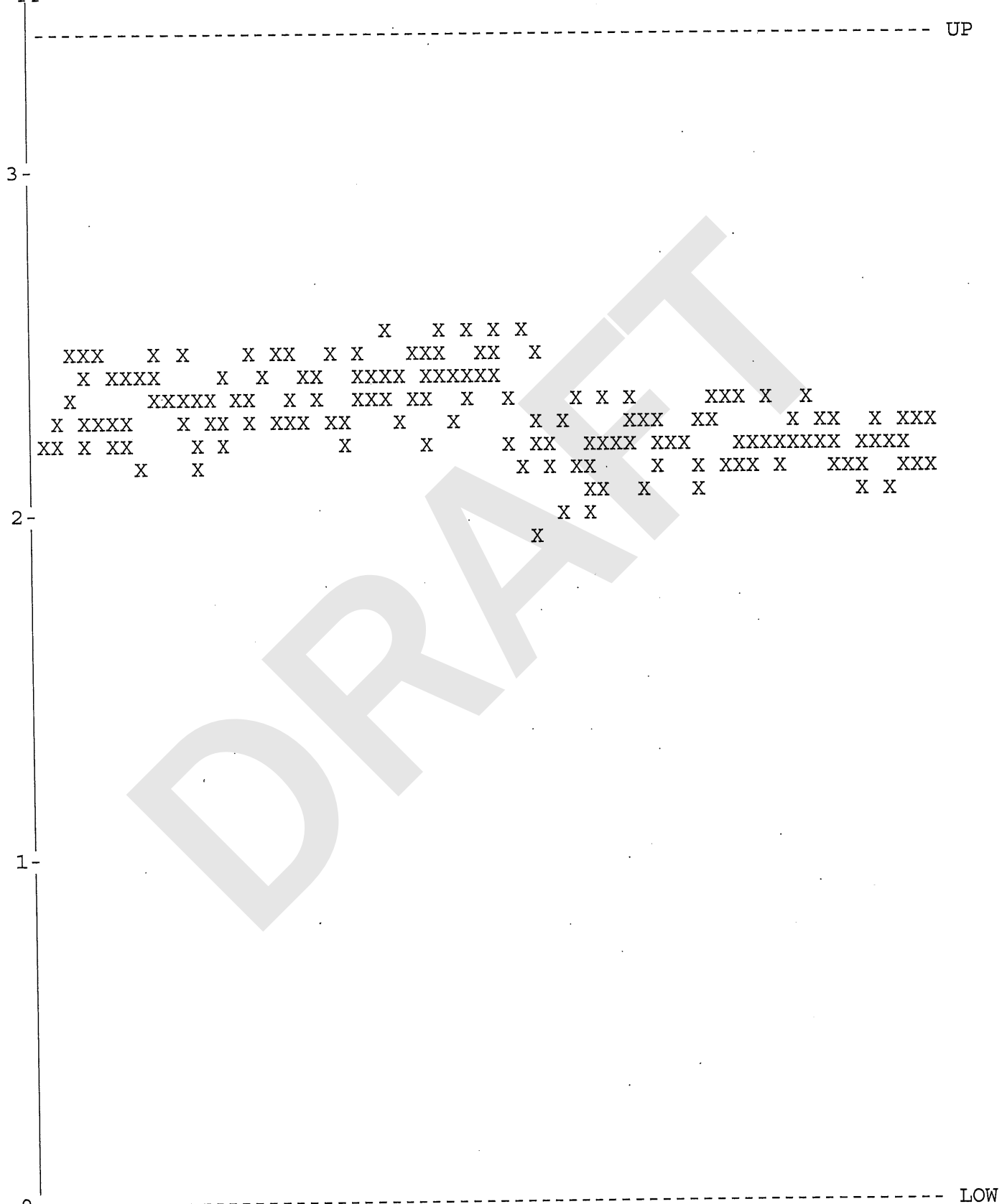
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE08_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:09 through 30-MAR-2017 00:00
Mean +- Std Dev : 157.382 +- 5.24375 (3.33 %)



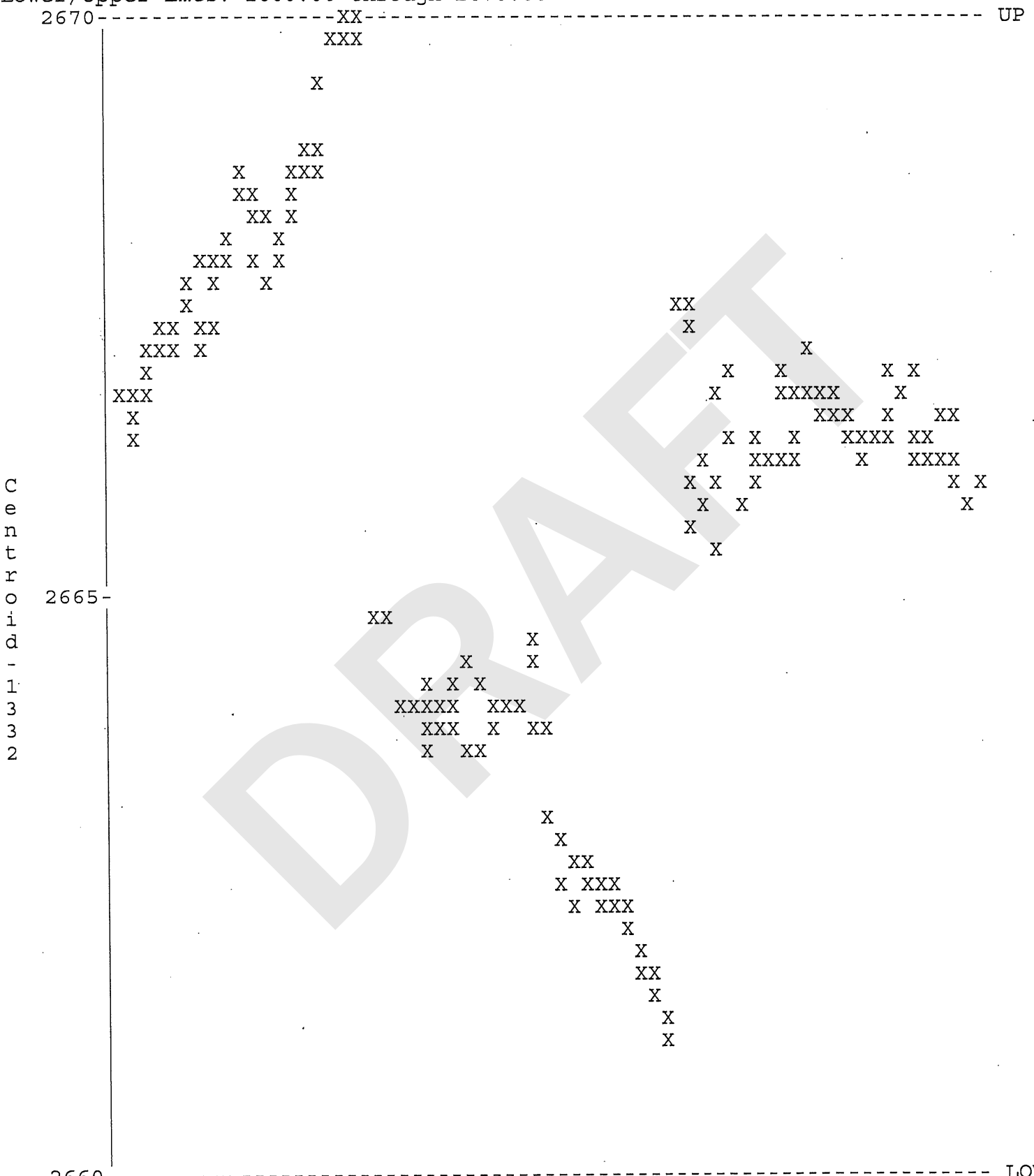
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QA filename : DKB100:[GAMMA.QUALITY]TBE08_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:25 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



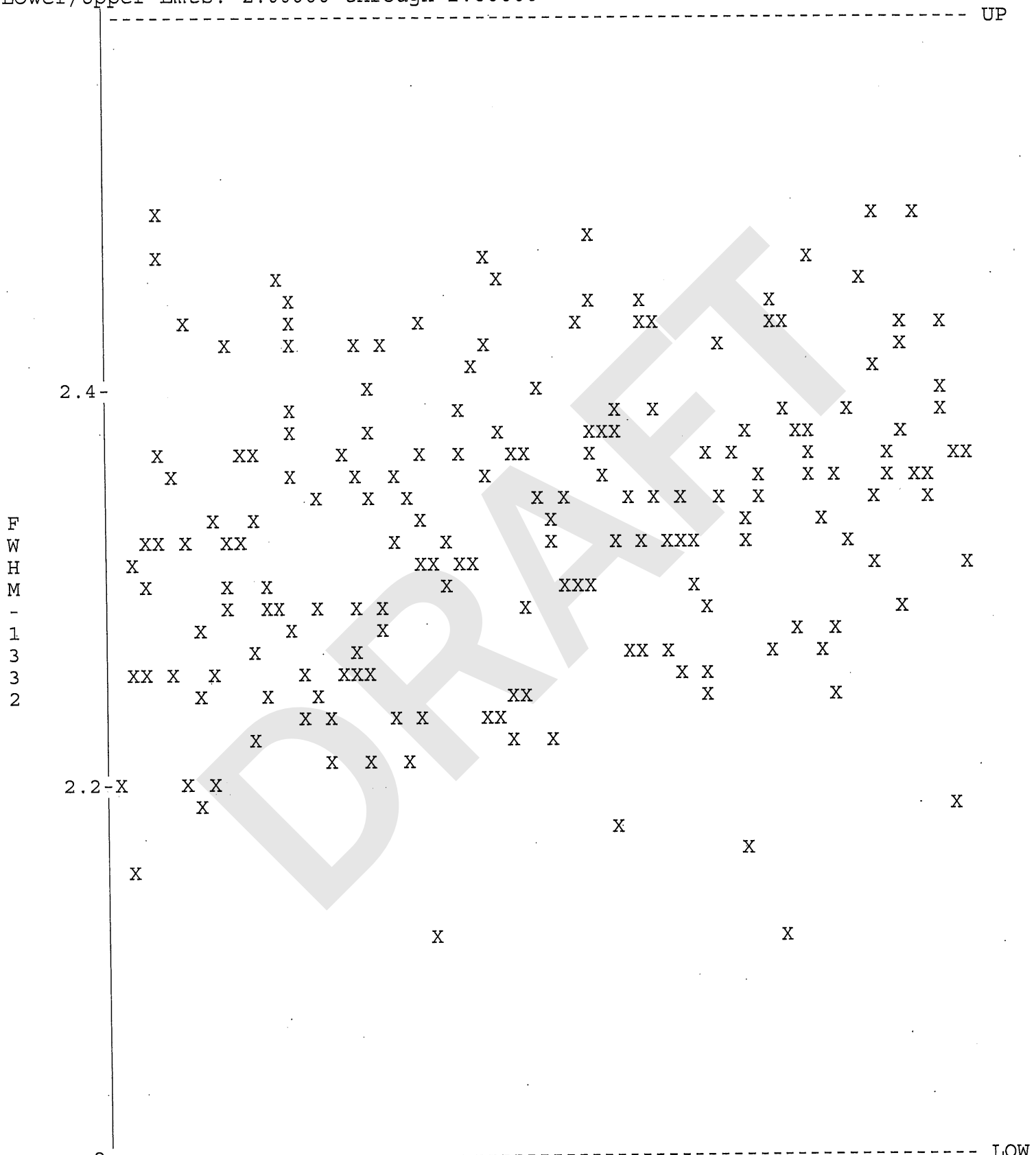
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



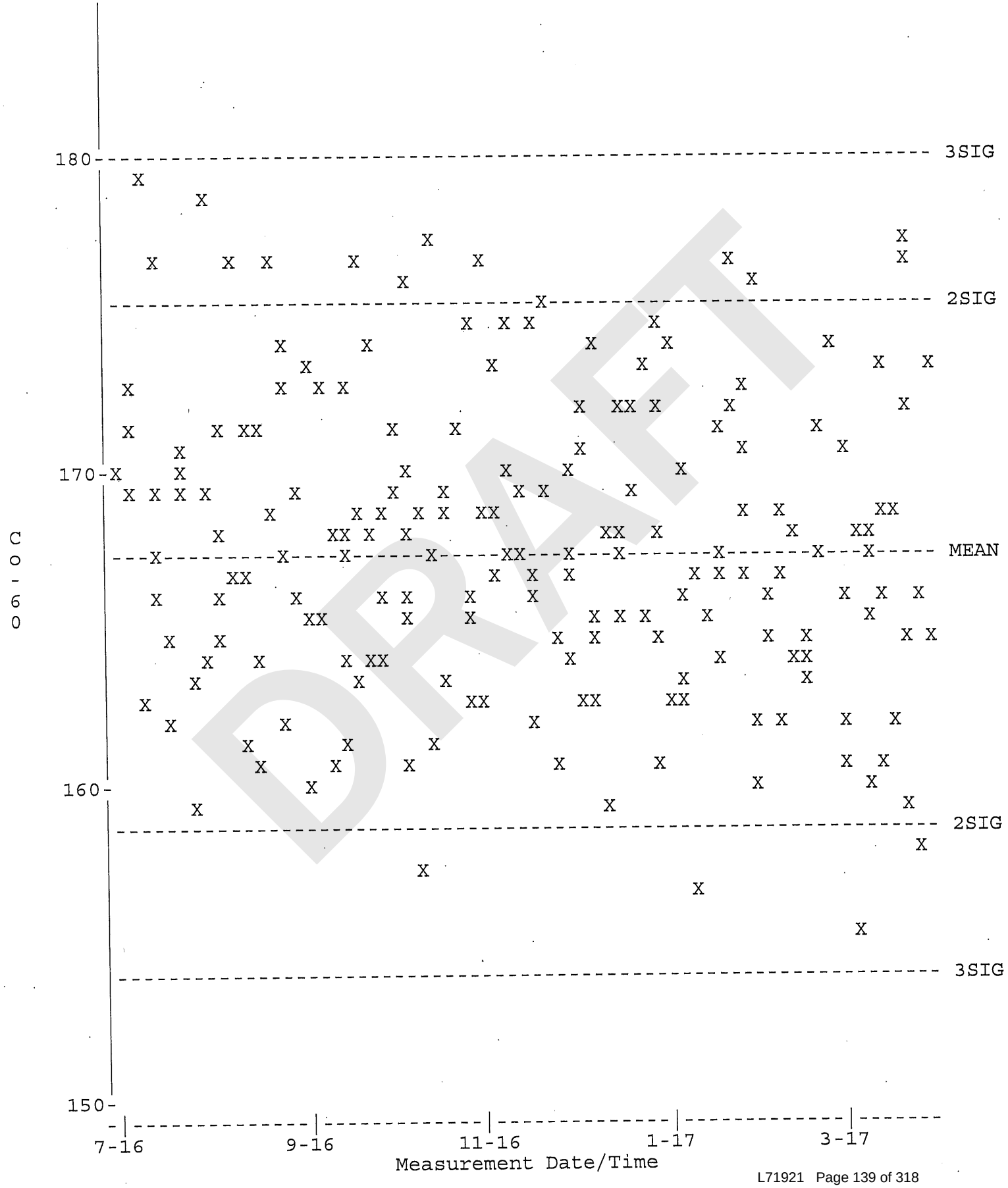
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2.00000 through 2.60000



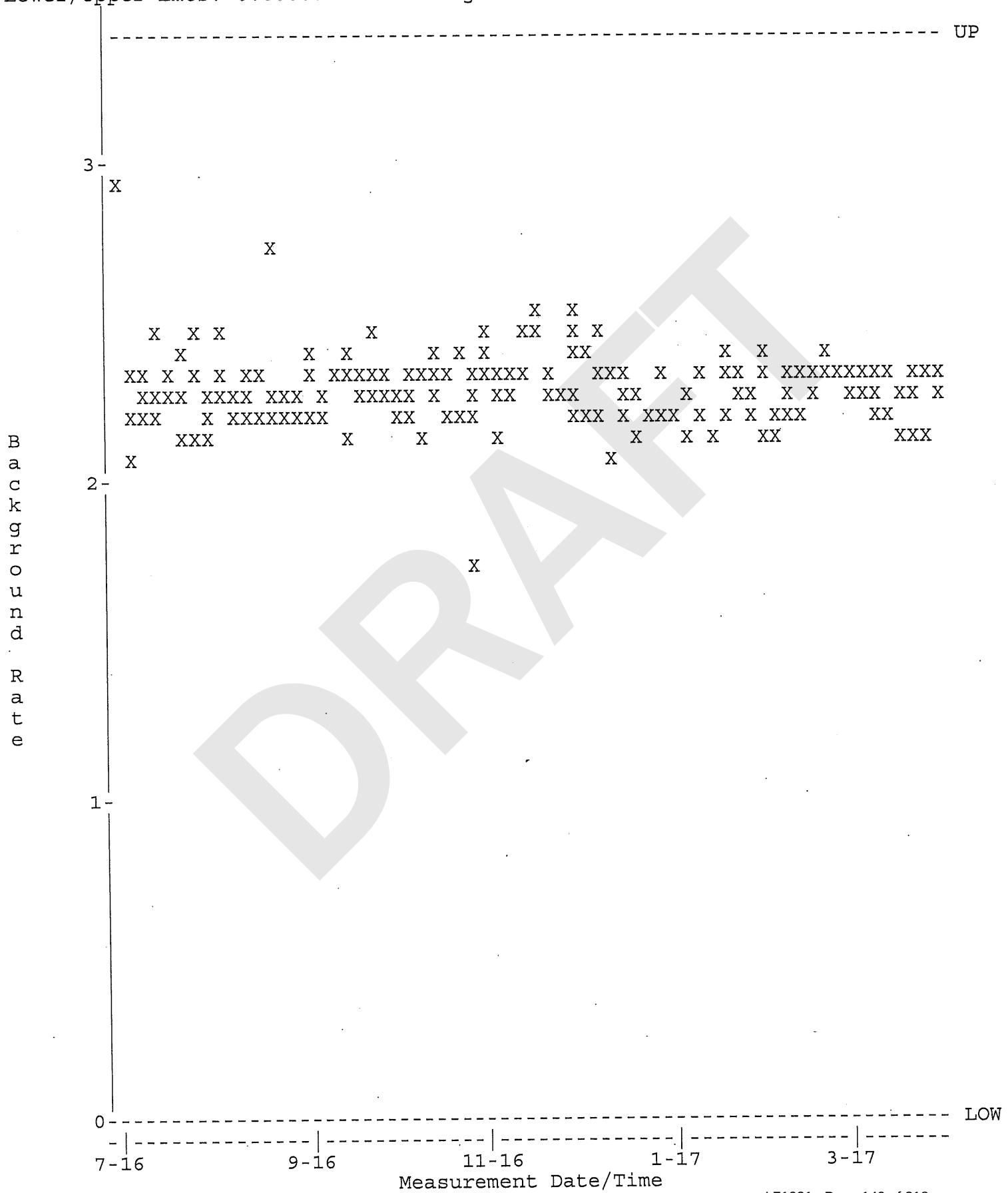
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE14_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Mean +- Std Dev : 167.424 +- 4.31182 (2.58 %)



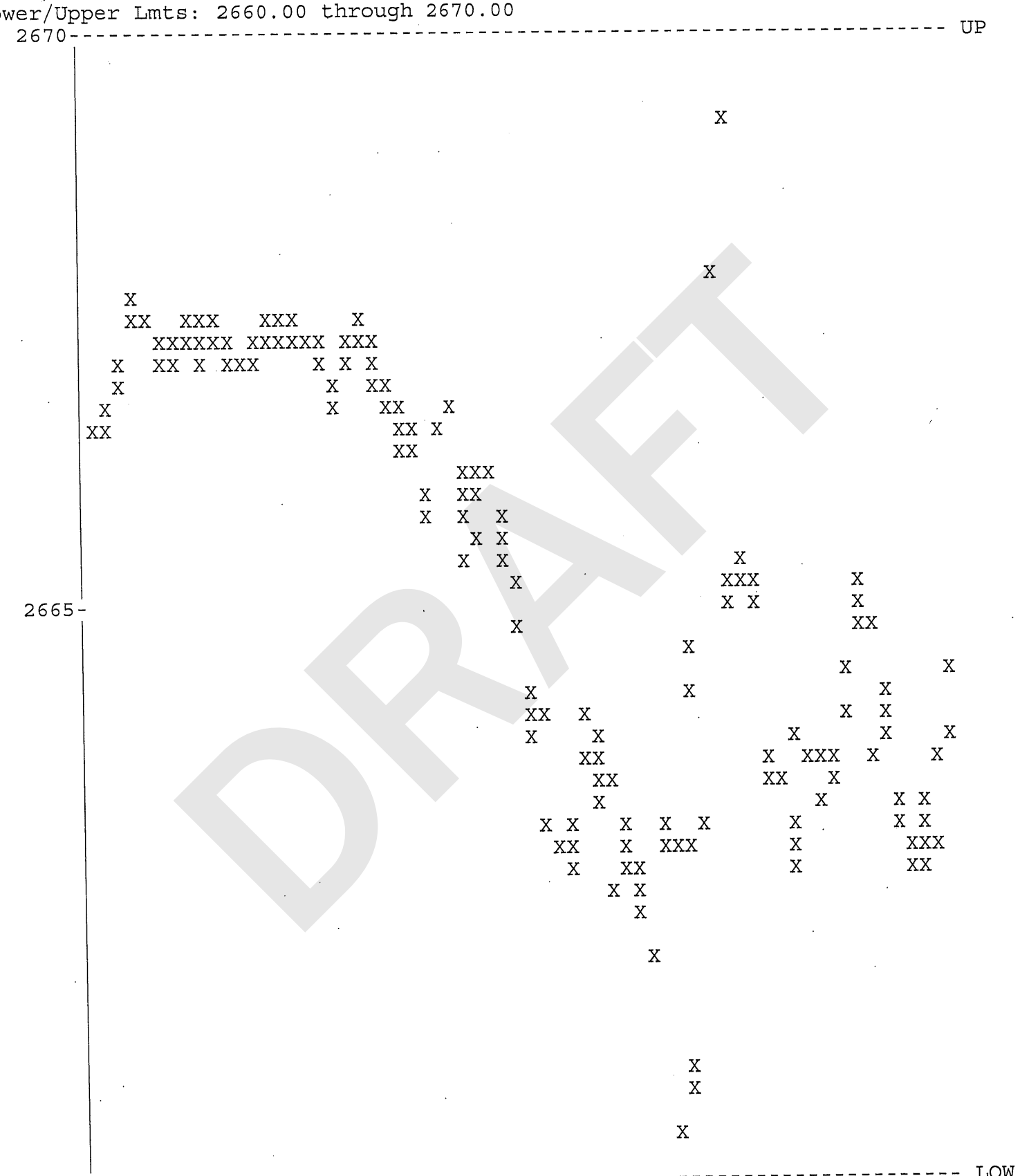
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE14_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



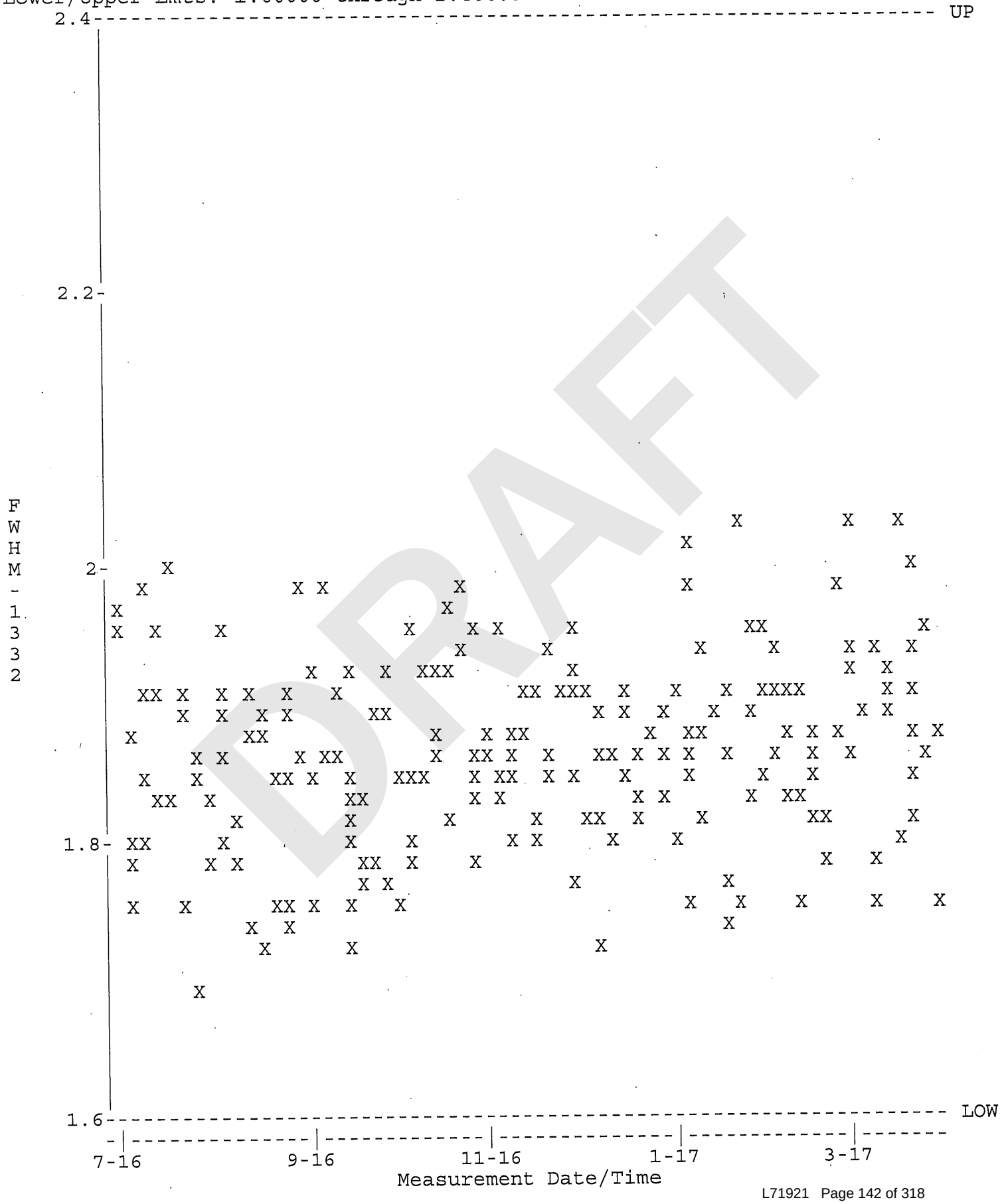
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



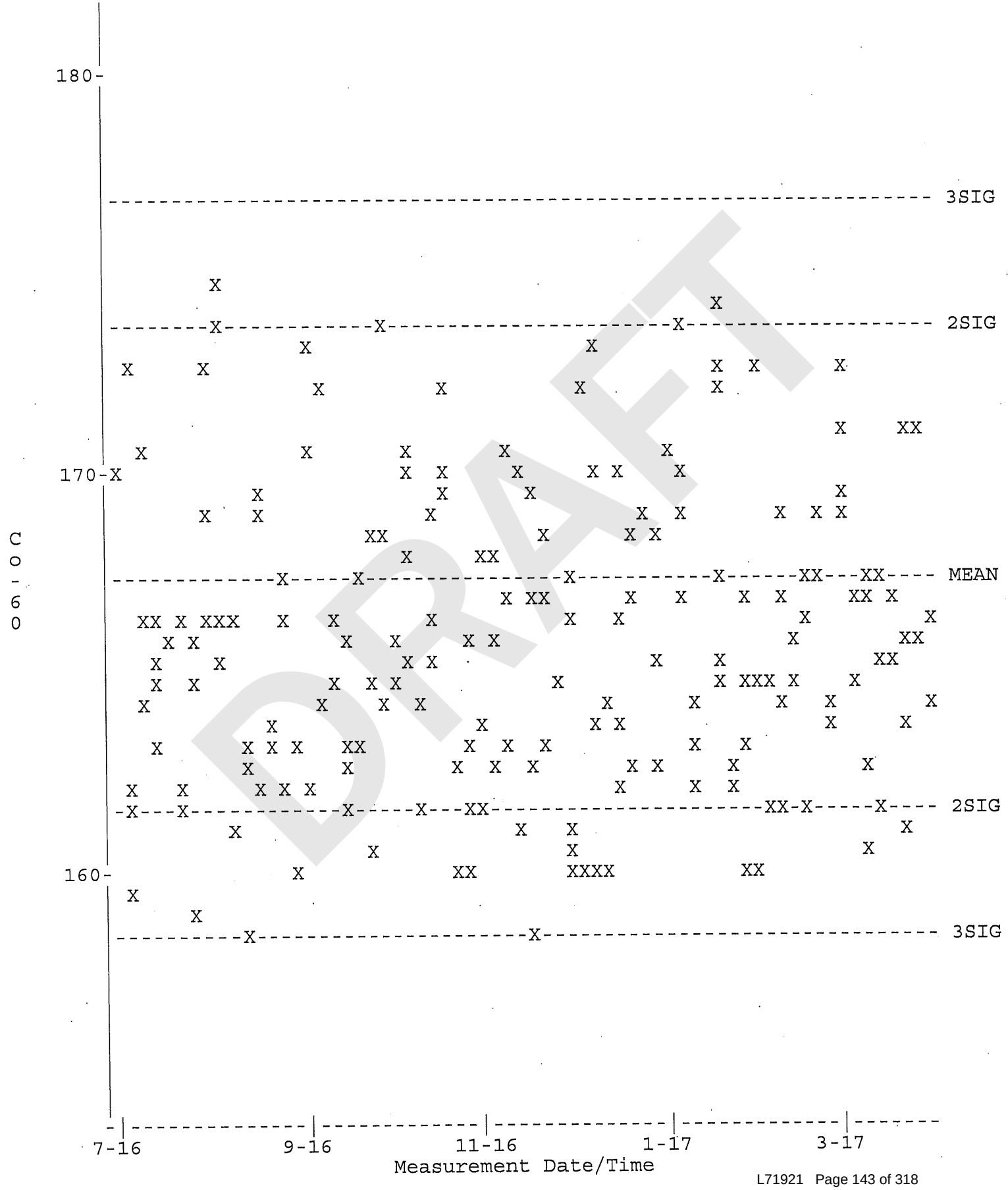
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:44 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.60000 through 2.40000



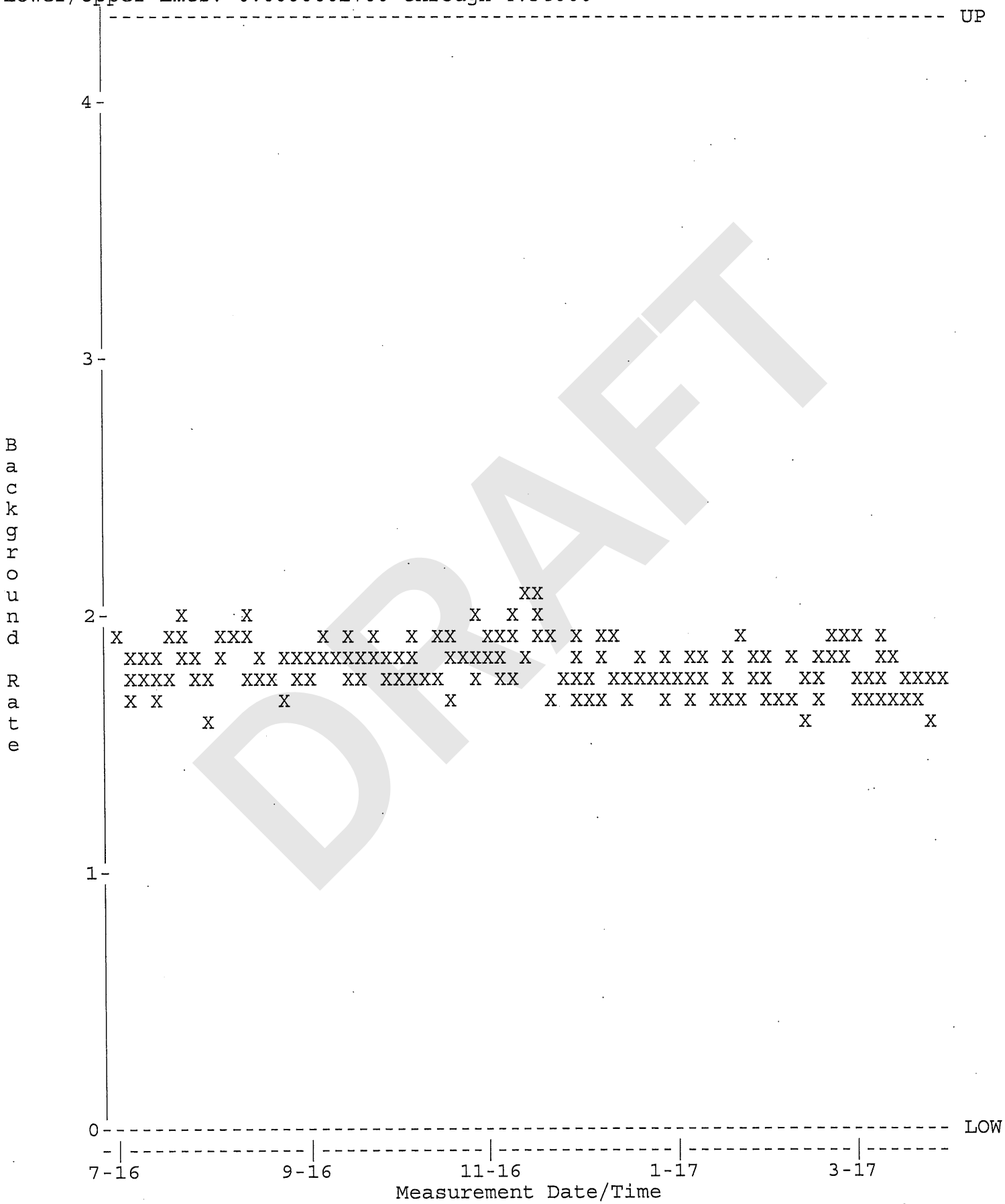
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE15_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 08:09 through 30-MAR-2017 00:00
Mean +- Std Dev : 167.933 +- 3.08657 (1.84 %)



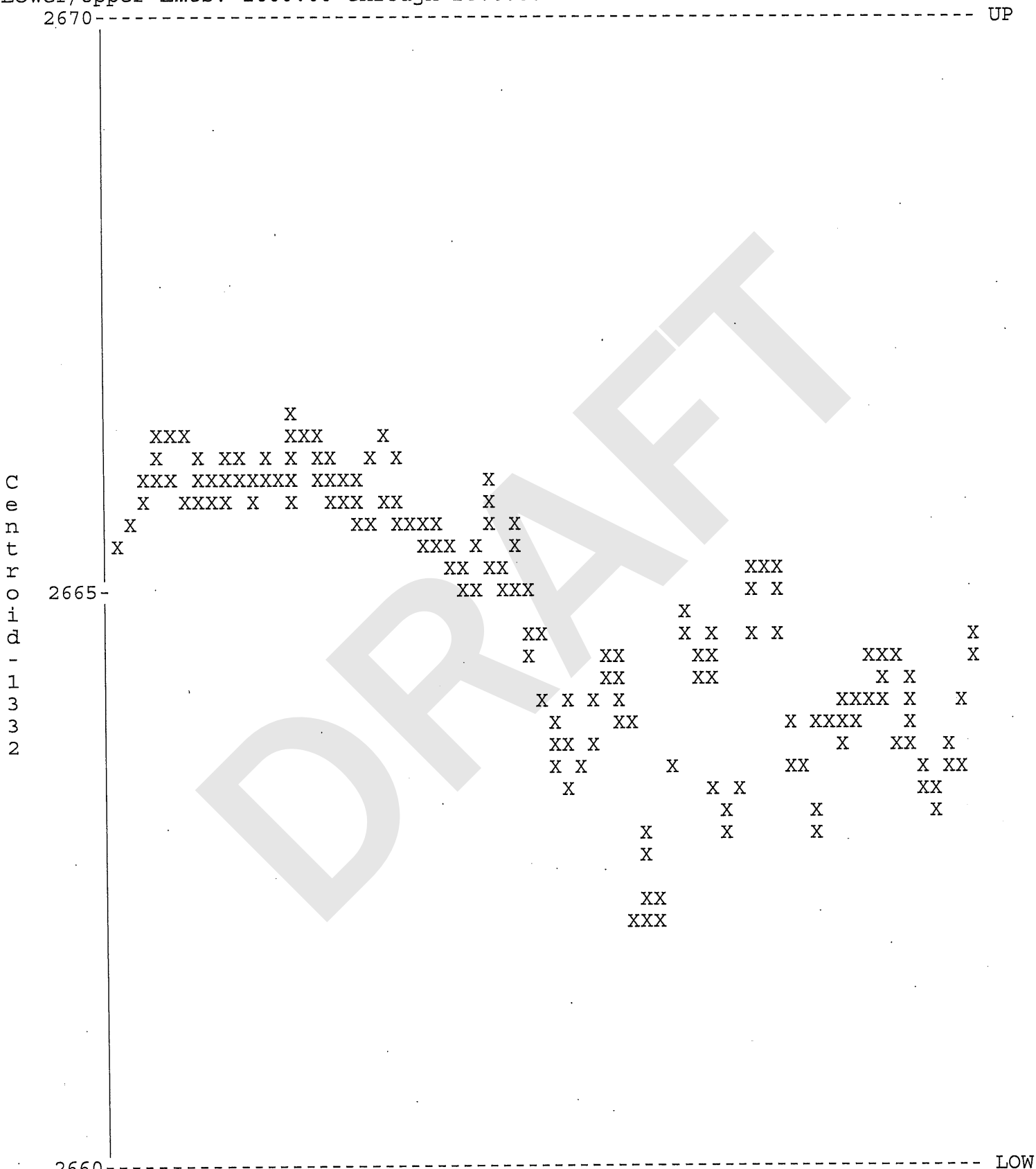
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE15_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:26 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 4.34000



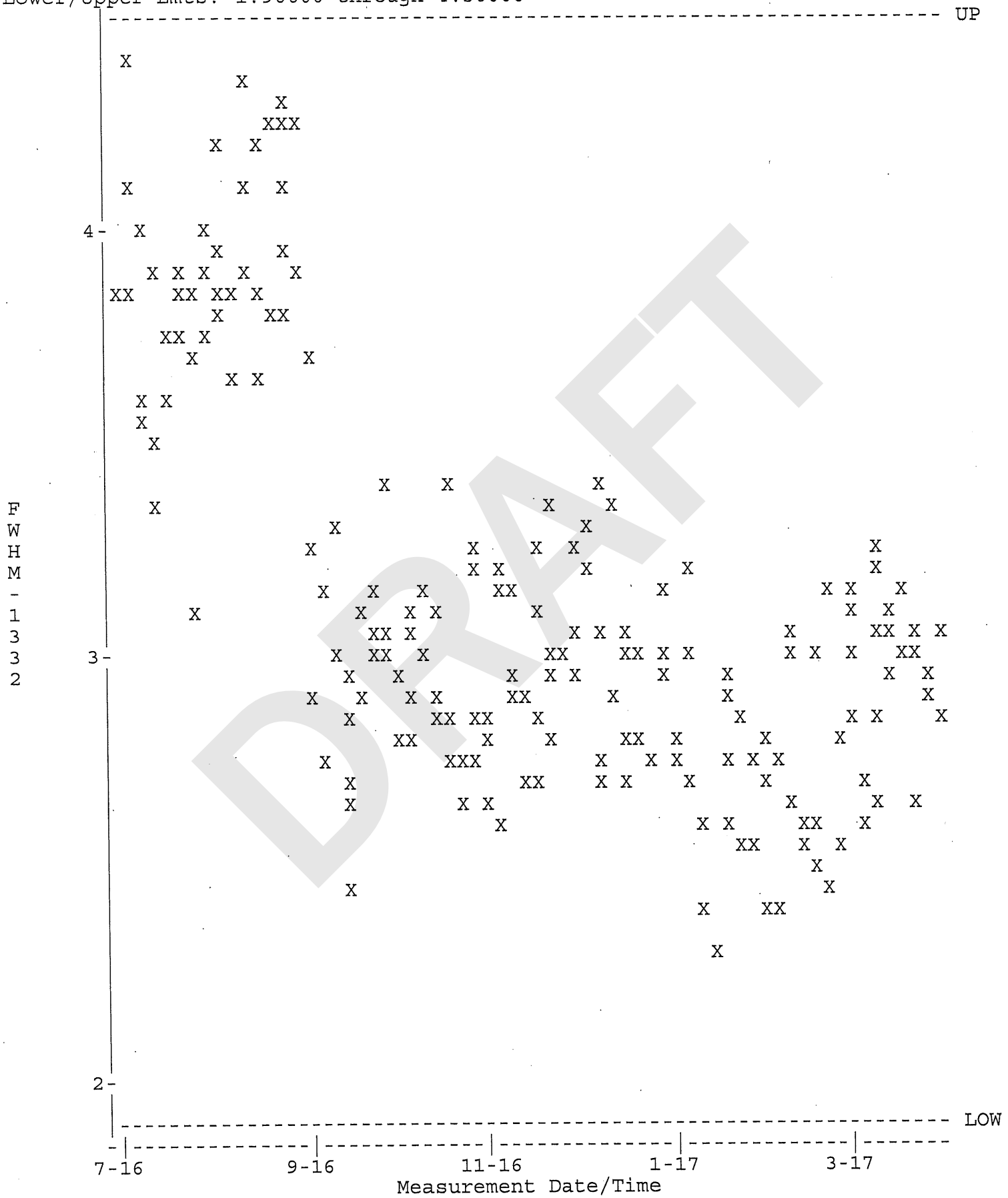
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSCENTRD (Centroid-1332)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Lower/Upper Lmts: 2660.00 through 2670.00



