Appendix 5.3.3B
Surface Water Quality Goldsim Model

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1 INTRODUCTION

The water quality effects assessment was modelled using Goldsim™, version 11. Goldsim is a simulation model, and was used to determine mass loadings of modelled parameters for Davidson Creek, Creek 661, and lower Chedakuz Creek. Resultant concentrations at modelled nodes were determined from collective inputs at these nodes, including background concentrations at the nodes. The mass balance approach used in the model in its simplest form is shown below:

$$\frac{Qt = \sum(V1\ x\ Q1 + \cdots + Vn\ x\ Qn)}{Vt}$$

Where Q = water quality, V = water quantity, t = total or resultant

The predicted water quality at any node is the sum of the loadings at that node divided by the total volume of water at the node.

Monthly time steps were used from commencement of operations through closure and 18 years post-closure for a total of 50 years.

A major input source was mine pit water and to simulate equilibrium of ions at surface in this water, the equilibrium model PHREEQC was applied to estimate pH in the open pit water routed to the TSF D. Equilibrium modelling was not applied to any other parameters or any other sources.

Table 1 shows the major mine phases.

Table 1: Major Mine Phases

Phase	Major Mine Activity	From	To
Construction	Construction (Year -1)	Jan. Year -1	Dec. Year -1
Operations	Mining Operations begins	Jan. Year 1	
	End of mining operations; no discharge of tailing slurry to, or recovery of reclaim water from, the TSF		Mar .Year 17
Closure	TSF D pond pumping to open pit starts	Sep. Year 16	
	TSF D pond pumping to open pit stops, as pit lake becomes full		Sep. Year 35
	Pit overflow to TSF D starts		Sep. Year 35
Post-Closure	TSF C pond overflow to TSF D begins	Jun. Year 27	
	TSF D overflow to Davidson Creek begins	Sep. Year 35	
	50 years of monitoring from start of Project		Jan. Year 50

1.1 Modelled Nodes

Table 2 shows the hydrology and water quality nodes modelled, and shows which nodes were incorporated in the water quality model and the rationale for their selection. In general, nodes were

selected for representing locations closest to the Project. Nodes were secondarily selected for being important locations for fish or fish habitat interactions, with potential Project effects on water quality. Most Project infrastructure is located in the Davidson Creek watershed. Surface water and groundwater flow from the 11-DC subcatchment would contribute to Creek 705 during construction and operations (flow changes are predicted to be up to approximately 5% of mean monthly winter low flow), but flows in Creek 705 would remain the same as baseline condition at post-closure. Negligible change of flow (approximately 1%) is predicted at Creek 661. Therefore, no significant potential effects on Creek 661, Creek 705, or the adjacent Turtle Creek drainage are anticipated.

Table 2: Hydrology and Water Quality Modelled Nodes

Hydrology Node	Sampled Water Quality Node	Rationale	Modelled Water Quality Node
Davidson Creek Watershed			
11DC	WQ23	Headwater lake of Davidson Creek close to the Project footprint	-
H2	WQ10	Davidson Creek; closest point to the Project where all contributing drainages are accounted for	Primary (up to end of closure), compliance point
Wetland	-	The flow from the treatment wetland in the ECD / water reservoir basins; includes seepage, TSF Dam D shell drainage, and the catchment below TSF Dam D	-
Plunge Pool	Pool	The flow after wetland, before discharging to Davidson Creek. The flow at the Plunge Pool includes the wetland flows and the TSF supernatant surface discharge (overflow), which bypasses the wetland	Primary, compliance point at post-closure, in place of WQ10
H4B	WQ26	All contributing drainages upstream of kokanee distribution are accounted for here	-
4DC	n/a	Approximate limit of kokanee migration up Davidson Creek	-
1DC	WQ7	Mouth of Davidson Creek; water quality point to integrate Davidson Creek effects for cumulative effects assessment	Secondary, in place of WQ26. as complete monthly baseline data not available for WQ26.
Creek 705 Watershed			
6-705	WQ16	Headwaters of Creek 705	No effects-
4-705	WQ16, WQ15	Downstream of confluence of Creek 705 with outlet of second headwater lake	No effects
H7	WQ12	Creek 705 above its confluence with Fawnie Creek; integrates water quality of the creek	No effects
1-705	n/a	Creek 705 at its confluence with Fawnie Creek; integrates all water quality of the creek	No effects

Hydrology Node	Sampled Water Quality Node	Rationale	Modelled Water Quality Node
Creek 661 Watershed			
1-50569	WQ3	Potential for Project effects on the water quality of a tributary of Creek 661; only tributary to Creek 661 with potential Project effects	No effects expected
H1	WQ5	Integrates Project effects on Creek 661	No effects expected
1-661	n/a	Integrates all water quality for Creek 661 before entering Upper Chedakuz Creek	No effects
Chedakuz Creek Watershed			
15CC	WQ8	Mouth of Tatelkuz Lake	Proxy for Tatelkuz Lake water quality
H5	WQ9	Chedakuz Creek at WQ9; integrates water quality of Tatelkuz Lake	Secondary

Water quality nodes WQ11 and WQ14 in the Turtle Creek watershed (corresponding to hydrology nodes H3 and 1TC, respectively) were monitored as part of the baseline water quality monitoring program. However, no effects were expected at these locations in the Turtle Creek watershed; therefore, they are not included in the water quality model.

2 MODELLED SCENARIOS

The average case and worst-case scenarios were modelled. **Table 3** lists the inputs for each of these scenarios. The worst-case scenario combined all the items listed in the table, and is conservative.

Table 3: Modelled Scenarios

Scenario	Best Estimate				Worst Case			
Rainfall Event	**Average**	**7dQ10**	**7dQ20**	**1:50 dry**	**Average**	**7dQ10**	**7dQ20**	**1:50 dry**
Flow								
Rainfall Event	Average	7dQ10	7dQ20	1:50 dry	Average	7dQ10	7dQ20	1:50 dry
In-stream Fish Needs (IFN), operations and closure phases only	Average	Average	Average	Average	Average	Average	Average	Average
TSF unrecoverable seepage at ECD (end of mine operations)	O & C: 2 L/s PC: 70 L/s	50% higher	50% higher	50% higher	O & C: 2 L/s PC: 70 L/s	50% higher	50% higher	50% higher

Scenario	Best Estimate				Worst Case			
Rainfall Event	**Average**	**7dQ10**	**7dQ20**	**1:50 dry**	**Average**	**7dQ10**	**7dQ20**	**1:50 dry**
TSF total embankment/ foundation seepage (end of mine operations)	55.8 L/s	50% higher (82.5 L/s)	50% higher (82.5 L/s)	50% higher (82.5 L/s)	55.8 L/s	50% higher (82.5 L/s)	50% higher (82.5 L/s)	50% higher (82.5 L/s)
TSF D embankment north & south abutment unrecoverable seepage	1.5 L/s	50% higher	50% higher	50% higher	1.5 L/s	50% higher	50% higher	50% higher
Water Quality								
Background water quality	Average	Average	Average	Average	95th percentile	95th percentile	95th percentile	95th percentile
Neutralization of PAG rock	Average	Average	Average	Average	95th percentile	95th percentile	95th percentile	95th percentile
TSF embankment/ foundation seepage quality	Average	Average	Average	Average	95th percentile	95th percentile	95th percentile	95th percentile
Pit water quality	Pit lake model	Pit lake model	Pit lake model	Pit lake model	50% higher than model value	50% higher than model value	50% higher than model value	50% higher than model value
Pit mixing	Complete mixing	Complete mixing	Complete mixing	Complete mixing	Complete mixing	Complete mixing	Complete mixing	Complete mixing
Interstitial water quality	Average	Average	Average	Average	95th percentile	95th percentile	95th percentile	95th percentile
Wetland treatment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: 1:50 dry = 1 in 50 year dry return period for rainfall, assumed to occur for one year in mine Year 37;
7dQ10 = Seven-day, consecutive low flow with a ten year return frequency, the lowest stream flow for seven consecutive days that would be expected to occur once in ten years;
7dQ20 = Seven-day, consecutive low flow with a twenty year return frequency, the lowest stream flow for seven consecutive days that would be expected to occur once in twenty years;
7dQ10 and 7dQ20 = rainfall events assumed to occur in the month with lowest flow (February) of mine Year 37;
O = Operations; C = Closure; PC = Post-closure; ECD = environmental control dam;
L/s = litres per second; TSF = tailings storage facility; PAG = potentially acid-generating.

2.1 Rainfall Events

In addition to the best estimate and worst-case scenarios, water quality models were also generated for various extreme dry rainfall return period events using average water quality and geochemistry conditions:

- 7dQ10 (Seven-day, consecutive low flow with a ten year return frequency) and 7dQ20 (Seven-day, consecutive low flow with a twenty year return frequency) dry rainfall return

periods were simulated in the driest month of the year (February) of the a complete post-closure year (February of mine year 37); and

- 1-in-50 dry rainfall events were applied for a, complete year of post-closure (mine year 37) for every month of the year, using average water quality and geochemistry.

It is noted that dry rainfall events were not applied in the water quality model in the operations and closure phases, because during those phases pumping of water from Tatelkuz Lake to Davidson Creek will be applied to meet in-stream fish needs (IFN).

3 MODEL INPUTS

Model inputs and input routings are based on the site water balance of the Project and are shown schematically on **Figure 1** and **Figure 2** for the operations and closure phases, respectively.

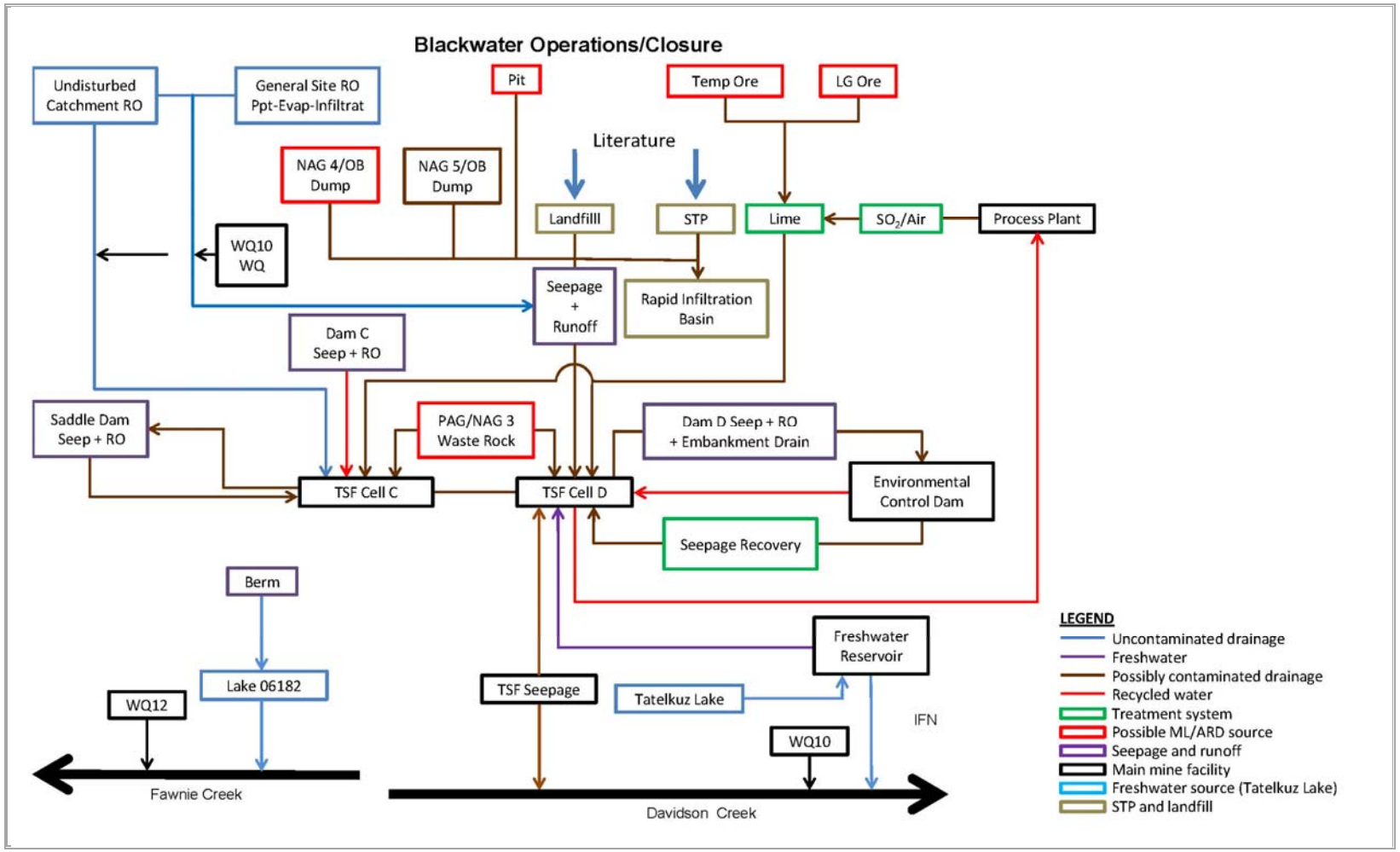


Figure 1: Water Quality Model Schematic 1

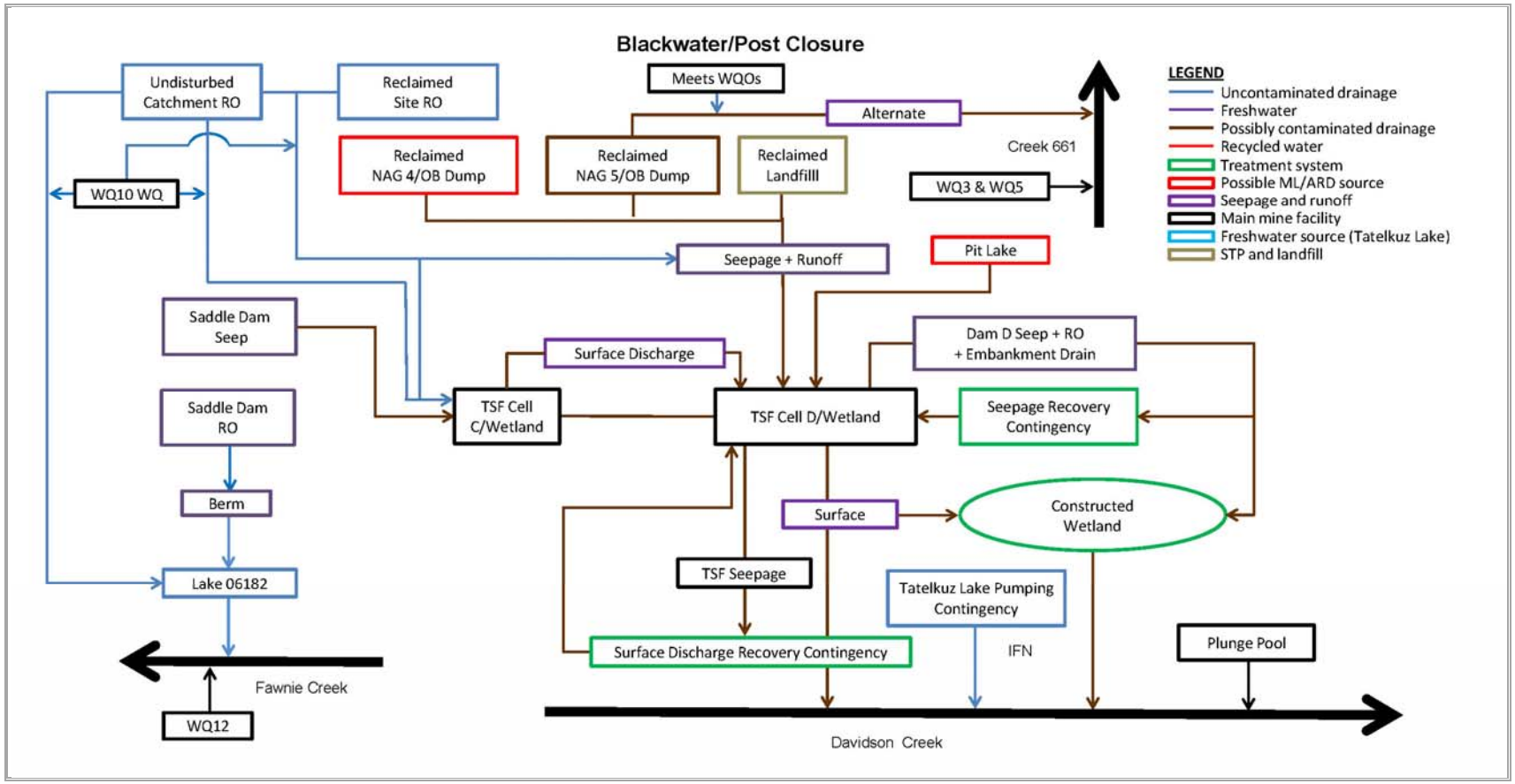


Figure 2: Water Quality Model Schematic 2

3.1 Source Loading

Details of the site water balance model are discussed in Knight Piésold's Site Water Balance Report included in **Annex C** of this report. The corresponding sources of each component in the site water balance are presented in **Table 4**. **Table 5** presents a summary of water balance data for selected mining years.

