APPENDIX H

RE-EVALUATION OF BACKGROUND VALUES FOR CONSTITUENTS IN GROUNDWATER NEAR DOE AREAS

1. RE-EVALUATION OF BACKGROUND VALUES FOR CONSTITUENTS IN GROUNDWATER NEAR DOE AREAS

This section provides the results for a re-evaluation of background concentrations of constituents in groundwater at the Laboratory for Energy-related Health Research (LEHR)/Old Campus Landfill Superfund Site (Site), located at the University of California, Davis (UC Davis) for the U.S. Department of Energy (DOE) Areas subject to an ongoing groundwater monitoring program. The re-evaluation was initiated in response to increasing concentration trends reported in the *2016 Annual Water Monitoring Report* (Weiss, 2017) for some of the monitored constituents and concerns that the prolonged drought may be causing constituent concentrations in Site groundwater to shift. As such, any new values would need to be incorporated into the groundwater monitoring program.

1.1 Background Values

Initial background values for all constituents were determined using data collected from two established off-site background wells (UCD1-018 and UCD1-063) during 2011 and 2012, except "provisional background" values were used for the new well constituents (NWCs) iron and manganese which had only two quarters of background sampling results in 2011 and two quarters of background sampling results in 2012 (Weiss, 2014). Provisional background is based on values developed in the *DOE Areas Remedial Investigation Report* (Weiss, 2003). To determine current background levels, the DOE initiated a re-evaluation in 2016 per Section 4.1 of the *Remedial Design/Remedial Action Work Plan* (RD/RAWP) (DOE, 2010).

1.2 Sampling of Wells

Sampling for the re-evaluation commenced as DOE collected groundwater samples from established background wells UCD1-018 and UCD1-063 for four consecutive quarters (Q4 2016 through Q3 2017). In addition, DOE collected groundwater samples from prospective background wells UCD1-073 and UCD1-079.

The new background values in this evaluation are based only on data collected from the same two established background wells used in the initial determination (UCD1-018 and UCD1-063). Well UCD1-018 is located north of Putah Creek and west of the DOE Areas and provides a background reference location that is upgradient of LEHR Site contamination based on the inferred groundwater flow direction. Well UCD1-063 is located south of Putah creek and southeast of the DOE Areas and provides a local background reference that is isolated from LEHR Site contamination by a hydraulic divide generated by Putah Creek. Ambient concentrations of redox sensitive metals (e.g., chromium, manganese, arsenic), other trace metals (e.g., boron), and nitrate in groundwater are spatially variable in the vicinity of the LEHR Site and multiple background reference wells are necessary to properly assess background.

Groundwater samples collected from both the established and prospective background wells were analyzed for the full suite of 19 inorganic constituents of concern (COCs), monitoring-only constituents (MOCs), and NWCs. If the status of a prospective background well is changed to "established", another background re-evaluation may be initiated.[1]

The methodology for determining background values from groundwater data collected initially in 2011-2012 (also referred to as the first collection) and 2016-2017 (also referred to as the second collection) included detecting outliers, testing for trends, and visually inspecting for trends.

After outliers were removed and appropriate data sets identified, the maximum concentration was used to represent background as established in the RD/RAWP (DOE, 2010). The background evaluation approach established in the RD/RAWP is empirical and no attempt is made in this re-evaluation to investigate or explain geochemical mechanisms that may be changing concentrations of constituents in Site groundwater. Evaluation details are presented below.

1.2.1 Background Sample Collection

Groundwater samples were collected from background wells in 2011, 2012, 2016, and 2017. Results for samples collected in 2011, 2012, and 2016 are documented in the *Annual Water Monitoring Report* for each of those years (Weiss, 2013; 2014; 2017). Results for groundwater samples collected in 2017 are documented in the 2017 Annual Report.

1.2.2 Detection Frequency and Concentration Range

Detection frequencies and concentration ranges from the first and second collections are shown in Table H-1. Detection frequencies are similar between the first and second collection for all constituents except aluminum. The aluminum detection frequency increased after the method detection (MDL) limit was lowered from 10.5 to 3.31 micrograms per liter (µg/L).

Concentration ranges were similar between the first and second collection for all constituents except manganese and nickel. The maximum concentration of manganese in the first collection (4.48 µg/L) was greater than the maximum in the second collection (0.475 J µg/L) by a factor of 9.4. The first collection maximum had a field duplicate with a similar concentration (4.17 µg/L). Minimum concentrations of manganese are similar (0.174 and 0.166 µg/L), but the data set is left-censored (i.e., contains non-detect results) and the lowest detected concentrations are near the lowest MDL of 0.139 µg/L, making a comparison of minimum concentrations inconclusive.

The maximum concentration of nickel in the first collection (141 µg/L) was greater than the maximum in the second collection (5.19 J µg/L) by a factor of 27. The first collection maximum had a field duplicate with a similar concentration (137 µg/L). Minimum concentrations of nickel are similar (1.32 and 1.03 µg/L), indicating no significant change in concentration at the lower tail of the distribution.

Data from the first and second collections are tabulated and presented in Attachment H1.

[1] The ongoing study to determine the status of prospective background wells is presented in Section 3.4 of the 2017 Annual Report.

1.2.3 Outlier Evaluation

The background data were tested for outliers using Dixon's test (for data sets with 24 or fewer sample results) or Rosner's test (for data sets with 25 or more results) available in the U.S. Environmental Protection Agency's (USEPA's) *ProUCL Version 5.1.002 (ProUCL)* (USEPA, 2016). Dixon's outlier test was applied to most of the constituents since fewer than 24 results were available; Rosner's test was applied only to selenium and hexavalent chromium (Cr[VI]) since 29 results were available.

Constituents with all non-detect or highly-censored (more than 80 percent non-detect) data (i.e., americium-241, carbon-14, cesium-137, mercury, silver, and strontium-90 [Sr-90]) were not tested. When radiological constituents had partially censored data sets, the reported activity-concentration was used instead of non-detect estimation methods because it is a rough approximation of the true activity concentration. When chemical constituents had partially censored data sets, only detected data were used in the outlier testing as recommended in the *ProUCL Version 5.1.002 Technical Guide* (USEPA, 2015a). Test results are summarized in Table H-1 and the input and output files are included in Attachment H2.

Test results indicated upper tail outliers for radium-226 (Ra-226) and zinc data. After removing the highest Ra-226 result (1.17 picoCuries per liter), Dixon's test indicated no outliers at 1, 5, and 10 percent significance levels. After the highest zinc result was removed, Dixon's test continued to indicate an upper tail outlier at 1, 5, and 10 percent significance levels. After removing the second highest zinc result, Dixon's test indicated no outliers at 1, 5, and 10 percent significance levels. The highest Ra-226 and two highest zinc results were classified as outliers and eliminated from representing the upper tails of their distributions, respectively.

Iron and nickel test results did not indicate outliers at the 1 percent significance level but indicated their maximum concentrations were potential outliers at the 5 and 10 percent significance levels. The highest iron and nickel results were supported by confirming field duplicate results as indicated by relative percent differences of 25 and 3 percent, respectively, for these constituents. Because outlier test results did not conclusively indicate the maximum concentrations of iron and nickel were outliers, and the maximums are supported by field duplicate results, the results were not eliminated from representing the upper tail of their distributions.

The remaining nine constituents had test results indicating no upper tail outliers at 1, 5, and 10 percent significance levels.

1.2.4 Trend Evaluation

The background data were tested for trends to evaluate if significant changes in concentration have occurred over time. An increasing or decreasing trend test result could indicate that data from the first collection are not representative of current background conditions. Trend tests were conducted using the Mann-Kendall test in the *ProUCL* (USEPA, 2016). Individual tests were conducted for wells UCD1-018 and UCD1-063 for each constituent. The data were tested at an alpha significance level of 1 percent as specified in the RD/RAWP (DOE, 2010). Constituents with all non-detect or highly-censored data (i.e., americium-241, carbon-14, cesium-137, mercury, silver, and Sr-90) were not tested. The *ProUCL's* non-detect estimation methods were used for partially censored chemical data,

however the reported activity-concentration was used for partially censored radiological data (see Section 1.2.3 above). The test results are summarized in Table H-1 and the input and output files are included in Attachment H3. Time series plots were generated for each constituent for visual evaluation; these plots are also presented in Attachment H3.

Test results did not indicate significant increasing or decreasing trends for any of the constituents except for increasing zinc in well UCD1-063. Visual inspection of the zinc time series plot confirmed that concentrations in well UCD1-063 were mostly higher in the second collection. As discussed above, outlier test results identified two zinc concentrations as potential upper tail outliers.

The highest zinc result was from well UCD1-018 and visual inspection of the time series plot indicates the maximum is inconsistent with the overall time series for that well. As seen in the time series plot for zinc in well UCD1-063, and confirmed by the trend test result, the second highest zinc concentration is consistent with the overall increasing trend.

For constituents whose test results did not indicate a trend, visual inspection of the time series plots indicated potential increasing trends for aluminum, iron, selenium, and uranium-238, and potential decreasing trends for manganese and nickel. Maximum concentrations of aluminum, iron, selenium, and uranium-238 were from the second collection, indicating these maximums are consistent with current background.

1.2.5 Background Value Determination

Maximum concentrations were used to represent background, as established in the RD/RAWP (DOE, 2010). The data were evaluated as discussed above to determine their representativeness based on statistical testing and visual inspections of the plotted data. Decisions made in the determination of background values are presented below in order of increasing complexity:

- The reporting limit was identified as the background value for chemical and radiological constituents that were not detected in any of the samples. Constituents in this category are americium-241, carbon-14, cesium-137, silver, and Sr-90.
- The reporting limit was identified as the background value for mercury. Although mercury was detected once at a concentration near the MDL in 2011, it was not detected in background samples collected in 2012, 2016, or 2017, indicating the detection is likely an outlier.
- The maximum concentration was identified as the background value for constituents whose statistical test results indicated no outliers and no trends. Constituents in this category are aluminum, Cr(VI), total chromium, gross beta, iron, manganese, molybdenum, nickel, nitrate, selenium, and uranium-238.
- The second highest concentration was identified as the background value for Ra-226, for which statistical test results indicated an upper tail outlier and no trends. The second highest Ra-226 activity-concentration was not an outlier, supporting its use.
- The third highest concentration was identified as the background value for zinc, with statistical test results that indicated two upper tail outliers and an increasing trend in well UCD1-063. The third highest zinc concentration was not an outlier, supporting its use.

Table H-2 contains a comparison of the background values determined in this evaluation to those established in 2012. As shown, background values increased for aluminum, Cr(VI), total chromium, mercury, molybdenum, nitrate, selenium, uranium-238, and zinc, but decreased for iron, manganese, and Ra-226. There was no change for americium-241, gross beta, carbon-14, cesium-137, nickel, silver, and Sr-90.

"Provisional background" was not used in this background update for NWCs. Background for NWCs was defined as the higher of the maximum detected concentration or provisional background as reported in Table 5-4 of the *2012 Comprehensive Annual Water Monitoring Report* (Weiss, 2014). Specifically, provisional background was used for NWCs iron and manganese when the 2012 background was established (Table H-2).

1.3 Revised Background Data Use and Next Steps

Concentrations of well-specific COCs, MOCs, and NWCs are compared to one of two criteria (background or baseline) when DOE Areas groundwater monitoring program data are evaluated each year. Baseline is the representative initial concentration of a constituent in a well as specified in the RD/RAWP (DOE, 2010), and was determined from samples collected in 2011 and 2012 and documented in the *2012 Comprehensive Annual Water Monitoring Report* (Weiss, 2014). When baseline is greater than background, baseline is used for comparisons. When background is greater than or equal to baseline, background is used.

The classification of a well-specific constituent's baseline as above or below background is its "baseline condition." The baseline condition for certain well-specific constituents changed due to the results of this background evaluation. For example, the baseline condition classification for selenium in well UCD1-068 was established as "above" in 2012 because its baseline concentration (2.24 µg/L) was above 2012 background (1.74 µg/L). The baseline condition classification for selenium in well UCD1-068 is now below because the 2017 background concentration (2.92 µg/L) is above baseline.

Baseline condition changes are shown in Table H-3 along with 2012 and 2017 background, well-specific baseline, and the 2012 baseline conditions. As shown, the baseline condition changed from "below" to "above" for one well-specific constituent and from "above" to "below" for eight well-specific constituents. These baseline condition changes were applied in the evaluation of DOE Areas groundwater monitoring program data collected in 2017 (Section 3 of the 2017 Annual Report).

As discussed in the trend evaluation, additional manganese and nickel background samples could be collected to provide more confident decisions about the upper tails of their background distributions. However, baseline is the comparison criteria for manganese and the collection of additional background data will not likely change the manganese baseline condition. Additional nickel background samples are recommended when the next background sample collection effort is performed.

Well UCD1-079 is a prospective background well, and continuous water level measurements were initiated in May 2017 to evaluate hydraulic gradient near this well. If well UCD1-079 is confirmed as an established background well, another background re-evaluation will be initiated.

2. REFERENCES

U.S. Department of Energy, 2010. *Remedial Design/Remedial Action Work Plan for the Former Laboratory for Energy-Related Health Research Federal Facility, University of California, Davis*, LMS/LEH/S05822-0.0, November.

U.S. Environmental Protection Agency (USEPA), 2015a, *ProUCL Version 5.1.002 Technical Guide*, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations, EPA/600/R-07/041, October.

USEPA, 2015b, *ProUCL Version 5.1.002 User Guide*, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations, EPA/600/R-07/041, October.

USEPA, 2016. *ProUCL Version 5.1.002*, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations, https://www.epa.gov/land-research/proucl-software, updated June 20.

Weiss Associates (Weiss), 2003. *Doe Areas Remedial Investigation Report for the Laboratory for Energy-Related Health Research University of California, Davis*, prepared for U.S. Department of Energy, National Nuclear Security Administration Service Center, Oakland, September 18.

Weiss, 2013. *2011 Comprehensive Annual Water Monitoring Report for the Laboratory for Energy-related Health Research/Old Campus Landfill Superfund Site, University of California, Davis*, prepared for University of California, Davis, March 18.

Weiss, 2014. *2012 Comprehensive Annual Water Monitoring Report for the Laboratory for Energy-related Health Research/Old Campus Landfill Superfund Site, University of California, Davis*, prepared for University of California, Davis, February 6.

Weiss, 2017. *2016 Annual Water Monitoring Report for the Laboratory for Energy-related Health Research/Old Campus Landfill Superfund Site, University of California, Davis*, prepared for University of California, Davis, April 25.

Tables

Table H-1. Background Update, U.S. DOE Groundwater Monitoring Program, Laboratory for Energy-related Health Research/Old Campus Landfill, University of California, Davis

Constituent	Constituent Type	Units	2011-2012 Detection Frequency[a]	2016 - 2017 Detection Frequency[a]	2011-2012 Range	2016 - 2017 Range	Outlier Test Result	Trend Test Result[b]	Updated Background[c]
Aluminum	MOC	µg/L	1/14	9/9	5.86 J	4.67 J - 13.5 J	no outliers	no trend	13.5 J
Americium-241	MOC	pCi/L	0/12	0/9	<0.71	<1	na	na	<1
Beta, Gross	NWC	pCi/L	3/12	2/9	1.84 J - 2.88 J	1.23 J - 1.73 J	no outliers	no trend	2.88 J
Carbon-14	COC/NWC	pCi/L	0/14	0/8	<7	<7	na	na	<7
Cesium-137	COC	pCi/L	0/14	0/9	<5	<5	na	na	<5
Cr(VI)	COC/NWC	µg/L	20/20	9/9	3.6 - 40	14 - 49	no outliers	no trend	49
Chromium, Total	COC/MOC/NWC	µg/L	14/14	9/9	7.19 - 43.7	15.8 - 48.2	no outliers	no trend	48.2
Iron	NWC	µg/L	9/9	9/9	16.7 J - 58.3	10.6 J - 85.6	no outliers[d]	no trend	85.6
Manganese	NWC	µg/L	5/9	6/9	0.174 J - 4.48	0.166 J - 0.475 J	no outliers	no trend	4.48
Mercury	COC/MOC	µg/L	1/20	0/9	0.0479 J	<0.2 - <0.5	na	na	<0.2
Molybdenum	COC	µg/L	14/14	9/9	1.24 - 3.13	1.35 - 3.57	no outliers	no trend	3.57
Nickel	MOC	µg/L	12/12	9/9	1.23 - 141	1.03 - 5.19	no outliers[d]	no trend	141
Nitrate (As N)	COC	mg/L	14/14	9/9	1.1 - 15	0.55 - 16	no outliers	no trend	16
Radium-226	COC	pCi/L	5/14	3/9	0.245 - 1.17	0.352 J - 0.553 J	1.17 pCi/L is outlier	no trend	0.639 J [e]
Selenium	COC	µg/L	20/20	9/9	0.631 J - 1.74	1 - 2.92	no outliers	no trend	2.92
Silver	COC/MOC	µg/L	0/14	0/9	<1	<1	na	na	<1
Strontium-90	COC	pCi/L	0/14	0/9	<1	<1	na	na	<1
Uranium-238	NWC	pCi/L	7/9	7/9	0.376 J - 0.946 J	0.655 J - 1.59	no outliers	no trend	1.59
Zinc	MOC	µg/L	12/12	8/9	2.47 J - 20.9	3.42 - 59.9	59.9 µg/L is outlier	ucd63 increase	21.5 [f]

Notes:

[a] Samples collected from background wells UCD1-018 and UCD1-063; detection frequency includes field duplicates.

[b] Wells UCD1-018 and UCD1-063 tested for trends individually.

[c] Updated background is the maximum concentration unless noted otherwise.

[d] Maximum concentration was not an outlier at 1 percent significance level, but was a potential outlier at 5 and 10 percent significance levels.

[e] Second highest radium-226 activity-concentration selected; highest concentration identified as an outlier; second highest concentration was not an outlier at 1, 5, and 10 percent

[f] Third highest zinc concentration selected. Highest amd second highest concentrations identified as outliers.

Acronyms/Abbreviations:

<n - not detected at or above laboratory reporting of n concentration (activity for radioactive constituents)
COC - constituent of concern
Cr(VI) - hexavalent chromium
DOE - U.S. Department of Energy
J - the result is qualified as an estimated concentration (activity)
mg/L - milligrams per liter
MOC - monitoring-only constituent
na - not applicable
N - nitrogen
NWC - new well constituent
pCi/L - picoCuries per liter
µg/L - micrograms per liter
ucd63 - background reference well UCD1-063

Table H-2. Background Changes, U.S. DOE Groundwater Monitoring Program, Laboratory for Energy-related Health Research/Old Campus Landfill, University of California, Davis

Constituent	Constituent Type	Units	2012 Background	2017 Background	Change
Aluminum	MOC	µg/L	5.86 J	13.5 J	up
Americium-241	MOC	pCi/L	<0.71	<1	same
Beta, Gross	NWC	pCi/L	2.88 J	2.88 J	same
Carbon-14	COC/NWC	pCi/L	<7	<7	same
Cesium-137	COC	pCi/L	<5	<5	same
Chromium, Hexavalent	COC/NWC	µg/L	40	49	up
Chromium, Total	COC/MOC/NWC	µg/L	43.7	48.2	up
Iron	NWC	µg/L	502 [a]	85.6	down
Manganese	NWC	µg/L	10 [a]	4.48	down
Mercury	COC/MOC	µg/L	0.0479 J	<0.2	up
Molybdenum	COC	µg/L	3.13	3.57	up
Nickel	MOC	µg/L	141	141	same
Nitrate (As N)	COC	mg/L	15	16	up
Radium-226	COC	pCi/L	1.17	0.639 J	down
Selenium	COC	µg/L	1.74	2.92	up
Silver	COC/MOC	µg/L	<1	<1	same
Strontium-90	COC	pCi/L	<1	<1	same
Uranium-238	NWC	pCi/L	0.946 J	1.59	up
Zinc	MOC	µg/L	20.9	21.5	up

Notes:

[a] 2012 background for NWCs is defined as the higher of the maximum detected concentration or "provisional background" as reported on Table 5-4 of the 2012 Annual Water Monitoring Report (Weiss, 2014).

