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Technical Note

To	EQ Resources/Mount Carbine Quarries
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Mount Carbine void water quality, groundwater relationship and spill risk

Introduction

The water quality, groundwater relationship (*ie* sink or source) and spill risk of the Mount Carbine void are examined to assist with its management and long-term planning.

Void water quality

Void water quality was examined to inform the environmental risk associated with spills (*ie* the void over-topping) and seepage (loss from the wall and floor). The examination compared all available void water quality data (*ie* from 1992 to 2023) to:

1. aquatic ecosystem protection guideline values
2. the quality of water previously released from site
3. livestock drinking water quality guidelines.

Before assessments were undertaken, water quality data for each site-analyte was screened for outliers. Outliers were nominated as values greater than the 75th percentile plus 1.5 times the interquartile range (*ie* 75th percentile – 25th percentile) or less than the 25th percentile minus 1.5 times the interquartile range (*ie* the inter-quartile range method described in DES (2021)). Due to the reduction in analytical reliability as determinations approach the limit of reporting (LOR), values that were less than 10 times the LOR were not considered outliers. Outliers were excluded from the assessment. Data summaries and outliers are in **Attachment 1**.

Aquatic ecosystems

Void water quality was assessed against aquatic ecosystem protection guideline values using:

- the Mount Carbine receiving environment monitoring program (REMP), (NRA 2020) site-specific guideline values (SSGVs) for Manganese Creek[1] for pH, electrical conductivity (EC), sulfate, fluoride, filtered aluminium, filtered antimony, filtered arsenic, filtered cadmium, filtered chromium, filtered cobalt, filtered copper, filtered lead, filtered manganese, filtered molybdenum, filtered nickel, filtered selenium, filtered tungsten, and filtered zinc. Medians are the assessment values used with SSGVs.
- toxicant default guideline values (DGVs) for the protection of moderately disturbed aquatic ecosystems (ANZG 2018) for aluminium, antimony, arsenic, boron, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, uranium, and zinc (all filtered concentrations). The 95th percentiles are the assessment values used with toxicant DGVs.

Assessment values had to be greater than (or less than for pH assessment against lower guideline values) all relevant guideline values (*ie* DGVs and SSGVs) for the analyte to report an exceedance. Exceedances were reported for pH, EC, fluoride, sulfate, filtered arsenic, filtered cadmium, filtered molybdenum, filtered tungsten and filtered uranium.

Comparison to release water quality

Void water was compared to water quality of releases[2] from TSF4 that occurred from:

- 24 January – 12 February 2013
- 15 April – 8 May 2014
- 3–14 February 2022.

Maximum values in void water were compared to maximum values during releases, and the minimum pH value in the void water was compared to the minimum pH recorded during the releases. pH, EC, sulfate, fluoride, sodium, calcium, magnesium, chloride and filtered and unfiltered concentrations of aluminium, antimony, arsenic, boron, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, and uranium were assessed.

The maximum value for void water exceeded the maximum value record during releases for pH, EC, sulfate, fluoride, sodium, calcium, magnesium, chloride, filtered antimony, filtered and unfiltered arsenic, filtered and unfiltered boron, filtered and unfiltered cadmium, filtered and unfiltered cobalt, filtered lead, filtered and unfiltered nickel, filtered and unfiltered selenium, filtered and unfiltered tungsten, filtered and unfiltered uranium, and unfiltered zinc. The minimum void water pH was not lower than the lowest pH recorded during a release.

Livestock

Void water quality was assessed against livestock (beef cattle) drinking water quality guideline values (ANZG 2018). The assessment compared the maximum, median and minimum of each analyte in the void water to the guideline value. Analytes assessed were EC, sulfate, fluoride, aluminium, arsenic, boron, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, uranium and zinc.

[1] If the void were to spill, Manganese Creek is expected to be the receiving water.

[2] Only release events where the REMP reporting has been concluded.

The only reported exceedance was for fluoride. The maximum, median and minimum values all exceed the fluoride guideline value for livestock (beef cattle) drinking water.

Relationship to groundwater

The water balance modelling indicates that the void is expected to act as a groundwater sink under three modelled climate scenarios (see **Spill risk** section immediately below). This has been interpreted using the equilibrium water levels from the modelled scenarios and the reported elevation of the in-flow/out-flow transition point[3] (365 m AHD[4]) in the void. The transition point is consistent with the highest groundwater level recorded in proximity to the void by Piteau & Associates (1982) prior to the void's expansion to its current dimensions.