Table 4: Water Quality Model Sources Assumptions

Mine Site Facility	Site Water Balance Component	Input	Output	Source Loading			
				Construction	Operations	Closure	Post-Closure
Pit Lake	Open pit lake surface evaporation		x	No contaminant loading output from evaporation			
	Direct precipitation on open pit lake surface	x		No contaminant loading input from precipitation			
	Open pit dewatering to mill		x	Open pit water quality model			
	Open pit wall runoff	x		Incorporated in open pit water quality model			
	Groundwater inflow to open pit	x		Incorporated in open pit water quality model			
	Undisturbed catchment runoff contributing to open pit	x		Incorporated in open pit water quality model			
TSF C Pond	Direct precipitation on TSF C pond	x		No contaminant loading input from precipitation			
	TSF C beach tailings infiltration to pond	x		-	SO_2/air concentration		
	TSF C tailings beach runoff to pond	x		-	SO_2/air concentration		
	Undisturbed catchment runoff contributing to TSF C pond	x		WQ10 baseline concentration			
	Water pumped from TSF D starter pond to TSF C	x		WQ10 baseline concentration			
	Water in tailings slurry to TSF C pond	x		-	39-day aging test free water concentration	-	-
	Waste rock and tailings loadings to TSF C	x		-	39-day aging test free water concentration; neutralization of PAG rock	-	-
	Water lost to waste rock voids in TSF C		x	-	TSF C supernatant concentration from previous month	-	-
	Water lost to tailings voids in TSF C		x	-	TSF C supernatant concentration from previous month		
	TSF C embankment seepage (contributes to TSF D)			-	39-day aging test free water concentration	Concentration is proportioned by the total waste rock (waste rock concentration) and total tailings (SO_2/air concentration) in TSF C storage	

Mine Site Facility	Site Water Balance Component	Input	Output	Source Loading			
				Construction	Operations	Closure	Post-Closure
TSF C Pond	TSF C pond evaporation loss		x	No contaminant loading output from evaporation			
	Reclaim from TSF C pond to mill		x	-	TSF C supernatant concentration from previous month		
	TSF C pond overflow to TSF D		x	-	-	TSF C supernatant concentration from previous month	
TSF D Pond	Direct precipitation on TSF D pond	x		No contaminant loading input from precipitation			
	NAG/OVB stockpile infiltration to TSF D pond	x		-	East-west dump infiltration concentration		
	NAG/OVB stockpile runoff to TSF D pond	x		-	East-west dump runoff concentration		WQ10 baseline concentration
	LGO stockpile infiltration to TSF D pond	x		-	Neutralization of PAG rock concentration		-
	LGO stockpile runoff to TSF D pond	x		-	-	Neutralization of PAG rock concentration	WQ10 baseline concentration
	TSF D beach tailings infiltration to pond	x		-	SO_2/air concentration		
	TSF D tailings beach runoff to pond	x		-	SO_2/air concentration		
	Undisturbed catchment runoff contributing to TSF D pond	x		WQ10 baseline concentration			
	Open pit water overflow to TSF D in closure	x		-	-	TSF D supernatant concentration	
	Water in tailings slurry to TSF D pond	x		-	39-day aging test free water concentration	-	-
	Waste rock and tailings loadings to TSF D			-	39-day aging test free water concentration; neutralization of PAG rock	-	-
	Water recycled from ECD pond to TSF D pond	x		-	ECD pond concentration		-
	TSF D total embankment/foundation seepage loss		x	-	39-day aging test interstitial water concentration		
	TSF D pond evaporation loss		x	No contaminant loading output from evaporation			
	Reclaim from TSF D pond to mill		x	-	TSF D supernatant concentration	-	-
	Water lost to tailings voids in TSF D		x	-	TSF D supernatant concentration	-	-
	Water lost to waste rock voids in TSF D		x	-	TSF D supernatant concentration	-	-

Mine Site Facility	Site Water Balance Component	Input	Output	Source Loading			
				Construction	Operations	Closure	Post-Closure
TSF D Pond	TSF D overflow in post-closure to Davidson Creek		x	-	-	-	TSF D supernatant concentration, which is WQ10 baseline concentration at post-closure
	TSF D embankment runoff to ECD pond		x	-	Dam D downstream concentration		
	TSF D embankment infiltration to ECD pond		x	-	Dam D downstream concentration		
	TSF D north and south abutment seepage		x		39-day aging test interstitial water concentration		
	TSF D pond pumping to open pit in closure		x	-	-	TSF D supernatant concentration	-
	Reclaim water required for mill from TSF D pond		x	-	TSF D supernatant concentration	-	-
	Explosives use	x		Explosives (ANFO, 25/75 emulsion/ANFO, and 70/30 emulsion/ANFO) consumption from blasting schedule			
	Landfill runoff	x		-	WQ10 baseline concentration	-	-
	Landfill infiltration	x		-	Landfill leachate concentration (literature)	-	-
ECD Pond	Undisturbed catchment runoff contributing to ECD pond	x		-	WQ10 baseline concentration		
	ECD unrecoverable seepage		x	-	Interstitial water concentration		

Note: OVB = overburden; LGO = Low grade ores; ECD = Environmental Control Dam; TSF = tailings storage facility.

Table 5: Summary Sources Water Balance Selected Mining Years

Part 1

Month	Mine Life (year)	Open it lake surface evaporation	Direct precipitation on Open pit lake surface	Open pit dewatering to Mill	Open pit wall runoff	Groundwater inflow to Open pit	Undisturbed catchment runoff contributing to Open pit	Direct precipitation on TSF C pond	TSF C beach tailings infiltration to pond	TSF C tailings beach runoff to pond	Undisturbed catchment runoff contributing to TSF C pond	Water pumped from TSF D starter pond to TSF C	Water in tailings slurry to TSF C pond	Open pit dewatering to TSF C (preproduction only)	Reclaim water required for Mill from TSF D pond	Water lost to waste rock voids in TSF C	Water lost to tailings voids in TSF C	TSF C embankment seepage (contributes to TSF D)	TSF C pond evaporation loss	Reclaim from TSF C pond to Mill	TSF C pond overflow to TSF D	Direct precipitation on TSF D pond	NAG/OVB stockpile infiltration to TSF D pond	NAG/OVB stockpile runoff to TSF D pond	LGO stockpile infiltration to TSF D pond	LGO stockpile runoff to TSF D pond
		m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon
1	-1	0	0	23,825	0	0	23,825	0	0	0	53,509	188,911	0	23,825	0	0	0	0	0	0	0	0	0	0	0	0
2	-1	0	0	18,964	0	0	18,964	0	0	0	42,510	150,372	0	18,964	0	0	0	0	0	0	0	0	0	0	0	0
3	-1	0	0	28,334	0	0	28,334	0	0	0	63,241	224,592	0	28,334	0	0	0	0	237	0	0	0	0	0	0	0
4	-1	0	0	51,490	0	0	51,490	9,428	0	0	114,356	409,629	0	51,490	0	0	0	0	1,408	0	0	1,596	0	0	0	0
5	-1	0	0	159,312	0	0	159,312	13,535	0	0	351,329	1,263,703	0	159,312	0	0	0	0	8,869	0	0	1,428	0	0	0	0
6	-1	0	0	140,174	0	0	140,174	29,269	0	0	305,314	1,112,076	0	140,174	0	0	0	0	19,627	0	0	1,867	0	0	0	0
7	-1	0	0	54,275	0	0	54,275	16,676	0	0	116,536	429,596	0	54,275	0	0	94,575	0	33,869	0	0	733	0	0	0	0
8	-1	0	0	34,327	0	0	34,327	22,626	0	0	72,394	266,670	0	34,327	0	0	94,575	0	42,249	0	0	5,264	0	0	0	0
9	-1	0	0	27,280	0	0	27,280	22,891	0	0	57,025	214,080	0	27,280	0	0	91,524	0	25,741	0	0	7,537	0	0	0	0
10	-1	0	0	31,539	0	0	31,539	17,022	0	0	65,480	252,182	0	31,539	0	0	94,575	0	6,444	0	0	6,445	0	0	0	0
11	-1	0	0	33,397	0	0	33,397	0	0	0	68,861	262,399	0	33,397	0	0	91,524	0	0	0	0	0	0	0	0	0
12	-1	0	0	27,102	0	0	27,102	0	0	0	55,542	212,567	0	27,102	0	0	94,575	0	0	0	0	0	0	0	0	0
Average		0	0	52,502	0	0	52,502	10,954	0	0	113,841	415,565	0	52,502	0	0	46,779	0	11,537	0	0	2,073	0	0	0	0
1	1	0	0	23,825	0	0	23,825	0	0	0	48,586	0	918,245	0	0	377,222	113,615	0	0	774,287	0	0	0	0	0	0
2	1	0	0	20,067	0	1,173	18,893	0	0	0	38,368	0	829,383	0	0	340,717	102,620	2,157	0	700,809	0	0	0	0	0	0
3	1	0	0	30,603	0	2,473	28,131	0	0	0	56,985	0	918,245	0	0	377,222	113,615	4,546	2,258	767,509	0	0	0	0	0	0
4	1	0	0	57,758	3,180	3,650	50,928	54,047	9,008	9,008	102,953	0	888,624	0	0	365,054	109,950	6,711	8,074	714,608	0	65,330	2,756	0	899	0
5	1	0	0	165,816	3,794	5,029	156,993	50,807	8,468	8,468	316,539	0	918,245	0	0	377,222	113,615	9,246	33,290	632,296	0	68,790	3,288	0	1,073	0
6	1	0	0	149,971	6,240	6,124	137,606	70,532	11,755	11,755	276,256	0	888,624	0	0	365,054	109,950	11,259	47,297	622,396	0	111,050	5,408	0	1,764	0
7	1	0	0	63,607	2,939	7,585	53,083	29,082	4,847	4,847	106,222	0	918,245	0	0	377,222	113,615	13,946	59,066	734,505	0	50,402	2,547	0	831	0
8	1	0	0	45,704	3,376	8,884	33,444	29,464	4,911	4,911	66,854	0	918,245	0	0	377,222	113,615	16,335	55,017	752,407	0	52,717	2,925	0	954	0
9	1	0	0	39,781	3,451	9,855	26,475	27,073	4,512	4,512	52,881	0	888,624	0	0	365,054	109,950	18,119	30,443	732,585	0	49,409	2,990	0	976	0
10	1	0	0	44,577	2,642	11,441	30,494	18,978	3,163	3,163	60,860	0	918,245	0	0	377,222	113,615	21,035	7,184	753,535	0	35,206	2,290	0	747	0
11	1	0	0	44,494	0	12,329	32,165	0	0	0	64,136	0	888,624	0	0	365,054	109,950	22,668	0	727,872	0	0	0	0	0	0
12	1	0	0	40,001	0	13,997	26,004	0	0	0	51,804	0	918,245	0	0	377,222	113,615	25,735	0	758,111	0	0	0	0	0	0
Average		0	0	60,517	2,135	6,878	51,504	23,332	3,889	3,889	103,537	0	900,966	0	0	370,124	111,477	12,646	20,219	722,577	0	36,075	1,850	0	604	0
1	8	0	0	123,553	0	107,115	16,438	0	2,319	2,319	41,938	0	0	0	0	0	0	56,246	0	0	0	0	0	0	0	0
2	8	0	0	110,936	0	97,922	13,013	0	1,845	1,845	33,384	0	0	0	0	0	0	50,803	0	0	0	0	0	0	0	0
3	8	0	0	128,972	0	109,629	19,343	0	2,756	2,756	49,880	0	0	0	553,533	0	0	56,246	4,661	0	0	0	0	0	0	0

		Open it lake surface evaporation	Direct precipitation on Open pit lake surface	Open pit dewatering to Mill	Open pit wall runoff	Groundwater inflow to Open pit	Undisturbed catchment runoff contributing to Open pit	Direct precipitation on TSF C pond	TSF C beach tailings infiltration to pond	TSF C tailings beach runoff to pond	Undisturbed catchment runoff contributing to TSF C pond	Water pumped from TSF D starter pond to TSF C	Water in tailngs slurry to TSF C pond	Open pit dewatering to TSF C (preproduction only)	Reclaim water required for Mill from TSF D pond	Water lost to waste rock voids in TSF C	Water lost to tailings voids in TSF C	TSF C embankment seepage (contributes to TSF D)	TSF C pond evaporation loss	Reclaim from TSF C pond to Mill	TSF C pond overflow to TSF D	Direct precipitation on TSF D pond	NAG/OVB stockpile infiltration to TSF D pond	NAG/OVB stockpile runoff to TSF D pond	LGO stockpile infiltration to TSF D pond	LGO stockpile runoff to TSF D pond
4	8	0	0	235,848	93,541	107,350	34,957	105,176	4,957	4,957	90,904	0	0	0	477,740	0	0	54,432	15,711	0	0	374,282	81,062	0	26,446	0
5	8	0	0	304,396	84,631	112,186	107,579	94,139	15,345	15,345	281,221	0	0	0	0	0	0	56,246	61,683	0	0	338,267	73,341	0	23,927	0
6	8	0	0	315,868	111,916	109,824	94,129	123,724	13,574	13,574	247,076	0	0	0	0	0	0	54,432	82,967	0	0	448,340	96,986	0	31,642	0
7	8	0	0	195,443	44,452	114,742	36,249	48,838	5,281	5,281	95,540	0	0	0	0	0	0	56,246	99,191	0	0	178,496	38,522	0	12,568	0
8	8	0	0	182,929	44,091	116,041	22,797	47,899	3,340	3,340	60,427	0	0	0	0	0	0	56,246	89,441	0	0	176,641	38,209	0	12,466	0
9	8	0	0	171,331	39,762	113,555	18,014	42,693	2,653	2,653	48,028	0	0	0	0	0	0	54,432	48,008	0	0	158,858	34,457	0	11,242	0
10	8	0	0	166,700	27,390	118,598	20,712	29,094	3,067	3,067	55,529	0	0	0	0	0	0	56,246	11,014	0	0	109,162	23,736	0	7,744	0
11	8	0	0	137,836	0	116,029	21,807	0	3,249	3,249	58,793	0	0	0	0	0	0	54,432	0	0	0	0	0	0	0	0
12	8	0	0	138,752	0	121,154	17,598	0	2,637	2,637	47,709	0	0	0	0	0	0	56,246	0	0	0	0	0	0	0	0
Average		0	0	184,380	37,148	112,012	35,220	40,964	5,085	5,085	92,536	0	0	0	85,939	0	0	55,188	34,390	0	0	148,671	32,193	0	10,503	0
1	17	0	0	0	0	192,830	6,936	0	2,469	2,469	41,184	0	0	0	0	0	0	56,246	0	0	0	0	0	0	0	0
2	17	0	0	0	0	173,348	5,449	0	1,965	1,965	32,783	0	0	0	0	0	0	50,803	0	0	0	0	0	0	0	0
3	17	1,614	0	0	0	191,100	8,045	0	2,936	2,936	48,983	0	0	0	0	0	0	56,246	4,965	0	0	0	0	0	0	0
4	17	5,675	37,988	0	179,308	184,055	14,427	113,181	5,334	5,334	89,017	0	0	0	0	0	0	54,432	16,907	0	0	579,572	90,862	90,862	3,298	3,298
5	17	25,276	38,577	0	157,684	189,310	44,058	101,460	16,539	16,539	275,255	0	0	0	0	0	0	56,246	66,479	0	0	515,805	81,696	81,696	2,628	2,628
6	17	39,036	58,212	0	201,190	182,324	38,239	133,183	14,612	14,612	241,887	0	0	0	0	0	0	54,432	89,310	0	0	674,293	107,354	107,354	3,001	3,001
7	17	49,620	24,431	0	78,272	187,521	14,608	52,515	5,679	5,679	93,552	0	0	0	0	0	0	56,246	106,659	0	0	264,889	42,384	42,384	1,014	1,014
8	17	48,366	25,902	0	75,708	186,612	9,110	51,501	3,591	3,591	59,170	0	0	0	0	0	0	56,246	96,168	0	0	259,795	41,783	41,783	827	827
9	17	26,162	23,266	0	67,827	179,712	7,137	45,908	2,853	2,853	47,029	0	0	0	0	0	0	54,432	51,622	0	0	231,694	37,454	37,454	588	588
10	17	6,036	15,946	0	46,446	184,822	8,137	31,285	3,298	3,298	54,374	0	0	0	0	0	0	56,246	11,843	0	0	157,912	25,653	25,653	302	302
11	17	0	0	0	0	177,980	8,491	0	3,493	3,493	57,571	0	0	0	0	0	0	54,432	0	0	0	0	0	0	0	0
12	17	0	0	0	0	183,033	6,792	0	2,835	2,835	46,718	0	0	0	0	0	0	56,246	0	0	0	0	0	0	0	0
Average		16,815	18,693	0	67,203	184,387	14,286	44,086	5,467	5,467	90,627	0	0	0	0	0	0	55,188	36,996	0	0	223,663	35,599	35,599	971	971
1	35	0	0	0	0	0	5,881	0	2,702	2,702	40,022	0	0	0	0	0	0	56,246	0	0	0	0	0	0	0	0
2	35	0	0	0	0	0	4,681	0	2,150	2,150	31,859	0	0	0	0	0	0	50,803	0	0	0	0	0	0	0	0
3	35	7,952	0	0	0	0	6,994	0	3,212	3,212	47,602	0	0	0	0	0	0	56,246	5,432	0	0	0	0	0	0	0
4	35	27,106	181,462	0	74,247	0	12,710	123,829	5,836	5,836	86,508	0	0	0	0	0	0	54,432	18,497	0	0	576,572	95,073	95,073	0	0
5	35	106,709	162,857	0	66,005	0	39,324	110,868	18,072	18,072	267,586	0	0	0	0	0	0	56,246	72,644	0	285,709	515,805	85,053	85,053	0	0
6	35	143,423	213,879	0	85,501	0	34,600	144,934	15,901	15,901	235,441	0	0	0	0	0	0	54,432	97,190	0	260,556	674,293	111,186	111,186	0	0
7	35	171,777	84,577	0	33,143	0	13,397	56,936	6,157	6,157	91,162	0	0	0	0	0	0	56,246	115,637	0	0	264,889	43,678	43,678	0	0
8	35	155,828	83,451	0	32,105	0	8,473	55,833	3,893	3,893	57,660	0	0	0	0	0	0	56,246	104,256	0	0	259,795	42,838	42,838	0	0
9	35	83,705	74,439	0	28,621	0	6,734	49,768	3,093	3,093	45,830	0	0	0	0	0	0	54,432	55,963	0	0	96,539	38,205	38,205	0	0
10	35	19,205	50,734	0	19,507	0	7,785	33,916	3,575	3,575	52,988	0	0	0	0	0	0	56,246	12,839	0	0	65,797	26,039	26,039	0	0
11	35	0	0	0	0	0	8,244	0	3,787	3,787	56,103	0	0	0	0	0	0	54,432	0	0	0	0	0	0	0	0
12	35	0	0	0	0	0	6,690	0	3,073	3,073	45,527	0	0	0	0	0	0	56,246	0	0	0	0	0	0	0	0
Average		59,642	70,950	0	28,261	0	12,959	48,007	5,954	5,954	88,191	0	0	0	0	0	0	55,188	40,205	0	45,522	204,474	36,839	36,839	0	0

