Kennedy Jenks

22 November 2019

Mr. Panjini Balaraju
Washington State Department of Ecology
PO Box 47775
Olympia, Washington 98504-7775

Subject: 2019 Long-Term Groundwater Monitoring Report
Former Strebor Property, Cleanup Site ID 2615, Facility/Site ID 34822454
Tetra Pak Vancouver
Vancouver, Washington
Ecology VCP File No. SW0377
KJ 1996007*00

Dear Mr. Balaraju:

This letter report summarizes the results of the 2019 long-term groundwater monitoring event conducted on 17 July 2019 at the former Strebor property (Site). The Site is located at 3125 Thompson Avenue in Vancouver, Washington (see Figure 1).

Investigation and cleanup activities have been conducted at the Site under the Voluntary Cleanup Program (VCP) (VCP No. SW0377) through the Washington State Department of Ecology (Ecology). The purpose of long-term groundwater monitoring at the Site is to confirm the effectiveness of the implemented remedy (impacted soil removal and engineered asphalt cap and cover) and to assess that the remedy remains protective of groundwater. Long-term groundwater monitoring was implemented in first quarter 2009 and is conducted once every 18 months.

In December 2012, Ecology determined that no further remedial action is necessary at the Site (Ecology 2012). Ecology's no further remedial action determination was based on characterization of the Site, establishment of cleanup standards, selection and implementation of the cleanup action, post cleanup institutional and engineering controls, and long-term groundwater monitoring.

Activities Conducted During Groundwater Monitoring

Activities completed during the 2019 groundwater monitoring event were conducted in accordance with the *Long Term Groundwater Monitoring Plan* (Kennedy/Jenks Consultants, Inc. 2009) and the *Opinion under WAC 173-340-515(5) on Remedial Action(s) for the Tetra Pak Hazardous Waste Site* (Ecology 2007). These activities consisted of:

- Measuring depths to groundwater on 17 July 2019 in monitoring wells MW-1, MW-2, MW-3, MW-5, MW-6, MW-7, and MW-8. Depth to groundwater measured at monitoring well MW-3 could not be converted to groundwater elevation as the casing had been modified and the current top of casing elevation was not available.

- Collecting groundwater samples from monitoring wells MW-2, MW-5, MW-6, MW-7, and MW-8 on 17 July 2019. Insufficient water was available in monitoring well MW-1 for sampling. Monitoring well MW-3 was inaccessible at the time of the sampling due to a damaged casing and no sample was collected. The groundwater samples were collected following purging the wells and stabilization of temperature, pH, conductivity, and dissolved oxygen in the purge water.
- Submitting groundwater samples to Apex Laboratories (Apex) in Tigard, Oregon, for analysis of pentachlorophenol and all isomers of tetrachlorophenol and trichlorophenol using U.S. Environmental Protection Agency (EPA) Method 8270D.
- Submitting the groundwater sample collected from MW-7 to Apex in Tigard, Oregon, for analysis of dioxins and furans by EPA Method 1613B (analysis performed by Cape Fear Analytical LLC). Analysis of dioxins/furans in samples collected from monitoring well MW-7 is performed once every 5 years.

Results

The results of groundwater level measurements are summarized in Table 1. Figure 2 is a site map with groundwater elevations for each monitoring well.

Groundwater Elevation Monitoring

Groundwater was measured at depths between 5.23 (monitoring well MW-2) and 5.38 feet (monitoring well MW-3) above mean sea level (MSL). The groundwater elevations in the monitoring wells were within 0.15 foot of each other, indicating the gradient is flat, consistent with historical groundwater gradients. For this reason, groundwater elevation contours are not plotted on Figure 2.

Groundwater Sampling Results

The groundwater analytical results from the July 2019 and previous sampling events are summarized in Table 2. A copy of the laboratory analytical report is included in Attachment A. Copies of field forms are included in Attachment B.

Based on the analytical results for the July 2019 sampling event, pentachlorophenol, tetrachlorophenol, or trichlorophenol compounds were not detected above the method detection limits in the samples collected. These compounds were also not detected in samples collected during the previous three sampling events (although monitoring well MW-1 has been dry and not sampled during these events).

The dioxin/furan Toxicity Equivalent Quotient (TEQ) in the sample collected from monitoring well MW-7 was 1.43 picograms per liter (pg/L), calculated using 2005 World Health Organization

Toxic Equivalency Factors and assuming a concentration of 0 for individual dioxins/furans not reported above the laboratory reporting limit in accordance with guidance provided in Ecology's Implementation Memo No. 13 (Ecology 2016). This TEQ is consistent with the TEQ value of 2.73 pg/L calculated for the groundwater sample collected from MW-7 in March 2012, the last monitoring event during which dioxin analysis was performed.

Data Quality

A duplicate groundwater sample (D-20190717) was collected from monitoring well MW-7 for analysis of pentachlorophenol, tetrachlorophenol, and trichlorophenol. These constituents were not detected in the primary or duplicate sample.

Kennedy/Jenks Consultants, Inc. reviewed the laboratory quality control data included with the laboratory report and found no laboratory data quality issues associated with the 17 July 2019 sampling event.

Monitoring Well MW-3 Status

Monitoring well MW-3 was originally installed as a stickup well located in a parking and truck loading area of the parking lot (Figure 2). In the past, a vehicle collided with MW-3, bending the well casing. In 2018, Tetra Pak converted MW-3 to a flush-mount well to reduce the risk of future vehicle collisions. MW-3 appears to have become damaged during the conversion, and standard groundwater sampling equipment could not access the well. Therefore, a groundwater sample was not collected from MW-3. Tetra-Pak proposes that sampling of MW-3 be discontinued due to the damaged casing. Neither pentachlorophenol nor isomers of tetrachlorophenol and trichlorophenol have been reported above laboratory reporting limits since December 2006.

Conclusion

The monitoring results indicate that the remedial actions at the Site continue to be effective at protecting groundwater quality at the Site. Ecology's 5-year review was conducted in late 2017 for the Site and concluded that "remedial actions conducted at the Site continue to be protective of the human health and the environment" (Ecology 2018). Tetra Pak requests that Ecology evaluate a reduction in sampling frequency to once every 5 years during the next 5-year review, expected to occur in 2022.

Future Sampling Activities

The next long-term groundwater monitoring event is scheduled for first quarter 2021. This event will consist of sampling monitoring wells MW-1, MW-2, MW-5, MW-6, and MW-8 for analysis of pentachlorophenol, tetrachlorophenol, and trichlorophenol by EPA Method 8270D. Sampling will not occur at monitoring well MW-3.

Please feel free to call Alice Robinson at (503) 423-4018 with any questions regarding this report.

Very truly yours,

Kennedy/Jenks Consultants, Inc.

State of Washington
3242
Licensed Geologist
Julia Schwarz
Expires 9/27/2020

Alice Robinson
Project Manager

Julia Schwarz, L.G.,
Project Geologist

Attachments:

Table 1 Summary of Groundwater Elevation Data
Table 2 Summary of Water Quality and Geochemical Parameters
Figure 1 Site Vicinity Map
Figure 2 Groundwater Elevation Map July 2019

Attachment A Laboratory Analytical Report
Attachment B Groundwater Sampling and Purge Forms

cc: Larry Price, Tetra Pak
Robert B. Lowry, Kell Alterman & Runstein, LLP

References

Kennedy/Jenks Consultants, Inc. 2009. Long Term Groundwater Monitoring Plan, Former Strebor Site. 9 January 2009.

Washington State Department of Ecology. 2007. Opinion under WAC 173-340-515(5) on Remedial Action(s) for the Tetra Pak Hazardous Waste Site. Washington State Department of Ecology. 5 April 2007.

Washington State Department of Ecology. 2012. No Further Action at the Following Site: Site Name: Tetra Pak; Site Address: 3125 Thompson Avenue, Vancouver; Facility/Site No.; 34822454; Cleanup Site ID No.: 2615; VCP Project No.: SW0377. Washington State Department of Ecology. 27 December 2012.

Washington State Department of Ecology. 2016. Implementation Memorandum No. 13: Dioxins, Furans, and Dioxin-like PCB Congeners: Ecological Risk Calculation Methodology for Upland Soil. Washington State Department of Ecology. 12 July 2016.

Washington State Department of Ecology. 2018. Periodic Review Report Draft: Tetra Pak, Facility Site ID# 34822454, Cleanup Site ID#: 2615. Washington State Department of Ecology. July 2018.

Tables

Table 1: Water Level Measurements

Well	Date	TOC Elevation (ft msl)[a]	Depth to Water (ft)[b]	Water Elevation (ft msl)[c]
MW-1	02/19/02	54.40	48.62	5.78
	02/27/02		47.73	6.67
	03/25/02		48.78	5.62
	04/18/02		43.55	10.85
	05/28/02		45.70	8.70
	08/19/02		49.45	4.95
	11/18/02		49.64	4.76
	02/25/03		48.23	6.17
	06/15/06		42.38	12.02
	07/06/06		48.27	6.13
	12/28/06		45.36	9.04
	09/23/08		DRY	DRY
	01/06/09		45.04	9.36
	04/28/09		45.01	9.39
	02/16/10		48.60	5.80
	07/13/10		47.46	6.94
	03/19/12		44.01	10.39
	09/30/13		49.50	4.90
	07/28/15		DRY	DRY
	01/31/17		47.72	6.68
	07/17/19		49.09	5.31
MW-2	10/08/01	51.44	48.10	3.34
	02/19/02		45.73	5.71
	02/27/02		44.72	6.72
	03/25/02		45.80	5.64
	04/18/02		40.55	10.89
	05/28/02		42.78	8.66
	08/19/02		46.55	4.89
	11/18/02		46.73	4.71
	02/25/03		45.32	6.12
	06/15/06		39.47	11.97
	07/06/06		45.35	6.09
	12/28/06		42.37	9.07
	09/23/08		48.04	3.40
	01/06/09		42.09	9.35
	04/28/09		42.07	9.37
	02/16/10		45.71	5.73
	07/13/10		44.56	6.88
	03/19/12		41.07	10.37
	09/30/13		46.55	4.89
	07/28/15		47.22	4.22
	01/31/17		44.82	6.62
	07/17/19		46.21	5.23
MW-3	10/08/01	53.38	50.28	3.10
	02/19/02		47.53	5.85
	02/27/02		46.70	6.68
	03/25/02		47.79	5.59
	04/18/02		42.78	10.60
	05/28/02		44.68	8.70
	08/19/02		48.43	4.95
	11/18/02		48.63	4.75

Table 1: Water Level Measurements

Well	Date	TOC Elevation (ft msl)[a]	Depth to Water (ft)[b]	Water Elevation (ft msl)[c]
MW-3 (cont)	02/24/03		47.23	6.15
	06/15/06		41.32	12.06
	07/06/06		47.28	6.10
	12/28/06		44.37	9.01
	09/23/08		49.97	3.41
	01/06/09		44.01	9.37
	04/28/09		43.99	9.39
	02/16/10		47.61	5.77
	07/13/10		46.45	6.93
	03/19/12		43.00	10.38
	09/30/13		48.49	4.89
	07/28/15		49.10	4.28
	01/31/17		46.43	6.95
	07/17/19		NM	NM
MW-5	10/08/01	51.17	48.05	3.12
	02/19/02		45.52	5.65
	02/27/02		44.42	6.75
	03/25/02		45.50	5.67
	04/18/02		40.24	10.93
	05/28/02		42.46	8.71
	08/19/02		46.25	4.92
	11/18/02		46.42	4.75
	02/25/03		45.02	6.15
	06/15/06		39.19	11.98
	07/06/06		45.02	6.15
	12/28/06		42.07	9.10
	09/23/08		47.75	3.42
	01/06/09		41.76	9.41
	04/28/09		41.74	9.43
	02/16/10		45.39	5.78
	07/13/10		44.26	6.91
	03/19/12		40.77	10.40
	09/30/13		46.28	4.89
	07/28/15		46.80	4.37
	01/31/17		44.52	6.65
	07/17/19		45.90	5.27
MW-6	04/18/02	49.94	38.92	11.02
	05/28/02		41.45	8.49
	08/19/02		44.92	5.02
	11/18/02		45.10	4.84
	02/24/03		43.73	6.21
	06/15/06		37.78	12.16
	07/06/06		43.75	6.19
	12/28/06		40.81	9.13
	09/23/08		46.44	3.50
	01/06/09		40.50	9.44
	04/28/09		40.44	9.50
	02/16/10		45.05	4.89
	07/13/10		42.91	7.03
	03/19/12		39.55	10.39
	09/30/13		44.96	4.98
	07/28/15		45.60	4.34
	01/31/17		43.17	6.77
	07/17/19		44.57	5.37