The equilibrium water levels given by ATCW (2022a) for each climate scenario are:

- for the no-change scenario: oscillating between 357 m and 369 m RL (mid-point 363 m RL), indicating the void will swap between in-flows and outflows; as the mid-point of the oscillation range is below the transition elevation, the void is expected to act as a net groundwater sink
- for the RCP4.5 scenario: oscillating between 355 m and 365 m RL, indicating that the void will act as a groundwater sink
- for the RCP8.5 scenario: oscillating between 352 m and 364 m RL, indicating that the void will act as a groundwater sink.

The void acting as a groundwater sink reduces the risk of void water migration and the associated environmental concerns.

Groundwater flow near the void is expected to be relatively inhibited by the geology. RLA & Hydrogeologist (2022) identifies that the hydraulic conductivity of the void host rocks (Hodgkinson Formation hornfels) may be reduced relative to the surrounding rock. This suggests that where groundwater flows to or from the void occur, they are likely to be limited relative to the wider geology.

Spill risk

ATCW (2022a) modelled the water balance for the final void with the objective of assessing the long-term water balance of the void following cessation of mining operations. Climatic condition and groundwater in-flows (as described in ATCW (2022b)) were included in the models. The water balance was simulated for 650 years (from 2027 to 2677).

Three climate scenarios were modelled to examine the possible effects of climate change:

1. no change in climate
2. Queensland Future Climate Change Model for the scenario RCP4.5 (gradual increase to stable levels of carbon dioxide at 2060 AD)
3. Queensland Future Climate Change Model for the scenario RCP8.5 (continually increasing levels of carbon dioxide).

[3] The transition point is where water levels that are higher result in outflows from the void, and void water levels that are lower result in inflows (Diagram 19 of ATCW 2022b).

[4] ATCW (2022a) reports elevations in relative level (RL); ATCW (2022b) reports elevations in RL and Australian Height Datum (AHD). As RL and AHD are used for the same elevations (*eg* spill elevation) they are assumed to be equivalent between the ATCW (2022a, 2022b) reports.

Results of the void water balance model for the no change scenario:

- The Mount Carbine final void water level is predicted to take approximately 51 years to reach an equilibrium and will then oscillate between approximately RL 357 m and 369 m. The maximum forecast water level is approximately 11 m below the final void spill level.
- There is a very low risk of spill from the final void.

Results of the void water balance model for RCP4.5 scenario:

- The final void water level is predicted to take approximately 84 years to reach an equilibrium and will then oscillate between approximately RL 355 m and 365 m. The maximum forecast water level is approximately 15 m below the final void spill level.
- There is a very low risk of spill from the final void.

Results of the void water balance model for RCP8.5 scenario:

- The final void water level is predicted to take approximately 154 years to reach an equilibrium and will then oscillate between approximately RL 352 m RL and 364 m RL. The maximum forecast water level is approximately 16 m below the final void spill level.
- There is a very low risk of spill from the final void.

ATCW (2022a) modelling indicates that the void has a very low risk of spill under prevailing and predicted climatic conditions.

Summary

The quality of the waters in the void may pose a greater risk of environmental impact than waters previously released from site. Impacts from a release would be dependent on the quality, volume and duration of the release, as well as climatic and flow conditions in the receiving environment. Water balance modelling of the void under no change and climate change scenarios show that there is a very low risk of spill. The modelling has also been interpreted to indicate that the void will be a net groundwater sink, which will reduce the risk of groundwater migration.

References

ANZG 2018, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Governments and Australian state and territory governments, Canberra, viewed July 2022, https://www.waterquality.gov.au/anz-guidelines/guideline-values.

ATCW 2022a, *Mount Carbine Mining Stage 3 Water Management Plan – Final Void Water Balance Model*, Memorandum prepared by ATC Williams, 8 December 2022 (119190.04-M001Rev0).

ATCW 2022b, *Mount Carbine Mining Stage 3 Water Management Plan*, Report prepared by ATC Williams, November 2022 (119190.04R01_0).

DES 2021, *Using monitoring data to assess groundwater quality and potential environmental impacts, Version 2*, Department of Environment and Science, Queensland Government, Brisbane.

NRA 2020, *Mt Carbine Mine Receiving Environment Monitoring Program Version 2.0*, R01, prepared by NRA Environmental Consultants for Mt Carbine Quarries Pty Ltd, 30 October 2020.