Part 2

Month	Mine Life (year)	LGO stockpile runoff to TSF D pond	TSF D beach tailings infiltration to pond	TSF D tailings beach runoff to pond	Undisturbed catchment runoff contributing to TSF D pond	Open pit water overflow to TSF D in closure	Water in tailings slurry to TSF D pond	Water recycled from ECD pond to TSF D pond	TSF D total embankment/foundation seepage loss	TSF D pond evaporation loss	Reclaim from TSF D pond to Mill	Water lost to tailings voids in TSF D	Water lost to waste rock voids in TSF D	Make up water from TSF D pond to TSF C pond	TSF D pond pumping to Open pit in closure	Total process makeup water required from outside source for Mill	TSF D overflow in post-closure to Davidson Creek	TSF D embankment runoff to ECD pond	TSF D embankment infiltration to ECD pond	Undisturbed catchment runoff contributing to ECD pond	ECD unrecoverable seepage	TSF D embankment north and south abutment unrecoverable seepage	Freshwater requirement for Mill (operations)	Water in ore contributing to Mill (operations)	Freshwater from water supply pipeline to open pit	Open pit pond volume	TSF D pond volume	TSF C pond volume
		m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3/mon	m3	m3	m3
1	-1	0	0	0	188,911	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,916	26,916	0	0	0	0	0	0	0
2	-1	0	0	0	150,372	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21,425	21,425	0	0	0	0	0	0	77,333
3	-1	0	0	0	224,662	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	32,010	32,010	0	0	0	0	0	0	317,726
4	-1	0	0	0	408,271	0	0	0	0	238	0	0	0	0	0	0	0	0	0	0	58,171	58,171	0	0	0	0	0	0	575,547
5	-1	0	0	0	1,263,211	0	0	0	0	936	0	0	0	0	0	0	0	0	0	0	179,982	179,982	0	0	0	0	0	0	966,759
6	-1	0	0	0	1,111,461	0	0	0	0	1,252	0	0	0	0	0	0	0	0	0	0	158,361	158,361	0	0	0	0	0	0	1,905,350
7	-1	0	0	0	430,352	0	0	0	0	1,489	0	0	0	0	0	0	0	0	0	0	61,317	61,317	0	0	0	0	0	0	3,583,418
8	-1	0	0	0	271,235	0	0	0	0	9,830	0	0	0	0	0	0	0	0	0	0	38,781	38,781	0	0	0	0	0	0	4,791,607
9	-1	0	0	0	215,019	0	0	0	0	8,475	0	0	0	0	0	0	0	0	0	0	30,819	30,819	0	0	0	0	0	0	5,213,725
10	-1	0	0	0	248,177	0	0	0	0	2,440	0	0	0	0	0	0	0	0	0	0	35,631	35,631	0	0	0	0	0	0	5,461,724
11	-1	0	0	0	262,399	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37,730	37,730	0	0	0	0	0	0	5,695,962
12	-1	0	0	0	212,567	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30,619	30,619	0	0	0	0	0	0	5,950,743
Average		0	0	0	415,553	0	0	0	0	2,061	0	0	0	0	0	0	0	0	0	0	59,313	59,313	0	0	0	0	0	0	2,878,324
1	1	0	0	0	254,576	0	0	26,916	0	0	0	0	0	0	0	0	0	0	0	0	26,916	0	0	89,280	30,853	0	0	0	6,209,958
2	1	0	0	0	201,998	0	0	22,267	869	0	0	0	0	0	0	0	0	0	0	0	21,425	3	24	80,640	27,867	0	0	281,492	6,124,233
3	1	0	0	0	301,021	0	0	33,784	1,831	2,457	0	0	0	0	0	0	0	0	0	0	32,010	7	50	89,280	30,853	0	0	507,046	5,845,681
4	1	0	0	0	545,363	0	0	93,633	2,702	9,759	0	0	0	0	0	0	0	16,422	16,422	58,171	10	74	86,400	29,858	0	0	842,109	5,555,762	
5	1	0	0	0	1,681,254	0	0	212,972	3,723	45,073	0	0	0	0	0	0	0	14,691	14,691	179,982	14	102	89,280	30,853	0	0	1,544,340	5,415,006	
6	1	0	0	0	1,471,363	0	0	201,164	4,534	74,468	0	0	0	0	0	0	0	19,205	19,205	158,361	16	124	86,400	29,858	0	0	3,472,166	5,551,863	
7	1	0	0	0	567,142	0	0	81,848	5,616	102,367	0	0	0	0	0	0	0	7,544	7,544	61,317	20	153	89,280	30,853	0	0	5,195,173	5,654,830	
8	1	0	0	0	357,778	0	0	59,954	6,578	98,438	0	0	0	0	0	0	0	7,399	7,399	38,781	24	179	89,280	30,853	0	0	5,803,906	5,419,719	
9	1	0	0	0	283,688	0	0	51,088	7,296	55,560	0	0	0	0	0	0	0	6,599	6,599	30,819	27	199	86,400	29,858	0	0	6,189,553	5,129,507	
10	1	0	0	0	327,287	0	0	52,834	8,470	13,327	0	0	0	0	0	0	0	4,498	4,498	35,631	31	231	89,280	30,853	0	0	6,532,967	4,850,959	
11	1	0	0	0	345,845	0	0	46,576	9,128	0	0	0	0	0	0	0	0	0	0	37,730	33	249	86,400	29,858	0	0	6,950,569	4,582,778	
12	1	0	0	0	280,118	0	0	40,661	10,363	0	0	0	0	0	0	0	0	0	0	30,619	38	283	89,280	30,853	0	0	7,356,529	4,309,996	
Average		0	0	0	551,453	0	0	76,975	5,092	33,454	0	0	0	0	0	0	0	6,363	6,363	59,313	19	139	87,600	30,272	0	0	3,722,987	5,387,524	
1	8	0	0	0	203,715	0	1,858,982	103,768	79,303	0	1,583,687	763,684	321,304	0	0	0	0	0	0	26,916	288	2,163	89,280	62,462	0	0	8,237,934	3,660,346	
2	8	0	0	0	161,776	0	1,679,080	91,681	72,497	0	1,431,087	689,779	290,210	0	0	0	0	0	0	21,425	264	1,977	80,640	56,417	0	0	7,712,667	3,650,674	
3	8	0	0	0	241,129	0	1,858,982	110,665	81,164	16,266	1,084,603	763,684	321,304	0	0	0	0	0	0	32,010	295	2,214	89,280	62,462	0	0	7,500,000	3,636,455	
4	8	0	62,380	62,380	437,029	0	1,799,014	168,034	79,477	55,910	1,416,319	739,049	310,940	0	0	0	0	16,422	16,422	58,171	289	2,168	86,400	60,447	0	0	7,500,000	3,077,407	
5	8	0	56,378	56,378	1,348,326	0	1,858,982	289,854	83,057	221,643	1,402,844	763,684	321,304	0	0	0	0	14,691	14,691	179,982	302	2,265	89,280	62,462	0	0	7,964,518	3,105,010	

		LGO stockpile runoff to TSF D pond	TSF D beach tailings infiltration to pond	TSF D tailings beach runoff to pond	Undisturbed catchment runoff contributing to TSF D pond	Open pit water overflow to TSF D in closure	Water in tailings slurry to TSF D pond	Water recycled from ECD pond to TSF D pond	TSF D total embankment/foundation seepage loss	TSF D pond evaporation loss	Reclaim from TSF D pond to Mill	Water lost to tailings voids in TSF D	Water lost to waste rock voids in TSF D	Make up water from TSF D pond to TSF C pond	TSF D pond pumping to Open pit in closure	Total process makeup water required from outside source for Mill	TSF D overflow in post-closure to Davidson Creek	TSF D embankment runoff to ECD pond	TSF D embankment infiltration to ECD pond	Undisturbed catchment runoff contributing to ECD pond	ECD unrecoverable seepage	TSF D embankment north and south abutment unrecoverable seepage	Freshwater requirement for Mill (operations)	Water in ore contributing to Mill (operations)	Freshwater from water supply pipeline to open pit	Open pit pond volume	TSF D pond volume	TSF C pond volume
6	8	0	74,723	74,723	1,182,017	0	1,799,014	275,566	81,308	300,648	1,336,299	739,049	310,940	0	0	0	0	19,205	19,205	158,361	296	2,218	86,400	60,447	0	0	9,273,684	3,393,132
7	8	0	29,749	29,749	456,026	0	1,858,982	158,729	84,950	362,528	1,511,797	763,684	321,304	0	0	0	0	7,544	7,544	61,317	309	2,317	89,280	62,462	0	0	10,542,883	3,653,682
8	8	0	29,440	29,440	287,637	0	1,858,982	136,836	85,911	329,840	1,524,311	763,684	321,304	0	0	0	0	7,399	7,399	38,781	312	2,343	89,280	62,462	0	0	10,317,688	3,653,185
9	8	0	26,476	26,476	227,983	0	1,799,014	125,489	84,071	178,632	1,480,836	739,049	310,940	0	0	0	0	6,599	6,599	30,819	306	2,293	86,400	60,447	0	0	9,918,533	3,622,503
10	8	0	18,194	18,194	262,898	0	1,858,982	129,716	87,804	41,323	1,540,540	763,684	321,304	0	0	0	0	4,498	4,498	35,631	319	2,395	89,280	62,462	0	0	9,589,434	3,616,091
11	8	0	0	0	277,629	0	1,799,014	120,977	85,902	0	1,514,332	739,049	310,940	0	0	0	0	0	0	37,730	312	2,343	86,400	60,447	0	0	9,319,650	3,639,588
12	8	0	0	0	224,724	0	1,858,982	117,543	89,697	0	1,568,488	763,684	321,304	0	0	0	0	0	0	30,619	326	2,446	89,280	62,462	0	0	8,921,480	3,650,447
Average		0	24,778	24,778	442,574	0	1,824,001	152,405	82,928	125,566	1,449,595	749,314	315,258	0	0	0	0	6,363	6,363	59,313	302	2,262	87,600	61,286	0	0	8,899,873	3,529,876
1	17	0	0	0	169,333	0	1,734,472	169,675	147,312	0	1,586,914	712,535	0	0	1,116,799	0	0	0	0	26,916	536	4,018	89,280	58,278	89,280	12,746,593	19,394,118	7,776,558
2	17	0	0	0	134,770	0	1,566,620	150,368	133,056	0	1,433,342	643,580	0	0	987,205	0	0	0	0	21,425	484	3,629	80,640	52,638	80,640	14,152,438	17,984,106	7,766,434
3	17	0	0	0	201,332	0	1,734,472	174,769	147,312	25,419	1,586,914	712,535	0	0	1,126,158	0	0	0	0	32,010	536	4,018	89,280	58,278	89,280	15,399,080	16,659,516	7,752,345
4	17	3,298	27,316	27,316	365,799	0	0	205,612	142,560	86,575	0	0	0	0	868,720	0	0	4,644	4,644	58,171	518	3,888	0	0	86,400	16,812,048	15,456,478	7,745,987
5	17	2,628	84,080	84,080	1,133,812	0	0	351,478	147,312	337,970	0	0	0	0	6,898,232	0	0	14,368	14,368	179,982	536	4,018	0	0	89,280	18,177,272	10,000,000	7,887,516
6	17	3,001	73,979	73,979	997,449	0	0	321,799	142,560	452,168	0	0	0	0	1,847,292	0	0	12,642	12,642	158,361	518	3,888	0	0	86,400	25,569,136	10,000,000	8,174,582
7	17	1,014	28,644	28,644	386,148	0	0	213,865	147,312	537,993	0	0	0	0	1,882,644	0	0	4,895	4,895	61,317	536	4,018	0	0	89,280	27,943,758	10,000,000	8,435,134
8	17	827	18,117	18,117	244,189	0	0	187,732	147,312	485,114	0	0	0	0	379,928	0	0	3,096	3,096	38,781	536	4,018	0	0	89,280	30,170,894	10,000,000	8,429,653
9	17	588	14,397	14,397	194,024	0	0	173,893	142,560	260,535	0	0	0	0	229,344	0	0	2,460	2,460	30,819	518	3,888	0	0	86,400	30,889,068	10,000,000	8,395,094
10	17	302	16,645	16,645	224,284	0	0	184,079	147,312	59,777	0	0	0	0	367,688	0	0	2,844	2,844	35,631	536	4,018	0	0	89,280	31,456,592	10,000,000	8,387,682
11	17	0	17,626	17,626	237,493	0	0	181,908	142,560	0	0	0	0	0	484,483	0	0	3,012	3,012	37,730	518	3,888	0	0	86,400	32,162,876	10,000,000	8,411,847
12	17	0	14,304	14,304	192,770	0	0	178,266	147,312	0	0	0	0	0	378,742	0	0	2,444	2,444	30,619	536	4,018	0	0	89,280	32,920,230	10,000,000	8,421,973
Average		971	24,592	24,592	373,450	0	419,630	207,787	144,540	187,129	383,931	172,387	0	0	1,380,603	0	0	4,201	4,201	59,313	526	3,942	21,600	14,100	87,600	24,033,332	12,457,852	8,132,067
1	35	0	12,574	12,574	169,497	0	0	173,972	147,312	0	0	0	0	0	308,621	0	0	2,149	2,149	26,916	536	4,018	0	0	89,280	227,796,192	10,000,000	14,328,513
2	35	0	10,009	10,009	134,919	0	0	153,789	133,056	0	0	0	0	0	250,692	0	0	1,710	1,710	21,425	484	3,629	0	0	80,640	228,199,968	10,000,000	14,317,692
3	35	0	14,954	14,954	201,574	0	0	179,879	147,312	25,290	0	0	0	0	250,738	0	0	2,555	2,555	32,010	536	4,018	0	0	89,280	228,535,984	10,000,000	14,303,049
4	35	0	27,175	27,175	366,315	0	0	205,612	142,560	86,127	0	0	0	0	285,489	0	0	4,644	4,644	58,171	518	3,888	0	0	86,400	228,875,040	10,000,000	14,295,396
5	35	0	84,080	84,080	1,133,397	0	0	351,478	147,312	337,970	0	0	0	0	1,413,486	0	0	14,368	14,368	179,982	536	4,018	0	0	89,280	230,028,464	10,000,000	14,358,179
6	35	0	73,979	73,979	997,242	0	0	321,799	142,560	452,168	0	0	0	0	2,124,791	0	0	12,642	12,642	158,361	518	3,888	0	0	86,400	231,692,704	10,000,000	14,358,179
7	35	0	28,644	28,644	386,127	0	0	213,865	147,312	537,993	0	0	0	0	2,153,389	0	0	4,895	4,895	61,317	536	4,018	0	0	89,280	234,094,464	10,000,000	14,358,179
8	35	0	18,117	18,117	244,215	0	0	187,732	147,312	485,114	0	0	0	0	380,468	0	0	3,096	3,096	38,781	536	4,018	0	0	89,280	236,296,464	10,000,000	14,346,707
9	35	0	26,995	26,995	194,076	541,315	0	0	142,560	108,556	0	0	0	0	515,227	0	765,645	2,460	2,460	30,819	174,412	3,888	0	0	0	236,365,984	10,000,000	14,307,489
10	35	0	31,210	31,210	224,378	58,820	0	0	147,312	24,907	0	0	0	0	0	0	347,519	2,844	2,844	35,631	184,614	4,018	0	0	0	236,365,984	10,000,000	14,298,877
11	35	0	33,049	33,049	237,597	8,244	0	0	142,560	0	0	0	0	0	0	0	223,810	3,012	3,012	37,730	182,426	3,888	0	0	0	236,365,984	10,000,000	14,323,845
12	35	0	26,819	26,819	192,813	6,690	0	0	147,312	0	0	0	0	0	0	0	162,076	2,444	2,444	30,619	178,802	4,018	0	0	0	236,365,984	10,000,000	14,333,090
Average		0	32,300	32,300	373,513	51,256	0	149,011	144,540	171,510	0	0	0	0	640,242	0	124,921	4,735	4,735	59,313	60,371	3,942	0	0	58,320	232,581,935	10,000,000	14,327,433

3.2 Model Assumptions

General model assumptions were made in the algorithm of the model, including:

- The water quality model was based on the watershed model and the site water balance model, both conducted by Knight Piésold (**Appendices 5.1.2.1D** and **Annex C** of this report).
- The water quality model was based on a conservative mass balance calculation; chemical precipitation and dissociation, adsorption, and degradation were not taken into account in the model.
- Attenuation of contaminants in seepage by subsurface materials was found to be significant (Lorax, 2013), but was not considered in the model (**Section 5.3.4**).
- TSF D supernatant concentration at:
  - Operations: TSF D supernatant at the end of operations is assumed to be completely mixed.
  - Closure and post-closure: the concentration of the TSF D supernatant is assumed to become the same background water quality concentration after 3 years. During the 3-year transition of TSF D complete-mixing supernatant concentration to background water quality in the TSF supernatant, the concentration of the supernatant in TSF D is assumed to change linearly in the 3-year period.