Table 1: Water Level Measurements

Well	Date	TOC Elevation (ft msl)[a]	Depth to Water (ft)[b]	Water Elevation (ft msl)[c]
MW-7	08/07/02	49.76	44.39	5.37
	08/19/02		44.80	4.96
	11/18/02		44.97	4.79
	02/25/03		43.55	6.21
	09/23/08		46.31	3.45
	01/06/09		40.31	9.45
	04/28/09		40.28	9.48
	02/16/10		43.95	5.81
	07/13/10		42.77	6.99
	03/19/12		39.29	10.47
	09/30/13		44.84	4.92
	07/28/15		NM[d]	NM
	01/31/17		NM	NM
	07/17/19		44.41	5.35
MW-8	02/25/03	48.42	42.18	6.24
	06/15/06		36.35	12.07
	07/06/06		42.22	6.20
	12/28/06		39.32	9.10
	09/23/08		44.95	3.47
	01/06/09		38.98	9.44
	04/28/09		38.96	9.46
	02/16/10		42.64	5.78
	07/13/10		41.40	7.02
	03/19/12		37.96	10.46
	09/30/13		43.45	4.97
	07/28/15		44.10	4.32
	01/31/17		41.68	6.74
	07/17/19		43.04	5.38

Notes:

(a) Top of casing (TOC) elevations reported in feet (ft) above mean sea level (msl).
(b) Depth to water measured in feet below TOC.
(c) Water elevation calculated as the difference between the TOC elevation and the depth to water.
(d) NM = Not measured

Table 2: Summary of SVOC Groundwater Analytical Results

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Monitoring Well Number	Date Sampled	Semivolatile Organic Compounds (µg/l)[a,b] Pentachlorophenol µg/l	2,3,4,6 Tetrachlorophenol µg/l	2,3,5,6 Tetrachlorophenol µg/l	2,4,5 Trichlorophenol µg/l	2,4,6 Trichlorophenol µg/l	1,2,3,4,6,7,8-HpCDD pg/L	1,2,3,4,6,7,8,9-OCDD pg/L	1,2,3,4,6,7,8-HpCDF pg/L	1,2,3,4,7,8,9-HpCDF pg/L	1,2,3,4,7,8-HxCDD pg/L
MW-1	04/19/02	<0.8[c]	NA[d]	NA	NA	NA	-	-	-	-	-
	08/21/02	**1.48**	NA	NA	<0.8	<0.8	-	-	-	-	-
	11/19/02	**1.67**	NA	NA	<1.6	<1.6	-	-	-	-	-
	02/25/03	<0.19	NA	NA	<0.19	<0.19	-	-	-	-	-
	07/06/06	**1.2**	<0.10	**0.078 J**[e]	<0.051	<0.083	-	-	-	-	-
	12/28/06	0.68	**0.033 J**	**0.044 J**	<0.0083	<0.0097	-	-	-	-	-
	01/06/09	<0.33	<0.33	<0.19	<0.19	<0.29	-	-	-	-	-
	04/28/09	<0.36	<0.36	<0.20	<0.20	<0.30	-	-	-	-	-
	07/13/10	**0.78 B / 1.3 B**[f, g]	**0.046 J / 0.071 J**	**0.019 J / 0.034 J**	<0.0094 / <0.010	<0.013 / <0.014	-	-	-	-	-
	03/19/12	<0.943	<0.377	<0.377	<0.472	<0.472	-	-	-	-	-
	09/30/13	NS[h]	NS	NS	NS	NS	-	-	-	-	-
	07/28/15	NS	NS	NS	NS	NS	-	-	-	-	-
	01/31/17	NS	NS	NS	NS	NS	-	-	-	-	-
	07/17/19	NS	NS	NS	NS	NS	-	-	-	-	-
MW-2	04/18/02	<0.8	NA	NA	NA	NA	-	-	-	-	-
	08/21/02	<0.8	NA	NA	<0.8	<0.8	-	-	-	-	-
	11/19/02	<0.8	NA	NA	<0.8	<0.8	-	-	-	-	-
	02/25/03	<0.19	NA	NA	<0.19	<0.19	-	-	-	-	-
	07/06/06	<0.11	<0.11	<0.056	<0.055	<0.089	-	-	-	-	-
	12/28/06	**0.15 J**	<0.0089	<0.019	<0.0091	<0.011	-	-	-	-	-
	01/06/09	<0.33	<0.33	<0.19	<0.19	<0.29	-	-	-	-	-
	07/13/10	**0.055 J B**	<0.0083	<0.012	<0.0096	<0.014	-	-	-	-	-
	03/19/12	<0.935	<0.374	<0.374	<0.467	<0.467	-	-	-	-	-
	09/30/13	<0.472	<0.189	<0.189	<0.189	<0.189	-	-	-	-	-
	07/28/15	<0.476	<0.190	<0.190	<0.190	<0.190	-	-	-	-	-
	01/31/17	<0.200	<0.100	<0.100	<0.100	<0.100	-	-	-	-	-
	07/17/19	<0.0943	<0.0472	<0.0472	<0.0472	<0.0472	-	-	-	-	-
MW-3	04/18/02	<0.8	NA	NA	NA	NA	-	-	-	-	-
	08/20/02	<0.8	NA	NA	<0.8	<0.8	-	-	-	-	-
	11/18/02	<0.8	NA	NA	<1.6	<1.6	-	-	-	-	-
	02/24/03	**0.254**	NA	NA	<0.189	<0.189	-	-	-	-	-
	07/06/06	<0.11	<0.11	<0.055	<0.054	<0.087	-	-	-	-	-
	12/28/06	**0.13 J**	<0.0081	<0.018	<0.0083	<0.0098	-	-	-	-	-
	01/06/09	<0.34	<0.34	<0.19	<0.19	<0.29	-	-	-	-	-
	07/13/10	<0.011	<0.0083	<0.012	<0.0096	<0.014	-	-	-	-	-
	03/19/12	<0.943	<0.377	<0.377	<0.472	<0.472	-	-	-	-	-
	09/30/13	<0.472/<0.476[f]	<0.189/<0.190	<0.189/<0.190	<0.189/<0.190	<0.189/<0.190	-	-	-	-	-
	07/28/15	<0.476	<0.190	<0.190	<0.190	<0.190	-	-	-	-	-
	01/31/17	<0.190	<0.0952	<0.0952	<0.0952	<0.0952	-	-	-	-	-
	07/17/19	NS	NS	NS	NS	NS	-	-	-	-	-
MW-5	04/19/02	<0.8	NA	NA	NA	NA	-	-	-	-	-
	08/21/02	<0.8	NA	NA	<0.8	<0.8	-	-	-	-	-
	11/19/02	<0.8	NA	NA	<1.6	<1.6	-	-	-	-	-
	02/25/03	<0.189	NA	NA	<0.189	<0.189	-	-	-	-	-
	07/06/06	<0.11	<0.11	<0.053	<0.052	<0.083	-	-	-	-	-
	12/28/06	<0.013	<0.0081	<0.018	<0.0083	<0.0098	-	-	-	-	-
	01/06/09	<0.33	<0.33	<0.19	<0.19	<0.29	-	-	-	-	-
	07/13/10	<0.011	<0.0082	<0.012	<0.0094	<0.013	-	-	-	-	-
	03/19/12	<0.935/<0.935[f]	<0.374/<0.374	<0.374/<0.374	<0.467/<0.467	<0.467/<0.467	-	-	-	-	-
	09/30/13	<0.472	<0.189	<0.189	<0.189	<0.189	-	-	-	-	-
	07/28/15	<0.476	<0.190	<0.190	<0.190	<0.190	-	-	-	-	-
	01/31/17	<0.204/<0.202(f)	<0.102/<0.101	<0.102/<0.101	<0.102/<0.101	<0.102/<0.101	-	-	-	-	-
	07/17/19	<0.115	<0.0575	<0.0575	<0.0575	<0.0575	-	-	-	-	-

Table 2: Summary of SVOC Groundwater Analytical Results

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Monitoring Well Number	Date Sampled	Semivolatile Organic Compounds (µg/l)[a,b] Pentachlorophenol µg/l	2,3,4,6 Tetrachlorophenol µg/l	2,3,5,6 Tetrachlorophenol µg/l	2,4,5 Trichlorophenol µg/l	2,4,6 Trichlorophenol µg/l	1,2,3,4,6,7,8-HpCDD pg/L	1,2,3,4,6,7,8,9-OCDD pg/L	1,2,3,4,6,7,8-HpCDF pg/L	1,2,3,4,7,8,9-HpCDF pg/L	1,2,3,4,7,8-HxCDD pg/L
MW-6	04/18/02	<0.8	NA	NA	NA	NA	-	-	-	-	-
	08/20/02	<0.813	NA	NA	<0.813	<0.813	-	-	-	-	-
	11/18/02	<0.8	NA	NA	<1.6	<1.6	-	-	-	-	-
	02/24/03	<0.19	NA	NA	<0.19	<0.19	-	-	-	-	-
	07/06/06	**0.16 J**	<0.12	<0.059	<0.058	<0.092	-	-	-	-	-
	12/28/06	**0.21 J**	<0.0083	<0.018	<0.0085	<0.01	-	-	-	-	-
	01/06/09	<0.33	<0.33	<0.19	<0.19	<0.29	-	-	-	-	-
	07/13/10	**0.074 J B**	<0.0082	<0.012	<0.0094	<0.013	-	-	-	-	-
	03/19/12	<0.935	<0.374	<0.374	<0.472	<0.472	-	-	-	-	-
	09/30/13	<0.472	<0.189	<0.189	<0.189	<0.189	-	-	-	-	-
	07/28/15	<0.476	<0.190	<0.190	<0.190	<0.190	-	-	-	-	-
	01/31/17	<0.200	<0.100	<0.100	<0.100	<0.100	-	-	-	-	-
	07/17/19	<0.128	<0.0641	<0.0641	<0.0641	<0.0641	-	-	-	-	-
MW-7	08/07/02	**0.412 J**	NA	NA	<0.8	<0.8	-	-	-	-	-
	08/20/02	**0.347 J**	NA	NA	<0.8	<0.8	-	-	-	-	-
	11/19/02	**7.58**	NA	NA	<1.6	<1.6	-	-	-	-	-
	02/25/03	<0.191	NA	NA	<0.191	<0.191	-	-	-	-	-
	01/06/09	<0.34	<0.34	<0.19	<0.19	<0.29	-	-	-	-	-
	09/30/13	<0.481	<0.192	<0.192	<0.192	<0.192	**185**	**2830**	<47.9	<47.9	<47.9
	07/17/19	<0.103/<0.105	<0.0515/<0.0526	<0.0515/<0.0526	<0.0515/<0.0526	<0.0515/<0.0526	**72.1**	**1440**	**12.0 JK**	<2.07	<1.29
MW-8	02/25/03	<0.189	NA	NA	<0.189	<0.189	-	-	-	-	-
	07/06/06	<0.11	<0.11	<0.055	<0.054	<0.087	-	-	-	-	-
	12/28/06	**0.16 J**	<0.0081	<0.018	<0.0083	<0.0098	-	-	-	-	-
	01/06/09	<0.34	<0.34	<0.19	<0.19	<0.29	-	-	-	-	-
	07/13/10	<0.011	<0.0083	<0.012	<0.0096	<0.014	-	-	-	-	-
	03/19/12	<0.935	<0.374	<0.374	<0.472	<0.472	-	-	-	-	-
	09/30/13	<0.476	<0.190	<0.190	<0.190	<0.190	-	-	-	-	-
	07/28/15	<0.476/<0.476[f]	<0.190/<0.190	<0.190/<0.190	<0.190/<0.190	<0.190/<0.190	-	-	-	-	-
	01/31/17	<0.227	<0.114	<0.114	<0.114	<0.114	-	-	-	-	-
	07/17/19	<0.0943	<0.0472	<0.0472	<0.0472	<0.0472	-	-	-	-	-
MTCA Method B Cleanup Level[i]		0.22	NL[j]	NL	NL	4	NL	NL	NL	NL	NL