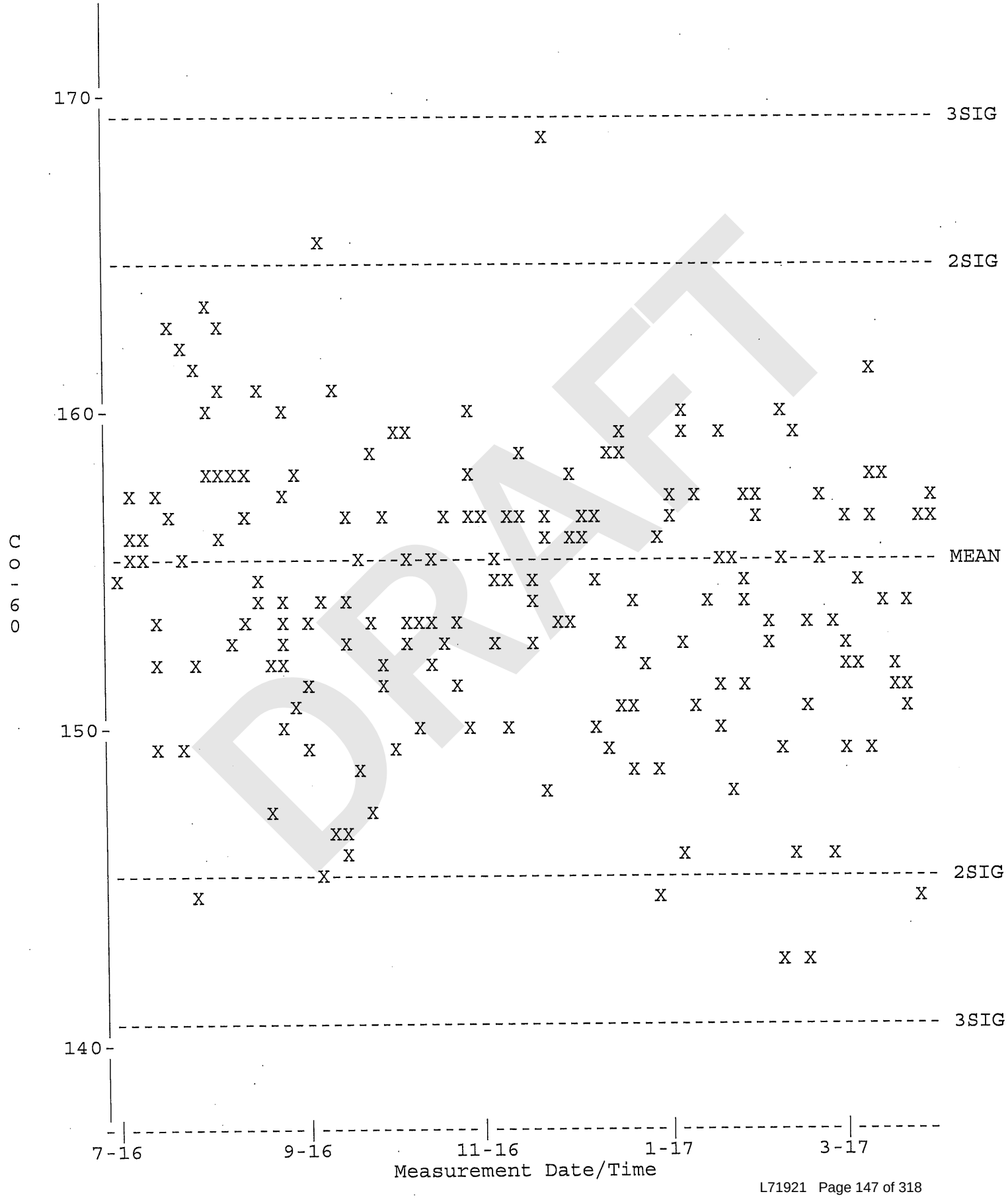
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : PSFWHM-1332 (FWHM-1332)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Lower/Upper Lmts: 1.90000 through 4.50000



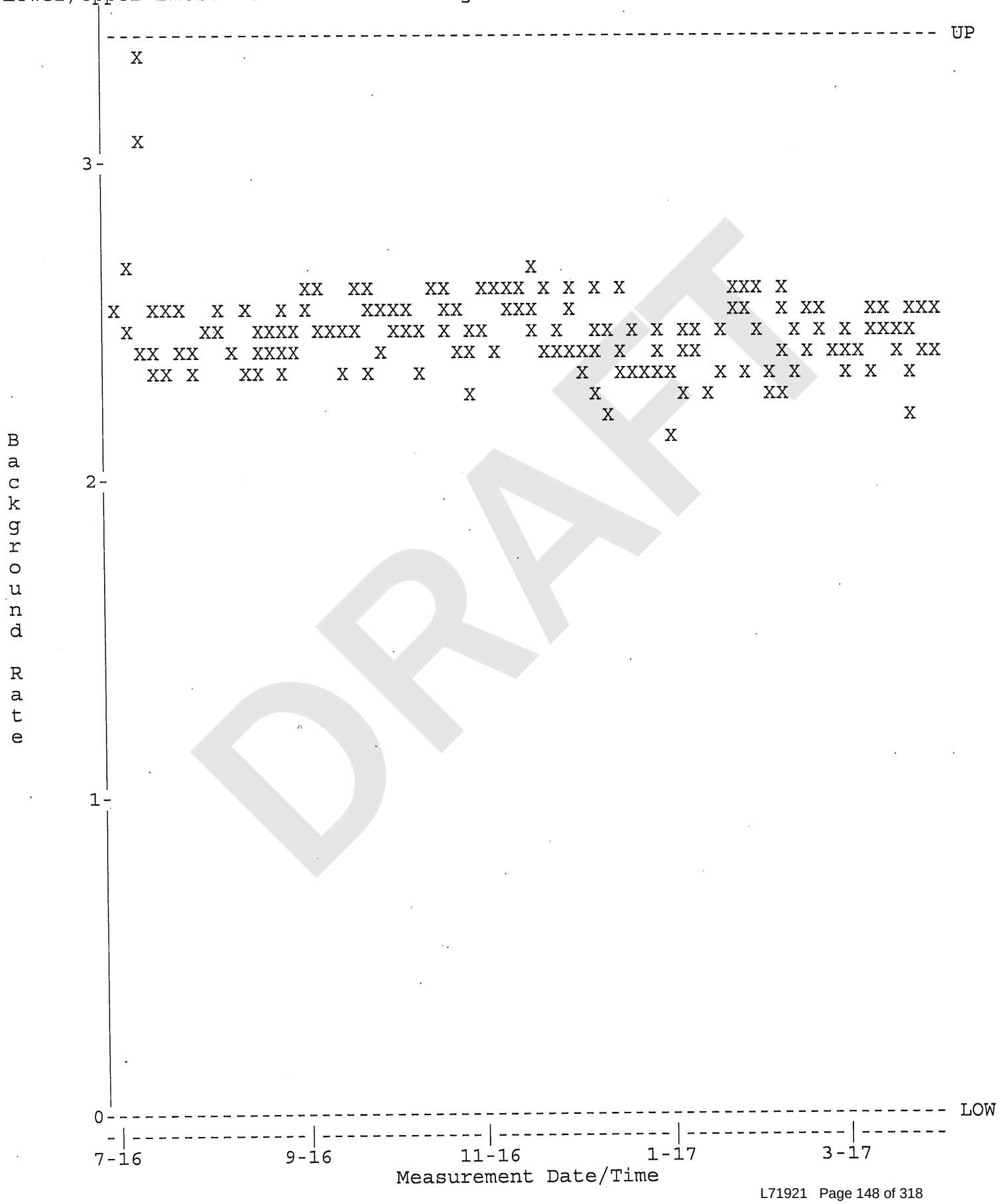
DRAFT

QA filename : DKB100:[GAMMA.QUALITY]NEW_TBE23_QC.QAF;1
Parameter Name : NCLWTMEAN-CO60 (Co-60)
Start/End Dates : 1-JUL-2016 07:45 through 30-MAR-2017 00:00
Mean +- Std Dev : 155.329 +- 4.74159 (3.05 %)



DRAFT

QA filename : DKB100:[GAMMA.QUALITY]TBE23_BKG_QC.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUL-2016 08:12 through 30-MAR-2017 00:00
Lower/Upper Lmts: 0.000000E+00 through 3.50000



DRAFT

GAMMA SPECTROSCOPY

Sample and QC Raw Data

DRAFT

Sec. Review: Analyst: BC

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 17:03:32.31
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 14-MAR-2017 14:03:11.78

LIMS No., Customer Name, Client ID: L71921-3 SS GEOENGINEERS SEDIMENT

Sample ID : 01L71921-3 Smple Date: 23-FEB-2017 08:04:00.
Sample Type : SS Geometry : 01B150022715
Quantity : 8.47300E+01 g Dry BKGFILE : 01BG022417MT
Start Channel : 90 Energy Tol : 1.50000 Real Time : 0 03:00:02.26
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 03:00:00.00
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.32*	31	250	1.12	126.84	1.19E+00	2.89E-03	94.0	1.19E+00
2	3	74.93*	4	240	0.83	150.04	2.26E+00	3.75E-04	620.4	3.99E+00
3	3	77.23	123	206	0.83	154.65	2.47E+00	1.14E-02	19.7	
4	1	84.19*	7	264	1.12	168.55	3.08E+00	6.21E-04	445.0	1.20E+00
5	1	87.10*	43	242	1.26	174.38	3.31E+00	3.99E-03	64.3	6.76E-01
6	1	93.02*	104	302	1.42	186.20	3.74E+00	9.64E-03	35.9	7.50E+00
7	1	144.16*	21	239	2.09	288.43	5.17E+00	1.97E-03	139.5	2.49E+00
8	1	185.69*	94	248	1.19	371.44	4.92E+00	8.70E-03	36.8	5.60E-01
9	3	238.64*	298	125	1.00	477.29	4.33E+00	2.76E-02	9.0	1.76E+00
10	3	241.87	80	228	1.59	483.75	4.29E+00	7.37E-03	36.4	
11	1	270.08	68	219	2.85	540.15	4.00E+00	6.30E-03	45.4	2.07E+00
12	1	295.17*	109	212	1.48	590.32	3.77E+00	1.01E-02	31.0	8.10E-01
13	1	338.74*	38	152	1.35	677.43	3.42E+00	3.51E-03	65.8	4.40E+00
14	1	351.79*	193	127	1.49	703.52	3.33E+00	1.79E-02	15.0	2.31E+00
15	1	510.85*	18	167	3.14	1021.61	2.52E+00	1.69E-03	216.3	2.51E+00
16	1	583.03*	83	104	1.57	1165.99	2.28E+00	7.67E-03	29.1	4.83E+00
17	1	609.17*	112	104	1.36	1218.27	2.20E+00	1.04E-02	21.5	7.45E-01
18	1	661.52	98	85	2.36	1323.00	2.06E+00	9.05E-03	24.2	1.55E+00
19	1	846.55*	21	37	2.13	1693.22	1.68E+00	1.91E-03	65.9	4.39E-01
20	1	911.04*	35	59	2.13	1822.27	1.58E+00	3.23E-03	50.0	1.89E+00
21	1	968.84*	44	45	1.95	1937.96	1.50E+00	4.09E-03	36.5	1.97E+00
22	1	1460.43*	509	19	2.36	2922.31	1.07E+00	4.71E-02	5.2	2.45E+00
23	1	1763.98*	21	9	2.73	3530.52	9.42E-01	1.99E-03	40.8	7.16E-01

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

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
CS-137	661.65	98	85.12*	2.061E+00	1.645E-01	1.647E-01	48.36

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.772E+00	------	Line Not Found	------

DRAFT

911.07	35	27.70*	1.579E+00	2.356E-01	2.371E-01	100.06

Flag: "*" = Keyline

DRAFT

Sample ID : 01L71921-3 Acquisition date : 14-MAR-2017 14:03:11

Total number of lines in spectrum	23	
Number of unidentified lines	21	
Number of lines tentatively identified by NID	2	8.70%

Nuclide Type : fission

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.17Y	1.00	1.645E-01	1.647E-01	0.797E-01	48.36	
			---------	---------			
	Total Activity :		1.645E-01	1.647E-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	2.356E-01	2.371E-01	2.372E-01	100.06	
			---------	---------			
	Total Activity :		2.356E-01	2.371E-01			
	Grand Total Activity :		4.001E-01	4.018E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.32	31	250	1.12	126.84	123	8	2.89E-03	****	1.19E+00	
3	74.93	4	240	0.83	150.04	146	13	3.75E-04	****	2.26E+00	
3	77.23	123	206	0.83	154.65	146	13	1.14E-02	39.3	2.47E+00	
1	84.19	7	264	1.12	168.55	164	8	6.21E-04	****	3.08E+00	
1	87.10	43	242	1.26	174.38	172	7	3.99E-03	****	3.31E+00	
1	93.02	104	302	1.42	186.20	182	10	9.64E-03	71.8	3.74E+00	
1	144.16	21	239	2.09	288.43	284	9	1.97E-03	****	5.17E+00	
1	185.69	94	248	1.19	371.44	367	11	8.70E-03	73.7	4.92E+00	
3	238.64	298	125	1.00	477.29	473	16	2.76E-02	17.9	4.33E+00	
3	241.87	80	228	1.59	483.75	473	16	7.37E-03	72.7	4.29E+00	
1	270.08	68	219	2.85	540.15	535	12	6.30E-03	90.7	4.00E+00	
1	295.17	109	212	1.48	590.32	584	14	1.01E-02	61.9	3.77E+00	
1	338.74	38	152	1.35	677.43	672	10	3.51E-03	****	3.42E+00	
1	351.79	193	127	1.49	703.52	698	13	1.79E-02	29.9	3.33E+00	
1	510.85	18	167	3.14	1021.61	1014	20	1.69E-03	****	2.52E+00	
1	583.03	83	104	1.57	1165.99	1159	13	7.67E-03	58.2	2.28E+00	
1	609.17	112	104	1.36	1218.27	1213	11	1.04E-02	43.0	2.20E+00	
1	846.55	21	37	2.13	1693.22	1689	9	1.91E-03	****	1.68E+00	
1	968.84	44	45	1.95	1937.96	1931	13	4.09E-03	72.9	1.50E+00	
1	1460.43	509	19	2.36	2922.31	2912	17	4.71E-02	10.4	1.07E+00	
1	1763.98	21	9	2.73	3530.52	3524	12	1.99E-03	81.7	9.42E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	23	
Number of unidentified lines	21	
Number of lines tentatively identified by NID	2	8.70%

Nuclide Type : fission

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
CS-137	30.17Y	1.00	1.645E-01	1.647E-01	0.797E-01	48.36	
	Total Activity :		1.645E-01	1.647E-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	2.356E-01	2.371E-01	2.372E-01	100.06	
	Total Activity :		2.356E-01	2.371E-01			

Grand Total Activity : 4.001E-01 4.018E-01

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

Interference Report

DRAFT

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
CS-137	1.647E-01	7.965E-02	7.074E-02	0.000E+00	2.328
AC-228	2.371E-01	2.372E-01	2.298E-01	0.000E+00	1.032

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	2.321E-02		4.372E-02	6.627E-02	0.000E+00	0.350

DRAFT

```
A,01L71921-3       ,03/14/2017 17:03,02/23/2017 08:04,   8.473E+01,L71921-3 SS GE
B,01L71921-3       ,CS134_137           ,01/05/2017 07:18,01B150022715
C,CS-137  ,YES,    1.647E-01,   7.965E-02,   7.074E-02,,    2.328
C,AC-228  ,YES,    2.371E-01,   2.372E-01,   2.298E-01,,    1.032
C,CS-134  ,NO ,    2.321E-02,   4.372E-02,   6.627E-02,,    0.350
```

DRAFT

Sec. Review: Analyst: BSG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 20-MAR-2017 11:16:52.08
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 20-MAR-2017 08:59:54.72

LIMS No., Customer Name, Client ID: L71921-6 SS GEOENGINEERS SEDIMENT

Sample ID : 01L71921-6
Sample Type : SS
Quantity : 6.77500E+01 g Dry
Start Channel : 90 Energy Tol : 1.50000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 08:10:00.
Geometry : 01B150022715
BKGFILE : 01BG022417MT
Real Time : 0 02:16:47.65
Live time : 0 02:16:45.82

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.41*	38	184	1.46	127.04	1.20E+00	4.63E-03	64.9	6.56E-01
2	1	74.93*	44	237	0.81	150.06	2.26E+00	5.37E-03	61.0	9.11E+00
3	1	77.75	130	268	0.86	155.69	2.52E+00	1.59E-02	21.8	4.56E+01
4	1	85.35*	70	385	3.75	170.88	3.17E+00	8.49E-03	62.5	5.10E+00
5	1	92.88*	99	361	2.13	185.93	3.73E+00	1.21E-02	41.9	9.81E+00
6	1	185.63*	88	180	1.07	371.32	4.92E+00	1.07E-02	31.3	1.50E+00
7	7	238.58*	279	94	1.22	477.18	4.33E+00	3.40E-02	8.8	1.77E+00
8	7	241.77	121	108	1.56	483.56	4.29E+00	1.48E-02	18.8	
9	1	295.30*	193	126	1.58	590.57	3.77E+00	2.35E-02	14.3	2.17E+00
10	1	338.64*	63	145	1.85	677.24	3.42E+00	7.62E-03	43.1	1.12E+00
11	1	351.81*	264	116	1.23	703.56	3.33E+00	3.22E-02	10.3	1.36E+00
12	1	582.99*	74	63	1.81	1165.91	2.28E+00	9.03E-03	26.1	9.76E-01
13	1	609.10*	249	80	1.65	1218.14	2.20E+00	3.03E-02	10.5	1.41E+00
14	1	661.45	61	49	2.11	1322.85	2.06E+00	7.41E-03	25.7	1.75E+00
15	1	910.81*	50	33	1.94	1821.82	1.58E+00	6.09E-03	28.9	1.34E+00
16	1	1120.01*	82	25	2.57	2240.57	1.32E+00	1.00E-02	17.9	6.85E-01
17	1	1239.19	36	54	1.01	2479.20	1.22E+00	4.37E-03	43.2	1.36E+01
18	1	1460.25*	357	10	2.41	2921.94	1.07E+00	4.35E-02	6.0	1.34E+00
19	1	1763.48*	47	22	2.97	3529.51	9.42E-01	5.70E-03	28.3	9.13E-01

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

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
CS-137	661.65	61	85.12*	2.061E+00	1.684E-01	1.687E-01	51.30

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.772E+00	------ Line Not Found		------
	911.07	50	27.70*	1.579E+00	5.557E-01	5.603E-01	57.77

Flag: "*" = Keyline

DRAFT

Sample ID : 01L71921-6 Acquisition date : 20-MAR-2017 08:59:54

Total number of lines in spectrum	19	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	2	10.53%

Nuclide Type : fission

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.17Y	1.00	1.684E-01	1.687E-01	0.865E-01	51.30	
	Total Activity :		1.684E-01	1.687E-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	5.557E-01	5.603E-01	3.237E-01	57.77	
	Total Activity :		5.557E-01	5.603E-01			
	Grand Total Activity :		7.241E-01	7.290E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 01L71921-6 Acquisition date : 20-MAR-2017 08:59:54

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.41	38	184	1.46	127.04	124	7	4.63E-03	****	1.20E+00	
1	74.93	44	237	0.81	150.06	147	6	5.37E-03	****	2.26E+00	
1	77.75	130	268	0.86	155.69	152	7	1.59E-02	43.7	2.52E+00	
1	85.35	70	385	3.75	170.88	165	14	8.49E-03	****	3.17E+00	
1	92.88	99	361	2.13	185.93	181	12	1.21E-02	83.7	3.73E+00	
1	185.63	88	180	1.07	371.32	367	8	1.07E-02	62.5	4.92E+00	
7	238.58	279	94	1.22	477.18	470	18	3.40E-02	17.7	4.33E+00	
7	241.77	121	108	1.56	483.56	470	18	1.48E-02	37.5	4.29E+00	
1	295.30	193	126	1.58	590.57	585	12	2.35E-02	28.7	3.77E+00	
1	338.64	63	145	1.85	677.24	670	13	7.62E-03	86.1	3.42E+00	
1	351.81	264	116	1.23	703.56	699	10	3.22E-02	20.6	3.33E+00	
1	582.99	74	63	1.81	1165.91	1160	12	9.03E-03	52.3	2.28E+00	
1	609.10	249	80	1.65	1218.14	1213	14	3.03E-02	21.0	2.20E+00	
1	1120.01	82	25	2.57	2240.57	2233	16	1.00E-02	35.8	1.32E+00	
1	1239.19	36	54	1.01	2479.20	2471	12	4.37E-03	86.5	1.22E+00	
1	1460.25	357	10	2.41	2921.94	2915	14	4.35E-02	12.0	1.07E+00	
1	1763.48	47	22	2.97	3529.51	3521	17	5.70E-03	56.5	9.42E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	19	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	2	10.53%

Nuclide Type : fission

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
CS-137	30.17Y	1.00	1.684E-01	1.687E-01	0.865E-01	51.30	
			---------	---------			
	Total Activity :		1.684E-01	1.687E-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	5.557E-01	5.603E-01	3.237E-01	57.77	
			---------	---------			
	Total Activity :		5.557E-01	5.603E-01			

Grand Total Activity : 7.241E-01 7.290E-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

DRAFT

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-137	1.687E-01	8.655E-02	1.030E-01	0.000E+00	1.638
AC-228	5.603E-01	3.237E-01	3.012E-01	0.000E+00	1.860

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-6.333E-03		6.473E-02	9.207E-02	0.000E+00	-0.069

DRAFT

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A,01L71921-6       ,03/20/2017 11:16,02/23/2017 08:10,   6.775E+01,L71921-6 SS GE
B,01L71921-6       ,CS134_137           ,01/05/2017 07:18,01B150022715
C,CS-137   ,YES,    1.687E-01,   8.655E-02,   1.030E-01,,    1.638
C,AC-228   ,YES,    5.603E-01,   3.237E-01,   3.012E-01,,    1.860
C,CS-134   ,NO ,   -6.333E-03,   6.473E-02,   9.207E-02,,   -0.069
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 14-MAR-2017 17:03:34.36
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 14-MAR-2017 14:03:14.96

LIMS No., Customer Name, Client ID: L71921-9 SS GEOENGINEERS SEDIMENT

Sample ID : 02L71921-9 Smple Date: 23-FEB-2017 08:16:00.
Sample Type : SS Geometry : 02B150101711
Quantity : 9.61900E+01 g Dry BKGFILE : 02BG022417MT
Start Channel : 40 Energy Tol : 2.00000 Real Time : 0 03:00:01.63
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 03:00:00.00
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	63.19*	68	254	0.90	110.84	1.98E+00	6.28E-03	42.1	
2	2	77.11*	155	225	0.91	138.84	3.06E+00	1.44E-02	17.0	1.81E+00
3	0	85.77*	148	398	3.89	156.25	3.54E+00	1.37E-02	29.6	
4	0	92.67*	243	280	1.31	170.13	3.83E+00	2.25E-02	14.8	
5	0	186.06*	143	279	1.01	357.97	3.79E+00	1.33E-02	25.8	
6	0	238.61*	215	266	1.02	463.67	3.22E+00	1.99E-02	14.4	
7	0	295.23*	113	163	1.09	577.56	2.73E+00	1.05E-02	25.2	
8	0	338.06	64	94	1.29	663.69	2.45E+00	5.91E-03	30.4	
9	0	351.71*	205	133	1.27	691.15	2.37E+00	1.90E-02	14.0	
10	0	583.14*	87	76	1.66	1156.63	1.53E+00	8.06E-03	25.5	
11	0	609.23*	133	95	1.25	1209.11	1.47E+00	1.23E-02	18.1	
12	0	910.98*	67	39	1.44	1816.05	1.02E+00	6.24E-03	23.7	
13	0	968.96*	44	33	1.69	1932.68	9.59E-01	4.11E-03	30.8	
14	0	1460.50*	354	13	1.90	2921.39	6.67E-01	3.28E-02	6.1	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.153E+00	------ Line Not Found		------
	911.07	67	27.70*	1.016E+00	6.229E-01	6.269E-01	47.41

Flag: "*" = Keyline

DRAFT

Sample ID : 02L71921-9 Acquisition date : 14-MAR-2017 14:03:14

Total number of lines in spectrum	14	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	1	7.14%

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	6.229E-01	6.269E-01	2.972E-01	47.41	
	Total Activity :		6.229E-01	6.269E-01			
	Grand Total Activity :		6.229E-01	6.269E-01			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	63.19	68	254	0.90	110.84	107	7	6.28E-03	84.2	1.98E+00	
2	77.11	155	225	0.91	138.84	131	19	1.44E-02	34.0	3.06E+00	
0	85.77	148	398	3.89	156.25	150	13	1.37E-02	59.3	3.54E+00	
0	92.67	243	280	1.31	170.13	167	9	2.25E-02	29.5	3.83E+00	
0	186.06	143	279	1.01	357.97	352	12	1.33E-02	51.6	3.79E+00	
0	238.61	215	266	1.02	463.67	459	8	1.99E-02	28.7	3.22E+00	
0	295.23	113	163	1.09	577.56	572	12	1.05E-02	50.4	2.73E+00	
0	338.06	64	94	1.29	663.69	659	9	5.91E-03	60.7	2.45E+00	
0	351.71	205	133	1.27	691.15	685	13	1.90E-02	28.0	2.37E+00	
0	583.14	87	76	1.66	1156.63	1148	16	8.06E-03	51.0	1.53E+00	
0	609.23	133	95	1.25	1209.11	1203	13	1.23E-02	36.3	1.47E+00	
0	968.96	44	33	1.69	1932.68	1927	12	4.11E-03	61.6	9.59E-01	
0	1460.50	354	13	1.90	2921.39	2914	17	3.28E-02	12.2	6.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	14	
Number of unidentified lines	13	
Number of lines tentatively identified by NID	1	7.14%

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	6.229E-01	6.269E-01	2.972E-01	47.41	
	Total Activity :		6.229E-01	6.269E-01			
	Grand Total Activity :		6.229E-01	6.269E-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
AC-228	6.269E-01	2.972E-01	2.851E-01	0.000E+00	2.199

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

Key-Line Activity	K.L.	Act error	MDA	MDA error	Act/MDA

DRAFT

Nuclide	(pCi/g Dry)	Ided	(pCi/g Dry)		
CS-134	1.035E-02	5.261E-02	7.503E-02	0.000E+00	0.138
CS-137	-1.351E-02	5.348E-02	8.801E-02	0.000E+00	-0.153

DRAFT

```
A,02L71921-9      ,03/14/2017 17:03,02/23/2017 08:16,   9.619E+01,L71921-9 SS GE
B,02L71921-9      ,CS134_137          ,01/03/2017 08:02,02B150101711
C,AC-228  ,YES,   6.269E-01,   2.972E-01,   2.851E-01,,    2.199
C,CS-134  ,NO ,   1.035E-02,   5.261E-02,   7.503E-02,,    0.138
C,CS-137  ,NO ,  -1.351E-02,   5.348E-02,   8.801E-02,,   -0.153
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 07:46:40.45
TBE01 33-TP20784A HpGe ******* Aquisition Date/Time: 15-MAR-2017 06:45:50.31

LIMS No., Customer Name, Client ID: L71921-12 SS GEOENGINEERS SEDIMENT

Sample ID : 01L71921-12 Smple Date: 23-FEB-2017 08:22:00.
Sample Type : SS Geometry : 01B150022715
Quantity : 1.22080E+02 g Dry BKGFILE : 01BG022417MT
Start Channel : 90 Energy Tol : 1.50000 Real Time : 0 01:00:38.43
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:00:37.64
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.97*	11	125	0.92	150.14	2.26E+00	2.91E-03	191.0	3.13E+00
2	1	77.47	66	61	1.35	155.13	2.49E+00	1.81E-02	22.9	1.08E+00
3	1	93.02*	21	152	1.96	186.21	3.74E+00	5.88E-03	118.9	4.08E+00
4	1	185.67*	55	67	1.54	371.41	4.92E+00	1.50E-02	33.2	2.48E+00
5	1	238.49*	164	58	1.21	477.00	4.33E+00	4.51E-02	11.4	2.09E+00
6	1	241.62	37	71	1.39	483.25	4.30E+00	1.03E-02	40.9	
7	1	295.07*	42	73	1.71	590.12	3.77E+00	1.14E-02	45.8	1.48E+00
8	1	338.09*	33	43	1.49	676.12	3.43E+00	9.06E-03	40.9	1.87E-01
9	1	351.58*	95	47	1.83	703.10	3.33E+00	2.61E-02	18.1	1.55E+00
10	1	510.86*	6	55	2.74	1021.63	2.52E+00	1.62E-03	376.8	1.74E+00
11	1	583.15*	43	18	1.55	1166.22	2.28E+00	1.19E-02	26.9	1.12E+00
12	1	609.37*	62	20	1.32	1218.68	2.20E+00	1.70E-02	20.1	2.17E+00
13	1	911.17*	27	15	2.37	1822.54	1.58E+00	7.45E-03	36.2	1.51E+00
14	1	968.92*	25	11	1.86	1938.12	1.50E+00	6.74E-03	36.0	7.82E-01
15	1	1460.57*	199	20	2.25	2922.58	1.07E+00	5.47E-02	8.9	4.97E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.772E+00	------	Line Not Found	------
	911.07	27	27.70*	1.579E+00	3.770E-01	3.795E-01	72.37

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 01L71921-12

Acquisition date : 15-MAR-2017 06:45:50

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	3.770E-01	3.795E-01	2.747E-01	72.37	
	Total Activity :		3.770E-01	3.795E-01			
	Grand Total Activity :		3.770E-01	3.795E-01			

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

DRAFT

Sample ID : 01L71921-12 Acquisition date : 15-MAR-2017 06:45:50

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.97	11	125	0.92	150.14	146	7	2.91E-03	****	2.26E+00	
1	77.47	66	61	1.35	155.13	153	6	1.81E-02	45.8	2.49E+00	
1	93.02	21	152	1.96	186.21	181	11	5.88E-03	****	3.74E+00	
1	185.67	55	67	1.54	371.41	367	9	1.50E-02	66.5	4.92E+00	
1	238.49	164	58	1.21	477.00	472	17	4.51E-02	22.9	4.33E+00	
1	241.62	37	71	1.39	483.25	472	17	1.03E-02	81.8	4.30E+00	
1	295.07	42	73	1.71	590.12	585	12	1.14E-02	91.7	3.77E+00	
1	338.09	33	43	1.49	676.12	672	9	9.06E-03	81.9	3.43E+00	
1	351.58	95	47	1.83	703.10	698	11	2.61E-02	36.2	3.33E+00	
1	510.86	6	55	2.74	1021.63	1013	20	1.62E-03	****	2.52E+00	
1	583.15	43	18	1.55	1166.22	1159	12	1.19E-02	53.8	2.28E+00	
1	609.37	62	20	1.32	1218.68	1213	10	1.70E-02	40.1	2.20E+00	
1	968.92	25	11	1.86	1938.12	1934	12	6.74E-03	71.9	1.50E+00	
1	1460.57	199	20	2.25	2922.58	2915	16	5.47E-02	17.9	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	15	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	1	6.67%

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	3.770E-01	3.795E-01	2.747E-01	72.37	
		Total Activity :	3.770E-01	3.795E-01			
		Grand Total Activity :	3.770E-01	3.795E-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
AC-228	3.795E-01	2.747E-01	3.485E-01	0.000E+00	1.089

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

Key-Line

DRAFT

Nuclide	Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	1.948E-02		5.376E-02	8.206E-02	0.000E+00	0.237
CS-137	-1.429E-04		5.107E-02	8.410E-02	0.000E+00	-0.002

DRAFT

```
A,01L71921-12      ,03/15/2017 07:46,02/23/2017 08:22,   1.221E+02,L71921-12 SS G
B,01L71921-12      ,CS134_137           ,01/05/2017 07:18,01B150022715
C,AC-228   ,YES,    3.795E-01,   2.747E-01,   3.485E-01,,    1.089
C,CS-134   ,NO ,    1.948E-02,   5.376E-02,   8.206E-02,,    0.237
C,CS-137   ,NO ,   -1.429E-04,   5.107E-02,   8.410E-02,,   -0.002
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 08:02:28.75
TBE02 51-TP42214B HpGe ******* Aquisition Date/Time: 15-MAR-2017 06:45:50.56

LIMS No., Customer Name, Client ID: L71921-15 SS GEOENGINEERS SEDIMENT

Sample ID : 02L71921-15
Sample Type : SS
Quantity : 1.42190E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 08:28:00.
Geometry : 02B150101711
BKGFILE : 02BG022417MT
Real Time : 0 01:16:27.78
Live time : 0 01:16:27.02

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	77.24*	84	121	0.88	139.11	3.06E+00	1.83E-02	24.6	
2	0	92.09*	79	196	0.94	168.96	3.81E+00	1.72E-02	38.2	
3	0	238.56*	187	76	1.25	463.58	3.22E+00	4.07E-02	11.1	
4	0	338.25	32	43	1.07	664.08	2.45E+00	6.88E-03	42.1	
5	0	351.89*	101	69	1.02	691.51	2.37E+00	2.20E-02	19.6	
6	0	510.72*	71	35	2.06	1010.97	1.72E+00	1.55E-02	28.4	
7	0	582.98*	35	28	0.85	1156.32	1.53E+00	7.59E-03	32.4	
8	0	609.20*	84	38	1.42	1209.05	1.47E+00	1.84E-02	19.6	
9	0	910.66*	41	19	1.83	1815.41	1.02E+00	8.97E-03	28.2	
10	0	1000.57*	11	7	1.02	1996.26	9.31E-01	2.46E-03	57.6	
11	0	1460.55*	237	3	2.13	2921.48	6.67E-01	5.16E-02	6.9	
12	0	1764.12*	24	0	1.33	3532.10	5.80E-01	5.28E-03	22.9	

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.153E+00	------	Line Not Found	------
	911.07	41	27.70*	1.016E+00	6.060E-01	6.100E-01	56.38

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 02L71921-15 Acquisition date : 15-MAR-2017 06:45:50

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	6.060E-01	6.100E-01	3.439E-01	56.38	
			---	---			
Total Activity :			6.060E-01	6.100E-01			
Grand Total Activity :			6.060E-01	6.100E-01			

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

DRAFT

Sample ID : 02L71921-15 Acquisition date : 15-MAR-2017 06:45:50

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	77.24	84	121	0.88	139.11	137	7	1.83E-02	49.3	3.06E+00	
0	92.09	79	196	0.94	168.96	163	12	1.72E-02	76.4	3.81E+00	
0	238.56	187	76	1.25	463.58	459	8	4.07E-02	22.3	3.22E+00	
0	338.25	32	43	1.07	664.08	660	9	6.88E-03	84.1	2.45E+00	
0	351.89	101	69	1.02	691.51	686	12	2.20E-02	39.3	2.37E+00	
0	510.72	71	35	2.06	1010.97	1002	20	1.55E-02	56.8	1.72E+00	
0	582.98	35	28	0.85	1156.32	1152	8	7.59E-03	64.9	1.53E+00	
0	609.20	84	38	1.42	1209.05	1202	14	1.84E-02	39.1	1.47E+00	
0	1000.57	11	7	1.02	1996.26	1987	13	2.46E-03	****	9.31E-01	
0	1460.55	237	3	2.13	2921.48	2913	15	5.16E-02	13.9	6.67E-01	
0	1764.12	24	0	1.33	3532.10	3526	12	5.28E-03	45.8	5.80E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	6.060E-01	6.100E-01	3.439E-01	56.38	
			---	---			
Total Activity :			6.060E-01	6.100E-01			
Grand Total Activity :			6.060E-01	6.100E-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
AC-228	6.100E-01	3.439E-01	3.147E-01	0.000E+00	1.939

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

DRAFT

CS-134	1.616E-02	6.419E-02	9.297E-02	0.000E+00	0.174
CS-137	1.024E-02	5.503E-02	9.440E-02	0.000E+00	0.108

DRAFT

```
A,02L71921-15     ,03/15/2017 08:02,02/23/2017 08:28,   1.422E+02,L71921-15 SS G
B,02L71921-15     ,CS134_137          ,01/03/2017 08:02,02B150101711
C,AC-228  ,YES,   6.100E-01,   3.439E-01,   3.147E-01,,     1.939
C,CS-134  ,NO ,   1.616E-02,   6.419E-02,   9.297E-02,,     0.174
C,CS-137  ,NO ,   1.024E-02,   5.503E-02,   9.440E-02,,     0.108
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 07:46:38.86
TBE07 31-TP10768B HpGe ******* Aquisition Date/Time: 15-MAR-2017 06:45:50.78

LIMS No., Customer Name, Client ID: L71921-18 SS GEOENGINEERS SEDIMENT

Sample ID : 07L71921-18 Smple Date: 23-FEB-2017 08:34:00.
Sample Type : SS Geometry : 07B150101811
Quantity : 1.56130E+02 g Dry BKGFILE : 07BG022417MT
Start Channel : 40 Energy Tol : 2.00000 Real Time : 0 01:00:38.69
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:00:38.14
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	185.82*	62	119	2.29	372.67	4.39E+00	1.70E-02	39.3	2.28E+00
2	1	238.48*	125	125	1.57	478.11	3.83E+00	3.43E-02	21.7	2.19E+00
3	1	296.42*	144	122	1.67	594.09	3.30E+00	3.97E-02	17.5	5.78E+01
4	1	351.42*	72	77	1.96	704.19	2.92E+00	1.98E-02	31.9	1.96E+00
5	1	583.05*	44	30	2.38	1167.80	1.98E+00	1.22E-02	32.3	1.48E+00
6	1	609.14*	53	39	1.74	1220.00	1.91E+00	1.44E-02	28.0	1.22E+00
7	1	911.02*	31	21	2.15	1824.00	1.39E+00	8.40E-03	40.6	1.25E+00
8	1	968.66	25	22	2.30	1939.31	1.32E+00	6.85E-03	46.0	1.30E+00
9	1	1460.41*	240	12	2.27	2922.67	9.57E-01	6.59E-02	7.6	8.79E-01
10	1	1764.47*	17	0	3.31	3530.43	8.48E-01	4.60E-03	29.2	7.28E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.550E+00	------	Line Not Found	------
	911.07	31	27.70*	1.387E+00	3.784E-01	3.808E-01	81.17

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 07L71921-18 Acquisition date : 15-MAR-2017 06:45:50

Total number of lines in spectrum	10	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	1	10.00%

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	3.784E-01	3.808E-01	3.092E-01	81.17	
			---	---			
Total Activity :			3.784E-01	3.808E-01			
Grand Total Activity :			3.784E-01	3.808E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 07L71921-18
Acquisition date : 15-MAR-2017 06:45:50

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	185.82	62	119	2.29	372.67	368	13	1.70E-02	78.6	4.39E+00	
1	238.48	125	125	1.57	478.11	473	14	3.43E-02	43.5	3.83E+00	
1	296.42	144	122	1.67	594.09	585	15	3.97E-02	35.1	3.30E+00	
1	351.42	72	77	1.96	704.19	697	17	1.98E-02	63.7	2.92E+00	
1	583.05	44	30	2.38	1167.80	1163	15	1.22E-02	64.7	1.98E+00	
1	609.14	53	39	1.74	1220.00	1214	11	1.44E-02	56.1	1.91E+00	
1	968.66	25	22	2.30	1939.31	1930	15	6.85E-03	92.0	1.32E+00	
1	1460.41	240	12	2.27	2922.67	2914	16	6.59E-02	15.2	9.57E-01	
1	1764.47	17	0	3.31	3530.43	3523	12	4.60E-03	58.3	8.48E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 10
Number of unidentified lines 9
Number of lines tentatively identified by NID 1 10.00%

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	3.784E-01	3.808E-01	3.092E-01	81.17	
		Total Activity :	3.784E-01	3.808E-01			

Grand Total Activity : 3.784E-01 3.808E-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
AC-228	3.808E-01	3.092E-01	2.650E-01	0.000E+00	1.437

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	2.625E-02		5.297E-02	8.214E-02	0.000E+00	0.320
CS-137	1.256E-02		5.422E-02	9.269E-02	0.000E+00	0.136

DRAFT