    Post-closure, the water quality of the TSF D overflow is a combination of the supernatant of the TSF D pond and the open pit water.
- TSF C and TSF D embankment/foundation seepage, TSF D north and south abutment seepage quality during:
  - Operation, closure and post-closure: quality of the interstitial water after 39 days of aging in SO_2/air test;
- East dump and west dump infiltration and runoff water quality is to be assumed the same from the operations phase through post-closure.
- Concentrations of those chemical parameters not provided in the source term inputs, are assumed to be at background water concentrations.
- Total metals are assumed to equal dissolved metals concentrations in seepage.

3.3 Source Inputs

Inputs to the water quality model and the assumptions associated with each source term are described in the following sections.

3.3.1 Wetland Treatment

Wetland treatment was based on wetland treatment data from the Musselwhite Project collected between 1997 and 2006. The Musselwhite wetland is a natural wetland that periodically receives influent from a polishing pond (June to October). The water quality from the wetland output is listed in Metal concentrations in wetlands were given in dissolved species. For the purposes of the water quality model, total metals concentrations were assumed to be equal to the dissolved metals concentrations. **Table 6**.

Parameters not available in the wetland treatment were assumed to exit the wetland at the same concentrations as their input concentrations.

Total cadmium and total zinc concentrations in the wetland effluent were based on a relationship developed from literature on influent and effluent concentrations for wetlands, bioreactors, and permeable reactive barriers (PRBs).

Metal concentrations in wetlands were given in dissolved species. For the purposes of the water quality model, total metals concentrations were assumed to be equal to the dissolved metals concentrations.

Table 6: Chemistry of Effluent from Wetland Treatment

General Parameters	Unit		Metals	Unit	
pH	pH units	7.7	T-Aluminum	mg/L	0.009
Conductivity	mS/cm	1,135	T-Antimony	mg/L	0.004
TDS	mg/L	769	T-Arsenic	mg/L	0.0021
TSS	mg/L	-	T-Barium	mg/L	0.06
Turbidity	mg/L	0.4	T-Beryllium	mg/L	-
Total Hardness	mg/L	360	T-Boron	mg/L	0.2
Total Alkalinity	mg/L	75	T-Cadmium	mg/L	See *
Fluoride	mg/L	-	T-Calcium	mg/L	128
Sulphate	mg/L	431	T-Chromium	mg/L	-
Chloride	mg/L	-	T-Cobalt	mg/L	0.001
Ammonia	mg/L	3	T-Copper	mg/L	0.003
Nitrate	mg/L	12.5	T-Iron	mg/L	0.03
Nitrite	mg/L	0.1	T-Lead	mg/L	-
TKN	mg/L		T-Lithium	mg/L	0.02
Ortho-phosphate	mg/L	0.007	T-Magnesium	mg/L	11
Total dissolved phosphorus	mg/L		T-Manganese	mg/L	0.011
TOC	mg/L	-	T-Mercury	mg/L	-
DOC	mg/L		T-molybdenum	mg/L	-
Temperature	°C	14	T-Nickel	mg/L	0.001
Cyanide	**Unit**	**-**	T-Phosphorus	mg/L	-
Total cyanide	mg/L	0.019	T-Potassium	mg/L	30
WAD cyanide	mg/L	0.007	T-Selenium	mg/L	-
Cyanate	mg/L		T-Silicon	mg/L	2.5
Thiocyanate	mg/L		T-Silver	mg/L	-

General Parameters	Unit		Metals	Unit	
* Cadmium $y = 0.0703x^{0.659}$			T-Sodium	mg/L	88
			T-Strontium	mg/L	0.32
			T-Thallium	mg/L	-
** Zinc $y = 0.1914\ x^{0.7332}$			T-Tin	mg/L	-
			T-Titanium	mg/L	-
Where y = influent concentration (µg/L) x = influent concentration (µg/L)			T-Uranium	mg/L	-
			T-Vanadium	mg/L	-
			T-Zinc	mg/L	See **

Note: °C = degrees Celsius; D = dissolved; mg/L = milligrams per litre; mS/cm = milliSiemens per centimetre; NTU = Nephelometric Turbidity Unit; T = total; TDS = total dissolved solids; TOC = total organic carbon; TSS = total suspended solids; *italics* = method detection limit used; TKN = Total Kjeldahl Nitrogen; DOC – dissolved organic carbon; WAD – week acid dissociable

3.3.2 SO_2/Air 39-day Supernatant Aging Test

The source loadings of the tailings solution deposited in the TSF are based on the results obtained from the SO_2/air 39-day aging test. The averages of the chemistry in the 39-day aged decant solution of sample CND 6-1 were used. Details of the selection of the composite sample are discussed in the Geochemistry Baseline Report, included as **Appendix 5.1.3.1A**.

For parameters that were not provided in the SO_2/air aging test, WQ10 water quality chemistry was used. For parameters where concentrations were below the method detection limit (MDL), MDL concentration was used. Both total and dissolved metal concentrations were given in the SO_2/air aging test. For the purpose of seepage water quality calculation, total metal concentrations were assumed to be equivalent to dissolved metal concentrations.

Table 7: SO_2/Air 39-Day Free Water Chemistry

General Parameters	Unit		Total Metals	Unit		Dissolved Metals	Unit	
pH	pH units	7.90	T-Aluminum	mg/L	0.051	D-Aluminum	mg/L	0.021
Conductivity	mS/cm	84.1	T-Antimony	mg/L	0.063	D-Antimony	mg/L	0.062
TDS	mg/L	68.3	T-Arsenic	mg/L	0.007	D-Arsenic	mg/L	0.007
TSS	mg/L	3.3	T-Barium	mg/L	0.050	D-Barium	mg/L	0.052
Turbidity	mg/L	1.8	T-Beryllium	mg/L	0.00010	D-Beryllium	mg/L	0.00010
Total hardness	mg/L	38.1	T-Boron	mg/L	0.025	D-Boron	mg/L	0.025
Total alkalinity	mg/L	43.1	T-Cadmium	mg/L	0.00352	D-Cadmium	mg/L	0.00356
Fluoride	mg/L	0.06	T-Calcium	mg/L	11.5	D-Calcium	mg/L	11.3
Sulphate	mg/L	2.75	T-Chromium	mg/L	0.00040	D-Chromium	mg/L	0.00100
Chloride	mg/L	0.44	T-Cobalt	mg/L	0.064	D-Cobalt	mg/L	0.065
Ammonia	mg/L	0.021	T-Copper	mg/L	0.012	D-Copper	mg/L	0.009
Nitrate	mg/L	0.04	T-Iron	mg/L	0.46	D-Iron	mg/L	0.38
Nitrite	mg/L	0.004	T-Lead	mg/L	0.0020	D-Lead	mg/L	0.0004
TKN	mg/L	0.21	T-Lithium	mg/L	0.012	D-Lithium	mg/L	0.012

General Parameters	Unit		Total Metals	Unit		Dissolved Metals	Unit	
Ortho-phosphate	mg/L	0.015	T-Magnesium	mg/L	3.09	D-Magnesium	mg/L	3.23
Total dissolved phosphorus	mg/L	0.02	T-Manganese	mg/L	0.364	D-Manganese	mg/L	0.362
TOC	mg/L	7.49	T-Mercury	mg/L	0.000009	D-Mercury	mg/L	0.00001
DOC	mg/L	7.22	T-molybdenum	mg/L	0.11	D-Molybdenum	mg/L	0.11
Temperature	°C	3.17	T-Nickel	mg/L	0.003	D-Nickel	mg/L	0.003
								Table continues …
Cyanide	**Unit**		T-Phosphorus	mg/L	0.010	D-Phosphorus	mg/L	0.011
Total cyanide	mg/L	0.0066	T-Potassium	mg/L	65.9	D-Potassium	mg/L	69.5
WAD cyanide	mg/L	0.005	T-Selenium	mg/L	0.0006	D-Selenium	mg/L	0.0006
Cyanate	mg/L	*0.2*	T-Silicon	mg/L	6.4	D-Silicon	mg/L	6.1
Thiocyanate	mg/L	*0.5*	T-Silver	mg/L	0.00003	D-Silver	mg/L	0.00001
			T-Sodium	mg/L	3.00	D-Sodium	mg/L	2.97
			T-Strontium	mg/L	0.52	D-Strontium	mg/L	0.52
			T-Thallium	mg/L	0.0001	D-Thallium	mg/L	0.0001
			T-Tin	mg/L	0.0174	D-Tin	mg/L	0.0177
			T-Titanium	mg/L	0.0027	D-Titanium	mg/L	0.00024
			T-Uranium	mg/L	0.0021	D-Uranium	mg/L	0.0021
			T-Vanadium	mg/L	0.00016	D-Vanadium	mg/L	0.00009
			T-Zinc	mg/L	0.0846	D-Zinc	mg/L	0.0778

Note: °C = degrees Celsius; D = dissolved; mg/L = milligrams per litre; mS/cm = milliSiemens per centimetre; NTU = Nephelometric Turbidity Unit; T = total; TDS = total dissolved solids; TOC = total organic carbon; TSS = total suspended solids; *italics* = method detection limit used; TKN = Total Kjeldahl Nitrogen; DOC = dissolved organic carbon; WAD = week acid dissociable

3.3.3 Interstitial Water Concentration 39-day Aging

Interstitial water concentration after 39 days of aging is provided in the Geochemistry Baseline Report (**Appendix 5.1.3.1A**). The interstitial water was sampled after 39 days of initialization of the aging of the composite sample CN 6-1. The average and the 95th percentile of the 39-day aged interstitial water were used in the water quality model for the best estimate and worst-case scenarios, respectively.

Metal concentrations in interstitial water were given in both total and dissolved species. Since only dissolved species of the metals will become mobile in the environment, total metal concentrations were assumed to be equal to the dissolved metal concentrations in interstitial water for water quality model purposes.

Table 8: Interstitial Water Chemistry – Average

General Parameters	Unit		Total Metals	Unit		Dissolved Metals	Unit	
pH	pH units	7.73	T-Aluminum	mg/L	0.040	D-Aluminum	mg/L	0.032
Conductivity	mS/cm	3,190	T-Antimony	mg/L	0.049	D-Antimony	mg/L	0.048
TDS	mg/L	68.3	T-Arsenic	mg/L	0.015	D-Arsenic	mg/L	0.015
TSS	mg/L	3.3	T-Barium	mg/L	0.046	D-Barium	mg/L	0.045
Turbidity	mg/L	1.8	T-Beryllium	mg/L	0.00010	D-Beryllium	mg/L	0.00010
Total hardness	mg/L	38.1	T-Boron	mg/L	0.025	D-Boron	mg/L	0.027
Total alkalinity	mg/L	59.8	T-Cadmium	mg/L	0.00008	D-Cadmium	mg/L	0.00006
Fluoride	mg/L	0.06	T-Calcium	mg/L	11.5	D-Calcium	mg/L	11.3
Sulphate	mg/L	1,340	T-Chromium	mg/L	0.00055	D-Chromium	mg/L	0.00034
Chloride	mg/L	0.44	T-Cobalt	mg/L	0.054	D-Cobalt	mg/L	0.056
Ammonia	mg/L	4.26	T-Copper	mg/L	0.009	D-Copper	mg/L	0.010
Nitrate	mg/L	0.04	T-Iron	mg/L	2.56	D-Iron	mg/L	2.63
Nitrite	mg/L	0.004	T-Lead	mg/L	0.0011	D-Lead	mg/L	0.0005
TKN	mg/L	0.21	T-Lithium	mg/L	0.008	D-Lithium	mg/L	0.009
Ortho-phosphate	mg/L	0.015	T-Magnesium	mg/L	2.07	D-Magnesium	mg/L	2.32
Total dissolved phosphorus	mg/L	0.02	T-Manganese	mg/L	0.056	D-Manganese	mg/L	0.055
TOC	mg/L	7.49	T-Mercury	mg/L	0.000026	D-Mercury	mg/L	0.00001
DOC	mg/L	7.22	T-molybdenum	mg/L	0.12	D-Molybdenum	mg/L	0.12
Temperature	°C	3.17	T-Nickel	mg/L	0.002	D-Nickel	mg/L	0.002
Cyanide	Unit		T-Phosphorus	mg/L	0.041	D-Phosphorus	mg/L	0.046
Total cyanide	mg/L	7.2	T-Potassium	mg/L	61.3	D-Potassium	mg/L	67.3
WAD cyanide	mg/L	0.05	T-Selenium	mg/L	0.0010	D-Selenium	mg/L	0.0006
Cyanate	mg/L	59.0	T-Silicon	mg/L	6.4	D-Silicon	mg/L	6.1
Thiocyanate	mg/L	57.6	T-Silver	mg/L	0.00012	D-Silver	mg/L	0.00012
			T-Sodium	mg/L	3.00	D-Sodium	mg/L	2.97
			T-Strontium	mg/L	0.53	D-Strontium	mg/L	0.55
			T-Thallium	mg/L	0.0005	D-Thallium	mg/L	0.0005
			T-Tin	mg/L	0.00014	D-Tin	mg/L	0.00013
			T-Titanium	mg/L	0.00118	D-Titanium	mg/L	0.00030
			T-Uranium	mg/L	0.0042	D-Uranium	mg/L	0.0044
			T-Vanadium	mg/L	0.00025	D-Vanadium	mg/L	0.00021
			T-Zinc	mg/L	0.0096	D-Zinc	mg/L	0.0044

Note: °C = degrees Celsius; D = dissolved; mg/L = milligrams per litre; mS/cm = milliSiemens per centimetre; NTU = Nephelometric Turbidity Unit; T = total; TDS = total dissolved solids; TOC = total organic carbon; TSS = total suspended solids TKN = Total Kjeldahl Nitrogen; DOC = dissolved organic carbon; WAD = week acid dissociable