Monitoring Well Number	Date Sampled	1,2,3,4,7,8-HxCDF pg/L	1,2,3,6,7,8-HxCDD pg/L	1,2,3,6,7,8-HxCDF pg/L	1,2,3,7,8,9-HxCDD pg/L	1,2,3,7,8,9-HxCDF pg/L	1,2,3,7,8-PeCDD pg/L	1,2,3,7,8-PeCDF pg/L	2,3,4,6,7,8-HxCDF pg/L	2,3,4,7,8-PeCDF pg/L	2,3,7,8-TCDD pg/L	2,3,7,8-TCDF pg/L	1,2,3,4,6,7,8,9-OCDF pg/L	TEQ
MW-1	04/19/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/21/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/19/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	02/25/03	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/06/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/28/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/06/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	04/28/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/13/10	-	-	-	-	-	-	-	-	-	-	-	-	-
	03/19/12	-	-	-	-	-	-	-	-	-	-	-	-	-
	09/30/13	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/28/15	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/31/17	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/17/19	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-2	04/18/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/21/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/19/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	02/25/03	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/06/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/28/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/06/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/13/10	-	-	-	-	-	-	-	-	-	-	-	-	-
	03/19/12	-	-	-	-	-	-	-	-	-	-	-	-	-
	09/30/13	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/28/15	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/31/17	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/17/19	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-3	04/18/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/20/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/18/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	02/24/03	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/06/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/28/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/06/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/13/10	-	-	-	-	-	-	-	-	-	-	-	-	-
	03/19/12	-	-	-	-	-	-	-	-	-	-	-	-	-
	09/30/13	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/28/15	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/31/17	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/17/19	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-5	04/19/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/21/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/19/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	02/25/03	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/06/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/28/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/06/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/13/10	-	-	-	-	-	-	-	-	-	-	-	-	-
	03/19/12	-	-	-	-	-	-	-	-	-	-	-	-	-
	09/30/13	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/28/15	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/31/17	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/17/19	-	-	-	-	-	-	-	-	-	-	-	-	-

Monitoring Well Number	Date Sampled	1,2,3,4,7,8-HxCDF pg/L	1,2,3,6,7,8-HxCDD pg/L	1,2,3,6,7,8-HxCDF pg/L	1,2,3,7,8,9-HxCDD pg/L	1,2,3,7,8,9-HxCDF pg/L	1,2,3,7,8-PeCDD pg/L	1,2,3,7,8-PeCDF pg/L	2,3,4,6,7,8-HxCDF pg/L	2,3,4,7,8-PeCDF pg/L	2,3,7,8-TCDD pg/L	2,3,7,8-TCDF pg/L	1,2,3,4,6,7,8,9-OCDF pg/L	TEQ
MW-6	04/18/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/20/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/18/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	02/24/03	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/06/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/28/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/06/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/13/10	-	-	-	-	-	-	-	-	-	-	-	-	-
	03/19/12	-	-	-	-	-	-	-	-	-	-	-	-	-
	09/30/13	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/28/15	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/31/17	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/17/19	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-7	08/07/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	08/20/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	11/19/02	-	-	-	-	-	-	-	-	-	-	-	-	-
	02/25/03	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/06/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	09/30/13	<47.9	<47.9	<47.9	<47.9	<47.9	<47.9	<47.9	<47.9	<47.9	<9.57	<9.57	**101**	**2.73**
	07/17/19	<1.39	**1.40 JK**	<1.34	<1.24	<1.85	<0.996	<0.879	<1.39	<0.797	<1.09	<1.53	**48.3 J**	**1.43**
MW-8	02/25/03	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/06/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	12/28/06	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/06/09	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/13/10	-	-	-	-	-	-	-	-	-	-	-	-	-
	03/19/12	-	-	-	-	-	-	-	-	-	-	-	-	-
	09/30/13	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/28/15	-	-	-	-	-	-	-	-	-	-	-	-	-
	01/31/17	-	-	-	-	-	-	-	-	-	-	-	-	-
	07/17/19	-	-	-	-	-	-	-	-	-	-	-	-	-
MTCA Method B Cleanup Level[(i)]		NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL

Notes:

(a) Results are reported in micrograms per liter (µg/l).

(b) Samples were analyzed for selected semivolatile organic compounds by US Environmental Protection Agency (EPA) Method 8270D.

(c) "<" denotes analyte was not detected above the indicated detection limit.

(d) NA = not analyzed

(e) J denotes positively identified, but numerical value is an estimated quantity.

(f) Second value is result from a field duplicate sample.

(g) B = pentachlorophenol identified in the laboratory blank sample at an estimated concentration of 0.0735 µg/l.

(h) NS = Not sampled, insufficient water available for sampling

(i) Model Toxics Control Act (MTCA) Method B Groundwater CLARC (dated July 2015), the pentachlorophenal Method B cleanup level prior to 2011 was 0.729 µg/l.

(j) NL = Not listed in the CLARC Information System

(k) K denotes estimated maximum possible concentration

(l) J denotes estimated value below laboratory reporting limit.

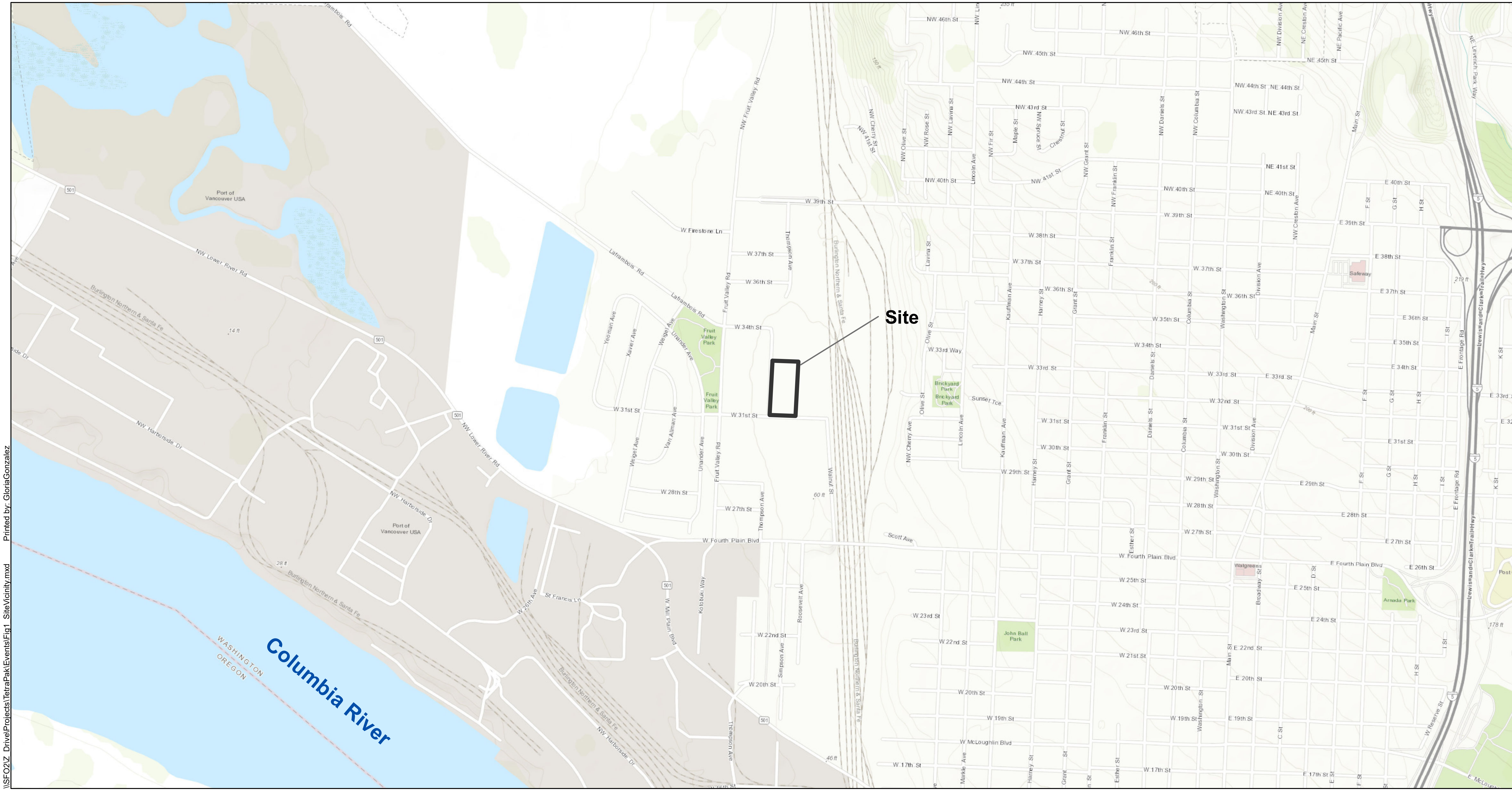
(m) Dioxin concentrations are reported in picograms per liter (pg/L)

Bold values indicate analyte was detected above the indicated laboratory detection limit.

Highlighted values indicate detection above MTCA Method B screening value.

Figures

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Legend

Property Boundary

N

0 500 1,000

Scale: Feet

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Notes
1. All locations are approximate

Kennedy/Jenks Consultants

Tetra Pak Materials LP
Vancouver, Washington
1996007*00

Figure 1
Site Vicinity Map

October 2019

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

\\SFO2\Z_Drive\Projects\TetraPak\Events\Fig2_GWElevations.mxd Printed by: GloriaGonzalez

Legend

MW-5 / 5.27 — Monitoring Well ID; Groundwater Elevation (ft msl)

NM — Not Measured

Notes
1. All locations are approximate

N

0 25 50

Scale: Feet

Kennedy/Jenks Consultants

Tetra Pak Materials LP
Vancouver, Washington
1996007*00

Figure 2
Groundwater Elevations
July 17, 2019

October 2019

Attachment A

Laboratory Analytical Report

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Tuesday, August 13, 2019

Alice Robinson
Kennedy Jenks
421 SW 6th Avenue Suite 1000
Portland, OR 97204

RE: A9G0598 - Tetra Pak - Tetra Pak

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9G0598, which was received by the laboratory on 7/18/2019 at 11:02:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	1.4 degC	Cooler #2	0.7 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-6-20190717	A9G0598-01	Water	07/17/19 12:25	07/18/19 11:02
MW-8-20190717	A9G0598-02	Water	07/17/19 13:45	07/18/19 11:02
MW-7-20190717	A9G0598-03	Water	07/17/19 14:20	07/18/19 11:02
MW-2-20190717	A9G0598-04	Water	07/17/19 15:16	07/18/19 11:02
MW-5-20190717	A9G0598-05	Water	07/17/19 16:00	07/18/19 11:02
D-20190717	A9G0598-06	Water	07/17/19 14:20	07/18/19 11:02

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503-718-2323
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Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

ANALYTICAL CASE NARRATIVE

Work Order: A9G0598

Subcontract

This report is not complete without the attached subcontract laboratory report for Dioxins from Cape Fear.