```
A,07L71921-18      ,03/15/2017 07:46,02/23/2017 08:34,   1.561E+02,L71921-18 SS G
B,07L71921-18      ,CS134_137           ,01/05/2017 07:18,07B150101811
C,AC-228   ,YES,   3.808E-01,   3.092E-01,   2.650E-01,,    1.437
C,CS-134   ,NO ,   2.625E-02,   5.297E-02,   8.214E-02,,    0.320
C,CS-137   ,NO ,   1.256E-02,   5.422E-02,   9.269E-02,,    0.136
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 08:16:34.11
TBE08 51-N22985A HpGe ******** Aquisition Date/Time: 15-MAR-2017 06:45:51.42

LIMS No., Customer Name, Client ID: L71921-21 SS GEOENGINEERS SEDIMENT

Sample ID : 08L71921-21
Sample Type : SS
Quantity : 1.69160E+02 g Dry
Start Channel : 25 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 08:40:00.
Geometry : 08B150022715
BKGFILE : 08BG022417MT
Real Time : 0 01:30:40.18
Live time : 0 01:30:38.60

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	46.52*	21	170	1.43	100.04	4.94E+00	3.93E-03	120.2	1.87E+00
2	1	73.20*	17	172	1.37	153.25	4.91E+00	3.20E-03	153.9	3.07E+00
3	1	74.95*	87	161	1.38	156.75	4.90E+00	1.60E-02	33.7	
4	1	77.08	136	130	1.16	161.00	4.88E+00	2.51E-02	17.5	
5	1	92.95*	76	198	1.42	192.64	4.70E+00	1.41E-02	36.9	8.90E-01
6	1	186.66*	38	135	1.74	379.53	3.33E+00	6.91E-03	62.8	1.04E+00
7	1	239.14*	137	121	1.56	484.20	2.75E+00	2.53E-02	16.6	4.60E+00
8	1	241.90	45	90	1.59	489.71	2.72E+00	8.30E-03	40.8	
9	1	295.88*	39	102	1.23	597.38	2.29E+00	7.25E-03	53.2	6.81E-01
10	1	340.09	80	94	4.53	685.56	2.01E+00	1.47E-02	29.4	2.23E+00
11	1	352.65*	99	66	1.50	710.62	1.95E+00	1.81E-02	19.1	2.11E+00
12	1	512.02*	4	52	2.95	1028.54	1.36E+00	6.79E-04	554.6	4.75E-01
13	1	583.12	69	58	3.29	1170.39	1.20E+00	1.26E-02	26.0	1.03E+01
14	1	910.26*	24	31	3.15	1823.16	7.98E-01	4.36E-03	49.1	6.03E+00
15	1	1121.40	10	32	1.04	2244.58	6.65E-01	1.90E-03	136.0	3.53E+00
16	1	1460.56*	194	4	2.15	2921.65	5.32E-01	3.56E-02	8.3	7.81E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	9.012E-01	------	Line Not Found	------
	911.07	24	27.70*	7.978E-01	3.153E-01	3.174E-01	98.17

Flag: "*" = Keyline

DRAFT

Sample ID : 08L71921-21
Acquisition date : 15-MAR-2017 06:45:51

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	3.153E-01	3.174E-01	3.116E-01	98.17	
			---------	---------			
Total Activity :			3.153E-01	3.174E-01			
Grand Total Activity :			3.153E-01	3.174E-01			

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

DRAFT

Sample ID : 08L71921-21 Acquisition date : 15-MAR-2017 06:45:51

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	46.52	21	170	1.43	100.04	96	9	3.93E-03	****	4.94E+00	
1	73.20	17	172	1.37	153.25	149	16	3.20E-03	****	4.91E+00	
1	74.95	87	161	1.38	156.75	149	16	1.60E-02	67.3	4.90E+00	
1	77.08	136	130	1.16	161.00	149	16	2.51E-02	35.1	4.88E+00	
1	92.95	76	198	1.42	192.64	188	9	1.41E-02	73.8	4.70E+00	
1	186.66	38	135	1.74	379.53	374	10	6.91E-03	****	3.33E+00	
1	239.14	137	121	1.56	484.20	480	14	2.53E-02	33.2	2.75E+00	
1	241.90	45	90	1.59	489.71	480	14	8.30E-03	81.6	2.72E+00	
1	295.88	39	102	1.23	597.38	591	11	7.25E-03	****	2.29E+00	
1	340.09	80	94	4.53	685.56	677	16	1.47E-02	58.7	2.01E+00	
1	352.65	99	66	1.50	710.62	705	11	1.81E-02	38.3	1.95E+00	
1	512.02	4	52	2.95	1028.54	1020	16	6.79E-04	****	1.36E+00	
1	583.12	69	58	3.29	1170.39	1164	14	1.26E-02	52.0	1.20E+00	
1	1121.40	10	32	1.04	2244.58	2238	17	1.90E-03	****	6.65E-01	
1	1460.56	194	4	2.15	2921.65	2915	15	3.56E-02	16.5	5.32E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	16	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	1	6.25%

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	3.153E-01	3.174E-01	3.116E-01	98.17	
			---	---			
Total Activity :			3.153E-01	3.174E-01			
Grand Total Activity :			3.153E-01	3.174E-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
AC-228	3.174E-01	3.116E-01	2.875E-01	0.000E+00	1.104

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

DRAFT

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-1.970E-01		6.426E-02	7.379E-02	0.000E+00	-2.669
CS-137	7.002E-02		5.164E-02	9.810E-02	0.000E+00	0.714

DRAFT

```
A,08L71921-21     ,03/15/2017 08:16,02/23/2017 08:40,   1.692E+02,L71921-21 SS G
B,08L71921-21     ,CS134_137           ,03/03/2017 07:12,08B150022715
C,AC-228  ,YES,   3.174E-01,   3.116E-01,   2.875E-01,,    1.104
C,CS-134  ,NO ,  -1.970E-01,   6.426E-02,   7.379E-02,,   -2.669
C,CS-137  ,NO ,   7.002E-02,   5.164E-02,   9.810E-02,,    0.714
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 07:47:39.33
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 15-MAR-2017 06:45:52.89

LIMS No., Customer Name, Client ID: L71921-24 SS GEOENGINEERS SEDIMENT

Sample ID : 15L71921-24
Sample Type : SS
Quantity : 1.72180E+02 g Dry
Start Channel : 90 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 7.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 08:46:00.
Geometry : 15B150102011
BKGFILE : 15BG022417MT
Real Time : 0 01:01:38.33
Live time : 0 01:01:37.87

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.14*	41	184	2.44	142.38	2.55E+00	1.10E-02	69.3	5.65E+00
2	1	93.79*	7	177	1.11	181.78	4.10E+00	1.87E-03	373.1	7.63E+00
3	1	238.54*	142	137	1.21	471.98	4.03E+00	3.83E-02	18.6	5.77E-01
4	0	295.49*	13	61	0.72	586.14	3.39E+00	3.54E-03	118.0	
5	1	351.93*	91	59	1.43	699.28	2.92E+00	2.47E-02	21.5	8.58E-01
6	1	583.23*	49	23	2.35	1162.79	1.86E+00	1.33E-02	28.6	2.35E+00
7	1	608.82*	53	40	1.77	1214.08	1.78E+00	1.45E-02	27.4	2.24E+00
8	1	911.28*	31	16	2.51	1819.94	1.23E+00	8.33E-03	32.9	1.74E+00
9	1	1460.83*	216	24	1.92	2920.15	7.96E-01	5.83E-02	8.4	7.57E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.395E+00	------	Line Not Found	------
	911.07	31	27.70*	1.227E+00	3.849E-01	3.875E-01	65.81

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15L71921-24 Acquisition date : 15-MAR-2017 06:45:52

Total number of lines in spectrum	9	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	1	11.11%

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	3.849E-01	3.875E-01	2.550E-01	65.81	
		Total Activity :	3.849E-01	3.875E-01			
		Grand Total Activity :	3.849E-01	3.875E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 15L71921-24
Acquisition date : 15-MAR-2017 06:45:52

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.14	41	184	2.44	142.38	137	11	1.10E-02	****	2.55E+00	
1	93.79	7	177	1.11	181.78	175	10	1.87E-03	****	4.10E+00	
1	238.54	142	137	1.21	471.98	468	12	3.83E-02	37.1	4.03E+00	
0	295.49	13	61	0.72	586.14	585	7	3.54E-03	****	3.39E+00	
1	351.93	91	59	1.43	699.28	693	14	2.47E-02	43.0	2.92E+00	
1	583.23	49	23	2.35	1162.79	1155	18	1.33E-02	57.1	1.86E+00	
1	608.82	53	40	1.77	1214.08	1210	13	1.45E-02	54.9	1.78E+00	
1	1460.83	216	24	1.92	2920.15	2913	13	5.83E-02	16.7	7.96E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	9	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	1	11.11%

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	3.849E-01	3.875E-01	2.550E-01	65.81	
	Total Activity :		3.849E-01	3.875E-01			
Grand Total Activity :			3.849E-01	3.875E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	3.875E-01	2.550E-01	1.876E-01	0.000E+00	2.065

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-3.068E-02		4.218E-02	5.065E-02	0.000E+00	-0.606
CS-137	-1.017E-02		4.668E-02	7.430E-02	0.000E+00	-0.137

DRAFT

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A,15L71921-24      ,03/15/2017 07:47,02/23/2017 08:46,   1.722E+02,L71921-24 SS G
B,15L71921-24      ,CS134_137           ,01/10/2017 07:46,15B150102011
C,AC-228   ,YES,    3.875E-01,   2.550E-01,   1.876E-01,,    2.065
C,CS-134   ,NO ,   -3.068E-02,   4.218E-02,   5.065E-02,,   -0.606
C,CS-137   ,NO ,   -1.017E-02,   4.668E-02,   7.430E-02,,   -0.137
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 07:47:40.91
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 15-MAR-2017 06:45:54.36

LIMS No., Customer Name, Client ID: L71921-27 SS GEOENGINEERS SEDIMENT

Sample ID : 06L71921-27
Sample Type : SS
Quantity : 1.73590E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 08:52:00.
Geometry : 06B150011912
BKGFILE : 06BG022417MT
Real Time : 0 01:01:37.94
Live time : 0 01:01:37.06

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	92.98*	61	121	1.90	186.54	3.13E+00	1.66E-02	38.9	2.32E+00
2	1	186.51*	52	71	3.54	373.56	3.67E+00	1.41E-02	37.2	2.64E+00
3	1	238.58*	78	91	1.03	477.68	3.12E+00	2.12E-02	22.8	7.51E+00
4	1	295.35*	56	40	2.10	591.18	2.63E+00	1.51E-02	25.8	1.45E+00
5	1	351.91*	105	34	2.34	704.27	2.26E+00	2.84E-02	16.4	2.15E+00
6	1	582.99*	29	20	1.31	1166.24	1.45E+00	7.85E-03	34.2	1.26E+00
7	1	609.13*	52	22	1.54	1218.49	1.40E+00	1.40E-02	23.8	3.24E+00
8	1	727.66	32	18	3.24	1455.41	1.20E+00	8.67E-03	32.9	1.09E+00
9	1	909.80*	56	7	3.53	1819.45	9.84E-01	1.51E-02	15.1	5.95E+00
10	1	1043.08	20	2	1.79	2085.80	8.73E-01	5.31E-03	25.5	4.57E-01
11	1	1120.09*	18	7	2.19	2239.69	8.19E-01	4.75E-03	38.1	3.91E-01
12	1	1460.20*	155	7	2.08	2919.24	6.52E-01	4.20E-02	9.6	1.64E+00

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.109E+00	------	Line Not Found	------
	911.07	56	27.70*	9.845E-01	8.636E-01	8.692E-01	30.12

Flag: "*" = Keyline

DRAFT

Sample ID : 06L71921-27 Acquisition date : 15-MAR-2017 06:45:54

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	8.636E-01	8.692E-01	2.619E-01	30.12	
			---	---			
Total Activity :			8.636E-01	8.692E-01			
Grand Total Activity :			8.636E-01	8.692E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 06L71921-27
Acquisition date : 15-MAR-2017 06:45:54

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	92.98	61	121	1.90	186.54	181	11	1.66E-02	77.7	3.13E+00	
1	186.51	52	71	3.54	373.56	369	12	1.41E-02	74.4	3.67E+00	
1	238.58	78	91	1.03	477.68	473	8	2.12E-02	45.6	3.12E+00	
1	295.35	56	40	2.10	591.18	586	10	1.51E-02	51.7	2.63E+00	
1	351.91	105	34	2.34	704.27	697	15	2.84E-02	32.8	2.26E+00	
1	582.99	29	20	1.31	1166.24	1161	9	7.85E-03	68.5	1.45E+00	
1	609.13	52	22	1.54	1218.49	1212	11	1.40E-02	47.6	1.40E+00	
1	727.66	32	18	3.24	1455.41	1450	14	8.67E-03	65.8	1.20E+00	
1	1043.08	20	2	1.79	2085.80	2082	8	5.31E-03	51.0	8.73E-01	
1	1120.09	18	7	2.19	2239.69	2235	10	4.75E-03	76.2	8.19E-01	
1	1460.20	155	7	2.08	2919.24	2912	14	4.20E-02	19.3	6.52E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	12	
Number of unidentified lines	11	
Number of lines tentatively identified by NID	1	8.33%

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	8.636E-01	8.692E-01	2.619E-01	30.12	
			---------	---------			
Total Activity :			8.636E-01	8.692E-01			
Grand Total Activity :			8.636E-01	8.692E-01			

Flags: "K" = Keyline not found
"E" = Manually edited
"M" = Manually accepted
"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
AC-228	8.692E-01	2.619E-01	2.923E-01	0.000E+00	2.974

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA

DRAFT

CS-134	5.723E-03	5.637E-02	8.339E-02	0.000E+00	0.069
CS-137	-4.394E-02	4.611E-02	6.424E-02	0.000E+00	-0.684

DRAFT

```
A,06L71921-27     ,03/15/2017 07:47,02/23/2017 08:52,   1.736E+02,L71921-27 SS G
B,06L71921-27     ,CS134_137          ,01/05/2017 07:18,06B150011912
C,AC-228  ,YES,   8.692E-01,   2.619E-01,   2.923E-01,,    2.974
C,CS-134  ,NO ,   5.723E-03,   5.637E-02,   8.339E-02,,    0.069
C,CS-137  ,NO ,  -4.394E-02,   4.611E-02,   6.424E-02,,   -0.684
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 07:48:14.71
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 15-MAR-2017 06:45:54.75

LIMS No., Customer Name, Client ID: L71921-30 SS GEOENGINEERS SEDIMENT

Sample ID : 14L71921-30 Smple Date: 23-FEB-2017 08:58:00.
Sample Type : SS Geometry : 14B150012012
Quantity : 1.61020E+02 g Dry BKGFILE : 14BG022417MT
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 01:02:03.13
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:02:02.15
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	185.85*	27	120	1.56	369.42	3.11E+00	7.26E-03	88.2	1.07E+00
2	3	238.66*	97	61	1.72	475.15	2.71E+00	2.61E-02	18.8	2.80E+00
3	3	242.12	43	52	2.15	482.07	2.68E+00	1.16E-02	45.3	
4	1	351.58*	60	52	1.41	701.22	2.04E+00	1.62E-02	27.8	1.36E+00
5	1	582.77*	25	28	2.07	1164.14	1.38E+00	6.85E-03	45.4	1.38E+00
6	1	609.46*	43	28	2.33	1217.57	1.34E+00	1.17E-02	29.7	3.30E-01
7	1	968.83*	19	10	2.50	1937.31	9.25E-01	5.24E-03	44.8	8.67E-01
8	1	1461.29*	159	4	2.44	2923.89	6.67E-01	4.28E-02	9.2	6.42E-01

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

Nuclide Line Activity Report

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 14L71921-30

Acquisition date : 15-MAR-2017 06:45:54

Total number of lines in spectrum	8	
Number of unidentified lines	8	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

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

DRAFT

Unidentified Energy Lines
Sample ID : 14L71921-30 Acquisition date : 15-MAR-2017 06:45:54

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	185.85	27	120	1.56	369.42	363	13	7.26E-03	****	3.11E+00	
3	238.66	97	61	1.72	475.15	469	21	2.61E-02	37.5	2.71E+00	
3	242.12	43	52	2.15	482.07	469	21	1.16E-02	90.6	2.68E+00	
1	351.58	60	52	1.41	701.22	696	11	1.62E-02	55.6	2.04E+00	
1	582.77	25	28	2.07	1164.14	1160	10	6.85E-03	90.7	1.38E+00	
1	609.46	43	28	2.33	1217.57	1212	11	1.17E-02	59.4	1.34E+00	
1	968.83	19	10	2.50	1937.31	1929	14	5.24E-03	89.6	9.25E-01	
1	1461.29	159	4	2.44	2923.89	2916	16	4.28E-02	18.4	6.67E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 8
Number of unidentified lines 8
Number of lines tentatively identified by NID 0 0.00%
**** There are no nuclides meeting summary criteria ****

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

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-4.592E-02		7.628E-02	9.945E-02	0.000E+00	-0.462
CS-137	-9.583E-02		6.678E-02	8.955E-02	0.000E+00	-1.070
AC-228	2.137E-01		2.933E-01	5.420E-01	0.000E+00	0.394

DRAFT

```
A,14L71921-30     ,03/15/2017 07:48,02/23/2017 08:58,   1.610E+02,L71921-30 SS G
B,14L71921-30     ,CS134_137           ,01/03/2017 08:02,14B150012012
C,CS-134  ,NO ,  -4.592E-02,   7.628E-02,   9.945E-02,,    -0.462
C,CS-137  ,NO ,  -9.583E-02,   6.678E-02,   8.955E-02,,    -1.070
C,AC-228  ,NO ,   2.137E-01,   2.933E-01,   5.420E-01,,     0.394
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 07:48:13.28
TBE23 03017322 HpGe ********** Aquisition Date/Time: 15-MAR-2017 06:45:57.44

LIMS No., Customer Name, Client ID: L71921-33 SS GEOENGINEERS SEDIMENT

Sample ID : 23L71921-33
Sample Type : SS
Quantity : 1.85490E+02 g Dry
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 09:04:00.
Geometry : 23B150082004
BKGFILE : 23BG022417MT
Real Time : 0 01:02:02.14
Live time : 0 01:01:58.48

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	0	33.55*	16	46	1.31	67.91	3.56E-01	4.44E-03	88.5	
2	0	48.20*	16	349	8.94	97.16	1.63E+00	4.21E-03	325.6	
3	0	185.86*	56	130	1.51	371.93	5.70E+00	1.50E-02	43.9	
4	0	238.98*	187	242	2.77	477.99	4.87E+00	5.04E-02	21.3	
5	0	294.93*	68	135	2.36	589.72	4.13E+00	1.84E-02	41.2	
6	0	351.75*	88	100	1.33	703.20	3.55E+00	2.36E-02	28.2	
7	0	582.71*	85	21	2.51	1164.63	2.27E+00	2.27E-02	16.5	
8	0	609.54*	39	71	1.89	1218.26	2.18E+00	1.05E-02	51.0	
9	0	1052.64	17	2	0.86	2104.35	1.39E+00	4.45E-03	29.6	
10	0	1460.08*	278	4	3.04	2920.02	1.07E+00	7.47E-02	6.8	

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

Nuclide Line Activity Report

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 23L71921-33

Acquisition date : 15-MAR-2017 06:45:57

Total number of lines in spectrum	10	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	33.55	16	46	1.31	67.91	64	9	4.44E-03	****	3.56E-01	
0	48.20	16	349	8.94	97.16	75	25	4.21E-03	****	1.63E+00	
0	185.86	56	130	1.51	371.93	367	11	1.50E-02	87.8	5.70E+00	
0	238.98	187	242	2.77	477.99	468	19	5.04E-02	42.7	4.87E+00	
0	294.93	68	135	2.36	589.72	581	17	1.84E-02	82.4	4.13E+00	
0	351.75	88	100	1.33	703.20	694	16	2.36E-02	56.4	3.55E+00	
0	582.71	85	21	2.51	1164.63	1158	14	2.27E-02	33.0	2.27E+00	
0	609.54	39	71	1.89	1218.26	1209	15	1.05E-02	****	2.18E+00	
0	1052.64	17	2	0.86	2104.35	2099	9	4.45E-03	59.3	1.39E+00	
0	1460.08	278	4	3.04	2920.02	2909	20	7.47E-02	13.6	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 10
Number of unidentified lines 10
Number of lines tentatively identified by NID 0 0.00%
**** There are no nuclides meeting summary criteria ****

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

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	3.171E-02		5.387E-02	8.668E-02	0.000E+00	0.366
CS-137	3.424E-03		4.061E-02	7.443E-02	0.000E+00	0.046
AC-228	3.166E-01		1.703E-01	3.675E-01	0.000E+00	0.862

DRAFT

```
A,23L71921-33      ,03/15/2017 07:48,02/23/2017 09:04,   1.855E+02,L71921-33 SS G
B,23L71921-33      ,CS134_137           ,01/05/2017 07:18,23B150082004
C,CS-134   ,NO ,   3.171E-02,   5.387E-02,   8.668E-02,,    0.366
C,CS-137   ,NO ,   3.424E-03,   4.061E-02,   7.443E-02,,    0.046
C,AC-228   ,NO ,   3.166E-01,   1.703E-01,   3.675E-01,,    0.862
```

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 08:59:20.79
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 15-MAR-2017 07:54:38.72

LIMS No., Customer Name, Client ID: L71921-36 SS GEOENGINEERS SEDIMENT

Sample ID : 15L71921-36
Sample Type : SS
Quantity : 1.85330E+02 g Dry
Start Channel : 90 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 7.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 09:10:00.
Geometry : 15B150102011
BKGFILE : 15BG022417MT
Real Time : 0 01:04:32.82
Live time : 0 01:04:32.35

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	3	75.00*	19	151	1.28	144.11	2.63E+00	4.79E-03	108.6	9.81E+00
2	3	77.80*	73	183	1.60	149.72	2.89E+00	1.88E-02	38.4	
3	1	93.61*	64	173	3.47	181.43	4.09E+00	1.64E-02	44.2	3.59E+00
4	1	186.22*	31	126	1.19	367.10	4.73E+00	7.90E-03	77.5	1.99E+00
5	1	238.62*	110	95	1.25	472.14	4.02E+00	2.83E-02	19.0	8.34E-01
6	1	295.21*	56	34	1.23	585.59	3.39E+00	1.45E-02	24.3	2.11E+00
7	1	351.70*	88	34	1.28	698.81	2.92E+00	2.27E-02	17.9	1.66E+00
8	1	583.15*	42	33	1.40	1162.64	1.86E+00	1.09E-02	32.7	7.58E-01
9	1	609.06*	77	38	1.64	1214.55	1.78E+00	1.98E-02	21.8	2.16E+00
10	1	910.77*	26	16	1.65	1818.92	1.23E+00	6.81E-03	38.6	7.71E-01
11	1	1460.75*	208	19	1.99	2919.97	7.96E-01	5.37E-02	8.5	8.84E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.395E+00	------	Line Not Found	------
	911.07	26	27.70*	1.228E+00	2.922E-01	2.941E-01	77.29

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15L71921-36

Acquisition date : 15-MAR-2017 07:54:38

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	2.922E-01	2.941E-01	2.273E-01	77.29	
	Total Activity :		2.922E-01	2.941E-01			
	Grand Total Activity :		2.922E-01	2.941E-01			

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

DRAFT

Sample ID : 15L71921-36 Acquisition date : 15-MAR-2017 07:54:38

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
3	75.00	19	151	1.28	144.11	141	15	4.79E-03	****	2.63E+00	
3	77.80	73	183	1.60	149.72	141	15	1.88E-02	76.8	2.89E+00	
1	93.61	64	173	3.47	181.43	172	12	1.64E-02	88.4	4.09E+00	
1	186.22	31	126	1.19	367.10	362	12	7.90E-03	****	4.73E+00	
1	238.62	110	95	1.25	472.14	467	9	2.83E-02	38.0	4.02E+00	
1	295.21	56	34	1.23	585.59	581	9	1.45E-02	48.6	3.39E+00	
1	351.70	88	34	1.28	698.81	694	12	2.27E-02	35.9	2.92E+00	
1	583.15	42	33	1.40	1162.64	1157	13	1.09E-02	65.4	1.86E+00	
1	609.06	77	38	1.64	1214.55	1207	15	1.98E-02	43.5	1.78E+00	
1	1460.75	208	19	1.99	2919.97	2912	15	5.37E-02	17.0	7.96E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	2.922E-01	2.941E-01	2.273E-01	77.29	
			---	---			
Total Activity :			2.922E-01	2.941E-01			
Grand Total Activity :			2.922E-01	2.941E-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
AC-228	2.941E-01	2.273E-01	2.039E-01	0.000E+00	1.443

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	2.191E-02		3.378E-02	5.434E-02	0.000E+00	0.403

DRAFT

CS-137	-5.580E-03	3.896E-02	6.258E-02	0.000E+00	-0.089

DRAFT

```
A,15L71921-36     ,03/15/2017 08:59,02/23/2017 09:10,   1.853E+02,L71921-36 SS G
B,15L71921-36     ,CS134_137           ,01/10/2017 07:46,15B150102011
C,AC-228  ,YES,   2.941E-01,   2.273E-01,   2.039E-01,,    1.443
C,CS-134  ,NO ,   2.191E-02,   3.378E-02,   5.434E-02,,    0.403
C,CS-137  ,NO ,  -5.580E-03,   3.896E-02,   6.258E-02,,   -0.089
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 08:59:40.43
TBE06 30-TP30563A HpGe ******* Aquisition Date/Time: 15-MAR-2017 07:54:40.43

LIMS No., Customer Name, Client ID: L71921-39 SS GEOENGINEERS SEDIMENT

Sample ID : 06L71921-39
Sample Type : SS
Quantity : 1.66120E+02 g Dry
Start Channel : 40 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: CS134_137

Smple Date: 23-FEB-2017 09:16:00.
Geometry : 06B150011912
BKGFILE : 06BG022417MT
Real Time : 0 01:04:50.09
Live time : 0 01:04:49.16

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	185.71*	37	94	1.39	371.97	3.67E+00	9.51E-03	54.3	1.23E+00
2	1	238.59*	79	83	1.03	477.71	3.12E+00	2.04E-02	24.2	4.12E+00
3	1	295.55*	64	62	0.80	591.59	2.62E+00	1.64E-02	26.7	2.29E+01
4	1	351.91*	64	56	1.04	704.27	2.26E+00	1.65E-02	27.5	8.28E-01
5	1	510.40*	37	57	2.81	1021.13	1.63E+00	9.63E-03	55.4	1.19E+00
6	1	583.15*	20	27	1.07	1166.56	1.45E+00	5.03E-03	54.1	6.11E+00
7	1	609.08*	50	25	2.20	1218.39	1.40E+00	1.28E-02	26.4	7.78E-01
8	1	910.81*	29	6	1.90	1821.47	9.84E-01	7.36E-03	27.9	1.23E+00
9	1	1005.36	11	8	0.94	2010.42	9.01E-01	2.92E-03	52.7	4.02E-01
10	1	1460.34*	126	10	2.13	2919.51	6.51E-01	3.25E-02	11.2	3.82E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.109E+00	------	Line Not Found	------
	911.07	29	27.70*	9.835E-01	4.393E-01	4.422E-01	55.88

Flag: "*" = Keyline

DRAFT

Sample ID : 06L71921-39 Acquisition date : 15-MAR-2017 07:54:40

Total number of lines in spectrum	10	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	1	10.00%

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	4.393E-01	4.422E-01	2.471E-01	55.88	
		Total Activity :	4.393E-01	4.422E-01			
		Grand Total Activity :	4.393E-01	4.422E-01			

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

DRAFT

Sample ID : 06L71921-39 Acquisition date : 15-MAR-2017 07:54:40

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	185.71	37	94	1.39	371.97	368	10	9.51E-03	****	3.67E+00	
1	238.59	79	83	1.03	477.71	474	8	2.04E-02	48.3	3.12E+00	
1	295.55	64	62	0.80	591.59	586	11	1.64E-02	53.5	2.62E+00	
1	351.91	64	56	1.04	704.27	698	12	1.65E-02	55.0	2.26E+00	
1	510.40	37	57	2.81	1021.13	1014	18	9.63E-03	****	1.63E+00	
1	583.15	20	27	1.07	1166.56	1161	9	5.03E-03	****	1.45E+00	
1	609.08	50	25	2.20	1218.39	1214	11	1.28E-02	52.8	1.40E+00	
1	1005.36	11	8	0.94	2010.42	2003	10	2.92E-03	****	9.01E-01	
1	1460.34	126	10	2.13	2919.51	2913	13	3.25E-02	22.4	6.51E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	10	
Number of unidentified lines	9	
Number of lines tentatively identified by NID	1	10.00%

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	4.393E-01	4.422E-01	2.471E-01	55.88	
	Total Activity :		4.393E-01	4.422E-01			
	Grand Total Activity :		4.393E-01	4.422E-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
AC-228	4.422E-01	2.471E-01	2.480E-01	0.000E+00	1.784

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-5.915E-03		5.875E-02	8.400E-02	0.000E+00	-0.070
CS-137	8.870E-03		4.860E-02	8.304E-02	0.000E+00	0.107

DRAFT

```
A,06L71921-39     ,03/15/2017 08:59,02/23/2017 09:16,   1.661E+02,L71921-39 SS G
B,06L71921-39     ,CS134_137          ,01/05/2017 07:18,06B150011912
C,AC-228  ,YES,   4.422E-01,   2.471E-01,   2.480E-01,,    1.784
C,CS-134  ,NO ,  -5.915E-03,   5.875E-02,   8.400E-02,,   -0.070
C,CS-137  ,NO ,   8.870E-03,   4.860E-02,   8.304E-02,,    0.107
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 09:00:00.81
TBE14 31-TP10760A HpGe ******* Aquisition Date/Time: 15-MAR-2017 07:54:40.63

LIMS No., Customer Name, Client ID: L71921-42 SS GEOENGINEERS SEDIMENT

Sample ID : 14L71921-42 Smple Date: 23-FEB-2017 09:22:00.
Sample Type : SS Geometry : 14B150012012
Quantity : 1.76920E+02 g Dry BKGFILE : 14BG022417MT
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 01:05:07.49
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:05:06.47
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	74.62*	17	179	2.03	146.77	9.95E-01	4.36E-03	181.8	1.82E+00
2	1	92.32*	22	95	1.03	182.20	1.98E+00	5.65E-03	83.6	4.07E-01
3	1	185.52*	21	129	1.54	368.77	3.11E+00	5.48E-03	111.4	6.33E-01
4	1	238.31*	85	151	1.08	474.45	2.71E+00	2.17E-02	30.3	1.47E+00
5	1	351.74*	65	58	1.77	701.54	2.04E+00	1.65E-02	27.8	1.26E+00
6	1	510.59*	35	86	3.35	1019.59	1.53E+00	9.00E-03	78.5	9.29E-01
7	1	583.14*	49	45	3.09	1164.87	1.38E+00	1.25E-02	35.3	8.61E+00
8	1	609.24*	54	30	1.98	1217.13	1.34E+00	1.39E-02	28.8	9.00E-01
9	1	911.56*	31	8	3.15	1822.60	9.72E-01	8.06E-03	30.1	9.93E-01
10	1	1461.10*	175	13	2.29	2923.52	6.67E-01	4.48E-02	9.2	4.17E-01
11	1	1765.04*	16	0	1.86	3532.60	5.91E-01	4.02E-03	29.6	3.29E-01

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

Nuclide Line Activity Report

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.086E+00	------	Line Not Found	------
	911.07	31	27.70*	9.721E-01	4.570E-01	4.600E-01	60.21

Flag: "*" = Keyline

DRAFT

Sample ID : 14L71921-42 Acquisition date : 15-MAR-2017 07:54:40

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	4.570E-01	4.600E-01	2.770E-01	60.21	
		Total Activity :	4.570E-01	4.600E-01			
		Grand Total Activity :	4.570E-01	4.600E-01			

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

DRAFT

Unidentified Energy Lines
Sample ID : 14L71921-42 Acquisition date : 15-MAR-2017 07:54:40

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	74.62	17	179	2.03	146.77	140	14	4.36E-03	****	9.95E-01	
1	92.32	22	95	1.03	182.20	179	8	5.65E-03	****	1.98E+00	
1	185.52	21	129	1.54	368.77	364	12	5.48E-03	****	3.11E+00	
1	238.31	85	151	1.08	474.45	470	11	2.17E-02	60.6	2.71E+00	
1	351.74	65	58	1.77	701.54	696	12	1.65E-02	55.6	2.04E+00	
1	510.59	35	86	3.35	1019.59	1010	24	9.00E-03	****	1.53E+00	
1	583.14	49	45	3.09	1164.87	1158	17	1.25E-02	70.6	1.38E+00	
1	609.24	54	30	1.98	1217.13	1208	17	1.39E-02	57.6	1.34E+00	
1	1461.10	175	13	2.29	2923.52	2917	13	4.48E-02	18.5	6.67E-01	
1	1765.04	16	0	1.86	3532.60	3526	11	4.02E-03	59.3	5.91E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	11	
Number of unidentified lines	10	
Number of lines tentatively identified by NID	1	9.09%

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	4.570E-01	4.600E-01	2.770E-01	60.21	
			---	---			
Total Activity :			4.570E-01	4.600E-01			
Grand Total Activity :			4.570E-01	4.600E-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
AC-228	4.600E-01	2.770E-01	2.394E-01	0.000E+00	1.922

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	7.460E-03		6.207E-02	9.102E-02	0.000E+00	0.082

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CS-137	-3.679E-02	5.937E-02	9.118E-02	0.000E+00	-0.404

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A,14L71921-42     ,03/15/2017 09:00,02/23/2017 09:22,   1.769E+02,L71921-42 SS G
B,14L71921-42     ,CS134_137          ,01/03/2017 08:02,14B150012012
C,AC-228  ,YES,   4.600E-01,   2.770E-01,   2.394E-01,,    1.922
C,CS-134  ,NO ,   7.460E-03,   6.207E-02,   9.102E-02,,    0.082
C,CS-137  ,NO ,  -3.679E-02,   5.937E-02,   9.118E-02,,   -0.404
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DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 15-MAR-2017 09:00:43.07
TBE23 03017322 HpGe ********** Aquisition Date/Time: 15-MAR-2017 07:54:41.49

LIMS No., Customer Name, Client ID: L71921-45 SS GEOENGINEERS SEDIMENT

Sample ID : 23L71921-45 Smple Date: 23-FEB-2017 09:28:00.
Sample Type : SS Geometry : 23B150082004
Quantity : 1.81600E+02 g Dry BKGFILE : 23BG022417MT
Start Channel : 50 Energy Tol : 2.00000 Real Time : 0 01:05:46.37
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 01:05:42.64
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	4	33.71*	32	17	1.91	68.24	3.65E-01	8.15E-03	45.9	2.21E+00
2	0	239.15*	254	206	2.72	478.34	4.87E+00	6.45E-02	16.1	
3	0	352.03*	142	51	1.73	703.75	3.55E+00	3.59E-02	14.7	
4	0	510.48*	8	38	3.24	1020.31	2.55E+00	1.96E-03	221.2	
5	0	582.79*	72	27	2.12	1164.79	2.27E+00	1.82E-02	20.4	
6	0	608.54*	97	49	1.39	1216.26	2.19E+00	2.46E-02	20.3	
7	0	1459.95*	279	0	3.06	2919.77	1.07E+00	7.08E-02	6.5	

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

Nuclide Line Activity Report

Flag: "*" = Keyline

DRAFT

Sample ID : 23L71921-45 Acquisition date : 15-MAR-2017 07:54:41

Total number of lines in spectrum	7	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

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

DRAFT

Sample ID : 23L71921-45 Acquisition date : 15-MAR-2017 07:54:41

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
4	33.71	32	17	1.91	68.24	64	19	8.15E-03	91.7	3.65E-01	
0	239.15	254	206	2.72	478.34	467	23	6.45E-02	32.2	4.87E+00	
0	352.03	142	51	1.73	703.75	697	17	3.59E-02	29.4	3.55E+00	
0	510.48	8	38	3.24	1020.31	1013	14	1.96E-03	****	2.55E+00	
0	582.79	72	27	2.12	1164.79	1158	15	1.82E-02	40.8	2.27E+00	
0	608.54	97	49	1.39	1216.26	1207	18	2.46E-02	40.6	2.19E+00	
0	1459.95	279	0	3.06	2919.77	2910	21	7.08E-02	13.0	1.07E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum 7
Number of unidentified lines 7
Number of lines tentatively identified by NID 0 0.00%
**** There are no nuclides meeting summary criteria ****

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

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	6.705E-02		5.275E-02	9.001E-02	0.000E+00	0.745
CS-137	5.208E-02		3.920E-02	7.983E-02	0.000E+00	0.652
AC-228	2.635E-01		1.775E-01	3.675E-01	0.000E+00	0.717

DRAFT

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A,23L71921-45     ,03/15/2017 09:00,02/23/2017 09:28,   1.816E+02,L71921-45 SS G
B,23L71921-45     ,CS134_137           ,01/05/2017 07:18,23B150082004
C,CS-134  ,NO ,   6.705E-02,   5.275E-02,   9.001E-02,,    0.745
C,CS-137  ,NO ,   5.208E-02,   3.920E-02,   7.983E-02,,    0.652
C,AC-228  ,NO ,   2.635E-01,   1.775E-01,   3.675E-01,,    0.717
```

DRAFT

Sec. Review: Analyst: BG

2

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 16-MAR-2017 13:22:45.44
TBE15 51-TP12994B HpGe ******* Aquisition Date/Time: 16-MAR-2017 09:49:39.01

LIMS No., Customer Name, Client ID: WG24441-1 SS GEOENGINEERS SEDIMENT

Sample ID : 15WG24441-1 Smple Date: 23-FEB-2017 08:04:00.
Sample Type : SS Geometry : 15B150102011
Quantity : 8.47300E+01 g Dry BKGFILE : 15BG022417MT
Start Channel : 90 Energy Tol : 2.00000 Real Time : 0 03:32:33.79
End Channel : 4090 Pk Srch Sens: 5.00000 Live time : 0 03:32:32.48
MDA Multiple : 4.6600 Library Used: CS134_137

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	1	63.13*	63	217	1.23	120.31	1.48E+00	4.94E-03	43.7	2.07E+00
2	2	74.95*	109	368	1.56	144.00	2.63E+00	8.54E-03	36.2	5.45E+00
3	2	77.14*	181	297	1.35	148.40	2.83E+00	1.42E-02	19.9	
4	1	85.78*	2	550	3.72	165.72	3.56E+00	1.69E-04*****		2.36E+00
5	1	93.04*	154	416	1.36	180.28	4.06E+00	1.21E-02	31.0	4.40E+00
6	1	185.62*	114	279	1.45	365.89	4.74E+00	8.91E-03	30.6	4.13E+00
7	2	238.58*	358	147	1.52	472.05	4.02E+00	2.81E-02	8.2	1.88E+00
8	2	241.70	143	165	1.95	478.32	3.99E+00	1.12E-02	23.8	
9	1	295.01*	149	194	1.66	585.19	3.40E+00	1.17E-02	21.7	1.96E+00
10	1	337.98	82	133	1.32	671.30	3.02E+00	6.45E-03	28.4	1.15E+00
11	1	351.64*	232	157	1.66	698.68	2.92E+00	1.82E-02	14.4	2.74E+00
12	1	510.53*	60	128	3.30	1017.13	2.10E+00	4.73E-03	58.9	7.63E-01
13	1	582.94*	85	75	1.53	1162.21	1.86E+00	6.67E-03	24.3	1.26E+00
14	1	609.25*	154	103	2.01	1214.93	1.78E+00	1.20E-02	18.2	1.84E+00
15	1	661.04	61	68	2.50	1318.68	1.65E+00	4.78E-03	31.0	1.21E+00
16	1	910.67*	47	52	2.53	1818.72	1.23E+00	3.66E-03	36.2	2.16E+00
17	1	969.58	58	28	4.08	1936.70	1.16E+00	4.53E-03	24.4	1.96E+00
18	1	1120.00*	35	42	1.94	2237.90	1.01E+00	2.78E-03	42.4	5.74E-01
19	1	1240.26	64	55	2.85	2478.67	9.20E-01	5.05E-03	27.6	9.12E+00
20	1	1460.40*	439	22	1.86	2919.28	7.96E-01	3.44E-02	5.7	8.50E-01
21	1	1764.09	58	0	4.09	3526.92	6.85E-01	4.51E-03	13.3	8.54E-01

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

Nuclide Line Activity Report

Nuclide Type: fission

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
CS-137	661.65	61	85.12*	1.655E+00	1.082E-01	1.083E-01	61.91

Nuclide Type: NATURAL

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	2-Sigma %Error
AC-228	794.70	------	4.60	1.395E+00	------	Line Not Found	------
	911.07	47	27.70*	1.228E+00	3.433E-01	3.457E-01	72.38

DRAFT

Flag: "*" = Keyline

DRAFT

Summary of Nuclide Activity
Sample ID : 15WG24441-1

Acquisition date : 16-MAR-2017 09:49:39

Total number of lines in spectrum	21	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	2	9.52%