Table 9: Interstitial Water Chemistry – 95th Percentile

General Parameters	Unit		Total Metals	Unit		Dissolved Metals	Unit	
pH	pH units	7.79	T-Aluminum	mg/L	0.0514	D-Aluminum	mg/L	0.041
Conductivity	mS/cm	3298	T-Antimony	mg/L	0.0512	D-Antimony	mg/L	0.050
TDS	mg/L	68.3	T-Arsenic	mg/L	0.018	D-Arsenic	mg/L	0.018
TSS	mg/L	3.3	T-Barium	mg/L	0.050	D-Barium	mg/L	0.049
Turbidity	mg/L	1.8	T-Beryllium	mg/L	0.00010	D-Beryllium	mg/L	0.00010
Total hardness	mg/L	38.1	T-Boron	mg/L	0.027	D-Boron	mg/L	0.028
Total alkalinity	mg/L	62.6	T-Cadmium	mg/L	0.00010	D-Cadmium	mg/L	0.00007
Fluoride	mg/L	0.06	T-Calcium	mg/L	11.5	D-Calcium	mg/L	11.3
Sulphate	mg/L	1400	T-Chromium	mg/L	0.00060	D-Chromium	mg/L	0.00034
Chloride	mg/L	0.44	T-Cobalt	mg/L	0.056	D-Cobalt	mg/L	0.058
Ammonia	mg/L	4.74	T-Copper	mg/L	0.012	D-Copper	mg/L	0.014
Nitrate	mg/L	0.04	T-Iron	mg/L	2.69	D-Iron	mg/L	2.79
Nitrite	mg/L	0.004	T-Lead	mg/L	0.0022	D-Lead	mg/L	0.0010
TKN	mg/L	0.21	T-Lithium	mg/L	0.010	D-Lithium	mg/L	0.010
Ortho-phosphate	mg/L	0.015	T-Magnesium	mg/L	2.25	D-Magnesium	mg/L	2.55
Total dissolved phosphorus	mg/L	0.02	T-Manganese	mg/L	0.093	D-Manganese	mg/L	0.090
TOC	mg/L	7.49	T-Mercury	mg/L	0.000050	D-Mercury	mg/L	0.00001
DOC	mg/L	7.22	T-molybdenum	mg/L	0.13	D-Molybdenum	mg/L	0.13
Temp	°C	3.17	T-Nickel	mg/L	0.002	D-Nickel	mg/L	0.002
Cyanide	**Unit**		T-Phosphorus	mg/L	0.074	D-Phosphorus	mg/L	0.078
Total cyanide	mg/L	7.2	T-Potassium	mg/L	64.3	D-Potassium	mg/L	71.4
WAD cyanide	mg/L	0.05	T-Selenium	mg/L	0.0010	D-Selenium	mg/L	0.0006
Cyanate	mg/L	59.0	T-Silicon	mg/L	6.4	D-Silicon	mg/L	6.1
Thiocyanate	mg/L	57.6	T-Silver	mg/L	0.00035	D-Silver	mg/L	0.00037
			T-Sodium	mg/L	3.00	D-Sodium	mg/L	2.97
			T-Strontium	mg/L	0.59	D-Strontium	mg/L	0.60
			T-Thallium	mg/L	0.0005	D-Thallium	mg/L	0.0005
			T-Tin	mg/L	0.00016	D-Tin	mg/L	0.00015
			T-Titanium	mg/L	0.00244	D-Titanium	mg/L	0.00038
			T-Uranium	mg/L	0.0048	D-Uranium	mg/L	0.0049
			T-Vanadium	mg/L	0.00034	D-Vanadium	mg/L	0.090
			T-Zinc	mg/L	0.0150	D-Zinc	mg/L	0.00001

Note: °C = degrees Celsius; D = dissolved; mg/L = milligrams per litre; mS/cm = milliSiemens per centimetre; NTU = Nephelometric Turbidity Unit; T = total; TDS = total dissolved solids; TOC = total organic carbon; TSS = total suspended solids; TKN = Total Kjeldahl Nitrogen; DOC = dissolved organic carbon; WAD = week acid dissociable

3.3.4 Dam D Downstream Concentration

The water chemistry of the TSF embankment runoff and infiltration, in terms of Dam D downstream concentration (**Table 10**), is provided in the Geochemistry Baseline Report (**Appendix 5.1.3.1A**).

3.3.5 Pit Water Concentration

Pit water concentration is provided in the pit water quality model in the Geochemistry Baseline Report (**Appendix 5.1.3.1A**). Pit water concentration was calculated based on complete mixing of the sources minus the output at the pit lake. Sources consist of the undisturbed catchment water, underground inflow, TSF D pond water, and direct precipitation. The output component comprises pit dewatering or discharge, and evaporation (**Table 11**).

3.3.6 East and West Dump Runoff and Infiltration

East Dump and West Dump runoff and infiltration water chemistry are provided in geochemistry, and described in detail in Appendix **5.1.3.1A.** The water chemistries of the East Dump and West Dump are conservatively assumed to be of the same water chemistry, as there is little difference in HCTs for NAG4 and NAG5 waste rock. (**Table 13**).

Table 10: Dam D Downstream Water Chemistry

	Acidity (as $CaCO_3$)	Alkalinity Total (as $CaCO_3$)	SO_4	Al-D	Sb-D	As-D	Ba-D	Be-D	Bi-D	B-D	Cd-D	Ca-D	Cr-D	Co-D	Cu-D	Fe-D	Pb-D	Li-D	Mg-D	Mn-D	Hg-D	Mo-D	Ni-D	P-D	K-D	Se-D	Si-D	Ag-D	Na-D	Sr-D	S-D	Tl-D	Sn-D	Ti-D	U-D	V-D	Zn-D
pre-production	1	2	0.50	0.005	0.0001	0.0001	0.00005	0.0001	0.0005	0.01	0.00001	0.05	0.0005	0.0001	0.0005	0.03	0.00005	0.0005	0.005	0.00005	0.00001	0.00005	0.0005	0.30	0.05	0.0001	0.05	0.00001	0.05	0.0002	0.50	0.00001	0.0001	0.01	0.00001	0.001	0.003
yr 1	36.9	422.69	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	266.82	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 2	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 3	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 4	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 5	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 6	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 7	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 8	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 9	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 10	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 11	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 12	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 13	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 14	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 15	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 16	36.9	423	358	0.91	0.20	0.15	0.04	0.001	0.01	0.14	0.003	267	0.0068	0.0028	0.01	0.41	0.01	0.10	10.9	2.65	0.00014	0.01	0.01	4.07	45.7	0.0014	25.4	0.00022	29.61	1.20	126	0.0003	0.0014	0.14	0.0032	0.02	0.04
yr 17	53.5	640	543	1.37	0.30	0.22	0.06	0.002	0.01	0.21	0.004	404	0.0103	0.0043	0.01	0.62	0.02	0.16	16.5	4.01	0.00021	0.02	0.01	6.16	69.2	0.0021	38.5	0.00034	44.8	1.82	191	0.0005	0.0021	0.21	0.0049	0.03	0.07
yr 18	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 19	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 20	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 21	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 22	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 23	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 24	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 25	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 26	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 27	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 28	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 29	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 30	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 31	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06
yr 32	47.5	568	482	1.22	0.27	0.20	0.05	0.002	0.01	0.18	0.004	359	0.0091	0.0038	0.01	0.55	0.02	0.14	14.7	3.56	0.00018	0.02	0.01	5.47	61.4	0.0018	34.2	0.0003	39.8	1.61	170	0.0004	0.0018	0.18	0.0043	0.03	0.06

Note: SO_4 = sulphate; Al = aluminum; Sb = antimony; As = arsenic; Ba = barium; Be = beryllium; Bi = bismuth; B = boron; Cd = cadmium; Ca = calcium; Cr = chromium; Co = cobalt; Cu = copper; Fe = iron; Pb = lead; Li = lithium; Mg = magnesium; Mn = manganese; Hg = mercury; Mo = molybdenum; Ni = nickel; P = phosphorus; K = potassium; Se = selenium; Si = silicon; Ag = silver; Na = sodium; Sr = strontium; S = sulphur; Tl = thallium; Sn = tin; Ti = titanium; U = uranium; V = vanadium; Zn = zinc; D = dissolved

Table 11: Pit Water Concentration in Completely Mixed Condition

Condition	Year	pH	Alkalinity	Acidity	$_4SO_4$	Cl	F	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn	NO_3	NO_3	Total CN	WAD CN	NH_3
		pH Unit	mg/L $CaCO_3$	mg/L $CaCO_3$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Preproduction - Pit Dewatering to TSF Pond C	Yr -2		0	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0.0000	0	0	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Yr -1		31.5	0	1.6	0.79	0.10	0.09	0.0001	0.0004	0.006	0.00010	0.0000	0.001	0.0000	8.6	0.0003	0.0000	0.0003	0.07	0.0008	0.0010	1.7	0.002	0.000007	0.0004	0.0002	0.010	0.50	0.0006	5.5	0.00005	2.4	0.06	0.00005	0.0001	0.0011	0.0002	0.0002	0.003	0.016	0.0038	0.007	0.005	
Operation - Pit Dewatering to Mill	Yr 1	7.39	34.5	0.1	2.7	0.77	0.11	0.10	0.0001	0.0023	0.007	0.00010	0.0001	0.002	0.0001	9.1	0.0003	0.0002	0.0004	0.07	0.0005	0.0010	1.8	0.046	0.000006	0.002	0.0006	0.040	0.58	0.0008	5.7	0.00004	3.3	0.06	0.00005	0.0001	0.0022	0.0002	0.0003	0.024	0.014	0.0034	0.006	0.005	
	Yr 2	7.10	38.1	0.0	3.8	0.75	0.11	0.11	0.0001	0.0050	0.008	0.00010	0.0001	0.004	0.0001	9.7	0.0003	0.0002	0.0004	0.07	0.0006	0.0009	1.8	0.086	0.000005	0.004	0.0009	0.082	0.65	0.0004	6.0	0.00004	4.6	0.07	0.00004	0.0001	0.0038	0.0003	0.0004	0.012	0.012	0.0028	0.006	0.005	
	Yr 3	6.98	40.2	0.1	4.5	0.72	0.11	0.12	0.0001	0.007	0.009	0.00010	0.0002	0.005	0.0001	10.1	0.0003	0.0003	0.0004	0.07	0.0006	0.0008	1.8	0.116	0.000004	0.005	0.0011	0.108	0.70	0.0004	6.2	0.00003	5.4	0.08	0.00003	0.0001	0.0047	0.0004	0.0005	0.014	0.011	0.0024	0.006	0.005	
	Yr 4	6.93	41.6	0.1	5.1	0.71	0.11	0.12	0.0001	0.008	0.009	0.00009	0.0002	0.006	0.0001	10.3	0.0002	0.0003	0.0004	0.07	0.0010	0.0008	1.8	0.139	0.000003	0.006	0.0014	0.125	0.74	0.0009	6.3	0.00003	6.0	0.08	0.00003	0.0001	0.0054	0.0004	0.0006	0.021	0.009	0.0021	0.005	0.005	
	Yr 5	6.89	42.2	0.1	5.5	0.69	0.11	0.12	0.0001	0.009	0.010	0.00009	0.0003	0.006	0.0002	10.4	0.0002	0.0004	0.0005	0.07	0.0016	0.0008	1.8	0.158	0.000003	0.007	0.0016	0.138	0.76	0.0003	6.3	0.00002	6.4	0.08	0.00002	0.0001	0.0059	0.0005	0.0006	0.032	0.009	0.0019	0.005	0.004	
	Yr 6	6.87	42.9	0.2	5.8	0.67	0.11	0.12	0.0001	0.009	0.010	0.00009	0.0003	0.007	0.0002	10.5	0.0003	0.0005	0.0005	0.07	0.0019	0.0007	1.8	0.172	0.000002	0.007	0.0017	0.148	0.78	0.0003	6.3	0.00002	6.6	0.08	0.00002	0.0001	0.0062	0.0005	0.0006	0.039	0.008	0.0018	0.005	0.004	
	Yr 7	6.85	43.4	0.3	6.2	0.67	0.11	0.13	0.0002	0.010	0.010	0.00009	0.0003	0.007	0.0004	10.6	0.0002	0.0006	0.0006	0.08	0.0030	0.0007	1.8	0.190	0.000002	0.008	0.0020	0.156	0.80	0.0002	6.3	0.00002	6.9	0.08	0.00002	0.0002	0.0065	0.0005	0.0007	0.061	0.007	0.0016	0.005	0.004	
	Yr 8	6.83	43.8	0.4	6.5	0.66	0.11	0.13	0.0002	0.010	0.010	0.00009	0.0003	0.007	0.0005	10.6	0.0002	0.0008	0.0007	0.08	0.0045	0.0007	1.9	0.210	0.000002	0.008	0.0023	0.162	0.82	0.0002	6.4	0.00002	7.0	0.08	0.00002	0.0002	0.0068	0.0005	0.0007	0.089	0.007	0.0015	0.005	0.004	
	Yr 9	6.82	44.0	0.4	6.7	0.65	0.11	0.13	0.0002	0.010	0.010	0.00009	0.0003	0.008	0.0006	10.6	0.0002	0.0008	0.0007	0.09	0.0052	0.0007	1.8	0.221	0.000002	0.008	0.0025	0.168	0.83	0.0002	6.4	0.00002	7.2	0.08	0.00002	0.0002	0.0069	0.0005	0.0007	0.102	0.007	0.0014	0.005	0.004	
	Yr 10	6.81	44.1	0.5	6.9	0.64	0.11	0.14	0.0002	0.011	0.010	0.00009	0.0003	0.008	0.0007	10.6	0.0002	0.001	0.0008	0.09	0.0063	0.0007	1.8	0.235	0.000001	0.009	0.0027	0.172	0.84	0.0013	6.3	0.00002	7.3	0.08	0.00002	0.0002	0.0071	0.0005	0.0007	0.123	0.006	0.0013	0.004	0.004	
	Yr 11	6.80	44.2	0.6	7.1	0.63	0.11	0.14	0.0002	0.011	0.010	0.00009	0.0004	0.008	0.0008	10.6	0.0003	0.001	0.0008	0.09	0.0069	0.0007	1.8	0.244	0.000001	0.009	0.0028	0.176	0.85	0.0002	6.3	0.00002	7.4	0.08	0.00002	0.0002	0.0072	0.0005	0.0007	0.134	0.006	0.0013	0.004	0.004	
	Yr 12	6.79	44.4	0.7	7.2	0.63	0.11	0.14	0.0002	0.011	0.010	0.00009	0.0004	0.008	0.0009	10.7	0.0002	0.001	0.0009	0.10	0.0079	0.0007	1.8	0.256	0.000001	0.009	0.0031	0.179	0.86	0.0002	6.3	0.00001	7.5	0.08	0.00002	0.0002	0.0073	0.0005	0.0008	0.155	0.006	0.0012	0.004	0.004	
	Yr 13	6.79	44.4	0.8	7.4	0.62	0.11	0.15	0.0002	0.011	0.011	0.00009	0.0004	0.008	0.0011	10.7	0.0002	0.001	0.0010	0.11	0.0096	0.0007	1.8	0.273	0.000001	0.009	0.0034	0.182	0.87	0.0002	6.3	0.00001	7.5	0.09	0.00002	0.0002	0.0074	0.0006	0.0008	0.187	0.005	0.0012	0.004	0.004	
Closure - No Pit Discharge	Yr 14	6.78	44.6	0.9	7.6	0.62	0.10	0.12	0.0002	0.011	0.011	0.00010	0.0004	0.008	0.0013	10.7	0.0001	0.002	0.0011	0.12	0.0116	0.0007	1.8	0.290	0.000008	0.009	0.0038	0.183	0.88	0.0002	6.4	0.00001	7.6	0.09	0.00002	0.0002	0.0075	0.0006	0.0008	0.226	0.005	0.0011	0.004	0.004	
	Yr 15	6.72	44.6	0.9	7.6	0.62	0.11	0.12	0.0002	0.011	0.011	0.00010	0.0004	0.008	0.0013	10.7	0.0001	0.002	0.0011	0.12	0.0117	0.0007	1.8	0.290	0.000008	0.009	0.0038	0.182	0.88	0.0002	6.4	0.00001	7.5	0.09	0.00002	0.0002	0.0075	0.0006	0.0008	0.227	0.005	0.0012	0.004	0.004	
	Yr 16	6.72	44.3	0.9	7.6	0.62	0.12	0.12	0.0002	0.011	0.011	0.00010	0.0004	0.008	0.0013	10.6	0.0001	0.002	0.0011	0.12	0.0117	0.0007	1.8	0.288	0.000008	0.009	0.0037	0.181	0.88	0.0002	6.3	0.00001	7.5	0.08	0.00002	0.0002	0.0074	0.0006	0.0008	0.227	0.005	0.0012	0.004	0.004	
	Yr 17	7.19	46.2	0.9	115	1.82	0.11	0.12	0.009	0.012	0.012	0.00009	0.0003	0.010	0.0012	20.0	0.0001	0.007	0.0030	0.20	0.0107	0.0013	1.8	0.263	0.000009	0.015	0.0035	0.164	7.8	0.0002	5.9	0.00002	57.1	0.10	0.00003	0.0013	0.0067	0.0009	0.0007	0.207	0.059	0.03	0.38	0.007	
	Yr 18	7.76	55.3	0.5	570	6.93	0.06	0.14	0.048	0.016	0.018	0.00006	0.0002	0.020	0.0008	59.8	0.0004	0.031	0.011	0.57	0.0062	0.0037	1.9	0.163	0.000014	0.041	0.0027	0.098	37.1	0.0006	4.1	0.00004	268	0.17	0.00010	0.0061	0.0040	0.0021	0.0005	0.119	0.29	0.14	2.0	0.02	
	Yr 19	8.09	58.2	0.4	714	8.55	0.05	0.14	0.061	0.017	0.020	0.00005	0.0002	0.023	0.0007	72.4	0.0004	0.039	0.013	0.69	0.0048	0.0045	1.9	0.131	0.000015	0.049	0.0025	0.077	46.3	0.0007	3.6	0.00005	335	0.20	0.00013	0.0076	0.0031	0.0025	0.0004	0.090	0.36	0.18	2.5	0.03	
	Yr 20	8.10	59.8	0.3	786	9.36	0.04	0.15	0.067	0.018	0.021	0.00005	0.0002	0.024	0.0006	78.8	0.0005	0.043	0.015	0.74	0.0040	0.0048	1.9	0.114	0.000016	0.053	0.0023	0.067	51.0	0.0007	3.3	0.00005	368	0.21	0.00014	0.0084	0.0027	0.0027	0.0004	0.075	0.39	0.20	2.7	0.03	
	Yr 21	8.12	60.7	0.3	831	9.87	0.04	0.15	0.070	0.018	0.022	0.00004	0.0002	0.025	0.0005	82.7	0.0005	0.045	0.015	0.78	0.0035	0.0051	1.9	0.104	0.000016	0.056	0.0023	0.060	53.9	0.0008	3.2	0.00005	389	0.22	0.00014	0.0089	0.0024	0.0029	0.0003	0.065	0.42	0.21	2.9	0.03	
	Yr 22	8.12	61.4	0.2	862	10.22	0.03	0.15	0.073	0.019	0.023	0.00004	0.0002	0.026	0.0005	85.5	0.0005	0.047	0.016	0.81	0.0031	0.0052	1.9	0.096	0.000017	0.058	0.0022	0.056	55.9	0.0008	3.1	0.00005	403	0.22	0.00015	0.0092	0.0023	0.0030	0.0003	0.058	0.43	0.22	3.0	0.03	
	Yr 23	8.14	61.9	0.2	886	10.48	0.03	0.15	0.075	0.019	0.023	0.00004	0.0001	0.027	0.0005	87.6	0.0005	0.048	0.016	0.82	0.0029	0.0054	1.9	0.091	0.000017	0.059	0.0021	0.052	57.4	0.0008	3.0	0.00006	414	0.23	0.00015	0.0095	0.0021	0.0030	0.0003	0.053	0.44	0.22	3.1	0.03	
	Yr 24	8.14	62.3	0.2	904	10.69	0.03	0.15	0.077	0.019	0.023	0.00004	0.0001	0.027	0.0005	89.2	0.0005	0.049	0.017	0.84	0.0026	0.0055	1.9	0.086	0.000017	0.060	0.0021	0.050	58.6	0.0008	2.9	0.00006	423	0.23	0.00016	0.0097	0.0020	0.0031	0.0003	0.048	0.45	0.23	3.1	0.03	
	Yr 25	8.14	62.7	0.2	920	10.87	0.03	0.15	0.078	0.019	0.023	0.00004	0.0001	0.027	0.0004	90.6	0.0005	0.050	0.017	0.85	0.0024	0.0055	1.9	0.082	0.000017	0.061	0.0021	0.047	59.6	0.0008	2.9	0.00006	430	0.23	0.00016	0.0098	0.0019	0.0031	0.0003	0.044	0.46	0.23	3.2	0.03	
	Yr 26	8.14	63.0	0.2	933	11.02	0.03	0.15	0.079	0.019	0.024	0.00004	0.0001	0.028	0.0004	91.8	0.0005	0.051	0.017	0.86	0.0023	0.0056	1.9	0.079	0.000017	0.062	0.0020	0.045	60.4	0.0008	2.8	0.00006	436	0.23	0.00016	0.0100	0.0018	0.0032	0.0003	0.041	0.47	0.23	3.2	0.03	
	Yr 27	8.15	63.3	0.2	945	11.16	0.02	0.15	0.080	0.019	0.024	0.00004	0.0001	0.028	0.0004	92.8	0.0005	0.051	0.017	0.87	0.0021	0.0057	1.9	0.076	0.000018	0.063	0.0020	0.043	61.2	0.0008	2.8	0.00006	442	0.24	0.00016	0.0101	0.0017	0.0032	0.0003	0.038	0.47	0.24	3.3	0.03	
	Yr 28	8.15	63.5	0.1	956	11.28	0.02	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.8	0.0005	0.052	0.018	0.88	0.0020	0.0057	1.9	0.073	0.000018	0.063	0.0020	0.042	61.9	0.0008	2.7	0.00006	447	0.24	0.00016	0.0102	0.0017	0.0032	0.0003	0.036	0.48	0.24	3.3	0.03	
	Yr 29	8.15	63.8	0.1	966	11.39	0.02	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.6	0.0005	0.052	0.018	0.89	0.0019	0.0058	1.9	0.071	0.000018	0.064	0.0020	0.040	62.5	0.0009	2.7	0.00006	451	0.24	0.00017	0.0103	0.0016	0.0033	0.0003	0.034	0.48	0.24	3.3	0.03	
	Yr 30	8.15	64.0	0.1	975	11.49	0.02	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.4	0.0006	0.053	0.018	0.90	0.0018	0.0058	1.9	0.069	0.000018	0.064	0.0019	0.039	63.1	0.0009	2.7	0.00006	456	0.24	0.00017	0.0104	0.0016	0.0033	0.0003	0.032	0.49	0.24	3.4	0.03	
	Yr 31	8.15	64.2	0.1	983	11.59	0.02	0.15	0.084	0.020	0.024	0.00004	0.0001	0.029	0.0004	96.2	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.067	0.000018	0.065	0.0019	0.037	63.7	0.0009	2.7	0.00006	460	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.030	0.49	0.25	3.4	0.03	
	Yr 32	8.15	64.3	0.1	988	11.64	0.03	0.15	0.084	0.020	0.024	0.00004	0.0001	0.029	0.0004	96.6	0.0006	0.053	0.018	0.91	0.0017	0.0059	1.9	0.065	0.000018	0.065	0.0019	0.036	63.9	0.0009	2.7	0.00006	462	0.24	0.00017	0.0106	0.0015	0.0033	0.0003	0.029	0.49	0.25	3.4	0.03	
	Yr 33	8.15	64.3	0.1	984	11.61	0.13	0.15	0.084	0.020	0.024	0.00004	0.0001	0.029	0.0004	96.3	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.065	0.0019	0.037	63.7	0.0009	2.7	0.00006	460	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.029	0.49	0.25	3.4	0.03	
	Yr 34	8.15	64.3	0.1	981	11.58	0.23	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	96.1	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.065	0.0019	0.037	63.5	0.0009	2.7	0.00006	459	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.030	0.49	0.25	3.4	0.03	
Closure - Pit Discharge to TSF Pond D	Yr 35	8.15	64.3	0.1	979	11.55	0.33	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.9	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.064	0.0019	0.037	63.4	0.0009	2.7	0.00006	458	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 36	8.15	64.2	0.1	976	11.52	0.43	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.7	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.064	0.0019	0.037	63.2	0.0009	2.7	0.00006	456	0.24	0.00017	0.0104	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 37	8.15	64.2	0.1	974	11.50	0.53	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.4	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.064	0.0019	0.037	63.1	0.0009	2.8	0.00006	455	0.24	0.00017	0.0104	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 38	8.15	64.2	0.1	971	11.47	0.63	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.2	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.064	0.0019	0.036	62.9	0.0009	2.8	0.00006	454	0.24	0.00017	0.0104	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 39	8.15	64.2	0.1	969	11.44	0.73	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.0	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.064	0.0019	0.036	62.7	0.0009	2.8	0.00006	453	0.24	0.00017	0.0103	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 40	8.15	64.2	0.1	966	11.42	0.83	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.8	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.064	0.0019	0.036	62.6	0.0009	2.8	0.00006	452	0.24	0.00017	0.0103	0.0015	0.0033	0.0003	0.030	0.48	0.24	3.3	0.03	
	Yr 41	8.15	64.2	0.1	963	11.39	0.93	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.6	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.063	0.0019	0.036	62.4	0.0009	2.8	0.00006	450	0.24	0.00017	0.0103	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 42	8.15	64.2	0.1	961	11.36	1.03	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.4	0.0006	0.052	0.018	0.89	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	62.2	0.0009	2.9	0.00006	449	0.24	0.00017	0.0103	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 43	8.15	64.2	0.1	958	11.34	1.13	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.2	0.0006	0.052	0.018	0.88	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	62.1	0.0009	2.9	0.00006	448	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 44	8.15	64.1	0.1	956	11.31	1.23	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.0	0.0006	0.052	0.018	0.88	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	61.9	0.0009	2.9	0.00006	447	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 45	8.15	64.1	0.1	953	11.28	1.33	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.8	0.0006	0.052	0.018	0.88	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	61.7	0.0009	2.9	0.00006	446	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 46	8.15	64.1	0.1	951	11.26	1.43	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.6	0.0006	0.051	0.018	0.88	0.0018	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	61.6	0.0009	2.9	0.00006	444	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 47	8.15	64.1	0.1	948	11.23	1.49	0.16	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.4	0.0006	0.051	0.017	0.88	0.0018	0.0058	2.0	0.065	0.000018	0.062	0.0019	0.036	61.4	0.0009	3.0	0.00006	443	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 48	8.15	64.1	0.1	946	11.21	1.49	0.16	0.080	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.2	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.065	0.000018	0.062	0.0019	0.036	61.3	0.0009	3.0	0.00006	442	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.031	0.47	0.24	3.3	0.03	
	Yr 49	8.15	64.1	0.1	943	11.18	1.49	0.16	0.080	0.019	0.024	0.00004	0.0001	0.027	0.0004	93.0	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.065	0.000018	0.062	0.0019	0.036	61.1	0.0009	3.0	0.00006	441	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.032	0.47	0.24	3.3	0.03	