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-6-20190717 (A9G0598-01RE1)				**Matrix: Water**		**Batch: 9071219**		
Pentachlorophenol (PCP)	ND	0.128	0.256	ug/L	1	07/24/19 16:35	EPA 8270D	
2,3,4,6-Tetrachlorophenol	ND	0.0641	0.128	ug/L	1	07/24/19 16:35	EPA 8270D	
2,3,5,6-Tetrachlorophenol	ND	0.0641	0.128	ug/L	1	07/24/19 16:35	EPA 8270D	
2,4,5-Trichlorophenol	ND	0.0641	0.128	ug/L	1	07/24/19 16:35	EPA 8270D	
2,4,6-Trichlorophenol	ND	0.0641	0.128	ug/L	1	07/24/19 16:35	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*54 %*	*Limits: 44-120 %*	*1*	*07/24/19 16:35*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*55 %*	*44-120 %*	*1*	*07/24/19 16:35*	*EPA 8270D*	
Phenol-d6 (Surr)			*18 %*	*10-120 %*	*1*	*07/24/19 16:35*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*70 %*	*50-133 %*	*1*	*07/24/19 16:35*	*EPA 8270D*	
2-Fluorophenol (Surr)			*30 %*	*19-120 %*	*1*	*07/24/19 16:35*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*86 %*	*43-140 %*	*1*	*07/24/19 16:35*	*EPA 8270D*	
MW-8-20190717 (A9G0598-02)				**Matrix: Water**		**Batch: 9071163**		
Pentachlorophenol (PCP)	ND	0.0943	0.189	ug/L	1	07/23/19 15:58	EPA 8270D	
2,3,4,6-Tetrachlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 15:58	EPA 8270D	
2,3,5,6-Tetrachlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 15:58	EPA 8270D	
2,4,5-Trichlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 15:58	EPA 8270D	
2,4,6-Trichlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 15:58	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*50 %*	*Limits: 44-120 %*	*1*	*07/23/19 15:58*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*52 %*	*44-120 %*	*1*	*07/23/19 15:58*	*EPA 8270D*	
Phenol-d6 (Surr)			*16 %*	*10-120 %*	*1*	*07/23/19 15:58*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*75 %*	*50-133 %*	*1*	*07/23/19 15:58*	*EPA 8270D*	
2-Fluorophenol (Surr)			*25 %*	*19-120 %*	*1*	*07/23/19 15:58*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*90 %*	*43-140 %*	*1*	*07/23/19 15:58*	*EPA 8270D*	
MW-7-20190717 (A9G0598-03RE1)				**Matrix: Water**		**Batch: 9071163**		
Pentachlorophenol (PCP)	ND	0.103	0.206	ug/L	1	07/23/19 18:23	EPA 8270D	
2,3,4,6-Tetrachlorophenol	ND	0.0515	0.103	ug/L	1	07/23/19 18:23	EPA 8270D	
2,3,5,6-Tetrachlorophenol	ND	0.0515	0.103	ug/L	1	07/23/19 18:23	EPA 8270D	
2,4,5-Trichlorophenol	ND	0.0515	0.103	ug/L	1	07/23/19 18:23	EPA 8270D	
2,4,6-Trichlorophenol	ND	0.0515	0.103	ug/L	1	07/23/19 18:23	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*79 %*	*Limits: 44-120 %*	*1*	*07/23/19 18:23*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*71 %*	*44-120 %*	*1*	*07/23/19 18:23*	*EPA 8270D*	
Phenol-d6 (Surr)			*21 %*	*10-120 %*	*1*	*07/23/19 18:23*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*68 %*	*50-133 %*	*1*	*07/23/19 18:23*	*EPA 8270D*	
2-Fluorophenol (Surr)			*35 %*	*19-120 %*	*1*	*07/23/19 18:23*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*90 %*	*43-140 %*	*1*	*07/23/19 18:23*	*EPA 8270D*	

Apex Laboratories

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-2-20190717 (A9G0598-04)				**Matrix: Water**		**Batch: 9071163**		
Pentachlorophenol (PCP)	ND	0.0943	0.189	ug/L	1	07/23/19 16:35	EPA 8270D	
2,3,4,6-Tetrachlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 16:35	EPA 8270D	
2,3,5,6-Tetrachlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 16:35	EPA 8270D	
2,4,5-Trichlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 16:35	EPA 8270D	
2,4,6-Trichlorophenol	ND	0.0472	0.0943	ug/L	1	07/23/19 16:35	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*57 %*	*Limits: 44-120 %*	*1*	*07/23/19 16:35*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*55 %*	*44-120 %*	*1*	*07/23/19 16:35*	*EPA 8270D*	
Phenol-d6 (Surr)			*18 %*	*10-120 %*	*1*	*07/23/19 16:35*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*70 %*	*50-133 %*	*1*	*07/23/19 16:35*	*EPA 8270D*	
2-Fluorophenol (Surr)			*30 %*	*19-120 %*	*1*	*07/23/19 16:35*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*91 %*	*43-140 %*	*1*	*07/23/19 16:35*	*EPA 8270D*	
MW-5-20190717 (A9G0598-05)				**Matrix: Water**		**Batch: 9071163**		
Pentachlorophenol (PCP)	ND	0.115	0.230	ug/L	1	07/23/19 17:11	EPA 8270D	
2,3,4,6-Tetrachlorophenol	ND	0.0575	0.115	ug/L	1	07/23/19 17:11	EPA 8270D	
2,3,5,6-Tetrachlorophenol	ND	0.0575	0.115	ug/L	1	07/23/19 17:11	EPA 8270D	
2,4,5-Trichlorophenol	ND	0.0575	0.115	ug/L	1	07/23/19 17:11	EPA 8270D	
2,4,6-Trichlorophenol	ND	0.0575	0.115	ug/L	1	07/23/19 17:11	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*64 %*	*Limits: 44-120 %*	*1*	*07/23/19 17:11*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*62 %*	*44-120 %*	*1*	*07/23/19 17:11*	*EPA 8270D*	
Phenol-d6 (Surr)			*23 %*	*10-120 %*	*1*	*07/23/19 17:11*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*75 %*	*50-133 %*	*1*	*07/23/19 17:11*	*EPA 8270D*	
2-Fluorophenol (Surr)			*36 %*	*19-120 %*	*1*	*07/23/19 17:11*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*96 %*	*43-140 %*	*1*	*07/23/19 17:11*	*EPA 8270D*	
D-20190717 (A9G0598-06)				**Matrix: Water**		**Batch: 9071163**		
Pentachlorophenol (PCP)	ND	0.105	0.211	ug/L	1	07/23/19 17:47	EPA 8270D	
2,3,4,6-Tetrachlorophenol	ND	0.0526	0.105	ug/L	1	07/23/19 17:47	EPA 8270D	
2,3,5,6-Tetrachlorophenol	ND	0.0526	0.105	ug/L	1	07/23/19 17:47	EPA 8270D	
2,4,5-Trichlorophenol	ND	0.0526	0.105	ug/L	1	07/23/19 17:47	EPA 8270D	
2,4,6-Trichlorophenol	ND	0.0526	0.105	ug/L	1	07/23/19 17:47	EPA 8270D	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*56 %*	*Limits: 44-120 %*	*1*	*07/23/19 17:47*	*EPA 8270D*	
2-Fluorobiphenyl (Surr)			*57 %*	*44-120 %*	*1*	*07/23/19 17:47*	*EPA 8270D*	
Phenol-d6 (Surr)			*17 %*	*10-120 %*	*1*	*07/23/19 17:47*	*EPA 8270D*	
p-Terphenyl-d14 (Surr)			*76 %*	*50-133 %*	*1*	*07/23/19 17:47*	*EPA 8270D*	
2-Fluorophenol (Surr)			*28 %*	*19-120 %*	*1*	*07/23/19 17:47*	*EPA 8270D*	
2,4,6-Tribromophenol (Surr)			*93 %*	*43-140 %*	*1*	*07/23/19 17:47*	*EPA 8270D*	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9071163 - EPA 3510C (Acid Extraction)									**Water**			
Blank (9071163-BLK2)		Prepared: 07/23/19 06:57		Analyzed: 07/23/19 12:55								
EPA 8270D												
Pentachlorophenol (PCP)	ND	0.0909	0.182	ug/L	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,3,5,6-Tetrachlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.0455	0.0909	ug/L	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)		*Recovery: 91 %*		*Limits: 44-120 %*				*Dilution: 1x*				
2-Fluorobiphenyl (Surr)		*83 %*		*44-120 %*				*"*				
Phenol-d6 (Surr)		*33 %*		*10-120 %*				*"*				
p-Terphenyl-d14 (Surr)		*94 %*		*50-133 %*				*"*				
2-Fluorophenol (Surr)		*52 %*		*19-120 %*				*"*				
2,4,6-Tribromophenol (Surr)		*101 %*		*43-140 %*				*"*				
LCS (9071163-BS2)		Prepared: 07/23/19 06:57		Analyzed: 07/23/19 13:31								
EPA 8270D												
Pentachlorophenol (PCP)	3.62	0.400	0.800	ug/L	4	4.00	---	90	35 - 138%	---	---	
2,3,4,6-Tetrachlorophenol	3.55	0.200	0.400	ug/L	4	4.00	---	89	50 - 128%	---	---	
2,3,5,6-Tetrachlorophenol	3.45	0.200	0.400	ug/L	4	4.00	---	86	50 - 121%	---	---	
2,4,5-Trichlorophenol	3.55	0.200	0.400	ug/L	4	4.00	---	89	53 - 123%	---	---	
2,4,6-Trichlorophenol	3.36	0.200	0.400	ug/L	4	4.00	---	84	50 - 125%	---	---	
Surr: Nitrobenzene-d5 (Surr)		*Recovery: 69 %*		*Limits: 44-120 %*				*Dilution: 4x*				
2-Fluorobiphenyl (Surr)		*77 %*		*44-120 %*				*"*				
Phenol-d6 (Surr)		*26 %*		*10-120 %*				*"*				
p-Terphenyl-d14 (Surr)		*91 %*		*50-133 %*				*"*				
2-Fluorophenol (Surr)		*43 %*		*19-120 %*				*"*				
2,4,6-Tribromophenol (Surr)		*93 %*		*43-140 %*				*"*				
LCS Dup (9071163-BSD2)		Prepared: 07/23/19 06:57		Analyzed: 07/23/19 14:08								**Q-19**
EPA 8270D												
Pentachlorophenol (PCP)	3.62	0.400	0.800	ug/L	4	4.00	---	90	35 - 138%	0.04	30%	
2,3,4,6-Tetrachlorophenol	3.45	0.200	0.400	ug/L	4	4.00	---	86	50 - 128%	3	30%	
2,3,5,6-Tetrachlorophenol	3.36	0.200	0.400	ug/L	4	4.00	---	84	50 - 121%	2	30%	
2,4,5-Trichlorophenol	3.39	0.200	0.400	ug/L	4	4.00	---	85	53 - 123%	5	30%	
2,4,6-Trichlorophenol	3.34	0.200	0.400	ug/L	4	4.00	---	84	50 - 125%	0.5	30%	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9071163 - EPA 3510C (Acid Extraction)												**Water**
LCS Dup (9071163-BSD2)			Prepared: 07/23/19 06:57 Analyzed: 07/23/19 14:08									**Q-19**
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 70 %*	*Limits: 44-120 %*	*Dilution: 4x*							
2-Fluorobiphenyl (Surr)			*77 %*	*44-120 %*	*"*							
Phenol-d6 (Surr)			*25 %*	*10-120 %*	*"*							
p-Terphenyl-d14 (Surr)			*87 %*	*50-133 %*	*"*							
2-Fluorophenol (Surr)			*41 %*	*19-120 %*	*"*							
2,4,6-Tribromophenol (Surr)			*89 %*	*43-140 %*	*"*							