Acronyms/Abbreviations:

<n - not detected at or above laboratory reporting of n concentration (activity for radioactive constituents)
COC - constituent of concern
DOE - U.S. Department of Energy
J - the result is qualified as an estimated concentration (activity)
mg/L - milligrams per liter
MOC - monitoring-only constituent
N - nitrogen
NWC - new well constituent
pCi/L - picoCuries per liter
µg/L - micrograms per liter

Table H-3 Baseline Condition Changes, U.S. DOE Groundwater Monitoring Program, Laboratory for Energy-related Health Research/Old Campus Landfill, University of California, Davis

Monitoring Well	Constituent	Units	2012 Background	2017 Background	Baseline	2012 Baseline Condition	Baseline Condition Change
Constituents of Concern							
UCD1-021	Carbon-14	pCi/L	<7	<7	<7	Same	---
UCD1-021	Nitrate as N	mg/L	15	16	27	Above	---
UCD1-021	Radium-226	pCi/L	1.17	0.639 J	0.292 J	Below	---
UCD1-023	Carbon-14	pCi/L	<7	<7	22.1	Above	---
UCD1-023	Nitrate as N	mg/L	15	16	5.1	Below	---
UCD1-054	Cesium-137	pCi/L	<5	<5	<5.02	Same	---
UCD1-054	Chromium	µg/L	43.7	48.2	13.6	Below	---
UCD1-054	Chromium (Hexavalent)	µg/L	40	49	12	Below	---
UCD1-054	Mercury	µg/L	0.0479 J	<0.2	0.072 J	Above	---
UCD1-054	Molybdenum	µg/L	3.13	3.57	3.11	Below	---
UCD1-054	Silver	µg/L	<1	<1	<1	Same	---
UCD1-054	Strontium-90	pCi/L	<1	<1	<1	Same	---
UCD1-068	Carbon-14	pCi/L	<7	<7	<7	Same	---
UCD1-068	Nitrate as N	mg/L	15	16	12	Below	---
UCD1-068	Radium-226	pCi/L	1.17	0.639 J	0.324	Below	---
UCD1-068	Selenium	µg/L	1.74	2.92	2.24	Above	Below
UCD1-069	Formaldehyde	µg/L	13 J	0	12 J	Below	Above
UCD1-069	Molybdenum	µg/L	3.13	3.57	1.81	Below	---
UCD1-069	Nitrate as N	mg/L	15	16	9.9	Below	---
UCD1-070	Carbon-14	pCi/L	<7	<7	18.9	Above	---
UCD1-070	Nitrate as N	mg/L	15	16	3	Below	---
UCD1-071	Cesium-137	pCi/L	<5	<5	<5	Same	---
UCD1-071	Chromium	µg/L	43.7	48.2	49.1	Above	---
UCD1-071	Chromium (Hexavalent)	µg/L	40	49	47	Above	Below
UCD1-071	Mercury	µg/L	0.0479 J	<0.2	0.0658 J	Above	---
UCD1-071	Molybdenum	µg/L	3.13	3.57	3.29	Above	Below
UCD1-071	Silver	µg/L	<1	<1	<1	Same	---
UCD1-071	Strontium-90	pCi/L	<1	<1	<1	Same	---
UCD1-072	Carbon-14	pCi/L	<7	<7	<7	Same	---
UCD1-072	Nitrate as N	mg/L	15	16	23	Above	---
UCD1-072	Radium-226	pCi/L	1.17	0.639 J	0.558 J	Below	---
Monitoring-Only Constituents							
UCD1-013	Chlordane	µg/L	0	0	<1	Below	---
UCD1-013	Dieldrin	µg/L	0	0	<0.1	Below	---
UCD1-021	Aluminum	µg/L	5.86 J	13.5 J	<50	Below	---
UCD1-021	Americium-241	pCi/L	<0.71	<1	<0.923	Same	---
UCD1-023	Mercury	µg/L	0.0479 J	<0.2	<0.2	Below	Same
UCD1-023	Zinc	µg/L	20.9	21.5	11.4	Below	---
UCD1-068	Aluminum	µg/L	5.86 J	13.5 J	<50	Below	---
UCD1-068	Americium-241	pCi/L	<0.71	<1	<0.555	Same	---
UCD1-068	Chromium	µg/L	43.7	48.2	40	Below	---
UCD1-068	Nickel	µg/L	141	141	2.29	Below	---
UCD1-069	Aluminum	µg/L	5.86 J	13.5 J	1080	Above	---
UCD1-069	Silver	µg/L	<1	<1	<1	Same	---

Table H-3 Baseline Condition Changes, U.S. DOE Groundwater Monitoring Program, Laboratory for Energy-related Health Research/Old Campus Landfill, University of California, Davis

Monitoring Well	Constituent	Units	2012 Background	2017 Background	Baseline	2012 Baseline Condition	Baseline Condition Change
Monitoring-Only Constituents (cont.)							
UCD1-070	Mercury	µg/L	0.0479 J	<0.2	<0.2	Below	Same
UCD1-070	Zinc	µg/L	20.9	21.5	35.2	Above	---
UCD1-071	Aluminum	µg/L	5.86 J	13.5 J	27.3 J	Above	---
UCD1-072	Aluminum	µg/L	5.86 J	13.5 J	207	Above	---
UCD1-072	Americium-241	pCi/L	<0.71	<1	<0.658	Same	---
New Well Constituents							
UCD1-068	Gross Beta	pCi/L	2.88 J	2.88 J	4.3	Above	---
UCD1-068	Chloroform	µg/L	0	0	0.23 J	Above	---
UCD1-068	Chromium (Hexavalent)	µg/L	40	49	42	Above	Below
UCD1-068	Formaldehyde	µg/L	13 J	0	14 J	Above	---
UCD1-068	Uranium-238	pCi/L	0.946 J	1.59	1.21	Above	Below
UCD1-069	1,1-Dichloroethane	µg/L	0	0	0.19 J	Above	---
UCD1-069	Gross Beta	pCi/L	2.88 J	2.88 J	6.42	Above	---
UCD1-069	Carbon-14	pCi/L	<7	<7	22.9	Above	---
UCD1-069	Chloroform	µg/L	0	0	0.11 J	Above	---
UCD1-069	Iron	µg/L	502	85.6	1620	Above	---
UCD1-069	Manganese	µg/L	10	4.48	34	Above	---
UCD1-069	Uranium-238	pCi/L	0.946 J	1.59	1.3	Above	Below
UCD1-070	Gross Beta	pCi/L	2.88 J	2.88 J	4.4 J	Above	---
UCD1-070	Uranium-238	pCi/L	0.946 J	1.59	1.38	Above	Below
UCD1-071	Benzene	µg/L	0	0	0.29 J	Above	---
UCD1-071	Gross Beta	pCi/L	2.88 J	2.88 J	4.83	Above	---
UCD1-071	Manganese	µg/L	10	4.48	48.7	Above	---
UCD1-071	Uranium-238	pCi/L	0.946 J	1.59	2.31	Above	---
UCD1-072	Gross Beta	pCi/L	2.88 J	2.88 J	3.74	Above	---
UCD1-072	Chloroform	µg/L	0	0	0.88	Above	---
UCD1-072	Chromium	µg/L	43.7	48.2	62.9	Above	---
UCD1-072	Chromium (Hexavalent)	µg/L	40	49	57	Above	---
UCD1-072	Formaldehyde	µg/L	13 J	0	14 J	Above	---
UCD1-072	Uranium-238	pCi/L	0.946 J	1.59	1.14	Above	Below

Abbreviations:

<# - constituent not detected; reporting limit shown

--- - no change to baseline condition

DOE - U.S. Department of Energy

J - the result is qualified as an estimated concentration

mg/L - milligrams per liter

pCi/L - picocuries per liter

µg/L - micrograms per liter

Attachments

Attachment H1

Groundwater Background Data
First and Second Collections
Established Background Wells UCD1-018 and UCD1-063

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0017	3/8/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-018	GWDOE0046	8/15/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Aluminum	N	50	50	10.5	µg/L	
UCD1-018	GWDOE0059	11/15/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-063	GWDOE0063	11/15/2011	N		Aluminum	N	50	50	10.5	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Aluminum	N	250	250	79.5	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Aluminum	N	250	250	79.5	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Aluminum	N	250	250	79.5	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Aluminum	TR	5.86	50	3.31	µg/L	J
UCD1-018	GWDOE0092	10/4/2012	N		Aluminum	N	50	50	3.31	µg/L	
UCD1-063	GWDOE0179	12/13/2016	N		Aluminum	Y	6.2	50	3.31	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Aluminum	Y	7.26	50	3.31	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Aluminum	TR	5.12	50	3.31	µg/L	J
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Aluminum	TR	4.67	50	3.31	µg/L	J
UCD1-063	GWDOE0190	3/23/2017	N		Aluminum	TR	9.09	50	3.31	µg/L	J
UCD1-063	GWDOE0200	5/24/2017	N		Aluminum	TR	11.9	50	3.31	µg/L	J
UCD1-018	GWDOE0198	5/25/2017	N		Aluminum	TR	8.55	50	3.31	µg/L	J
UCD1-018	GWDOE0206	7/19/2017	N		Aluminum	TR	10.3	50	3.31	µg/L	J
UCD1-063	GWDOE0207	7/19/2017	N		Aluminum	TR	13.5	50	3.31	µg/L	J
UCD1-018	GWDOE0017	3/8/2011	N		Americium-241	N	0.489	0.489		pci/l	
UCD1-063	GWDOE0018	3/14/2011	N		Americium-241	N	0.361	0.361		pci/l	
UCD1-018	GWDOE0031	5/3/2011	N		Americium-241	N	0.32	0.32		pci/l	
UCD1-063	GWDOE0032	5/9/2011	N		Americium-241	N	0.303	0.303		pci/l	
UCD1-018	GWDOE0046	8/15/2011	N		Americium-241	N	0.341	0.341		pci/l	
UCD1-063	GWDOE0050	8/15/2011	N		Americium-241	N	0.185	0.185		pci/l	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Americium-241	N	0.475	0.475		pci/l	
UCD1-018	GWDOE0059	11/15/2011	N		Americium-241	N	0.504	0.504		pci/l	
UCD1-063	GWDOE0063	11/15/2011	N		Americium-241	N	0.285	0.285		pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Americium-241	N	1	1	0.251	pci/l	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Americium-241	N	1	1	0.71	pci/l	
UCD1-063	GWDOE0078	3/7/2012	N		Americium-241	N	1	1	0.549	pci/l	
UCD1-063	GWDOE0179	12/13/2016	N		Americium-241	N	1	1	0.522	pci/l	
UCD1-018	GWDOE0178	12/13/2016	N		Americium-241	N	1	1	0.419	pci/l	
UCD1-018	GWDOE0187	3/21/2017	N		Americium-241	N	1	1	0.575	pci/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Americium-241	N	1	1	0.359	pci/l	
UCD1-063	GWDOE0190	3/23/2017	N		Americium-241	N	1	1	0.448	pci/l	
UCD1-063	GWDOE0200	5/24/2017	N		Americium-241	N	1	1	0.583	pci/l	
UCD1-018	GWDOE0198	5/25/2017	N		Americium-241	N	1	1	0.439	pci/l	
UCD1-018	GWDOE0206	7/19/2017	N		Americium-241	N	1	1	0.393	pci/l	
UCD1-063	GWDOE0207	7/19/2017	N		Americium-241	N	1	1	0.272	pci/l	
UCD1-018	GWDOE0017	3/8/2011	N		Beta, Gross	TR	1.84	1.47		pci/l	J
UCD1-063	GWDOE0018	3/14/2011	N		Beta, Gross	N	2.73	2.73		pci/l	
UCD1-018	GWDOE0031	5/3/2011	N		Beta, Gross	N	1.9	1.9		pci/l	
UCD1-063	GWDOE0032	5/9/2011	N		Beta, Gross	N	1.93	1.93		pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Beta, Gross	N	3	3	2.8	pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Beta, Gross	TR	2.57	3	2.25	pci/l	J
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Beta, Gross	N	3	3	2.89	pci/l	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Beta, Gross	N	3	3	2.29	pci/l	
UCD1-063	GWDOE0078	3/7/2012	N		Beta, Gross	TR	2.88	3	2.37	pci/l	J
UCD1-063	GWDOE0078	3/7/2012	N		Beta, Gross	N	3	3	2.3	pci/l	
UCD1-063	GWDOE0105	10/3/2012	N		Beta, Gross	N	3	3	2.93	pci/l	
UCD1-018	GWDOE0092	10/4/2012	N		Beta, Gross	N	3	3	2.79	pci/l	
UCD1-063	GWDOE0179	12/13/2016	N		Beta, Gross	N	3	3	0.876	pci/l	
UCD1-018	GWDOE0178	12/13/2016	N		Beta, Gross	Y	1.73	3	1.39	pci/l	
UCD1-018	GWDOE0187	3/21/2017	N		Beta, Gross	N	3	3	1.69	pci/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Beta, Gross	N	3	3	1.35	pci/l	
UCD1-063	GWDOE0190	3/23/2017	N		Beta, Gross	TR	1.23	3	0.957	pci/l	J
UCD1-063	GWDOE0200	5/24/2017	N		Beta, Gross	N	3	3	1.43	pci/l	
UCD1-018	GWDOE0198	5/25/2017	N		Beta, Gross	N	3	3	1.41	pci/l	
UCD1-018	GWDOE0206	7/19/2017	N		Beta, Gross	N	3	3	1.53	pci/l	
UCD1-063	GWDOE0207	7/19/2017	N		Beta, Gross	N	3	3	1.59	pci/l	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0017	3/8/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-063	GWDOE0018	3/14/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-018	GWDOE0031	5/3/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-063	GWDOE0045	6/1/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-018	GWDOE0046	8/15/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-063	GWDOE0050	8/15/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Carbon-14	N	7	7		pci/l	
UCD1-018	GWDOE0059	11/15/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-063	GWDOE0063	11/15/2011	N		Carbon-14	N	7	7		pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Carbon-14	N	7	7	5.65	pci/l	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Carbon-14	N	7	7	5.68	pci/l	
UCD1-063	GWDOE0078	3/7/2012	N		Carbon-14	N	7	7	5.65	pci/l	
UCD1-063	GWDOE0096	8/14/2012	N		Carbon-14	N	7	7	5.07	pci/l	
UCD1-018	GWDOE0092	10/4/2012	N		Carbon-14	N	7	7	5.7	pci/l	
UCD1-063	GWDOE0179	12/13/2016	N		Carbon-14	N	7	7	5.56	pci/l	
UCD1-018	GWDOE0178	12/13/2016	N		Carbon-14	N	7	7	5.55	pci/l	
UCD1-018	GWDOE0187	3/21/2017	N		Carbon-14	N	7	7	4.82	pci/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Carbon-14	N	7	7	4.82	pci/l	
UCD1-063	GWDOE0200	5/24/2017	N		Carbon-14	N	7	7	4.28	pci/l	
UCD1-018	GWDOE0198	5/25/2017	N		Carbon-14	N	7	7	4.3	pci/l	
UCD1-018	GWDOE0206	7/19/2017	N		Carbon-14	N	7	7	5.49	pci/l	
UCD1-063	GWDOE0207	7/19/2017	N		Carbon-14	N	7	7	5.48	pci/l	
UCD1-018	GWDOE0017	3/8/2011	N		Cesium-137	N	4.62	4.62		pci/l	
UCD1-063	GWDOE0018	3/14/2011	N		Cesium-137	N	4.45	4.45		pci/l	
UCD1-018	GWDOE0031	5/3/2011	N		Cesium-137	N	4.17	4.17		pci/l	
UCD1-063	GWDOE0032	5/9/2011	N		Cesium-137	N	3.43	3.43		pci/l	
UCD1-018	GWDOE0046	8/15/2011	N		Cesium-137	N	4.01	4.01		pci/l	
UCD1-063	GWDOE0050	8/15/2011	N		Cesium-137	N	3.33	3.33		pci/l	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Cesium-137	N	3.46	3.46		pci/l	
UCD1-018	GWDOE0059	11/15/2011	N		Cesium-137	N	3.68	3.68		pci/l	
UCD1-063	GWDOE0063	11/15/2011	N		Cesium-137	N	3.38	3.38		pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Cesium-137	N	5	5	3.21	pci/l	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Cesium-137	N	5	5	2.41	pci/l	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-063	GWDOE0078	3/7/2012	N		Cesium-137	N	5	5	2.7	pci/l	
UCD1-063	GWDOE0105	10/3/2012	N		Cesium-137	N	5	5	4.16	pci/l	
UCD1-018	GWDOE0092	10/4/2012	N		Cesium-137	N	5	5	2.98	pci/l	
UCD1-063	GWDOE0179	12/13/2016	N		Cesium-137	N	5	5	3.38	pci/l	
UCD1-018	GWDOE0178	12/13/2016	N		Cesium-137	N	5	5	4.25	pci/l	
UCD1-018	GWDOE0187	3/21/2017	N		Cesium-137	N	5	5	3.99	pci/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Cesium-137	N	5	5	2.11	pci/l	
UCD1-063	GWDOE0190	3/23/2017	N		Cesium-137	N	5	5	2.89	pci/l	
UCD1-063	GWDOE0200	5/24/2017	N		Cesium-137	N	5	5	2.87	pci/l	
UCD1-018	GWDOE0198	5/25/2017	N		Cesium-137	N	5	5	3.39	pci/l	
UCD1-018	GWDOE0206	7/19/2017	N		Cesium-137	N	5	5	2.75	pci/l	
UCD1-063	GWDOE0207	7/19/2017	N		Cesium-137	N	5	5	3.02	pci/l	
UCD1-018	GWDOE0017	3/8/2011	N		Chromium	Y	15.7	1	0.618	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Chromium	Y	31.3	1	0.618	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Chromium	Y	19.2	1	0.618	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Chromium	Y	29	1	0.618	µg/L	
UCD1-018	GWDOE0046	8/15/2011	N		Chromium	Y	20.1	1	0.618	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Chromium	Y	27.2	1	0.618	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Chromium	Y	28.9	1	0.618	µg/L	
UCD1-018	GWDOE0059	11/15/2011	N		Chromium	Y	7.19	1	0.618	µg/L	
UCD1-063	GWDOE0063	11/15/2011	N		Chromium	Y	40.5	1	0.618	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Chromium	Y	12.9	1	0.293	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Chromium	Y	12.8	1	0.293	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Chromium	Y	43.7	1	0.293	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Chromium	Y	37.9	1	0.402	µg/L	
UCD1-018	GWDOE0092	10/4/2012	N		Chromium	Y	8.99	1	0.402	µg/L	
UCD1-063	GWDOE0179	12/13/2016	N		Chromium	Y	48.2	1	0.402	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Chromium	Y	16.7	1	0.402	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Chromium	Y	25.5	1	0.402	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Chromium	Y	25.1	1	0.402	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Chromium	Y	22.2	1	0.402	µg/L	
UCD1-063	GWDOE0200	5/24/2017	N		Chromium	Y	17.7	1	0.402	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Chromium	Y	25.2	1	0.402	µg/L	
UCD1-018	GWDOE0206	7/19/2017	N		Chromium	Y	29.8	1	0.402	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Chromium	Y	15.8	1	0.402	µg/L	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0017	3/8/2011	N		Chromium (Hexavalent)	Y	14	1	0.041	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Chromium (Hexavalent)	Y	35	1	0.041	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Chromium (Hexavalent)	Y	18	1	0.041	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Chromium (Hexavalent)	Y	29	1	0.041	µg/L	
UCD1-018	GWDOE0046	8/15/2011	N		Chromium (Hexavalent)	Y	22	1	0.041	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Chromium (Hexavalent)	Y	30	1	0.041	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Chromium (Hexavalent)	Y	31	1	0.041	µg/L	
UCD1-018	GWDOE0059	11/15/2011	N		Chromium (Hexavalent)	Y	3.6	1	0.041	µg/L	
UCD1-063	GWDOE0063	11/15/2011	N		Chromium (Hexavalent)	Y	36	1	0.041	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Chromium (Hexavalent)	Y	9.5	1	0.067	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Chromium (Hexavalent)	Y	9.5	1	0.067	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Chromium (Hexavalent)	Y	34	1	0.067	µg/L	
UCD1-018	GWDOE0086	5/30/2012	N		Chromium (Hexavalent)	Y	18	1	0.067	µg/L	
UCD1-063	GWDOE0087	5/30/2012	N		Chromium (Hexavalent)	Y	29	1	0.067	µg/L	
UCD1-063	GWDOE0088	5/30/2012	FD	UCD1-063-20120530	Chromium (Hexavalent)	Y	31	1	0.067	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Chromium (Hexavalent)	Y	40	1	0.067	µg/L	
UCD1-018	GWDOE0092	10/4/2012	N		Chromium (Hexavalent)	Y	7.8	1	0.067	µg/L	
UCD1-063	GWDOE0108	12/19/2012	N		Chromium (Hexavalent)	Y	36	1	0.067	µg/L	
UCD1-018	GWDOE0106	12/19/2012	N		Chromium (Hexavalent)	Y	4.9	1	0.067	µg/L	
UCD1-018	GWDOE0107	12/19/2012	FD	GWDOE0106	Chromium (Hexavalent)	Y	4.9	1	0.067	µg/L	
UCD1-063	GWDOE0179	12/13/2016	N		Chromium (Hexavalent)	Y	49	1	0.067	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Chromium (Hexavalent)	Y	15	1	0.067	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Chromium (Hexavalent)	Y	23	1	0.067	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Chromium (Hexavalent)	Y	23	1	0.067	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Chromium (Hexavalent)	Y	21	1	0.067	µg/L	
UCD1-063	GWDOE0200	5/24/2017	N		Chromium (Hexavalent)	Y	17	1	0.067	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Chromium (Hexavalent)	Y	26	1	0.067	µg/L	
UCD1-018	GWDOE0206	7/19/2017	N		Chromium (Hexavalent)	Y	28	1	0.067	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Chromium (Hexavalent)	Y	14	1	0.067	µg/L	
UCD1-018	GWDOE0017	3/8/2011	N		Iron	Y	52.6	50	12.2	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Iron	Y	50.9	50	12.2	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Iron	TR	49.4	50	12.2	µg/L	J
UCD1-063	GWDOE0032	5/9/2011	N		Iron	TR	16.7	50	12.2	µg/L	J