Condition	Year	pH	Alkalinity	Acidity	$_4SO_4$	Cl	F	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn	NO_3	NO_3	Total CN	WAD CN	NH_3
	Yr 50	8.15	64.1	0.1	941	11.16	1.48	0.16	0.080	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.7	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.065	0.000018	0.062	0.0019	0.036	60.9	0.0009	3.0	0.00006	440	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.032	0.47	0.24	3.3	0.03	
	Yr 51	8.15	64.1	0.1	938	11.13	1.48	0.16	0.080	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.5	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.064	0.000018	0.062	0.0019	0.036	60.8	0.0009	3.0	0.00006	439	0.24	0.00017	0.0100	0.0015	0.0032	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 52	8.15	64.0	0.1	936	11.10	1.48	0.16	0.079	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.3	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.064	0.000018	0.062	0.0019	0.036	60.6	0.0009	3.1	0.00006	438	0.24	0.00017	0.0100	0.0015	0.0032	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 53	8.15	64.0	0.1	933	11.08	1.47	0.16	0.079	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.1	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.5	0.0009	3.1	0.00006	436	0.24	0.00017	0.0100	0.0015	0.0032	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 54	8.15	64.0	0.1	931	11.05	1.47	0.16	0.079	0.018	0.024	0.00004	0.0001	0.027	0.0004	91.9	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.3	0.0009	3.1	0.00006	435	0.24	0.00016	0.0100	0.0015	0.0031	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 55	8.15	64.0	0.1	928	11.03	1.47	0.16	0.079	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.7	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.2	0.0009	3.1	0.00006	434	0.23	0.00016	0.0099	0.0015	0.0031	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 56	8.15	64.0	0.1	926	11.00	1.46	0.16	0.079	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.5	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.0	0.0009	3.1	0.00006	433	0.23	0.00016	0.0099	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 57	8.15	64.0	0.1	924	10.98	1.46	0.16	0.078	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.3	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	59.8	0.0009	3.2	0.00006	432	0.23	0.00016	0.0099	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 58	8.15	64.0	0.1	921	10.95	1.46	0.16	0.078	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.1	0.0006	0.050	0.017	0.86	0.0018	0.0056	2.0	0.064	0.000018	0.061	0.0019	0.036	59.7	0.0009	3.2	0.00006	431	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 59	8.15	64.0	0.1	919	10.93	1.45	0.16	0.078	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.9	0.0006	0.050	0.017	0.85	0.0018	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.5	0.0009	3.2	0.00006	430	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 60	8.15	64.0	0.1	916	10.90	1.45	0.16	0.078	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.7	0.0006	0.050	0.017	0.85	0.0018	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.4	0.0009	3.2	0.00006	428	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 61	8.15	63.9	0.1	914	10.88	1.45	0.16	0.078	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.5	0.0006	0.049	0.017	0.85	0.0018	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.2	0.0009	3.2	0.00006	427	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 62	8.15	63.9	0.1	911	10.85	1.44	0.16	0.077	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.3	0.0006	0.049	0.017	0.85	0.0019	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.1	0.0009	3.2	0.00006	426	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 63	8.15	63.9	0.1	909	10.83	1.44	0.16	0.077	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.1	0.0006	0.049	0.017	0.85	0.0019	0.0056	2.0	0.064	0.000018	0.060	0.0018	0.036	58.9	0.0009	3.3	0.00006	425	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.1	0.03	
	Yr 64	8.15	63.9	0.1	907	10.80	1.44	0.16	0.077	0.018	0.023	0.00005	0.0001	0.026	0.0004	90.0	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.060	0.0018	0.036	58.8	0.0009	3.3	0.00006	424	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 65	8.15	63.9	0.1	904	10.78	1.43	0.16	0.077	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.8	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.059	0.0018	0.035	58.6	0.0009	3.3	0.00006	423	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 66	8.15	63.9	0.1	902	10.75	1.43	0.16	0.077	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.6	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.059	0.0018	0.035	58.5	0.0009	3.3	0.00006	422	0.23	0.00016	0.0096	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 67	8.15	63.9	0.1	899	10.73	1.43	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.4	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.059	0.0018	0.035	58.3	0.0009	3.3	0.00006	421	0.23	0.00016	0.0096	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 68	8.15	63.9	0.1	897	10.70	1.42	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.2	0.0006	0.049	0.017	0.84	0.0019	0.0055	2.0	0.064	0.000018	0.059	0.0018	0.035	58.1	0.0009	3.4	0.00006	420	0.23	0.00016	0.0096	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 69	8.15	63.9	0.1	895	10.68	1.42	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.0	0.0006	0.048	0.017	0.84	0.0019	0.0055	2.0	0.064	0.000018	0.059	0.0018	0.035	58.0	0.0009	3.4	0.00006	418	0.23	0.00016	0.0096	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 70	8.15	63.8	0.1	892	10.65	1.42	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.8	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.0	0.064	0.000018	0.059	0.0018	0.035	57.8	0.0009	3.4	0.00006	417	0.23	0.00016	0.0095	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 71	8.15	63.8	0.1	890	10.63	1.41	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.6	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.0	0.063	0.000018	0.059	0.0018	0.035	57.7	0.0009	3.4	0.00007	416	0.23	0.00016	0.0095	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 72	8.15	63.8	0.1	888	10.61	1.41	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.4	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.0	0.063	0.000018	0.058	0.0018	0.035	57.5	0.0009	3.4	0.00007	415	0.23	0.00016	0.0095	0.0016	0.0030	0.0003	0.035	0.45	0.22	3.1	0.03	
	Yr 73	8.15	63.8	0.1	885	10.58	1.41	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.2	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	57.4	0.0009	3.4	0.00007	414	0.23	0.00016	0.0095	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.1	0.03	
	Yr 74	8.15	63.8	0.1	883	10.56	1.40	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.0	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	57.2	0.0009	3.5	0.00007	413	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.1	0.03	
	Yr 75	8.15	63.8	0.1	881	10.53	1.40	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	87.8	0.0006	0.048	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	57.1	0.0009	3.5	0.00007	412	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 76	8.15	63.8	0.1	878	10.51	1.40	0.16	0.075	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.6	0.0006	0.047	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	56.9	0.0009	3.5	0.00007	411	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 77	8.15	63.8	0.1	876	10.49	1.39	0.16	0.074	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.4	0.0006	0.047	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	56.8	0.0009	3.5	0.00007	410	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 78	8.15	63.8	0.1	874	10.46	1.39	0.16	0.074	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.3	0.0006	0.047	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.057	0.0018	0.035	56.6	0.0009	3.5	0.00007	409	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 79	8.15	63.7	0.1	871	10.44	1.39	0.16	0.074	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.1	0.0006	0.047	0.016	0.82	0.0020	0.0054	2.1	0.063	0.000018	0.057	0.0018	0.035	56.5	0.0009	3.6	0.00007	408	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 80	8.15	63.7	0.1	869	10.41	1.38	0.16	0.074	0.017	0.023	0.00005	0.0001	0.025	0.0004	86.9	0.0006	0.047	0.016	0.82	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	56.4	0.0009	3.6	0.00007	406	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.036	0.44	0.22	3.0	0.03	
	Yr 81	8.15	63.7	0.1	867	10.39	1.38	0.16	0.074	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.7	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	56.2	0.0009	3.6	0.00007	405	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.036	0.44	0.22	3.0	0.03	
	Yr 82	8.15	63.7	0.1	865	10.37	1.38	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.5	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	56.1	0.0009	3.6	0.00007	404	0.23	0.00016	0.0093	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 83	8.15	63.7	0.1	862	10.34	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.3	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	55.9	0.0009	3.6	0.00007	403	0.23	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 84	8.15	63.7	0.1	860	10.32	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.1	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	55.8	0.0009	3.6	0.00007	402	0.23	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 85	8.15	63.7	0.1	858	10.30	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.9	0.0006	0.046	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.6	0.0009	3.7	0.00007	401	0.23	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 86	8.15	63.7	0.2	855	10.27	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.8	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.5	0.0009	3.7	0.00007	400	0.22	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.21	3.0	0.03	
	Yr 87	8.15	63.7	0.2	853	10.25	1.36	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.6	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.3	0.0009	3.7	0.00007	399	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.036	0.43	0.21	3.0	0.03	
	Yr 88	8.15	63.6	0.2	851	10.23	1.36	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.4	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.2	0.0009	3.7	0.00007	398	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.037	0.43	0.21	2.9	0.03	
	Yr 89	8.15	63.6	0.2	849	10.20	1.36	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.2	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.0	0.0009	3.7	0.00007	397	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.037	0.43	0.21	2.9	0.03	
	Yr 90	8.15	63.6	0.2	846	10.18	1.35	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.0	0.0006	0.046	0.016	0.80	0.0020	0.0053	2.1	0.063	0.000017	0.056	0.0018	0.035	54.9	0.0009	3.8	0.00007	396	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.037	0.43	0.21	2.9	0.03	
	Yr 91	8.15	63.6	0.2	844	10.16	1.35	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	84.8	0.0006	0.046	0.016	0.80	0.0020	0.0053	2.1	0.063	0.000017	0.056	0.0018	0.035	54.8	0.0009	3.8	0.00007	395	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 92	8.15	63.6	0.2	842	10.13	1.35	0.16	0.072	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.7	0.0006	0.046	0.016	0.79	0.0020	0.0053	2.1	0.063	0.000017	0.055	0.0018	0.035	54.6	0.0009	3.8	0.00007	394	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 93	8.15	63.6	0.2	840	10.11	1.34	0.16	0.071	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.5	0.0006	0.045	0.016	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.035	54.5	0.0009	3.8	0.00007	393	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 94	8.15	63.6	0.2	838	10.09	1.34	0.16	0.071	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.3	0.0006	0.045	0.016	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	54.3	0.0009	3.8	0.00007	392	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 95	8.15	63.6	0.2	835	10.06	1.34	0.16	0.071	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.1	0.0006	0.045	0.015	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	54.2	0.0009	3.8	0.00007	391	0.22	0.00016	0.0089	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 96	8.15	63.6	0.2	833	10.04	1.33	0.16	0.071	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.9	0.0006	0.045	0.015	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	54.0	0.0009	3.9	0.00007	390	0.22	0.00016	0.0089	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 97	8.15	63.6	0.2	831	10.02	1.33	0.16	0.071	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.8	0.0006	0.045	0.015	0.79	0.0021	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	53.9	0.0009	3.9	0.00007	389	0.22	0.00016	0.0089	0.0016	0.0028	0.0003	0.038	0.42	0.21	2.9	0.03	
	Yr 98	8.15	63.5	0.2	829	10.00	1.33	0.16	0.070	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.6	0.0006	0.045	0.015	0.78	0.0021	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	53.8	0.0009	3.9	0.00007	388	0.22	0.00016	0.0089	0.0016	0.0028	0.0003	0.038	0.42	0.21	2.9	0.03	
	Yr 99	8.15	63.5	0.2	827	9.97	1.33	0.16	0.070	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.4	0.0006	0.045	0.015	0.78	0.0021	0.0053	2.1	0.062	0.000017	0.054	0.0018	0.034	53.6	0.0009	3.9	0.00007	387	0.22	0.00016	0.0089	0.0016	0.0028	0.0003	0.038	0.42	0.21	2.9	0.03	
	Yr 100	8.15	63.5	0.2	824	9.95	1.32	0.16	0.070	0.016	0.022	0.00006	0.0001	0.024	0.0004	83.2	0.0006	0.045	0.015	0.78	0.0021	0.0053	2.1	0.062	0.000017	0.054	0.0018	0.034	53.5	0.0009	3.9	0.00007	386	0.22	0.00016	0.0088	0.0016	0.0028	0.0003	0.038	0.41	0.21	2.9	0.03	