Nuclide Type : fission

Nuclide	Hlife	Decay	Uncorrected pCi/g Dry	Decay Corr pCi/g Dry	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.17Y	1.00	1.082E-01	1.083E-01	0.671E-01	61.91	
	Total Activity :		1.082E-01	1.083E-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	3.433E-01	3.457E-01	2.502E-01	72.38	
	Total Activity :		3.433E-01	3.457E-01			
	Grand Total Activity :		4.515E-01	4.541E-01			

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

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It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	63.13	63	217	1.23	120.31	117	7	4.94E-03	87.4	1.48E+00	
2	74.95	109	368	1.56	144.00	136	17	8.54E-03	72.5	2.63E+00	
2	77.14	181	297	1.35	148.40	136	17	1.42E-02	39.9	2.83E+00	
1	85.78	2	550	3.72	165.72	160	14	1.69E-04	****	3.56E+00	
1	93.04	154	416	1.36	180.28	173	14	1.21E-02	62.1	4.06E+00	
1	185.62	114	279	1.45	365.89	361	10	8.91E-03	61.3	4.74E+00	
2	238.58	358	147	1.52	472.05	467	17	2.81E-02	16.4	4.02E+00	
2	241.70	143	165	1.95	478.32	467	17	1.12E-02	47.5	3.99E+00	
1	295.01	149	194	1.66	585.19	579	13	1.17E-02	43.5	3.40E+00	
1	337.98	82	133	1.32	671.30	665	10	6.45E-03	56.8	3.02E+00	
1	351.64	232	157	1.66	698.68	691	16	1.82E-02	28.9	2.92E+00	
1	510.53	60	128	3.30	1017.13	1008	22	4.73E-03	****	2.10E+00	
1	582.94	85	75	1.53	1162.21	1157	12	6.67E-03	48.7	1.86E+00	
1	609.25	154	103	2.01	1214.93	1208	17	1.20E-02	36.3	1.78E+00	
1	969.58	58	28	4.08	1936.70	1930	15	4.53E-03	48.9	1.16E+00	
1	1120.00	35	42	1.94	2237.90	2230	13	2.78E-03	84.8	1.01E+00	
1	1240.26	64	55	2.85	2478.67	2466	17	5.05E-03	55.1	9.20E-01	
1	1460.40	439	22	1.86	2919.28	2913	16	3.44E-02	11.3	7.96E-01	
1	1764.09	58	0	4.09	3526.92	3518	16	4.51E-03	26.7	6.85E-01	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	21	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	2	9.52%

Nuclide Type : fission

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
CS-137	30.17Y	1.00	1.082E-01	1.083E-01	0.671E-01	61.91	
			---	---			
Total Activity :			1.082E-01	1.083E-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
AC-228	5.75Y	1.01	3.433E-01	3.457E-01	2.502E-01	72.38	
			---	---			
Total Activity :			3.433E-01	3.457E-01			

Grand Total Activity : 4.515E-01 4.541E-01

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

Interference Report

No interference correction performed

DRAFT

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/g Dry)	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-137	1.083E-01	6.707E-02	6.266E-02	0.000E+00	1.729
AC-228	3.457E-01	2.502E-01	2.594E-01	0.000E+00	1.333

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

Nuclide	Key-Line Activity (pCi/g Dry)	K.L. Ided	Act error	MDA (pCi/g Dry)	MDA error	Act/MDA
CS-134	-3.376E-03		4.474E-02	6.304E-02	0.000E+00	-0.054

DRAFT

```
A,15WG24441-1      ,03/16/2017 13:22,02/23/2017 08:04,   8.473E+01,WG24441-1 SS G
B,15WG24441-1      ,CS134_137           ,01/10/2017 07:46,15B150102011
C,CS-137   ,YES,   1.083E-01,   6.707E-02,   6.266E-02,,    1.729
C,AC-228   ,YES,   3.457E-01,   2.502E-01,   2.594E-01,,    1.333
C,CS-134   ,NO ,  -3.376E-03,   4.474E-02,   6.304E-02,,   -0.054
```

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GAMMA SPECTROSCOPY

Prep and Run Logs

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Logbook Page

L71921

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
WG24441-1	SS	DUP	GELI	84.73 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-3	SS		GELI	84.73 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-6	SS		GELI	67.75 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-9	SS		GELI	96.19 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-12	SS		GELI	122.08 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-15	SS		GELI	142.19 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-18	SS		GELI	156.13 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-21	SS		GELI	169.16 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-24	SS		GELI	172.18 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-27	SS		GELI	173.59 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-30	SS		GELI	161.02 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-33	SS		GELI	185.49 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-36	SS		GELI	185.33 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-39	SS		GELI	166.12 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-42	SS		GELI	176.92 g dry	03/14/17	MJW	BALANCE 8							WG24441
L71921-45	SS		GELI	181.6 g dry	03/14/17	MJW	BALANCE 8							WG24441

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GAMMA SPECTROSCOPY

Balance and Pipette Check

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Daily Balance Tolerance Check Reports

for : L71921

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 14-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod		
NONE	BALANCE 8	14-MAR-17
GELI	BALANCE 8	14-MAR-17

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Daily Pipette Tolerance Check

for: L71921

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LEAD 210

DRAFT

LEAD 210

Initial Calibration

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X COUNTER PB-210/BI-210 CALIBRATION

Detector Number		Eff. STD	Alpha	Beta		Min Ctd	HV Value	Beta CPM	BI-210 D.F.	BI-210 DPM	BI-210 Beta Eff.
1	a	BIPO4 #5	940	18658	2/13/2015 10:10	30	1580	621.93	0.7749	1998	0.3112
1	b	#6	896	17727	2/13/2015 10:10	30	1580	590.90	0.7749	1998	0.2957
1	c	#7	42	16503	2/13/2015 10:10	30	1580	550.10	0.7749	1998	0.2753
1	d	#8	793	16949	2/13/2015 10:10	30	1580	564.97	0.7749	1998	0.2827
2	a	#9	5	15909	2/13/2015 10:10	30	1580	530.30	0.7749	1998	0.2654
2	b	#10	336	14247	2/13/2015 10:10	30	1580	474.90	0.7749	1998	0.2377
2	c	BIPO4 #5	868	18598	2/13/2015 10:52	30	1580	619.93	0.7719	1990	0.3115
2	d	#6	880	13022	2/13/2015 10:52	30	1580	434.07	0.7719	1990	0.2181
3	a	#7	5	15919	2/13/2015 10:52	30	1580	530.63	0.7718	1990	0.2666
3	b	#8	669	16745	2/13/2015 10:52	30	1580	558.17	0.7718	1990	0.2805
3	c	#9	3	15677	2/13/2015 10:52	30	1580	522.57	0.7718	1990	0.2626
3	d	#10	696	17488	2/13/2015 10:52	30	1580	582.93	0.7718	1990	0.2929
4	a	BIPO4 #5	861	18350	2/13/2015 12:00	30	1580	611.67	0.7668	1977	0.3094
4	b	#6	920	17425	2/13/2015 12:00	30	1580	580.83	0.7668	1977	0.2938
4	c	#7	2	16382	2/13/2015 12:00	30	1580	546.07	0.7668	1977	0.2762
4	d	#8	609	16975	2/13/2015 12:00	30	1580	565.83	0.7668	1977	0.2862

210PB-061014	Activity		MILK DATE/TIME								
	pCi/ml	BI YIELD			Standards Prepared by:					2/21/15	
210PB-061014-1	2013	0.577	2/11/2015 13:55								
210PB-061014-2	2013	0.577	2/11/2015 13:55		Calibration by:	Keith Jett			2/21/15		
210PB-061014-3	2013	0.577	2/11/2015 13:55								
210PB-061014-4	2013	0.577	2/11/2015 13:55								
210PB-061014-5	2013	0.577	2/11/2015 13:55								
210PB-061014-6	2013	0.577	2/11/2015 13:55								

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Y COUNTER PB-210/BI-210 CALIBRATION

Detector Number		Eff. STD	Alpha	Beta		Min Ctd	HV Value	Beta CPM	BI-210 D.F.	BI-210 DPM	BI-210 Beta Eff.
1	a	BIPO4 #5	927	17714	2/13/2015 15:55	30	1650	590.47	0.7497	1933	0.3054
1	b	#6	882	16925	2/13/2015 15:55	30	1650	564.17	0.7497	1933	0.2918
1	c	#7	121	16119	2/13/2015 15:55	30	1650	537.30	0.7497	1933	0.2779
1	d	#8	856	16581	2/13/2015 15:55	30	1650	552.70	0.7497	1933	0.2859
2	a	#9	6	15238	2/13/2015 15:55	30	1650	507.93	0.7497	1933	0.2627
2	b	#10	756	17135	2/13/2015 15:55	30	1650	571.17	0.7497	1933	0.2955
2	c	BIPO4 #5	1657	18377	2/18/2015 10:24	60	1650	306.28	0.3877	1000	0.3064
2	d	#6	2017	17684	2/18/2015 10:24	60	1650	294.73	0.3877	1000	0.2948
3	a	#7	90	16259	2/18/2015 10:24	60	1650	270.98	0.3877	1000	0.2711
3	b	#8	1726	17225	2/18/2015 10:24	60	1650	287.08	0.3877	1000	0.2872
3	c	#9	16	15783	2/18/2015 10:24	60	1650	263.05	0.3877	1000	0.2631
3	d	#10	1502	17714	2/18/2015 10:24	60	1650	295.23	0.3877	1000	0.2953
4	a	BIPO4 #5	3108	13982	2/20/2015 12:38	60	1650	233.03	0.2903	749	0.3113
4	b	#6	3099	13105	2/20/2015 12:38	60	1650	218.42	0.2903	749	0.2918
4	c	#7	3	12270	2/20/2015 12:38	60	1650	204.50	0.2903	749	0.2732
4	d	#8	2476	12496	2/20/2015 12:38	60	1650	208.27	0.2903	749	0.2782

210PB-061014	Activity		MILK DATE/TIME								
	pCi/ml	BI YIELD			Standards Prepared by:						
210PB-061014-1	2013	0.577	2/11/2015 13:55								
210PB-061014-2	2013	0.577	2/11/2015 13:55		Calibration by:						
210PB-061014-3	2013	0.577	2/11/2015 13:55								
210PB-061014-4	2013	0.577	2/11/2015 13:55								
210PB-061014-5	2013	0.577	2/11/2015 13:55								
210PB-061014-6	2013	0.577	2/11/2015 13:55								

Keith Jett 2/21/15

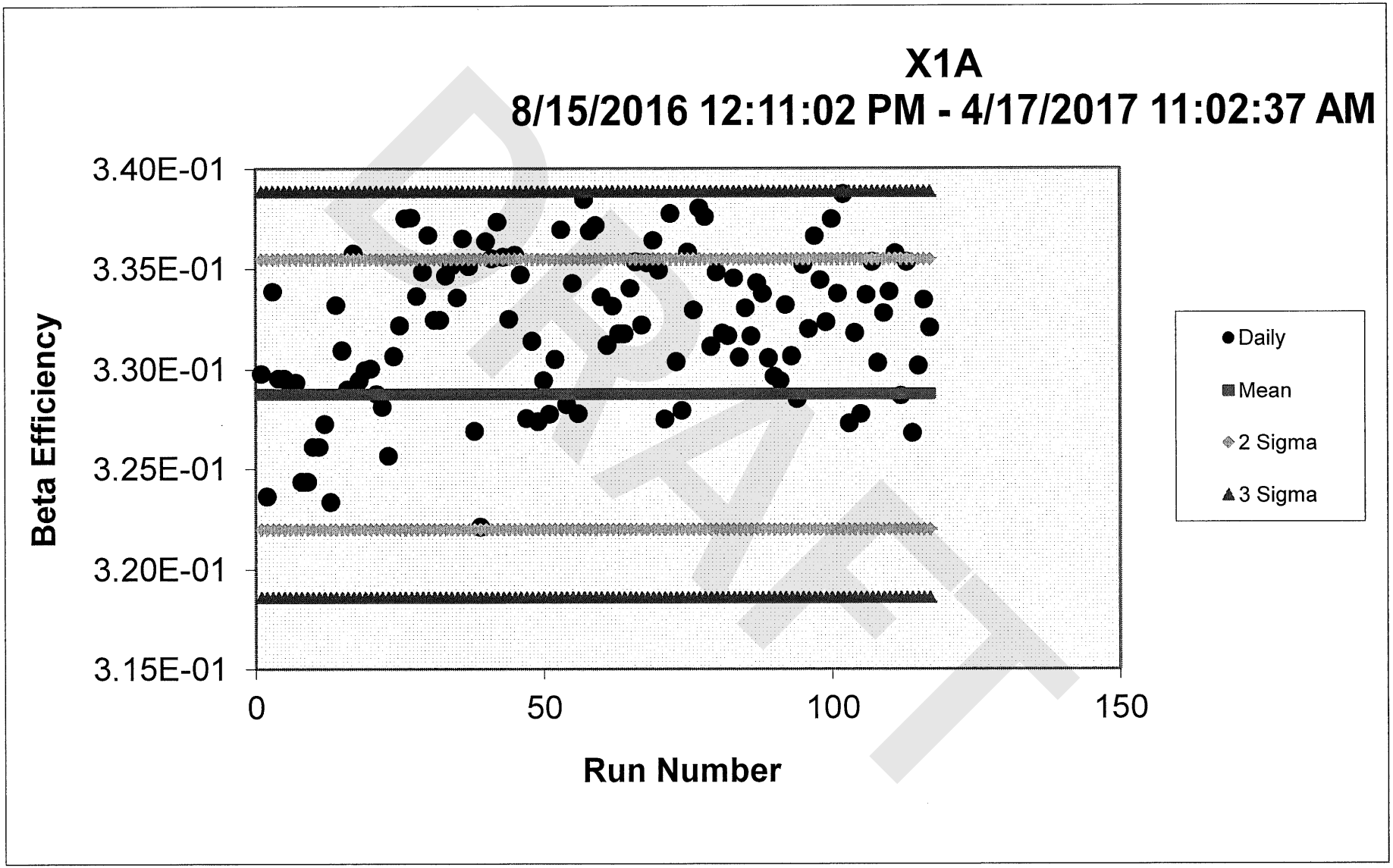
2/21/15

DRAFT

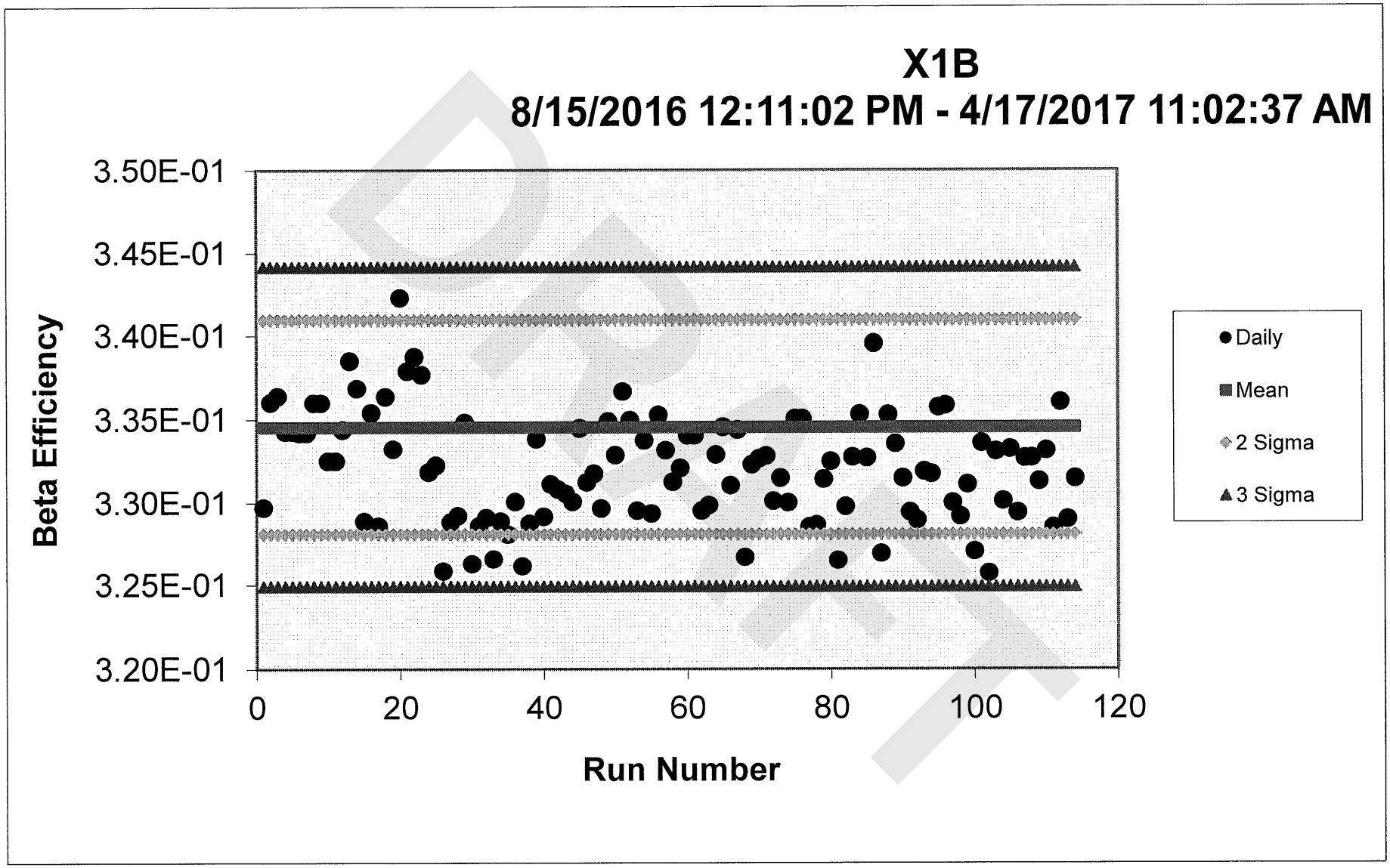
LEAD 210

Daily Source and Background Checks

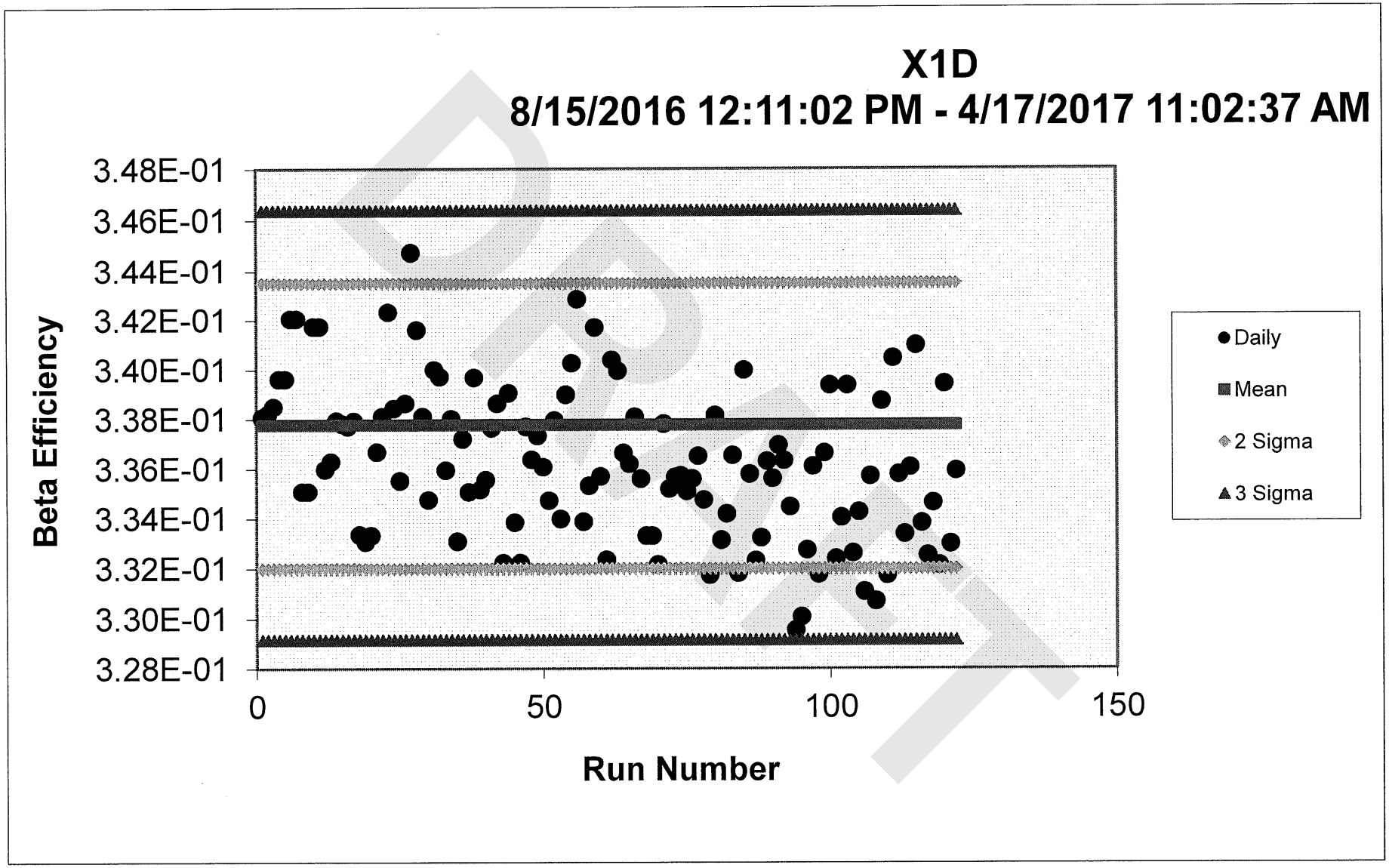
DRAFT


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Beta Efficiency
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3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

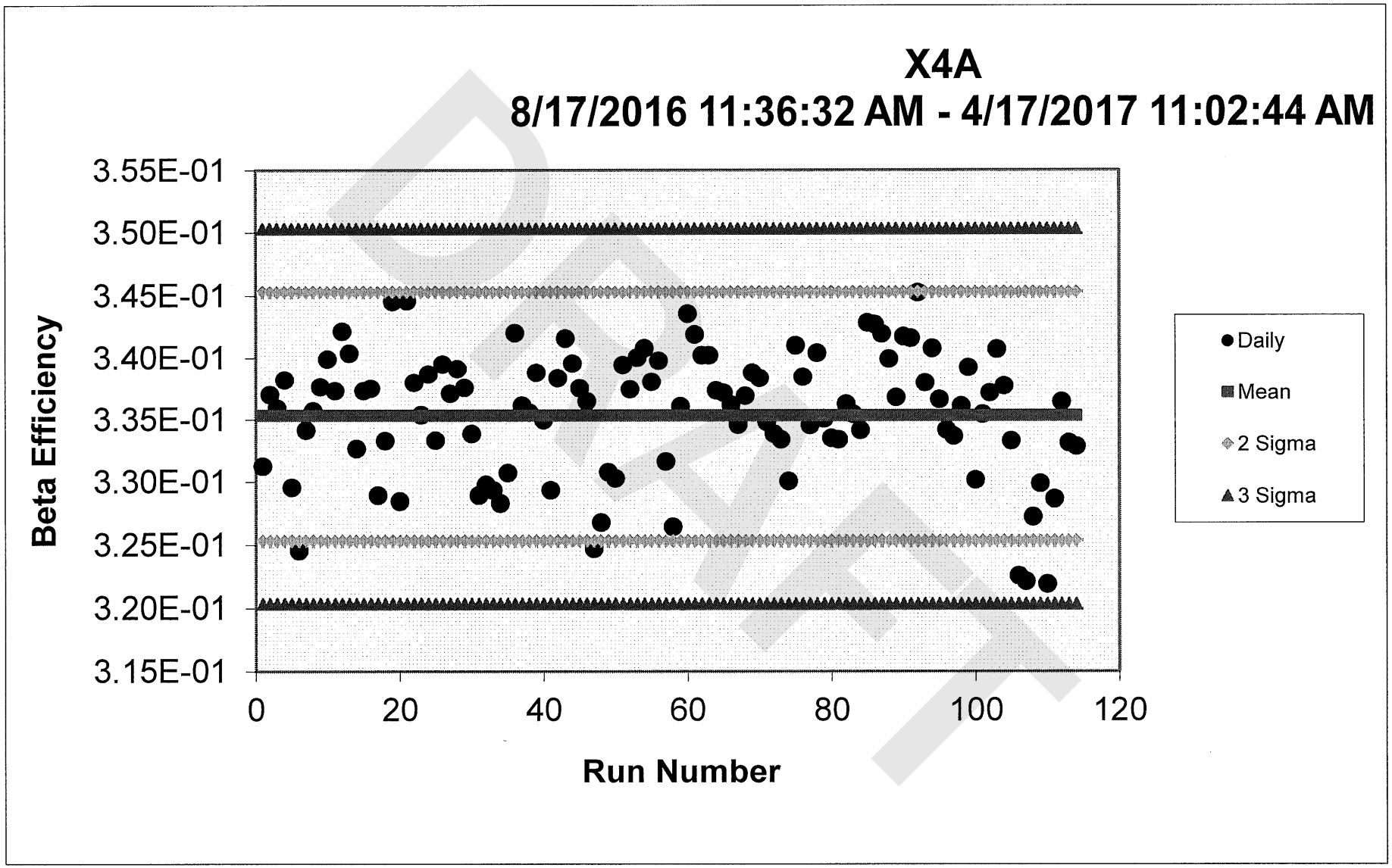
DRAFT


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3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
0
20
40
60
80
100
120
Run Number
Daily
Mean
2 Sigma
3 Sigma

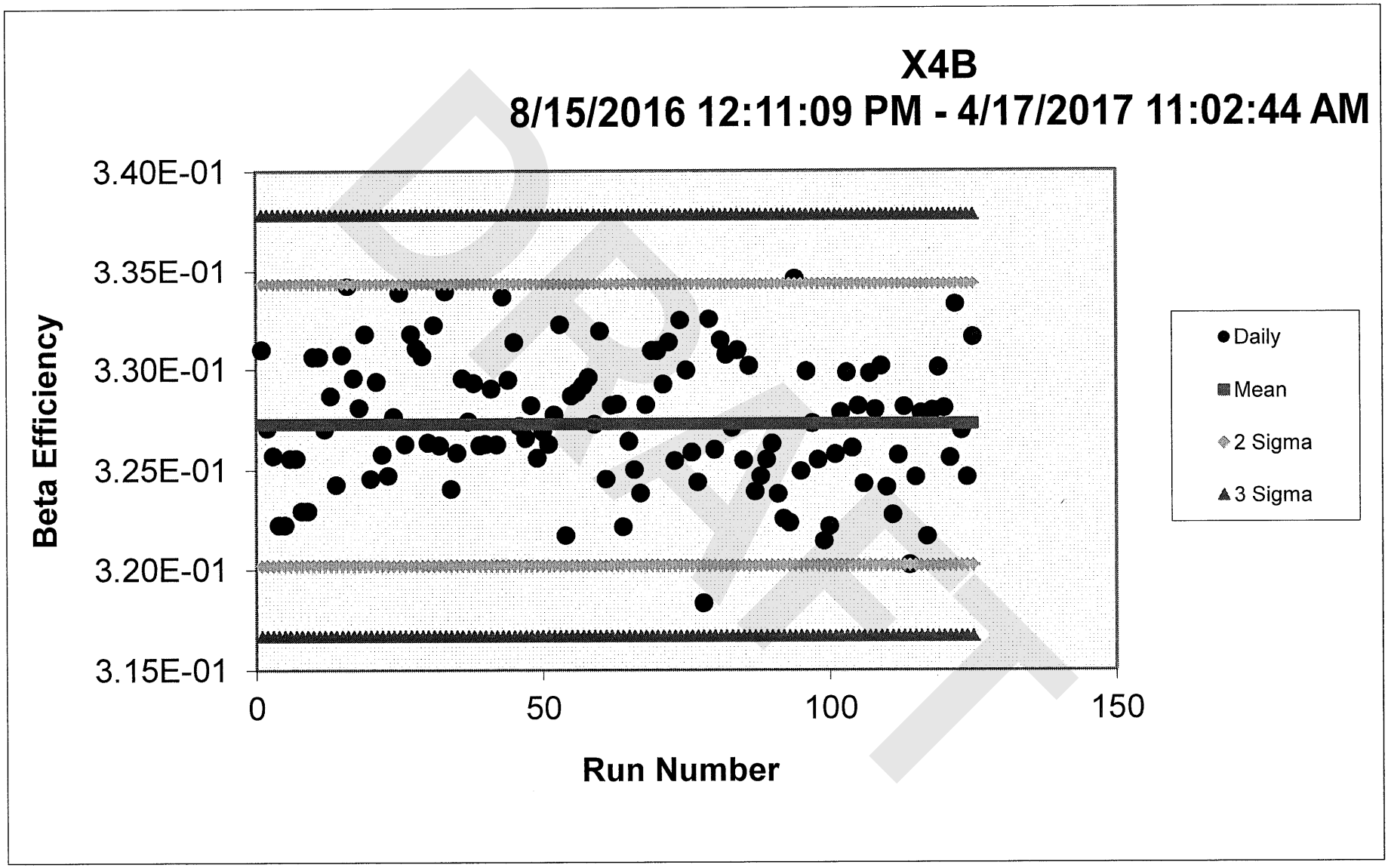
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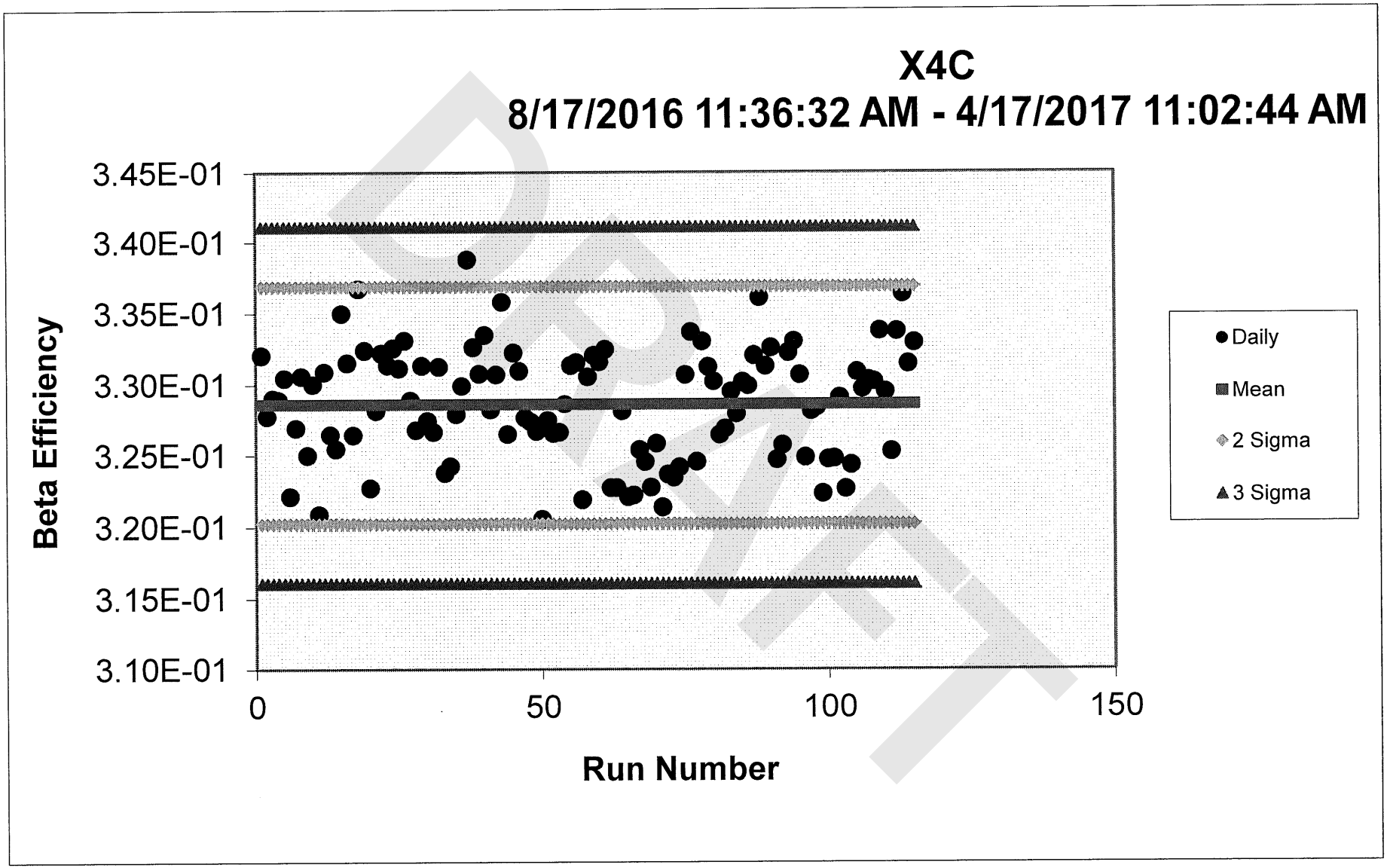

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3.44E-01
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3.40E-01
3.38E-01
3.36E-01
3.34E-01
3.32E-01
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3.28E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

DRAFT

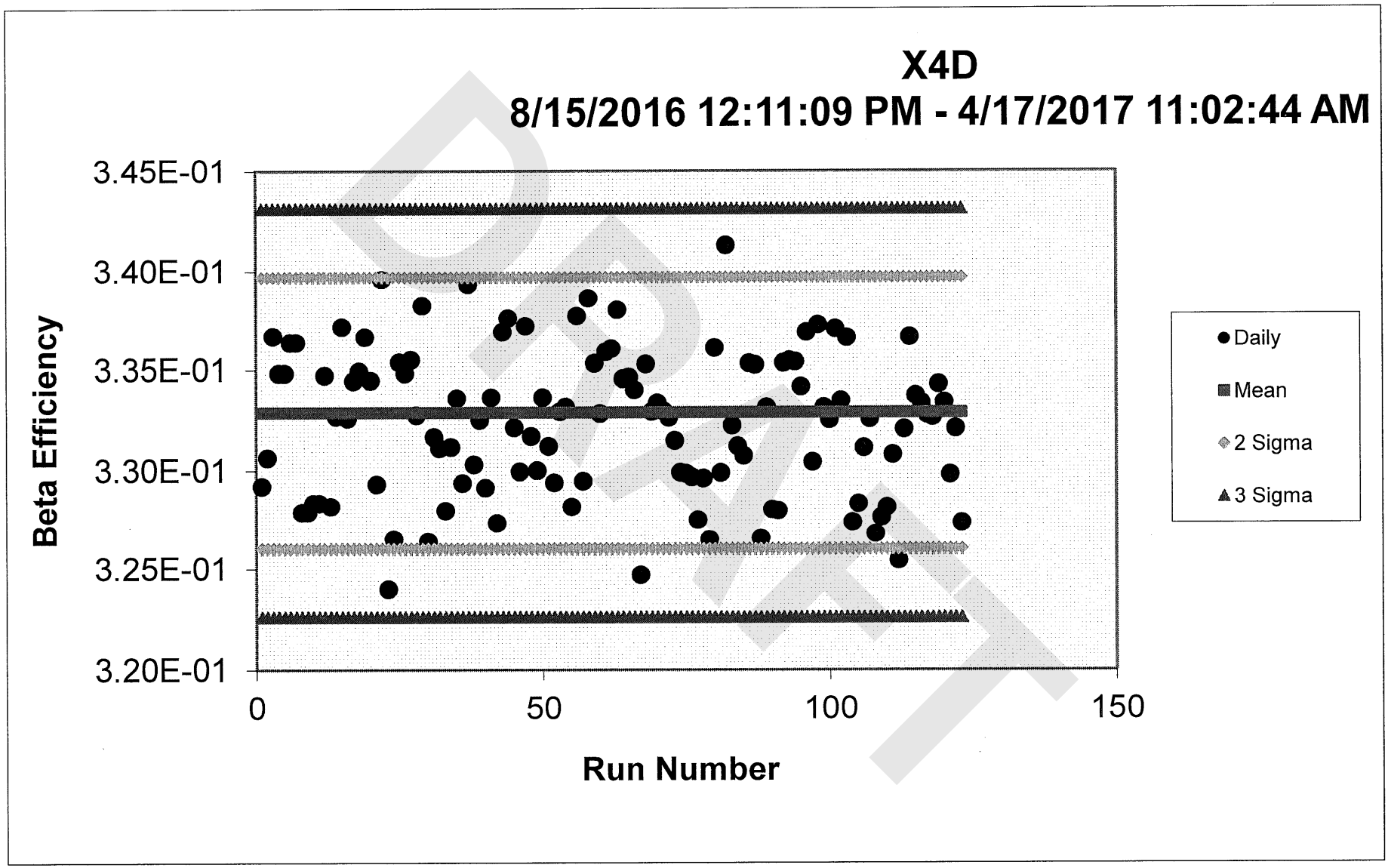

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3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
20
40
60
80
100
120
Run Number
Daily
Mean
2 Sigma
3 Sigma

DRAFT

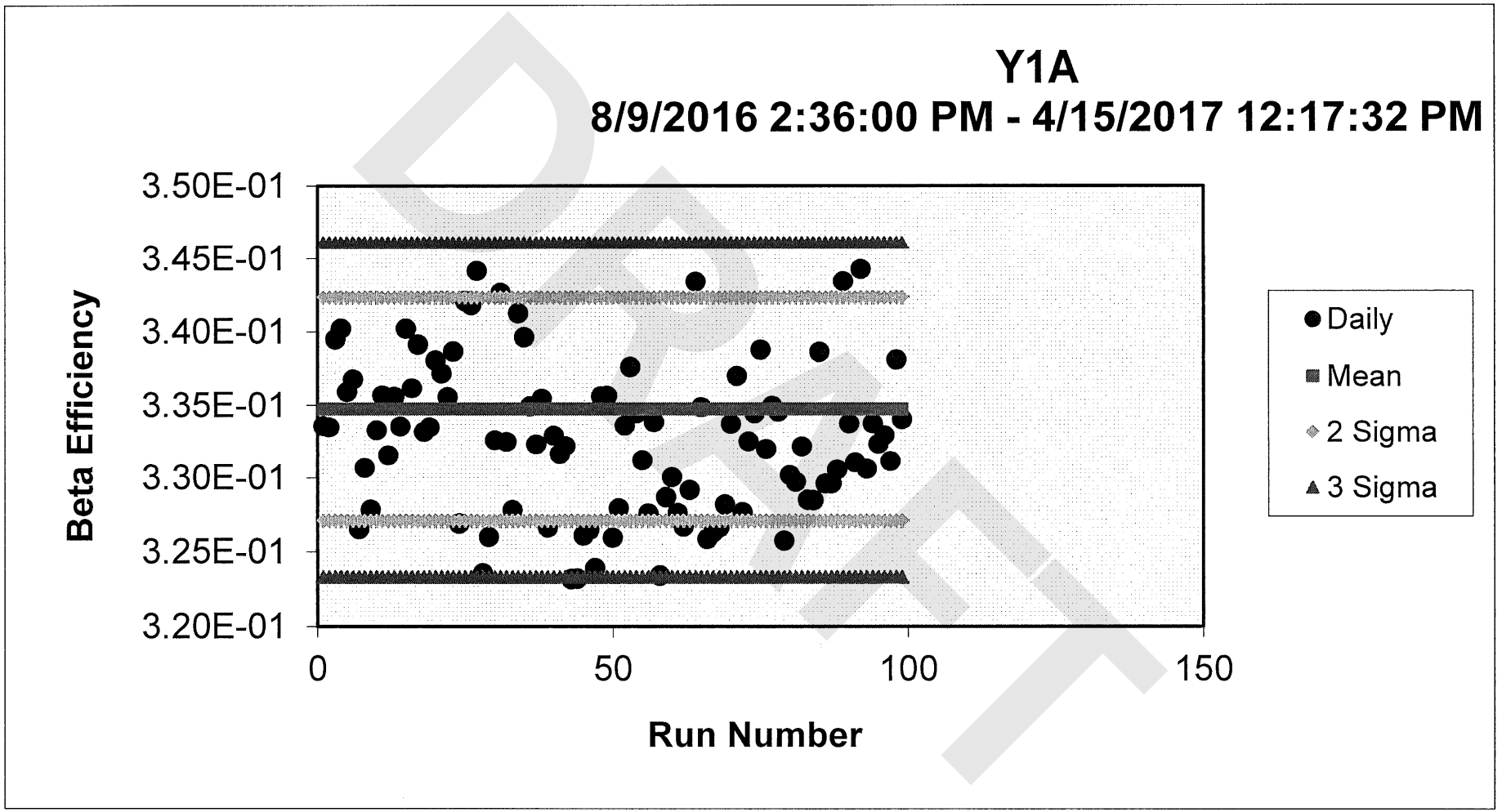

X4B
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Beta Efficiency
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3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma


X4C
8/17/2016 11:36:32 AM - 4/17/2017 11:02:44 AM
Beta Efficiency
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
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0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