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Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9071219 - EPA 3510C (Acid Extraction)									Water			
Blank (9071219-BLK1)			Prepared: 07/24/19 10:10		Analyzed: 07/24/19 14:46							
EPA 8270D												
Pentachlorophenol (PCP)	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,3,5,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 55 %*		*Limits: 44-120 %*			*Dilution: 1x*				
2-Fluorobiphenyl (Surr)			*56 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*21 %*		*10-120 %*			*"*				
p-Terphenyl-d14 (Surr)			*78 %*		*50-133 %*			*"*				
2-Fluorophenol (Surr)			*35 %*		*19-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*74 %*		*43-140 %*			*"*				
LCS (9071219-BS1)			Prepared: 07/24/19 10:10		Analyzed: 07/24/19 15:22							
EPA 8270D												
Pentachlorophenol (PCP)	3.42	0.400	0.800	ug/L	4	4.00	---	86	35 - 138%	---	---	
2,3,4,6-Tetrachlorophenol	3.47	0.200	0.400	ug/L	4	4.00	---	87	50 - 128%	---	---	
2,3,5,6-Tetrachlorophenol	3.41	0.200	0.400	ug/L	4	4.00	---	85	50 - 121%	---	---	
2,4,5-Trichlorophenol	3.69	0.200	0.400	ug/L	4	4.00	---	92	53 - 123%	---	---	
2,4,6-Trichlorophenol	3.51	0.200	0.400	ug/L	4	4.00	---	88	50 - 125%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 72 %*		*Limits: 44-120 %*			*Dilution: 4x*				
2-Fluorobiphenyl (Surr)			*82 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*26 %*		*10-120 %*			*"*				
p-Terphenyl-d14 (Surr)			*88 %*		*50-133 %*			*"*				
2-Fluorophenol (Surr)			*43 %*		*19-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*93 %*		*43-140 %*			*"*				
LCS Dup (9071219-BSD1)			Prepared: 07/24/19 10:10		Analyzed: 07/24/19 15:58							**Q-19**
EPA 8270D												
Pentachlorophenol (PCP)	3.42	0.400	0.800	ug/L	4	4.00	---	86	35 - 138%	0.06	30%	
2,3,4,6-Tetrachlorophenol	3.43	0.200	0.400	ug/L	4	4.00	---	86	50 - 128%	1	30%	
2,3,5,6-Tetrachlorophenol	3.44	0.200	0.400	ug/L	4	4.00	---	86	50 - 121%	0.8	30%	
2,4,5-Trichlorophenol	3.56	0.200	0.400	ug/L	4	4.00	---	89	53 - 123%	3	30%	
2,4,6-Trichlorophenol	3.41	0.200	0.400	ug/L	4	4.00	---	85	50 - 125%	3	30%	

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Lisa Domenighini, Client Services Manager

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EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9071219 - EPA 3510C (Acid Extraction)												**Water**
LCS Dup (9071219-BSD1)			Prepared: 07/24/19 10:10 Analyzed: 07/24/19 15:58									**Q-19**
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 67 %*	*Limits: 44-120 %*	*Dilution: 4x*							
2-Fluorobiphenyl (Surr)			*76 %*	*44-120 %*	*"*							
Phenol-d6 (Surr)			*25 %*	*10-120 %*	*"*							
p-Terphenyl-d14 (Surr)			*85 %*	*50-133 %*	*"*							
2-Fluorophenol (Surr)			*41 %*	*19-120 %*	*"*							
2,4,6-Tribromophenol (Surr)			*86 %*	*43-140 %*	*"*							

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421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

SAMPLE PREPARATION INFORMATION

Semivolatile Organic Compounds by EPA 8270D

Prep: EPA 3510C (Acid Extraction)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9071163							
A9G0598-02	Water	EPA 8270D	07/17/19 13:45	07/23/19 10:01	1060mL/1mL	1000mL/1mL	0.94
A9G0598-03RE1	Water	EPA 8270D	07/17/19 14:20	07/23/19 10:01	970mL/1mL	1000mL/1mL	1.03
A9G0598-04	Water	EPA 8270D	07/17/19 15:16	07/23/19 10:01	1060mL/1mL	1000mL/1mL	0.94
A9G0598-05	Water	EPA 8270D	07/17/19 16:00	07/23/19 10:01	870mL/1mL	1000mL/1mL	1.15
A9G0598-06	Water	EPA 8270D	07/17/19 14:20	07/23/19 10:01	950mL/1mL	1000mL/1mL	1.05
Batch: 9071219							
A9G0598-01RE1	Water	EPA 8270D	07/17/19 12:25	07/24/19 10:10	780mL/1mL	1000mL/1mL	1.28

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

Q-19 Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported.

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

LABORATORY ACCREDITATION INFORMATION

TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

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Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

APEX LABS

6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A9G0598 COC 1 of 1

Company: Kennedy Jenks | Project Mgr: Alice Robinson | Project Name: Tetra Pak | Project #:

Address: 421 SW 6th Ave Ste 1000 Portland | Phone: 503-423-4018 | Email: Alice Robinson@Kennedyjenks.com | PO#

Sampled by: A. Robinson / G. Gonzalez

Site Location: OR (WA) CA — AK ID ___

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	Pentachlorophenol, tetrachlorophenols and trichlorophenols by 8270D	Dioxins	Archive
MW-6-20190717		7-17	1225	GW																	X		
MW-8-20190717		7-17	1345																		X		
MW-7-20190717		↓	1420																		X	X	
MW-2-20190717		↓	1516																		X		
MW-5-20190717		↓	1600																		X		
D-20190717		↓																			X		

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SPECIAL INSTRUCTIONS:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature] Date: 7-17-19	Signature: [signature] Date:	Signature: [signature] Date: 7/18	Signature: [signature] Date: 7-18-19
Printed Name: Alice Robinson Time: 6:30p	Printed Name: Julia Shevchenko Time:	Printed Name: Julia Shevchenko Time: 1102	Printed Name: Michael Kuchinski Time: 1102
Company: Kennedy Jenks	Company: Kennedy Jenks	Company: Kennedy Jenks	Company: Apex Labs

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Kennedy Jenks	Project: **Tetra Pak**	
421 SW 6th Avenue Suite 1000	Project Number: **Tetra Pak**	**Report ID:**
Portland, OR 97204	Project Manager: **Alice Robinson**	**A9G0598 - 08 13 19 1430**

APEX LABS COOLER RECEIPT FORM

Client: Kennedy/Jenks Element WO#: A9 G0598

Project/Project #: Tetra Pak

Delivery Info:

Date/time received: 7-18-19 @ 1102 By: MM

Delivered by: Apex X Client ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Date/time inspected: 7-18-19 @ 1345 By: MM

Chain of Custody included? Yes X No Custody seals? Yes No X

Signed/dated by client? Yes X No

Signed/dated by Apex? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.4	0.7					
Received on ice? (Y/N)	Y	Y					
Temp. blanks? (Y/N)	N	Y					
Ice type: (Gel/Real/Other)	Real	Real					
Condition:	good	good					

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA

Out of temperature samples form initiated? Yes/No/NA

Samples Inspection: Date/time inspected: 7/18/19 @ 16:38 By: MM

All samples intact? Yes X No Comments:

Bottle labels/COCs agree? Yes X No Comments: No Sampling T on COC, for D-20190717. Lont reads 14.20

COC/container discrepancies form initiated? Yes No NA X

Containers/volumes received appropriate for analysis? Yes X No Comments:

Do VOA vials have visible headspace? Yes No NA X

Comments

Water samples: pH checked: Yes No NA X pH appropriate? Yes No NA X

Comments:

Additional information:

Labeled by: Witness: Cooler Inspected by: See Project Contact Form: Y

LJ TAM MM

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

CFA | Cape Fear Analytical LLC
an affiliate of The GEL Group INC

3306 Kitty Hawk Road, Suite 120 Wilmington, NC 28405
P 910.795.0421
www.capefearanalytical.com

August 13, 2019

Ms. Lisa Domenighini
Apex Laboratories
6700 SW Sandburg Street
Portland, Oregon 97223

Re: 2018 DXN & PCB IDIQ
Work Order: 15272
SDG: A9G0598

Dear Ms. Domenighini:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 23, 2019. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,

Cynde Larkins

Cynde Larkins
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A9G0598

WAD 7/29/19

SENDING LABORATORY:

Apex Laboratories
6700 S.W. Sandburg Street
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 718-0333
Project Manager: Lisa Domenighini

RECEIVING LABORATORY:

ARK 7/22

Cape Fear Analytical, LLC
3306 Kitty Hawk Rd Suite 120
Wilmington, NC 28405
Phone :(910) 795-0421
Fax: -

CFA WO#15272

Sample Name: MW-7-20190717 **Water** **Sampled: 07/17/19 14:20** (A9G0598-03)

Analysis	Due	Expires	Comments
1613 Dioxin (Sub)	07/31/19 17:00	07/24/19 14:20	Cape Fear
Containers Supplied:			
(C)1 L Amber Glass - Non Preserved			
(D)1 L Amber Glass - Non Preserved			

Standard TAT

Temp. = 5.1°C

Released By	Date	Received By	Date
	7/22/19 1400	Fed Ex (Shipper)	
Fed Ex (Shipper)	23JUL19	Cynde Larkins	23JUL19 @ 0950
Released By	Date	Received By	Date

SAMPLE RECEIPT CHECKLIST

Cape Fear Analytical

Client: APEX	Work Order: 15272
Shipping Company: FedEx	Date/Time Received: 23JUL19 0950

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			✓
Samples identified as Foreign Soil?			✓

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?		✓	
Samples < 2x background?		✓	

* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			✓

Air Witness: _____

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other(describe)
2	Custody seal/s present on cooler?			✓	Seal intact? Yes No
3	Chain of Custody documents included with shipment?	✓			
4	Samples requiring cold preservation within 0-6°C?	✓			Preservation Method: Temperature Blank present: (Yes) No (ice bags) blue ice dry ice none other (describe) 4.8° + 0.3 = 5.1°C
5	Aqueous samples found to have visible solids?	✓			Sample IDs, containers affected: Minimal (<1%) visible solids
5	Samples requiring chemical preservation at proper pH?		✓		Sample IDs, containers affected and pH observed: pH = 7 on both If preservative added, Lot#:
7	Samples requiring preservation have no residual chlorine?	✓			Sample IDs, containers affected: If preservative added, Lot#:
8	Samples received within holding time?	✓			Sample IDs, tests affected:
9	Sample IDs on COC match IDs on containers?	✓			Sample IDs, containers affected:
10	Date & time of COC match date & time on containers?	✓			Sample IDs, containers affected:
11	Number of containers received match number indicated on COC?	✓			List type and number of containers / Sample IDs, containers affected: 2- 1L NMAG
12	COC form is properly signed in relinquished/received sections?	✓			

Comments:

Checklist performed by: Initials: CR Date: 23 JUL 19

CF-UD-F-7

High Resolution Dioxins and Furans Analysis

Case Narrative

HDOX Case Narrative
Apex Laboratories (APEX)
SDG A9G0598
Work Order 15272

Method/Analysis Information

Product:	**Dioxins/Furans by EPA Method 1613B in Liquids**
Analytical Method:	EPA Method 1613B
Extraction Method:	SW846 3520C
Analytical Batch Number:	41272
Clean Up Batch Number:	41267
Extraction Batch Number:	41266

Sample Analysis

Sample 15272001 was received at 5.1°C. The following samples were analyzed using the analytical protocol as established in EPA Method 1613B:

Sample ID	Client ID
12024362	Method Blank (MB)
12024363	Laboratory Control Sample (LCS)
12024364	Laboratory Control Sample Duplicate (LCSD)
15272001	MW-7-20190717

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

Quality Control (QC) Information

Certification Statement
The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

Method Blank (MB) Statement
The MB(s) analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries
All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

Laboratory Control Sample Duplicate (LCSD) Recovery
The LCSD spike recoveries met the acceptance limits.