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0073	3/6/2012	N		Iron	Y	58.3	50	30.3	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Iron	Y	57.9	50	30.3	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Iron	Y	53.3	50	30.3	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Iron	TR	28.4	50	9.26	µg/L	J
UCD1-018	GWDOE0092	10/4/2012	N		Iron	TR	35	50	9.26	µg/L	J
UCD1-063	GWDOE0179	12/13/2016	N		Iron	Y	43.5	50	9.26	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Iron	Y	37	50	9.26	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Iron	Y	85.6	50	9.26	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Iron	Y	66.5	50	9.26	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Iron	TR	10.6	50	9.26	µg/L	J
UCD1-063	GWDOE0200	5/24/2017	N		Iron	Y	55.3	50	9.26	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Iron	TR	41.6	50	9.26	µg/L	J
UCD1-018	GWDOE0206	7/19/2017	N		Iron	TR	46.8	50	9.26	µg/L	J
UCD1-063	GWDOE0207	7/19/2017	N		Iron	Y	51.7	50	9.26	µg/L	
UCD1-018	GWDOE0017	3/8/2011	N		Manganese	N	1	1	0.62	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Manganese	N	1	1	0.62	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Manganese	N	1	1	0.62	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Manganese	N	1	1	0.62	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Manganese	Y	4.48	1	0.384	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Manganese	Y	4.17	1	0.384	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Manganese	Y	4.3	1	0.384	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Manganese	TR	0.328	1	0.139	µg/L	J
UCD1-018	GWDOE0092	10/4/2012	N		Manganese	TR	0.174	1	0.139	µg/L	J
UCD1-063	GWDOE0179	12/13/2016	N		Manganese	Y	0.203	1	0.139	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Manganese	Y	0.18	1	0.139	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Manganese	N	1	1	0.139	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Manganese	TR	0.166	1	0.139	µg/L	J
UCD1-063	GWDOE0190	3/23/2017	N		Manganese	TR	0.293	1	0.139	µg/L	J
UCD1-063	GWDOE0200	5/24/2017	N		Manganese	N	1	1	0.139	µg/L	U
UCD1-018	GWDOE0198	5/25/2017	N		Manganese	N	1	1	0.139	µg/L	U
UCD1-018	GWDOE0206	7/19/2017	N		Manganese	TR	0.475	1	0.139	µg/L	J
UCD1-063	GWDOE0207	7/19/2017	N		Manganese	TR	0.447	1	0.139	µg/L	J

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0017	3/8/2011	N		Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-018	GWDOE0046	8/15/2011	N		Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-018	GWDOE0059	11/15/2011	N		Mercury	TR	0.0479	0.2	0.0348	µg/L	J
UCD1-063	GWDOE0063	11/15/2011	N		Mercury	N	0.2	0.2	0.0348	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0086	5/30/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0087	5/30/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0088	5/30/2012	FD	UCD1-063-20120530	Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0092	10/4/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0108	12/19/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0106	12/19/2012	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0107	12/19/2012	FD	GWDOE0106	Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0179	12/13/2016	N		Mercury	N	0.5	0.5	0.0453	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Mercury	N	0.5	0.5	0.0453	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0200	5/24/2017	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0206	7/19/2017	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Mercury	N	0.2	0.2	0.0453	µg/L	
UCD1-018	GWDOE0017	3/8/2011	N		Molybdenum	Y	1.32	1	0.29	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Molybdenum	Y	2.59	1	0.29	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Molybdenum	Y	1.41	1	0.29	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Molybdenum	Y	3.13	1	0.29	µg/L	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0046	8/15/2011	N		Molybdenum	Y	1.24	1	0.29	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Molybdenum	Y	2.54	1	0.29	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Molybdenum	Y	2.9	1	0.29	µg/L	
UCD1-018	GWDOE0059	11/15/2011	N		Molybdenum	Y	1.63	1	0.29	µg/L	
UCD1-063	GWDOE0063	11/15/2011	N		Molybdenum	Y	2.78	1	0.29	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Molybdenum	Y	1.67	1	0.278	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Molybdenum	Y	1.63	1	0.278	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Molybdenum	Y	2.72	1	0.278	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Molybdenum	Y	2.77	1	0.127	µg/L	
UCD1-018	GWDOE0092	10/4/2012	N		Molybdenum	Y	1.66	1	0.127	µg/L	
UCD1-063	GWDOE0179	12/13/2016	N		Molybdenum	Y	2.7	1	0.127	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Molybdenum	Y	2.74	1	0.127	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Molybdenum	Y	1.36	1	0.127	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Molybdenum	Y	1.35	1	0.127	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Molybdenum	Y	2.97	1	0.127	µg/L	
UCD1-063	GWDOE0200	5/24/2017	N		Molybdenum	Y	2.96	1	0.127	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Molybdenum	Y	1.45	1	0.127	µg/L	
UCD1-018	GWDOE0206	7/19/2017	N		Molybdenum	Y	1.58	1	0.127	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Molybdenum	Y	3.57	1	0.127	µg/L	
UCD1-018	GWDOE0017	3/8/2011	N		Nickel	Y	3.22	1	0.155	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Nickel	Y	1.23	1	0.155	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Nickel	Y	3.63	1	0.155	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Nickel	Y	1.34	1	0.155	µg/L	
UCD1-018	GWDOE0046	8/15/2011	N		Nickel	Y	3.37	1	0.155	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Nickel	Y	1.91	1	0.155	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Nickel	Y	1.5	1	0.155	µg/L	
UCD1-018	GWDOE0059	11/15/2011	N		Nickel	Y	75.2	1	0.155	µg/L	
UCD1-063	GWDOE0063	11/15/2011	N		Nickel	Y	1.9	1	0.155	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Nickel	Y	141	1	0.209	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Nickel	Y	137	1	0.209	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Nickel	Y	1.3	1	0.209	µg/L	
UCD1-063	GWDOE0179	12/13/2016	N		Nickel	Y	1.31	1	0.132	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Nickel	Y	5.19	1	0.132	µg/L	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0187	3/21/2017	N		Nickel	Y	3.34	1	0.132	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Nickel	Y	3.35	1	0.132	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Nickel	Y	1.03	1	0.132	µg/L	
UCD1-063	GWDOE0200	5/24/2017	N		Nickel	Y	1.4	1	0.132	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Nickel	Y	3.55	1	0.132	µg/L	
UCD1-018	GWDOE0206	7/19/2017	N		Nickel	Y	3.25	1	0.132	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Nickel	Y	1.04	1	0.132	µg/L	
UCD1-018	GWDOE0017	3/8/2011	N		Nitrate as N	Y	6.4	0.1	0.017	mg/l	
UCD1-063	GWDOE0018	3/14/2011	N		Nitrate as N	Y	1.2	0.1	0.017	mg/l	
UCD1-018	GWDOE0031	5/3/2011	N		Nitrate as N	Y	10	0.2	0.074	mg/l	
UCD1-063	GWDOE0032	5/9/2011	N		Nitrate as N	Y	1.2	0.1	0.037	mg/l	
UCD1-018	GWDOE0046	8/15/2011	N		Nitrate as N	Y	15	0.2	0.074	mg/l	
UCD1-063	GWDOE0050	8/15/2011	N		Nitrate as N	Y	1.2	0.1	0.037	mg/l	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Nitrate as N	Y	1.2	0.1	0.037	mg/l	
UCD1-018	GWDOE0059	11/15/2011	N		Nitrate as N	Y	2.7	0.1	0.037	mg/l	
UCD1-063	GWDOE0063	11/15/2011	N		Nitrate as N	Y	1.2	0.1	0.037	mg/l	
UCD1-018	GWDOE0073	3/6/2012	N		Nitrate as N	Y	4.2	0.1	0.037	mg/l	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Nitrate as N	Y	4.2	0.1	0.037	mg/l	
UCD1-063	GWDOE0078	3/7/2012	N		Nitrate as N	Y	1.2	0.1	0.037	mg/l	
UCD1-063	GWDOE0096	8/14/2012	N		Nitrate as N	Y	1.1	0.1	0.037	mg/l	
UCD1-018	GWDOE0092	10/4/2012	N		Nitrate as N	Y	3.4	0.1	0.037	mg/l	
UCD1-063	GWGW3672	12/13/2016	N		Nitrate as N	Y	1.6	0.1	0.053	mg/l	
UCD1-018	GWGW3660	12/13/2016	N		Nitrate as N	Y	12	0.2	0.11	mg/l	
UCD1-018	GWDOE0187	3/21/2017	N		Nitrate as N	Y	11	0.2	0.11	mg/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Nitrate as N	Y	11	0.2	0.11	mg/l	
UCD1-063	GWDOE0190	3/23/2017	N		Nitrate as N	Y	1	0.1	0.053	mg/l	
UCD1-063	GWDOE0200	5/24/2017	N		Nitrate as N	Y	0.68	0.1	0.053	mg/l	
UCD1-018	GWDOE0198	5/25/2017	N		Nitrate as N	Y	13	0.2	0.11	mg/l	
UCD1-018	GWDOE0206	7/19/2017	N		Nitrate as N	Y	16	0.2	0.11	mg/l	
UCD1-063	GWDOE0207	7/19/2017	N		Nitrate as N	Y	0.55	0.1	0.053	mg/l	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0017	3/8/2011	N		Radium-226	N	0.341	0.341		pci/l	
UCD1-063	GWDOE0018	3/14/2011	N		Radium-226	Y	1.17	0.438		pci/l	
UCD1-018	GWDOE0031	5/3/2011	N		Radium-226	TR	0.639	0.535		pci/l	J
UCD1-063	GWDOE0032	5/9/2011	N		Radium-226	N	0.368	0.368		pci/l	
UCD1-018	GWDOE0046	8/15/2011	N		Radium-226	Y	0.245	0.187		pci/l	
UCD1-063	GWDOE0050	8/15/2011	N		Radium-226	Y	0.33	0.314		pci/l	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Radium-226	N	0.373	0.373		pci/l	
UCD1-018	GWDOE0059	11/15/2011	N		Radium-226	Y	0.508	0.432		pci/l	
UCD1-063	GWDOE0063	11/15/2011	N		Radium-226	N	0.714	0.714		pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Radium-226	N	1	1	0.418	pci/l	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Radium-226	N	1	1	0.491	pci/l	
UCD1-063	GWDOE0078	3/7/2012	N		Radium-226	N	1	1	0.452	pci/l	
UCD1-063	GWDOE0096	8/14/2012	N		Radium-226	N	1	1	0.246	pci/l	
UCD1-018	GWDOE0092	10/4/2012	N		Radium-226	N	1	1	0.772	pci/l	
UCD1-063	GWDOE0179	12/13/2016	N		Radium-226	N	1	1	0.384	pci/l	
UCD1-018	GWDOE0178	12/13/2016	N		Radium-226	Y	0.553	1	0.294	pci/l	
UCD1-018	GWDOE0187	3/21/2017	N		Radium-226	N	1	1	0.217	pci/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Radium-226	TR	0.552	1	0.294	pci/l	J
UCD1-063	GWDOE0190	3/23/2017	N		Radium-226	N	1	1	0.453	pci/l	
UCD1-063	GWDOE0200	5/24/2017	N		Radium-226	N	1	1	0.308	pci/l	
UCD1-018	GWDOE0198	5/25/2017	N		Radium-226	TR	0.352	1	0.267	pci/l	J
UCD1-018	GWDOE0206	7/19/2017	N		Radium-226	N	1	1	0.238	pci/l	
UCD1-063	GWDOE0207	7/19/2017	N		Radium-226	N	1	1	0.194	pci/l	
UCD1-018	GWDOE0017	3/8/2011	N		Selenium	TR	0.787	1	0.554	µg/L	J
UCD1-063	GWDOE0018	3/14/2011	N		Selenium	TR	0.986	1	0.554	µg/L	J
UCD1-018	GWDOE0031	5/3/2011	N		Selenium	Y	1.06	1	0.554	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Selenium	TR	0.931	1	0.554	µg/L	J
UCD1-018	GWDOE0046	8/15/2011	N		Selenium	Y	1.74	1	0.554	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Selenium	Y	1.1	1	0.554	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Selenium	TR	0.807	1	0.554	µg/L	J
UCD1-018	GWDOE0059	11/15/2011	N		Selenium	TR	0.731	1	0.554	µg/L	J
UCD1-063	GWDOE0063	11/15/2011	N		Selenium	Y	1.51	1	0.554	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Selenium	Y	1.13	1	0.221	µg/L	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Selenium	Y	1.25	1	0.221	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Selenium	Y	1.01	1	0.221	µg/L	
UCD1-018	GWDOE0086	5/30/2012	N		Selenium	Y	1.45	1	0.221	µg/L	
UCD1-063	GWDOE0087	5/30/2012	N		Selenium	TR	0.972	1	0.221	µg/L	J
UCD1-063	GWDOE0088	5/30/2012	FD	UCD1-063-20120530	Selenium	Y	1.01	1	0.221	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Selenium	TR	0.992	1	0.168	µg/L	J
UCD1-018	GWDOE0092	10/4/2012	N		Selenium	TR	0.631	1	0.168	µg/L	J
UCD1-063	GWDOE0108	12/19/2012	N		Selenium	Y	1.51	1	0.168	µg/L	
UCD1-018	GWDOE0106	12/19/2012	N		Selenium	Y	1.03	1	0.168	µg/L	
UCD1-018	GWDOE0107	12/19/2012	FD	GWDOE0106	Selenium	Y	0.676	1	0.168	µg/L	J
UCD1-063	GWDOE0179	12/13/2016	N		Selenium	Y	1.5	1	0.168	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Selenium	Y	1.23	1	0.168	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Selenium	Y	2.09	1	0.168	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Selenium	Y	2.35	1	0.168	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Selenium	Y	2.2	1	0.168	µg/L	
UCD1-063	GWDOE0200	5/24/2017	N		Selenium	Y	1.02	1	0.168	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Selenium	Y	2.86	1	0.168	µg/L	
UCD1-018	GWDOE0206	7/19/2017	N		Selenium	Y	2.92	1	0.168	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Selenium	Y	1	1	0.168	µg/L	
UCD1-018	GWDOE0017	3/8/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-063	GWDOE0018	3/14/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-018	GWDOE0031	5/3/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-018	GWDOE0046	8/15/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Silver	N	1	1	0.12	µg/L	
UCD1-018	GWDOE0059	11/15/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-063	GWDOE0063	11/15/2011	N		Silver	N	1	1	0.12	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Silver	N	1	1	0.129	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Silver	N	1	1	0.129	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Silver	N	1	1	0.129	µg/L	
UCD1-063	GWDOE0105	10/3/2012	N		Silver	N	1	1	0.111	µg/L	
UCD1-018	GWDOE0092	10/4/2012	N		Silver	N	1	1	0.111	µg/L	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-063	GWDOE0179	12/13/2016	N		Silver	N	1	1	0.111	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Silver	N	1	1	0.111	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Silver	N	1	1	0.111	µg/L	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Silver	N	1	1	0.111	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Silver	N	1	1	0.111	µg/L	
UCD1-063	GWDOE0200	5/24/2017	N		Silver	N	1	1	0.111	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Silver	N	1	1	0.111	µg/L	
UCD1-018	GWDOE0206	7/19/2017	N		Silver	N	1	1	0.111	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Silver	N	1	1	0.111	µg/L	
UCD1-018	GWDOE0017	3/8/2011	N		Strontium-90	N	0.768	0.768		pci/l	
UCD1-063	GWDOE0018	3/14/2011	N		Strontium-90	N	0.726	0.726		pci/l	
UCD1-018	GWDOE0031	5/3/2011	N		Strontium-90	N	0.854	0.854		pci/l	
UCD1-063	GWDOE0032	5/9/2011	N		Strontium-90	N	0.844	0.844		pci/l	
UCD1-018	GWDOE0046	8/15/2011	N		Strontium-90	N	0.824	0.824		pci/l	
UCD1-063	GWDOE0050	8/15/2011	N		Strontium-90	N	0.526	0.526		pci/l	
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Strontium-90	N	0.495	0.495		pci/l	
UCD1-018	GWDOE0059	11/15/2011	N		Strontium-90	N	0.707	0.707		pci/l	
UCD1-063	GWDOE0063	11/15/2011	N		Strontium-90	N	0.575	0.575		pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Strontium-90	N	1	1	0.947	pci/l	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Strontium-90	N	1	1	0.903	pci/l	
UCD1-063	GWDOE0078	3/7/2012	N		Strontium-90	N	1	1	0.913	pci/l	
UCD1-063	GWDOE0105	10/3/2012	N		Strontium-90	N	1	1	0.609	pci/l	
UCD1-018	GWDOE0092	10/4/2012	N		Strontium-90	N	1	1	0.527	pci/l	
UCD1-063	GWDOE0179	12/13/2016	N		Strontium-90	N	1	1	0.926	pci/l	
UCD1-018	GWDOE0178	12/13/2016	N		Strontium-90	N	1	1	0.941	pci/l	
UCD1-018	GWDOE0187	3/21/2017	N		Strontium-90	N	1	1	0.973	pci/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Strontium-90	N	1	1	0.96	pci/l	
UCD1-063	GWDOE0190	3/23/2017	N		Strontium-90	N	1	1	0.96	pci/l	
UCD1-063	GWDOE0200	5/24/2017	N		Strontium-90	N	1	1	0.939	pci/l	
UCD1-018	GWDOE0198	5/25/2017	N		Strontium-90	N	1	1	0.744	pci/l	
UCD1-018	GWDOE0206	7/19/2017	N		Strontium-90	N	1	1	0.919	pci/l	
UCD1-063	GWDOE0207	7/19/2017	N		Strontium-90	N	1	1	0.976	pci/l	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0017	3/8/2011	N		Uranium-238	TR	0.78	0.292		pci/l	J
UCD1-063	GWDOE0018	3/14/2011	N		Uranium-238	TR	0.702	0.369		pci/l	J
UCD1-018	GWDOE0031	5/3/2011	N		Uranium-238	TR	0.654	0.404		pci/l	J
UCD1-063	GWDOE0032	5/9/2011	N		Uranium-238	N	0.549	0.549		pci/l	
UCD1-018	GWDOE0073	3/6/2012	N		Uranium-238	TR	0.514	1	0.364	pci/l	J
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Uranium-238	TR	0.673	1	0.252	pci/l	J
UCD1-063	GWDOE0078	3/7/2012	N		Uranium-238	TR	0.946	1	0.284	pci/l	J
UCD1-063	GWDOE0105	10/3/2012	N		Uranium-238	TR	0.376	1	0.226	pci/l	J
UCD1-018	GWDOE0092	10/4/2012	N		Uranium-238	N	1	1	0.367	pci/l	
UCD1-063	GWDOE0179	12/13/2016	N		Uranium-238	Y	0.655	1	0.492	pci/l	
UCD1-018	GWDOE0178	12/13/2016	N		Uranium-238	Y	1.28	1	0.416	pci/l	
UCD1-018	GWDOE0187	3/21/2017	N		Uranium-238	Y	1.06	1	0.249	pci/l	
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Uranium-238	Y	1.59	1	0.373	pci/l	
UCD1-063	GWDOE0190	3/23/2017	N		Uranium-238	N	1	1	0.112	pci/l	U
UCD1-063	GWDOE0200	5/24/2017	N		Uranium-238	TR	0.693	1	0.412	pci/l	J
UCD1-018	GWDOE0198	5/25/2017	N		Uranium-238	TR	0.756	1	0.44	pci/l	J
UCD1-018	GWDOE0206	7/19/2017	N		Uranium-238	Y	1.29	1	0.193	pci/l	
UCD1-063	GWDOE0207	7/19/2017	N		Uranium-238	N	1	1	0.534	pci/l	
UCD1-018	GWDOE0017	3/8/2011	N		Zinc	TR	4.41	5	1.8	µg/L	J
UCD1-063	GWDOE0018	3/14/2011	N		Zinc	TR	2.54	5	1.8	µg/L	J
UCD1-018	GWDOE0031	5/3/2011	N		Zinc	Y	20.3	5	1.8	µg/L	
UCD1-063	GWDOE0032	5/9/2011	N		Zinc	Y	8.16	5	1.8	µg/L	
UCD1-018	GWDOE0046	8/15/2011	N		Zinc	Y	20.9	5	1.8	µg/L	
UCD1-063	GWDOE0050	8/15/2011	N		Zinc	TR	4.02	5	1.8	µg/L	J
UCD1-063	GWDOE0051	8/15/2011	FD	UCD1-063-20110815	Zinc	Y	16.9	5	1.8	µg/L	J
UCD1-018	GWDOE0059	11/15/2011	N		Zinc	TR	2.47	5	1.8	µg/L	J
UCD1-063	GWDOE0063	11/15/2011	N		Zinc	Y	12.3	5	1.8	µg/L	
UCD1-018	GWDOE0073	3/6/2012	N		Zinc	Y	7.02	5	0.702	µg/L	
UCD1-018	GWDOE0074	3/6/2012	FD	UCD1-018-20120306	Zinc	Y	5.62	5	0.702	µg/L	
UCD1-063	GWDOE0078	3/7/2012	N		Zinc	Y	14	5	0.702	µg/L	
UCD1-063	GWDOE0179	12/13/2016	N		Zinc	Y	3.42	5	0.479	µg/L	
UCD1-018	GWDOE0178	12/13/2016	N		Zinc	Y	5.85	5	0.479	µg/L	
UCD1-018	GWDOE0187	3/21/2017	N		Zinc	Y	8.01	5	0.479	µg/L	