Piteau & Associates, 1982, *Report on Slope Stability Analysis and Design of Open Pit Slopes*. Project 81-358, April 1982.

RLA & Hydrogeologist 2022, *Mount Carbine Operations – Revised Conceptual Groundwater Model*, prepared for EQ Resources by Rob Lait and Associates Pty Ltd and hydrogeologist.com.au, 15 November 2022.

Attachment 1 – Water quality

Table 1: Void water quality data summary (monitoring site OW1)

Analyte	Start	Finish	Count	Minimum	5%ile	20%ile	50%ile	80%ile	95%ile	Maximum
Aluminium, filtered mg/L	08/02/2011	06/01/2023	62	0.011	0.013	0.02	0.023	0.032	0.041	0.048
Aluminium, unfiltered mg/L	16/03/2011	26/08/2021	56	0.01	0.018	0.022	0.029	0.045	0.068	0.094
Antimony, filtered mg/L	31/03/2011	06/01/2023	26	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	0.003
Antimony, unfiltered mg/L	31/03/2011	06/01/2023	26	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic, filtered mg/L	08/02/2011	06/01/2023	69	0.016	0.086	0.11	0.14	0.15	0.16	0.17
Arsenic, unfiltered mg/L	30/05/2002	06/01/2023	73	0.045	0.088	0.11	0.15	0.16	0.16	0.18
Boron, filtered mg/L	04/06/2013	26/08/2021	39	<0.005	0.014	0.023	0.028	0.039	<0.05	<0.05
Boron, unfiltered mg/L	04/06/2013	26/08/2021	39	<0.005	0.013	0.022	0.027	0.04	<0.05	<0.05
Cadmium, filtered mg/L	08/02/2011	06/01/2023	66	<0.0001	<0.0001	0.0003	0.0007	0.0008	0.001	0.0012
Cadmium, unfiltered mg/L	30/05/2002	06/01/2023	73	<0.0001	<0.0001	0.0001	0.0007	0.0009	0.0012	0.0014
Calcium mg/L	16/03/2011	06/01/2023	58	51	62	74	90	94	95	100
Chloride mg/L	16/03/2011	06/01/2023	56	8	34	43	59	62	63	68
Chromium, filtered mg/L	08/02/2011	06/01/2023	69	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium, unfiltered mg/L	25/02/2011	06/01/2023	67	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt, filtered mg/L	08/02/2011	06/01/2023	69	0.0005	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005
Cobalt, unfiltered mg/L	25/02/2011	06/01/2023	67	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005
Copper, filtered mg/L	08/02/2011	06/01/2023	69	0.0005	<0.001	<0.001	<0.001	<0.001	0.003	0.005
Copper, unfiltered mg/L	09/01/2003	06/01/2023	73	0.0005	<0.001	<0.001	<0.001	0.002	0.004	0.007
EC µS/cm	30/05/2002	06/01/2023	77	550	620	744	820	858	872	950
Fluoride mg/L	08/02/2011	06/01/2023	67	6.6	6.7	7.8	8.4	9	9.4	10
Lead, filtered mg/L	08/02/2011	06/01/2023	65	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Lead, unfiltered mg/L	25/02/2011	06/01/2023	63	0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	0.002

Analyte	Start	Finish	Count	Minimum	5%ile	20%ile	50%ile	80%ile	95%ile	Maximum
Magnesium mg/L	16/03/2011	06/01/2023	58	17	19	22	25	26	27	27
Manganese, filtered mg/L	08/02/2011	06/01/2023	63	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006
Manganese, unfiltered mg/L	25/02/2011	06/01/2023	61	<0.005	<0.005	<0.005	<0.005	0.006	0.028	0.038
Molybdenum, filtered mg/L	08/02/2011	06/01/2023	63	0.041	0.046	0.051	0.059	0.063	0.065	0.069
Molybdenum, unfiltered mg/L	25/02/2011	06/01/2023	61	0.041	0.045	0.052	0.059	0.064	0.067	0.07
Nickel, filtered mg/L	31/03/2011	06/01/2023	26	<0.001	<0.001	<0.001	<0.001	0.001	<0.002	0.002
Nickel, unfiltered mg/L	31/03/2011	06/01/2023	26	<0.001	<0.001	<0.001	<0.001	0.001	<0.002	0.002
pH unitless	10/11/1992	06/01/2023	79	7	7.3	7.87	8.1	8.2	8.3	8.5
Potassium mg/L	16/03/2011	06/01/2023	56	2.3	2.5	2.6	2.8	2.9	3	3.1
Selenium, filtered mg/L	27/11/2014	06/01/2023	24	0.002	0.002	<0.003	<0.003	<0.003	<0.003	0.003
Selenium, unfiltered mg/L	27/11/2014	06/01/2023	24	<0.003	<0.003	<0.003	<0.003	<0.003	0.004	0.004
Sodium mg/L	16/03/2011	06/01/2023	57	24	27	34	40	41	42	45
Sulfate mg/L	08/02/2011	06/01/2023	69	160	190	230	250	260	280	290
Tin, filtered mg/L	31/03/2011	27/04/2011	2	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tin, unfiltered mg/L	31/03/2011	27/04/2011	2	<0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total alkalinity mgEq$CaCO_3$/L	26/11/2020	06/01/2023	8	57	59	63	70	73	73	73
Tungsten, filtered mg/L	31/03/2011	6/01/2023	43	<0.0001	0.001	0.023	0.036	0.041	0.047	0.051
Tungsten, unfiltered mg/L	31/03/2011	6/01/2023	42	<0.0001	0.0018	0.025	0.036	0.045	0.048	0.057
Uranium, filtered mg/L	04/06/2013	26/08/2021	39	<0.0005	<0.0005	0.0006	0.001	0.001	0.0013	0.0015
Uranium, unfiltered mg/L	04/06/2013	26/08/2021	39	<0.0005	0.0006	0.0007	0.001	0.001	0.0012	0.0018
Zinc, filtered mg/L	08/02/2011	06/01/2023	64	0.0025	<0.005	<0.005	<0.005	0.007	0.016	0.019
Zinc, unfiltered mg/L	09/01/2003	06/01/2023	66	0.0025	<0.005	<0.005	<0.005	<0.01	0.025	0.042

Table 2: Release water quality data summary (monitoring site OW4)

Analyte	Start	Finish	Count	Minimum	5%ile	20%ile	50%ile	80%ile	95%ile	Maximum
Aluminium, filtered mg/L	31/01/2013	10/02/2022	15	0.007	0.008	0.011	0.018	0.025	0.063	0.12
Aluminium, unfiltered mg/L	24/01/2013	10/02/2022	20	0.035	0.043	0.07	1.01	2.1	3.3	3.3
Antimony, filtered mg/L	03/02/2022	10/02/2022	8	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Antimony, unfiltered mg/L	03/02/2022	10/02/2022	8	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic, filtered mg/L	24/01/2013	10/02/2022	23	<0.003	<0.003	0.003	0.029	0.071	0.08	0.085
Arsenic, unfiltered mg/L	24/01/2013	10/02/2022	23	0.004	0.005	0.007	0.04	0.084	0.09	0.093
Boron, filtered mg/L	15/04/2014	09/02/2022	10	0.02	0.021	0.023	0.026	0.043	0.044	0.044
Boron, unfiltered mg/L	15/04/2014	09/02/2022	10	0.029	0.029	0.03	0.031	0.042	0.044	0.044
Cadmium, filtered mg/L	24/01/2013	10/02/2022	23	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	0.0004	0.0004
Cadmium, unfiltered mg/L	24/01/2013	10/02/2022	23	<0.0001	<0.0001	<0.0001	0.0001	0.0004	0.0006	0.0006
Calcium mg/L	24/01/2013	10/02/2022	23	12	23	25	32	51	54	55
Chloride mg/L	24/01/2013	10/02/2022	23	4	4	5	10	35	39	39
Chromium, filtered mg/L	24/01/2013	10/02/2022	23	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium, unfiltered mg/L	24/01/2013	10/02/2022	23	<0.001	<0.001	<0.001	<0.001	0.002	0.003	0.004
Cobalt, filtered mg/L	24/01/2013	10/02/2022	23	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Cobalt, unfiltered mg/L	24/01/2013	10/02/2022	23	<0.001	<0.001	<0.001	<0.001	0.001	0.002	0.003
Copper, filtered mg/L	24/01/2013	10/02/2022	17	<0.001	<0.001	<0.001	0.001	0.003	0.007	0.01
Copper, unfiltered mg/L	24/01/2013	10/02/2022	16	<0.001	<0.001	<0.001	0.002	0.004	0.007	0.008
EC µS/cm	24/01/2013	10/02/2022	23	120	128	224	280	629	682.1	710
Fluoride mg/L	24/01/2013	10/02/2022	23	0.89	2.1	2.2	2.6	7.3	7.6	7.7
Lead, filtered mg/L	24/01/2013	10/02/2022	23	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead, unfiltered mg/L	24/01/2013	10/02/2022	23	<0.001	<0.001	<0.001	<0.001	0.002	0.003	0.003
Magnesium mg/L	24/01/2013	10/02/2022	23	2.1	4.2	4.3	12	21	23	23
Manganese, filtered mg/L	24/01/2013	10/02/2022	20	<0.005	<0.005	<0.005	<0.005	0.033	0.066	0.068

Analyte	Start	Finish	Count	Minimum	5%ile	20%ile	50%ile	80%ile	95%ile	Maximum
Manganese, unfiltered mg/L	24/01/2013	10/02/2022	22	0.007	0.012	0.019	0.054	0.108	0.21	0.22
Molybdenum, filtered mg/L	24/01/2013	10/02/2022	23	0.03	0.031	0.038	0.079	0.11	0.13	0.15
Molybdenum, unfiltered mg/L	24/01/2013	10/02/2022	23	0.032	0.032	0.037	0.08	0.11	0.13	0.16
Nickel, filtered mg/L	03/02/2022	10/02/2022	8	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel, unfiltered mg/L	03/02/2022	10/02/2022	8	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
pH unitless	24/01/2013	10/02/2022	23	6.4	6.6	6.8	7.28	7.54	7.6	7.7
Potassium mg/L	24/01/2013	10/02/2022	23	1.5	1.5	2.1	3.5	5.9	6.4	6.6
Selenium, filtered mg/L	03/02/2022	10/02/2022	8	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Selenium, unfiltered mg/L	03/02/2022	10/02/2022	8	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Sodium mg/L	24/01/2013	10/02/2022	23	3.5	7.4	7.6	17	32	34	34
Sulfate mg/L	24/01/2013	10/02/2022	23	31	62	63	110	170	180	200
Total alkalinity mgEq$CaCO_3$/L	03/02/2022	10/02/2022	8	19	43	87	98	100	106	110
Tungsten, filtered mg/L	15/04/2014	10/02/2022	14	0.001	0.001	0.001	0.024	0.029	0.031	0.032
Tungsten, unfiltered mg/L	15/04/2014	10/02/2022	14	0.001	0.001	0.001	0.026	0.032	0.033	0.034
Uranium, filtered mg/L	15/04/2014	09/02/2022	10	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
Uranium, unfiltered mg/L	15/04/2014	09/02/2022	10	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
Zinc, filtered mg/L	24/01/2013	10/02/2022	23	<0.005	<0.005	<0.005	<0.005	0.006	0.009	0.022
Zinc, unfiltered mg/L	24/01/2013	10/02/2022	23	<0.005	<0.005	<0.005	<0.005	0.013	0.026	0.033

Table 3: Values identified as outliers using the inter-quartile range method in the void and release datasets