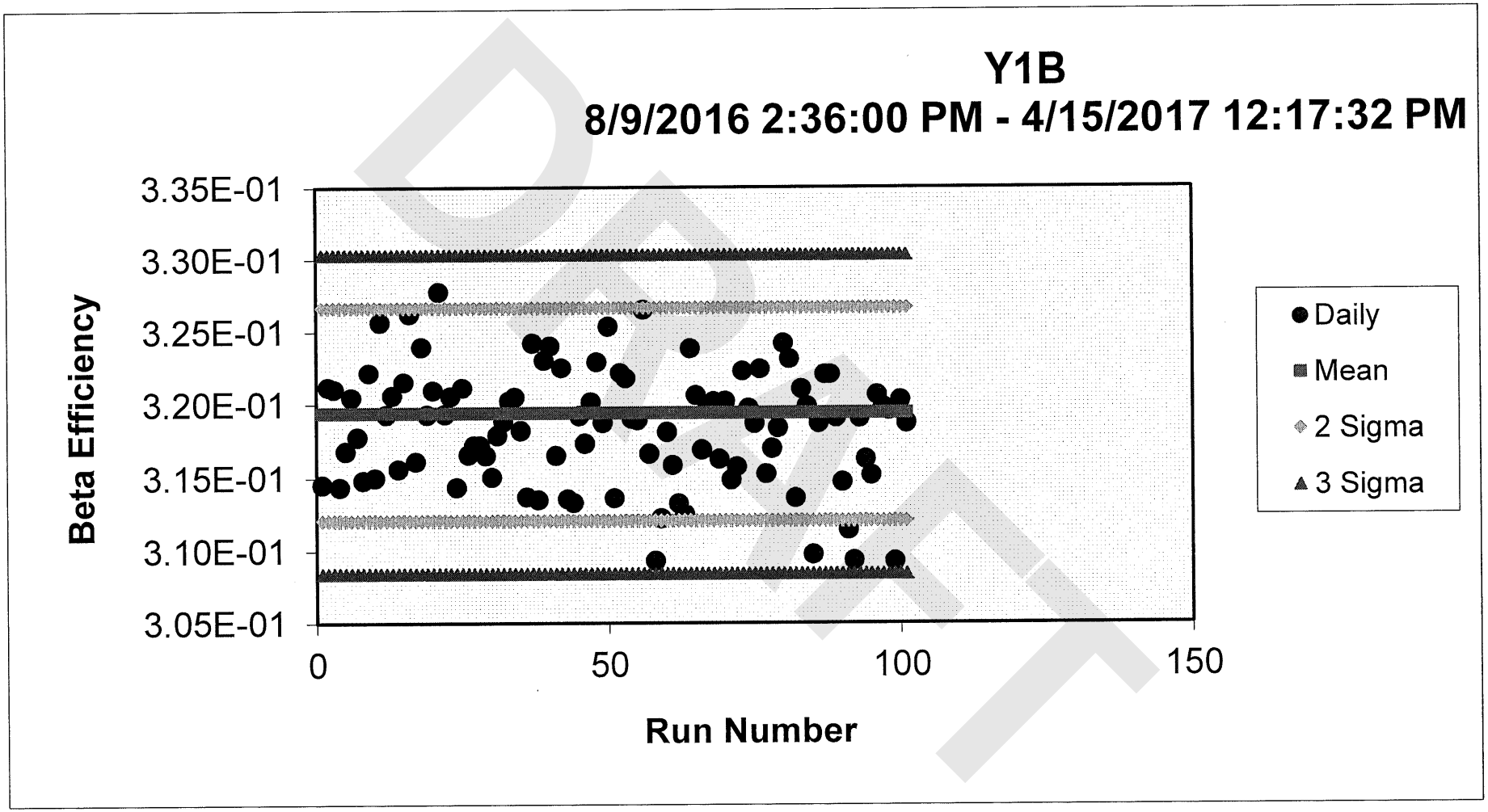
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X4D
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3.40E-01
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3.25E-01
3.20E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

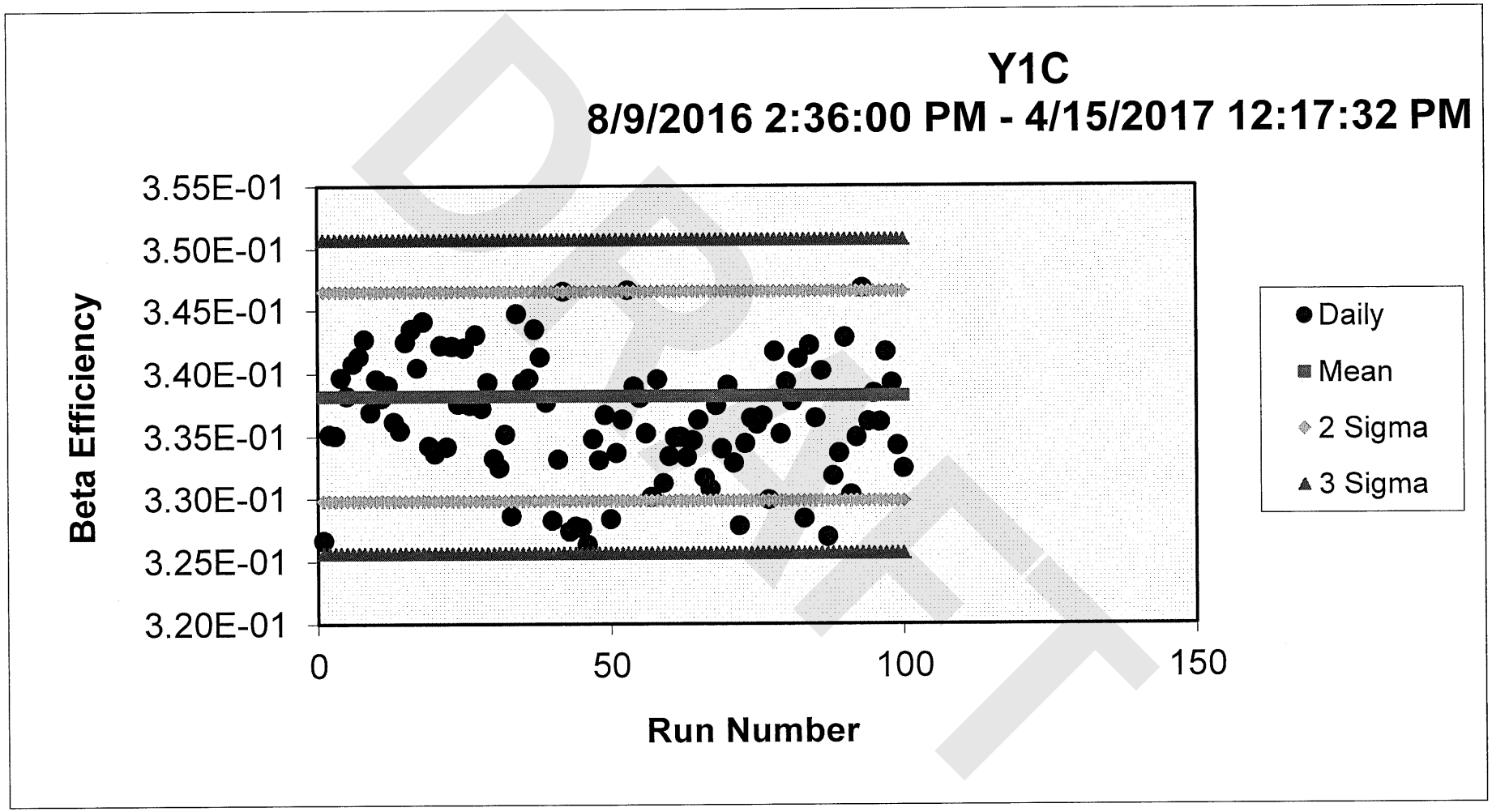
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Y1A
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3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

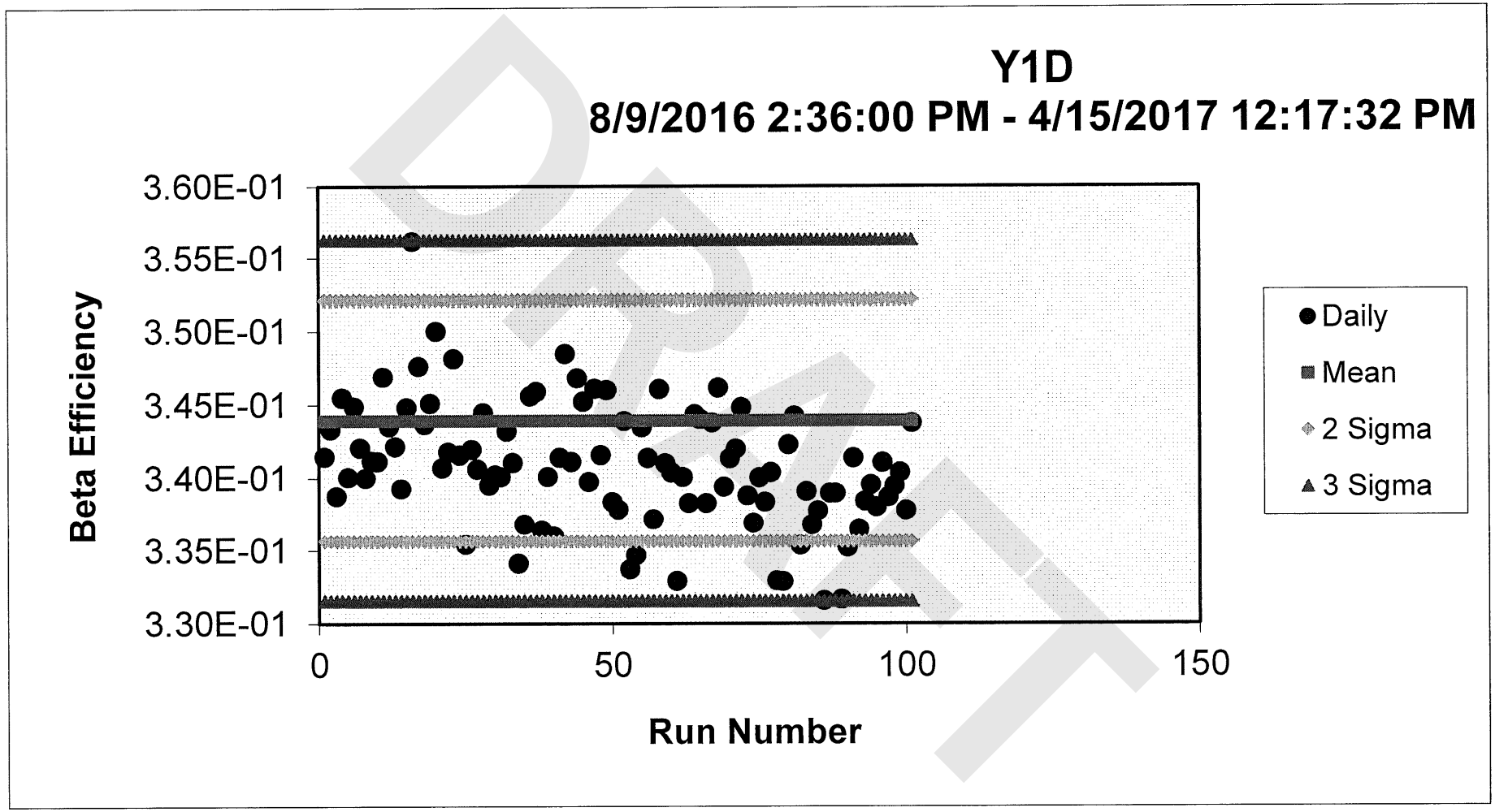
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Y1B
8/9/2016 2:36:00 PM - 4/15/2017 12:17:32 PM
Beta Efficiency
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3.25E-01
3.20E-01
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3.10E-01
3.05E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

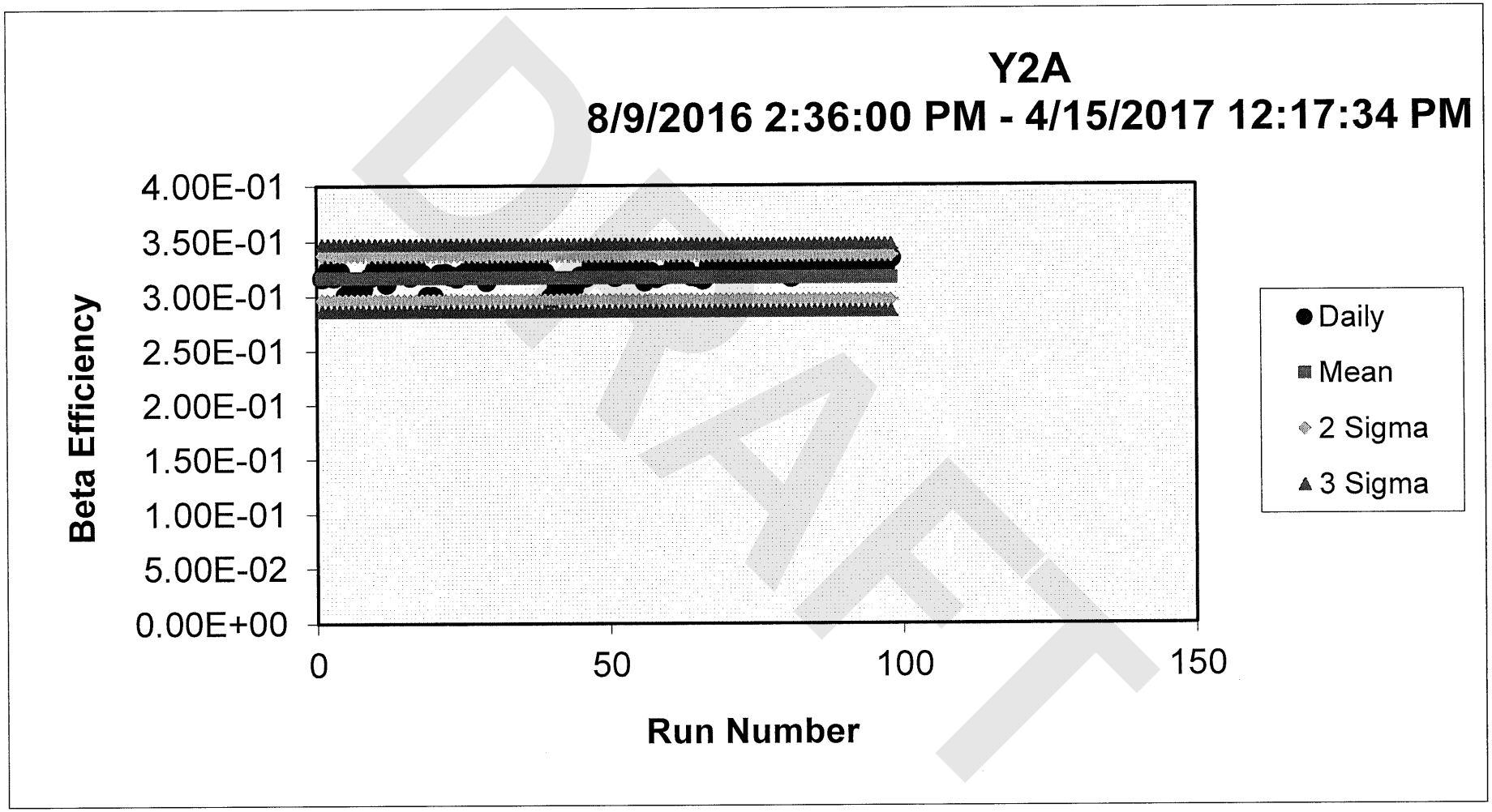
DRAFT


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0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

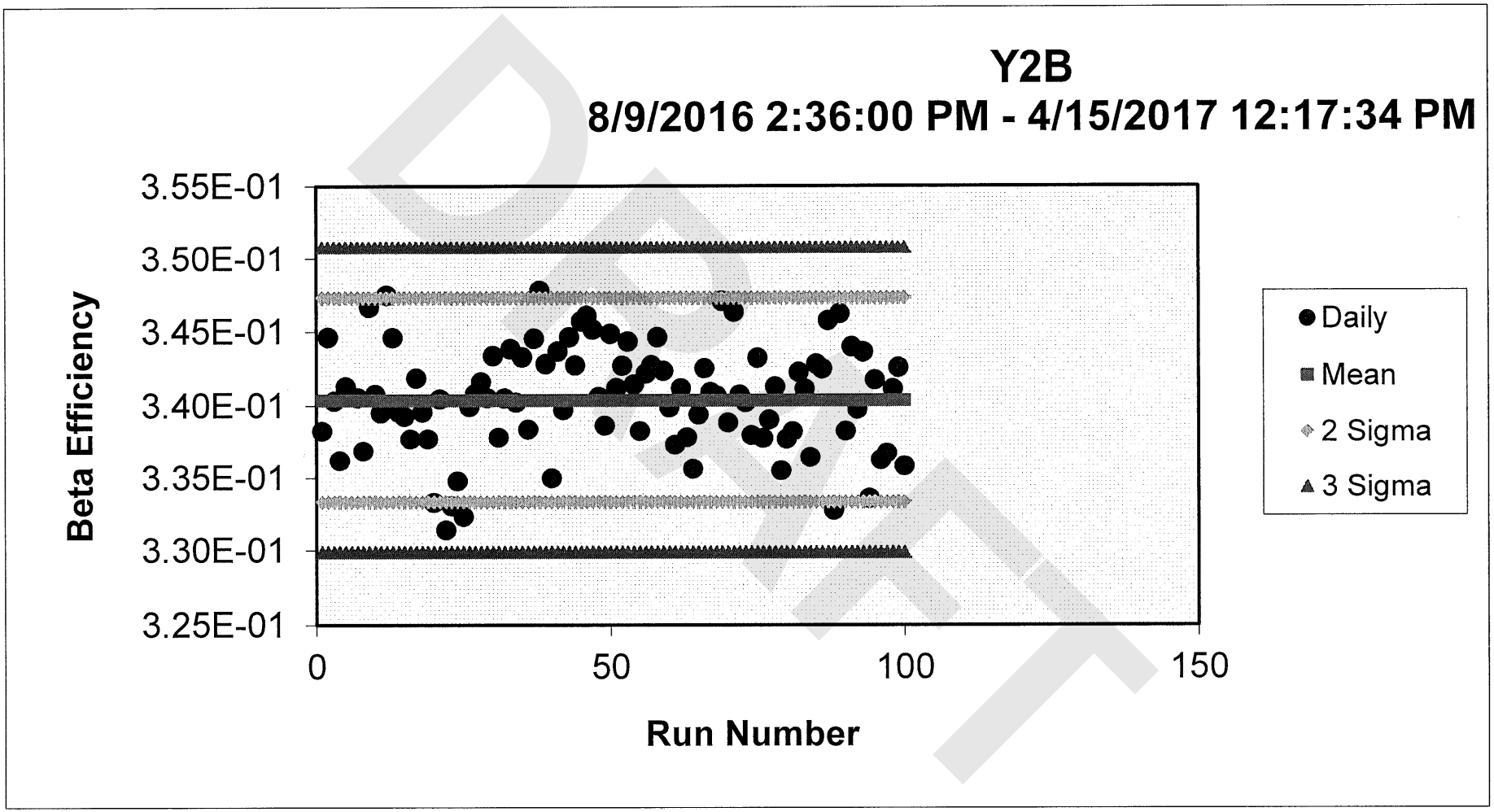
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Y1D
8/9/2016 2:36:00 PM - 4/15/2017 12:17:32 PM
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3.55E-01
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3.35E-01
3.30E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

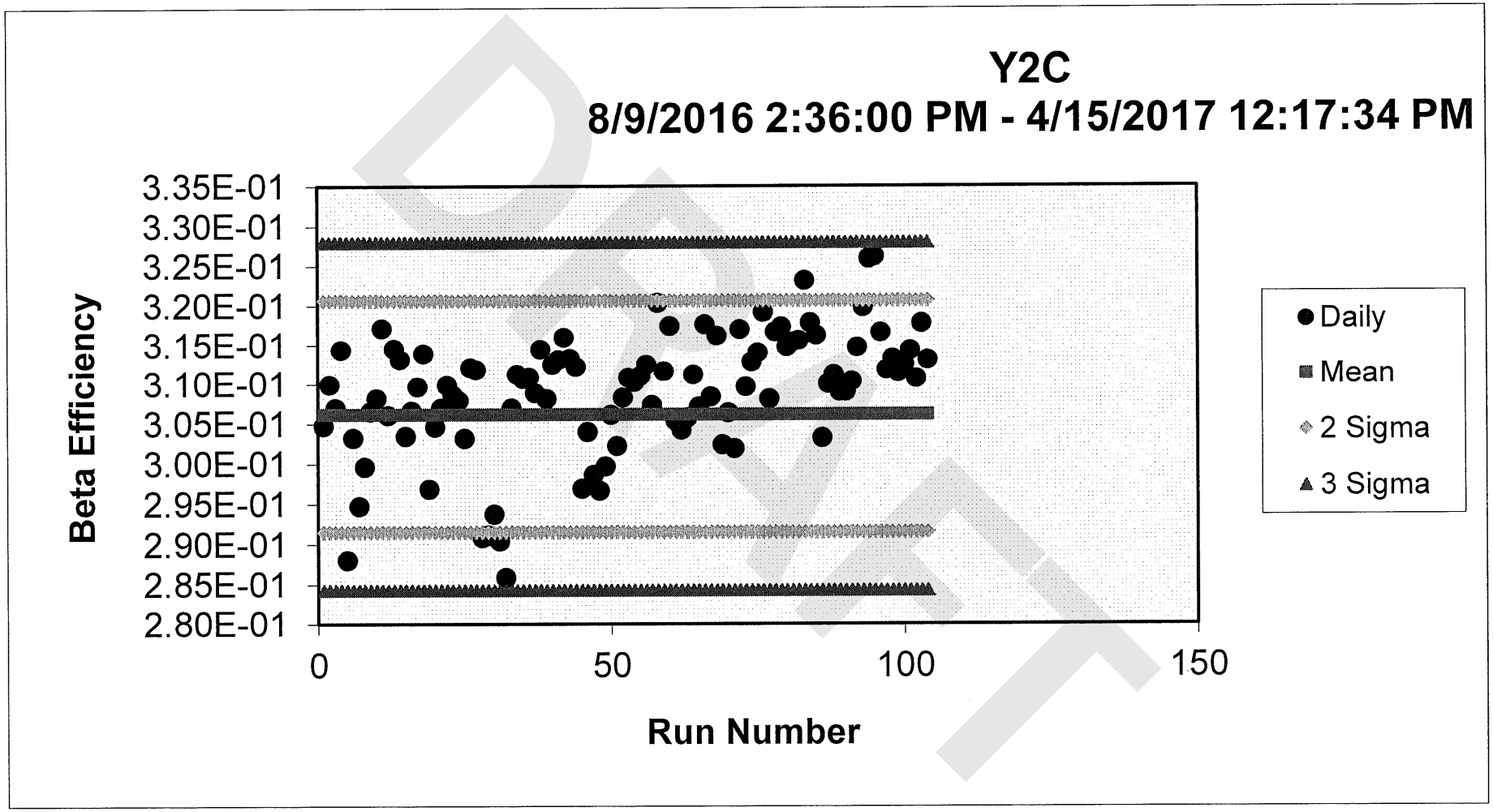
DRAFT


Y2A
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3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

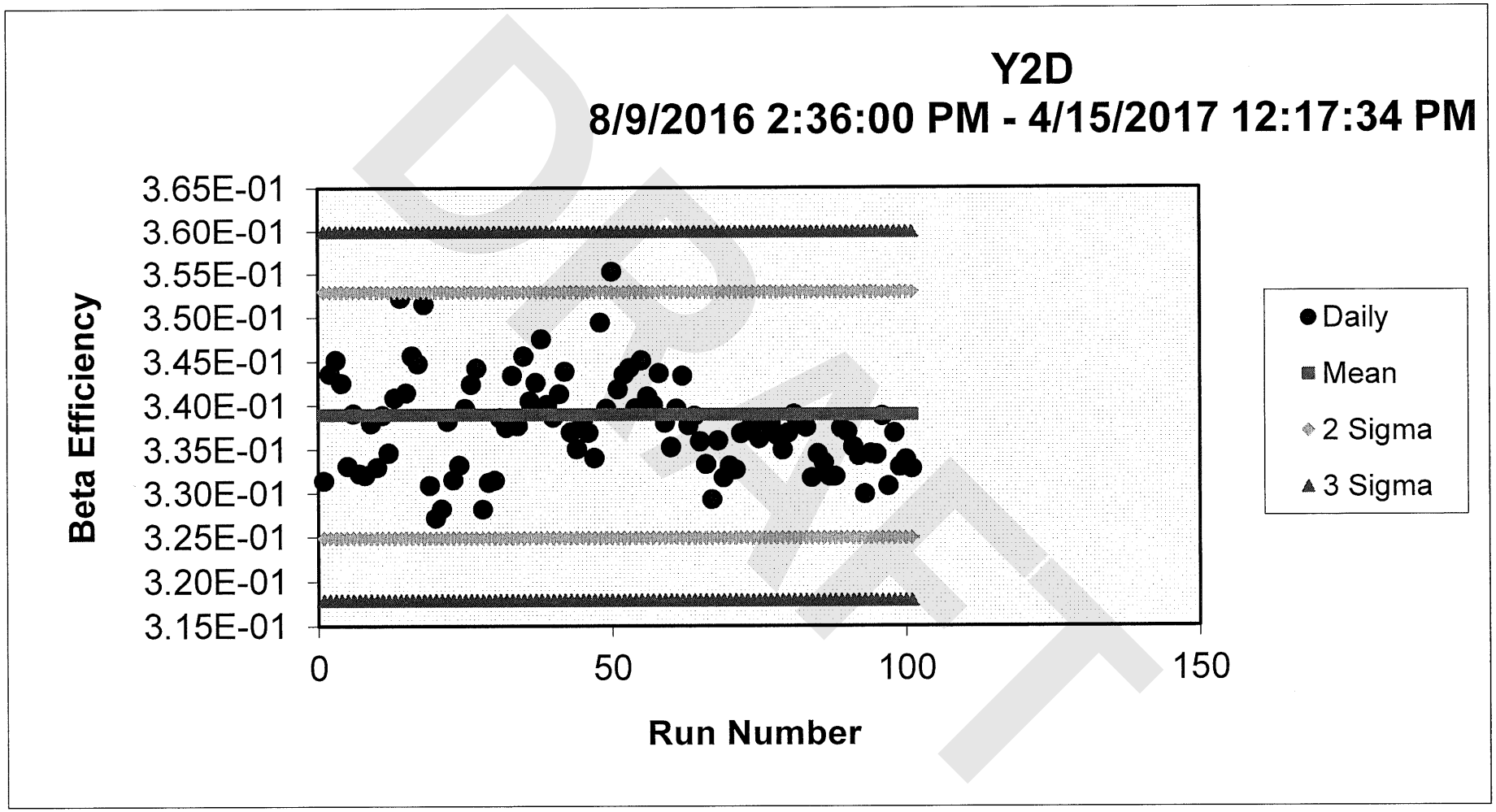
DRAFT


Y2B
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3.45E-01
3.40E-01
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3.30E-01
3.25E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

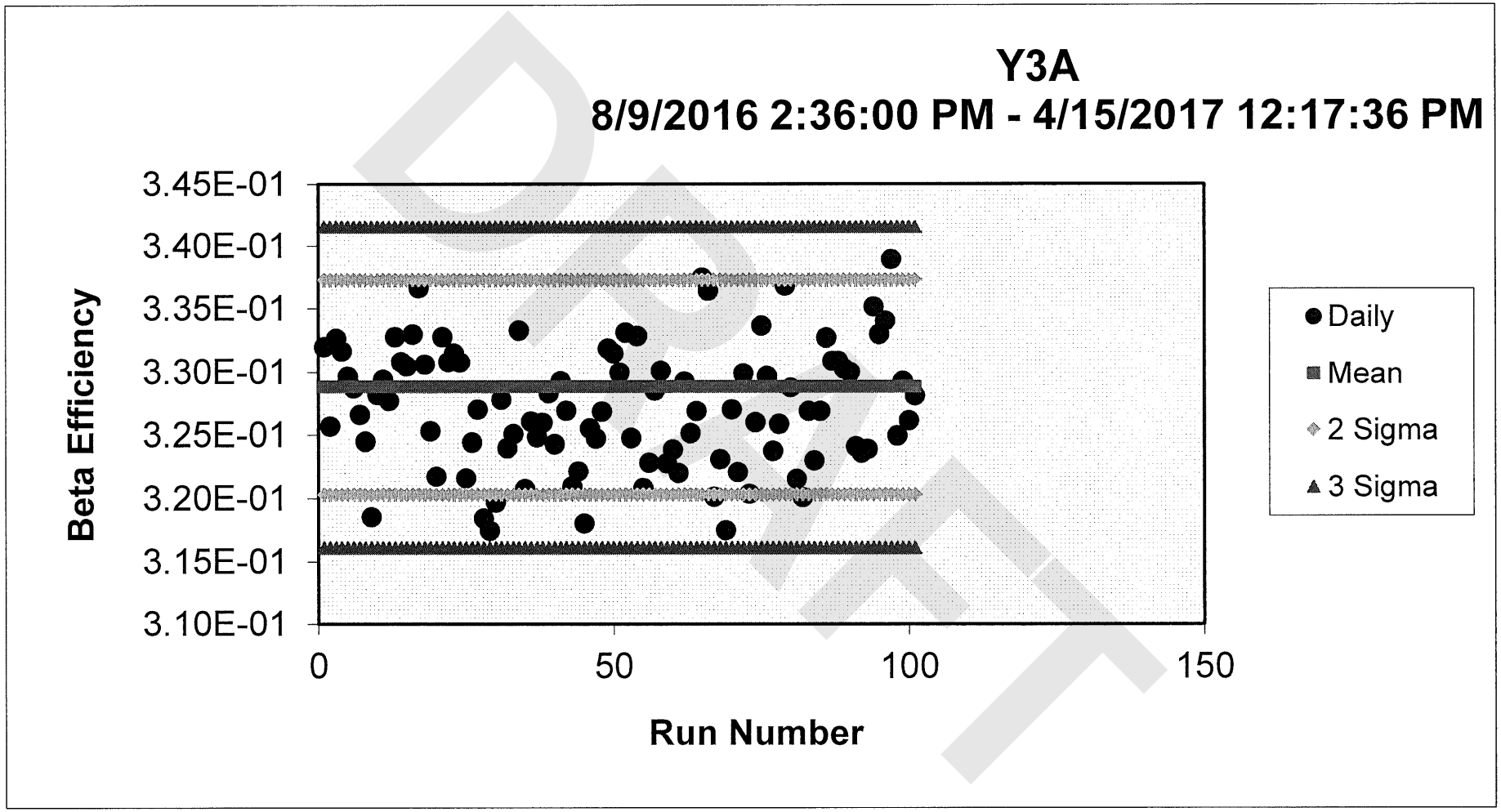
DRAFT


Y2C
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3.20E-01
3.15E-01
3.10E-01
3.05E-01
3.00E-01
2.95E-01
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100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

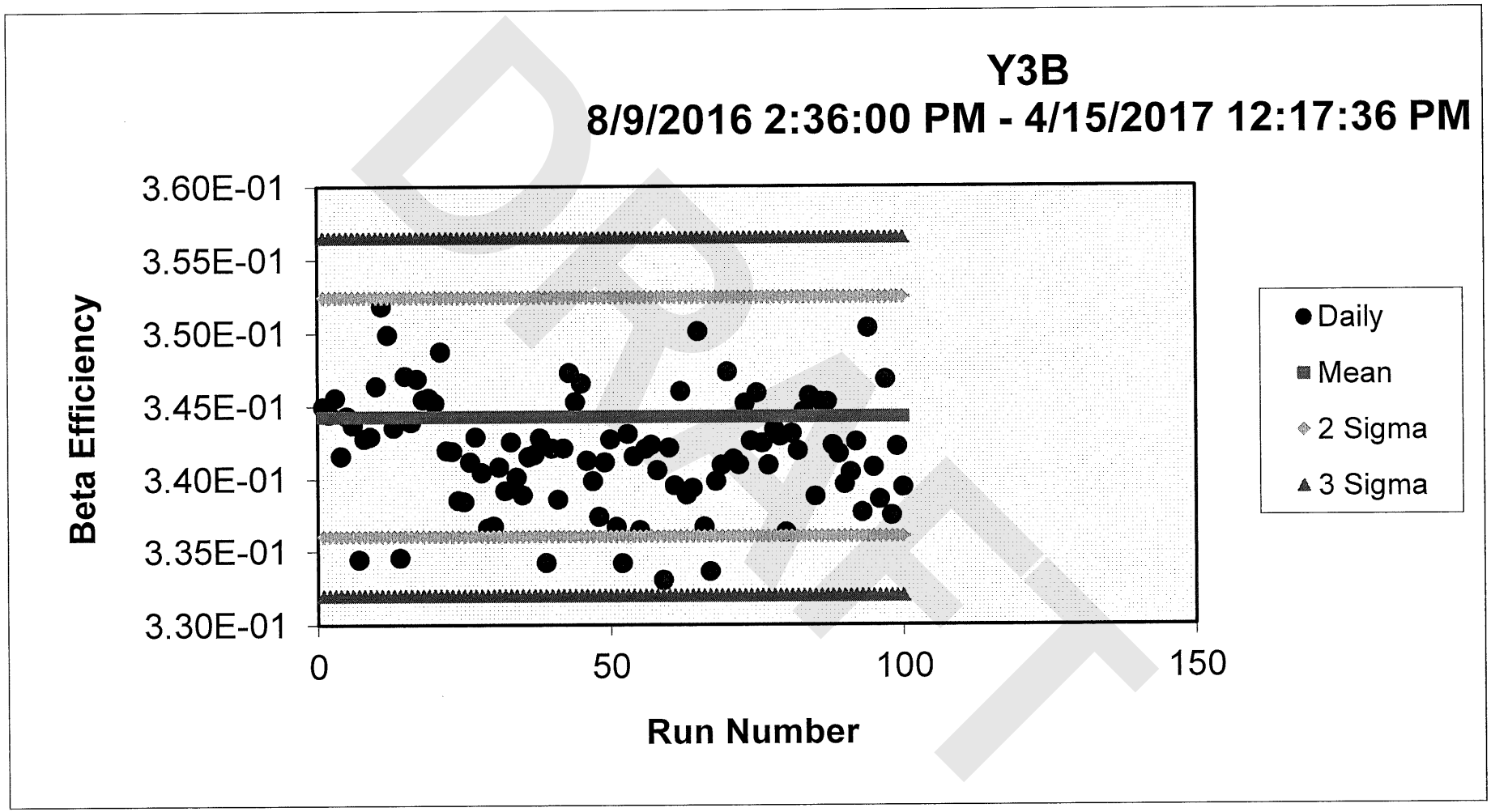
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Y2D
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3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
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50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

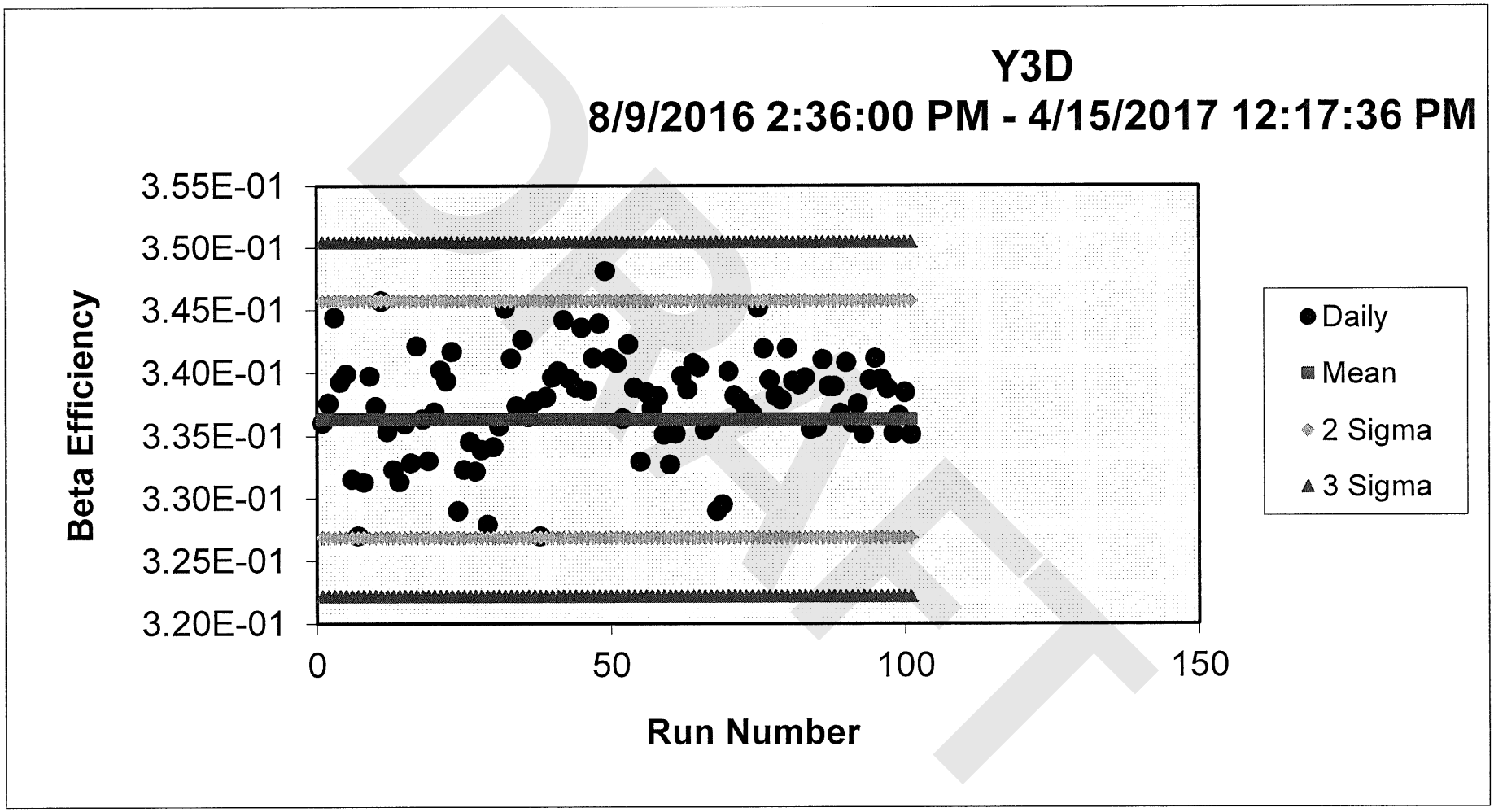
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Y3A
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Beta Efficiency
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3.30E-01
3.25E-01
3.20E-01
3.15E-01
3.10E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

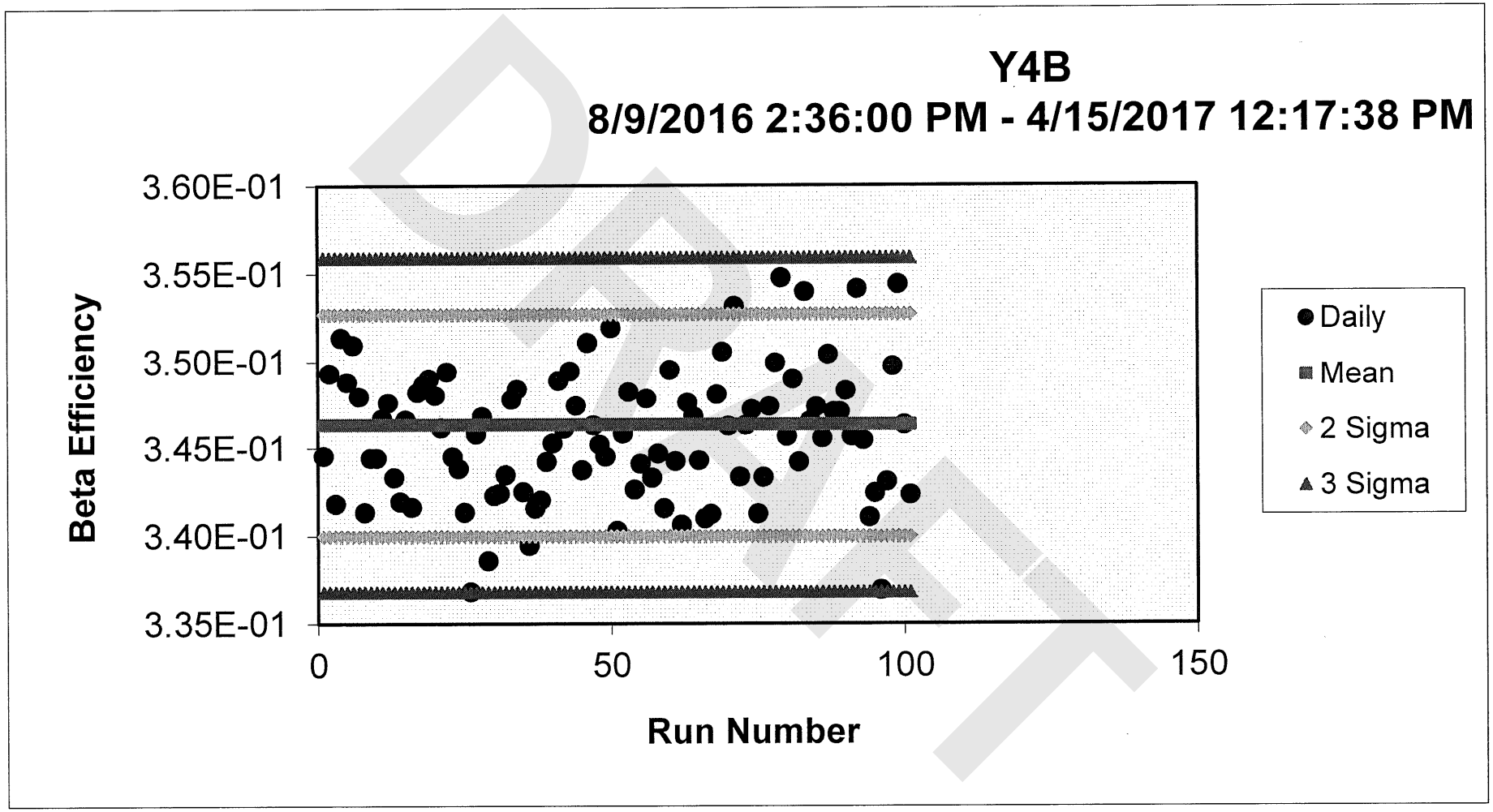
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Y3B
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3.50E-01
3.45E-01
3.40E-01
3.35E-01
3.30E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