Attachment H1. Groundwater Background Data, First and Second Collections, Established Background Wells UCD1-018 and UCD1-063

Location	Sample Name	Sample Date	Sample Type Code	Parent Sample Code	Chemical Name	Detect Flag	Result Value	Reporting Limit	MDL	Result Units	Qualifiers
UCD1-018	GWDOE0188	3/21/2017	FD	GWDOE0187	Zinc	Y	10.2	5	0.479	µg/L	
UCD1-063	GWDOE0190	3/23/2017	N		Zinc	Y	21.5	5	0.479	µg/L	J
UCD1-063	GWDOE0200	5/24/2017	N		Zinc	Y	20.4	5	0.479	µg/L	
UCD1-018	GWDOE0198	5/25/2017	N		Zinc	N	5	5	0.479	µg/L	U
UCD1-018	GWDOE0206	7/19/2017	N		Zinc	Y	59.9	5	0.479	µg/L	
UCD1-063	GWDOE0207	7/19/2017	N		Zinc	Y	44.5	5	0.479	µg/L	

Abbreviations:
FD - field duplicate
J - concentration is estimated
mg/L - milligrams per liter
N - in Sample_Tu[e_Code column "N" means primary field sample;
pCi/L - picoCuries per liter
TR - trace
U - not detected
µg/L -micrograms per liter

Attachment H2

Outlier Tests

ATTACHMENT H2

Outlier Test ProUCL Load File

Aluminum	Hexavalent_Chromium	Chromium	Iron	Manganese	Molybdenum	Nickel	Nitrate_as_N	Selenium	Zinc_test1	Zinc_test2	Zinc_test3	Gross_Beta	Radium-226_test1	Radium-226_test2	Uranium-238
7.26	14	15.7	52.6	4.48	1.32	3.22	6.4	0.787	4.41	2.47	2.47	1.84	0.0616	-0.133	0.78
5.12	18	19.2	49.4	4.17	1.41	3.63	10	1.06	20.3	2.54	2.54	1.06	1.17	-0.112	0.702
4.67	22	20.1	58.3	0.174	1.24	3.37	15	1.74	20.9	3.42	3.42	1.76	0.639	0	0.654
8.55	3.6	7.19	57.9	0.18	1.63	75.2	2.7	0.731	2.47	4.02	4.02	2.57	0.0998	0.0404	0.475
10.3	9.5	12.9	35	0.166	1.67	141	4.2	1.13	6.26	4.41	4.41	-0.581	0.245	0.0616	0.514
5.86	9.5	12.8	37	0.193	1.63	137	4.2	1.25	5.36	4.72	4.72	1.59	0.33	0.0762	0.673
6.2	18	8.99	85.6	0.475	1.66	5.19	3.4	1.45	7.02	5.36	5.36	-1.05	0	0.0871	0.946
9.09	7.8	16.7	66.5	4.3	2.74	3.34	12	0.631	5.62	5.62	5.62	1.73	0.508	0.0998	0.376
11.9	4.9	25.5	41.6	0.328	1.36	3.35	11	1.03	5.85	5.85	5.85	1.18	0.398	0.113	0.135
13.5	4.9	25.1	46.8	0.203	1.35	3.55	11	0.676	8.01	6.26	6.26	1.05	0.0871	0.14	0.655
	15	25.2	50.9	0.293	1.45	3.25	13	1.23	10.2	7.02	7.02	0.628	0.243	0.196	1.28
	23	29.8	16.7	0.213	1.58	1.23	16	2.09	4.72	8.01	8.01	0.623	0.196	0.237	1.06
	23	31.3	53.3	0.447	2.59	1.34	1.2	2.35	59.9	8.16	8.16	0.0583	0.14	0.243	1.59
	26	29	28.4		3.13	1.91	1.2	2.86	2.54	8.86	8.86	1.88	0.573	0.245	0.672
	28	27.2	43.5		2.54	1.5	1.2	2.92	8.16	10.2	10.2	2.88	-0.133	0.33	0.693
	35	28.9	10.6		2.9	1.9	1.2	0.986	4.02	12.3	12.3	0.402	0.553	0.352	0.756
	29	40.5	55.3		2.78	1.3	1.2	0.931	16.9	14	14	0.883	0.113	0.398	1.29
	30	43.7	51.7		2.72	1.31	1.2	1.1	12.3	16.9	16.9	0.279	0.552	0.508	0.289
	31	37.9			2.77	1.03	1.1	0.807	8.86	20.3	20.3	1.23	-0.112	0.552	
	36	48.2			2.7	1.4	1.6	1.51	14	20.4	20.4	1.11	0.0762	0.553	
	34	22.2			2.97	1.04	1	1.01	3.42	20.9	20.9	1.14	0.352	0.573	
	29	17.7			2.96		0.68	0.972	21.5	21.5	21.5		0.237	0.639	
	31	15.8			3.57		0.55	1.01	20.4	44.5			0.0404		
	40							0.992	44.5						
	36							1.51							
	49							1.5							
	21							2.2							
	17							1.02							
	14							1							

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.112/6/2017 6:23:50 PM							
4					From File ProUCL_Load_OutlierTest.xls							
5					Full Precision ON							
6												
7												
8					**Dixon's Outlier Test for Aluminum**							
9												
10	Number of Observations = 10											
11	10% critical value: 0.409											
12	5% critical value: 0.477											
13	1% critical value: 0.597											
14												
15	**1. Observation Value 13.5 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.191											
18												
19	For 10% significance level, 13.5 is not an outlier.											
20	For 5% significance level, 13.5 is not an outlier.											
21	For 1% significance level, 13.5 is not an outlier.											
22												
23	**2. Observation Value 4.67 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.062											
26												
27	For 10% significance level, 4.67 is not an outlier.											
28	For 5% significance level, 4.67 is not an outlier.											
29	For 1% significance level, 4.67 is not an outlier.											
30												

1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3			Date/Time of Computation	ProUCL 5.112/6/2017 6:28:36 PM								
4				From File	ProUCL_Load_OutlierTest.xls							
5				Full Precision	ON							
6												
7												
8				**Rosner's Outlier Test for Hexavalent_Chromium**								
9												
10												
11				**Mean**	**22.73**							
12				**Standard Deviation**	**11.64**							
13				**Number of data**	**29**							
14				**Number of suspected outliers**	**1**							
15												
16				Potential	Obs.	Test	Critical	Critical				
17	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
18	1	22.73	11.44	49	26	2.297	2.89	3.22				
19												
20	For 5% Significance Level, there is no Potential Outlier											
21												
22	For 1% Significance Level, there is no Potential Outlier											
23												

	Outlier Tests for Selected Uncensored Variables	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 6:34:24 PM	
From File	ProUCL_Load_OutlierTest.xls	
Full Precision	ON	

Dixon's Outlier Test for Chromium

Number of Observations = 23

10% critical value: 0.374

5% critical value: 0.421

1% critical value: 0.505

1. Observation Value 48.2 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.218

For 10% significance level, 48.2 is not an outlier.

For 5% significance level, 48.2 is not an outlier.

For 1% significance level, 48.2 is not an outlier.

2. Observation Value 7.19 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.168

For 10% significance level, 7.19 is not an outlier.

For 5% significance level, 7.19 is not an outlier.

For 1% significance level, 7.19 is not an outlier.

	Outlier Tests for Selected Uncensored Variables	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 6:35:44 PM	
From File	ProUCL_Load_OutlierTest.xls	
Full Precision	ON	

Dixon's Outlier Test for Iron

Number of Observations = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Observation Value 85.6 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.477

For 10% significance level, 85.6 is an outlier.

For 5% significance level, 85.6 is an outlier.

For 1% significance level, 85.6 is not an outlier.

2. Observation Value 10.6 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.373

For 10% significance level, 10.6 is not an outlier.

For 5% significance level, 10.6 is not an outlier.

For 1% significance level, 10.6 is not an outlier.

	Outlier Tests for Selected Uncensored Variables	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 6:44:34 PM	
From File	ProUCL_Load_OutlierTest.xls	
Full Precision	ON	

Dixon's Outlier Test for Manganese

Number of Observations = 13

10% critical value: 0.467

5% critical value: 0.521

1% critical value: 0.615

1. Observation Value 4.48 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.072

For 10% significance level, 4.48 is not an outlier.

For 5% significance level, 4.48 is not an outlier.

For 1% significance level, 4.48 is not an outlier.

2. Observation Value 0.166 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.003

For 10% significance level, 0.166 is not an outlier.

For 5% significance level, 0.166 is not an outlier.

For 1% significance level, 0.166 is not an outlier.

	Outlier Tests for Selected Uncensored Variables	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 6:45:35 PM	
From File	ProUCL_Load_OutlierTest.xls	
Full Precision	ON	

Dixon's Outlier Test for Molybdenum

Number of Observations = 23

10% critical value: 0.374

5% critical value: 0.421

1% critical value: 0.505

1. Observation Value 3.57 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.270

For 10% significance level, 3.57 is not an outlier.

For 5% significance level, 3.57 is not an outlier.

For 1% significance level, 3.57 is not an outlier.

2. Observation Value 1.24 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.064

For 10% significance level, 1.24 is not an outlier.

For 5% significance level, 1.24 is not an outlier.

For 1% significance level, 1.24 is not an outlier.

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.112/6/2017 6:46:37 PM							
4					From File	ProUCL_Load_OutlierTest.xls						
5					Full Precision	ON						
6												
7												
8				**Dixon's Outlier Test for Nickel**								
9												
10	Number of Observations = 21											
11	10% critical value: 0.391											
12	5% critical value: 0.44											
13	1% critical value: 0.524											
14												
15	**1. Observation Value 141 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.471											
18												
19	For 10% significance level, 141 is an outlier.											
20	For 5% significance level, 141 is an outlier.											
21	For 1% significance level, 141 is not an outlier.											
22												
23	**2. Observation Value 1.03 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.003											
26												
27	For 10% significance level, 1.03 is not an outlier.											
28	For 5% significance level, 1.03 is not an outlier.											
29	For 1% significance level, 1.03 is not an outlier.											
30												

	Outlier Tests for Selected Uncensored Variables	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 6:48:47 PM	
From File	ProUCL_Load_OutlierTest.xls	
Full Precision	ON	

Dixon's Outlier Test for Nitrate_as_N

Number of Observations = 23

10% critical value: 0.374

5% critical value: 0.421

1% critical value: 0.505

1. Observation Value 16 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.200

For 10% significance level, 16 is not an outlier.

For 5% significance level, 16 is not an outlier.

For 1% significance level, 16 is not an outlier.

2. Observation Value 0.55 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.036

For 10% significance level, 0.55 is not an outlier.

For 5% significance level, 0.55 is not an outlier.

For 1% significance level, 0.55 is not an outlier.

Outlier Tests for Selected Uncensored Variables

User Selected Options

Date/Time of Computation	ProUCL 5.112/6/2017 6:49:56 PM
From File	ProUCL_Load_OutlierTest.xls
Full Precision	ON

Rosner's Outlier Test for Selenium

Mean	**1.327**
Standard Deviation	**0.614**
Number of data	**29**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	1.327	0.604	2.92	15	2.639	2.89	3.22

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.112/7/2017 9:39:33 AM							
4					From File	ProUCL_Load_OutlierTest.xls						
5					Full Precision	OFF						
6												
7												
8				**Dixon's Outlier Test for Zinc_test1**								
9												
10	Number of Observations = 24											
11	10% critical value: 0.367											
12	5% critical value: 0.413											
13	1% critical value: 0.497											
14												
15	**1. Observation Value 59.9 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.680											
18												
19	For 10% significance level, 59.9 is an outlier.											
20	For 5% significance level, 59.9 is an outlier.											
21	For 1% significance level, 59.9 is an outlier.											
22												
23	**2. Observation Value 2.47 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.050											
26												
27	For 10% significance level, 2.47 is not an outlier.											
28	For 5% significance level, 2.47 is not an outlier.											
29	For 1% significance level, 2.47 is not an outlier.											
30												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.112/7/2017 11:38:54 AM							
4					From File	ProUCL_Load_OutlierTest.xls						
5					Full Precision	ON						
6												
7												
8				**Dixon's Outlier Test for Zinc_test2**								
9												
10	Number of Observations = 23											
11	10% critical value: 0.374											
12	5% critical value: 0.421											
13	1% critical value: 0.505											
14												
15	**1. Observation Value 44.5 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.574											
18												
19	For 10% significance level, 44.5 is an outlier.											
20	For 5% significance level, 44.5 is an outlier.											
21	For 1% significance level, 44.5 is an outlier.											
22												
23	**2. Observation Value 2.47 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.052											
26												
27	For 10% significance level, 2.47 is not an outlier.											
28	For 5% significance level, 2.47 is not an outlier.											
29	For 1% significance level, 2.47 is not an outlier.											
30												

Outlier Tests for Selected Uncensored Variables		
User Selected Options		
Date/Time of Computation	ProUCL 5.12/22/2018 11:50:23 AM	
From File	ProUCL_Load_OutlierTest.xls	
Full Precision	OFF	

Dixon's Outlier Test for Zinc_test3

Number of Observations = 22

10% critical value: 0.382

5% critical value: 0.43

1% critical value: 0.514

1. Observation Value 21.5 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.061

For 10% significance level, 21.5 is not an outlier.

For 5% significance level, 21.5 is not an outlier.

For 1% significance level, 21.5 is not an outlier.

2. Observation Value 2.47 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.053

For 10% significance level, 2.47 is not an outlier.

For 5% significance level, 2.47 is not an outlier.

For 1% significance level, 2.47 is not an outlier.

1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.112/7/2017 9:43:45 AM							
4					From File	ProUCL_Load_OutlierTest.xls						
5					Full Precision	OFF						
6												
7												
8	**Dixon's Outlier Test for Gross_Beta**											
9												
10	Number of Observations = 21											
11	10% critical value: 0.391											
12	5% critical value: 0.44											
13	1% critical value: 0.524											
14												
15	**1. Observation Value 2.88 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.354											
18												
19	For 10% significance level, 2.88 is not an outlier.											
20	For 5% significance level, 2.88 is not an outlier.											
21	For 1% significance level, 2.88 is not an outlier.											
22												
23	**2. Observation Value -1.05 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.378											
26												
27	For 10% significance level, -1.05 is not an outlier.											
28	For 5% significance level, -1.05 is not an outlier.											
29	For 1% significance level, -1.05 is not an outlier.											
30												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.112/7/2017 9:56:09 AM							
4				From File	ProUCL_Load_OutlierTest.xls							
5				Full Precision	OFF							
6												
7												
8				**Dixon's Outlier Test for Radium-226_test1**								
9												
10	Number of Observations = 23											
11	10% critical value: 0.374											
12	5% critical value: 0.421											
13	1% critical value: 0.505											
14												
15	**1. Observation Value 1.17 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.510											
18												
19	For 10% significance level, 1.17 is an outlier.											
20	For 5% significance level, 1.17 is an outlier.											
21	For 1% significance level, 1.17 is an outlier.											
22												
23	**2. Observation Value -0.133 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.188											
26												
27	For 10% significance level, -0.133 is not an outlier.											
28	For 5% significance level, -0.133 is not an outlier.											
29	For 1% significance level, -0.133 is not an outlier.											
30												

	A	B	C	D	E	F	G	H	I	J	K	L
1					**Outlier Tests for Selected Uncensored Variables**							
2				**User Selected Options**								
3				Date/Time of Computation	ProUCL 5.112/7/2017 11:44:58 AM							
4					From File	ProUCL_Load_OutlierTest.xls						
5					Full Precision	ON						
6												
7												
8				**Dixon's Outlier Test for Radium-226_test2**								
9												
10	Number of Observations = 22											
11	10% critical value: 0.382											
12	5% critical value: 0.43											
13	1% critical value: 0.514											
14												
15	**1. Observation Value 0.639 is a Potential Outlier (Upper Tail)?**											
16												
17	Test Statistic: 0.135											
18												
19	For 10% significance level, 0.639 is not an outlier.											
20	For 5% significance level, 0.639 is not an outlier.											
21	For 1% significance level, 0.639 is not an outlier.											
22												
23	**2. Observation Value -0.133 is a Potential Outlier (Lower Tail)?**											
24												
25	Test Statistic: 0.194											
26												
27	For 10% significance level, -0.133 is not an outlier.											
28	For 5% significance level, -0.133 is not an outlier.											
29	For 1% significance level, -0.133 is not an outlier.											
30												

Outlier Tests for Selected Uncensored Variables		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/7/2017 10:00:46 AM	
From File	ProUCL_Load_OutlierTest.xls	
Full Precision	OFF	

Dixon's Outlier Test for Uranium-238

Number of Observations = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Observation Value 1.59 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.255

For 10% significance level, 1.59 is not an outlier.