LCS/LCSD Relative Percent Difference (RPD) Statement
The RPD(s) between the LCS and LCSD met the acceptance limits.

QC Sample Designation
A matrix spike and matrix spike duplicate analysis was not required for this SDG.

Technical Information

Holding Time Specifications
CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification
All procedures were performed as stated in the SOP.

Sample Dilutions
The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information

Nonconformance (NCR) Documentation
A NCR was not required for this SDG.

Manual Integrations
Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

System Configuration
This analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
HRP763_1	Primary Dioxin Analysis	Dioxin Analysis	DB-5MS	60m x 0.25mm, 0.25um

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Sample Data Summary

Cape Fear Analytical, LLC
3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

Qualifier Definition Report
for

APEX001 Apex Laboratories

Client SDG: A9G0598 CFA Work Order: 15272

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a surrogate compound
B The target analyte was detected in the associated blank.
J Value is estimated
K Estimated Maximum Possible Concentration
U Analyte was analyzed for, but not detected above the specified detection limit.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature:  **Name: Heather Patterson**

Date: 13 AUG 2019 **Title: Group Leader**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9G0598**	**Client:**	**APEX001**	**Project:**	**APEX00217**
Lab Sample ID:	**15272001**	**Date Collected:**	**07/17/2019 14:20**	**Matrix:**	**WATER**
Client Sample:	**1613B Water**	**Date Received:**	**07/23/2019 09:50**		
Client ID:	**MW-7-20190717**			**Prep Basis:**	**As Received**
Batch ID:	**41272**	**Method:**	**EPA Method 1613B**		
Run Date:	**07/31/2019 08:15**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b30jul19b_2-9**			**Dilution:**	**1**
Prep Batch:	**41266**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**25-JUL-19**	**Prep Aliquot:**	**928 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.09	pg/L	1.09	10.8
40321-76-4	1,2,3,7,8-PeCDD	U	0.996	pg/L	0.996	53.9
39227-28-6	1,2,3,4,7,8-HxCDD	U	1.29	pg/L	1.29	53.9
57653-85-7	1,2,3,6,7,8-HxCDD	JK	1.40	pg/L	1.17	53.9
19408-74-3	1,2,3,7,8,9-HxCDD	U	1.24	pg/L	1.24	53.9
35822-46-9	1,2,3,4,6,7,8-HpCDD		72.1	pg/L	2.67	53.9
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1440	pg/L	5.80	108
51207-31-9	2,3,7,8-TCDF	U	1.53	pg/L	1.53	10.8
57117-41-6	1,2,3,7,8-PeCDF	U	0.879	pg/L	0.879	53.9
57117-31-4	2,3,4,7,8-PeCDF	U	0.797	pg/L	0.797	53.9
70648-26-9	1,2,3,4,7,8-HxCDF	U	1.39	pg/L	1.39	53.9
57117-44-9	1,2,3,6,7,8-HxCDF	U	1.34	pg/L	1.34	53.9
60851-34-5	2,3,4,6,7,8-HxCDF	U	1.39	pg/L	1.39	53.9
72918-21-9	1,2,3,7,8,9-HxCDF	U	1.85	pg/L	1.85	53.9
67562-39-4	1,2,3,4,6,7,8-HpCDF	JK	12.0	pg/L	1.36	53.9
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	2.07	pg/L	2.07	53.9
39001-02-0	1,2,3,4,6,7,8,9-OCDF	J	48.3	pg/L	3.92	108
41903-57-5	Total TeCDD	U	1.09	pg/L	1.09	10.8
36088-22-9	Total PeCDD	U	0.996	pg/L	0.996	53.9
34465-46-8	Total HxCDD	JK	7.97	pg/L	1.17	53.9
37871-00-4	Total HpCDD	J	118	pg/L	2.67	53.9
30402-14-3	Total TeCDF	U	1.53	pg/L	1.53	10.8
30402-15-4	Total PeCDF	BJK	4.07	pg/L	0.642	53.9
55684-94-1	Total HxCDF	BJ	10.3	pg/L	1.34	53.9
38998-75-3	Total HpCDF	JK	38.5	pg/L	1.36	53.9
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		1.43	pg/L		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		3.11	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1970	2160	pg/L	91.5	(25%-164%)
13C-1,2,3,7,8-PeCDD		1870	2160	pg/L	87.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		1930	2160	pg/L	89.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		1780	2160	pg/L	82.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		1930	2160	pg/L	89.3	(23%-140%)
13C-OCDD		3120	4310	pg/L	72.3	(17%-157%)
13C-2,3,7,8-TCDF		2010	2160	pg/L	93.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		2070	2160	pg/L	96.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		2030	2160	pg/L	94.0	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		1800	2160	pg/L	83.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		1780	2160	pg/L	82.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		1830	2160	pg/L	84.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		2020	2160	pg/L	93.6	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9G0598**	**Client:**	**APEX001**	**Project:**	**APEX00217**
Lab Sample ID:	**15272001**	**Date Collected:**	**07/17/2019 14:20**	**Matrix:**	**WATER**
Client Sample:	**1613B Water**	**Date Received:**	**07/23/2019 09:50**		
Client ID:	**MW-7-20190717**			**Prep Basis:**	**As Received**
Batch ID:	**41272**	**Method:**	**EPA Method 1613B**		
Run Date:	**07/31/2019 08:15**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b30jul19b_2-9**			**Dilution:**	**1**
Prep Batch:	**41266**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**25-JUL-19**	**Prep Aliquot:**	**928 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		1770	2160	pg/L	82.0	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		1860	2160	pg/L	86.1	(26%-138%)
37Cl-2,3,7,8-TCDD		209	216	pg/L	97.1	(35%-197%)

Comments:

B **The target analyte was detected in the associated blank.**
J **Value is estimated**
K **Estimated Maximum Possible Concentration**
U **Analyte was analyzed for, but not detected above the specified detection limit.**

Quality Control Summary

Hi-Res Dioxins/Furans

Surrogate Recovery Report

SDG Number: A9G0598

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12024362	MB for batch 41266	13C-2,3,7,8-TCDD		85.9	(25%-164%)
		13C-1,2,3,7,8-PeCDD		78.9	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		83.3	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		81.3	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		80.9	(23%-140%)
		13C-OCDD		66.5	(17%-157%)
		13C-2,3,7,8-TCDF		85.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		91.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		84.8	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		84.1	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		77.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		85.9	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		86.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		78.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		80.5	(26%-138%)
		37Cl-2,3,7,8-TCDD		102	(35%-197%)
15272001	MW-7-20190717	13C-2,3,7,8-TCDD		91.5	(25%-164%)
		13C-1,2,3,7,8-PeCDD		87.0	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		89.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		82.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		89.3	(23%-140%)
		13C-OCDD		72.3	(17%-157%)
		13C-2,3,7,8-TCDF		93.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		96.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		94.0	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		83.7	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		82.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		84.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		93.6	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		82.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		86.1	(26%-138%)
		37Cl-2,3,7,8-TCDD		97.1	(35%-197%)
12024363	LCS for batch 41266	13C-2,3,7,8-TCDD		86.7	(20%-175%)
		13C-1,2,3,7,8-PeCDD		88.5	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		90.9	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		82.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		89.0	(22%-166%)
		13C-OCDD		72.5	(13%-199%)
		13C-2,3,7,8-TCDF		89.3	(22%-152%)
		13C-1,2,3,7,8-PeCDF		95.5	(21%-192%)
		13C-2,3,4,7,8-PeCDF		95.0	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		86.2	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		81.9	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		85.4	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		89.3	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		82.1	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		88.2	(20%-186%)
		37Cl-2,3,7,8-TCDD		97.9	(31%-191%)
12024364	LCSD for batch 41266	13C-2,3,7,8-TCDD		74.1	(20%-175%)

Hi-Res Dioxins/Furans
Surrogate Recovery Report

SDG Number: A9G0598

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12024364	LCSD for batch 41266	13C-1,2,3,7,8-PeCDD		79.0	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		81.5	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		74.5	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		86.7	(22%-166%)
		13C-OCDD		74.4	(13%-199%)
		13C-2,3,7,8-TCDF		76.8	(22%-152%)
		13C-1,2,3,7,8-PeCDF		85.6	(21%-192%)
		13C-2,3,4,7,8-PeCDF		85.1	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		75.7	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		73.5	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		78.3	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		82.0	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		76.7	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		82.4	(20%-186%)
		37Cl-2,3,7,8-TCDD		97.5	(31%-191%)

* Recovery outside Acceptance Limits
# Column to be used to flag recovery values
D Sample Diluted

Hi-Res Dioxins/Furans

Quality Control Summary
Spike Recovery Report

SDG Number: A9G0598 **Sample Type:** Laboratory Control Sample

Client ID: LCS for batch 41266 **Matrix:** WATER

Lab Sample ID: 12024363

Instrument: HRP763 **Analysis Date:** 07/31/2019 13:14 **Dilution:** 1

Analyst: MLS **Prep Batch ID:** 41266

Batch ID: 41272

CAS No.		Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits
1746-01-6	LCS	2,3,7,8-TCDD	200	198	99.1	67-158
40321-76-4	LCS	1,2,3,7,8-PeCDD	1000	1170	117	70-142
39227-28-6	LCS	1,2,3,4,7,8-HxCDD	1000	1110	111	70-164
57653-85-7	LCS	1,2,3,6,7,8-HxCDD	1000	1110	111	74-134
19408-74-3	LCS	1,2,3,7,8,9-HxCDD	1000	1160	116	64-162
35822-46-9	LCS	1,2,3,4,6,7,8-HpCDD	1000	1100	110	70-140
3268-87-9	LCS	1,2,3,4,6,7,8,9-OCDD	2000	2270	113	78-144
51207-31-9	LCS	2,3,7,8-TCDF	200	211	106	75-158
57117-41-6	LCS	1,2,3,7,8-PeCDF	1000	1170	117	80-134
57117-31-4	LCS	2,3,4,7,8-PeCDF	1000	1130	113	68-160
70648-26-9	LCS	1,2,3,4,7,8-HxCDF	1000	1130	113	72-134
57117-44-9	LCS	1,2,3,6,7,8-HxCDF	1000	1120	112	84-130
60851-34-5	LCS	2,3,4,6,7,8-HxCDF	1000	1150	115	70-156
72918-21-9	LCS	1,2,3,7,8,9-HxCDF	1000	1150	115	78-130
67562-39-4	LCS	1,2,3,4,6,7,8-HpCDF	1000	1130	113	82-122
55673-89-7	LCS	1,2,3,4,7,8,9-HpCDF	1000	1150	115	78-138
39001-02-0	LCS	1,2,3,4,6,7,8,9-OCDF	2000	2420	121	63-170