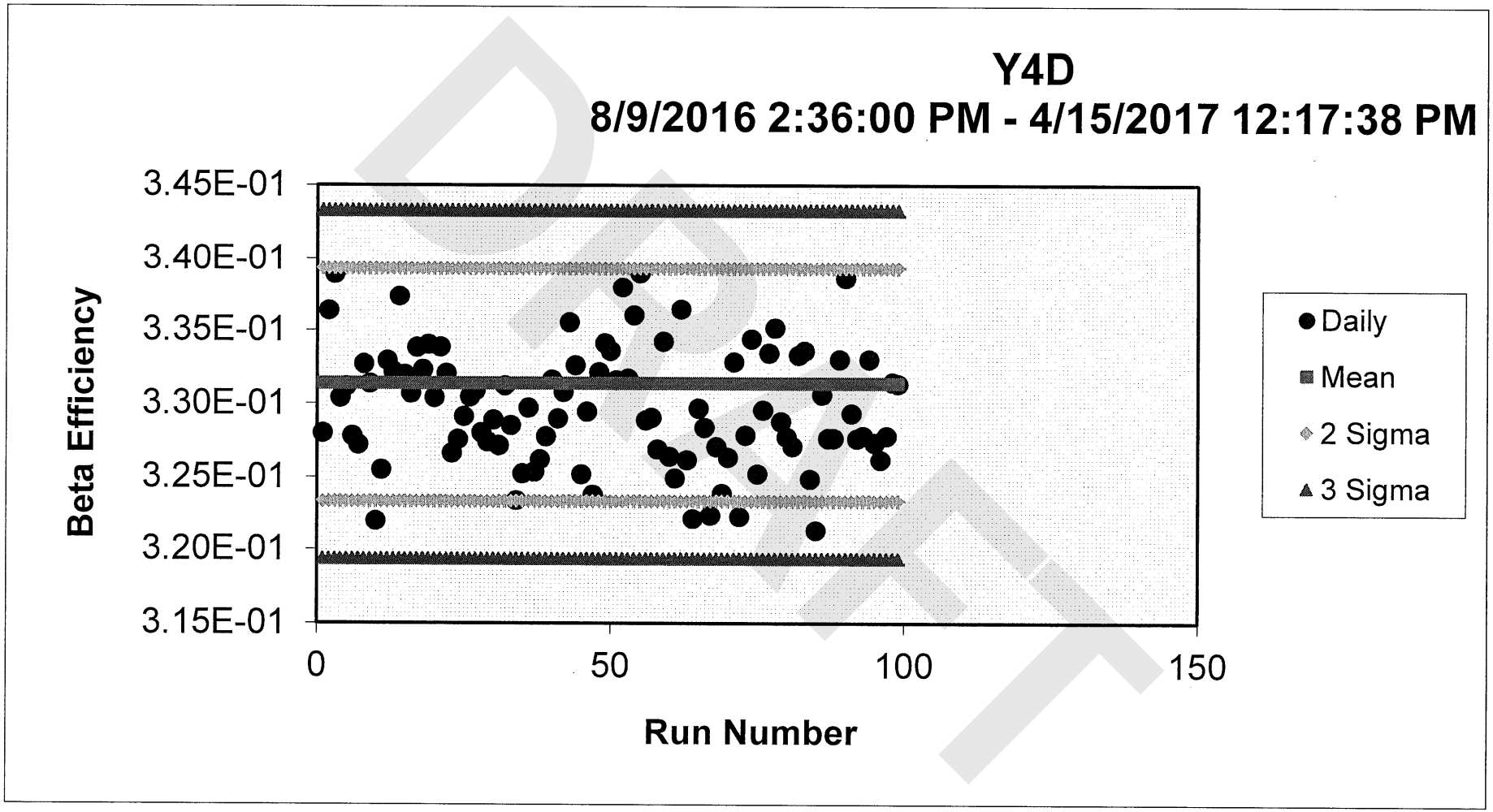
DRAFT


Y3D
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3.50E-01
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3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

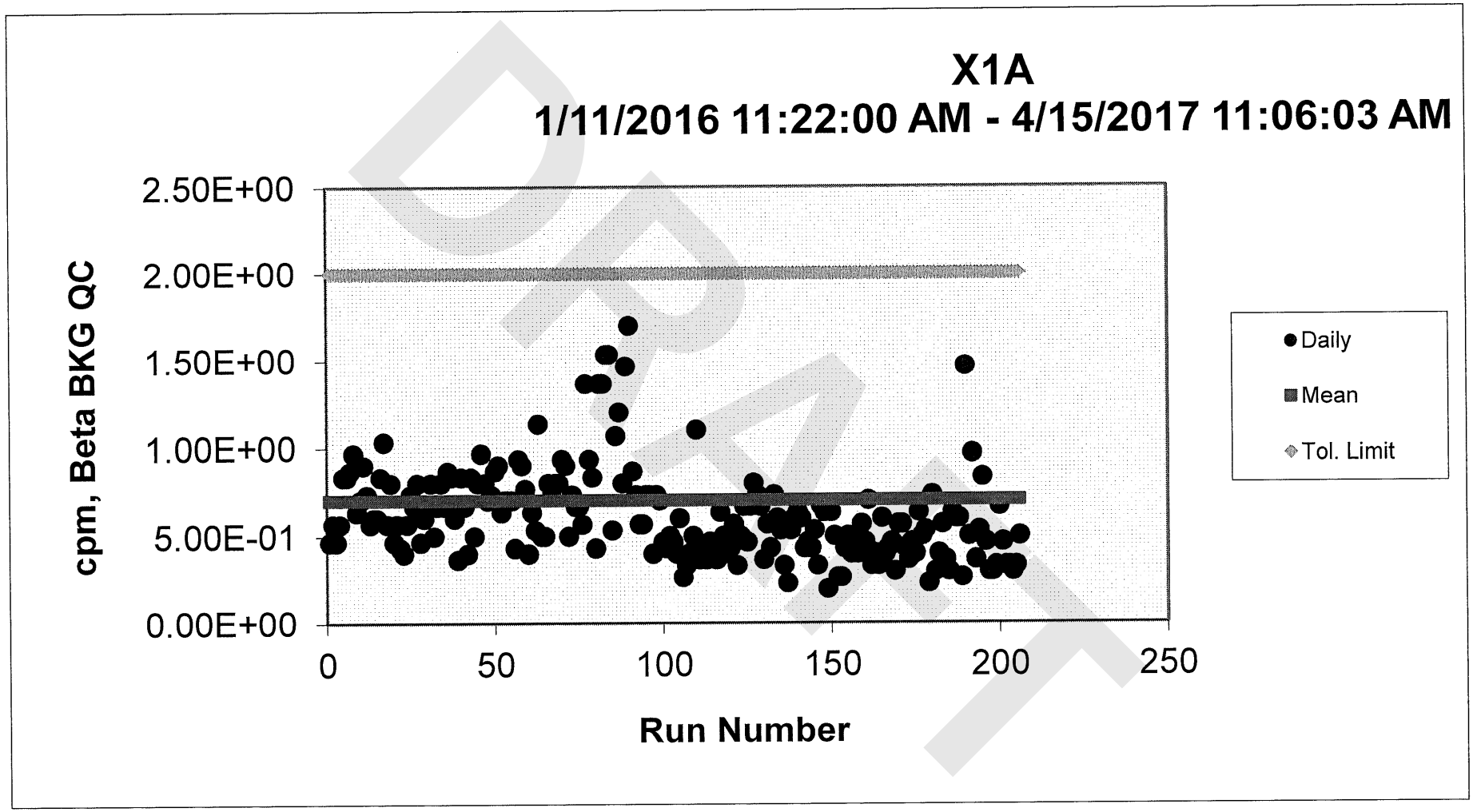
DRAFT


Y4B
8/9/2016 2:36:00 PM - 4/15/2017 12:17:38 PM
Beta Efficiency
3.60E-01
3.55E-01
3.50E-01
3.45E-01
3.40E-01
3.35E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

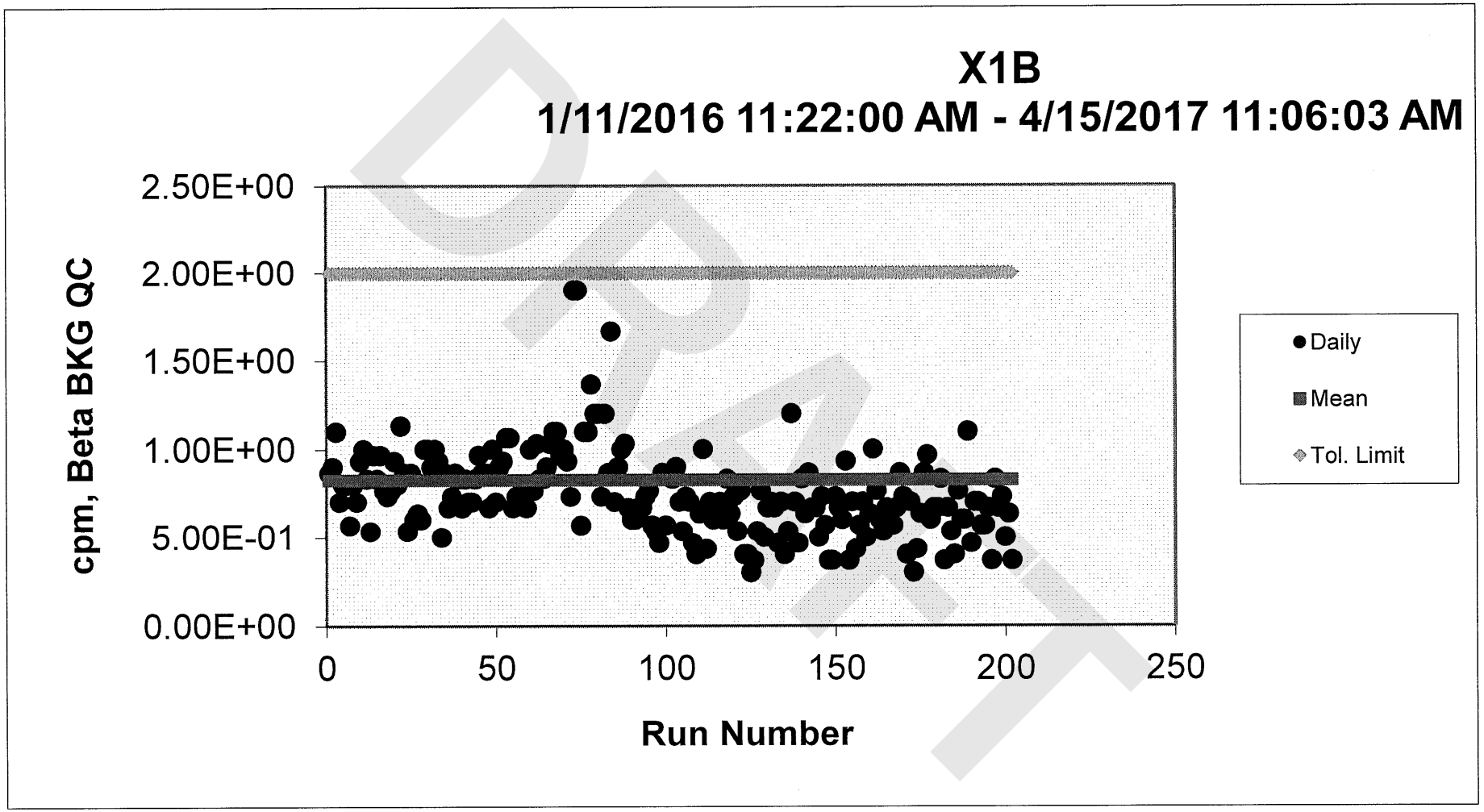
DRAFT


Y4D
8/9/2016 2:36:00 PM - 4/15/2017 12:17:38 PM
Beta Efficiency
3.45E-01
3.40E-01
3.35E-01
3.30E-01
3.25E-01
3.20E-01
3.15E-01
0
50
100
150
Run Number
Daily
Mean
2 Sigma
3 Sigma

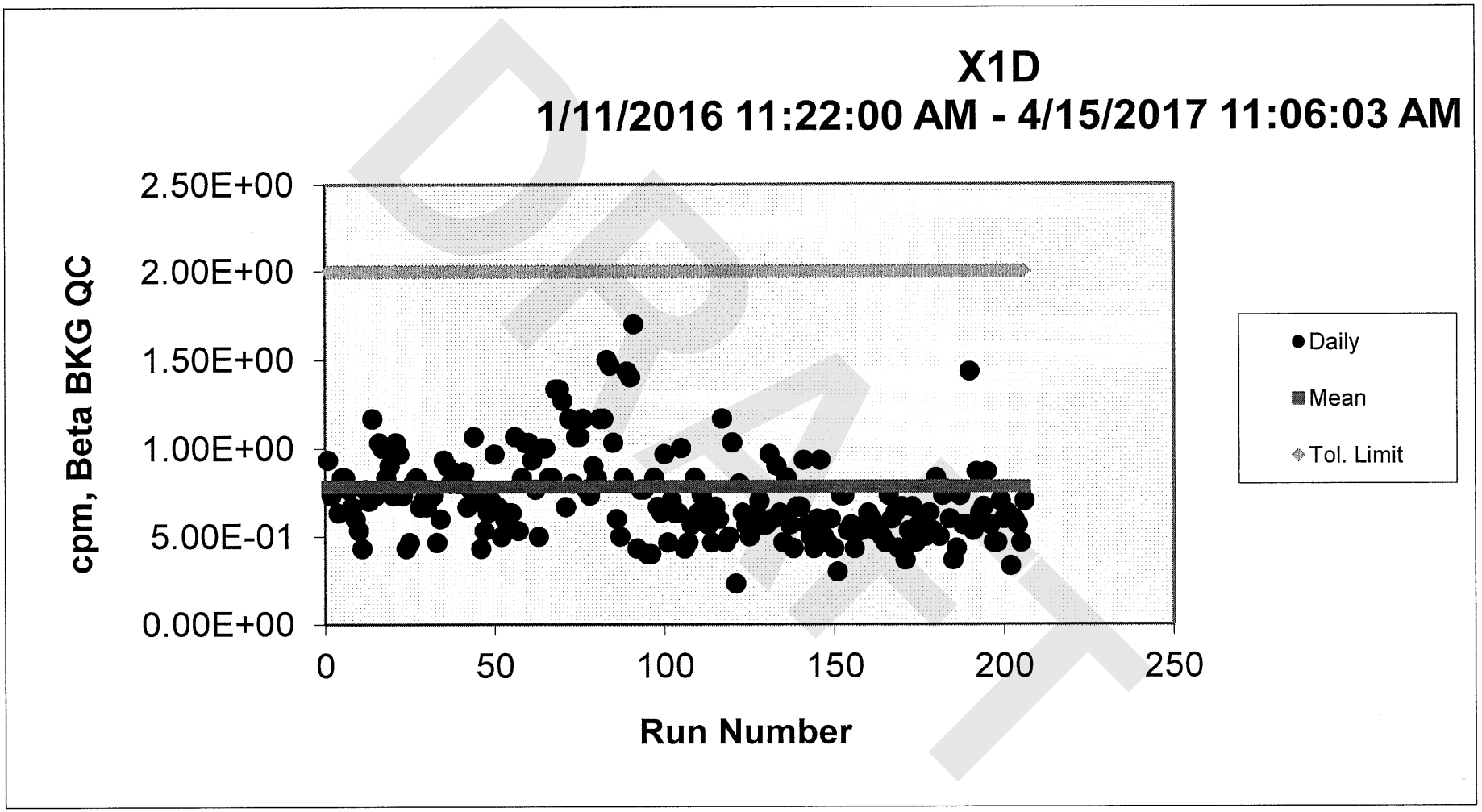
DRAFT


X1A
1/11/2016 11:22:00 AM - 4/15/2017 11:06:03 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

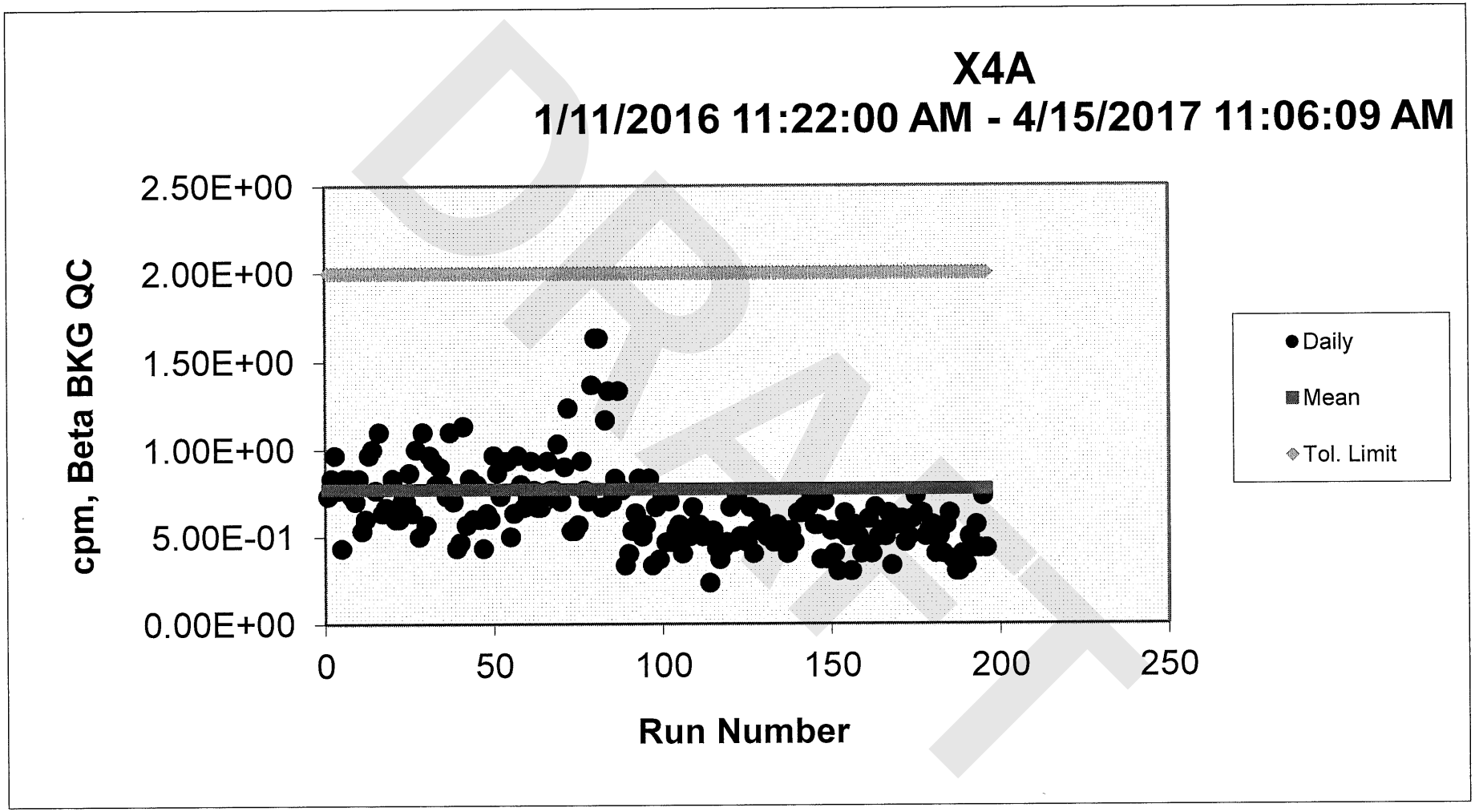
DRAFT


X1B
1/11/2016 11:22:00 AM - 4/15/2017 11:06:03 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

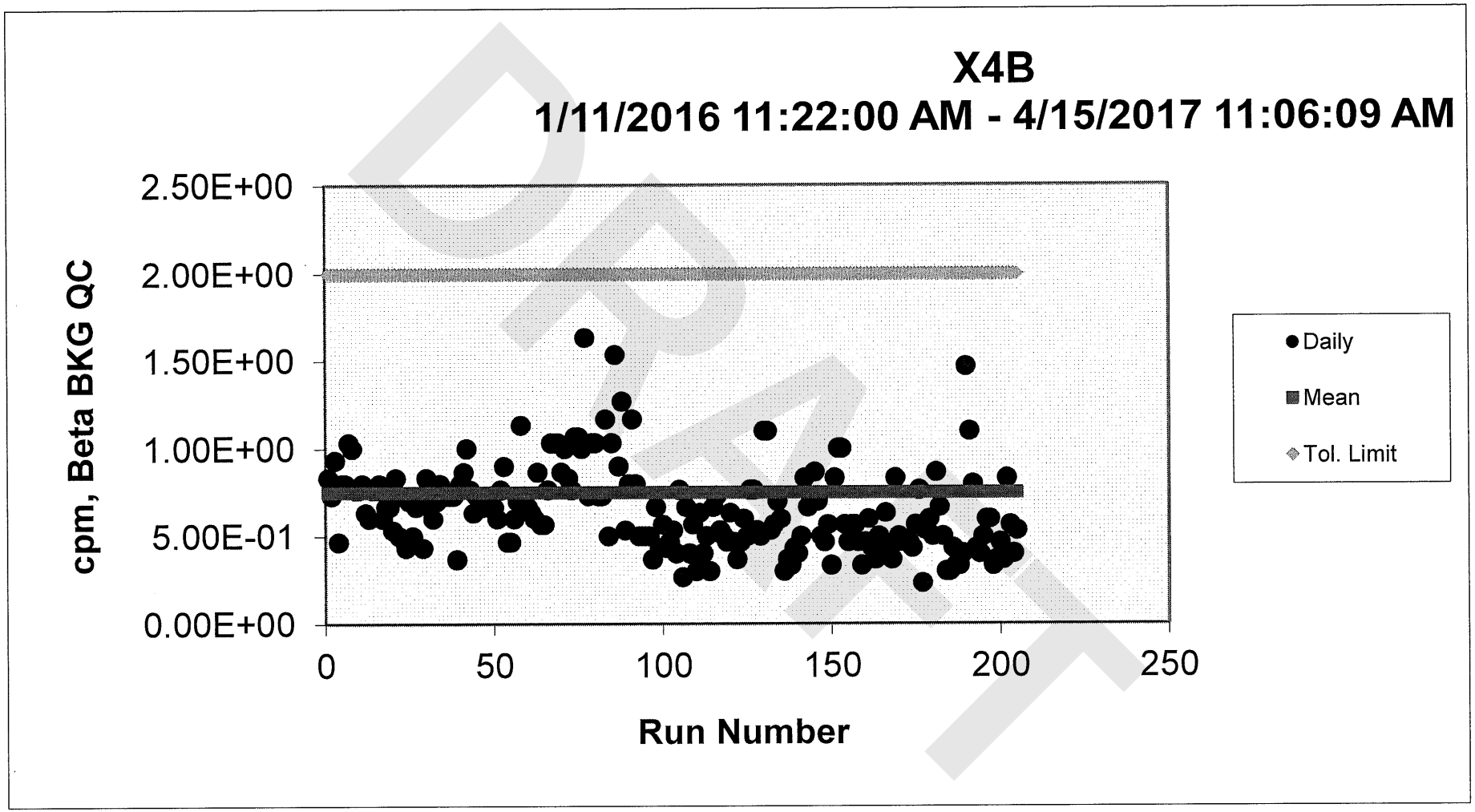
DRAFT


X1D
1/11/2016 11:22:00 AM - 4/15/2017 11:06:03 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

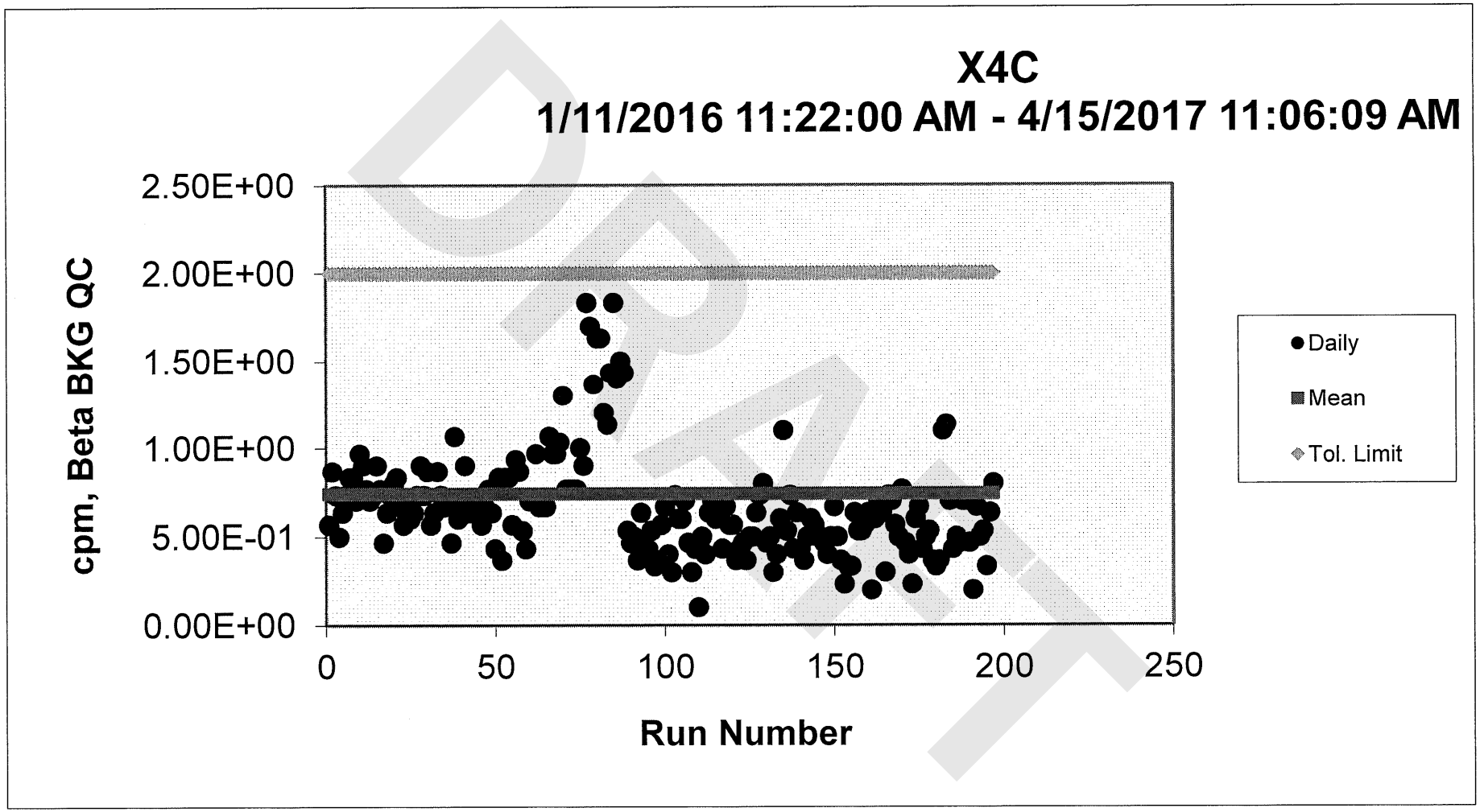
DRAFT


X4A
1/11/2016 11:22:00 AM - 4/15/2017 11:06:09 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

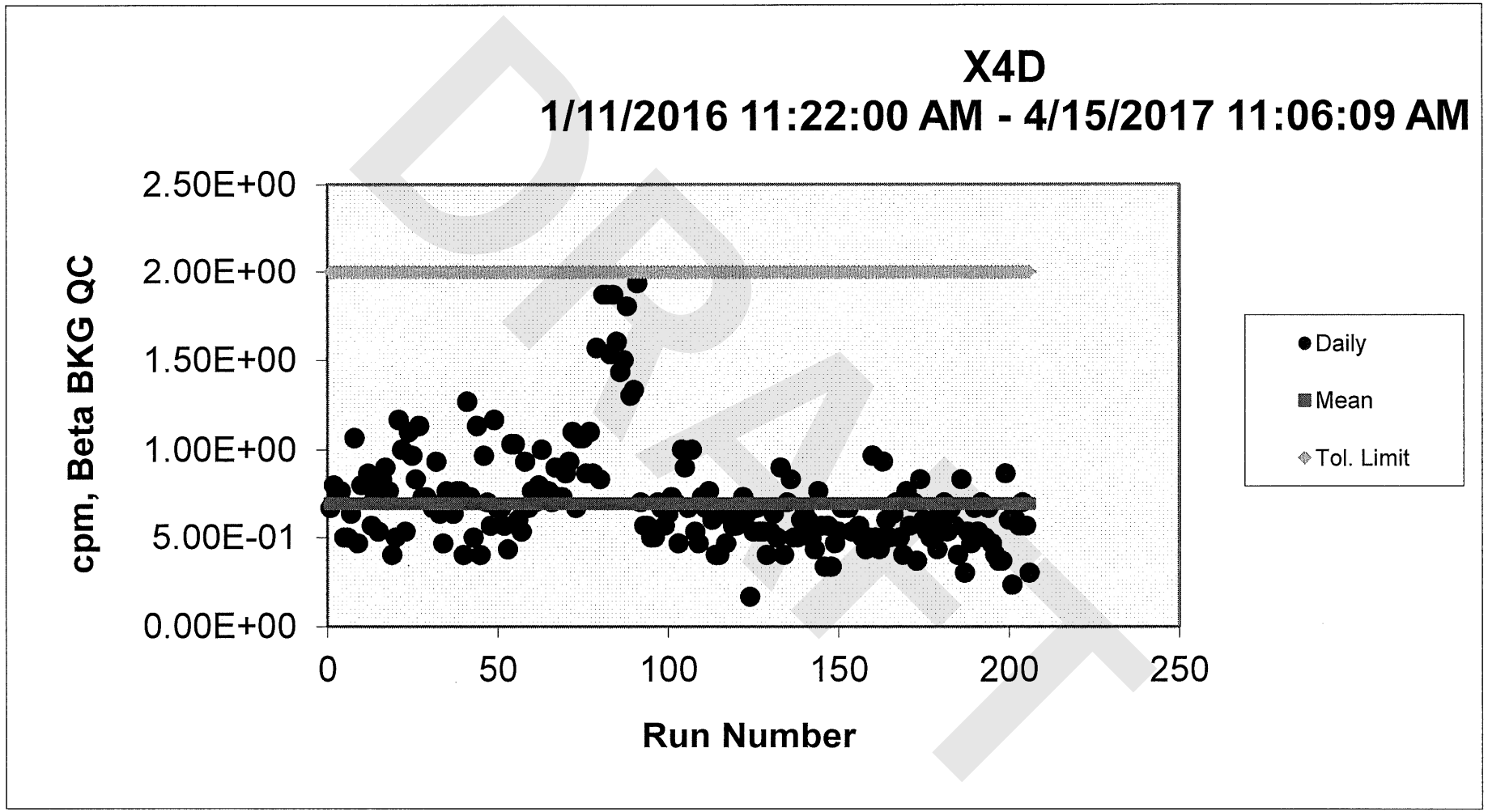
DRAFT


X4B
1/11/2016 11:22:00 AM - 4/15/2017 11:06:09 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

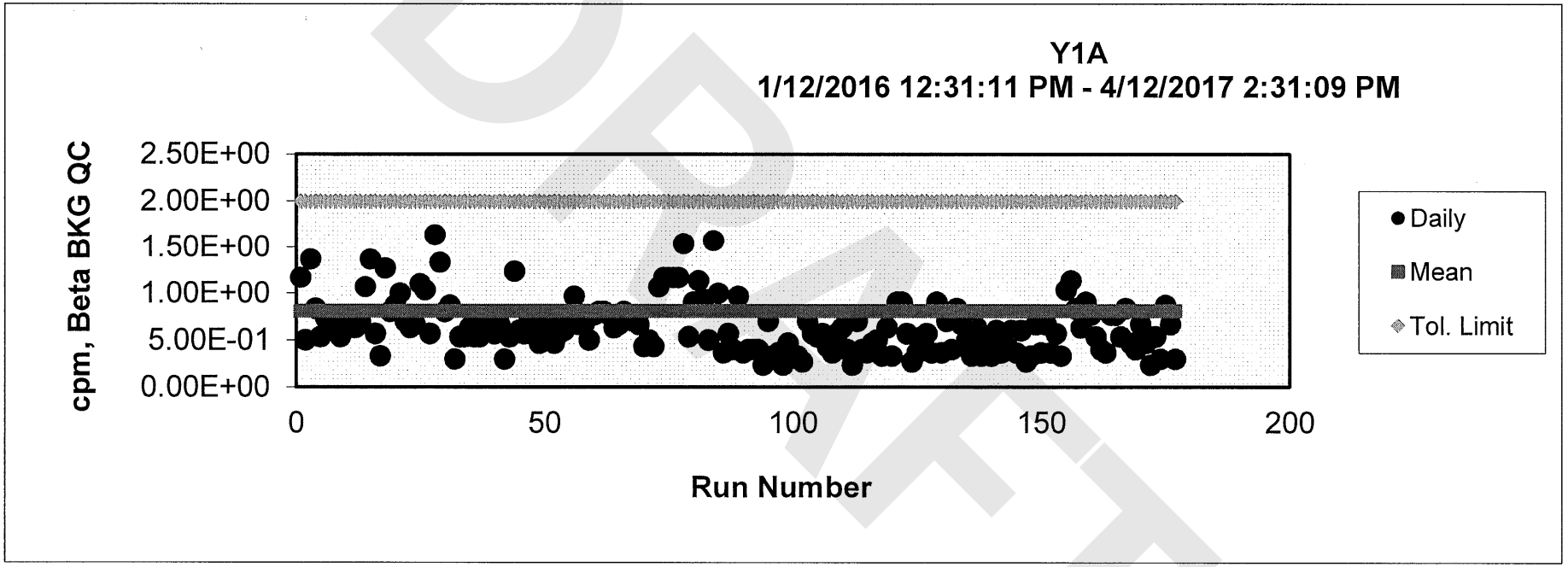
DRAFT


X4C
1/11/2016 11:22:00 AM - 4/15/2017 11:06:09 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

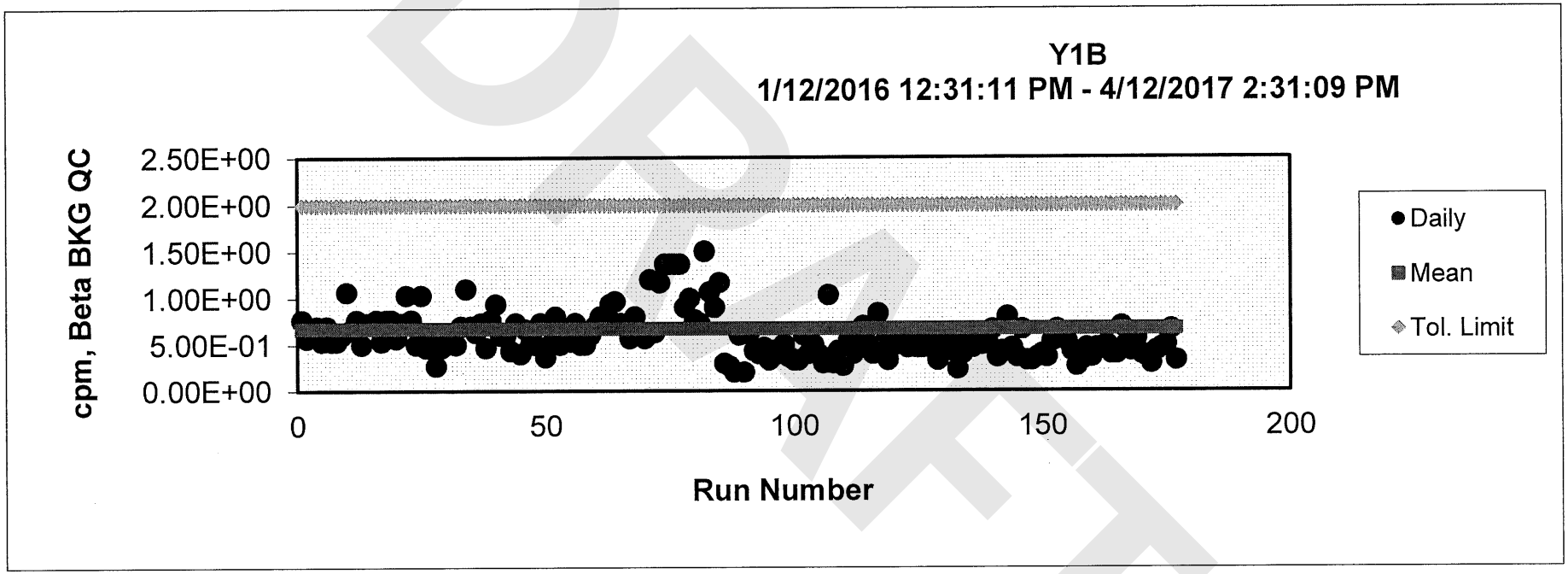
DRAFT


X4D
1/11/2016 11:22:00 AM - 4/15/2017 11:06:09 AM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
250
Run Number
Daily
Mean
Tol. Limit