For 5% significance level, 1.59 is not an outlier.

For 1% significance level, 1.59 is not an outlier.

2. Observation Value 0.135 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.210

For 10% significance level, 0.135 is not an outlier.

For 5% significance level, 0.135 is not an outlier.

For 1% significance level, 0.135 is not an outlier.

Attachment H3

Trend Tests and Time Series Plots

Attachment H3. Trend Test ProUCL Load File

Aluminum_UCD1-018	D_Aluminum_UCD1-018	Aluminum_UCD1-063	D_Aluminum_UCD1-063	Chromium_UCD1-018
50	0	50	0	15.7
50	0	50	0	19.2
50	0	50	0	20.1
50	0	50	0	7.19
250	0	250	0	12.85
50	0	5.86	1	8.99
7.26	1	6.2	1	16.7
4.895	1	9.09	1	25.3
8.55	1	11.9	1	25.2
10.3	1	13.5	1	29.8

Trend Test ProUCL Load File

Chromium_UCD1-063	Cr6_UCD1-018	Cr6_UCD1-063	Iron_UCD1-018	Iron_UCD1-063	Manganese_UCD1-018	d_Manganese_UCD1-018
31.3	14	35	52.6	50.9	1	0
29	18	29	49.4	16.7	1	0
28.05	22	30.5	58.1	53.3	4.325	1
40.5	3.6	36	35	28.4	0.174	1
43.7	9.5	34	37	43.5	0.18	1
37.9	18	30	76.05	10.6	0.166	1
48.2	7.8	40	41.6	55.3	1	0
22.2	4.9	36	46.8	51.7	0.475	1
17.7	15	49				
15.8	23	21				
	26	17				
	28	14				

Trend Test ProUCL Load File

Manganese_UCD1-063	d_Manganese_UCD1-063	Molybdenum_UCD1-018	Molybdenum_UCD1-063	Nickel_UCD1-018	Nickel_UCD1-063
1	0	1.32	2.59	3.22	1.23
1	0	1.41	3.13	3.63	1.34
4.3	1	1.24	2.72	3.37	1.705
0.328	1	1.63	2.78	75.2	1.9
0.203	1	1.65	2.72	139	1.3
0.293	1	1.66	2.77	5.19	1.31
1	0	2.74	2.7	3.345	1.03
0.447	1	1.355	2.97	3.55	1.4
		1.45	2.96	3.25	1.04
		1.58	3.57		

Trend Test ProUCL Load File

Nitrate_as_N_UCD1-018	Nitrate_as_N_UCD1-063	Selenium_UCD1-018	Selenium_UCD1-063	Zinc_UCD1-018	d_Zinc_UCD1-018
6.4	1.2	0.787	0.986	4.41	1
10	1.2	1.06	0.931	20.3	1
15	1.2	1.74	0.9535	20.9	1
2.7	1.2	0.731	1.51	2.47	1
4.2	1.2	1.19	1.01	6.32	1
3.4	1.1	1.45	0.991	5.85	1
12	1.6	0.631	0.992	9.105	1
11	1	0.853	1.51	5	0
13	0.68	1.23	1.5	59.9	1
16	0.55	2.22	2.2		
		2.86	1.02		
		2.92	1		

Trend Test ProUCL Load File

Zinc_UCD1-063	Gross_Beta_UCD1-018	Gross_Beta_UCD1-063	Ra-226_UCD1-018	Ra-226_UCD1-063	U-238_UCD1-018	U-238_UCD1-063
2.54	1.84	0.0583	0.0616	1.17	0.78	0.702
8.16	1.06	1.88	0.639	0.0998	0.654	0.475
10.46	1.76	0.402	0.245	0.165	0.5935	0.946
12.3	1.53725	2.88	0.508	0.398	0.135	0.376
14	-1.05	0.883	0.16505	0.196	1.28	0.655
3.42	1.73	0.279	0.573	0.14	1.325	0.672
21.5	1.115	1.23	0.553	-0.133	0.756	0.693
20.4	0.628	1.11	0.3325	-0.112	1.29	0.289
44.5	0.623	1.14	0.352	0.0762		
			0.237	0.0404		

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:14:37 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Aluminum_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	4.8950000
Maximum	250.00000
Mean	53.100500
Geometric Mean	27.468078
Median	50.000000
Standard Deviation	72.310465
Coefficient of Variation	1.3617662

Mann-Kendall Test

M-K Test Value (S)	-17.00000
Tabulated p-value	0.0780000
Standard Deviation of S	10.408330
Standardized Value of S	-1.537230
Approximate p-value	0.0621185

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:16:15 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Aluminum_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	5.8600000
Maximum	250.00000
Mean	49.655000
Geometric Mean	24.652184
Median	31.750000
Standard Deviation	73.275036
Coefficient of Variation	1.4756829

Mann-Kendall Test

M-K Test Value (S)	-11.00000
Tabulated p-value	0.1900000
Standard Deviation of S	10.785793
Standardized Value of S	-0.927146
Approximate p-value	0.1769255

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:17:22 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Chromium_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	7.1900000
Maximum	29.800000
Mean	18.103000
Geometric Mean	16.608264
Median	17.950000
Standard Deviation	7.3155285
Coefficient of Variation	0.4041059

Mann-Kendall Test

M-K Test Value (S)	19.000000
Tabulated p-value	0.0540000
Standard Deviation of S	11.180340
Standardized Value of S	1.6099689
Approximate p-value	0.0537023

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:18:36 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Chromium_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	15.800000
Maximum	48.200000
Mean	31.435000
Geometric Mean	29.569782
Median	30.150000
Standard Deviation	11.011409
Coefficient of Variation	0.3502914

Mann-Kendall Test

M-K Test Value (S)	-13.00000
Tabulated p-value	0.1460000
Standard Deviation of S	11.180340
Standardized Value of S	-1.073313
Approximate p-value	0.1415654

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:21:38 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Cr6_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	12
Number Values Reported (n)	12
Minimum	3.6000000
Maximum	28.000000
Mean	15.816667
Geometric Mean	13.374583
Median	16.500000
Standard Deviation	8.1355375
Coefficient of Variation	0.5143649

Mann-Kendall Test

M-K Test Value (S)	23.000000
Tabulated p-value	0.0760000
Standard Deviation of S	14.548769
Standardized Value of S	1.5121555
Approximate p-value	0.0652472

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

Mann-Kendall Trend Test Analysis	
User Selected Options	
Date/Time of Computation	ProUCL 5.112/6/2017 4:22:52 PM
From File	1_Mann_Kendall_Load.xls
Full Precision	ON
Confidence Coefficient	0.9900000
Level of Significance	0.0100000

Cr6_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	12
Number Values Reported (n)	12
Minimum	14.000000
Maximum	49.000000
Mean	30.958333
Geometric Mean	29.303441
Median	32.250000
Standard Deviation	9.8637498
Coefficient of Variation	0.3186137

Mann-Kendall Test

M-K Test Value (S)	-13.00000
Tabulated p-value	0.2300000
Standard Deviation of S	14.548769
Standardized Value of S	-0.824812
Approximate p-value	0.2047391

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:24:12 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Iron_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	35.000000
Maximum	76.050000
Mean	49.568750
Geometric Mean	48.161458
Median	48.100000
Standard Deviation	13.226838
Coefficient of Variation	0.2668382

Mann-Kendall Test

M-K Test Value (S)	-2.000000
Tabulated p-value	0.4520000
Standard Deviation of S	8.0829038
Standardized Value of S	-0.123718
Approximate p-value	0.4507693

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:25:30 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Iron_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	10.600000
Maximum	55.300000
Mean	38.800000
Geometric Mean	33.782075
Median	47.200000
Standard Deviation	17.765215
Coefficient of Variation	0.4578664

Mann-Kendall Test

M-K Test Value (S)	4.0000000
Tabulated p-value	0.3600000
Standard Deviation of S	8.0829038
Standardized Value of S	0.3711537
Approximate p-value	0.3552615

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:38:44 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Manganese_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	0.1660000
Maximum	4.3250000
Mean	1.0400000
Geometric Mean	0.5669910
Median	0.7375000
Standard Deviation	1.3819594
Coefficient of Variation	1.3288071

Mann-Kendall Test

M-K Test Value (S)	-7.000000
Tabulated p-value	0.2740000
Standard Deviation of S	7.8528127
Standardized Value of S	-0.764057
Approximate p-value	0.2224165

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:39:41 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Manganese_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	0.2030000
Maximum	4.3000000
Mean	1.0713750
Geometric Mean	0.6633637
Median	0.7235000
Standard Deviation	1.3491635
Coefficient of Variation	1.2592823

Mann-Kendall Test

M-K Test Value (S)	-7.000000
Tabulated p-value	0.2740000
Standard Deviation of S	7.8528127
Standardized Value of S	-0.764057
Approximate p-value	0.2224165

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:41:01 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Molybdenum_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	1.2400000
Maximum	2.7400000
Mean	1.6035000
Geometric Mean	1.5641231
Median	1.5150000
Standard Deviation	0.4260285
Coefficient of Variation	0.2656866

Mann-Kendall Test

M-K Test Value (S)	15.000000
Tabulated p-value	0.1080000
Standard Deviation of S	11.180340
Standardized Value of S	1.2521981
Approximate p-value	0.1052489

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:41:48 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Molybdenum_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	2.5900000
Maximum	3.5700000
Mean	2.8910000
Geometric Mean	2.8791127
Median	2.7750000
Standard Deviation	0.2870714
Coefficient of Variation	0.0992983

Mann-Kendall Test

M-K Test Value (S)	17.000000
Tabulated p-value	0.0780000
Standard Deviation of S	11.180340
Standardized Value of S	1.4310835
Approximate p-value	0.0762031

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:42:47 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Nickel_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	3.2200000
Maximum	139.00000
Mean	26.639444
Geometric Mean	7.5785988
Median	3.5500000
Standard Deviation	48.328682
Coefficient of Variation	1.8141776

Mann-Kendall Test

M-K Test Value (S)	-2.000000
Tabulated p-value	0.4600000
Standard Deviation of S	9.5916630
Standardized Value of S	-0.104257
Approximate p-value	0.4584826

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:44:27 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Nickel_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	1.0300000
Maximum	1.9000000
Mean	1.3616667
Geometric Mean	1.3368353
Median	1.3100000
Standard Deviation	0.2843633
Coefficient of Variation	0.2088348

Mann-Kendall Test

M-K Test Value (S)	-6.000000
Tabulated p-value	0.3060000
Standard Deviation of S	9.5916630
Standardized Value of S	-0.521286
Approximate p-value	0.3010838

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:45:42 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Nitrate_as_N_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	2.7000000
Maximum	16.000000
Mean	9.3700000
Geometric Mean	7.9560966
Median	10.500000
Standard Deviation	4.8817233
Coefficient of Variation	0.5209950

Mann-Kendall Test

M-K Test Value (S)	17.000000
Tabulated p-value	0.0780000
Standard Deviation of S	11.180340
Standardized Value of S	1.4310835
Approximate p-value	0.0762031

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:47:14 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Nitrate_as_N_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	0.5500000
Maximum	1.6000000
Mean	1.0930000
Geometric Mean	1.0505798
Median	1.2000000
Standard Deviation	0.2959748
Coefficient of Variation	0.2707913

Mann-Kendall Test

M-K Test Value (S)	-23.00000
Tabulated p-value	0.0230000
Standard Deviation of S	10.408330
Standardized Value of S	-2.113692
Approximate p-value	0.0172708

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:48:12 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Selenium_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	12
Number Values Reported (n)	12
Minimum	0.6310000
Maximum	2.9200000
Mean	1.4726667
Geometric Mean	1.2960964
Median	1.2100000
Standard Deviation	0.8017954
Coefficient of Variation	0.5444514

Mann-Kendall Test

M-K Test Value (S)	32.000000
Tabulated p-value	0.0160000
Standard Deviation of S	14.583095
Standardized Value of S	2.1257490
Approximate p-value	0.0167621

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:50:02 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Selenium_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	12
Number Values Reported (n)	12
Minimum	0.9310000
Maximum	2.2000000
Mean	1.2169583
Geometric Mean	1.1713234
Median	1.0050000
Standard Deviation	0.3876635
Coefficient of Variation	0.3185512

Mann-Kendall Test

M-K Test Value (S)	27.000000
Tabulated p-value	0.0430000
Standard Deviation of S	14.548769
Standardized Value of S	1.7870928
Approximate p-value	0.0369612

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:51:06 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Zinc_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	2.4700000
Maximum	59.900000
Mean	14.917222
Geometric Mean	9.1864456
Median	6.3200000
Standard Deviation	18.172140
Coefficient of Variation	1.2181986

Mann-Kendall Test

M-K Test Value (S)	6.0000000
Tabulated p-value	0.3060000
Standard Deviation of S	9.5916630
Standardized Value of S	0.5212860
Approximate p-value	0.3010838

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 4:52:01 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Zinc_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	2.5400000
Maximum	44.500000
Mean	15.253333
Geometric Mean	11.067777
Median	12.300000
Standard Deviation	12.777508
Coefficient of Variation	0.8376862

Mann-Kendall Test

M-K Test Value (S)	26.000000
Tabulated p-value	0.0030000
Standard Deviation of S	9.5916630
Standardized Value of S	2.6064302
Approximate p-value	0.0045746

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 5:03:13 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Gross_Beta_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	-1.050000
Maximum	1.8400000
Mean	1.0270278
Geometric Mean	N/A
Median	1.1150000
Standard Deviation	0.9081575
Coefficient of Variation	0.8842580

Mann-Kendall Test

M-K Test Value (S)	-18.00000
Tabulated p-value	0.0380000
Standard Deviation of S	9.5916630
Standardized Value of S	-1.772373
Approximate p-value	0.0381664

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

	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 5:07:29 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Gross_Beta_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	9
Number Values Reported (n)	9
Minimum	0.0583000
Maximum	2.8800000
Mean	1.0958111
Geometric Mean	0.7147053
Median	1.1100000
Standard Deviation	0.8724044
Coefficient of Variation	0.7961266

Mann-Kendall Test

M-K Test Value (S)	6.0000000
Tabulated p-value	0.3060000
Standard Deviation of S	9.5916630
Standardized Value of S	0.5212860
Approximate p-value	0.3010838

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 5:09:40 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Ra-226_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	0.0616000
Maximum	0.6390000
Mean	0.3666150
Geometric Mean	0.3056110
Median	0.3422500
Standard Deviation	0.1938349
Coefficient of Variation	0.5287151

Mann-Kendall Test

M-K Test Value (S)	-1.000000
Tabulated p-value	0.5000000
Standard Deviation of S	11.180340
Standardized Value of S	0
Approximate p-value	0.5000000

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 5:10:51 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

Ra-226_UCD1-063

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	10
Number Values Reported (n)	10
Minimum	-0.133000
Maximum	1.1700000
Mean	0.2040400
Geometric Mean	N/A
Median	0.1199000
Standard Deviation	0.3717606
Coefficient of Variation	1.8219986

Mann-Kendall Test

M-K Test Value (S)	-23.00000
Tabulated p-value	0.0230000
Standard Deviation of S	11.180340
Standardized Value of S	-1.967740
Approximate p-value	0.0245490

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 5:11:51 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

U-238_UCD1-018

General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	0.1350000
Maximum	1.3250000
Mean	0.8516875
Geometric Mean	0.7140778
Median	0.7680000
Standard Deviation	0.4197400
Coefficient of Variation	0.4928333

Mann-Kendall Test

M-K Test Value (S)	8.0000000
Tabulated p-value	0.1190000
Standard Deviation of S	8.0829038
Standardized Value of S	0.8660254
Approximate p-value	0.1932381

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

Mann-Kendall Trend Test Analysis		
User Selected Options		
Date/Time of Computation	ProUCL 5.112/6/2017 5:14:00 PM	
From File	1_Mann_Kendall_Load.xls	
Full Precision	ON	
Confidence Coefficient	0.9900000	
Level of Significance	0.0100000	

U-238_UCD1-063

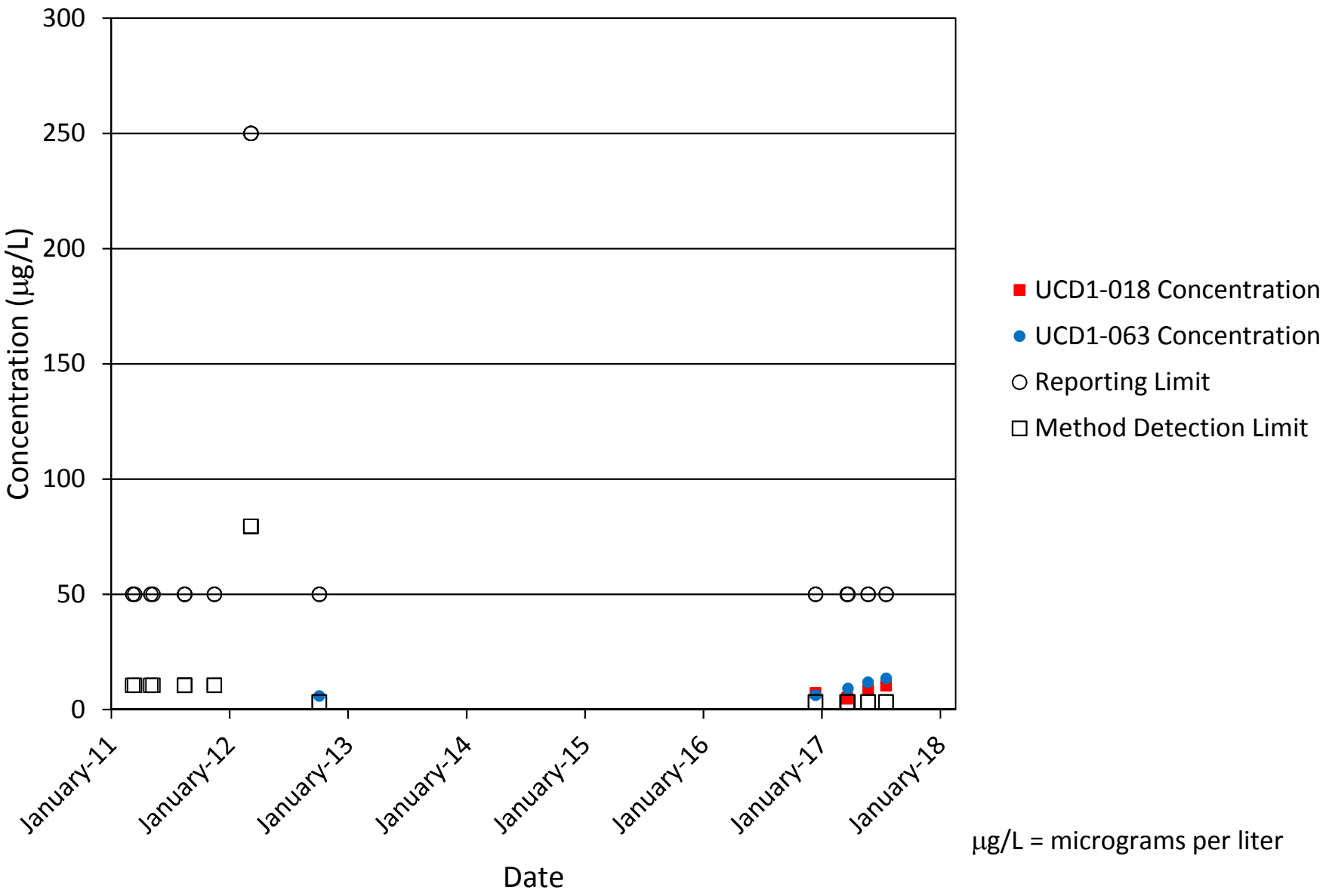
General Statistics

Number or Reported Events Not Used	0
Number of Generated Events	8
Number Values Reported (n)	8
Minimum	0.2890000
Maximum	0.9460000
Mean	0.6010000
Geometric Mean	0.5654822
Median	0.6635000
Standard Deviation	0.2102692
Coefficient of Variation	0.3498656