Hi-Res Dioxins/Furans

Quality Control Summary
Spike Recovery Report

SDG Number: A9G0598 **Sample Type:** Laboratory Control Sample Duplicate

Client ID: LCSD for batch 41266 **Matrix:** WATER

Lab Sample ID: 12024364

Instrument: HRP763 **Analysis Date:** 07/31/2019 14:02 **Dilution:** 1

Analyst: MLS **Prep Batch ID:** 41266

Batch ID: 41272

CAS No.		Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD	2,3,7,8-TCDD	200	195	97.3	67-158	1.81	0-20
40321-76-4	LCSD	1,2,3,7,8-PeCDD	1000	1150	115	70-142	1.92	0-20
39227-28-6	LCSD	1,2,3,4,7,8-HxCDD	1000	1080	108	70-164	2.92	0-20
57653-85-7	LCSD	1,2,3,6,7,8-HxCDD	1000	1070	107	74-134	3.23	0-20
19408-74-3	LCSD	1,2,3,7,8,9-HxCDD	1000	1130	113	64-162	3.18	0-20
35822-46-9	LCSD	1,2,3,4,6,7,8-HpCDD	1000	1060	106	70-140	3.39	0-20
3268-87-9	LCSD	1,2,3,4,6,7,8,9-OCDD	2000	2180	109	78-144	3.75	0-20
51207-31-9	LCSD	2,3,7,8-TCDF	200	210	105	75-158	0.704	0-20
57117-41-6	LCSD	1,2,3,7,8-PeCDF	1000	1100	110	80-134	6.39	0-20
57117-31-4	LCSD	2,3,4,7,8-PeCDF	1000	1120	112	68-160	1.61	0-20
70648-26-9	LCSD	1,2,3,4,7,8-HxCDF	1000	1100	110	72-134	2.78	0-20
57117-44-9	LCSD	1,2,3,6,7,8-HxCDF	1000	1090	109	84-130	2.50	0-20
60851-34-5	LCSD	2,3,4,6,7,8-HxCDF	1000	1110	111	70-156	2.78	0-20
72918-21-9	LCSD	1,2,3,7,8,9-HxCDF	1000	1070	107	78-130	7.06	0-20
67562-39-4	LCSD	1,2,3,4,6,7,8-HpCDF	1000	1140	114	82-122	0.422	0-20
55673-89-7	LCSD	1,2,3,4,7,8,9-HpCDF	1000	1140	114	78-138	1.01	0-20
39001-02-0	LCSD	1,2,3,4,6,7,8,9-OCDF	2000	2340	117	63-170	3.28	0-20

Method Blank Summary

SDG Number:	**A9G0598**	**Client:**	**APEX001**	**Matrix:**	**WATER**
Client ID:	**MB for batch 41266**	**Instrument ID:**	**HRP763**	**Data File:**	**b30jul19b_2-3**
Lab Sample ID:	**12024362**	**Prep Date:**	**25-JUL-19**	**Analyzed:**	**07/31/19 03:24**
Column:					

This method blank applies to the following samples and quality control samples:

	Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01	MW-7-20190717	15272001	b30jul19b_2-9	07/31/19	0815
02	LCS for batch 41266	12024363	b30jul19b_3-1	07/31/19	1314
03	LCSD for batch 41266	12024364	b30jul19b_3-2	07/31/19	1402

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9G0598**	**Client:**	**APEX001**	**Project:**	**APEX00217**
Lab Sample ID:	**12024362**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 41266**				
Client ID:	**MB for batch 41266**			**Prep Basis:**	**As Received**
Batch ID:	**41272**	**Method:**	**EPA Method 1613B**		
Run Date:	**07/31/2019 03:24**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b30jul19b_2-3**			**Dilution:**	**1**
Prep Batch:	**41266**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**25-JUL-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.54	pg/L	0.540	10.0
40321-76-4	1,2,3,7,8-PeCDD	U	0.372	pg/L	0.372	50.0
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.91	pg/L	0.910	50.0
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.896	pg/L	0.896	50.0
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.912	pg/L	0.912	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD	JK	2.10	pg/L	1.55	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	8.48	pg/L	3.24	100
51207-31-9	2,3,7,8-TCDF	U	0.74	pg/L	0.740	10.0
57117-41-6	1,2,3,7,8-PeCDF	JK	0.600	pg/L	0.598	50.0
57117-31-4	2,3,4,7,8-PeCDF	U	0.568	pg/L	0.568	50.0
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.632	pg/L	0.632	50.0
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.672	pg/L	0.672	50.0
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.662	pg/L	0.662	50.0
72918-21-9	1,2,3,7,8,9-HxCDF	JK	1.48	pg/L	0.926	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	0.412	pg/L	0.412	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	1.32	pg/L	1.32	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	2.2	pg/L	2.20	100
41903-57-5	Total TeCDD	U	0.54	pg/L	0.540	10.0
36088-22-9	Total PeCDD	U	0.372	pg/L	0.372	50.0
34465-46-8	Total HxCDD	U	0.896	pg/L	0.896	50.0
37871-00-4	Total HpCDD	JK	2.10	pg/L	1.55	50.0
30402-14-3	Total TeCDF	U	0.74	pg/L	0.740	10.0
30402-15-4	Total PeCDF	JK	0.600	pg/L	0.568	50.0
55684-94-1	Total HxCDF	JK	1.48	pg/L	0.632	50.0
38998-75-3	Total HpCDF	U	0.412	pg/L	0.412	50.0
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.190	pg/L		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		1.01	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1720	2000	pg/L	85.9	(25%-164%)
13C-1,2,3,7,8-PeCDD		1580	2000	pg/L	78.9	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		1670	2000	pg/L	83.3	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		1630	2000	pg/L	81.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		1620	2000	pg/L	80.9	(23%-140%)
13C-OCDD		2660	4000	pg/L	66.5	(17%-157%)
13C-2,3,7,8-TCDF		1710	2000	pg/L	85.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		1840	2000	pg/L	91.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		1700	2000	pg/L	84.8	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		1680	2000	pg/L	84.1	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		1550	2000	pg/L	77.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		1720	2000	pg/L	85.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		1730	2000	pg/L	86.3	(29%-147%)

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9G0598**	**Client:**	**APEX001**	**Project:**	**APEX00217**
Lab Sample ID:	**12024362**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 41266**				
Client ID:	**MB for batch 41266**			**Prep Basis:**	**As Received**
Batch ID:	**41272**	**Method:**	**EPA Method 1613B**		
Run Date:	**07/31/2019 03:24**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b30jul19b_2-3**			**Dilution:**	**1**
Prep Batch:	**41266**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**25-JUL-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-1,2,3,4,6,7,8-HpCDF		1580	2000	pg/L	78.9	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		1610	2000	pg/L	80.5	(26%-138%)
37Cl-2,3,7,8-TCDD		204	200	pg/L	102	(35%-197%)

Comments:

J **Value is estimated**

K **Estimated Maximum Possible Concentration**

U **Analyte was analyzed for, but not detected above the specified detection limit.**

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9G0598**	**Client:**	**APEX001**	**Project:**	**APEX00217**
Lab Sample ID:	**12024363**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 41266**				
Client ID:	**LCS for batch 41266**			**Prep Basis:**	**As Received**
Batch ID:	**41272**	**Method:**	**EPA Method 1613B**		
Run Date:	**07/31/2019 13:14**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b30jul19b_3-1**			**Dilution:**	**1**
Prep Batch:	**41266**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**25-JUL-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		198	pg/L	1.19	10.0
40321-76-4	1,2,3,7,8-PeCDD		1170	pg/L	1.42	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1110	pg/L	2.90	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1110	pg/L	2.70	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1160	pg/L	2.82	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1100	pg/L	3.34	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2270	pg/L	5.52	100
51207-31-9	2,3,7,8-TCDF		211	pg/L	1.55	10.0
57117-41-6	1,2,3,7,8-PeCDF		1170	pg/L	1.48	50.0
57117-31-4	2,3,4,7,8-PeCDF		1130	pg/L	1.34	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1130	pg/L	2.50	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1120	pg/L	2.34	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1150	pg/L	2.56	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1150	pg/L	3.26	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1130	pg/L	3.16	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1150	pg/L	4.72	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2420	pg/L	7.20	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1730	2000	pg/L	86.7	(20%-175%)
13C-1,2,3,7,8-PeCDD		1770	2000	pg/L	88.5	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		1820	2000	pg/L	90.9	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		1640	2000	pg/L	82.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		1780	2000	pg/L	89.0	(22%-166%)
13C-OCDD		2900	4000	pg/L	72.5	(13%-199%)
13C-2,3,7,8-TCDF		1790	2000	pg/L	89.3	(22%-152%)
13C-1,2,3,7,8-PeCDF		1910	2000	pg/L	95.5	(21%-192%)
13C-2,3,4,7,8-PeCDF		1900	2000	pg/L	95.0	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		1720	2000	pg/L	86.2	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		1640	2000	pg/L	81.9	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		1710	2000	pg/L	85.4	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		1790	2000	pg/L	89.3	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		1640	2000	pg/L	82.1	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		1760	2000	pg/L	88.2	(20%-186%)
37Cl-2,3,7,8-TCDD		196	200	pg/L	97.9	(31%-191%)

Comments:

U Analyte was analyzed for, but not detected above the specified detection limit.

Hi-Res Dioxins/Furans
Certificate of Analysis
Sample Summary

SDG Number:	**A9G0598**	**Client:**	**APEX001**	**Project:**	**APEX00217**
Lab Sample ID:	**12024364**			**Matrix:**	**WATER**
Client Sample:	**QC for batch 41266**				
Client ID:	**LCSD for batch 41266**			**Prep Basis:**	**As Received**
Batch ID:	**41272**	**Method:**	**EPA Method 1613B**		
Run Date:	**07/31/2019 14:02**	**Analyst:**	**MLS**	**Instrument:**	**HRP763**
Data File:	**b30jul19b_3-2**			**Dilution:**	**1**
Prep Batch:	**41266**	**Prep Method:**	**SW846 3520C**		
Prep Date:	**25-JUL-19**	**Prep Aliquot:**	**1000 mL**		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		195	pg/L	1.48	10.0
40321-76-4	1,2,3,7,8-PeCDD		1150	pg/L	1.54	50.0
39227-28-6	1,2,3,4,7,8-HxCDD		1080	pg/L	2.32	50.0
57653-85-7	1,2,3,6,7,8-HxCDD		1070	pg/L	2.20	50.0
19408-74-3	1,2,3,7,8,9-HxCDD		1130	pg/L	2.28	50.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1060	pg/L	3.38	50.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2180	pg/L	6.14	100
51207-31-9	2,3,7,8-TCDF		210	pg/L	2.12	10.0
57117-41-6	1,2,3,7,8-PeCDF		1100	pg/L	1.77	50.0
57117-31-4	2,3,4,7,8-PeCDF		1120	pg/L	1.53	50.0
70648-26-9	1,2,3,4,7,8-HxCDF		1100	pg/L	3.22	50.0
57117-44-9	1,2,3,6,7,8-HxCDF		1090	pg/L	3.12	50.0
60851-34-5	2,3,4,6,7,8-HxCDF		1110	pg/L	3.16	50.0
72918-21-9	1,2,3,7,8,9-HxCDF		1070	pg/L	4.18	50.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1140	pg/L	4.08	50.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1140	pg/L	5.76	50.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2340	pg/L	7.18	100

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1480	2000	pg/L	74.1	(20%-175%)
13C-1,2,3,7,8-PeCDD		1580	2000	pg/L	79.0	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		1630	2000	pg/L	81.5	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		1490	2000	pg/L	74.5	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		1730	2000	pg/L	86.7	(22%-166%)
13C-OCDD		2970	4000	pg/L	74.4	(13%-199%)
13C-2,3,7,8-TCDF		1540	2000	pg/L	76.8	(22%-152%)
13C-1,2,3,7,8-PeCDF		1710	2000	pg/L	85.6	(21%-192%)
13C-2,3,4,7,8-PeCDF		1700	2000	pg/L	85.1	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		1510	2000	pg/L	75.7	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		1470	2000	pg/L	73.5	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		1570	2000	pg/L	78.3	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		1640	2000	pg/L	82.0	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		1530	2000	pg/L	76.7	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		1650	2000	pg/L	82.4	(20%-186%)
37Cl-2,3,7,8-TCDD		195	200	pg/L	97.5	(31%-191%)

Comments:

U Analyte was analyzed for, but not detected above the specified detection limit.