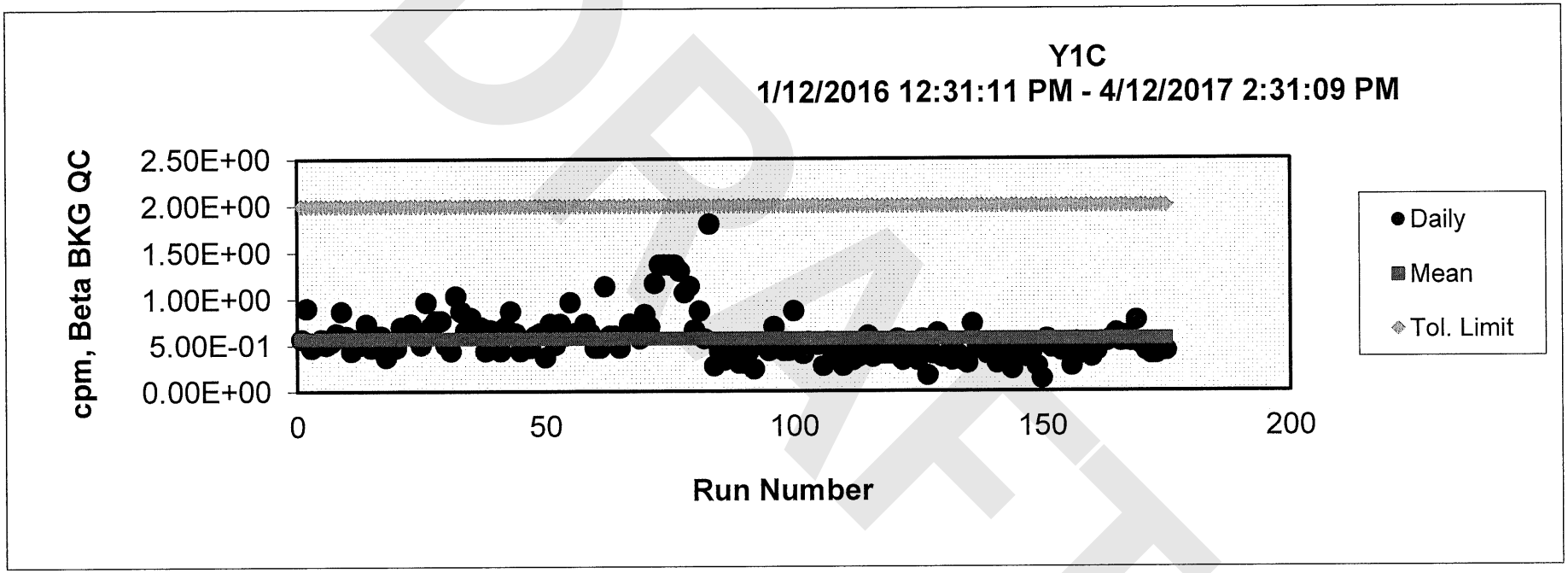
DRAFT


Y1A
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

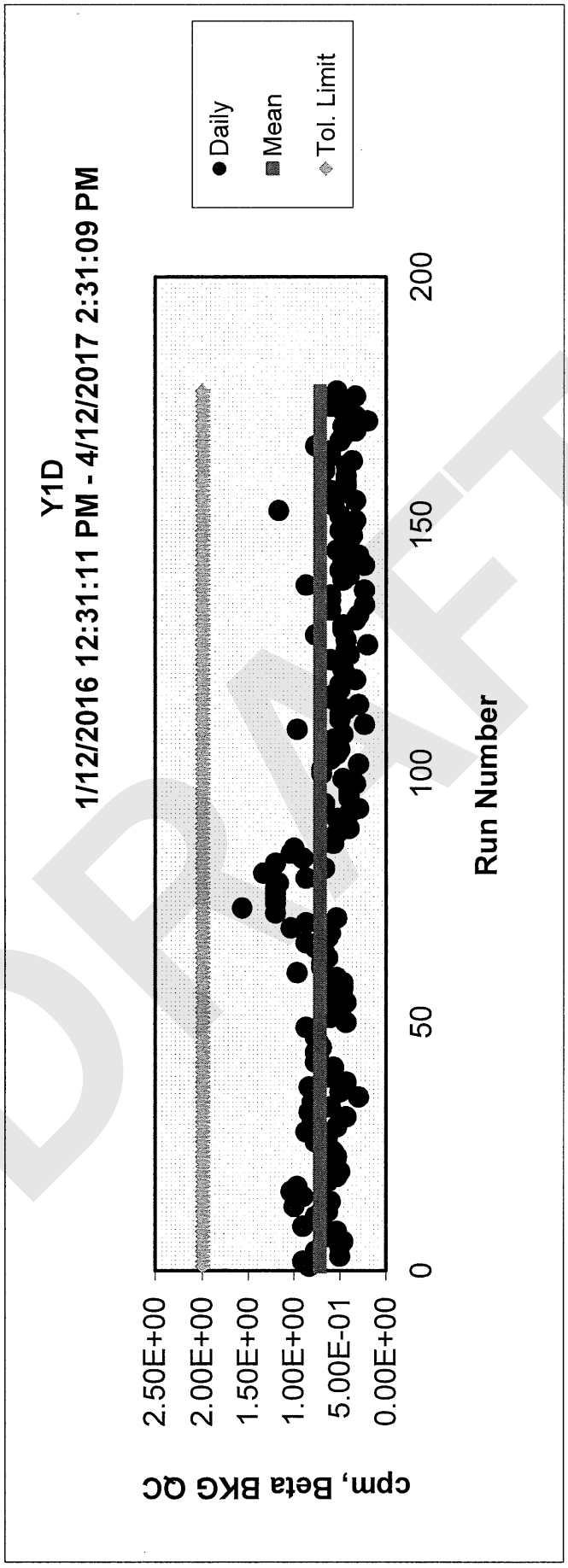
DRAFT


Y1B
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

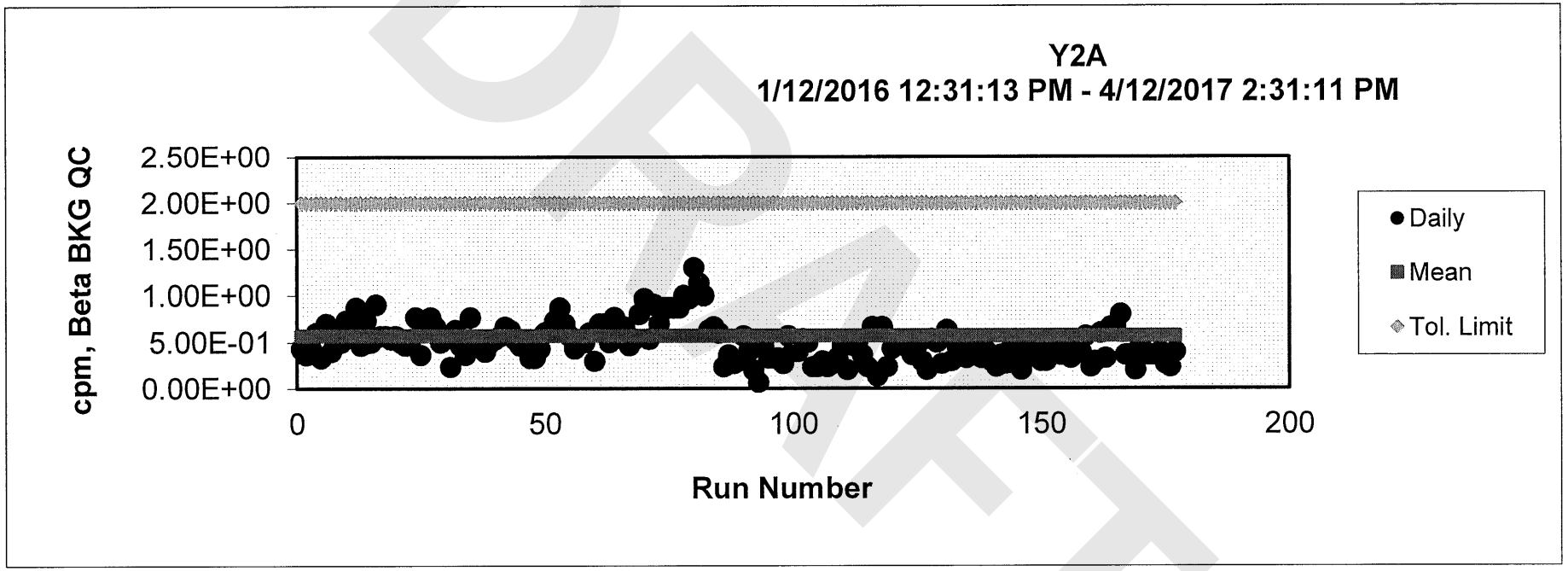
DRAFT


Y1C
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

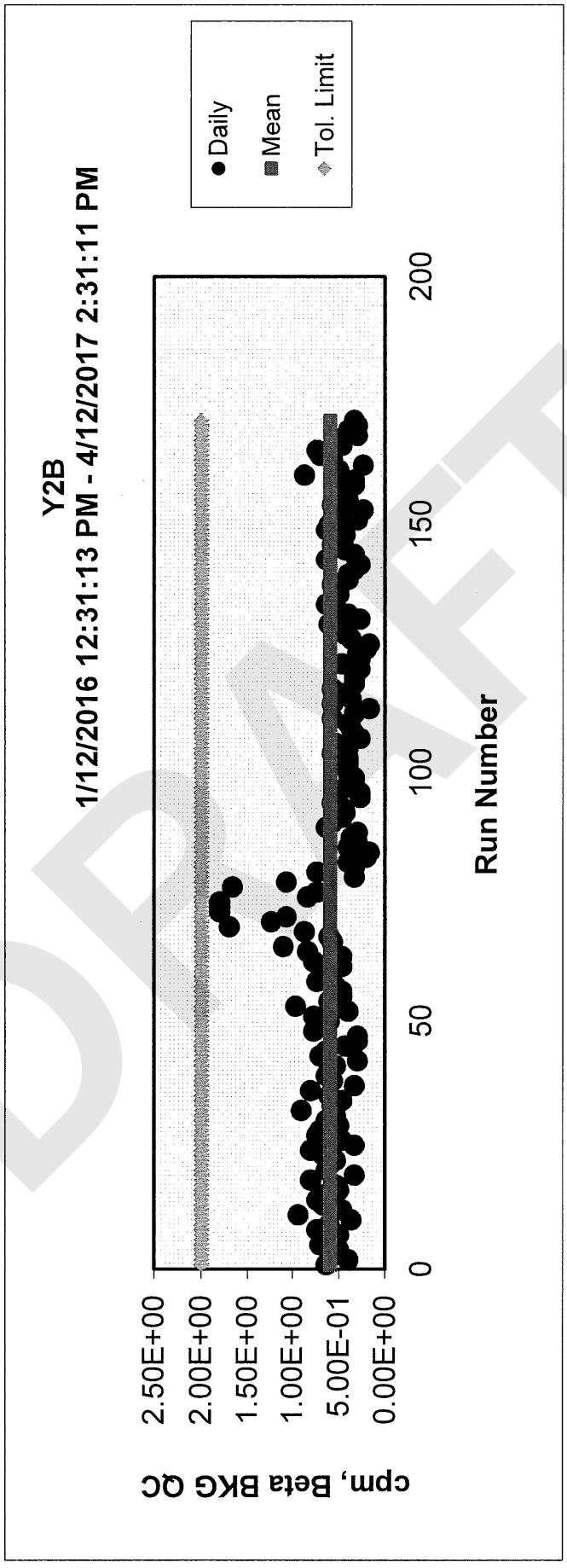
DRAFT


Y1D
1/12/2016 12:31:11 PM - 4/12/2017 2:31:09 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

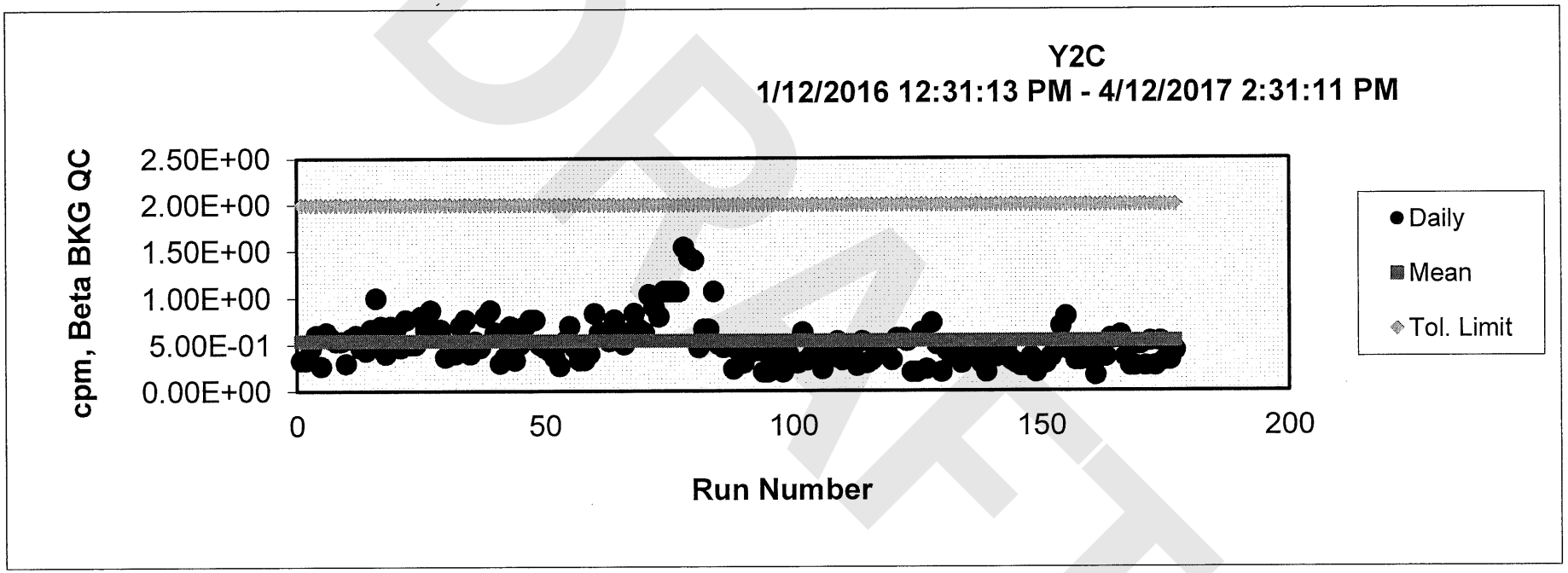
DRAFT


Y2A
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

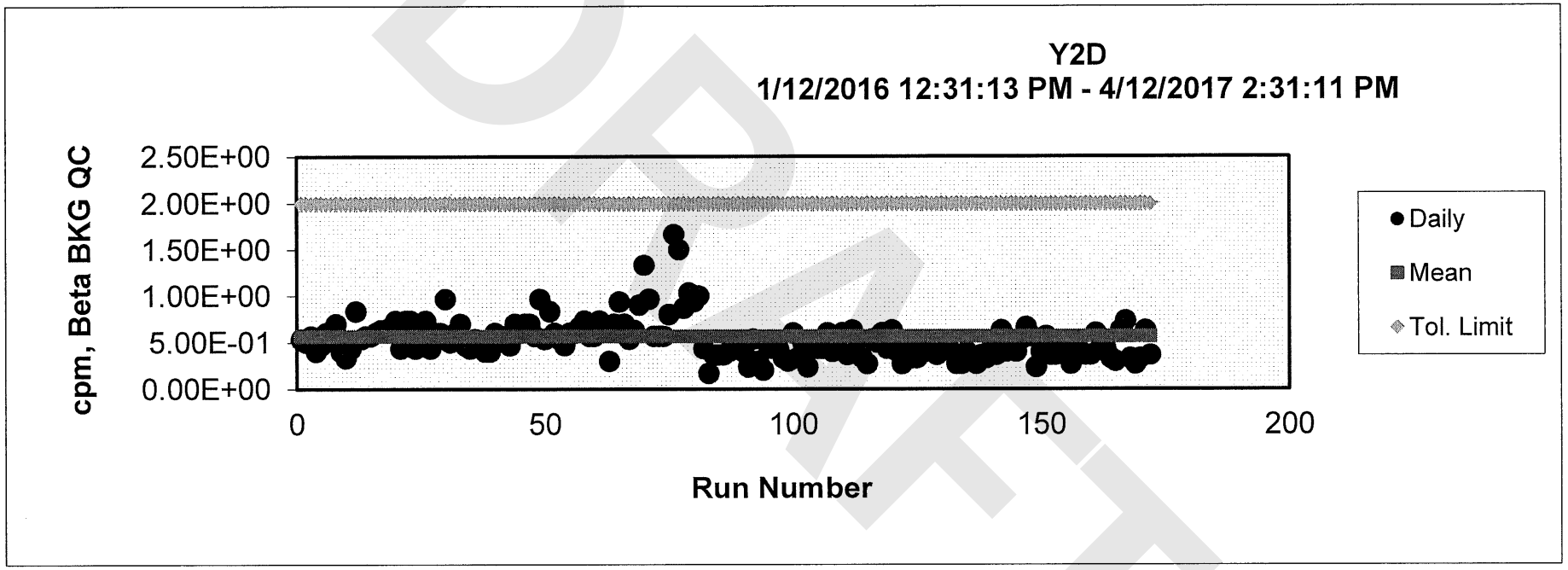
DRAFT


Y2B
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

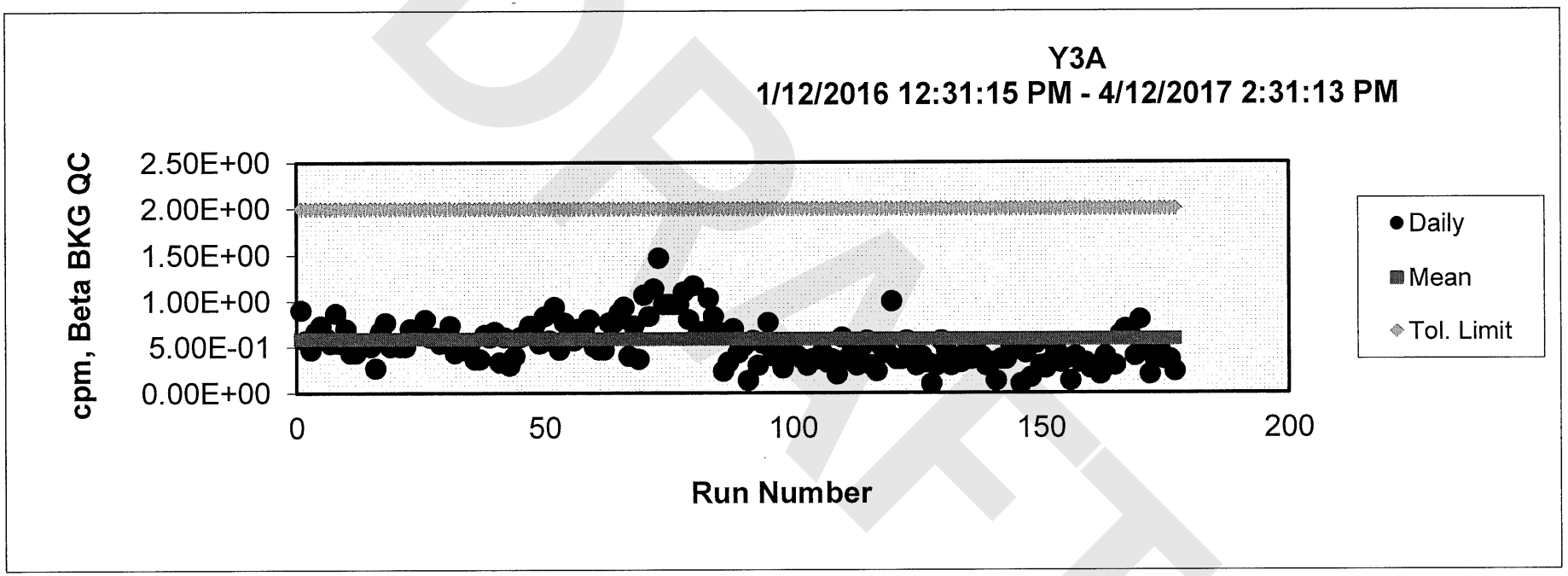
DRAFT


Y2C
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

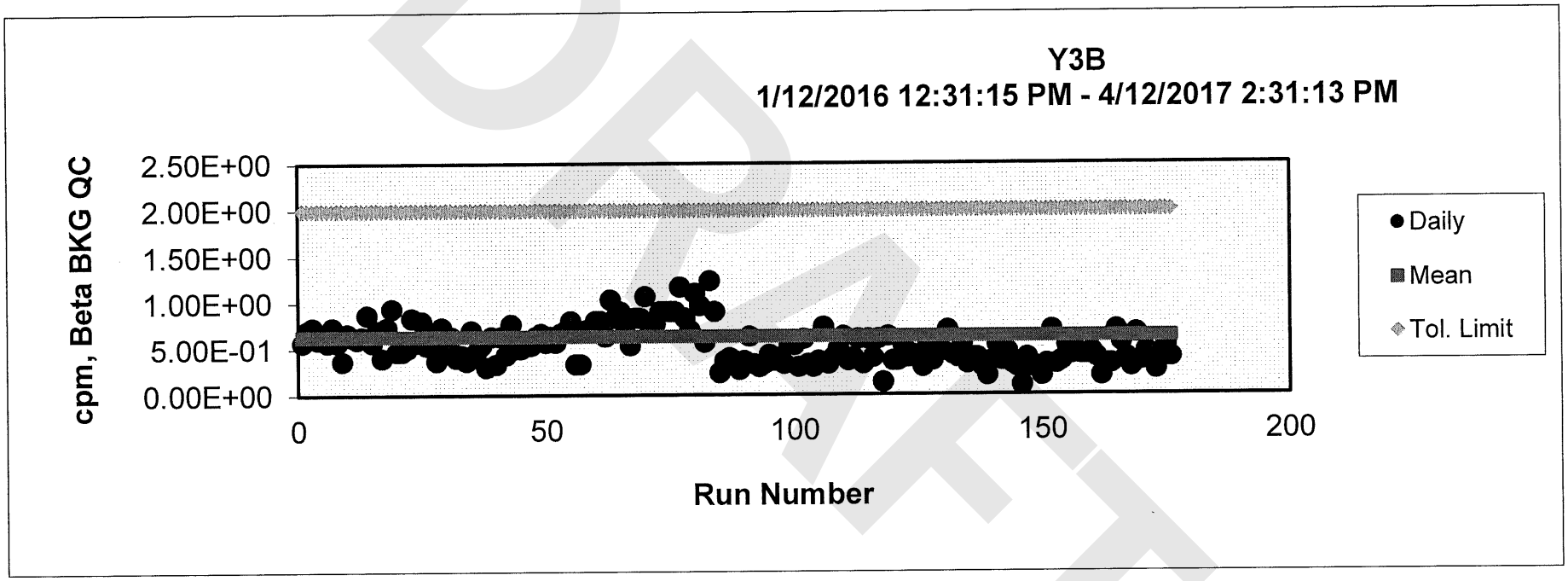
DRAFT


Y2D
1/12/2016 12:31:13 PM - 4/12/2017 2:31:11 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

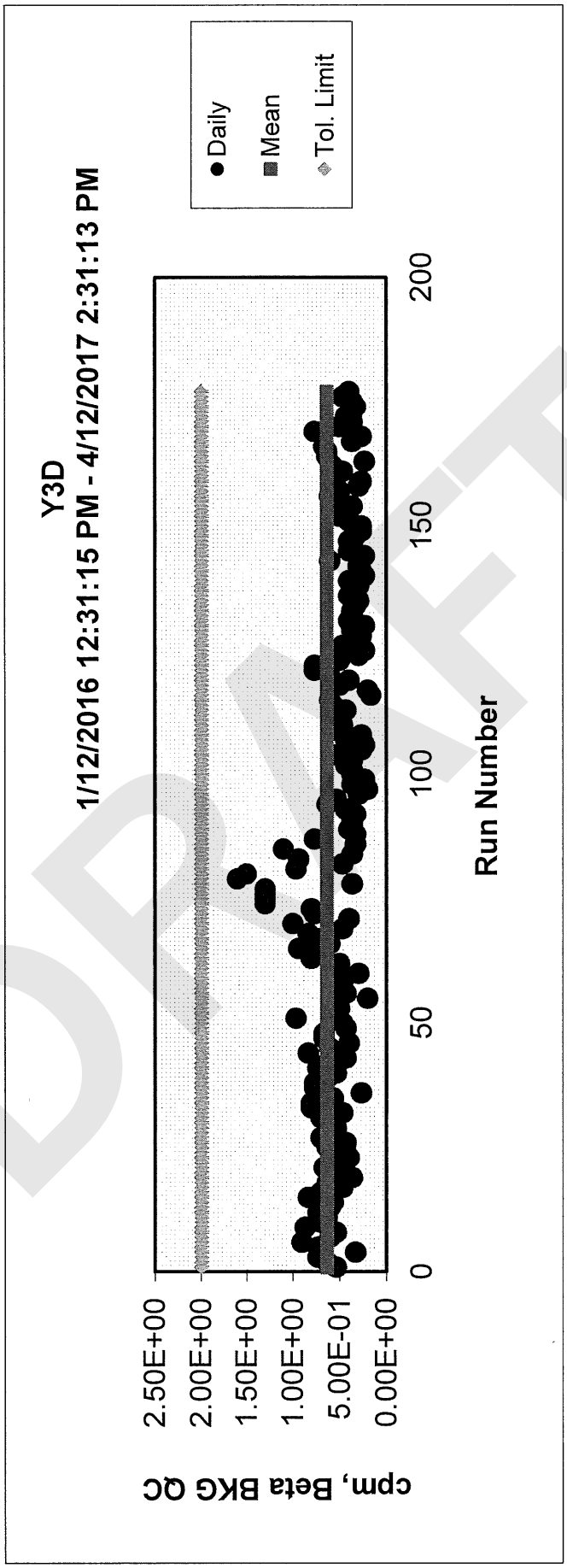
DRAFT


Y3A
1/12/2016 12:31:15 PM - 4/12/2017 2:31:13 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

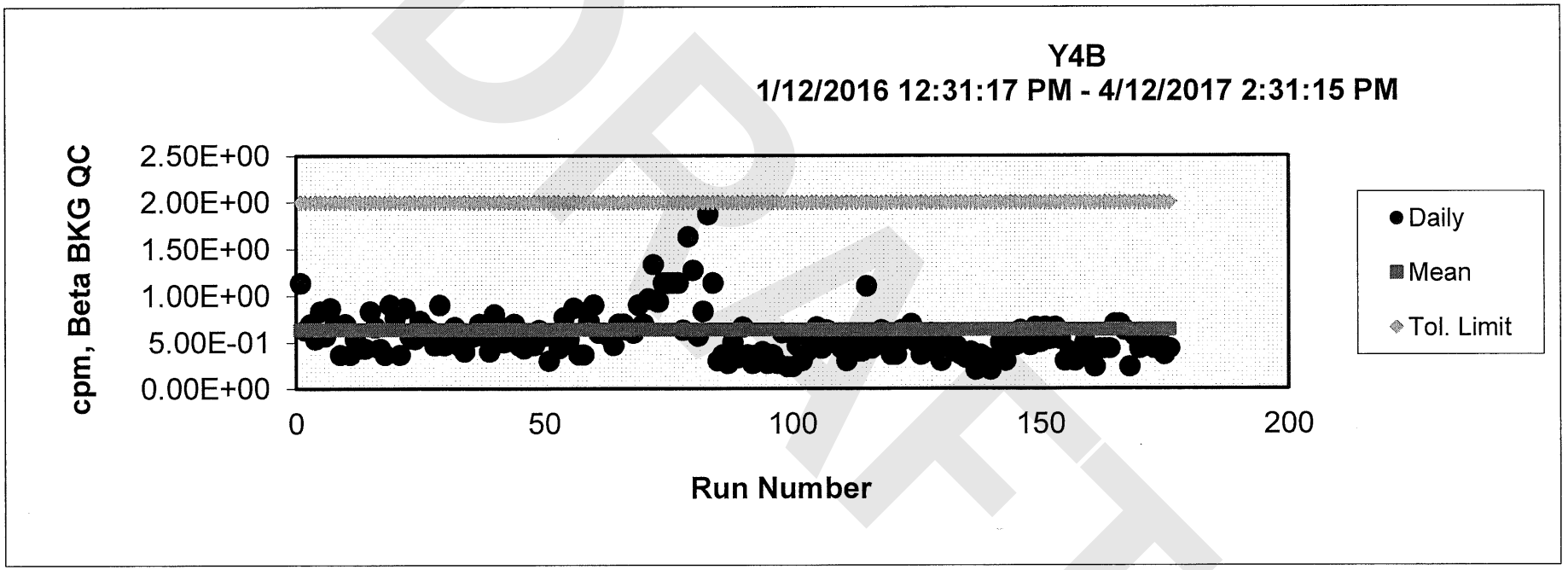
DRAFT


Y3B
1/12/2016 12:31:15 PM - 4/12/2017 2:31:13 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

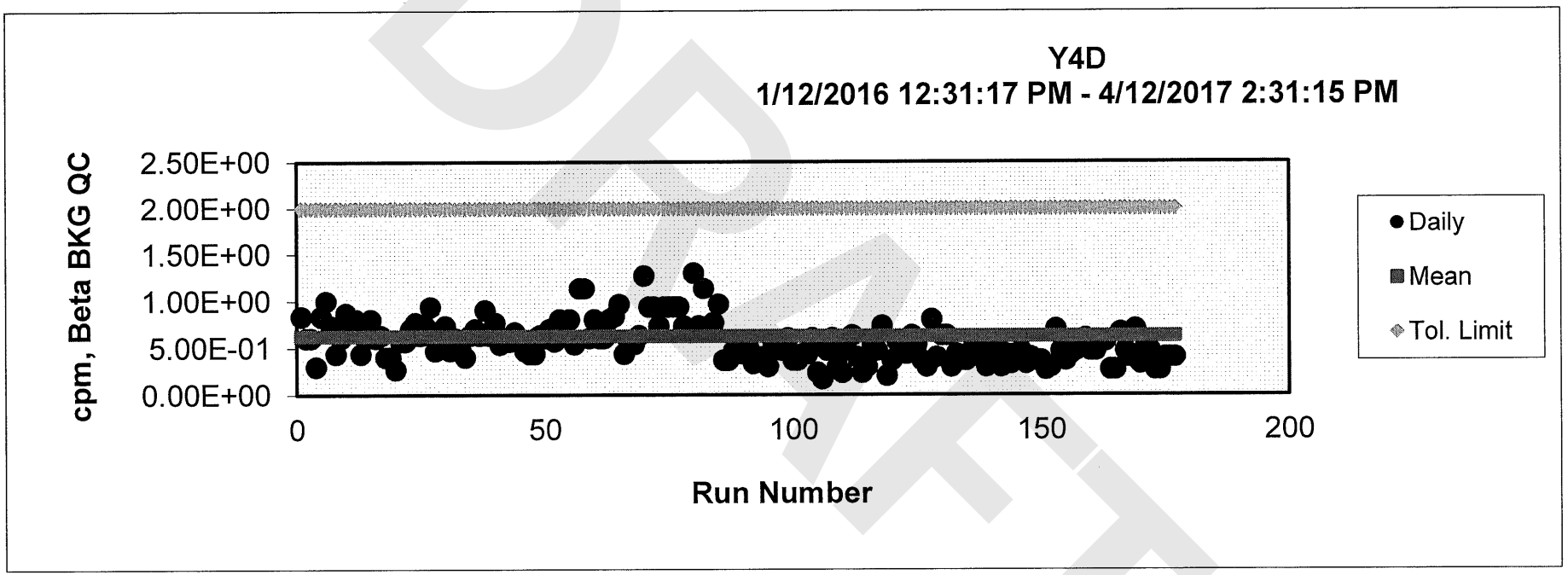
DRAFT


Y3D
1/12/2016 12:31:15 PM - 4/12/2017 2:31:13 PM
Daily
Mean
Tol. Limit
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number

DRAFT


Y4B
1/12/2016 12:31:17 PM - 4/12/2017 2:31:15 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

DRAFT


Y4D
1/12/2016 12:31:17 PM - 4/12/2017 2:31:15 PM
cpm, Beta BKG QC
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
0
50
100
150
200
Run Number
Daily
Mean
Tol. Limit

DRAFT

LEAD 210 RECOVERY

DRAFT

WG24441

Pb-210 Recovery (Bi-210)

Bi-207 Tracer	
recovery 1	59.72
recovery 2	57.12
recovery 3	60.83
Average	59.22
2 sigma	3.81
RPD highest and lowest	6.29
< 30	Yes

DRAFT

Sec. Review: Analyst: BG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 13-APR-2017 12:53:30.51
TBE23 03017322 HpGe ********** Aquisition Date/Time: 13-APR-2017 12:23:07.50

LIMS No., Customer Name, Client ID: L72921-21BI

Sample ID	: 23L72921-21BI			Smple Date:	8-OCT-2014 00:00:00.0
Sample Type	: WO			Geometry	: 2325MM093004
Quantity	: 1.00000E+00 TOTAL			BKGFILE	: 23BG033117MT
Start Channel	: 50	Energy Tol	: 2.00000	Real Time	: 0 00:30:02.13
End Channel	: 4090	Pk Srch Sens:	5.00000	Live time	: 0 00:30:00.00
MDA Multiple	: 4.6600	Library Used:	BI207		

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	10	34.07*	77	21	1.36	68.18	3.50E-01	4.27E-02	22.2	1.89E+00
2	10	36.98*	107	230	3.80	74.00	7.25E-01	5.96E-02	37.5	
3	0	74.15	3654	1101	4.26	148.24	1.64E+01	2.03E+00	2.8	
4	0	85.32	1279	447	4.41	170.57	1.99E+01	7.10E-01	4.6	
5	0	569.59	2699	124	3.68	1138.48	7.90E+00	1.50E+00	2.1	
6	0	1063.59	1103	89	3.24	2126.71	3.93E+00	6.13E-01	3.7	
7	0	1632.62	166	0	3.90	3266.17	2.59E+00	9.22E-02	7.8	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1103	74.50*	3.933E+00	5.651E+02	5.972E+02	7.42
	1770.24	------	6.87	2.458E+00	------	Line Not Found	------

Flag: "*" = Keyline

59.72%

DRAFT

Sample ID : 23L72921-21BI Acquisition date : 13-APR-2017 12:23:07

Total number of lines in spectrum	7	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	1	14.29%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.651E+02	5.972E+02	0.443E+02	7.42	
			---	---			
	Total Activity :		5.651E+02	5.972E+02			
	Grand Total Activity :		5.651E+02	5.972E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
10	34.07	77	21	1.36	68.18	62	26	4.27E-02	44.3	3.50E-01	
10	36.98	107	230	3.80	74.00	62	26	5.96E-02	74.9	7.25E-01	
0	74.15	3654	1101	4.26	148.24	131	30	2.03E+00	5.5	1.64E+01	
0	85.32	1279	447	4.41	170.57	160	23	7.10E-01	9.2	1.99E+01	
0	569.59	2699	124	3.68	1138.48	1126	24	1.50E+00	4.3	7.90E+00	
0	1632.62	166	0	3.90	3266.17	3256	19	9.22E-02	15.5	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	7	
Number of unidentified lines	6	
Number of lines tentatively identified by NID	1	14.29%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.651E+02	5.972E+02	0.443E+02	7.42	
			---	---			
	Total Activity :		5.651E+02	5.972E+02			
	Grand Total Activity :		5.651E+02	5.972E+02			

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

Interference Report

No interference correction performed

Combined Activity-MDA Report

---- Identified Nuclides ----

Nuclide	Activity (pCi/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	5.972E+02	4.433E+01	1.938E+01	0.000E+00	30.817

DRAFT

```
A,23L72921-21BI    ,04/13/2017 12:53,10/08/2014 00:00,   1.000E+00,L72921-21BI
B,23L72921-21BI    ,BI207              ,04/03/2017 07:06,2325MM093004
C,BI-207   ,YES,    5.972E+02,   4.433E+01,   1.938E+01,,   30.817
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 13-APR-2017 11:44:28.27
TBE23 03017322 HpGe ********** Aquisition Date/Time: 13-APR-2017 11:14:07.96

LIMS No., Customer Name, Client ID: L72921-12BI

Sample ID : 23L72921-12
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: BI207

Smple Date: 8-OCT-2014 00:00:00.0
Geometry : 2325MM093004
BKGFILE : 23BG033117MT
Real Time : 0 00:30:02.02
Live time : 0 00:30:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	8	34.36*	96	43	1.72	68.76	3.79E-01	5.35E-02	20.9	1.81E+00
2	8	37.81*	93	221	4.65	75.66	8.67E-01	5.19E-02	32.7	
3	0	44.11*	27	330	5.19	88.23	2.52E+00	1.50E-02	124.4	
4	0	74.13	3290	988	4.04	148.20	1.64E+01	1.83E+00	2.9	
5	0	85.55	1029	478	4.34	171.02	2.00E+01	5.72E-01	5.6	
6	0	569.67	2326	156	3.64	1138.63	7.90E+00	1.29E+00	2.5	
7	0	1063.65	1062	34	3.68	2126.83	3.93E+00	5.90E-01	3.3	
8	0	1632.54	131	7	4.17	3266.02	2.59E+00	7.30E-02	9.8	
9	0	1770.17	47	21	0.81	3541.80	2.46E+00	2.63E-02	24.2	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1062	74.50*	3.933E+00	5.442E+02	5.752E+02	6.63
	1770.24	47	6.87	2.458E+00	4.203E+02	4.441E+02	48.42

Flag: "*" = Keyline

57.12 %

DRAFT

Sample ID : 23L72921-12 Acquisition date : 13-APR-2017 11:14:07

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.442E+02	5.752E+02	0.381E+02	6.63	
	Total Activity :		5.442E+02	5.752E+02			
	Grand Total Activity :		5.442E+02	5.752E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
8	34.36	96	43	1.72	68.76	63	21	5.35E-02	41.9	3.79E-01	
8	37.81	93	221	4.65	75.66	63	21	5.19E-02	65.4	8.67E-01	
0	44.11	27	330	5.19	88.23	83	14	1.50E-02	****	2.52E+00	
0	74.13	3290	988	4.04	148.20	131	30	1.83E+00	5.8	1.64E+01	
0	85.55	1029	478	4.34	171.02	160	22	5.72E-01	11.1	2.00E+01	
0	569.67	2326	156	3.64	1138.63	1126	29	1.29E+00	4.9	7.90E+00	
0	1632.54	131	7	4.17	3266.02	3253	23	7.30E-02	19.7	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.405E+02	5.712E+02	0.376E+02	6.57	
			---	---			
	Total Activity :		5.405E+02	5.712E+02			
	Grand Total Activity :		5.405E+02	5.712E+02			

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/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	5.712E+02	3.755E+01	1.713E+01	0.000E+00	33.346

DRAFT

```
A,23L72921-12      ,04/13/2017 11:44,10/08/2014 00:00,   1.000E+00,L72921-12BI
B,23L72921-12      ,BI207               ,04/03/2017 07:06,2325MM093004
C,BI-207   ,YES,    5.712E+02,   3.755E+01,   1.713E+01,,   33.346
```

DRAFT

Sec. Review: Analyst: BCG

VAX/VMS Teledyne Brown Eng. Laboratory Gamma Report: 13-APR-2017 13:35:30.86
TBE23 03017322 HpGe ********** Aquisition Date/Time: 13-APR-2017 13:05:11.76

LIMS No., Customer Name, Client ID: L72921-39BI

Sample ID : 23L72921-39BI
Sample Type : WO
Quantity : 1.00000E+00 TOTAL
Start Channel : 50 Energy Tol : 2.00000
End Channel : 4090 Pk Srch Sens: 5.00000
MDA Multiple : 4.6600 Library Used: BI207

Smple Date: 8-OCT-2014 00:00:00.0
Geometry : 2325MM093004
BKGFILE : 23BG033117MT
Real Time : 0 00:30:02.12
Live time : 0 00:30:00.00

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	%Eff	Cts/Sec	%Err	Fit
1	9	34.31*	98	26	1.89	68.66	3.74E-01	5.43E-02	20.4	1.50E+00
2	9	38.83*	172	231	5.01	77.69	1.07E+00	9.56E-02	22.1	
3	9	42.65*	52	123	1.47	85.32	2.05E+00	2.89E-02	32.9	
4	0	74.31	3433	987	4.16	148.56	1.65E+01	1.91E+00	2.7	
5	0	85.43	1260	507	4.07	170.78	2.00E+01	7.00E-01	5.4	
6	0	569.61	2545	99	3.88	1138.52	7.90E+00	1.41E+00	2.2	
7	0	1063.46	1128	36	3.62	2126.46	3.93E+00	6.27E-01	3.3	
8	0	1632.59	134	7	3.95	3266.11	2.59E+00	7.46E-02	9.5	
9	0	1769.11	59	8	4.34	3539.66	2.46E+00	3.30E-02	16.5	

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

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	2-Sigma %Error
BI-207	1063.66	1128	74.50*	3.934E+00	5.779E+02	6.107E+02	6.52
	1770.24	59	6.87	2.459E+00	5.273E+02	5.573E+02	33.09

Flag: "*" = Keyline

60.83 %

DRAFT

Sample ID : 23L72921-39BI Acquisition date : 13-APR-2017 13:05:11

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/TOTAL	Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.779E+02	6.107E+02	0.398E+02	6.52	
			---	---			
Total Activity :			5.779E+02	6.107E+02			
Grand Total Activity :			5.779E+02	6.107E+02			

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

DRAFT

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
9	34.31	98	26	1.89	68.66	63	26	5.43E-02	40.8	3.74E-01	
9	38.83	172	231	5.01	77.69	63	26	9.56E-02	44.1	1.07E+00	
9	42.65	52	123	1.47	85.32	63	26	2.89E-02	65.8	2.05E+00	
0	74.31	3433	987	4.16	148.56	134	27	1.91E+00	5.5	1.65E+01	
0	85.43	1260	507	4.07	170.78	161	31	7.00E-01	10.8	2.00E+01	
0	569.61	2545	99	3.88	1138.52	1126	26	1.41E+00	4.4	7.90E+00	
0	1632.59	134	7	3.95	3266.11	3256	20	7.46E-02	19.0	2.59E+00	

Flags: "T" = Tentatively associated

Summary of Nuclide Activity

Total number of lines in spectrum	9	
Number of unidentified lines	7	
Number of lines tentatively identified by NID	2	22.22%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/TOTAL	Wtd Mean Decay Corr pCi/TOTAL	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BI-207	31.55Y	1.06	5.756E+02	6.083E+02	0.389E+02	6.39	
			---	---			
	Total Activity :		5.756E+02	6.083E+02			
	Grand Total Activity :		5.756E+02	6.083E+02			

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/TOTAL)	Act error	MDA (pCi/TOTAL)	MDA error	Act/MDA
BI-207	6.083E+02	3.890E+01	1.565E+01	0.000E+00	38.864

DRAFT

