Response Appendix A. Evaluation of Fluoride Concentrations in Groundwater Samples from Aluminum City Neighborhood Residential Wells
Response to Human Health Risk Assessment Work Plan Comments

On behalf of the Columbia Falls Aluminum Company, LLC (CFAC), Roux Associates, Inc. (Roux) performed a statistical evaluation of fluoride concentrations measured in groundwater samples from Aluminum City water supply wells. Aluminum City is a residential neighborhood located adjacent to the southwest corner of the former CFAC aluminum reduction facility (commonly referred to as an aluminum smelter) located in Flathead County, Montana (Site). The Site is the subject on an ongoing Remedial Investigation/Feasibility Study (RI/FS) that is being conducted pursuant to the Administrative Settlement Agreement and Order on Consent dated November 30, 2015, between CFAC and the United States Environmental Protection Agency (USEPA) (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. 08-2016-0002).

Analyses of quarterly groundwater samples collected from residential water supply wells in the Aluminum City neighborhood have detected the presence of fluoride, a naturally-occurring substance, in concentrations ranging from below laboratory method detection limits (MDLs) to a maximum of 0.28 mg/L. To determine whether fluoride concentrations in groundwater beneath Aluminum City are related to naturally-occurring conditions or should be attributed to historical Site operations, Aluminum City fluoride data was compared with regional groundwater analytical results (specifically, fluoride concentrations in public water supply [PWS] wells for Flathead County, MT).

Groundwater fluoride data from Flathead County PWS wells collected from 2013 to 2016 were obtained from the Montana Department of Environmental Quality (MDEQ) (Table 1a and Table 1b). The MDEQ confirmed that drinking water sources included in the dataset were not fluoridated.[1] Data from the Aluminum City wells were collected in quarterly sampling events from 2014 through 2017 (Table 2a and Table 2b). In order to properly compare the data, the following data preparation process was performed:

- Temporal averages were calculated for each PWS location and for each Aluminum City well;
- Fluoride concentrations below laboratory MDLs were included in the analysis as one half the reporting limit (0.5 * MDL);
- Field duplicate samples were not included in the Aluminum City dataset;
- There are four instances in the Aluminum City dataset in which a monitoring well has two results for a given date (GW09 on 11/29/2016, GW12 on 07/14/2016, GW12 on 09/07/2016, and GW23 on 03/08/2017). In these instances, the greater of the two values was retained to be conservative; and
- PWS concentrations were reported in milligrams per liter (mg/L), while Aluminum City data was provided in micrograms per liter (µg/L). Aluminum City data was converted to mg/L for the purposes of these analyses.

Summary statistics for the two processed datasets are detailed in the table below.

Statistic	Unit	PWS dataset	AC dataset
Number of observations	Count	117	17
Minimum	mg/L	0.03	0.05
First Quartile	mg/L	0.08	0.07

[1] Email correspondence with Gregory Butts, Field Services Section Supervisor dated February 5, 2018.

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Median	mg/L	0.12	0.10
Third Quartile	mg/L	0.15	0.11
Maximum	mg/L	2.75	0.18
Mean	mg/L	0.17	0.10
Standard Deviation	mg/L	0.29	0.04

To compare the means of groundwater fluoride concentrations between samples collected from PWS in Flathead County, MT and samples collected from residential water supply wells in Aluminum City, two-sample t-tests were performed utilizing ProUCL (version 5.1). The null hypothesis of the one-sided two-sample t-test is that the mean fluoride concentration from the PWS dataset is less than or equal to the mean fluoride concentration from the Aluminum City dataset (H_0: $\mu_1 \leq \mu_2$); and the alternative hypothesis is that the mean fluoride concentration from the PWS dataset is greater than the mean fluoride concentration from the Aluminum City dataset (H_A: $\mu_1 > \mu_2$).

First, an F-test for the equality of two variances was performed. The null hypothesis of the F-test is that the variances of the two datasets are equal (H_0: $\sigma_1 = \sigma_2$). There is sufficient evidence (F-statistic = 61.503 | df = 116,16 | p = 0.000) using a significance level $\alpha = 0.05$ to conclude that the variances between the two datasets are not equal. Due to the unequal sample variances, the pooled sample variance method was not utilized for the t-test and, instead, the Welch-Satterthwaite method for two-sample t-tests was employed (Welch's t-test).

Using the one-sided Welch's t-test, the t-statistic is equal to 2.380 (df = 131.5) with p = 0.009. Because the p-value is less than $\alpha = 0.05$, there is sufficient evidence to reject the null hypothesis and conclude that the mean fluoride concentration from the PWS dataset is greater than the mean fluoride concentration from the Aluminum City dataset.

Following the preliminary analysis, the data was evaluated for outliers. Box plots (Figure 1) and Q-Q plots (Figures 2 and 3) were generated to visually identify potential outliers. Three potential upper-tail outliers were visually identified in the PWS dataset; no potential lower-tail PWS outliers were identified. No potential upper- or lower-tail outliers were visually identified in the Aluminum City dataset. Statistical outlier tests were then performed to confirm the identification of potential outliers. Rosner's outlier test was performed on the PWS dataset for the three suspected outliers, and the three greatest fluoride concentrations were identified as potential outliers at the 5% significance level. These potential outliers correspond with temporal averages at the following locations: Montana Academy in Marion, MT; Kila School District No. 20 in Kalispell, MT; and Wettington Water Inc in Kalispell, MT. MDEQ identified two of these regions (the two locations with the greatest fluoride concentrations) as exhibiting naturally occurring elevated fluoride concentrations.[2] For the AC dataset, Dixon's outlier test was performed and no outliers were identified.

When the F-test is performed excluding these outliers from the dataset, the test once again indicates the variances are not equal (F-statistic = 4.183 | df = 113,16 | p = 0.002 at $\alpha = 0.05$). The one-sided Welch's t-test yields a t-statistic equal to 2.435 (df = 40.0) with p = 0.010 at $\alpha = 0.05$. Because the p-value is less than $\alpha = 0.05$, there is sufficient

[2] Email correspondence with Gregory Butts, Field Services Section Supervisor dated February 5, 2018.

evidence to reject the null hypothesis and conclude that the mean fluoride concentration from the PWS dataset is greater than the mean fluoride concentration from the Aluminum City dataset.

Based on the analyses described herein, Roux Associates is confident in the conclusion that the mean concentration of fluoride in the Aluminum City residential water supply wells is statistically less than the mean concentration of fluoride in other drinking water wells in the region. In addition, hydrogeologic investigations have shown that the flow of groundwater beneath the Site is toward the Flathead River, not towards Aluminum City (see Groundwater/Surface Water Data Summary Report dated March 16, 2018; Roux Associates, 2018). Together, these results provide multiple lines of evidence indicating that fluoride concentrations in groundwater beneath Aluminum City are related to naturally-occurring conditions; not historical operations at the Site.

All ProUCL output is provided in Attachment 1.

TABLES

1a. Public Water Supply Fluoride Data
1b. Public Water Supply Fluoride Data Temporal Average
2a. Aluminum City Fluoride Data
2b. Aluminum City Fluoride Data Temporal Average

Table 1a: Public Water Supply Fluoride Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