Note: SO_4 = sulphate; Al = aluminum; Sb = antimony; As = arsenic; Ba = barium; Be = beryllium; Bi = bismuth; B = boron; Cd = cadmium; Ca = calcium; Cr = chromium; Co = cobalt; Cu = copper; Fe = iron; Pb = lead; Li = lithium; Mg = magnesium; Mn = manganese; Hg = mercury; Mo = molybdenum; Ni = nickel; P = phosphorus; K = potassium; Se = selenium; Si = silicon; Ag = silver; Na = sodium; Sr = strontium; S = sulphur; Tl = thallium; Sn = tin; Ti = titanium; U = uranium; V = vanadium; Zn = zinc

Table 12: Pit Water Concentration in Stratified Condition

Condition	Year	pH	Alkalinity	Acidity	SO_4	Cl	F	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn	NO_3	NO_3	Total CN	WAD CN	NH_3
		pH Unit	mg/L $CaCO_3$	mg/L $CaCO_3$	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Preproduction - Pit Dewatering to TSF Pond C	Yr -2		0	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0.0000	0	0	0.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Yr -1		31.5	0	1.6	0.79	0.10	0.09	0.0001	0.0004	0.006	0.00010	0.0000	0.001	0.0000	8.6	0.0003	0.0000	0.0003	0.07	0.0008	0.0010	1.7	0.002	0.000007	0.0004	0.0002	0.010	0.50	0.0006	5.5	0.00005	2.4	0.06	0.00005	0.0001	0.0011	0.0002	0.0002	0.003	0.016	0.0038	0.007	0.005	
Operation - Pit Dewatering to Mill	Yr 1	7.39	34.5	0.1	2.7	0.77	0.11	0.10	0.0001	0.0023	0.007	0.00010	0.0001	0.002	0.0001	9.1	0.0003	0.0002	0.0004	0.07	0.0005	0.0010	1.8	0.046	0.000006	0.002	0.0006	0.040	0.58	0.0008	5.7	0.00004	3.3	0.06	0.00005	0.0001	0.0022	0.0002	0.0003	0.024	0.014	0.0034	0.006	0.005	
	Yr 2	7.10	38.1	0.0	3.8	0.75	0.11	0.11	0.0001	0.0050	0.008	0.00010	0.0001	0.004	0.0001	9.7	0.0003	0.0002	0.0004	0.07	0.0006	0.0009	1.8	0.086	0.000005	0.004	0.0009	0.082	0.65	0.0004	6.0	0.00004	4.6	0.07	0.00004	0.0001	0.0038	0.0003	0.0004	0.012	0.012	0.0028	0.006	0.005	
	Yr 3	6.98	40.2	0.1	4.5	0.72	0.11	0.12	0.0001	0.007	0.009	0.00010	0.0002	0.005	0.0001	10.1	0.0003	0.0003	0.0004	0.07	0.0006	0.0008	1.8	0.116	0.000004	0.005	0.0011	0.108	0.70	0.0004	6.2	0.00003	5.4	0.08	0.00003	0.0001	0.0047	0.0004	0.0005	0.014	0.011	0.0024	0.006	0.005	
	Yr 4	6.93	41.6	0.1	5.1	0.71	0.11	0.12	0.0001	0.008	0.009	0.00009	0.0002	0.006	0.0001	10.3	0.0002	0.0003	0.0004	0.07	0.0010	0.0008	1.8	0.139	0.000003	0.006	0.0014	0.125	0.74	0.0009	6.3	0.00003	6.0	0.08	0.00003	0.0001	0.0054	0.0004	0.0006	0.021	0.009	0.0021	0.005	0.005	
	Yr 5	6.89	42.2	0.1	5.5	0.69	0.11	0.12	0.0001	0.009	0.010	0.00009	0.0003	0.006	0.0002	10.4	0.0002	0.0004	0.0005	0.07	0.0016	0.0008	1.8	0.158	0.000003	0.007	0.0016	0.138	0.76	0.0003	6.3	0.00002	6.4	0.08	0.00002	0.0001	0.0059	0.0005	0.0006	0.032	0.009	0.0019	0.005	0.004	
	Yr 6	6.87	42.9	0.2	5.8	0.67	0.11	0.12	0.0001	0.009	0.010	0.00009	0.0003	0.007	0.0002	10.5	0.0003	0.0005	0.0005	0.07	0.0019	0.0007	1.8	0.172	0.000002	0.007	0.0017	0.148	0.78	0.0003	6.3	0.00002	6.6	0.08	0.00002	0.0001	0.0062	0.0005	0.0006	0.039	0.008	0.0018	0.005	0.004	
	Yr 7	6.85	43.4	0.3	6.2	0.67	0.11	0.13	0.0002	0.010	0.010	0.00009	0.0003	0.007	0.0004	10.6	0.0002	0.0006	0.0006	0.08	0.0030	0.0007	1.8	0.190	0.000002	0.008	0.0020	0.156	0.80	0.0002	6.3	0.00002	6.9	0.08	0.00002	0.0002	0.0065	0.0005	0.0007	0.061	0.007	0.0016	0.005	0.004	
	Yr 8	6.83	43.8	0.4	6.5	0.66	0.11	0.13	0.0002	0.010	0.010	0.00009	0.0003	0.007	0.0005	10.6	0.0002	0.0008	0.0007	0.08	0.0045	0.0007	1.9	0.210	0.000002	0.008	0.0023	0.162	0.82	0.0002	6.4	0.00002	7.0	0.08	0.00002	0.0002	0.0068	0.0005	0.0007	0.089	0.007	0.0015	0.005	0.004	
	Yr 9	6.82	44.0	0.4	6.7	0.65	0.11	0.13	0.0002	0.010	0.010	0.00009	0.0003	0.008	0.0006	10.6	0.0002	0.0008	0.0007	0.09	0.0052	0.0007	1.8	0.221	0.000002	0.008	0.0025	0.168	0.83	0.0002	6.4	0.00002	7.2	0.08	0.00002	0.0002	0.0069	0.0005	0.0007	0.102	0.007	0.0014	0.005	0.004	
	Yr 10	6.81	44.1	0.5	6.9	0.64	0.11	0.14	0.0002	0.011	0.010	0.00009	0.0003	0.008	0.0007	10.6	0.0002	0.001	0.0008	0.09	0.0063	0.0007	1.8	0.235	0.000001	0.009	0.0027	0.172	0.84	0.0013	6.3	0.00002	7.3	0.08	0.00002	0.0002	0.0071	0.0005	0.0007	0.123	0.006	0.0013	0.004	0.004	
	Yr 11	6.80	44.2	0.6	7.1	0.63	0.11	0.14	0.0002	0.011	0.010	0.00009	0.0004	0.008	0.0008	10.6	0.0003	0.001	0.0008	0.09	0.0069	0.0007	1.8	0.244	0.000001	0.009	0.0028	0.176	0.85	0.0002	6.3	0.00002	7.4	0.08	0.00002	0.0002	0.0072	0.0005	0.0007	0.134	0.006	0.0013	0.004	0.004	
	Yr 12	6.79	44.4	0.7	7.2	0.63	0.11	0.14	0.0002	0.011	0.010	0.00009	0.0004	0.008	0.0009	10.7	0.0002	0.001	0.0009	0.10	0.0079	0.0007	1.8	0.256	0.000001	0.009	0.0031	0.179	0.86	0.0002	6.3	0.00001	7.5	0.08	0.00002	0.0002	0.0073	0.0005	0.0008	0.155	0.006	0.0012	0.004	0.004	
	Yr 13	6.79	44.4	0.8	7.4	0.62	0.11	0.15	0.0002	0.011	0.011	0.00009	0.0004	0.008	0.0011	10.7	0.0002	0.001	0.0010	0.11	0.0096	0.0007	1.8	0.273	0.000001	0.009	0.0034	0.182	0.87	0.0002	6.3	0.00001	7.5	0.09	0.00002	0.0002	0.0074	0.0006	0.0008	0.187	0.005	0.0012	0.004	0.004	
Closure - No Pit Discharge	Yr 14	6.78	44.6	0.9	7.6	0.62	0.10	0.12	0.0002	0.011	0.011	0.00010	0.0004	0.008	0.0013	10.7	0.0001	0.002	0.0011	0.12	0.0116	0.0007	1.8	0.290	0.000008	0.009	0.0038	0.183	0.88	0.0002	6.4	0.00001	7.6	0.09	0.00002	0.0002	0.0075	0.0006	0.0008	0.226	0.005	0.0011	0.004	0.004	
	Yr 15	6.72	44.6	0.9	7.6	0.62	0.11	0.12	0.0002	0.011	0.011	0.00010	0.0004	0.008	0.0013	10.7	0.0001	0.002	0.0011	0.12	0.0117	0.0007	1.8	0.290	0.000008	0.009	0.0038	0.182	0.88	0.0002	6.4	0.00001	7.5	0.09	0.00002	0.0002	0.0075	0.0006	0.0008	0.227	0.005	0.0012	0.004	0.004	
	Yr 16	6.72	44.3	0.9	7.6	0.62	0.12	0.12	0.0002	0.011	0.011	0.00010	0.0004	0.008	0.0013	10.6	0.0001	0.002	0.0011	0.12	0.0117	0.0007	1.8	0.288	0.000008	0.009	0.0037	0.181	0.88	0.0002	6.3	0.00001	7.5	0.08	0.00002	0.0002	0.0074	0.0006	0.0008	0.227	0.005	0.0012	0.004	0.004	
	Yr 17	7.19	46.2	0.9	115	1.82	0.11	0.12	0.009	0.012	0.012	0.00009	0.0003	0.010	0.0012	20.0	0.0001	0.007	0.0030	0.20	0.0107	0.0013	1.8	0.263	0.000009	0.015	0.0035	0.164	7.8	0.0002	5.9	0.00002	57.1	0.10	0.00003	0.0013	0.0067	0.0009	0.0007	0.207	0.059	0.03	0.38	0.007	
	Yr 18	7.76	55.3	0.5	570	6.93	0.06	0.14	0.048	0.016	0.018	0.00006	0.0002	0.020	0.0008	59.8	0.0004	0.031	0.011	0.57	0.0062	0.0037	1.9	0.163	0.000014	0.041	0.0027	0.098	37.1	0.0006	4.1	0.00004	268	0.17	0.00010	0.0061	0.0040	0.0021	0.0005	0.119	0.29	0.14	2.0	0.02	
	Yr 19	8.09	58.2	0.4	714	8.55	0.05	0.14	0.061	0.017	0.020	0.00005	0.0002	0.023	0.0007	72.4	0.0004	0.039	0.013	0.69	0.0048	0.0045	1.9	0.131	0.000015	0.049	0.0025	0.077	46.3	0.0007	3.6	0.00005	335	0.20	0.00013	0.0076	0.0031	0.0025	0.0004	0.090	0.36	0.18	2.5	0.03	
	Yr 20	8.10	59.8	0.3	786	9.36	0.04	0.15	0.067	0.018	0.021	0.00005	0.0002	0.024	0.0006	78.8	0.0005	0.043	0.015	0.74	0.0040	0.0048	1.9	0.114	0.000016	0.053	0.0023	0.067	51.0	0.0007	3.3	0.00005	368	0.21	0.00014	0.0084	0.0027	0.0027	0.0004	0.075	0.39	0.20	2.7	0.03	
	Yr 21	8.12	60.7	0.3	831	9.87	0.04	0.15	0.070	0.018	0.022	0.00004	0.0002	0.025	0.0005	82.7	0.0005	0.045	0.015	0.78	0.0035	0.0051	1.9	0.104	0.000016	0.056	0.0023	0.060	53.9	0.0008	3.2	0.00005	389	0.22	0.00014	0.0089	0.0024	0.0029	0.0003	0.065	0.42	0.21	2.9	0.03	
	Yr 22	8.12	61.4	0.2	862	10.22	0.03	0.15	0.073	0.019	0.023	0.00004	0.0002	0.026	0.0005	85.5	0.0005	0.047	0.016	0.81	0.0031	0.0052	1.9	0.096	0.000017	0.058	0.0022	0.056	55.9	0.0008	3.1	0.00005	403	0.22	0.00015	0.0092	0.0023	0.0030	0.0003	0.058	0.43	0.22	3.0	0.03	
	Yr 23	8.14	61.9	0.2	886	10.48	0.03	0.15	0.075	0.019	0.023	0.00004	0.0001	0.027	0.0005	87.6	0.0005	0.048	0.016	0.82	0.0029	0.0054	1.9	0.091	0.000017	0.059	0.0021	0.052	57.4	0.0008	3.0	0.00006	414	0.23	0.00015	0.0095	0.0021	0.0030	0.0003	0.053	0.44	0.22	3.1	0.03	
	Yr 24	8.14	62.3	0.2	904	10.69	0.03	0.15	0.077	0.019	0.023	0.00004	0.0001	0.027	0.0005	89.2	0.0005	0.049	0.017	0.84	0.0026	0.0055	1.9	0.086	0.000017	0.060	0.0021	0.050	58.6	0.0008	2.9	0.00006	423	0.23	0.00016	0.0097	0.0020	0.0031	0.0003	0.048	0.45	0.23	3.1	0.03	
	Yr 25	8.14	62.7	0.2	920	10.87	0.03	0.15	0.078	0.019	0.023	0.00004	0.0001	0.027	0.0004	90.6	0.0005	0.050	0.017	0.85	0.0024	0.0055	1.9	0.082	0.000017	0.061	0.0021	0.047	59.6	0.0008	2.9	0.00006	430	0.23	0.00016	0.0098	0.0019	0.0031	0.0003	0.044	0.46	0.23	3.2	0.03	
	Yr 26	8.14	63.0	0.2	933	11.02	0.03	0.15	0.079	0.019	0.024	0.00004	0.0001	0.028	0.0004	91.8	0.0005	0.051	0.017	0.86	0.0023	0.0056	1.9	0.079	0.000017	0.062	0.0020	0.045	60.4	0.0008	2.8	0.00006	436	0.23	0.00016	0.0100	0.0018	0.0032	0.0003	0.041	0.47	0.23	3.2	0.03	
	Yr 27	8.15	63.3	0.2	945	11.16	0.02	0.15	0.080	0.019	0.024	0.00004	0.0001	0.028	0.0004	92.8	0.0005	0.051	0.017	0.87	0.0021	0.0057	1.9	0.076	0.000018	0.063	0.0020	0.043	61.2	0.0008	2.8	0.00006	442	0.24	0.00016	0.0101	0.0017	0.0032	0.0003	0.038	0.47	0.24	3.3	0.03	
	Yr 28	8.15	63.5	0.1	956	11.28	0.02	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.8	0.0005	0.052	0.018	0.88	0.0020	0.0057	1.9	0.073	0.000018	0.063	0.0020	0.042	61.9	0.0008	2.7	0.00006	447	0.24	0.00016	0.0102	0.0017	0.0032	0.0003	0.036	0.48	0.24	3.3	0.03	
	Yr 29	8.15	63.8	0.1	966	11.39	0.02	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.6	0.0005	0.052	0.018	0.89	0.0019	0.0058	1.9	0.071	0.000018	0.064	0.0020	0.040	62.5	0.0009	2.7	0.00006	451	0.24	0.00017	0.0103	0.0016	0.0033	0.0003	0.034	0.48	0.24	3.3	0.03	
	Yr 30	8.15	64.0	0.1	975	11.49	0.02	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.4	0.0006	0.053	0.018	0.90	0.0018	0.0058	1.9	0.069	0.000018	0.064	0.0019	0.039	63.1	0.0009	2.7	0.00006	456	0.24	0.00017	0.0104	0.0016	0.0033	0.0003	0.032	0.49	0.24	3.4	0.03	
	Yr 31	8.15	64.2	0.1	983	11.59	0.02	0.15	0.084	0.020	0.024	0.00004	0.0001	0.029	0.0004	96.2	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.067	0.000018	0.065	0.0019	0.037	63.7	0.0009	2.7	0.00006	460	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.030	0.49	0.25	3.4	0.03	
	Yr 32	8.15	64.3	0.1	988	11.64	0.03	0.15	0.084	0.020	0.024	0.00004	0.0001	0.029	0.0004	96.6	0.0006	0.053	0.018	0.91	0.0017	0.0059	1.9	0.065	0.000018	0.065	0.0019	0.036	63.9	0.0009	2.7	0.00006	462	0.24	0.00017	0.0106	0.0015	0.0033	0.0003	0.029	0.49	0.25	3.4	0.03	
	Yr 33	8.15	64.3	0.1	984	11.61	0.13	0.15	0.084	0.020	0.024	0.00004	0.0001	0.029	0.0004	96.3	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.065	0.0019	0.037	63.7	0.0009	2.7	0.00006	460	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.029	0.49	0.25	3.4	0.03	
	Yr 34	8.15	64.3	0.1	981	11.58	0.23	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	96.1	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.065	0.0019	0.037	63.5	0.0009	2.7	0.00006	459	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.030	0.49	0.25	3.4	0.03	
Closure - Pit Discharge to TSF Pond D	Yr 35	8.15	64.3	0.1	979	11.55	0.33	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.9	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.064	0.0019	0.037	63.4	0.0009	2.7	0.00006	458	0.24	0.00017	0.0105	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 36	8.15	64.2	0.1	976	11.52	0.43	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.7	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.064	0.0019	0.037	63.2	0.0009	2.7	0.00006	456	0.24	0.00017	0.0104	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 37	8.15	64.2	0.1	974	11.50	0.53	0.15	0.083	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.4	0.0006	0.053	0.018	0.90	0.0017	0.0059	1.9	0.065	0.000018	0.064	0.0019	0.037	63.1	0.0009	2.8	0.00006	455	0.24	0.00017	0.0104	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 38	8.15	64.2	0.1	971	11.47	0.63	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.2	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.064	0.0019	0.036	62.9	0.0009	2.8	0.00006	454	0.24	0.00017	0.0104	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 39	8.15	64.2	0.1	969	11.44	0.73	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	95.0	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.064	0.0019	0.036	62.7	0.0009	2.8	0.00006	453	0.24	0.00017	0.0103	0.0015	0.0033	0.0003	0.030	0.49	0.24	3.4	0.03	
	Yr 40	8.15	64.2	0.1	966	11.42	0.83	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.8	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.064	0.0019	0.036	62.6	0.0009	2.8	0.00006	452	0.24	0.00017	0.0103	0.0015	0.0033	0.0003	0.030	0.48	0.24	3.3	0.03	
	Yr 41	8.15	64.2	0.1	963	11.39	0.93	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.6	0.0006	0.052	0.018	0.89	0.0017	0.0058	1.9	0.065	0.000018	0.063	0.0019	0.036	62.4	0.0009	2.8	0.00006	450	0.24	0.00017	0.0103	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 42	8.15	64.2	0.1	961	11.36	1.03	0.15	0.082	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.4	0.0006	0.052	0.018	0.89	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	62.2	0.0009	2.9	0.00006	449	0.24	0.00017	0.0103	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 43	8.15	64.2	0.1	958	11.34	1.13	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.2	0.0006	0.052	0.018	0.88	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	62.1	0.0009	2.9	0.00006	448	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 44	8.15	64.1	0.1	956	11.31	1.23	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	94.0	0.0006	0.052	0.018	0.88	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	61.9	0.0009	2.9	0.00006	447	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 45	8.15	64.1	0.1	953	11.28	1.33	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.8	0.0006	0.052	0.018	0.88	0.0017	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	61.7	0.0009	2.9	0.00006	446	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 46	8.15	64.1	0.1	951	11.26	1.43	0.15	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.6	0.0006	0.051	0.018	0.88	0.0018	0.0058	2.0	0.065	0.000018	0.063	0.0019	0.036	61.6	0.0009	2.9	0.00006	444	0.24	0.00017	0.0102	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 47	8.15	64.1	0.1	948	11.23	1.49	0.16	0.081	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.4	0.0006	0.051	0.017	0.88	0.0018	0.0058	2.0	0.065	0.000018	0.062	0.0019	0.036	61.4	0.0009	3.0	0.00006	443	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.031	0.48	0.24	3.3	0.03	
	Yr 48	8.15	64.1	0.1	946	11.21	1.49	0.16	0.080	0.019	0.024	0.00004	0.0001	0.028	0.0004	93.2	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.065	0.000018	0.062	0.0019	0.036	61.3	0.0009	3.0	0.00006	442	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.031	0.47	0.24	3.3	0.03	
	Yr 49	8.15	64.1	0.1	943	11.18	1.49	0.16	0.080	0.019	0.024	0.00004	0.0001	0.027	0.0004	93.0	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.065	0.000018	0.062	0.0019	0.036	61.1	0.0009	3.0	0.00006	441	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.032	0.47	0.24	3.3	0.03	