Site	Analyte	Date	Value
OW1	Total alkalinity mgEq$CaCO_3$/L	10/11/1992	162
OW1	Aluminium, filtered mg/L	14/02/2011	0.54
OW1	Aluminium, filtered mg/L	25/02/2011	0.055
OW1	Aluminium, filtered mg/L	16/03/2011	0.056
OW1	Aluminium, filtered mg/L	31/03/2011	0.058
OW1	Aluminium, filtered mg/L	09/01/2017	0.057
OW1	Aluminium, filtered mg/L	09/02/2017	0.06
OW1	Aluminium, filtered mg/L	02/05/2019	0.052
OW1	Aluminium, unfiltered mg/L	25/02/2011	0.11
OW1	Aluminium, unfiltered mg/L	09/01/2013	0.1
OW1	Aluminium, unfiltered mg/L	21/01/2013	0.13
OW1	Aluminium, unfiltered mg/L	06/02/2013	0.37
OW1	Aluminium, unfiltered mg/L	24/07/2013	0.52
OW1	Aluminium, unfiltered mg/L	10/03/2016	0.12
OW1	Aluminium, unfiltered mg/L	09/01/2017	0.36
OW1	Aluminium, unfiltered mg/L	09/02/2017	0.34
OW1	Aluminium, unfiltered mg/L	26/08/2021	0.24
OW1	Aluminium, unfiltered mg/L	05/01/2023	0.2
OW1	Aluminium, unfiltered mg/L	06/01/2023	0.19
OW1	Arsenic, unfiltered mg/L	05/12/2005	0.2
OW1	Cadmium, filtered mg/L	28/10/2011	0.0013
OW1	Cadmium, filtered mg/L	21/11/2013	0.0013
OW1	Cadmium, filtered mg/L	27/03/2014	0.0013
OW1	Cadmium, unfiltered mg/L	22/08/2013	0.009
OW1	Calcium mg/L	10/11/1992	165.0
OW1	Calcium mg/L	05/04/1994	184.0
OW1	Chloride mg/L	10/11/1992	210
OW1	Chloride mg/L	05/04/1994	111.0
OW1	Chloride mg/L	01/05/2015	85
OW1	Copper, unfiltered mg/L	30/05/2002	0.024
OW1	EC µS/cm	10/11/1992	2100.0
OW1	EC µS/cm	05/04/1994	1320.0
OW1	EC µS/cm	09/01/2003	990
OW1	EC µS/cm	15/10/2007	980
OW1	Fluoride mg/L	28/10/2011	20
OW1	Fluoride mg/L	26/11/2020	11
OW1	Magnesium mg/L	10/11/1992	66.0
OW1	Magnesium mg/L	05/04/1994	47.0
OW1	pH unitless	30/05/2002	8.7
OW1	Potassium mg/L	10/11/1992	4.9
OW1	Potassium mg/L	05/04/1994	4.4
OW1	Potassium mg/L	06/11/2017	3.3
OW1	Potassium mg/L	08/11/2018	3.3

Site	Analyte	Date	Value
OW1	Sodium mg/L	10/11/1992	89.0
OW1	Sodium mg/L	05/04/1994	80.0
OW1	Sodium mg/L	27/06/2012	90
OW1	Sodium mg/L	31/07/2012	92
OW1	Sodium mg/L	21/01/2013	48
OW1	Sulfate mg/L	10/11/1992	460
OW1	Sulfate mg/L	05/04/1994	620.0
OW1	Tungsten, unfiltered mg/L	24/07/2013	0.077
OW1	Zinc, unfiltered mg/L	30/05/2002	0.21
OW1	Zinc, unfiltered mg/L	06/02/2004	0.15
OW1	Zinc, unfiltered mg/L	05/12/2005	0.1
OW4	Aluminium, filtered mg/L	24/01/2013	0.19
OW4	Aluminium, filtered mg/L	25/01/2013	0.24
OW4	Aluminium, filtered mg/L	26/01/2013	0.16
OW4	Aluminium, filtered mg/L	27/01/2013	0.16
OW4	Aluminium, filtered mg/L	28/01/2013	0.14
OW4	Aluminium, filtered mg/L	29/01/2013	0.18
OW4	Aluminium, filtered mg/L	30/01/2013	0.16
OW4	Aluminium, filtered mg/L	06/02/2013	0.15
OW4	Aluminium, unfiltered mg/L	15/04/2014	8.4
OW4	Aluminium, unfiltered mg/L	16/04/2014	8.8
OW4	Aluminium, unfiltered mg/L	18/04/2014	6.1
OW4	Copper, filtered mg/L	25/01/2013	0.011
OW4	Copper, filtered mg/L	26/01/2013	0.013
OW4	Copper, filtered mg/L	27/01/2013	0.013
OW4	Copper, filtered mg/L	28/01/2013	0.013
OW4	Copper, filtered mg/L	29/01/2013	0.012
OW4	Copper, filtered mg/L	30/01/2013	0.012
OW4	Copper, unfiltered mg/L	25/01/2013	0.023
OW4	Copper, unfiltered mg/L	26/01/2013	0.015
OW4	Copper, unfiltered mg/L	27/01/2013	0.023
OW4	Copper, unfiltered mg/L	28/01/2013	0.019
OW4	Copper, unfiltered mg/L	29/01/2013	0.015
OW4	Copper, unfiltered mg/L	30/01/2013	0.015
OW4	Copper, unfiltered mg/L	31/01/2013	0.016
OW4	Manganese, filtered mg/L	25/01/2013	0.2
OW4	Manganese, filtered mg/L	26/01/2013	0.12
OW4	Manganese, filtered mg/L	06/02/2013	0.44
OW4	Manganese, unfiltered mg/L	06/02/2013	0.57

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