FLUORIDE CONCENTRATIONS IN MONTANA PUBLIC WATER SUPPLIES (SOURCE OF DATA: MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY 2013-2016)					
County	City	Public Water Supply ID	Water System Name	Concentration (mg/L)	Collection Date
FLATHEAD	WHITEFISH	MT0000060	BIG MOUNTAIN	< 0.1	11/12/2013
FLATHEAD	WHITEFISH	MT0000060	BIG MOUNTAIN	< 0.1	11/1/2016
FLATHEAD	WHITEFISH	MT0000060	BIG MOUNTAIN	< 0.1	11/1/2016
FLATHEAD	WHITEFISH	MT0000062	OUTBACK MOBILE	0.06	6/15/2015
FLATHEAD	KALISPELL	MT0000077	SUNRISE TERRACE	0.08	11/5/2013
FLATHEAD	KALISPELL	MT0000077	SUNRISE TERRACE	0.08	11/5/2013
FLATHEAD	KALISPELL	MT0000077	SUNRISE TERRACE	0.08	9/14/2016
FLATHEAD	KALISPELL	MT0000078	STILLWATER	0.12	12/13/2016
FLATHEAD	KALISPELL	MT0000079	SPRUCE PARK	0.05	6/20/2016
FLATHEAD	KALISPELL	MT0000082	MEADOWLARK	0.13	11/14/2013
FLATHEAD	KALISPELL	MT0000088	PLEASANT HILL	0.14	8/2/2015
FLATHEAD	KALISPELL	MT0000088	PLEASANT HILL	0.21	8/2/2015
FLATHEAD	KALISPELL	MT0000098	WILLOW GLEN	0.20	2/7/2013
FLATHEAD	KALISPELL	MT0000098	WILLOW GLEN	0.10	3/1/2016
FLATHEAD	KALISPELL	MT0000099	BROOK DRIVE	0.14	7/29/2013
FLATHEAD	KALISPELL	MT0000099	BROOK DRIVE	0.13	2/21/2016
FLATHEAD	COLUMBIA FALLS	MT0000108	RIVERSIDE MOBILE	0.05	1/29/2013
FLATHEAD	COLUMBIA FALLS	MT0000108	RIVERSIDE MOBILE	0.05	6/28/2016
FLATHEAD	KALISPELL	MT0000109	GREEN ACRES	0.14	7/16/2013
FLATHEAD	KALISPELL	MT0000109	GREEN ACRES	0.13	8/22/2016
FLATHEAD	KALISPELL	MT0000110	NORTHFORK TR CT	0.10	9/14/2016
FLATHEAD	KALISPELL	MT0000111	LAZY DAY COURT	0.08	6/3/2013
FLATHEAD	WHITEFISH	MT0000133	PTARMIGAN	0.05	12/9/2013
FLATHEAD	COLUMBIA FALLS	MT0000181	COLUMBIA FALLS	0.05	5/21/2014
FLATHEAD	COLUMBIA FALLS	MT0000181	COLUMBIA FALLS	0.04	5/22/2014
FLATHEAD	COLUMBIA FALLS	MT0000184	FLATHEAD COUNTY	0.09	11/25/2013
FLATHEAD	COLUMBIA FALLS	MT0000184	FLATHEAD COUNTY	0.17	11/27/2013
FLATHEAD	CORAM	MT0000189	CORAM COUNTY	0.10	6/11/2013
FLATHEAD	CORAM	MT0000189	CORAM COUNTY	0.09	5/26/2015
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.06	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.15	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.14	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.13	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.16	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.24	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.16	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.20	1/8/2013
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.13	1/17/2014
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.05	1/17/2014
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.13	1/17/2014
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.12	1/17/2014
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.16	1/17/2014
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.22	1/17/2014
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.16	1/17/2014
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC	0.19	1/17/2014
FLATHEAD	WHITEFISH	MT0000261	FLATHEAD CO	0.18	6/27/2013
FLATHEAD	WHITEFISH	MT0000261	FLATHEAD CO	0.15	2/29/2016
FLATHEAD	LAKESIDE	MT0000267	TROUTBECK RISE	0.10	7/26/2016
FLATHEAD	LAKESIDE	MT0000267	TROUTBECK RISE	0.15	7/26/2016
FLATHEAD	MARTIN CITY	MT0000286	MARTIN CITY	0.13	4/11/2013
FLATHEAD	SOMERS	MT0000332	SOMERS CO WATER	0.12	6/23/2014
FLATHEAD	SOMERS	MT0000332	SOMERS CO WATER	0.13	6/23/2014
FLATHEAD	WHITEFISH	MT0000357	WHITEFISH CITY OF	0.03	1/13/2013
FLATHEAD	WHITEFISH	MT0000357	WHITEFISH CITY OF	0.02	1/12/2015
FLATHEAD	KALISPELL	MT0000392	LION MOUNTAIN	0.12	2/26/2013
FLATHEAD	KALISPELL	MT0000392	LION MOUNTAIN	0.13	2/26/2013
FLATHEAD	KALISPELL	MT0000392	LION MOUNTAIN	0.12	2/15/2016
FLATHEAD	KALISPELL	MT0000392	LION MOUNTAIN	0.12	2/15/2016
FLATHEAD	KALISPELL	MT0000429	FOSTERS COUNTRY	0.12	9/16/2016
FLATHEAD	KALISPELL	MT0000892	KILA SCHOOL	1.86	7/18/2013
FLATHEAD	KALISPELL	MT0000892	KILA SCHOOL	1.14	2/18/2016
FLATHEAD	KALISPELL	MT0000895	WEST VALLEY	0.13	7/16/2013
FLATHEAD	KALISPELL	MT0000895	WEST VALLEY	0.11	2/18/2016
FLATHEAD	KALISPELL	MT0000896	CAYUSE PRAIRIE	0.11	9/18/2014
FLATHEAD	COLUMBIA FALLS	MT0000906	CFAC PLANT WATER	0.29	5/14/2013
FLATHEAD	KALISPELL	MT0000910	DEER PARK SCHOOL	0.08	6/23/2013

Table 1a: Public Water Supply Fluoride Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

FLUORIDE CONCENTRATIONS IN MONTANA PUBLIC WATER SUPPLIES (SOURCE OF DATA: MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY 2013-2016)					
County	City	Public Water Supply ID	Water System Name	Concentration (mg/L)	Collection Date
FLATHEAD	KALISPELL	MT0000910	DEER PARK SCHOOL	0.08	3/6/2016
FLATHEAD	COLUMBIA FALLS	MT0000911	F H STOLTZE LAND	0.11	7/17/2014
FLATHEAD	COLUMBIA FALLS	MT0000914	MEADOW LAKE CO	0.15	10/29/2013
FLATHEAD	COLUMBIA FALLS	MT0000914	MEADOW LAKE CO	0.12	10/29/2013
FLATHEAD	COLUMBIA FALLS	MT0000914	MEADOW LAKE CO	0.12	11/8/2016
FLATHEAD	COLUMBIA FALLS	MT0000914	MEADOW LAKE CO	0.10	11/8/2016
FLATHEAD	COLUMBIA FALLS	MT0000917	WEYERHAEUSER	< 0.1	9/16/2013
FLATHEAD	COLUMBIA FALLS	MT0000917	WEYERHAEUSER	< 0.1	9/29/2016
FLATHEAD	KALISPELL	MT0000923	BISSELL SCHOOL	0.20	7/16/2013
FLATHEAD	KALISPELL	MT0000923	BISSELL SCHOOL	0.18	2/18/2016
FLATHEAD	KALISPELL	MT0000927	HELENA FLATS	0.08	6/23/2013
FLATHEAD	KALISPELL	MT0000927	HELENA FLATS	0.06	2/18/2016
FLATHEAD	KALISPELL	MT0000931	FAIRMONT EGAN	0.06	6/23/2013
FLATHEAD	KALISPELL	MT0000931	FAIRMONT EGAN	0.06	2/10/2016
FLATHEAD	KALISPELL	MT0000933	CRESTON SCHOOL	0.07	6/23/2013
FLATHEAD	KALISPELL	MT0000933	CRESTON SCHOOL	0.07	2/10/2016
FLATHEAD	KALISPELL	MT0000935	SMITH VALLEY	0.39	7/11/2013
FLATHEAD	KALISPELL	MT0000935	SMITH VALLEY	0.37	2/18/2016
FLATHEAD	KALISPELL	MT0000936	MARION SCHOOL	0.07	8/26/2013
FLATHEAD	KALISPELL	MT0000936	MARION SCHOOL	0.05	2/11/2016
FLATHEAD	KALISPELL	MT0001672	MORNING STAR	0.15	12/12/2013
FLATHEAD	COLUMBIA FALLS	MT0001737	HIDEAWAY TR PK	0.10	6/22/2016
FLATHEAD	LAKESIDE	MT0001741	MISSION VIEW	0.20	10/21/2013
FLATHEAD	KALISPELL	MT0001743	LAKESHORE	0.19	6/17/2016
FLATHEAD	KALISPELL	MT0001744	FLATHEAD COUNTY	0.09	7/15/2015
FLATHEAD	KALISPELL	MT0001744	FLATHEAD COUNTY	0.04	7/15/2015
FLATHEAD	KALISPELL	MT0001744	FLATHEAD COUNTY	0.09	7/15/2015
FLATHEAD	KALISPELL	MT0001744	FLATHEAD COUNTY	0.09	7/15/2015
FLATHEAD	KALISPELL	MT0001745	TWIN ACRES	0.10	2/6/2013
FLATHEAD	KALISPELL	MT0001745	TWIN ACRES	0.10	2/6/2013
FLATHEAD	KALISPELL	MT0001922	HILLTOP TERRACE	0.11	12/6/2016
FLATHEAD	KALISPELL	MT0001922	HILLTOP TERRACE	0.10	12/6/2016
FLATHEAD	KALISPELL	MT0001923	GREENACRES	0.13	11/19/2013
FLATHEAD	KALISPELL	MT0001934	RIDGEVIEW WATER	0.09	9/24/2014
FLATHEAD	WHITEFISH	MT0001984	HAPPY VALLEY	0.18	2/26/2013
FLATHEAD	WHITEFISH	MT0001984	HAPPY VALLEY	0.18	2/29/2016
FLATHEAD	COLUMBIA FALLS	MT0002493	BIG SKY MOBILE	0.08	5/21/2013
FLATHEAD	COLUMBIA FALLS	MT0002493	BIG SKY MOBILE	0.08	11/7/2016
FLATHEAD	KALISPELL	MT0002640	MOUNTAIN VILLA	0.17	8/29/2013
FLATHEAD	KALISPELL	MT0002640	MOUNTAIN VILLA	0.26	4/21/2016
FLATHEAD	KALISPELL	MT0002812	ROCKY MOUNTAIN	0.06	12/18/2014
FLATHEAD	KALISPELL	MT0002812	ROCKY MOUNTAIN	0.06	12/18/2014
FLATHEAD	KALISPELL	MT0002812	ROCKY MOUNTAIN	0.06	2/18/2015
FLATHEAD	KALISPELL	MT0002844	SWAN RIVER	0.13	6/23/2013
FLATHEAD	KALISPELL	MT0002844	SWAN RIVER	0.11	2/10/2016
FLATHEAD	KALISPELL	MT0002846	COUNTRY ESTATES	0.16	12/6/2016
FLATHEAD	KALISPELL	MT0002846	COUNTRY ESTATES	0.16	12/6/2016
FLATHEAD	WHITEFISH	MT0002862	EMERALD HEIGHTS	0.11	4/4/2016
FLATHEAD	KALISPELL	MT0002863	PONDEROSA	0.17	11/5/2013
FLATHEAD	KALISPELL	MT0002863	PONDEROSA	0.18	11/5/2013
FLATHEAD	KALISPELL	MT0002863	PONDEROSA	0.18	11/5/2013
FLATHEAD	KALISPELL	MT0002893	THOMPSON	0.08	11/5/2013
FLATHEAD	COLUMBIA FALLS	MT0002997	KOKANEE BEND	0.07	8/23/2013
FLATHEAD	BIGFORK	MT0003076	RANCH CO WATER	0.15	7/2/2013
FLATHEAD	BIGFORK	MT0003076	RANCH CO WATER	0.15	3/11/2016
FLATHEAD	LAKESIDE	MT0003141	CHAUTAUQUA	0.16	11/25/2013
FLATHEAD	LAKESIDE	MT0003141	CHAUTAUQUA	0.14	8/11/2016
FLATHEAD	WHITEFISH	MT0003219	BLANCHARD	0.22	11/5/2013
FLATHEAD	WHITEFISH	MT0003229	ALPINE VILLAGE	0.08	2/23/2016
FLATHEAD	LAKESIDE	MT0003262	YOUTH WITH A	0.10	8/19/2014
FLATHEAD	KALISPELL	MT0003328	TWO MILE TRACT	0.10	6/24/2013
FLATHEAD	KALISPELL	MT0003328	TWO MILE TRACT	0.15	2/21/2016
FLATHEAD	LAKESIDE	MT0003393	TAMARACK WOODS	0.11	6/24/2016
FLATHEAD	COLUMBIA FALLS	MT0003412	WEYERHAEUSER	< 0.1	9/17/2013
FLATHEAD	KALISPELL	MT0003414	WEST VALLEY PINES	0.15	6/24/2013
FLATHEAD	KALISPELL	MT0003414	WEST VALLEY PINES	0.10	2/21/2016

Table 1a: Public Water Supply Fluoride Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

FLUORIDE CONCENTRATIONS IN MONTANA PUBLIC WATER SUPPLIES (SOURCE OF DATA: MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY 2013-2016)					
County	City	Public Water Supply ID	Water System Name	Concentration (mg/L)	Collection Date
FLATHEAD	KALISPELL	MT0003414	WEST VALLEY PINES	0.15	2/21/2016
FLATHEAD	COLUMBIA FALLS	MT0003531	HALFMOON MOBILE	0.06	8/5/2015
FLATHEAD	COLUMBIA FALLS	MT0003652	RIVER BLUFF HOA	0.12	11/5/2013
FLATHEAD	COLUMBIA FALLS	MT0003652	RIVER BLUFF HOA	0.12	9/14/2016
FLATHEAD	KALISPELL	MT0003770	APPLIED MATERIALS	0.06	11/1/2013
FLATHEAD	KALISPELL	MT0003770	APPLIED MATERIALS	0.06	11/1/2013
FLATHEAD	KALISPELL	MT0003774	WAPITI ACRES	0.13	10/25/2016
FLATHEAD	WHITEFISH	MT0003888	MONTANA COFFEE	0.13	9/2/2015
FLATHEAD	BIG FORK	MT0004005	STREETERS CORNER	0.38	9/28/2016
FLATHEAD	KALISPELL	MT0004029	KALISPELL	0.13	10/25/2014
FLATHEAD	KALISPELL	MT0004046	H E ROBINSON VO	0.13	7/16/2013
FLATHEAD	KALISPELL	MT0004046	H E ROBINSON VO	0.12	2/23/2016
FLATHEAD	WHITEFISH	MT0004052	IRON HORSE	0.08	2/26/2013
FLATHEAD	WHITEFISH	MT0004052	IRON HORSE	0.08	2/26/2013
FLATHEAD	WHITEFISH	MT0004052	IRON HORSE	0.07	1/20/2016
FLATHEAD	WHITEFISH	MT0004052	IRON HORSE	0.08	1/20/2016
FLATHEAD	WHITEFISH	MT0004052	IRON HORSE	0.07	1/20/2016
FLATHEAD	KALISPELL	MT0004083	WETTINGTON	0.65	10/25/2013
FLATHEAD	KALISPELL	MT0004083	WETTINGTON	0.25	10/25/2013
FLATHEAD	KALISPELL	MT0004083	WETTINGTON	1.31	10/25/2013
FLATHEAD	KALISPELL	MT0004083	WETTINGTON	0.57	4/10/2016
FLATHEAD	KALISPELL	MT0004083	WETTINGTON	0.21	4/10/2016
FLATHEAD	KALISPELL	MT0004083	WETTINGTON	1.22	4/10/2016
FLATHEAD	KALISPELL	MT0004105	KALISPELL	0.08	11/20/2013
FLATHEAD	KALISPELL	MT0004105	KALISPELL	0.07	11/18/2015
FLATHEAD	KALISPELL	MT0004109	FLTHD CTY ROAD	0.14	7/12/2016
FLATHEAD	KALISPELL	MT0004150	FOYS LAKESIDE	0.14	6/24/2016
FLATHEAD	KALISPELL	MT0004193	NORTHERN PINES	0.14	6/4/2013
FLATHEAD	KALISPELL	MT0004193	NORTHERN PINES	0.18	6/4/2013
FLATHEAD	KALISPELL	MT0004193	NORTHERN PINES	0.09	6/4/2013
FLATHEAD	KALISPELL	MT0004193	NORTHERN PINES	0.11	5/16/2016
FLATHEAD	KALISPELL	MT0004193	NORTHERN PINES	0.16	5/16/2016
FLATHEAD	KALISPELL	MT0004193	NORTHERN PINES	0.07	5/16/2016
FLATHEAD	KALISPELL	MT0004198	SKY RANCH WATER	0.13	6/21/2016
FLATHEAD	KALISPELL	MT0004198	SKY RANCH WATER	0.19	6/21/2016
FLATHEAD	KALISPELL	MT0004220	WOOD RIDGE HOA	0.09	6/23/2013
FLATHEAD	KALISPELL	MT0004220	WOOD RIDGE HOA	0.11	6/23/2013
FLATHEAD	KALISPELL	MT0004220	WOOD RIDGE HOA	0.14	2/10/2016
FLATHEAD	KALISPELL	MT0004220	WOOD RIDGE HOA	0.15	2/10/2016
FLATHEAD	KALISPELL	MT0004221	STILLWATER	0.16	10/25/2014
FLATHEAD	KALISPELL	MT0004246	CRESTON CENTER	0.25	6/23/2013
FLATHEAD	KALISPELL	MT0004246	CRESTON CENTER	0.25	2/10/2016
FLATHEAD	KALISPELL	MT0004251	SONJU INDUSTRIAL	0.14	10/22/2014
FLATHEAD	KALISPELL	MT0004270	SUMMIT RANCH	0.12	10/23/2014
FLATHEAD	SOMERS	MT0004276	SOUTH EIGHTY	0.11	10/21/2013
FLATHEAD	SOMERS	MT0004276	SOUTH EIGHTY	0.10	7/26/2016
FLATHEAD	MARION	MT0004277	MONTANA	2.75	7/2/2013
FLATHEAD	MARION	MT0004277	MONTANA	2.75	2/15/2016
FLATHEAD	KALISPELL	MT0004283	QUAIL RIDGE	0.14	2/6/2013
FLATHEAD	KALISPELL	MT0004283	QUAIL RIDGE	0.08	1/14/2015
FLATHEAD	KALISPELL	MT0004323	PIONEER BUSINESS	0.04	10/28/2014
FLATHEAD	KALISPELL	MT0004367	ASPEN KNOLL	0.10	7/24/2013
FLATHEAD	KALISPELL	MT0004367	ASPEN KNOLL	0.07	8/26/2015
FLATHEAD	KALISPELL	MT0004367	ASPEN KNOLL	0.08	2/21/2016
FLATHEAD	KALISPELL	MT0004367	ASPEN KNOLL	0.08	2/21/2016
FLATHEAD	KALISPELL	MT0004389	ALPINE BUSINESS	0.15	11/13/2013
FLATHEAD	KALISPELL	MT0004449	STONERIDGE HOME	0.45	2/28/2013
FLATHEAD	KALISPELL	MT0004449	STONERIDGE HOME	0.44	2/28/2013
FLATHEAD	KALISPELL	MT0004449	STONERIDGE HOME	0.31	4/18/2016
FLATHEAD	KALISPELL	MT0004449	STONERIDGE HOME	0.38	4/18/2016
FLATHEAD	KALISPELL	MT0004458	FOX HILL ESTATES	0.10	2/6/2013
FLATHEAD	KALISPELL	MT0004458	FOX HILL ESTATES	0.12	1/14/2015
FLATHEAD	KALISPELL	MT0004459	ROCKY CLIFF	0.20	10/28/2014
FLATHEAD	KALISPELL	MT0004475	EAGLE RIDGE	0.39	10/28/2014
FLATHEAD	COLUMBIA FALLS	MT0004483	PRAIRIE FALCON	0.11	2/18/2013
FLATHEAD	COLUMBIA FALLS	MT0004483	PRAIRIE FALCON	0.12	6/11/2014

Table 1a: Public Water Supply Fluoride Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

FLUORIDE CONCENTRATIONS IN MONTANA PUBLIC WATER SUPPLIES (SOURCE OF DATA: MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY 2013-2016)					
County	City	Public Water Supply ID	Water System Name	Concentration (mg/L)	Collection Date
FLATHEAD	KALISPELL	MT0004514	EAST VALLEY	0.05	6/23/2013
FLATHEAD	KALISPELL	MT0004514	EAST VALLEY	0.05	2/10/2016
FLATHEAD	WHITEFISH	MT0004542	GREAT BEAR	0.13	6/1/2015
FLATHEAD	MARION	MT0004543	ASHLEY HILL	0.36	6/18/2014
FLATHEAD	LAKESIDE	MT0004576	JUNIPER BAY	0.04	8/12/2013
FLATHEAD	LAKESIDE	MT0004576	JUNIPER BAY	0.21	5/5/2014
FLATHEAD	MARION	MT0004597	COUNTRY BOURNE	0.06	3/12/2015
FLATHEAD	WHITEFISH	MT0004641	TOTAL LABEL USA	0.11	6/9/2014
FLATHEAD	KALISPELL	MT0004645	HADLEY ROAD HOA	0.06	10/25/2016
FLATHEAD	KALISPELL	MT0004658	ROSEWOOD ACRES	0.20	4/28/2016
FLATHEAD	KALISPELL	MT0004660	WHITEFISH RIVER	0.07	8/27/2015
FLATHEAD	MISSOULA	MT0004662	SPRUCE MEADOWS	0.10	6/20/2016
FLATHEAD	KALISPELL	MT0004700	GLACIER RANCH	0.07	8/25/2015
FLATHEAD	COLUMBIA FALLS	MT0004735	EXPRESSIONS	0.08	2/18/2013
FLATHEAD	COLUMBIA FALLS	MT0004735	EXPRESSIONS	0.05	6/12/2014
FLATHEAD	KALISPELL	MT0004770	SWAN RIDGE HOA	0.13	3/1/2016
FLATHEAD	KALISPELL	MT0004817	MIDWAY RENTAL	0.05	5/14/2013
FLATHEAD	KALISPELL	MT0004817	MIDWAY RENTAL	0.05	6/24/2016
FLATHEAD	KALISPELL	MT0004818	COLUMBIA RANGE	0.15	4/9/2015
FLATHEAD	COLUMBIA FALLS	MT0004819	PROOF RESEARCH	0.08	3/5/2013
FLATHEAD	COLUMBIA FALLS	MT0004819	PROOF RESEARCH	0.05	6/11/2014
FLATHEAD	SOMERS	MT0004853	MOUNTAIN	0.33	5/29/2014
FLATHEAD	LAKESIDE	MT0004856	CHERRY VIEW	0.17	7/26/2016
FLATHEAD	LAKESIDE	MT0004856	CHERRY VIEW	0.17	7/26/2016
FLATHEAD	LAKESIDE	MT0004856	CHERRY VIEW	0.19	7/28/2016
FLATHEAD	LAKESIDE	MT0004856	CHERRY VIEW	0.18	7/28/2016
FLATHEAD	KALISPELL	MT0004874	MOUNTAIN VIEW	0.10	7/18/2016

Table 1b: Public Water Supply Fluoride Data Temporal Average
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

County	City	Public Water Supply ID	Water System Name	Temporal Average
FLATHEAD	BIG FORK	MT0004005	STREETERS CORNER WATER SYSTEM	0.38
FLATHEAD	BIGFORK	MT0003076	RANCH CO WATER AND SEWER DIST THE	0.15
FLATHEAD	COLUMBIA FALLS	MT0002493	BIG SKY MOBILE MANOR	0.08
FLATHEAD	COLUMBIA FALLS	MT0000906	CFAC PLANT WATER SUPPLY	0.29
FLATHEAD	COLUMBIA FALLS	MT0000181	COLUMBIA FALLS CITY OF	0.05
FLATHEAD	COLUMBIA FALLS	MT0004735	EXPRESSIONS ASSISTED LIVING FACILITY	0.07
FLATHEAD	COLUMBIA FALLS	MT0000911	F H STOLTZE LAND AND LUMBER CO	0.11
FLATHEAD	COLUMBIA FALLS	MT0000184	FLATHEAD COUNTY WATER DIST 101	0.13
FLATHEAD	COLUMBIA FALLS	MT0003531	HALFMOON MOBILE HOME PARK INC	0.06
FLATHEAD	COLUMBIA FALLS	MT0001737	HIDEAWAY TR PK COLUMBIA FALLS	0.10
FLATHEAD	COLUMBIA FALLS	MT0002997	KOKANEE BEND HOA	0.07
FLATHEAD	COLUMBIA FALLS	MT0000914	MEADOW LAKE CO WATER AND SEWER DISTRICT	0.12
FLATHEAD	COLUMBIA FALLS	MT0004483	PRAIRIE FALCON ACRES	0.12
FLATHEAD	COLUMBIA FALLS	MT0004819	PROOF RESEARCH	0.07
FLATHEAD	COLUMBIA FALLS	MT0003652	RIVER BLUFF HOA WHITEFISH	0.12
FLATHEAD	COLUMBIA FALLS	MT0000108	RIVERSIDE MOBILE HOME PARK	0.05
FLATHEAD	COLUMBIA FALLS	MT0000917	WEYERHAEUSER MDF	0.05
FLATHEAD	COLUMBIA FALLS	MT0003412	WEYERHAEUSER PLUM CREEK OFFICE	0.05
FLATHEAD	CORAM	MT0000189	CORAM COUNTY WATER AND SEWER DISTRICT	0.10
FLATHEAD	KALISPELL	MT0004389	ALPINE BUSINESS CENTER	0.15
FLATHEAD	KALISPELL	MT0003770	APPLIED MATERIALS	0.06
FLATHEAD	KALISPELL	MT0004367	ASPEN KNOLL	0.08
FLATHEAD	KALISPELL	MT0000923	BISSELL SCHOOL DISTRICT NO 58	0.19
FLATHEAD	KALISPELL	MT0000099	BROOK DRIVE WATER ASSN	0.14
FLATHEAD	KALISPELL	MT0000896	CAYUSE PRAIRIE SCHOOL DIST NO 10	0.11
FLATHEAD	KALISPELL	MT0004818	COLUMBIA RANGE HOA	0.15
FLATHEAD	KALISPELL	MT0002846	COUNTRY ESTATES WATER SUPPLY	0.16
FLATHEAD	KALISPELL	MT0004246	CRESTON CENTER	0.25
FLATHEAD	KALISPELL	MT0000933	CRESTON SCHOOL DISTRICT 9	0.07
FLATHEAD	KALISPELL	MT0000910	DEER PARK SCHOOL DISTRICT 2	0.08
FLATHEAD	KALISPELL	MT0004475	EAGLE RIDGE ESTATES CO W AND S DIST	0.39
FLATHEAD	KALISPELL	MT0004514	EAST VALLEY ESTATES	0.05
FLATHEAD	KALISPELL	MT0000931	FAIRMONT EGAN SCHOOL DIST NO 3	0.06
FLATHEAD	KALISPELL	MT0001744	FLATHEAD COUNTY WATER AND SEWER	0.08
FLATHEAD	KALISPELL	MT0004109	FLTHD CTY ROAD MAINTENANCE SHOP	0.14
FLATHEAD	KALISPELL	MT0000429	FOSTERS COUNTRY VIEW TR PK LLC	0.12
FLATHEAD	KALISPELL	MT0004458	FOX HILL ESTATES	0.11

Table 1b: Public Water Supply Fluoride Data Temporal Average
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

County	City	Public Water Supply ID	Water System Name	Temporal Average
FLATHEAD	KALISPELL	MT0004150	FOYS LAKESIDE ESTATES WATER & SEWER DIST	0.14
FLATHEAD	KALISPELL	MT0004700	GLACIER RANCH	0.07
FLATHEAD	KALISPELL	MT0000109	GREEN ACRES COURT	0.14
FLATHEAD	KALISPELL	MT0001923	GREENACRES COUNTY WATER AND SEWER DIST	0.13
FLATHEAD	KALISPELL	MT0004046	H E ROBINSON VO AG CENTER	0.13
FLATHEAD	KALISPELL	MT0004645	HADLEY ROAD HOA	0.06
FLATHEAD	KALISPELL	MT0000927	HELENA FLATS SCHOOL DIST 15	0.07
FLATHEAD	KALISPELL	MT0001922	HILLTOP TERRACE SUBDIVISION	0.11
FLATHEAD	KALISPELL	MT0004029	KALISPELL INDUSTRIAL CENTER WUA	0.13
FLATHEAD	KALISPELL	MT0004105	KALISPELL MONTESSORI SCHOOL	0.08
FLATHEAD	KALISPELL	MT0000259	KALISPELL PUBLIC WORKS	0.15
FLATHEAD	KALISPELL	MT0000892	KILA SCHOOL DISTRICT NO 20	1.50
FLATHEAD	KALISPELL	MT0001743	LAKESHORE HEIGHTS HOA	0.19
FLATHEAD	KALISPELL	MT0000111	LAZY DAY COURT COLUMBIA FALLS	0.08
FLATHEAD	KALISPELL	MT0000392	LION MOUNTAIN HOMEOWNERS ASSOC	0.12
FLATHEAD	KALISPELL	MT0000936	MARION SCHOOL DISTRICT 54	0.06
FLATHEAD	KALISPELL	MT0000082	MEADOWLARK MOBILE HOME PARK	0.13
FLATHEAD	KALISPELL	MT0004817	MIDWAY RENTAL BUSINESS PARK	0.05
FLATHEAD	KALISPELL	MT0001672	MORNING STAR	0.15
FLATHEAD	KALISPELL	MT0004874	MOUNTAIN VIEW TIMBERS	0.10
FLATHEAD	KALISPELL	MT0002640	MOUNTAIN VILLA APTS KALISPELL	0.22
FLATHEAD	KALISPELL	MT0004193	NORTHERN PINES COMMUNITY HOA	0.13
FLATHEAD	KALISPELL	MT0000110	NORTHFORK TR CT COLUMBIA FALLS	0.10
FLATHEAD	KALISPELL	MT0004323	PIONEER BUSINESS PARK LLC	0.04
FLATHEAD	KALISPELL	MT0000088	PLEASANT HILL ESTATES HOA	0.18
FLATHEAD	KALISPELL	MT0002863	PONDEROSA HOMEOWNERS ASSN INC	0.18
FLATHEAD	KALISPELL	MT0004283	QUAIL RIDGE	0.11
FLATHEAD	KALISPELL	MT0001934	RIDGEVIEW WATER USERS ASSOC	0.09
FLATHEAD	KALISPELL	MT0004459	ROCKY CLIFF ESTATES	0.20
FLATHEAD	KALISPELL	MT0002812	ROCKY MOUNTAIN HI RV PARK	0.06
FLATHEAD	KALISPELL	MT0004658	ROSEWOOD ACRES	0.20
FLATHEAD	KALISPELL	MT0004198	SKY RANCH WATER ASSOCIATION	0.16
FLATHEAD	KALISPELL	MT0000935	SMITH VALLEY SCHOOL LOWER	0.38
FLATHEAD	KALISPELL	MT0004251	SONJU INDUSTRIAL INC	0.14
FLATHEAD	KALISPELL	MT0000079	SPRUCE PARK MOBILE VILLAGE	0.05
FLATHEAD	KALISPELL	MT0004221	STILLWATER ESTATES COUNTY W AND S DIST	0.16
FLATHEAD	KALISPELL	MT0000078	STILLWATER WATER DISTRICT	0.12
FLATHEAD	KALISPELL	MT0004449	STONERIDGE HOME OWNERS ASSOCIATION	0.40
FLATHEAD	KALISPELL	MT0004270	SUMMIT RANCH	0.12
FLATHEAD	KALISPELL	MT0000077	SUNRISE TERRACE NO 1 HOA	0.08
FLATHEAD	KALISPELL	MT0004770	SWAN RIDGE HOA	0.13
FLATHEAD	KALISPELL	MT0002844	SWAN RIVER SCHOOL DIST 04	0.12
FLATHEAD	KALISPELL	MT0002893	THOMPSON RANCHETTES II	0.08
FLATHEAD	KALISPELL	MT0001745	TWIN ACRES TRAILER COURT	0.10
FLATHEAD	KALISPELL	MT0003328	TWO MILE TRACT HOA	0.13
FLATHEAD	KALISPELL	MT0003774	WAPITI ACRES COUNTY WATER AND SEWER DIST	0.13
FLATHEAD	KALISPELL	MT0003414	WEST VALLEY PINES HOA INC	0.13

Table 1b: Public Water Supply Fluoride Data Temporal Average
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

County	City	Public Water Supply ID	Water System Name	Temporal Average
FLATHEAD	KALISPELL	MT0000895	WEST VALLEY SCHOOL DISTRICT NO 1	0.12
FLATHEAD	KALISPELL	MT0004083	WETTINGTON WATER INC	0.70
FLATHEAD	KALISPELL	MT0004660	WHITEFISH RIVER RANCH	0.07
FLATHEAD	KALISPELL	MT0000098	WILLOW GLEN TRAILER COURT KSPL	0.15
FLATHEAD	KALISPELL	MT0004220	WOOD RIDGE HOA	0.12
FLATHEAD	LAKESIDE	MT0003141	CHAUTAUQUA TERRACE HOA	0.15
FLATHEAD	LAKESIDE	MT0004856	CHERRY VIEW	0.18
FLATHEAD	LAKESIDE	MT0004576	JUNIPER BAY VILLAS	0.13
FLATHEAD	LAKESIDE	MT0001741	MISSION VIEW TERRACE	0.20
FLATHEAD	LAKESIDE	MT0003393	TAMARACK WOODS HOA LAKESIDE	0.11
FLATHEAD	LAKESIDE	MT0000267	TROUTBECK RISE LAKESIDE EST WATER SYSTEM	0.13
FLATHEAD	LAKESIDE	MT0003262	YOUTH WITH A MISSION	0.10
FLATHEAD	MARION	MT0004543	ASHLEY HILL SUBDIVISION	0.36
FLATHEAD	MARION	MT0004597	COUNTRY BOURNE	0.06
FLATHEAD	MARION	MT0004277	MONTANA ACADEMY	2.75
FLATHEAD	MARTIN CITY	MT0000286	MARTIN CITY WATER AND SEWER DIST	0.13
FLATHEAD	MISSOULA	MT0004662	SPRUCE MEADOWS HOA	0.10
FLATHEAD	SOMERS	MT0004853	MOUNTAIN MEADOW HERBS	0.33
FLATHEAD	SOMERS	MT0000332	SOMERS CO WATER AND SEWER DIST	0.13
FLATHEAD	SOMERS	MT0004276	SOUTH EIGHTY WATER	0.11
FLATHEAD	WHITEFISH	MT0003229	ALPINE VILLAGE WUA	0.08
FLATHEAD	WHITEFISH	MT0000060	BIG MOUNTAIN WATER COMPANY	0.05
FLATHEAD	WHITEFISH	MT0003219	BLANCHARD HOLLOW ESTATES WUA	0.22
FLATHEAD	WHITEFISH	MT0002862	EMERALD HEIGHTS HOA WATEDR & SEWER DIST	0.11
FLATHEAD	WHITEFISH	MT0000261	FLATHEAD CO WATER DISTRICT NO 8	0.17
FLATHEAD	WHITEFISH	MT0004542	GREAT BEAR ESTATES	0.13
FLATHEAD	WHITEFISH	MT0001984	HAPPY VALLEY WATER DIST B KSPL	0.18
FLATHEAD	WHITEFISH	MT0004052	IRON HORSE HOMEOWNERS ASSOC	0.08
FLATHEAD	WHITEFISH	MT0003888	MONTANA COFFEE TRADER INC	0.13
FLATHEAD	WHITEFISH	MT0000062	OUTBACK MOBILE HOME SETTLEMENT	0.06
FLATHEAD	WHITEFISH	MT0000133	PTARMIGAN VILLAGE INC	0.05
FLATHEAD	WHITEFISH	MT0004641	TOTAL LABEL USA	0.11
FLATHEAD	WHITEFISH	MT0000357	WHITEFISH CITY OF	0.03

Notes

(1) Data obtained from Montana Department of Environmental Quality (2013-2016 sampling results).

(2) Temporal averages were calculated for each public water supply based on 2013-2016 data.
Results below laboratory reporting limits were included in temporal averages as one half the reporting limit.

Table 2a: Aluminum City Fluoride Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

Monitoring Well	Date	Field Duplicate?	Result (ug/L)
GW01	03/08/2017	N	100
GW01	03/23/2016	N	100 U
GW01	06/08/2016	N	100
GW01	06/12/2015	N	100 U
GW01	09/07/2016	N	170
GW01	09/15/2015	N	100 U
GW01	11/29/2016	N	220
GW01	12/08/2015	N	100 U
GW02	03/08/2017	N	100
GW02	03/23/2016	N	110
GW02	06/08/2016	N	100 U
GW02	06/12/2015	N	100 U
GW02	09/07/2016	N	280
GW02	09/15/2015	N	100 U
GW02	11/29/2016	N	210
GW02	12/08/2015	N	100 U
GW03	04/01/2014	N	200 U
GW03	11/20/2014	N	100
GW04	03/08/2017	N	100 U
GW04	03/23/2016	N	110
GW04	06/08/2016	N	100 U
GW04	06/12/2015	N	100 U
GW04	06/12/2015	FD	100 U
GW04	09/07/2016	N	180
GW04	09/09/2015	N	100 U
GW04	11/29/2016	N	160
GW04	12/08/2015	N	100 U
GW05	03/08/2017	N	100 U
GW05	03/23/2016	N	110
GW05	06/08/2016	N	100 U
GW05	06/12/2015	N	100 U
GW05	09/07/2016	N	270
GW05	09/09/2015	N	100 U
GW05	11/29/2016	N	210
GW05	12/08/2015	N	100 U
GW06	03/08/2017	N	100 U
GW06	03/23/2016	N	100 U
GW06	04/01/2014	N	100 U
GW06	06/08/2016	N	100 U
GW06	06/08/2016	FD	100 U
GW06	06/12/2015	N	100 U
GW06	09/07/2016	N	130
GW06	09/15/2015	N	100 U

Table 2a: Aluminum City Fluoride Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

Monitoring Well	Date	Field Duplicate?	Result (ug/L)
GW06	11/20/2014	N	100 U
GW06	11/29/2016	N	160
GW06	12/07/2015	N	100 U
GW07	03/08/2017	N	100 U
GW07	03/23/2016	N	100 U
GW07	04/01/2014	N	100 U
GW07	06/08/2016	N	100 U
GW07	06/12/2015	N	100 U
GW07	09/07/2016	N	190
GW07	09/15/2015	N	100 U
GW07	11/20/2014	N	100 U
GW07	11/29/2016	N	100
GW07	12/07/2015	N	100 U
GW08	04/01/2014	N	100 U
GW08	11/20/2014	N	100 U
GW09	03/08/2017	N	140
GW09	03/23/2016	N	150
GW09	04/01/2014	N	130
GW09	06/08/2016	N	150
GW09	06/12/2015	N	120
GW09	09/07/2016	N	240
GW09	09/09/2015	N	140
GW09	09/09/2015	FD	140
GW09	11/20/2014	N	100
GW09	11/29/2016	N	100
GW09	11/29/2016	N	180
GW09	11/29/2016	FD	100 U
GW09	11/29/2016	FD	180
GW09	12/07/2015	N	120
GW10	03/08/2017	N	110
GW10	09/07/2016	N	230
GW10	11/29/2016	N	200
GW12	03/23/2016	N	110
GW12	06/08/2016	N	100 U
GW12	06/08/2016	N	NA
GW12	06/18/2015	N	100 U
GW12	07/14/2016	N	220
GW12	07/14/2016	N	100 U
GW12	07/14/2016	FD	240
GW12	07/14/2016	FD	100 U
GW12	09/07/2016	N	100 U
GW12	09/07/2016	N	260
GW12	09/07/2016	FD	100 U

Table 2a: Aluminum City Fluoride Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

Monitoring Well	Date	Field Duplicate?	Result (ug/L)
GW12	09/07/2016	FD	230
GW12	09/09/2015	N	100 U
GW12	12/07/2015	N	100 U
GW14	04/01/2014	N	100 U
GW14	11/20/2014	N	100 U
GW19	03/08/2017	N	100 U
GW19	04/01/2014	N	100 U
GW19	09/07/2016	N	220
GW19	11/20/2014	N	100 U
GW19	11/20/2014	FD	100 U
GW19	11/29/2016	N	150
GW20	03/08/2017	N	150
GW20	03/23/2016	N	160
GW20	04/01/2014	N	140
GW20	06/08/2016	N	130
GW20	06/12/2015	N	100 U
GW20	09/07/2016	N	260
GW20	09/15/2015	N	130
GW20	11/20/2014	N	200
GW20	11/29/2016	N	190
GW20	12/08/2015	N	140
GW20	12/08/2015	FD	140
GW21	03/08/2017	N	100 U
GW21	03/23/2016	N	100 U
GW21	03/23/2016	FD	100 U
GW21	06/08/2016	N	100 U
GW21	09/07/2016	N	100 U
GW21	09/15/2015	N	100 U
GW21	11/29/2016	N	110
GW21	12/07/2015	N	100 U
GW22	03/08/2017	N	100 U
GW22	11/29/2016	N	140
GW23	03/08/2017	N	100 U
GW23	03/08/2017	N	100 U
GW23	03/08/2017	FD	100 U
GW23	03/08/2017	FD	100 U
GW23	11/29/2016	N	170

Table 2b: Aluminum City Fluoride Data Temporal Average
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

Monitoring Well	Temporal Average (mg/L)
GW01	0.10
GW02	0.11
GW04	0.09
GW03	0.10
GW05	0.11
GW06	0.07
GW07	0.07
GW08	0.05
GW09	0.15
GW10	0.18
GW12	0.11
GW14	0.05
GW19	0.10
GW20	0.16
GW21	0.06
GW22	0.10
GW23	0.11

FIGURES

1a. Outlier Box Plots for PWS and Aluminum City
1b. Q-Q Plots for PWS Fluoride Concentrations
1c. Q-Q Plots for Aluminum City Fluoride Concentrations

Figure 1. Outlier Box Plots for PWS and Aluminum City
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

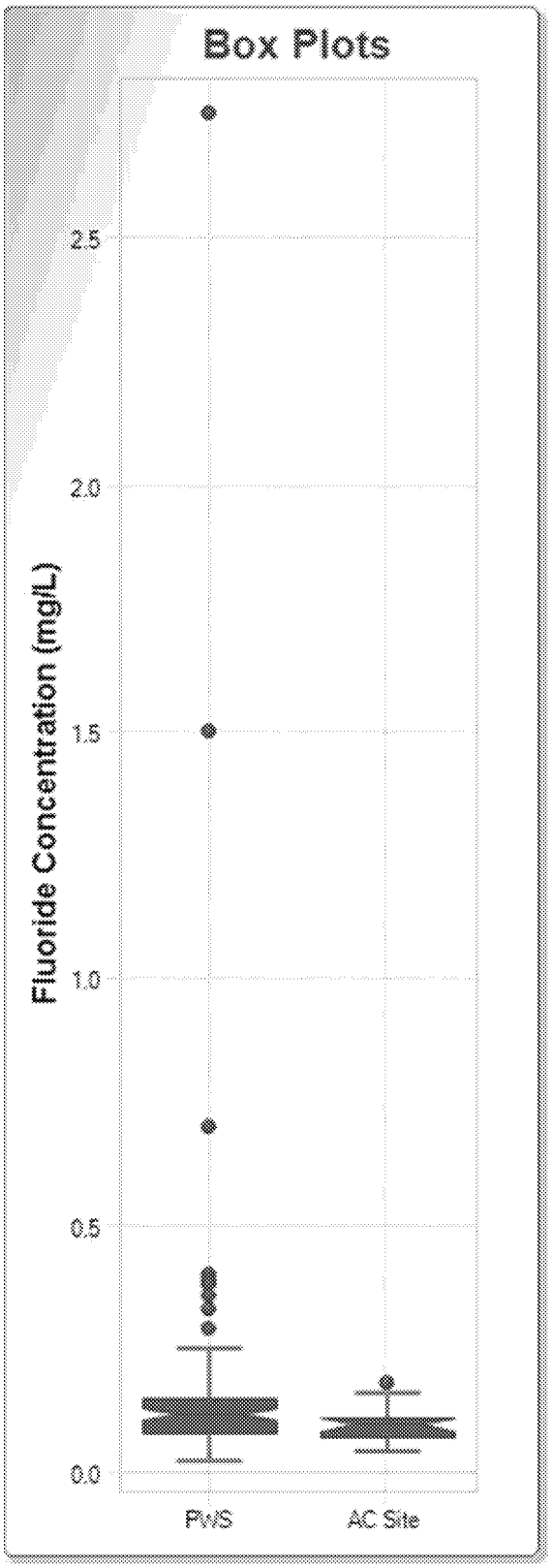


Figure 2. Q-Q Plots for PWS Fluoride Concentrations
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

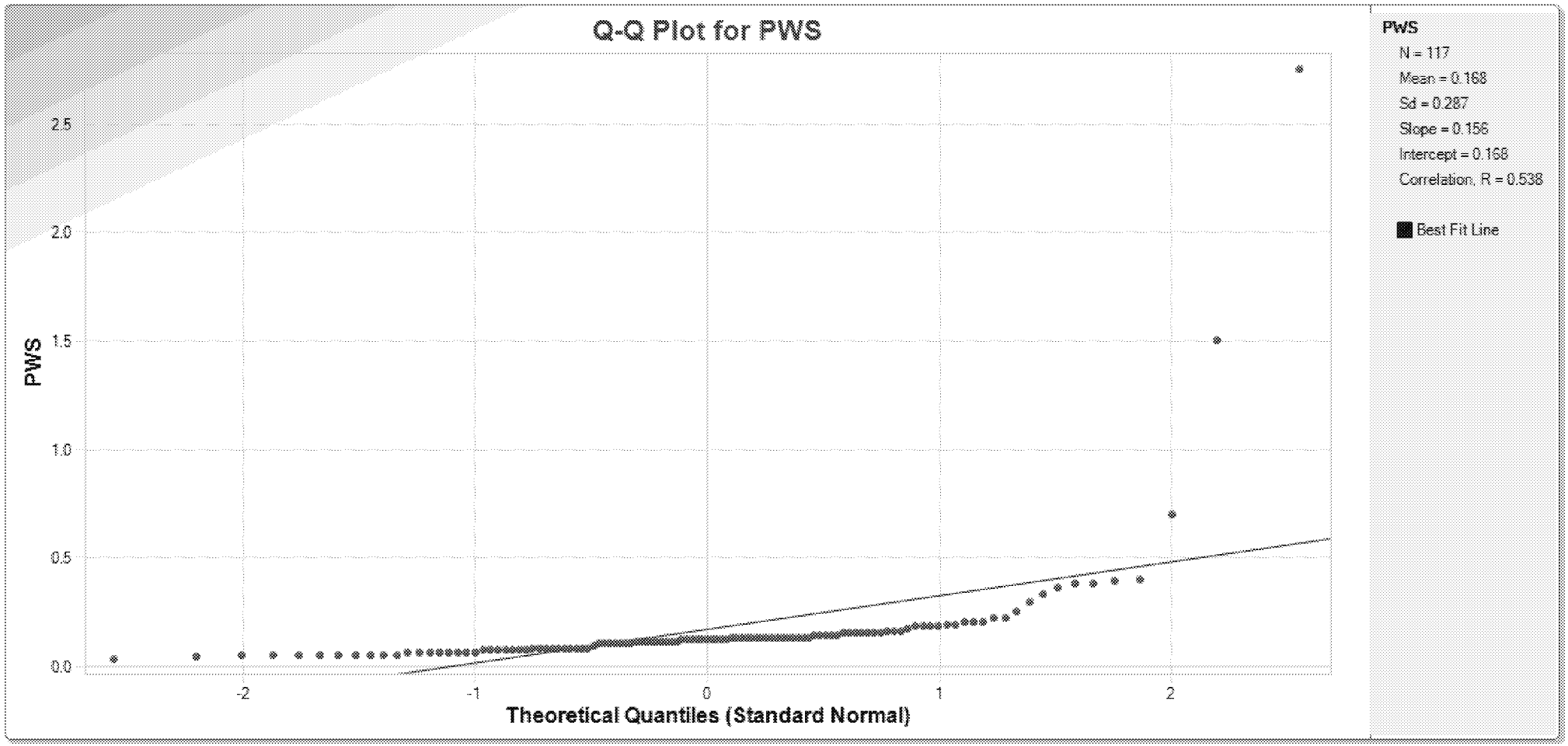
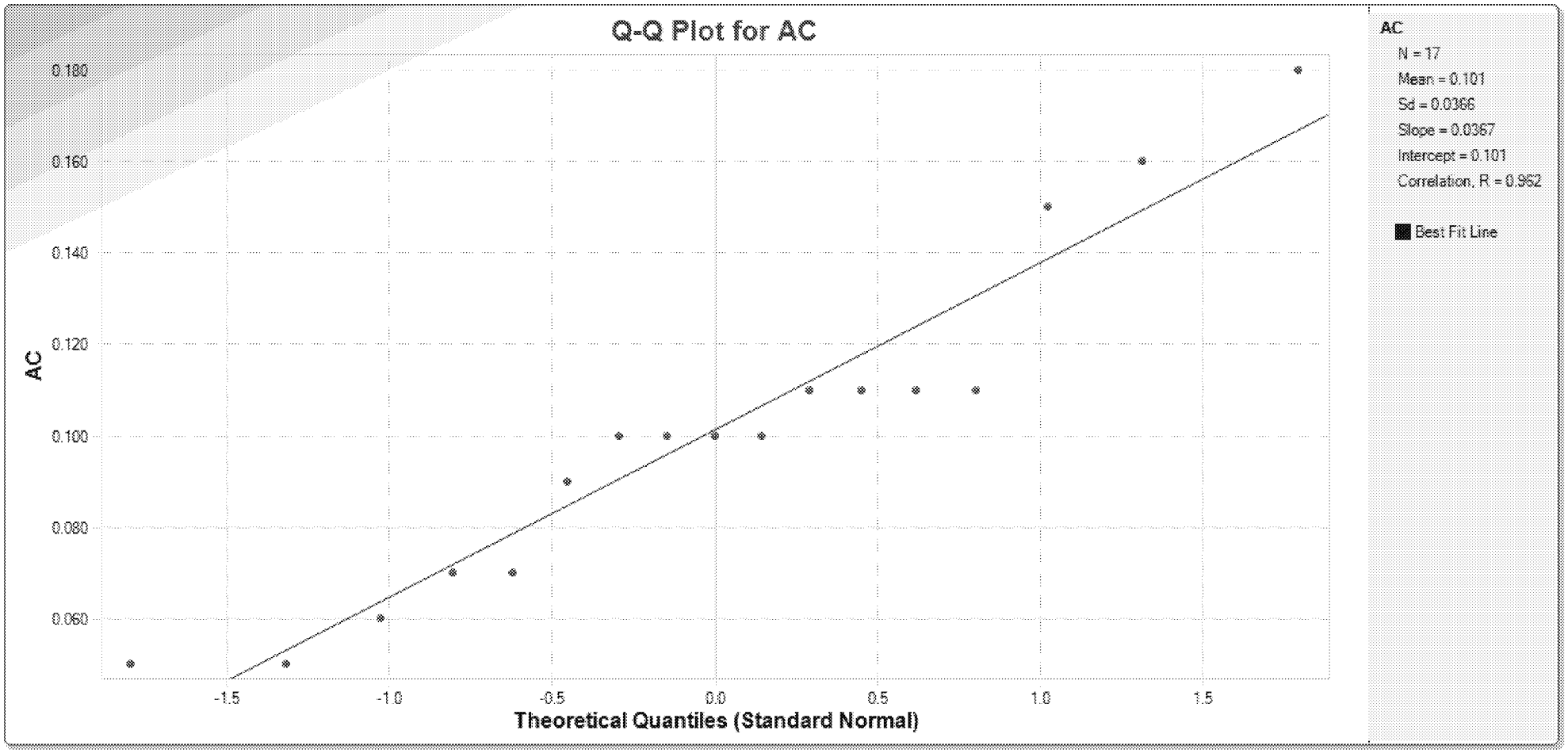


Figure 3. Q-Q Plots for Aluminum City Fluoride Concentrations
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT



ATTACHMENTS

1a. t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

1b. t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs - Outliers Removed

1c. Outlier Tests for Selected Uncensored Variables - PWS

1d. Outlier Tests for Selected Uncensored Variables - Aluminum City

1e. General Statistics on Uncensored Full Data

Attachment 1a. t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.12/28/2018 4:50:19 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0.000
Selected Null Hypothesis	Sample 1 Mean <= Sample 2 Mean (Form 1)
Alternative Hypothesis	Sample 1 Mean > the Sample 2 Mean

Sample 1 Data: PWS

Sample 2 Data: AC Site

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	117	17
Number of Distinct Observations	29	9
Minimum	0.03	0.05
Maximum	2.75	0.18
Mean	0.168	0.101
Median	0.12	0.1
SD	0.287	0.0366
SE of Mean	0.0265	0.00887

Sample 1 vs Sample 2 Two-Sample t-Test

H0: Mean of Sample 1 - Mean of Sample 2 <= 0

Method	DF	t-Test Value	Critical t (0.05)	P-Value
Pooled (Equal Variance)	132	0.953	1.656	0.171
Welch-Satterthwaite (Unequal Variance)	131.5	2.380	1.657	0.009

Pooled SD 0.269

Conclusion with Alpha = 0.050

Student t (Pooled) Test: Do Not Reject H0, Conclude Sample 1 <= Sample 2

Welch-Satterthwaite Test: Reject H0, Conclude Sample 1 > Sample 2

Test of Equality of Variances

Variance of Sample 1	0.0822
Variance of Sample 2	0.00134

Numerator DF	Denominator DF	F-Test Value	P-Value
116	16	61.503	0.000

Conclusion with Alpha = 0.05

Two variances are not equal

Attachment 1b. t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs - Outliers Removed

Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

t-Test Sample 1 vs Sample 2 Comparison for Uncensored Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.13/15/2018 3:24:35 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0.000
Selected Null Hypothesis	Sample 1 Mean <= Sample 2 Mean (Form 1)
Alternative Hypothesis	Sample 1 Mean > the Sample 2 Mean

Sample 1 Data: PWS

Sample 2 Data: AC

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	114	17
Number of Distinct Observations	26	9
Minimum	0.03	0.05
Maximum	0.4	0.18
Mean	0.129	0.101
Median	0.12	0.1
SD	0.0748	0.0366
SE of Mean	0.007	0.00887

Sample 1 vs Sample 2 Two-Sample t-Test

H0: Mean of Sample 1 - Mean of Sample 2 <= 0

Method	DF	t-Test Value	Critical t (0.05)	P-Value
Pooled (Equal Variance)	129	1.487	1.657	0.070
Welch-Satterthwaite (Unequal Variance)	40.0	2.435	1.684	0.010

Pooled SD 0.071

Conclusion with Alpha = 0.050

Student t (Pooled) Test: Do Not Reject H0, Conclude Sample 1 <= Sample 2

Welch-Satterthwaite Test: Reject H0, Conclude Sample 1 > Sample 2

Test of Equality of Variances

Variance of Sample 1	0.00559
Variance of Sample 2	0.00134

Numerator DF	Denominator DF	F-Test Value	P-Value
113	16	4.183	0.002

Conclusion with Alpha = 0.05

Two variances are not equal

Attachment 1c. Outlier Tests for Selected Uncensored Variables - PWS
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

	Outlier Tests for Selected Uncensored Variables
User Selected Options	
Date/Time of Computation	ProUCL 5.13/15/2018 3:27:18 PM
From File	WorkSheet.xls
Full Precision	OFF

Rosner's Outlier Test for PWS

Mean	**0.168**
Standard Deviation	**0.287**
Number of data	**117**
Number of suspected outliers	**3**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	0.168	0.285	2.75	117	9.047	3.428	3.798
2	0.145	0.156	1.5	116	8.672	3.424	3.798
3	0.134	0.0915	0.7	115	6.188	3.424	3.798

For 5% significance level, there are 3 Potential Outliers

Potential outliers are:

2.75, 1.5, 0.7

For 1% Significance Level, there are 3 Potential Outliers

Potential outliers are:

2.75, 1.5, 0.7

Attachment 1d. Outlier Tests for Selected Uncensored Variables - Aluminum City
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

	Outlier Tests for Selected Uncensored Variables
User Selected Options	
Date/Time of Computation	ProUCL 5.12/28/2018 4:43:58 PM
From File	WorkSheet.xls
Full Precision	OFF

Dixon's Outlier Test for AC Site

Number of Observations = 17

10% critical value: 0.438

5% critical value: 0.49

1% critical value: 0.577

1. Observation Value 0.18 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.250

For 10% significance level, 0.18 is not an outlier.

For 5% significance level, 0.18 is not an outlier.

For 1% significance level, 0.18 is not an outlier.

2. Observation Value 0.05 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.100

For 10% significance level, 0.05 is not an outlier.

For 5% significance level, 0.05 is not an outlier.

For 1% significance level, 0.05 is not an outlier.

Attachment 1e. General Statistics on Uncensored Full Data
Columbia Falls Aluminum Company, LLC, 2000 Aluminum Drive, Columbia Falls, MT

	General Statistics on Uncensored Full Data
Date/Time of Computation	ProUCL 5.13/15/2018 7:03:12 PM
User Selected Options	
From File	WorkSheet.xls
Full Precision	OFF

From File: WorkSheet.xls

General Statistics for Uncensored Data Sets

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Geo-Mean	SD	SEM	MAD/0.675	Skewness	CV
PWS	117	0	0.03	2.75	0.168	0.12	0.28	0.0265	0.0593	7.352	1.709
AC	17	0	0.05	0.18	0.101	0.095	0.036	0.00887	0.0148	0.598	0.361

Percentiles for Uncensored Data Sets

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
PWS	117	0	0.06	0.07	0.08	0.12	0.15	0.16	0.22	0.38	1.372
AC	17	0	0.056	0.07	0.07	0.1	0.11	0.11	0.154	0.164	0.177