DATA VALIDATION SUMMARY
Tetra Pak GWM

Laboratory Reports included in Data Validation	Dates	Sample IDs
Laboratory: APEX Laboratories, Cape Fear Analytical, LLC SDG: A9G0598 Analyses: 8270D, Dioxins	**Report Date:** 8/13/2019 **Sample Dates:** 7/17/2019-7/17/2019 **Validation Date:** 10/31/2019	Aqueous Samples: MW-6-20190717, MW-8-20190717, MW-7-20190717, MW-2-20190717, MW-5-20190717 Field Duplicate: D-20190717 (duplicate of MW-7-20190717) Equipment Blank: Not Collected Trip Blank: Not Collected

Criteria	(Yes or No)	Comment
Chain-of-Custody (COC) – Chain-of-custody protocol followed?	Yes	
Temperature Blank – Sample temperature criteria met?	Yes	
Holding times – Samples analyzed within specified holding time?	Yes	
Laboratory method blank samples – Analytes present in method blank samples?	Yes	See Note
Field/Equipment blank samples – Analytes present in field/equipment blank samples?	No	See Note
Trip blank samples – Analytes present in trip blank samples?	No	See Note
Matrix Spikes (MS)/Matrix Spike Duplicate (MSD) samples – Control limits met?	Yes	See Note
Surrogate percent recoveries – Control limits met?	Yes	
Laboratory Control Sample (LCS) – Control limits met?	Yes	
Laboratory duplicate samples (if applicable) – Control limits met?	Yes	
Field duplicate samples (if submitted) – Relative percent differences within control limits?	Yes	See Note
Other Issues?	Yes	See Note

Method Blank Note: 1,2,3,4,6,7,8-HpCDD detected in the method blank at 2.10J pg/L for batch 41272, no action taken as the sample result was much higher than that detected in the method blank.
1,2,3,4,6,7,8,9-OCDD detected in the method blank at 8.48J pg/L for batch 41272, no action taken as the sample result was much higher than that detected in the method blank.
1,2,3,7,8-PeCDF detected in the method blank at 0.600J pg/L for batch 41272, the associated sample result was not detected, no action taken.
1,2,3,7,8,9-HxCDF detected in the method blank at 1.48J pg/L for batch 41272, the associated sample result was not detected, no action taken.
Total HpCDD detected in the method blank at 2.10J pg/L for batch 41272, no action taken as the sample result was much higher than that detected in the method blank.
Total PeCDF detected in the method blank at 0.600J pg/L for batch 41272. The result for the associated sample was qualified as non-detect, U, at the reporting limit.
Total HxCDF detected in the method blank at 1.48J pg/L for batch 41272. The result for the associated sample was qualified as non-detect, U, at the reporting limit.
Field Blank Note: Not collected
Trip Blank Note: Not collected
MS/MSD Note: Not applicable
Field Duplicate Note: D-20190717 Parent Sample ID: MW-7-20190717

Other Note: Custody seals not present on coolers. No action taken.

SUMMARY
Overall, the findings with respect to the quality assurance/quality control (QA/QC) data do not adversely affect the use of the analytical results.

Attachment B

Groundwater Sampling and Purge Forms

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks Consultants**

Date:	7-17-19	Well Number:	MW-1
Project Name:	Tetra Pak	Monument Type:	Stickup: ✓ (ft PVC) Flush:
Project Number:		Well Diameter (in):	
Sampling Personnel:	Robinson / Gonzalez	Well Condition:	good.
Water Level Meter:		Total Casing Depth (ft):	–
Purging Equipment:	bailer	Screened Interval (ft):	–
Sampling Equipment:		Purge Depth (ft):	~54'
Sampling Time:	NA	Depth to Groundwater (ft):	49.09'
Total Discharge (gal):		Depth to LNAPL (ft):	
Water Disposal:	On-site Container	Water Column (ft):	
Weather:	overcast		

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
none collected							

Time	1300	13:05						
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)	~.5	~.7						
Water Depth (ft)								
Temperature (°C), (± 0.2)	15.89	15.93						
pH, (± 0.1)	6.22	5.68						
Sp. Conductance (uS/cm),(± 3%)	129	240						
DO (mg/L), (± 10% or 10% of 0.2mg/l)	probe not submerged	6.96						
ORP (mV), (± 10%)	157.0	186.4						
Turbidity (NTU), (± 10% or 3 <10 NTUs)	18.22	34.34						
Color	clr	clr						
Odor/Evidence of LNAPL	none	none						

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters insufficient water did not sample

Groundwater Purge and Sample Form (Minimal Drawdown) **Kennedy/Jenks C**

Date: 07/17/19
Project Name: Tetra Pak
Project Number:
Sampling Personnel: AR/GRG
Water Level Meter:
Purging Equipment:
Sampling Equipment:
Sampling Time: 1:30
Total Discharge (gal):
Water Disposal: On-site Container
Weather: cloudy

Well Number: MW-8
Monument Type: Stickup: (ft PVC) Flush:
Well Diameter (in):
Well Condition: good
Total Casing Depth (ft):
Screened Interval (ft):
Purge Depth (ft):
Depth to Groundwater (ft): 43.04 ft
Depth to LNAPL (ft): none
Water Column (ft):

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
MW-8 20190717				1L	no		
MW-8 20190717				1L	no		

Time	1:30p	1:35p	1:40p	1:45p				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (°C), (± 0.2)	14.44	14.31	14.00	13.86				
pH, (± 0.1)	6.28	5.75	5.45	5.33				
Sp. Conductance (uS/cm),(± 3%)	226	225	223	223				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	7.75	7.69	7.72	7.94				
ORP (mV), (± 10%)	155.8	181.9	197.0	203.1				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.01	4.29	4.03	9.15				
Color	none	none	none	none				
Odor/Evidence of LNAPL	none	none	none	none				

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) — **Kennedy/Jenks Consultants**

Date: 7-17-19

Project Name: Tetra Pak

Project Number:

Sampling Personnel: Robinson / Gonzalez

Water Level Meter:

Purging Equipment:

Sampling Equipment:

Sampling Time:

Total Discharge (gal):

Water Disposal: On-site Container

Weather:

Well Number: MW-6

Monument Type: Stickup: _____ (ft PVC) Flush: ✓

Well Diameter (in):

Well Condition: good

Total Casing Depth (ft):

Screened Interval (ft):

Purge Depth (ft): ~50'

Depth to Groundwater (ft): 44.57

Depth to LNAPL (ft):

Water Column (ft):

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time
Temp/pH/SC/ORP/DO:	YSI 556	
Turbidity:	Micro TPW	
Other:		

QA/QC Samples		
Type	Sample ID	Time

Sample ID	Sample Containers: No.	Type	Pres.	Vol.	Field Filtered	Analysis Requested	MS/MSD & Comments
MW-6 20190717					no		
MW-6 20190717					no		

Parameter (every 5 min)	Time: ~~12:15~~ 12:10	12:20	12:25	12:30				
	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (°C), (± 0.2)	14.85	14.92	15.10					
pH, (± 0.1)	5.50	4.92	5.20					
Sp. Conductance (uS/cm),(± 3%)	0.248	236	238					
DO (mg/L), (± 10% or 10% of 0.2mg/l)	7.26	7.17	7.10					
ORP (mV), (± 10%)	201.5	219.5	204.7					
Turbidity (NTU), (± 10% or 3 <10 NTUs)	23.69	20.76	18.27					
Color	none	none	none					
Odor/Evidence of LNAPL	none	none	none					

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) — **Kennedy/Jenks Consultants**

Date: 7/17/19
Project Name: Tetra Pak
Project Number:
Sampling Personnel: AR | GRG
Water Level Meter:
Purging Equipment:
Sampling Equipment:
Sampling Time: 2pm - 2:20pm
Total Discharge (gal):
Water Disposal: On-site Container
Weather: cloudy

Well Number: MW-7
Monument Type: Stickup: _____ (ft PVC) Flush: X
Well Diameter (in):
Well Condition: good.
Total Casing Depth (ft):
Screened Interval (ft):
Purge Depth (ft):
Depth to Groundwater (ft): 44.41 ft
Depth to LNAPL (ft):
Water Column (ft):

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
MW-7 20190717							
MW-7 20190717							

Time	14:05	14:10	14:15	14:20				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (°C), (± 0.2)	14.48	14.32	14.22	14.03				
pH, (± 0.1)	6.38	5.65	5.58	5.65				
Sp. Conductance (uS/cm),(± 3%)	258	260	259	258				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	7.53	6.67	7.12	7.16				
ORP (mV), (± 10%)	162.2	200.4	~~177.3~~ 203.3	199.0				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	94.06	2448	147.3	221.9				
Color	cloudy brown	cloudy brown	→	→				
Odor/Evidence of LNAPL	none.	none	none.	none				

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) — **Kennedy/Jenks Consultants**

Date: 7/17/19
Project Name: Tetra Pak
Project Number:
Sampling Personnel: AR IGRG
Water Level Meter:
Purging Equipment:
Sampling Equipment:
Sampling Time: 15:16
Total Discharge (gal):
Water Disposal: On-site Container
Weather:

Well Number: MW-2
Monument Type: Stickup: (ft PVC) Flush:
Well Diameter (in):
Well Condition: good
Total Casing Depth (ft):
Screened Interval (ft):
Purge Depth (ft):
Depth to Groundwater (ft): 46.21 ft
Depth to LNAPL (ft): none
Water Column (ft):

Reference: TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
MW-2 20190717							
MW-2 20190717							

Time	14:59	15:04	15:09	15:14				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (°C), (± 0.2)	14.43	13.98	14.05	14.26				
pH, (± 0.1)	6.30	5.57	5.51	5.59				
Sp. Conductance (uS/cm),(± 3%)	272	266	259	~~255~~ 257				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	8.40	7.40	7.31	6.83				
ORP (mV), (± 10%)	170.9	200.1	202.7	197.7				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	0.78	66.48	66.33	50.63				
Color	none	milky	cloudy	none				
Odor/Evidence of LNAPL	none.	none	none.	none				

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters

Groundwater Purge and Sample Form (Minimal Drawdown) — **Kennedy/Jenks Consultants**

Date: 7-17-19
Project Name: Tetra Pak
Project Number:
Sampling Personnel: A Robinson / G Gonzalez
Water Level Meter:
Purging Equipment:
Sampling Equipment:
Sampling Time: 16:00
Total Discharge (gal):
Water Disposal: On-site Container

Well Number: MW-5
Monument Type: Stickup: ✓ (ft PVC) Flush:
Well Diameter (in): 2"
Well Condition: good
Total Casing Depth (ft):
Screened Interval (ft):
Purge Depth (ft): ~ 51'
Depth to Groundwater (ft): 45.90
Depth to LNAPL (ft): —
Water Column (ft): —

Reference: TOC

Weather: overc

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPW				
Other:					

Sample ID	Sample Containers				Field Filtered	Analysis Requested	MS/MSD & Comments
	No.	Type	Pres.	Vol.			

Time	15:43	15:48	15:53	15:58				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)	~.5	~1	~1.5	~2				
Water Depth (ft)								
Temperature (°C), (± 0.2)	14.68	14.95	14.20	14.19				
pH, (± 0.1)	6.23	5.71	5.55	5.61				
Sp. Conductance (uS/cm),(± 3%)	183	183	183	182				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	7.84	7.66	8.03	8.09				
ORP (mV), (± 10%)	171.3	196.5	201.0	195.8				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	10.99	44.95	10.63	15.78				
Color	clr	Light milky color	clr	clr				
Odor/Evidence of LNAPL	none	none	none	none				

Notes: (i.e. actions taken if well dewaters, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters