Shenandoah S 1 Flowback Report
EP 117

REV	DATE	REASON FOR ISSUE	AUTHOR	APPROVER
0	24/07/2024	Flowback report	BO	MK

Contents

1 Introduction

Tamboran B2 Ltd (Tamboran) was granted approval for the Beetaloo Sub-basin Kyalla 117 N2 Multi-well Drilling, Hydraulic Fracturing and Well Testing Environment Management Plan (ORI 6-3) on 22 February 2021, which included the Shenandoah South 1 Horizontal (Shenandoah S 1H) well. The Shenandoah S 1H was successfully stimulated in December 2023, with flowback operations commencing on January 25 2024 post well clean up. In accordance with the Northern Territory (NT) Petroleum (Environment) Regulation 2016 (PER), a report on the quality of hydraulic flowback fluid (Section 37A) and produced water (Section 37B) must be submitted to the Minister within six (6) months of flowback occurring. The following section satisfies these regulatory reporting requirements.

2 Reporting Requirements

2.1 37A Report about flowback fluid

In accordance with section 37A, Tamboran is required to provide certain information relating to chemicals or Naturally Occurring Radioactive Material (NORM) found within flowback fluid within six (6) months of commencing flowback operations. The information required under section 37A of the PER, is provided in Table 1.

Table 1 37A Report about flowback fluid

Reporting requirement	Shenandoah S 1H information
(a)The identity of any chemical or NORM found in the flowback fluid	Characterisation of the flowback was completed with the analytes listed in the Code of Practice: Onshore Petroleum Activities in the Northern Territory (Code of Practice) C.8 Wastewater chemistry analytes. The full list of analytes is listed in Appendix A.
(b)The concentration of any chemical or NORM found in the flowback fluid	Characterisation of the flowback was completed with the analytes listed in the Code of Practice: C.8 Wastewater chemistry analytes. The full list of analytes and their concentration are listed in Appendix A.
(c) Details regarding how any chemical or NORM has been or will be managed	All flowback, including chemical and NORM constituents, are currently stored within double lined, enclosed wastewater tanks as per the Code of Practice. Each tank has continuous leak detection and level monitoring, with all freeboard having a 1:1000 Annual re-occurrence interval wet/dry season freeboard. Flowback will be evaporated and then transported offsite to a licenced wastewater handling facility for final disposal.
(d) Details regarding how any chemical or NORM has been or will be transported	Flowback, and associate chemical and NORM constituents, will be transported by licenced listed water transport provider, in accordance with the NT Waste Management and Pollution Control Act 1998.
(e) Details regarding how any chemical or NORM has been or will be treated	Flowback, including chemical and NORM constituents, will be treated in open wastewater tanks to reduce the volume of flowback through evaporation.

Reporting requirement	Shenandoah S 1H information
(f) Details regarding any action proposed to be taken to prevent any chemical or NORM spill	A spill management plan and emergency management has been implemented, as a part of the approved Beetaloo Sub-basin Kyalla 117 N2 Multi-well Drilling, Hydraulic Fracturing and Well Testing Environment Management Plan (ORI 6-3). Actions implemented to prevent the spill of chemical or NORM from flowback water include: • Use of double lined enclosed tanks • Use of secondary containment for all transfer points • Use of continuous leak detection and level monitoring on wastewater tank fluid levels with alarms • Lease pad is fully bunded to contain 110% of the volume of the largest tank • Routine (daily during wet season and weekly during dry season) site inspections • Procedures in place to manage significant rainfall events
(g) Details of the emergency contingency plan included in the environment management plan to which the activity relates	An emergency management plan (NT-2050-15-MP-024) was developed, as a part of the Beetaloo Sub-basin Kyalla 117 N2 Multi-well Drilling, Hydraulic Fracturing and Well Testing Environment Management Plan (ORI 6-3). Contingent plans include: • Response processes for onsite and offsite spills • Onsite wastewater transfer equipment to transfer wastewater in case of a spill • First response civil equipment onsite to contain a spill
(h) The requirements in relation to the management of any chemical or NORM of the prescribed chemical legislation	The management of flowback wastewater must be undertaken in accordance with the approved the Beetaloo Sub-basin Kyalla 117 N2 Multi-well Drilling, Hydraulic Fracturing and Well Testing Environment Management Plan (ORI 6-3) and Code of Practice for Onshore Petroleum Activities in the Northern Territory. This includes requirements to manage the environmental risks associated with generation, storage, treatment and disposal. All flowback wastewater is classified as a listed waste under the Waste Management and Pollution Control Act 1998. Transport and disposal of flowback must be undertaken in accordance with this Act. The NORM levels observed are consistent with historical assessments, indicating the levels within the flowback do not meet the limits as described in the NT Radiation Protection Regulation 2007

2.2 37B Report about produced water

In accordance with section 37B, Tamboran is required to provide certain information relating to chemicals or NORM found within produced water within 6 months of produced water being extracted. The information required under section 37B of the PER, is provided in Table 2.

Table 2 Report about produced water

Reporting requirement	Shenandoah S 1H information
(a)The identity of any chemical or NORM found in the flowback fluid	N/A-no produced water has been encountered during the Shenandoah S 1H flowback activities.
(b)The concentration of any chemical or NORM fund in the flowback fluid	N/A- no produced water has been encountered during the Shenandoah S 1H flowback activities.
(c) Details regarding how any chemical or NORM has been or will be managed	N/A- no produced water has been encountered during the Shenandoah S 1H flowback activities.
(d) Details regarding how any chemical or NORM has been or will be transported	N/A- no produced water has been encountered during the Shenandoah S 1H flowback activities.
(e) Details regarding how any chemical or NORM has been or will be treated	N/A- no produced water has been encountered during the Shenandoah S 1H flowback activities.
(f) Details regarding any action proposed to be taken to prevent any chemical or NORM spill	N/A- no produced water has been encountered during the Shenandoah S 1H flowback activities.
(g) Details of the emergency contingency plan included in the environment management plan to which the activity relates	N/A- no produced water has been encountered during the Shenandoah S 1H flowback activities.
(h) The requirements in relation to the management of any chemical or NORM of the prescribed chemical legislation	N/A- no produced water has been encountered during the Shenandoah S 1H flowback activities.

Appendix A- Shenandoah S 1H flowback laboratory data

Analyte		Unit	EQL	Date											
				20 Dec 2023	27 Dec 2023	28 Jan 2024	04 Feb 2024	13 Feb 2024	18 Feb 2024	06 Mar 2024	13 Mar 2024	20 Mar 2024	27 Mar 2024	17 Apr 2024	24 Apr 2024
BTEX	Naphthalene (VOC)	mg/L	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007
	Benzene	µg/L	1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Toluene	µg/L	2	<5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Ethylbenzene	µg/L	2	<5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene (m & p)	µg/L	2	<10	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene (o)	µg/L	2	<5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Xylene Total	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Total BTEX	µg/L	1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Halogenated Benzenes	Hexachlorobenzene	µg/L	0.5	<2.5	<1.3	ND	ND	ND	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Inorganics	Total Phosphorus as P (Organic Phosphate as P)	mg/L	0.01	2.52	1.28	1.36	1.05	0.77	0.38	0.42	<0.10	0.41	0.30	0.20	0.15
	Sulfate as SO4 - Turbidimetric (filtered)	mg/L	1	164	31	40	18	26	36	16	9	18	12	13	7
	Silicon as SiO2	mg/L	0.1	141	164	173	170	161	148	130	131	115	88.2	53.4	45.4
	Nitrite + Nitrate as N	mg/L	0.01	0.06	0.02	0.03	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
	Alkalinity (Bicarbonate as CaCO3)	mg/L	1	554	243	332	269	223	201	162	156	156	148	116	102
	Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Alkalinity (Hydroxide) as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Alkalinity (total) as CaCO3	mg/L	1	554	243	332	269	223	201	162	156	156	148	116	102
	Ammonia as N	mg/L	0.01	14.8	13.0	19.8	21.8	18.8	0.04	20.9	23.3	19.4	17.6	15.4	14.4
	Anions Total	meq/L	0.01	203	157	383	477	445	ND	390	ND	367	288	287	170
	Bromide	µg/L	10	84,600	71,500	205,000	250,000	304,000	275,000	216,000	217,000	197,000	136,000	138,000	73,600
	Bromine	µg/L	100	75,800	115,000	168,000	188,000	218,000	225,000	179,000	173,000	127,000	124,000	108,000	94,400
	Bromine (filtered)	µg/L	100	96,800	118,000	185,000	228,000	284,000	286,000	227,000	226,000	204,000	149,000	149,000	77,600
	Cations Total	meq/L	0.01	199	153	374	448	470	ND	365	ND	406	318	310	183

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	Chloride	**mg/L**	1	6,690	5,360	13,300	16,700	15,600	14,100	13,700	14,000	12,900	10,100	10,100	5,960
	Fluoride	**mg/L**	0.1	1.6	1.0	1.2	1.1	1.0	1.0	0.9	0.7	0.8	0.6	0.5	0.4
	Ionic Balance	**%**	0.01	1.12	1.03	1.17	3.12	2.75		3.31		5.02	4.96	3.71	3.60
	Kjeldahl Nitrogen Total	**mg/L**	0.1	34.8	27.9	44.1	44.8	43.8	2.7	31.7	40.9	40.2	34.7	26.8	18.6
	Nitrate (as N)	**mg/L**	0.01	0.06	0.02	0.03	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
	Nitrite (as N)	**mg/L**	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Nitrogen (Total)	**mg/L**	0.1	34.9	27.9	44.1	44.8	43.8	2.7	31.7	40.9	40.2	34.7	26.8	18.6
	Reactive Phosphorus as P (Orthophosphate as P)	**mg/L**	0.01	0.21	0.02	0.01	0.14	0.06	0.10	0.16	<0.01	<0.01	<0.01	0.18	<0.01
	Sodium (filtered)	**mg/L**	1	1	4,130	3,090	7,340	8,680	9,080	8,680	6,990	8,230	7,440	5,810	5,450
	Sodium Absorption Ratio (filtered)	**-**	0.01	0.01	59.6	44.2	62.0	64.4	65.1	61.7	55.7	51.3	50.7	44.5	39.6
	Total Dissolved Solids (Lab)	**mg/L**	10	10	12,800	10,100	25,400	30,400	35,200	33,500	28,000	28,600	25,500	19,300	20,800
	Total Suspended Solids (Lab)	**mg/L**	5	5	115	248	91	64	64	34	50	52	60	54	58
Metals	**Aluminium**	**mg/L**	0.01	0.10	0.07	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	<0.10	<0.10	0.01	0.03
	Aluminium (filtered)	**mg/L**	0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01
	Antimony	**mg/L**	0.001	0.007	0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Antimony (filtered)	**mg/L**	0.001	0.008	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Arsenic	**mg/L**	0.001	0.023	0.016	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Arsenic (filtered)	**mg/L**	0.001	0.016	0.003	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Barium	**mg/L**	0.001	3.97	15.9	21.5	30.1	30.0	33.9	29.8	15.6	30.9	24.0	21.7	16.5
	Barium (filtered)	**mg/L**	0.001	4.92	2.14	20.2	29.3	30.3	30.3	32.4	3.24	31.2	25.0	20.8	12.9
	Beryllium	**mg/L**	0.001	<0.001	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Beryllium (filtered)	**mg/L**	0.001	<0.001	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Boron	**mg/L**	0.05	0.05	15.6	16.0	21.9	22.2	18.8	19.4	15.0	15.6	13.0	10.3	8.92
	Boron (filtered)	**mg/L**	0.05	0.05	16.4	15.8	20.5	21.9	18.2	17.3	15.8	15.5	14.5	11.5	8.39
	Cadmium	**mg/L**	0.0001	0.0001	<0.0001	<0.0001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001

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Cadmium (filtered)	**mg/L**	0.0001	0.0001	<0.0001	<0.0001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0001
Calcium (filtered)	**mg/L**	1	261	292	787	1,040	1,110	1,130	881	1,600	1,310	1,040	1,200	711
Chromium (III+VI)	**mg/L**	0.001	0.029	0.068	0.034	0.025	0.023	0.042	0.038	0.042	0.017	0.022	0.005	0.075
Chromium (III+VI) (filtered)	**mg/L**	0.001	0.014	0.009	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.002	0.001
Copper	**mg/L**	0.001	0.010	0.018	0.022	<0.010	0.076	<0.010	<0.010	0.011	<0.010	<0.010	0.001	0.004
Copper (filtered)	**mg/L**	0.001	0.002	<0.001	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
Iron	**mg/L**	0.05	15.2	25.9	26.3	21.9	18.8	25.2	24.6	22.8	19.9	26.5	14.4	15.2
Iron (filtered)	**mg/L**	0.05	<0.05	<0.05	<0.10	<0.10	0.22	0.94	6.36	10.0	13.0	15.2	14.6	9.13
Lead	**mg/L**	0.001	0.008	0.003	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	0.002
Lead (filtered)	**mg/L**	0.001	<0.001	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
Magnesium (filtered)	**mg/L**	1	62	48	166	205	220	223	190	213	194	153	142	84
Manganese	**mg/L**	0.001	0.405	0.450	0.971	1.08	0.988	0.969	1.09	1.06	0.912	0.805	0.659	0.493
Manganese (filtered)	**mg/L**	0.001	0.385	0.326	1.03	1.02	0.959	0.927	1.00	1.03	0.957	0.821	0.763	0.518
Mercury	**mg/L**	0.0001	<0.0001	<0.0010	<0.0010	<0.0010	0.0004	0.0020	0.0009	0.0002	0.0005	0.0007	0.0054	0.0089
Mercury (filtered)	**mg/L**	0.0001	<0.0001	<0.0010	<0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001
Molybdenum	**mg/L**	0.001	0.019	0.021	0.011	<0.010	<0.010	<0.010	<0.010	0.035	0.012	0.011	0.005	0.007
Nickel	**mg/L**	0.001	0.004	0.005	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.002	0.004
Nickel (filtered)	**mg/L**	0.001	0.002	0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.003	0.002
Potassium (filtered)	**mg/L**	1	36	22	62	66	68	62	53	60	49	38	40	23
Selenium	**mg/L**	0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01
Selenium (filtered)	**mg/L**	0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01
Silver	**mg/L**	0.001	<0.001	0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.003	<0.001
Silver (filtered)	**mg/L**	0.001	0.001	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
Strontium	**mg/L**	0.001	15.2	27.1	60.8	84.6	83.5	97.0	92.8	97.6	104	77.3	58.0	46.1
Strontium (filtered)	**mg/L**	0.001	16.1	22.0	58.0	81.5	84.2	82.1	87.9	94.7	99.0	78.0	62.4	34.8
Thorium	**µg/L**	1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	1	<1
Thorium (filtered)	**µg/L**	1	1	3	<10	<10	<10	<10	<10	<10	<10	<10	<1	<1

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	Tin	mg/L	0.001	<0.001	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Tin (filtered)	mg/L	0.001	<0.001	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.001	<0.001
	Uranium	µg/L	1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	<1	<1
	Uranium (filtered)	µg/L	1	<1	<1	<10	<10	<10	<10	<10	<10	<10	<10	<1	<1
	Vanadium	mg/L	0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01
	Vanadium (filtered)	mg/L	0.01	<0.01	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01
	Zinc	mg/L	0.005	0.068	0.026	<0.052	<0.052	0.065	<0.052	<0.052	<0.052	<0.052	<0.052	0.014	0.012
	Zinc (filtered)	mg/L	0.005	0.008	<0.005	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.014	0.010
NA	Formaldehyde	mg/L	0.1	0.4	1.0	1.3	2.3	1.8	3.0	3.1	4.7	8.7	9.9	4.6	3.7
Organic	Dissolved Organic Carbon	mg/L	1	254	86	169	148	155	148	136	123	114	93	89	59
	Total Organic Carbon	mg/L	1	232	181	194	165	156	154	138	124	119	98	85	65
PAH	Benzo(b+j+k)fluoranthene	mg/L	0.001	<0.0050	<0.0026				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Acenaphthene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Acenaphthylene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Anthracene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Benzo(a)anthracene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Benzo(a) pyrene	µg/L	0.5	<2.5	<1.3	<4.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b+j)fluoranthene	mg/L	0.001	<0.0556	<0.0049	<0.0049	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Benzo(g,h,i)perylene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Benzo(k)fluoranthene	µg/L	1	<55.6	<4.9	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Chrysene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dibenz(a,h)anthracene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Fluoranthene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Fluorene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Indeno(1,2,3-c,d)pyrene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Naphthalene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Phenanthrene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Analyte		Unit	EQL	Date											
				20 Dec 2023	27 Dec 2023	28 Jan 2024	04 Feb 2024	13 Feb 2024	18 Feb 2024	06 Mar 2024	13 Mar 2024	20 Mar 2024	27 Mar 2024	17 Apr 2024	24 Apr 2024
	Pyrene	µg/L	1	<2.5	<1.3	<4.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Benzo(a)pyrene TEQ calc (Zero)	mg/L	0.0005	<0.0012	<0.0006	<0.0024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	PAHs (Sum of total)	µg/L	0.5	<1.2	<0.6	<2.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenols	3&4-Methylphenol (m&p-cresol)	µg/L	4	<5	<4	ND	ND	ND	<4	<4	<4	<4	<4	<4	<4
	2,3,5,6-Tetrachlorophenol	mg/L	0.002	<0.002	<0.002	ND	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
	2,4,5-Trichlorophenol	µg/L	2	<2	<2	ND	ND	ND	<2	<2	<2	<2	<2	<2	<2
	2,4,6-Trichlorophenol	µg/L	2	<2	<2	ND	ND	ND	<2	<2	<2	<2	<2	<2	<2
	2,4-Dichlorophenol	µg/L	2	<2	<2	ND	ND	ND	<2	<2	<2	<2	<2	<2	<2
	2,4-Dimethylphenol	µg/L	4	<4	<4	ND	ND	ND	<4	<4	<4	<4	<4	<4	<4
	2,4-Dinitrophenol	mg/L	0.1	<0.1	<0.1	ND	ND	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	2,6-Dichlorophenol	µg/L	2	<2	<2	ND	ND	ND	<2	<2	<2	<2	<2	<2	<2
	2,3,4,5 & 2,3,4,6-Tetrachlorophenol	mg/L	0.002	<0.005	<0.003	ND	ND	ND	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
	2-Chlorophenol	µg/L	2	<2	<2	ND	ND	ND	<2	<2	<2	<2	<2	<2	<2
	2-Methylphenol	µg/L	4	<4	<4	ND	ND	ND	<4	<4	<4	<4	<4	<4	<4
	2-Nitrophenol	µg/L	4	<4	<4	ND	ND	ND	<4	<4	<4	<4	<4	<4	<4
	4,6-Dinitro-2-methylphenol	µg/L	50	<100	<50	ND	ND	ND	<50	<50	<50	<50	<50	<50	<50
	4,6-Dinitro-o-cyclohexyl phenol	µg/L	50	<100	<50	ND	ND	ND	<50	<50	<50	<50	<50	<50	<50
	4-chloro-3-methylphenol	µg/L	4	<4	<4	ND	ND	ND	<4	<4	<4	<4	<4	<4	<4
	4-Nitrophenol	µg/L	50	<100	<50	ND	ND	ND	<50	<50	<50	<50	<50	<50	<50
	Cresol Total	mg/L	0.004	<0.025	<0.013	ND	ND	ND	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
	Pentachlorophenol	µg/L	2	<5	<3	ND	ND	ND	<2	<2	<2	<2	<2	<2	<2
	Phenol	µg/L	4	<4	<4	ND	ND	ND	<4	<4	<4	<4	<4	<4	<4
	Phenols (halogenated) EPAVic	µg/L	2	<10	<5	ND	ND	ND	<2	<2	<2	<2	<2	<2	<2