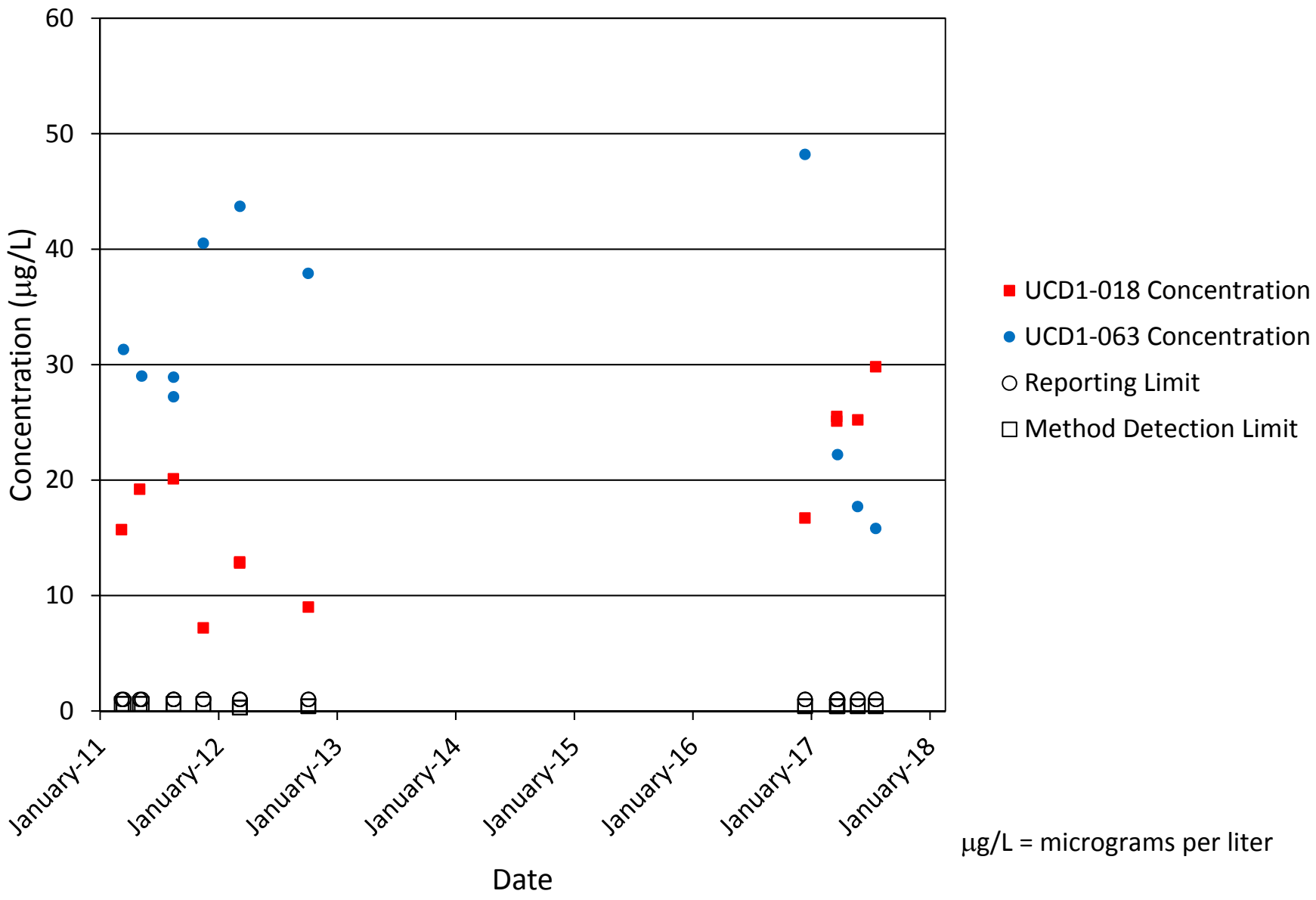
Mann-Kendall Test

M-K Test Value (S)	-6.000000
Tabulated p-value	0.2740000
Standard Deviation of S	8.0829038
Standardized Value of S	-0.618590
Approximate p-value	0.2680934

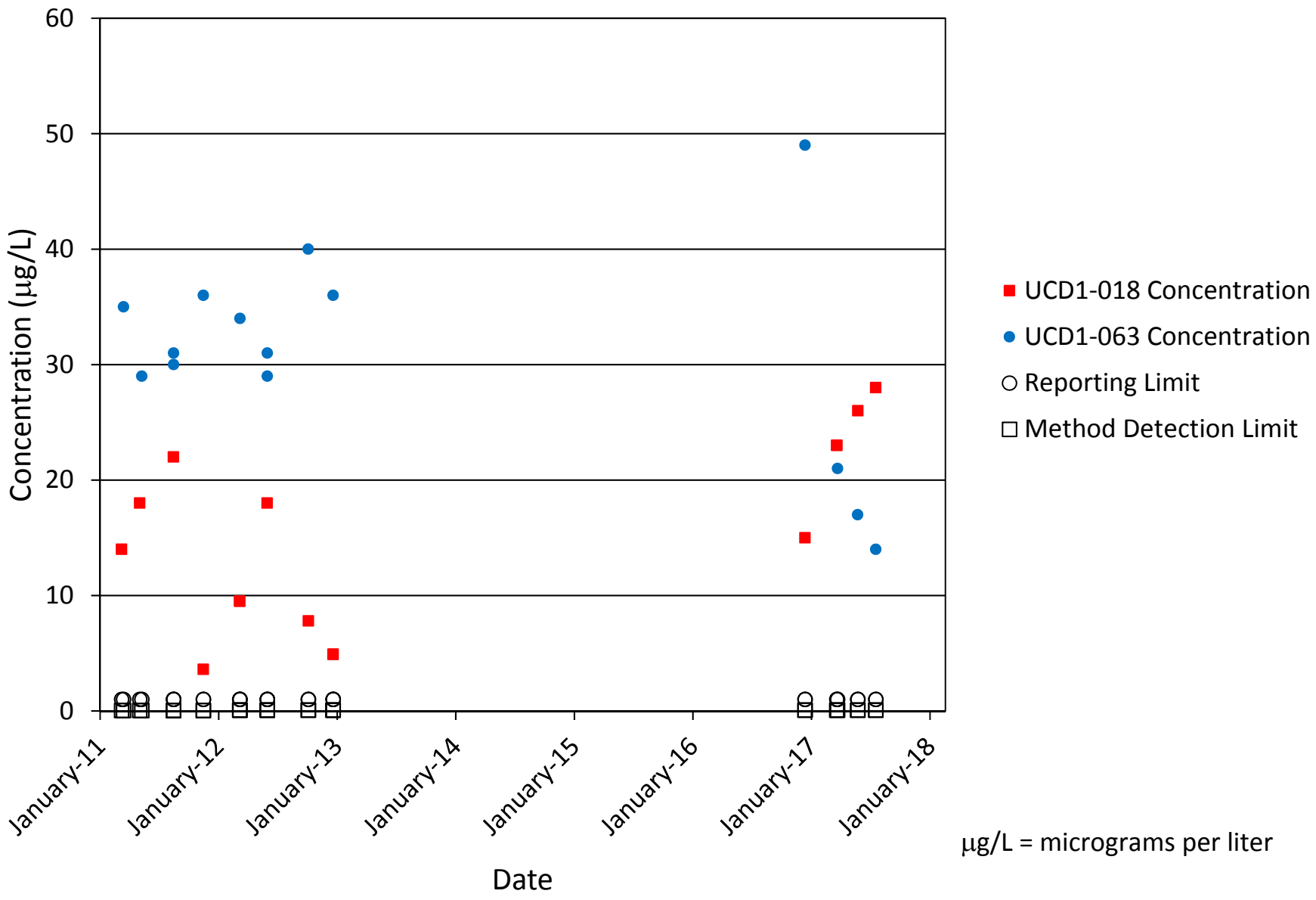
Insufficient evidence to identify a significant trend at the specified level of significance.



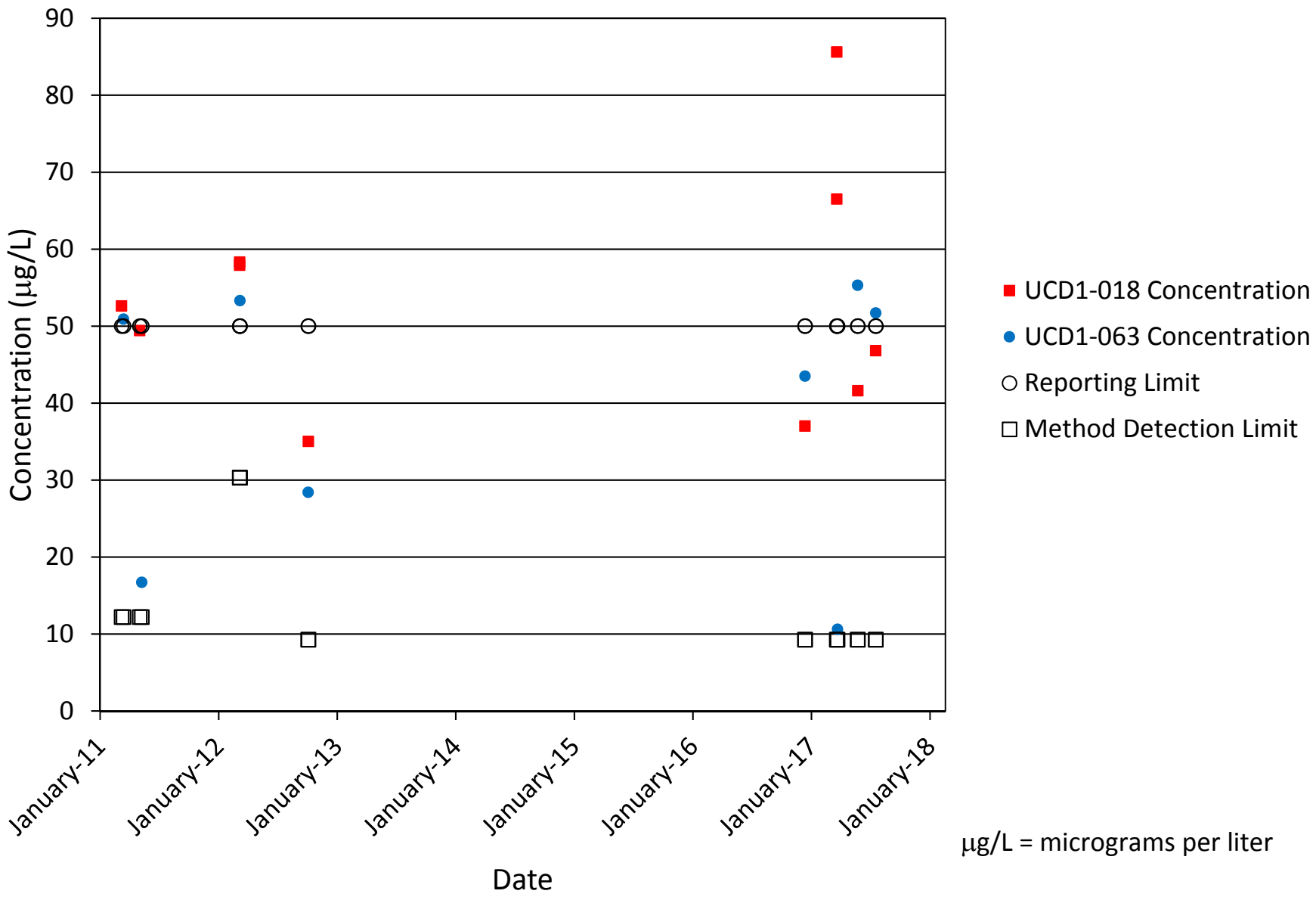
Aluminum in Background Wells UCD1-018 and UCD1-063



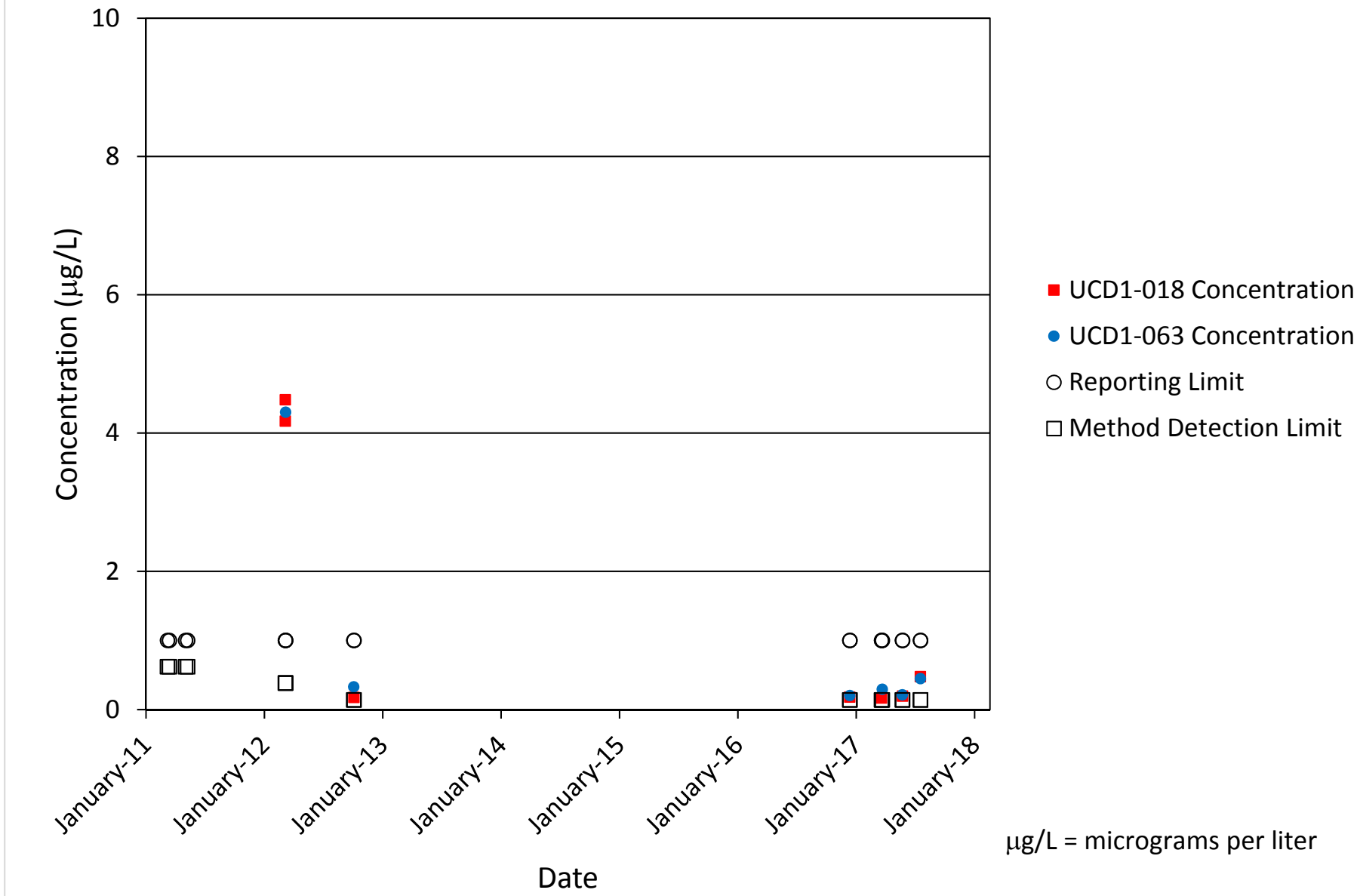
Chromium in Background Wells UCD1-018 and UCD1-063



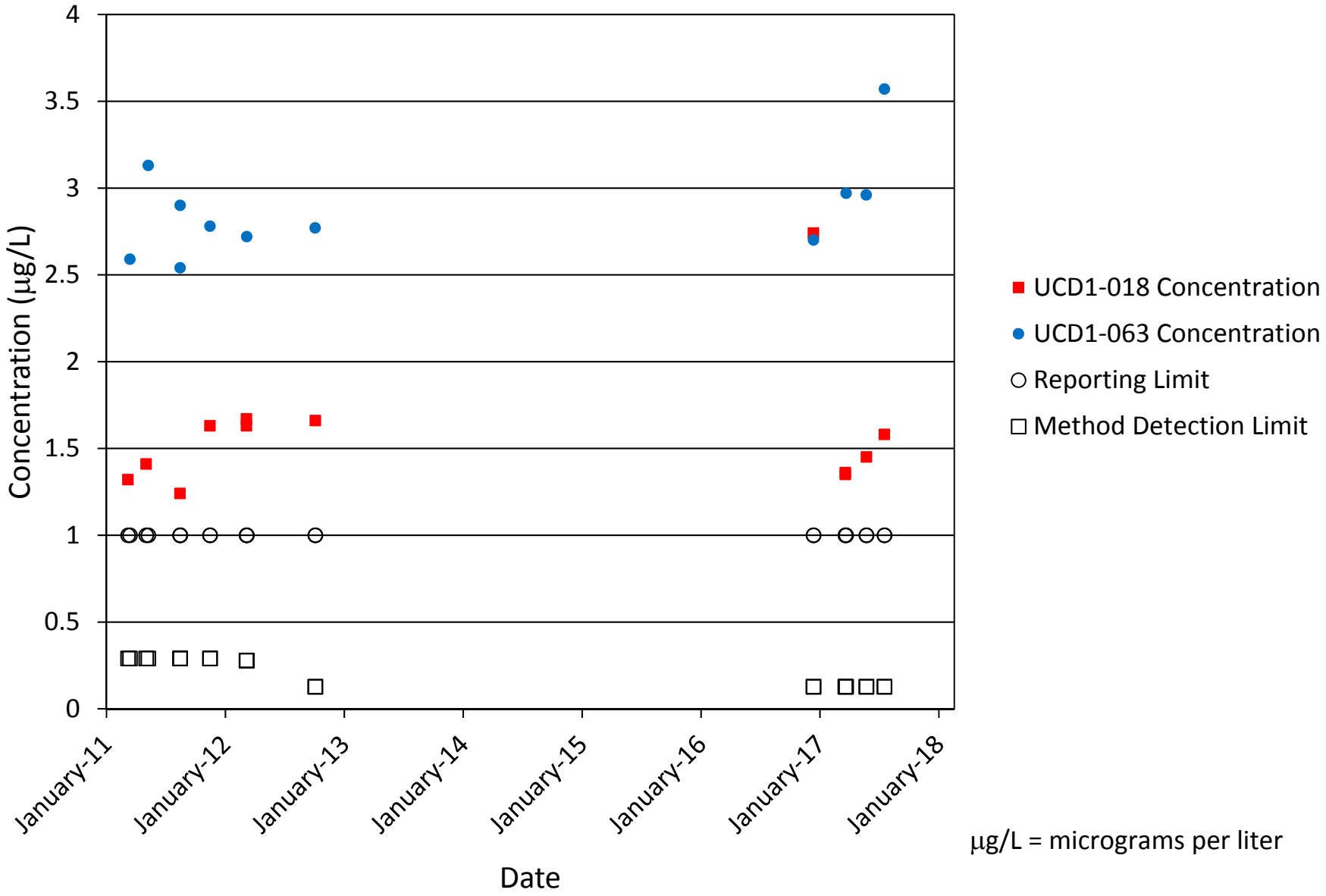
Hexavalent Chromium in Background Wells UCD1-018 and UCD1-063



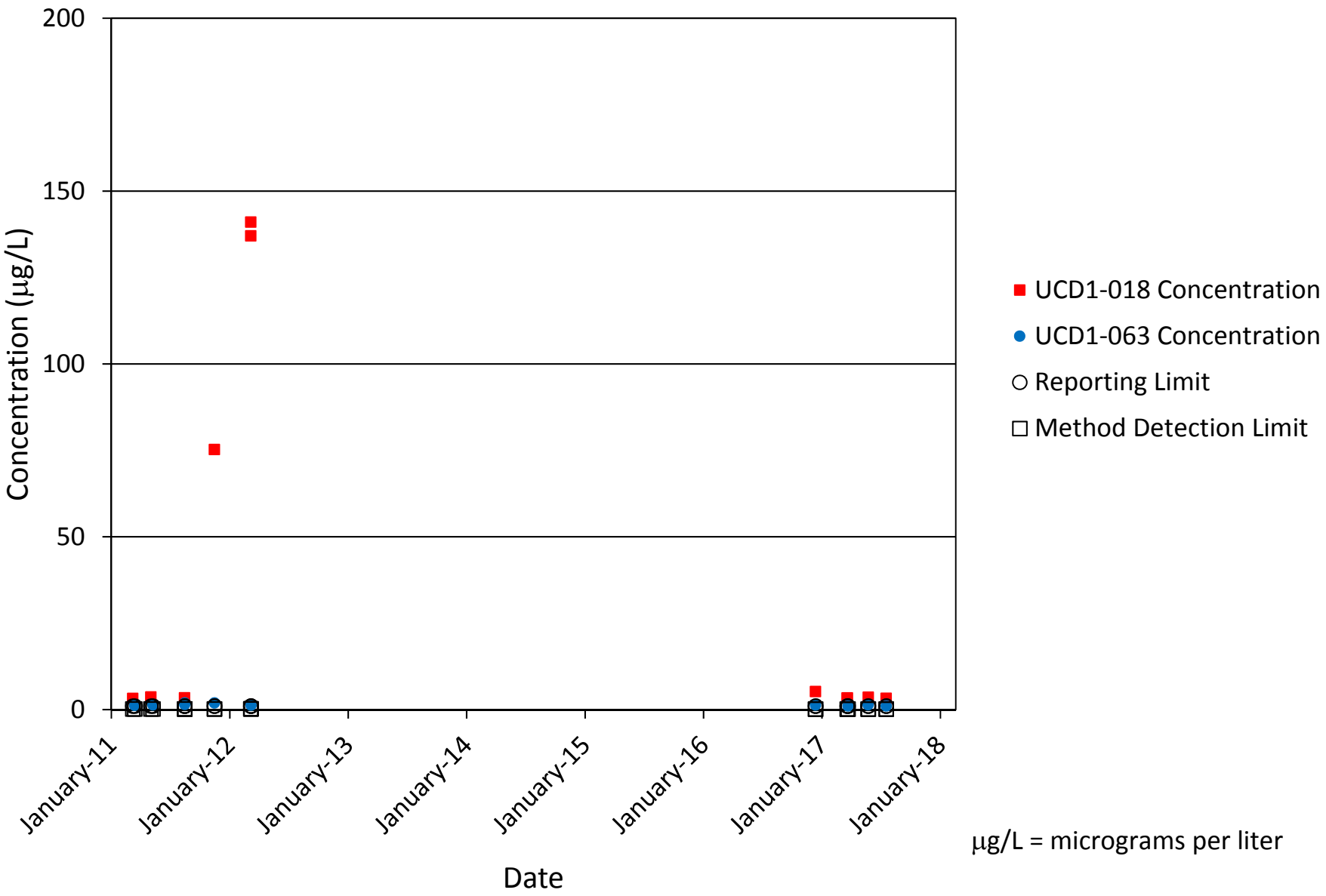
Iron in Background Wells UCD1-018 and UCD1-063



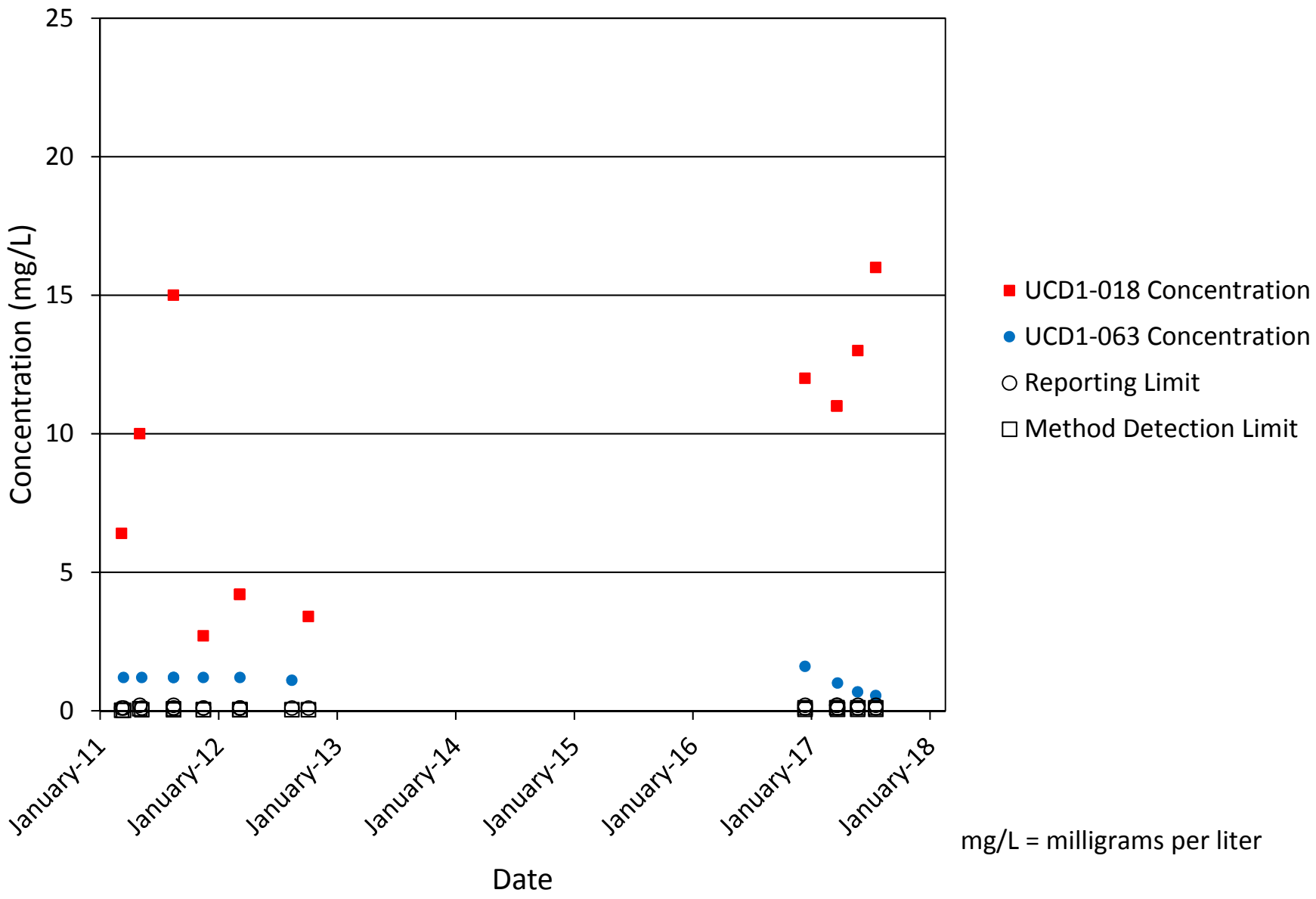
Manganese in Background Wells UCD1-018 and UCD1-063



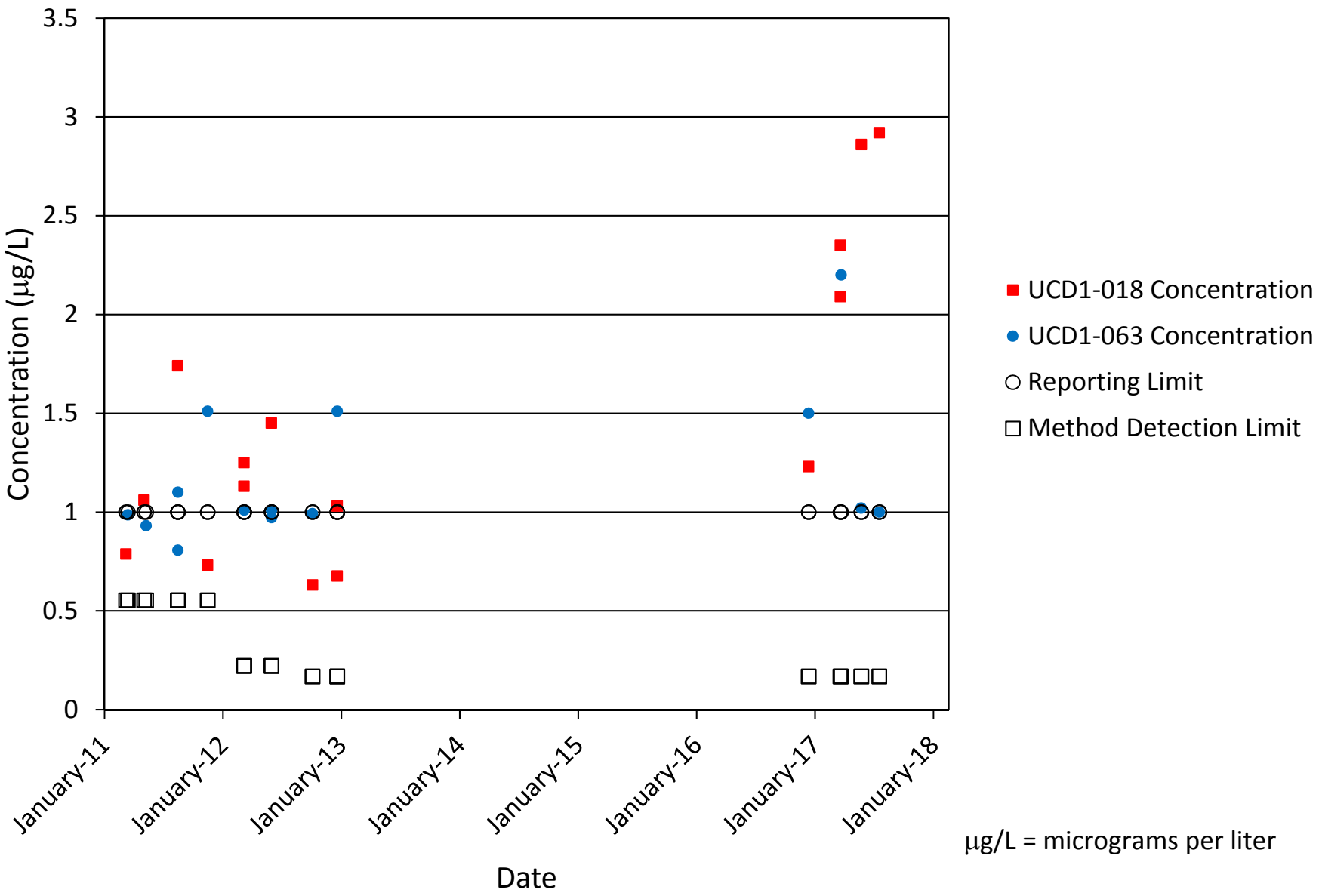
Molybdenum in Background Wells UCD1-018 and UCD1-063



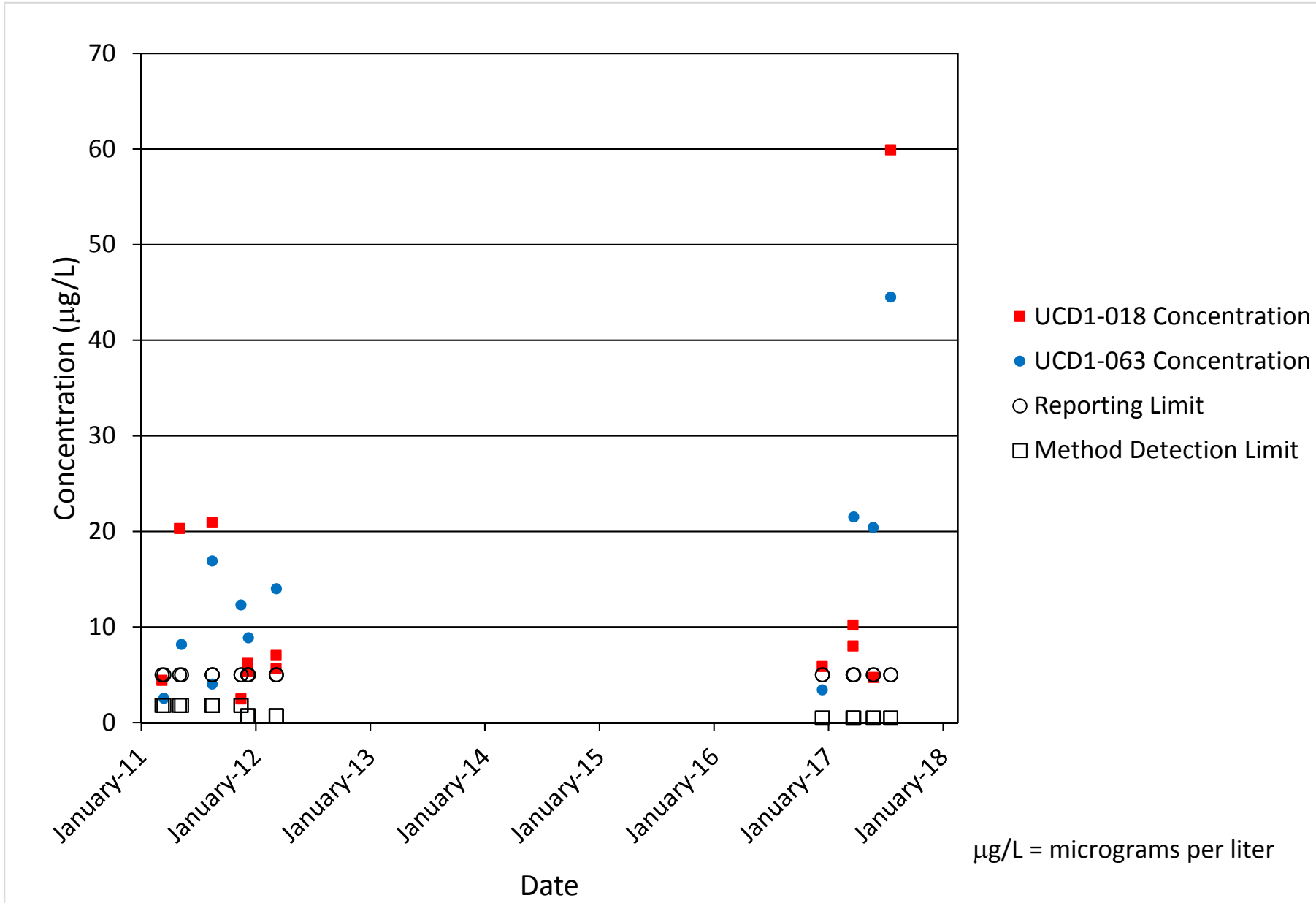
Nickel in Background Wells UCD1-018 and UCD1-063



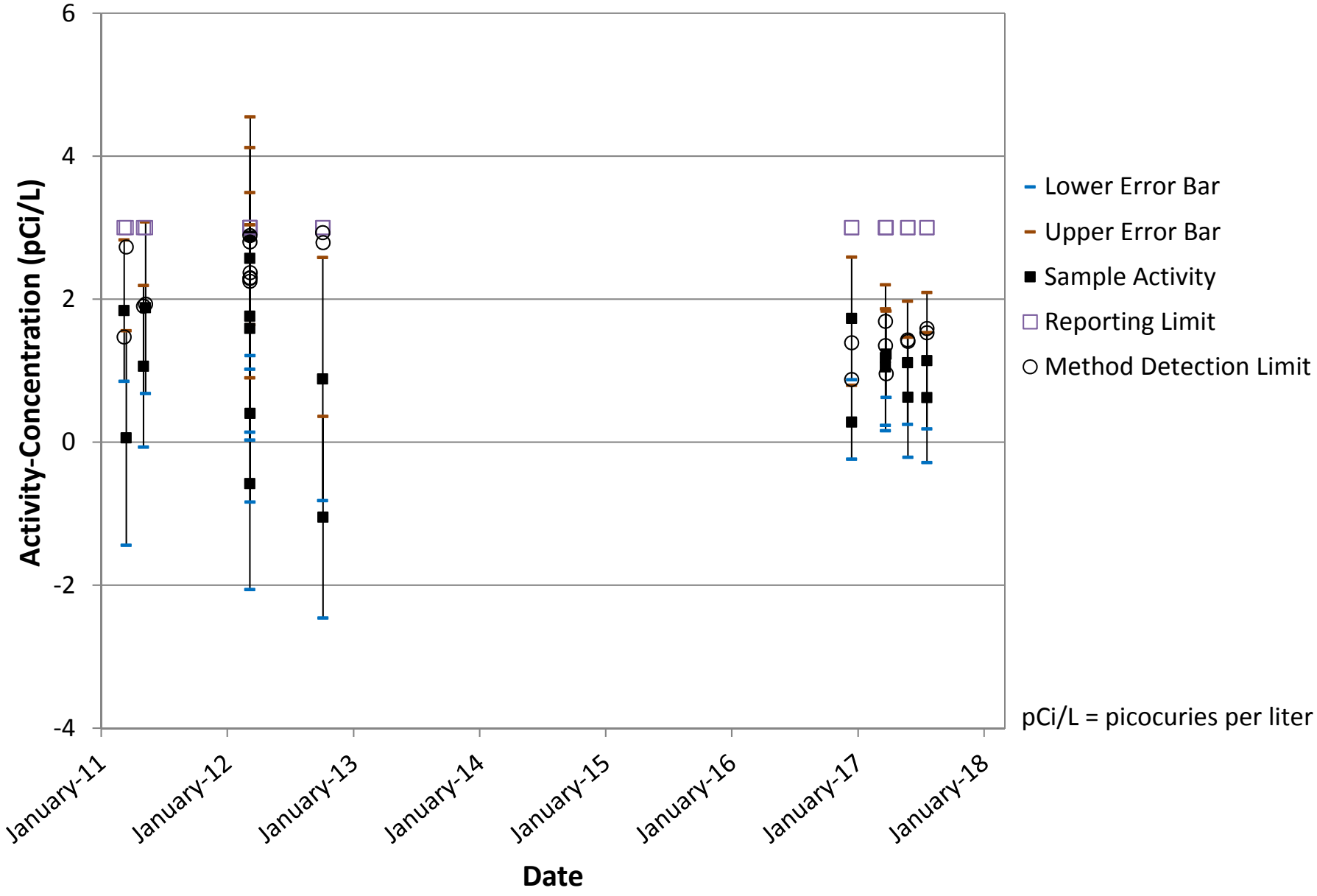
Nitrate as N in Background Wells UCD1-018 and UCD1-063



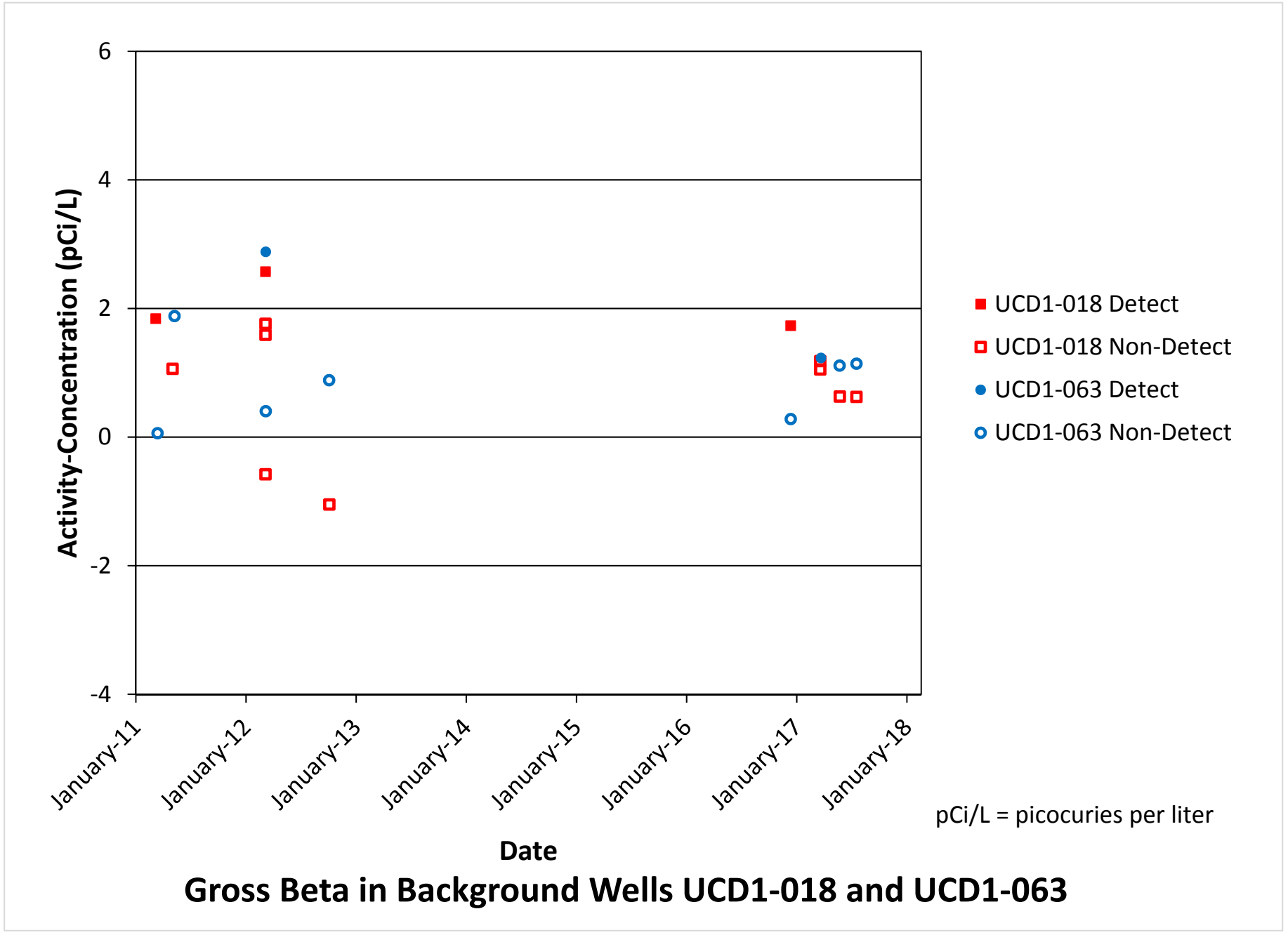
Selenium in Background Wells UCD1-018 and UCD1-063



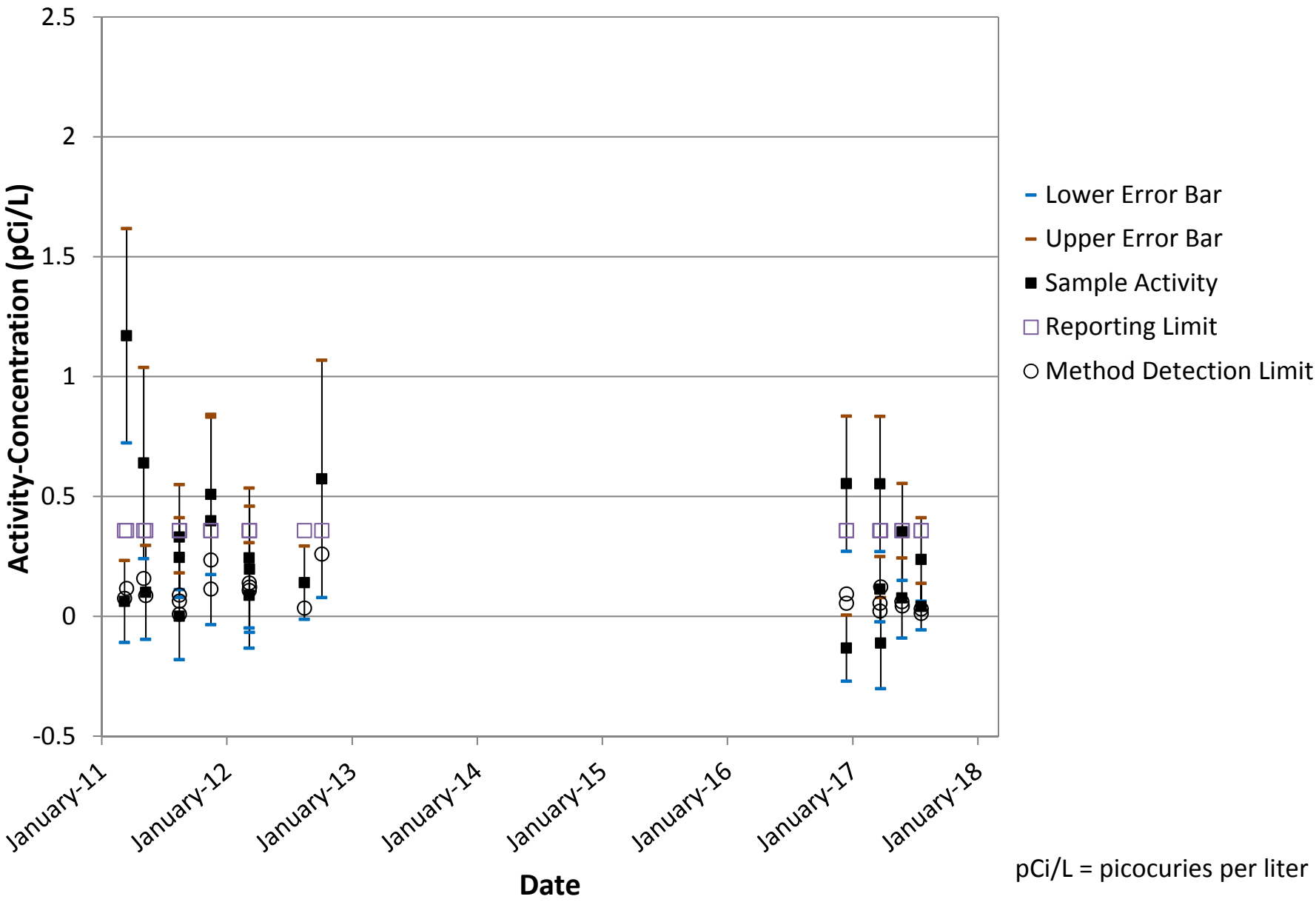
Zinc in Background Wells UCD1-018 and UCD1-063



Gross Beta in Background Wells UCD1-018 and UCD1-063

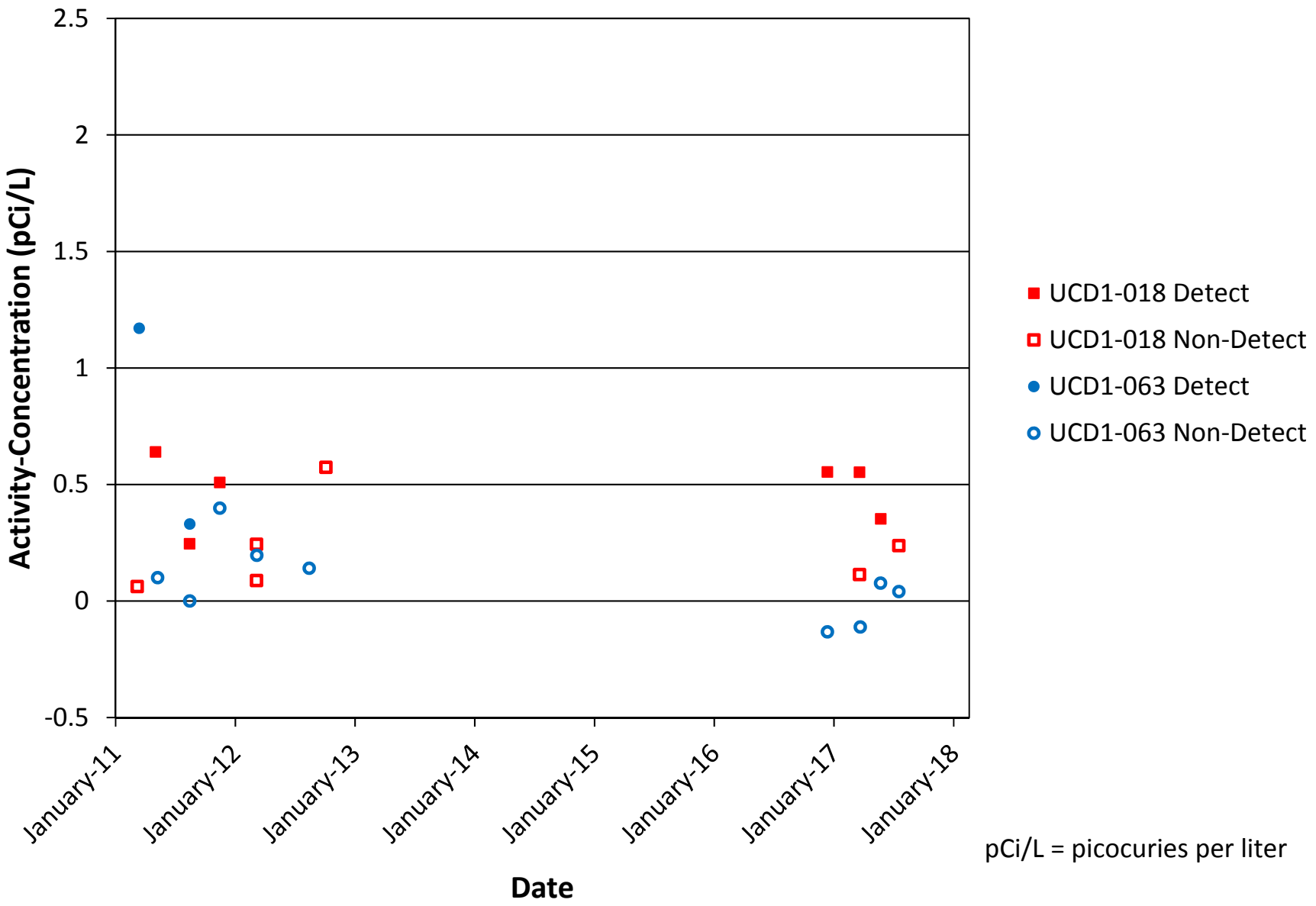


Gross Beta in Background Wells UCD1-018 and UCD1-063

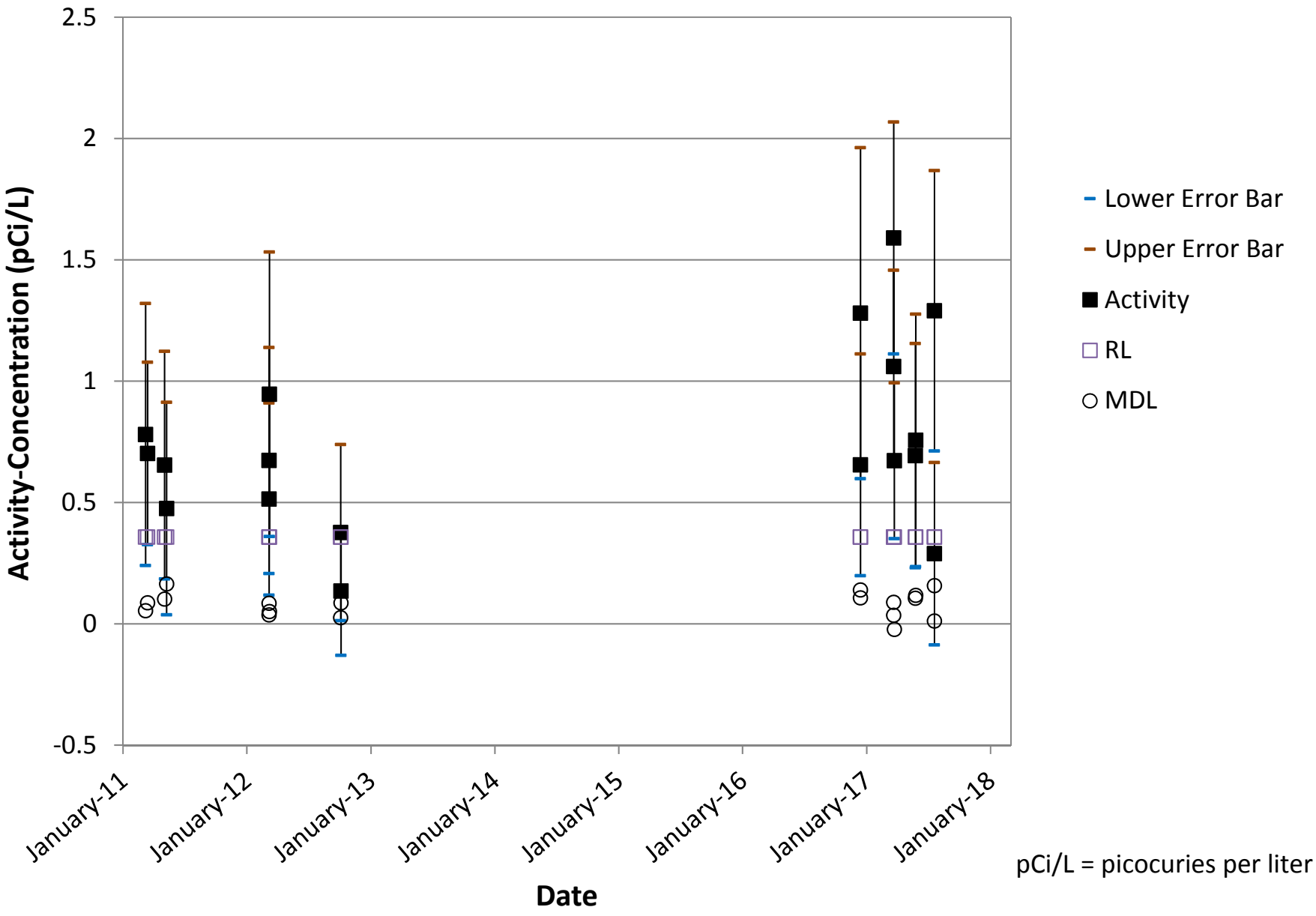


pCi/L = picocuries per liter

Radium-226 in Background Wells UCD1-018 and UCD1-063

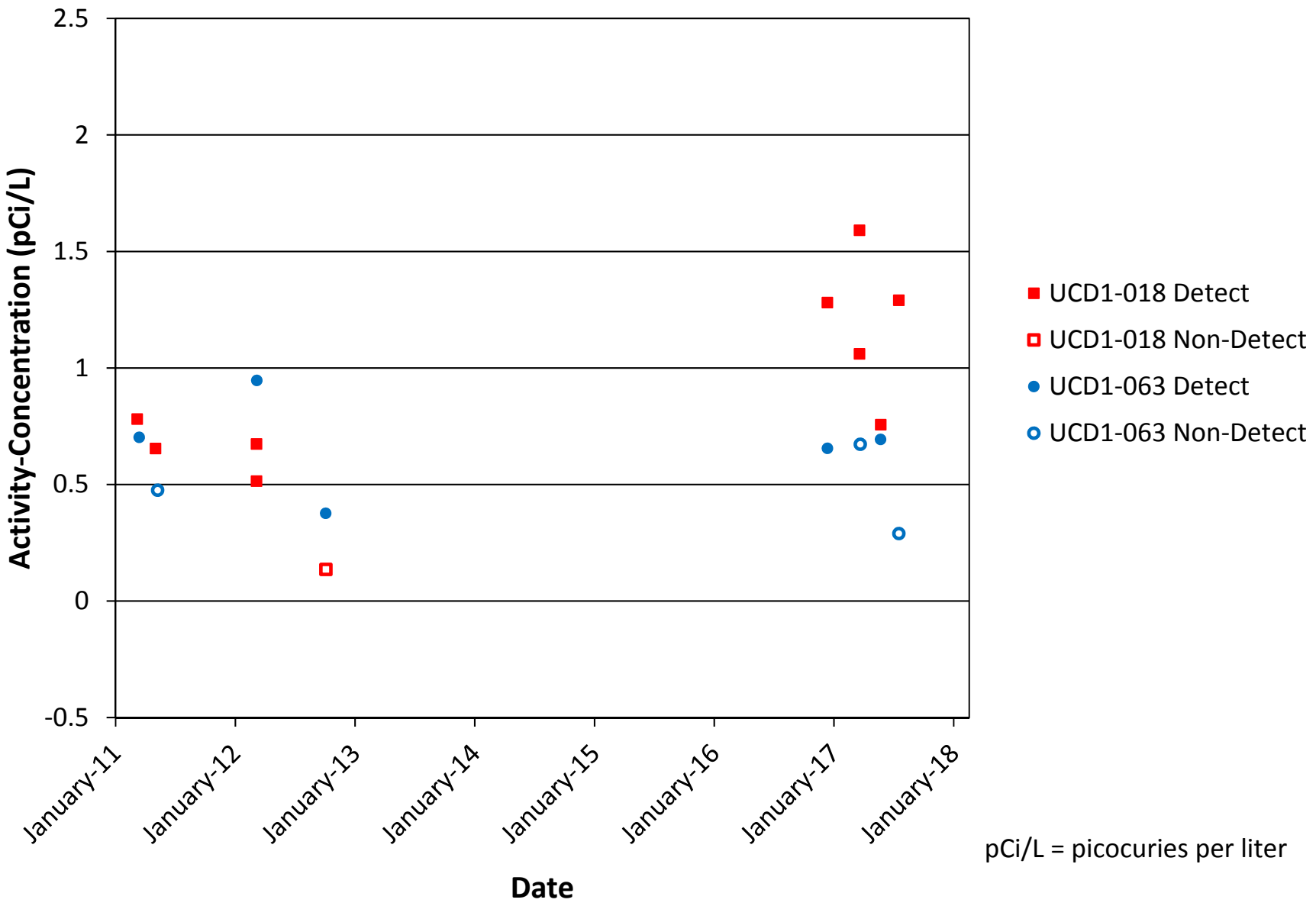


Radium-226 in Background Wells UCD1-018 and UCD1-063



pCi/L = picocuries per liter

Uranium-238 in Background Wells UCD1-018 and UCD1-063



Uranium-238 in Background Wells UCD1-018 and UCD1-063