```
A,23L72921-39BI    ,04/13/2017 13:35,10/08/2014 00:00,   1.000E+00,L72921-39BI
B,23L72921-39BI    ,BI207                ,04/03/2017 07:06,2325MM093004
C,BI-207   ,YES,    6.083E+02,    3.890E+01,    1.565E+01,,    38.864
```

DRAFT

LEAD 210

Sample and QC Raw Data

DRAFT

Raw Data Sheet (rawdata)

04/17/17 12:55

Work Order: **L71921** Customer: **GeoEngineers**

Analysis: **PB-210** Project: **GE002-3EREG-17**

RMG 4/17/17

Sample ID / Client ID	Run #	Analysis	Reference Date/Time	Volume/ Aliquot	Scavenge Date/Time	Milking Date/Time	Mount Weight	Recovery	Count Date/Time	Detector ID	Total Counts	Sample dt	Bkg Counts	Bkg dt	Eff.	Decay & Ingrowth Factor	Analy
L71921-3		PB-210	23-feb-17 08:04	6.0565 g dry		04-11-17 13:40	.0448	57.78	04-12-17 17:30	Y1D	2449	1300 M	1217	1440 M	.286	.903	KSC
MAF-GC-01-3																	
Activity: **5.05E-01**	Error:	4.39E-02	MDC: 5.78E-02	pCi/gDry		**L71921-3**			**PB-210**								
L71921-6		PB-210	23-feb-17 08:10	6.0179 g dry		04-11-17 13:40	.0348	44.89	04-12-17 17:30	Y3B	1768	1300 M	1137	1440 M	.287	.903	KSC
MAF-GC-01-6																	
Activity: **2.78E-01**	Error:	3.89E-02	MDC: 5.60E-02	pCi/gDry		**L71921-6**			**PB-210**								
L71921-9		PB-210	23-feb-17 08:16	6.1373 g dry		04-11-17 13:40	.0495	63.85	04-12-17 17:31	Y4B	1551	1300 M	1254	1440 M	.292	.903	KSC
MAF-GC-01-9																	
Activity: **1.52E-01**	Error:	3.67E-02	MDC: 5.67E-02	pCi/gDry		**L71921-9**			**PB-210**								
L71921-12		PB-210	23-feb-17 08:22	6.0676 g dry		04-11-17 13:40	.0426	54.95	04-12-17 17:30	Y1B	1366	1300 M	1186	1440 M	.292	.903	KSC
MAF-GC-01-12																	
Activity: **1.08E-01**	Error:	3.54E-02	MDC: 5.58E-02	pCi/gDry		**L71921-12**			**PB-210**								
L71921-15		PB-210	23-feb-17 08:28	6.1421 g dry		04-11-17 13:40	.0458	59.07	04-12-17 17:30	Y1C	1360	1300 M	1189	1440 M	.278	.903	KSC
MAF-GC-01-15																	
Activity: **1.09E-01**	Error:	3.66E-02	MDC: 5.80E-02	pCi/gDry		**L71921-15**			**PB-210**								
L71921-18		PB-210	23-feb-17 08:34	6.0439 g dry		04-11-17 13:40	.0299	38.57	04-12-17 17:30	Y3A	1232	1300 M	1138	1440 M	.271	.903	KSC
MAF-GC-01-18																	
Activity: **8.09E-02**	Error:	3.68E-02	MDC: 5.91E-02	pCi/gDry		**L71921-18**			**PB-210**								
L71921-21		PB-210	23-feb-17 08:40	6.2963 g dry		04-11-17 13:40	.0533	68.75	04-12-17 17:30	Y2D	1342	1300 M	1134	1440 M	.295	.903	KSC
MAF-GC-01-21																	
Activity: **1.11E-01**	Error:	3.32E-02	MDC: 5.20E-02	pCi/gDry		**L71921-21**			**PB-210**								
L71921-24		PB-210	23-feb-17 08:46	6.0272 g dry		04-11-17 13:40	.0339	43.73	04-12-17 17:30	Y2A	1173	1300 M	1103	1440 M	.263	.903	KSC
MAF-GC-01-24																	

DRAFT

Work Order: **L71921**
PB-210

Customer: **GeoEngineers**
GE002-3EREG-17

EAC 4/17/17

L71921-24	PB-210	23-feb-17 08:46	6.0272 g dry		04-11-17 13:40	.0339	43.73	04-12-17 17:30	Y2A	1173	1300 M	1103	1440 M	.263	.903	KSC
MAF-GC-01-24																
Activity: **7.25E-02**	Error: 3.73E-02	MDC: 6.02E-02	pCi/gDry	**L71921-24**		**PB-210**										
L71921-27	PB-210	23-feb-17 08:52	6.0838 g dry		04-11-17 13:40	.0444	57.27	04-12-17 17:30	Y1A	1182	1300 M	1270	1440 M	.305	.903	KSC
MAF-GC-01-27																
Activity: 1.24E-02	Error: 3.28E-02	MDC: **5.50E-02**	pCi/gDry	L71921-27		PB-210										
L71921-30	PB-210	23-feb-17 08:58	6.1217 g dry		04-11-17 13:40	.0353	45.53	04-12-17 17:30	Y2C	1409	1300 M	1226	1440 M	.306	.903	KSC
MAF-GC-01-30																
Activity: **1.04E-01**	Error: 3.39E-02	MDC: 5.36E-02	pCi/gDry	**L71921-30**		**PB-210**										
L71921-33	PB-210	23-feb-17 09:04	6.0406 g dry		04-11-17 13:40	.0244	31.47	04-12-17 17:30	Y3D	1370	1300 M	1163	1440 M	.295	.903	KSC
MAF-GC-01-33																
Activity: **1.16E-01**	Error: 3.50E-02	MDC: 5.48E-02	pCi/gDry	**L71921-33**		**PB-210**										
L71921-36	PB-210	23-feb-17 09:10	6.2464 g dry		04-11-17 13:40	.0901	116.21	04-12-17 17:27	X4A	1235	1300 M	1313	1440 M	.309	.903	KSC
MAF-GC-01-36																
Activity: 1.66E-02	Error: 3.22E-02	MDC: **5.38E-02**	pCi/gDry	L71921-36		PB-210										
L71921-39	PB-210	23-feb-17 09:16	6.1193 g dry		04-11-17 13:40	.092	118.66	04-12-17 17:27	X4B	1283	1300 M	1301	1440 M	.294	.903	KSC
MAF-GC-01-39																
Activity: 3.91E-02	Error: 3.49E-02	MDC: **5.75E-02**	pCi/gDry	L71921-39		PB-210										
L71921-42	PB-210	23-feb-17 09:22	6.063 g dry		04-11-17 13:40	.095	122.53	04-12-17 17:27	X4C	1216	1300 M	1239	1440 M	.276	.903	KSC
MAF-GC-01-42																
Activity: 3.77E-02	Error: 3.65E-02	MDC: **6.03E-02**	pCi/gDry	L71921-42		PB-210										
L71921-45	PB-210	23-feb-17 09:28	6.1699 g dry		04-11-17 13:40	.0989	127.56	04-12-17 17:27	X4D	1303	1300 M	1360	1440 M	.286	.903	KSC
MAF-GC-01-45																

DRAFT

Raw Data Sheet (rawdata)

04/17/17 12:55

Work Order: **L71921**
PB-210

Customer: **GeoEngineers**
GE002-3EREG-17

RKC 4/17/17

L71921-45	PB-210	23-feb-17 09:28	6.1699 g dry		04-11-17 13:40	.0989	127.56	04-12-17 17:27	X4D	1303	1300 M	1360	1440 M	.286	.903	KSC
MAF-GC-01-45																

Activity: 2.76E-02 Error: 3.60E-02 MDC: **5.99E-02** pCi/gDry L71921-45 PB-210

DRAFT

Raw Data Sheet (rawdata)

04/17/17 12:56

Work Order: **WG24683** Customer: **Teledyne Brown Engineering**

Analysis: **PB-210** Project: **TE511-LABQC**

RYC 4/17/17

Sample ID / Client ID	Run #	Analysis	Reference Date/Time	Volume/ Aliquot	Scavenge Date/Time	Milking Date/Time	Mount Weight	Recovery	Count Date/Time	Detector ID	Total Counts	Sample dt	Bkg Counts	Bkg dt	Eff.	Decay & Ingrowth Factor	Analy
WG24683-1		PB-210	05-apr-17 00:00	100 %		04-11-17 13:40	.0979	126.27	04-12-17 17:31	Y4D	855	1300 M	1192	1440 M	.278	.906	KSC
Blank Samples																	
Activity: -5.13E-01	Error:	1.98E-01	MDC: **3.55E-01**	pCi/Total		WG24683-1		PB-210									
WG24683-2		PB-210	01-jul-91 12:00	100 %		04-11-17 13:40	.0333	42.95	04-12-17 17:27	X1A	4957	100 M	1243	1440 M	.311	.384	KSC
Laboratory Control Samples																	
Activity: **3.10E+02**	Error:	8.96E+00	MDC: 2.75E+00	pCi/Total		**WG24683-2**		**PB-210**									
WG24683-3		PB-210	23-feb-17 09:28	6.0353 g dry		04-11-17 13:40	.0326	42.05	04-12-17 17:30	Y2B	1277	1300 M	1138	1440 M	.296	.903	KSC
MAF-GC-01-45																	
Activity: **9.07E-02**	Error:	3.41E-02	MDC: 5.43E-02	pCi/gDry		**WG24683-3**		**PB-210**									
WG24683-4		PB-210	23-feb-17 09:28	6.0052 g dry		04-11-17 13:40	.0513	66.17	04-12-17 17:27	X1B	4273	100 M	1413	1440 M	.296	.853	KSC
MAF-GC-01-45MS																	
Activity: **2.10E+01**	Error:	6.57E-01	MDC: 2.32E-01	pCi/gDry		**WG24683-4**		**PB-210**									
WG24683-5		PB-210	23-feb-17 09:28	6.0194 g dry		04-11-17 13:40	.0418	53.91	04-12-17 17:27	X1D	5269	100 M	1369	1440 M	.283	.853	KSC
MS																	
Activity: **2.71E+01**	Error:	7.62E-01	MDC: 2.38E-01	pCi/gDry		**WG24683-5**		**PB-210**									

DRAFT

Counter ID: X Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
WG24683-2	4957	4.66	100.00	04/12/2017 17:27		1.0000	%	pCi	PB-210	0.311	3.10E+02	8.96E+00	2.75E+00	Total	0.592	0.3842	1243.	1440.0	
WG24683-4	4273	4.66	100.00	04/12/2017 17:27		6.0052	g	pCi	PB-210	0.296	2.10E+01	6.57E-01	2.32E-01	g Dry	0.592	0.8527	1413.	1440.0	
WG24683-5	5269	4.66	100.00	04/12/2017 17:27		6.0194	g	pCi	PB-210	0.283	2.71E+01	7.62E-01	2.38E-01	g Dry	0.592	0.8527	1369.	1440.0	

DRAFT

Reviewed 4/17/17 Date

Data Filename: X041217Q.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

4/17/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

1 a	WG24683-2PB	143	4957	########	100 100MIN	1580
1 b	-4PB	15	4273	########	100 100MIN	1580
1 c		1	96	########	100 100MIN	1580
1 d	-5PB	55	5269	########	100 100MIN	1580
2 a		2	78	########	100 100MIN	1580
2 b		0	63	########	100 100MIN	1580
2 c		2	55	########	100 100MIN	1580
2 d		1	74	########	100 100MIN	1580

DRAFT

Counter ID: Y Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
L71921-27	1182	4.66	1300.00	04/12/2017 17:30		6.0838	g	pCi	PB-210	0.305	1.24E-02	3.28E-02	5.50E-02	g Dry	0.592	0.9030	1270.	1440.0	
L71921-12	1366	4.66	1300.00	04/12/2017 17:30		6.0676	g	pCi	PB-210	0.292	1.08E-01	3.54E-02	5.58E-02	g Dry	0.592	0.9030	1186.	1440.0	
L71921-15	1360	4.66	1300.00	04/12/2017 17:30		6.1421	g	pCi	PB-210	0.278	1.09E-01	3.66E-02	5.80E-02	g Dry	0.592	0.9030	1189.	1440.0	
L71921-3	2449	4.66	1300.00	04/12/2017 17:30		6.0565	g	pCi	PB-210	0.286	5.05E-01	4.39E-02	5.78E-02	g Dry	0.592	0.9030	1217.	1440.0	
L71921-24	1173	4.66	1300.00	04/12/2017 17:30		6.0272	g	pCi	PB-210	0.263	7.25E-02	3.73E-02	6.02E-02	g Dry	0.592	0.9030	1103.	1440.0	
WG24683-3	1277	4.66	1300.00	04/12/2017 17:30		6.0353	g	pCi	PB-210	0.296	9.07E-02	3.41E-02	5.43E-02	g Dry	0.592	0.9030	1138.	1440.0	
L71921-30	1409	4.66	1300.00	04/12/2017 17:30		6.1217	g	pCi	PB-210	0.306	1.04E-01	3.39E-02	5.36E-02	g Dry	0.592	0.9030	1226.	1440.0	
L71921-21	1342	4.66	1300.00	04/12/2017 17:30		6.2963	g	pCi	PB-210	0.295	1.11E-01	3.32E-02	5.20E-02	g Dry	0.592	0.9030	1134.	1440.0	
L71921-18	1232	4.66	1300.00	04/12/2017 17:30		6.0439	g	pCi	PB-210	0.271	8.09E-02	3.68E-02	5.91E-02	g Dry	0.592	0.9030	1138.	1440.0	
L71921-6	1768	4.66	1300.00	04/12/2017 17:30		6.0179	g	pCi	PB-210	0.287	2.78E-01	3.89E-02	5.60E-02	g Dry	0.592	0.9030	1137.	1440.0	
L71921-33	1370	4.66	1300.00	04/12/2017 17:30		6.0406	g	pCi	PB-210	0.295	1.16E-01	3.50E-02	5.48E-02	g Dry	0.592	0.9030	1163.	1440.0	
L71921-9	1551	4.66	1300.00	04/12/2017 17:31		6.1373	g	pCi	PB-210	0.292	1.52E-01	3.67E-02	5.67E-02	g Dry	0.592	0.9029	1254.	1440.0	
WG24683-1	855	4.66	1300.00	04/12/2017 17:31		1.0000	%	pCi	PB-210	0.278	-5.13E-01	1.98E-01	3.55E-01	Total	0.592	0.9061	1192.	1440.0	

DRAFT

Reviewed 4/17/17 Date

Data Filename: Y041217PB.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

KB 4/17/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

1 a	L71921-27PB	36	1182	########	1300 800MIN	1650
1 b	-12PB	44	1366	########	1300 800MIN	1650
1 c	-15PB	56	1360	########	1300 800MIN	1650
1 d	-3PB	57	2449	########	1300 800MIN	1650
2 a	L71921-24PB	33	1173	########	1300 800MIN	1650
2 b	WG24683-3PB	42	1277	########	1300 800MIN	1650
2 c	L71921-30PB	39	1409	########	1300 800MIN	1650
2 d	-21PB	36	1342	########	1300 800MIN	1650
3 a	L71921-18PB	52	1232	########	1300 800MIN	1650
3 b	-6PB	64	1768	########	1300 800MIN	1650
3 c		37	955	########	1300 800MIN	1650
3 d	-33PB	67	1370	########	1300 800MIN	1650
4 a		35	1061	########	1300 800MIN	1650
4 b	-9PB	29	1551	########	1300 800MIN	1650
4 c		62	1129	########	1300 800MIN	1650
4 d	WG24683-1PB	40	855	########	1300 800MIN	1650

DRAFT

Counter ID: X Analyst: KPW

Sample ID	Counts	MDAF*	Min. Ctd	Date/Time	Net Wt	Spl Vol	Spl Units	Act	Analysis	Eff	Res	Err	MDA	Act Units	Yield	DecayF	Bkg Cts	Bkg Ct Tim (M)	Flags
L71921-36	1235	4.66	1300.00	04/12/2017 17:27		6.2464	g	pCi	PB-210	0.309	1.66E-02	3.22E-02	5.38E-02	g Dry	0.592	0.9033	1313.	1440.0	
L71921-39	1283	4.66	1300.00	04/12/2017 17:27		6.1193	g	pCi	PB-210	0.294	3.91E-02	3.49E-02	5.75E-02	g Dry	0.592	0.9033	1301.	1440.0	
L71921-42	1216	4.66	1300.00	04/12/2017 17:27		6.0630	g	pCi	PB-210	0.276	3.77E-02	3.65E-02	6.03E-02	g Dry	0.592	0.9033	1239.	1440.0	
L71921-45	1303	4.66	1300.00	04/12/2017 17:27		6.1699	g	pCi	PB-210	0.286	2.76E-02	3.60E-02	5.99E-02	g Dry	0.592	0.9033	1360.	1440.0	

Reviewed Date 4/17/17 Data Filename: X041217PB.xls

MDAF*: 2.71 = 2.71/Sample Count Time + Normal MDA Calcs

Error calculations are 2-Sigma. If tpu flagged, error is TPU

KPW 4/17/17

Act = ((sam counts/sam ct time)-(bkgcts/bkgtim))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
Err = 2 * Sqr(sam counts/sam ct time^2+bkgcts/bkgtim^2)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decaf
TPU = 2 * Sqr((sam counts/sam ct time^2+bkgcts/bkgtim^2)+(net sample count rate ^ 2 * TPU factor))/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
MDA = mdaf * Sqr(bkgcts/bkgtim/sam ct time)/eff/putvol/splvolf*actvolf/actf/samaliq/yield/decayf
putvol: spl wt, splvolf: vol conv fac, actvolf: act vol conv fac, actf: act conv fac, samaliq: Spl Aliq

Calculated using BetaProp.XLS Workbook, V042106

DRAFT

3 a		41	1047	########	1300 800MIN	1580
3 b		99	1240	########	1300 800MIN	1580
3 c		48	996	########	1300 800MIN	1580
3 d		84	1177	########	1300 800MIN	1580
4 a	L71921-36PB	38	1235	########	1300 800MIN	1580
4 b	-39PB	31	1283	########	1300 800MIN	1580
4 c	-42PB	33	1216	########	1300 800MIN	1580
4 d	-45PB	44	1303	########	1300 800MIN	1580

DRAFT

LEAD 210

Prep and Run Logs

DRAFT

Logbook Page

L71921

PB-210

Sample#	Matrix	QC	Analysis	Spike Id	Spike Volume		Spike Conc
WG24683-2	WO	LCS	PB-210	210PB-012505	.5	mls	635.02
WG24683-4	SS	MS	PB-210	210PB-012505	.5	mls	635.02
WG24683-5	SS	MSD	PB-210	210PB-012505	.5	mls	635.02

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
WG24683-1	WO	BLK	PB-210	100 %	04/05/17	KSC	BALANCE 7	.0306	BALANCE 7	.1285	BALANCE 1	.0979	04/12/17	WG24683
WG24683-2	WO	LCS	PB-210	100 %	04/05/17	KSC	BALANCE 7	.0305	BALANCE 7	.0638	BALANCE 1	.0333	04/12/17	WG24683
WG24683-3	SS	DUP	PB-210	6.0353 g dry	04/05/17	KSC	BALANCE 7	.0305	BALANCE 7	.0631	BALANCE 1	.0326	04/12/17	WG24683
WG24683-4	SS	MS	PB-210	6.0052 g dry	04/05/17	KSC	BALANCE 7	.0303	BALANCE 7	.0816	BALANCE 1	.0513	04/12/17	WG24683
WG24683-5	SS	MSD	PB-210	6.0194 g dry	04/05/17	KSC	BALANCE 7	.0298	BALANCE 7	.0716	BALANCE 1	.0418	04/12/17	WG24683
L71921-3	SS		PB-210	6.0565 g dry	04/05/17	KSC	BALANCE 7	.0304	BALANCE 7	.0752	BALANCE 1	.0448	04/12/17	WG24683
L71921-6	SS		PB-210	6.0179 g dry	04/05/17	KSC	BALANCE 7	.0302	BALANCE 7	.0650	BALANCE 1	.0348	04/12/17	WG24683
L71921-9	SS		PB-210	6.1373 g dry	04/05/17	KSC	BALANCE 7	.0300	BALANCE 7	.0795	BALANCE 1	.0495	04/12/17	WG24683
L71921-12	SS		PB-210	6.0676 g dry	04/05/17	KSC	BALANCE 7	.0305	BALANCE 7	.0731	BALANCE 1	.0426	04/12/17	WG24683
L71921-15	SS		PB-210	6.1421 g dry	04/05/17	KSC	BALANCE 7	.0305	BALANCE 7	.0763	BALANCE 1	.0458	04/12/17	WG24683
L71921-18	SS		PB-210	6.0439 g dry	04/05/17	KSC	BALANCE 7	.0300	BALANCE 7	.0599	BALANCE 1	.0299	04/12/17	WG24683
L71921-21	SS		PB-210	6.2963 g dry	04/05/17	KSC	BALANCE 7	.0298	BALANCE 7	.0831	BALANCE 1	.0533	04/12/17	WG24683
L71921-24	SS		PB-210	6.0272 g dry	04/05/17	KSC	BALANCE 7	.0306	BALANCE 7	.0645	BALANCE 1	.0339	04/12/17	WG24683
L71921-27	SS		PB-210	6.0838 g dry	04/05/17	KSC	BALANCE 7	.0305	BALANCE 7	.0749	BALANCE 1	.0444	04/12/17	WG24683
L71921-30	SS		PB-210	6.1217 g dry	04/05/17	KSC	BALANCE 7	.0298	BALANCE 7	.0651	BALANCE 1	.0353	04/12/17	WG24683

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Logbook Page

L71921

PB-210

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
L71921-33	SS		PB-210	6.0406 g dry	04/05/17	KSC	BALANCE 7	.0302	BALANCE 7	.0546	BALANCE 1	.0244	04/12/17	WG2468 3
L71921-36	SS		PB-210	6.2464 g dry	04/05/17	KSC	BALANCE 7	.0301	BALANCE 7	.1202	BALANCE 1	.0901	04/12/17	WG2468 3
L71921-39	SS		PB-210	6.1193 g dry	04/05/17	KSC	BALANCE 7	.0298	BALANCE 7	.1218	BALANCE 1	.0920	04/12/17	WG2468 3
L71921-42	SS		PB-210	6.063 g dry	04/05/17	KSC	BALANCE 7	.0301	BALANCE 7	.1251	BALANCE 1	.0950	04/12/17	WG2468 3
L71921-45	SS		PB-210	6.1699 g dry	04/05/17	KSC	BALANCE 7	.0299	BALANCE 7	.1288	BALANCE 1	.0989	04/12/17	WG2468 3

DRAFT

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

RADIOCHEMICAL WORK SHEET (radchemws-wg01)

Apr 12 2017, 09:42 am

WG24683

Mount Date: 04/12/17 Scavenge Date: N/A Milk Date: 04/11/17 01:40 pm Analyst: KSC

Duplicate: L71921-45 **Spike Data**

ID	Nuclide	Ref Date	Conc Amt/Units	Amt Used	Activity:
210PB-012505	PB-210	07/01/1991 12:00	635.02 pCi/ml	.5	3.18E+02

Carrier limits: L71921(30-120)

Tracer limits: L71921(20-125)

Technical Notes:

1) Prior to accepting the raw data, check for radon deposition.

Det ID/ verify	LIMS Sample ID (*DUP)	Analysis	Mat	Site	Due Date	Ref. Date	Project	Target MDA	Aliquot Volume	Gamma Normalized Aliquot	Yield 1 PB-210	Yield 2 N/A	Est. Count Time	Tech Note
	WG24683-1 Y4D	PB-210	WO	Blank	05-12	04/12/17 0000	TE511LABQC		100.00 %	1.2627E+00	126.27%	N/A		1
	WG24683-2 X1A	PB-210	WO	LCS	05-12	07/01/1991 12:00	TE511LABQC		100.00 %	4.2951E-01	42.95%	N/A		1
	WG24683-3 Y2B	PB-210	SS	MAF-GC-01	05-12	02/23/2017 09:28 (F/M)	TE511LABQC	1.00E-01 pCi/g Dry	6.04 g dry	2.5377E+00	42.05%	N/A		1
	WG24683-4 X1B	PB-210	SS	MAF-GC-01	05-12	02/23/2017 09:28 (P/)	TE511LABQC		6.005E+00	3.9735E+00	66.17%	N/A		1
	WG24683-5 X1D	PB-210	SS	MS	05-12	NOT IN FLAG VALUES ***	TE511LABQC		6.019E+00	3.2453E+00	53.91%	N/A		1
	L71921-3 Y1D	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:04 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.057E+00**	**3.4997E+00**	**57.78%**	**N/A**		**1**
	L71921-6 Y3B	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:10 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.018E+00**	**2.7012E+00**	**44.89%**	**N/A**		**1**
	L71921-9 X4B	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:16 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.137E+00**	**3.9184E+00**	**63.85%**	**N/A**		**1**
	L71921-12 Y1B	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:22 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.068E+00**	**3.3339E+00**	**54.95%**	**N/A**		**1**
	L71921-15 Y1C	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:28 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.142E+00**	**3.6284E+00**	**59.07%**	**N/A**		**1**
	L71921-18 Y3A	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:34 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.044E+00**	**2.3309E+00**	**38.57%**	**N/A**		**1**
	L71921-21 Y2D	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:40 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.296E+00**	**4.3286E+00**	**68.75%**	**N/A**		**1**
	L71921-24 Y2A	**PB-210**	**SS**	**MAF-GC-01**	**04-07**	**02/23/2017 08:46 (F/M)**	**GE0023EREG17**	**1.00E-01 pCi/g Dry**	**6.027E+00**	**2.6354E+00**	**43.73%**	**N/A**		**1**

Teledyne Analytical Laboratory
2508 Quality Lane
Knoxville, Tennessee 37931

RADIOCHEMICAL WORK SHEET (radchemws-wg01)

Apr 12 2017, 09:42 am

WG24683

Mount Date: 04/12/17 Scavenge Date: N/A Milk Date: 04/11/17 01:40 pm Analyst: KSC

Duplicate: L71921-45 **Spike Data**

ID	Nuclide	Ref Date	Conc Amt/Units	Amt Used	Activity:
210PB-012505	PB-210	07/01/1991 12:00	635.02 pCi/ml	.5	3.18E+02

Det ID/ verify	LIMS Sample ID (*DUP)	Analysis	Mat	Site	Due Date	Ref. Date	Project	Target MDA	Aliquot Volume	Gamma Normalized Aliquot	Yield 1 PB-210	Yield 2 N/A	Est. Count Time	Tech Note
	L71921-27 Y1A	PB-210	SS	MAF-GC-01	04-07	02/23/2017 08:52 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.084E+00	3.4841E+00	57.27%	N/A		1
	L71921-30 Y2C	PB-210	SS	MAF-GC-01	04-07	02/23/2017 08:58 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.122E+00	2.7873E+00	45.53%	N/A		1
	L71921-33 Y3D	PB-210	SS	MAF-GC-01	04-07	02/23/2017 09:04 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.041E+00	1.9011E+00	31.47%	N/A		1
	L71921-36 X4A	PB-210	SS	MAF-GC-01	04-07	02/23/2017 09:10 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.246E+00	7.2591E+00	116.21%	N/A		1
	L71921-39 X4B	PB-210	SS	MAF-GC-01	04-07	02/23/2017 09:16 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.119E+00	7.2614E+00	118.66%	N/A		1
	L71921-42 X4C	PB-210	SS	MAF-GC-01	04-07	02/23/2017 09:22 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.063E+00	7.4292E+00	122.53%	N/A		1
	L71921-45 * X4D	PB-210	SS	MAF-GC-01	04-07	02/23/2017 09:28 (F/M)	GE0023EREG17	1.00E-01 pCi/g Dry	6.170E+00	7.8705E+00	127.56%	N/A		1

DRAFT

LEAD 210

Balance and Pipette Check

DRAFT

Daily Balance Tolerance Check Reports

for : L71921

Instrument: BALANCE 7

Model: A&D HR200

Serial Number: 12103994

Description: 4 Place Analytical Balance

Known Weight	Result Weight
.0050	.0050
1.0000	1.0001
100.0000	100.0000

Check Date: 05-APR-17

Analyst: DW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod

PB-210 BALANCE 7 05-APR-17

DRAFT

Daily Balance Tolerance Check Reports

for : L71921

Instrument: BALANCE 10

Model: METTLER TOLEDO AL204

Serial Number: 1232380018

Description: 4 place Analytical Balance

Known Weight	Result Weight
.0100	.0100
1.0000	1.0000
100.0000	100.0000

Check Date: 12-APR-17

Analyst: CJF

Weight Set Used: WTSET 1

Tolerance: 1%

Out of Range: N

Prod

PB-210 BALANCE 10 12-APR-17

DRAFT

Daily Balance Tolerance Check Reports

for : L71921

Instrument: BALANCE 7

Model: A&D HR200

Serial Number: 12103994

Description: 4 Place Analytical Balance

Known Weight	Result Weight
.0050	.0050
1.0000	.9987
100.0000	100.0120

Check Date: 11-APR-17

Analyst: MCB

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod

PB-210 BALANCE 7 11-APR-17

DRAFT

Daily Pipette Tolerance Check
for: L71921

Instrument: PIP ENV #6
Model: EPPENDORF
Serial #: 3317499
Description: 100 - 1000 uL

Known	Result
.2	.2014
1	1.0021

Check Date: 05-APR-17
Analyst: DW
Balance: BALANCE 7
Room Temp: 22
Tolerance: 1%
Out of range: N

Prod	Instrument	Check Date
PB-210	PIP ENV #6	05-APR-17

DRAFT

LEAD 210

Standard Certificates

DRAFT

Bismuth Carrier

Carrier ID:	BI17-1
Reagent Lot # :	006116
Reagent Manufacturer:	Fisher Scientific

Bismuth Carrier preparation:
Weigh 69.6 grams bismuth nitrate - $Bi(NO_3)_3.5H_2O$ - into a 1 liter beaker.
Add 1:19 HNO_3 to the 1 liter mark. Stir with magnetic stirrer until dissolved.
Transfer to the bismuth carrier volumetric flask and standardiz as bimuth phosphate per procedure TBE-2015.

NOTES:
Used 5 beakers containing 15 milliliters of 5N HNO3.
Added one milliliter of carrier to each beaker.
proceeded with steps 9.4.9 - 9.5.7 of procedure TBE-2015.

Precipitate weights	1	2	3	4	5
Gross wgt, grams	0.1082	0.1052	0.1044	0.109	0.1129
Tare wgt, grams	0.0308	0.032	0.0307	0.0312	0.0318
Net wgt, grams	0.0774	0.0732	0.0737	0.0778	0.0811

Average net wgt, grams 0.07553

Ratios	1	2	3	4	5
wgt/avg net wgt	1.0248	0.9692	0.9758	1.0301	1.0738

Acceptable ratio range - 0.95 - 1.05

0.0755 grams BiOCl/1 mL carrier

DRAFT

Preparer Signature: Susan Gilbert

Preparation Date: 3/15/2017

Reviewer Signature: Keith Jett

Reviewed Date: 3/16/17

%PB-
210%

Teledyne Brown Engineering

Source Certificate

Spike Id 210PB-012505

Nuclide: PB-210
Half Life: 22.26 YEARS
Original Std Id: P30621
Chemical Form: 1 M HNO3
Reference Date: 01-JUL-91
Expiration Date: 31-DEC-18
Activity: 635.02 pCi/ml
Total Uncertainty: 2.4
Comments: 10 ML 210PB-090393 DILUTED TO 100 ML

DRAFT

Prepared by: Date: 01/25/05

Approved by: Keith Jeter Date:

Signature on File

Amersham International plc
Amersham Laboratories

NAMAS
CALIBRATION
No. 0146

Certificate of calibration of absolutely standardized radioactive solution

P 30621

Description	Principal radionuclide:	Lead-210	Product code:	RBZ.24
	Daughter radionuclide:	Bismuth-210 + Polonium-210	Solution number:	S1/23/133

Measurement	Reference time:	1200 GMT on 1 July 1991	
	Radioactive concentration of lead-210:	4.426	kilobecquerels per gram of solution
	which is equivalent to:	119.6	nanocuries per gram of solution
	Mass of solution:	5.3634	grams
	Total activity of lead-210:	23.74	kilobecquerels
	which is equivalent to:	642	nanocuries

Method of measurement:
Repeated 4-pi alpha counting over a period of 63 days

Accuracy

Overall uncertainty in the radioactive concentration quoted above: ± 2.4 %

Random uncertainty: ± 0.6 % Systematic uncertainty: ± 1.8 %

Overall uncertainty is defined on the reverse of the certificate.

Radionuclidic Purity

The estimated activities of any radioactive impurities are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Other radionuclides less than 0.02 %

Chemical Composition

2M HNO_3 containing 100 micrograms of lead and 100 micrograms of bismuth per ml.

Physical Data

Recommended half life: 22.3 ± 0.2 years

Lead-210: 100% beta particle emission.
Bismuth-210: 100% beta particle emission. Half life 5.01 ± 0.01 days.
Polonium-210: 100% alpha particle emission. Half life 138.38 ± 0.01 days.

Remarks

The ratio of the activity of bismuth-210 to the activity of lead-210 = 1.0006
At the reference time polonium-210 was in radioactive equilibrium with lead-210.
The ratio of the activity of polonium-210 to the activity of lead-210 was 1.0179
There is no guarantee that all the polonium-210 will remain in solution.
Tests made over 4 years on standardized solutions of lead-210 stored in glass ampoules have shown that loss of lead-210 from solution is negligible other than by radioactive decay.

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving implicit NIST traceability as defined in NCRP 58 (1985).

Approved Signatory

B D D Singleton

Amersham

DRAFT

PERCENT MOISTURE

DRAFT

Run Date: 04/17/2017

Percent Moisture Report

L71921

Sample#	Client ID	Tare Wt	Wet Wt	Dry Wt	Tare Balance/Date		Dry Balance/Date		Analyst	% Moist
L71921-3	MAF-GC-01-3	13.45	166.1	100.52	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	42.96
L71921-6	MAF-GC-01-6	13.43	170.36	81.81	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	56.43
L71921-9	MAF-GC-01-9	13.45	191.68	110.4	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	45.6
L71921-12	MAF-GC-01-12	13.4	208.67	136.77	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	36.82
L71921-15	MAF-GC-01-15	13.39	220.05	156.25	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	30.87
L71921-18	MAF-GC-01-18	13.41	230.68	172.35	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	26.85
L71921-21	MAF-GC-01-21	13.4	239.03	183.25	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	24.72
L71921-24	MAF-GC-01-24	13.46	230.37	185.81	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	20.54
L71921-27	MAF-GC-01-27	13.45	225.58	187.52	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	17.94
L71921-30	MAF-GC-01-30	13.41	218.46	174.99	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	21.2
L71921-33	MAF-GC-01-33	13.37	239.4	199.23	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	17.77
L71921-36	MAF-GC-01-36	13.37	239.21	199.6	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	17.54
L71921-39	MAF-GC-01-39	13.4	221.91	181.07	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	19.59
L71921-42	MAF-GC-01-42	13.42	235.97	190.73	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	20.33
L71921-45	MAF-GC-01-45	13.41	238.87	195.31	BALANCE 8	03/13/17	BALANCE 8	03/14/17	MJW	19.32

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Daily Balance Tolerance Check Reports

for : L71921

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 14-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod		
NONE	BALANCE 8	14-MAR-17
GELI	BALANCE 8	14-MAR-17

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Daily Balance Tolerance Check Reports

for : L71921

Instrument: BALANCE 8

Model: GF-6100

Serial Number: 14619637

Description: 6100 g capacity top loading balance

Known Weight	Result Weight
1.00	1.00
100.00	100.00
1000.00	1000.16

Check Date: 13-MAR-17

Analyst: MJW

Weight Set Used: WTSET 2

Tolerance: 1%

Out of Range: N

Prod

NONE BALANCE 8 13-MAR-17

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ATTACHMENT 3
Data Validation Report

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GeoEngineers

Plaza 600 Building, 600 Stewart Street, Suite 1700, Seattle, WA 98101, Telephone: 206.728.2674, Fax: 206.728.2732 www.geoengineers.com

Data Validation Report

Project:	Sediment Geochronology Study, Former Mill A Site, Port of Everett
File:	0676-020-05
Date:	July 27, 2017
Lab Reports:	L71890, L71920, and L71921

This report presents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A validation (USEPA Document 540-R-08-005; USEPA 2009) of analytical data from the analyses of sediment samples obtained from the Former Mill A Site at the Port of Everett. Samples obtained were submitted to Teledyne Brown Engineering, Inc. (Teledyne) of Knoxville, Tennessee for radiochemical analysis.

The objective of the data quality assessment was to review laboratory analytical procedures and QC results to evaluate whether the samples were analyzed using well-defined and acceptable methods that provide quantitation limits below applicable regulatory criteria, the precision and accuracy of the data are well defined and sufficient to provide defensible data, and the quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

Teledyne sample data groups (SDGs; noted above) were reviewed for the following quality control (QC) elements:

- Sample Handling and Analysis System
    1. Sample Descriptors
    2. Sample Size
    3. Dates of sample collection, preparation, and analysis
    4. Preservation
    5. Sample tracking and trackability
    6. Result of measurement, uncertainty, Minimum Detectable Concentrations (MDC) and units.
- Method Blanks
- Laboratory Control Samples
- Laboratory Replicates
- Matrix Spikes/Matrix Spike Duplicates
- Tests of Detection and Unusual Uncertainty

DATA QUALITY ASSESSMENT SUMMARY

The results for each of the QC elements are summarized below. The data assessment was performed using guidance in two agency documents: USEPA Guidance for Labeling Externally Validated Laboratory analytical data for Superfund Use (USEPA 2009) and MARLAP Radiochemical Data Verification and Validation (MARLAP 2004).

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Sample Handling and Analysis System

All submitted samples were given the appropriate descriptors by the laboratory; including sample identification numbers, analytical methods, analytes, and matrix. The initial sample size and dilution factors used for all analyses were documented in each laboratory report, along with the appropriate units used for analysis. No chemical preservative was required for the analyses requested for this sampling event.

After analysis, each analytical result was appropriately linked to the instrument upon which it was analyzed and all solution standards and reference material used for inside the laboratory were traceable for verification/validation.

Lastly, the laboratory reports included the Count Time (Duration), Result of Measurement, Uncertainty, and the Minimum Detectable Concentration (MDC) for each sample and analyte of interest.

Method Blanks

The Method Blank is created internally by carrying all laboratory reagents and/or added materials used to systematically prepare a sample through the same preparation process. It establishes whether or not the target analyte is being contributed by the reagents and equipment used in the laboratory preparation process. Ideally, there will be no detected concentrations or analyte activity generated by the Method Blank alone.

Method blanks were analyzed with each batch of samples, at a frequency of one per twenty samples. For all sample batches, method blanks for were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in any of the method blanks.

Laboratory Control Samples

A Laboratory Control Sample (LCS) is essentially a blank sample of standard material which is prepared and analyzed in the same manner as each field sample. The LCS, however, is created internally by spiking the composition with a nominal concentration of the target analyte itself. Ideally, the LCS would give a 100% yield of the target radionuclides in the standard material, which is reported as the Percent Recovery (%R). Acceptance criteria for the LCS is 70% to 130%. If the target analyte %R value is within the control limits, the laboratory has demonstrated acceptable accuracy in the preparation/analysis process for the given target analyte.

The LCS, like the Method Blank should be performed once per analytical batch or every twenty field samples, whichever is more frequent. The frequency requirements were met for all analyses, and the %R values were within the proper control limits.

Laboratory Replicates

Internal laboratory replicates are used to determine preparation and analytical precision procedures. One laboratory replicate sample was analyzed along with the reviewed sample batch at a frequency of once per every 10 field samples. The replicate sample was created internally by taking 2 aliquots from the same field sample jar and analyzing for the same parameters. The relative percent difference (RPD) is used as the criteria for assessing precision, unless one or more of the samples used has a concentration greater than five times the reporting limit for that sample. In this case, the absolute difference is used instead of the RPD.

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The frequency requirements were met for all analyses, and the RPD/absolute difference values were within the proper control limits.

Matrix Spikes/Matrix Spike Duplicates

A Matrix Spike (MS) is typically an aliquant of a field sample that is spiked, like the LCS, with known concentrations of target radionuclides and subjected to the same preparation and analysis procedures as a typical sample. It is a test to establish whether or not the analytical method is appropriate for the analysis of a particular matrix; it uncovers the possible existence of recovery problems that are unseen and unplanned for by the field sampling procedures. The control limits for the MS are, for this sampling event, the same as those used for the LCS (70% to 130%).

Matrix Spike Duplicates (MSD) are used in a similar fashion as laboratory replicates, but when there are insufficient quantities of target radionuclides in the replicate sample set to provide statistically meaningful results. The MSD is primary used to generate a measurement of precision (RPD value) that is impossible to acquire from the MS alone. The MS/MSD sample sets, like the Method Blank should be performed once per analytical batch or every twenty field samples, whichever is more frequent. The frequency requirements were met for all analyses, and the %R and RPD values were within the proper control limits.

Tests of Detection and Unusual Uncertainty

In the case of radionuclides chemistry, the purpose of a test of detection is to decide if each result for a regular sample is significantly different from zero. Since most radiochemistry methods always produce a result, even if a very uncertain or negative one, some attention may be required by the chemist in order to tell with confidence whether a measured result is actually non-detected. For this sampling event, the laboratory provided a “critical value” in each report.

The laboratory met the Required Minimum Detectable Concentration (RMDC) proposed in the SAP, with some exceptions being when the target nuclides were labeled as detected by the laboratory. There were no recommendations given to the laboratory for determining a Maximum Allowable Standard Uncertainty. However, the method uncertainty values were reported by the laboratory and assessed for outliers. No statistical outliers were found.

OVERALL ASSESSMENT

As was determined by this data verification/validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the LCS, and MS/MSD %R values. Precision was acceptable, as demonstrated by the laboratory replicate, and MS/MSD RPD values. No data points were qualified for any reason. No data points were rejected. Based on this data quality review, the analytical data are of acceptable quality for their intended use.

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REFERENCES

U.S. Environmental Protection Agency (USEPA). "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

Multi-Agency Radiological Laboratory Protocols (MARLAP). "Radiochemical Data Verification and Validation". July 2004.

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