Analyte		Unit	EQL	Date											
				20 Dec 2023	27 Dec 2023	28 Jan 2024	04 Feb 2024	13 Feb 2024	18 Feb 2024	06 Mar 2024	13 Mar 2024	20 Mar 2024	27 Mar 2024	17 Apr 2024	24 Apr 2024
	Phenols (non-halogenated) EPAVic	µg/L	4	<10	<5	ND	ND	ND	<4	<4	<4	<4	<4	<4	<4
Phthalates	Bis(2-ethylhexyl) phthalate	µg/L	10	12	<10	ND	ND	ND	<10	<10	<10	<10	<10	<10	<10
Radionuclides	Gross Beta Activity -K40	Bq/L	0.1	ND	ND	1.86	<1.40	2.79	1.81	<1.30	3.86	3.03	3.29	ND	ND
	Gross alpha activity	-	0	ND	ND	3.12	6.00	6.91	6.73	7.46	10.7	5.55	5.67	ND	ND
	Gross beta activity	-	0	ND	ND	5.11	4.84	6.19	4.66	4.63	7.49	6.23	5.86	ND	ND
TPH	C6-C9 Fraction	µg/L	20	<100	50	120	60	80	70	60	70	100	110	50	50
	C10-C14 Fraction	µg/L	50	260,000	28,100	16,800	1,820	330	<50	210	230	150	250	170	270
	C15-C28 Fraction	µg/L	100	100,000	21,900	7,080	2,570	220	<100	120	130	260	480	<100	430
	C29-C36 Fraction	µg/L	50	1,040	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10-C36 Fraction (Sum)	µg/L	50	361,000	50,000	23,900	4,390	550	<50	330	360	410	730	170	700
TRH	C6-C10 Fraction (F1)	µg/L	20	<100	50	120	60	70	70	50	70	100	100	50	50
	C6-C10 (F1 minus BTEX)	µg/L	20	<100	50	120	60	70	70	50	70	100	100	50	50
	>C10-C16 Fraction (F2)	µg/L	100	328,000	41,200	20,200	3,160	380	<100	180	260	260	400	160	350
	>C10-C16 Fraction (F2 minus Naphthalene)	µg/L	100	328,000	41,200	20,200	3,160	380	<100	180	260	260	400	160	350
	>C16-C34 Fraction (F3)	µg/L	100	32,700	8,900	3,950	1,220	<100	<100	<100	<100	150	340	<100	360
	>C34-C40 Fraction (F4)	µg/L	100	330	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	>C10-C40 Fraction (Sum)	µg/L	100	361,000	50,100	24,200	4,380	380	<100	180	260	410	740	160	710

ND- No data due to laboratory issue

Appendix B- Field Chemistry

Shenandoah S 1H Field water chemistry data summary

Analyte	units	Minimum	Maximum	Average	Median
pH		5.4	7.9	6.6	6.6
Electrical conductivity	µs/cm	11.1	56,970.0	23,883.9	28,870.0
Temperature	°C	24.0	63.2	44.1	43.1
Dissolved Oxygen	mg/L	0.3	10.0	2.6	2.3