Condition	Year	pH	Alkalinity	Acidity	SO_4	Cl	F	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	U	V	Zn	NO_3	NO_3	Total CN	WAD CN	NH_3
	Yr 50	8.15	64.1	0.1	941	11.16	1.48	0.16	0.080	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.7	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.065	0.000018	0.062	0.0019	0.036	60.9	0.0009	3.0	0.00006	440	0.24	0.00017	0.0101	0.0015	0.0032	0.0003	0.032	0.47	0.24	3.3	0.03	
	Yr 51	8.15	64.1	0.1	938	11.13	1.48	0.16	0.080	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.5	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.064	0.000018	0.062	0.0019	0.036	60.8	0.0009	3.0	0.00006	439	0.24	0.00017	0.0100	0.0015	0.0032	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 52	8.15	64.0	0.1	936	11.10	1.48	0.16	0.079	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.3	0.0006	0.051	0.017	0.87	0.0018	0.0057	2.0	0.064	0.000018	0.062	0.0019	0.036	60.6	0.0009	3.1	0.00006	438	0.24	0.00017	0.0100	0.0015	0.0032	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 53	8.15	64.0	0.1	933	11.08	1.47	0.16	0.079	0.019	0.024	0.00004	0.0001	0.027	0.0004	92.1	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.5	0.0009	3.1	0.00006	436	0.24	0.00017	0.0100	0.0015	0.0032	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 54	8.15	64.0	0.1	931	11.05	1.47	0.16	0.079	0.018	0.024	0.00004	0.0001	0.027	0.0004	91.9	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.3	0.0009	3.1	0.00006	435	0.24	0.00016	0.0100	0.0015	0.0031	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 55	8.15	64.0	0.1	928	11.03	1.47	0.16	0.079	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.7	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.2	0.0009	3.1	0.00006	434	0.23	0.00016	0.0099	0.0015	0.0031	0.0003	0.032	0.47	0.23	3.2	0.03	
	Yr 56	8.15	64.0	0.1	926	11.00	1.46	0.16	0.079	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.5	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	60.0	0.0009	3.1	0.00006	433	0.23	0.00016	0.0099	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 57	8.15	64.0	0.1	924	10.98	1.46	0.16	0.078	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.3	0.0006	0.050	0.017	0.86	0.0018	0.0057	2.0	0.064	0.000018	0.061	0.0019	0.036	59.8	0.0009	3.2	0.00006	432	0.23	0.00016	0.0099	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 58	8.15	64.0	0.1	921	10.95	1.46	0.16	0.078	0.018	0.024	0.00005	0.0001	0.027	0.0004	91.1	0.0006	0.050	0.017	0.86	0.0018	0.0056	2.0	0.064	0.000018	0.061	0.0019	0.036	59.7	0.0009	3.2	0.00006	431	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 59	8.15	64.0	0.1	919	10.93	1.45	0.16	0.078	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.9	0.0006	0.050	0.017	0.85	0.0018	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.5	0.0009	3.2	0.00006	430	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 60	8.15	64.0	0.1	916	10.90	1.45	0.16	0.078	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.7	0.0006	0.050	0.017	0.85	0.0018	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.4	0.0009	3.2	0.00006	428	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 61	8.15	63.9	0.1	914	10.88	1.45	0.16	0.078	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.5	0.0006	0.049	0.017	0.85	0.0018	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.2	0.0009	3.2	0.00006	427	0.23	0.00016	0.0098	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 62	8.15	63.9	0.1	911	10.85	1.44	0.16	0.077	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.3	0.0006	0.049	0.017	0.85	0.0019	0.0056	2.0	0.064	0.000018	0.060	0.0019	0.036	59.1	0.0009	3.2	0.00006	426	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.2	0.03	
	Yr 63	8.15	63.9	0.1	909	10.83	1.44	0.16	0.077	0.018	0.023	0.00005	0.0001	0.027	0.0004	90.1	0.0006	0.049	0.017	0.85	0.0019	0.0056	2.0	0.064	0.000018	0.060	0.0018	0.036	58.9	0.0009	3.3	0.00006	425	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.033	0.46	0.23	3.1	0.03	
	Yr 64	8.15	63.9	0.1	907	10.80	1.44	0.16	0.077	0.018	0.023	0.00005	0.0001	0.026	0.0004	90.0	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.060	0.0018	0.036	58.8	0.0009	3.3	0.00006	424	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 65	8.15	63.9	0.1	904	10.78	1.43	0.16	0.077	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.8	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.059	0.0018	0.035	58.6	0.0009	3.3	0.00006	423	0.23	0.00016	0.0097	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 66	8.15	63.9	0.1	902	10.75	1.43	0.16	0.077	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.6	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.059	0.0018	0.035	58.5	0.0009	3.3	0.00006	422	0.23	0.00016	0.0096	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 67	8.15	63.9	0.1	899	10.73	1.43	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.4	0.0006	0.049	0.017	0.84	0.0019	0.0056	2.0	0.064	0.000018	0.059	0.0018	0.035	58.3	0.0009	3.3	0.00006	421	0.23	0.00016	0.0096	0.0015	0.0031	0.0003	0.034	0.45	0.23	3.1	0.03	
	Yr 68	8.15	63.9	0.1	897	10.70	1.42	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.2	0.0006	0.049	0.017	0.84	0.0019	0.0055	2.0	0.064	0.000018	0.059	0.0018	0.035	58.1	0.0009	3.4	0.00006	420	0.23	0.00016	0.0096	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 69	8.15	63.9	0.1	895	10.68	1.42	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	89.0	0.0006	0.048	0.017	0.84	0.0019	0.0055	2.0	0.064	0.000018	0.059	0.0018	0.035	58.0	0.0009	3.4	0.00006	418	0.23	0.00016	0.0096	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 70	8.15	63.8	0.1	892	10.65	1.42	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.8	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.0	0.064	0.000018	0.059	0.0018	0.035	57.8	0.0009	3.4	0.00006	417	0.23	0.00016	0.0095	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 71	8.15	63.8	0.1	890	10.63	1.41	0.16	0.076	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.6	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.0	0.063	0.000018	0.059	0.0018	0.035	57.7	0.0009	3.4	0.00007	416	0.23	0.00016	0.0095	0.0015	0.0030	0.0003	0.034	0.45	0.22	3.1	0.03	
	Yr 72	8.15	63.8	0.1	888	10.61	1.41	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.4	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.0	0.063	0.000018	0.058	0.0018	0.035	57.5	0.0009	3.4	0.00007	415	0.23	0.00016	0.0095	0.0016	0.0030	0.0003	0.035	0.45	0.22	3.1	0.03	
	Yr 73	8.15	63.8	0.1	885	10.58	1.41	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.2	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	57.4	0.0009	3.4	0.00007	414	0.23	0.00016	0.0095	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.1	0.03	
	Yr 74	8.15	63.8	0.1	883	10.56	1.40	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	88.0	0.0006	0.048	0.016	0.83	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	57.2	0.0009	3.5	0.00007	413	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.1	0.03	
	Yr 75	8.15	63.8	0.1	881	10.53	1.40	0.16	0.075	0.018	0.023	0.00005	0.0001	0.026	0.0004	87.8	0.0006	0.048	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	57.1	0.0009	3.5	0.00007	412	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 76	8.15	63.8	0.1	878	10.51	1.40	0.16	0.075	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.6	0.0006	0.047	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	56.9	0.0009	3.5	0.00007	411	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 77	8.15	63.8	0.1	876	10.49	1.39	0.16	0.074	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.4	0.0006	0.047	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.058	0.0018	0.035	56.8	0.0009	3.5	0.00007	410	0.23	0.00016	0.0094	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 78	8.15	63.8	0.1	874	10.46	1.39	0.16	0.074	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.3	0.0006	0.047	0.016	0.82	0.0019	0.0055	2.1	0.063	0.000018	0.057	0.0018	0.035	56.6	0.0009	3.5	0.00007	409	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 79	8.15	63.7	0.1	871	10.44	1.39	0.16	0.074	0.017	0.023	0.00005	0.0001	0.026	0.0004	87.1	0.0006	0.047	0.016	0.82	0.0020	0.0054	2.1	0.063	0.000018	0.057	0.0018	0.035	56.5	0.0009	3.6	0.00007	408	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.035	0.44	0.22	3.0	0.03	
	Yr 80	8.15	63.7	0.1	869	10.41	1.38	0.16	0.074	0.017	0.023	0.00005	0.0001	0.025	0.0004	86.9	0.0006	0.047	0.016	0.82	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	56.4	0.0009	3.6	0.00007	406	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.036	0.44	0.22	3.0	0.03	
	Yr 81	8.15	63.7	0.1	867	10.39	1.38	0.16	0.074	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.7	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	56.2	0.0009	3.6	0.00007	405	0.23	0.00016	0.0093	0.0016	0.0030	0.0003	0.036	0.44	0.22	3.0	0.03	
	Yr 82	8.15	63.7	0.1	865	10.37	1.38	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.5	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	56.1	0.0009	3.6	0.00007	404	0.23	0.00016	0.0093	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 83	8.15	63.7	0.1	862	10.34	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.3	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	55.9	0.0009	3.6	0.00007	403	0.23	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 84	8.15	63.7	0.1	860	10.32	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	86.1	0.0006	0.047	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.057	0.0018	0.035	55.8	0.0009	3.6	0.00007	402	0.23	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 85	8.15	63.7	0.1	858	10.30	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.9	0.0006	0.046	0.016	0.81	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.6	0.0009	3.7	0.00007	401	0.23	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.22	3.0	0.03	
	Yr 86	8.15	63.7	0.2	855	10.27	1.37	0.16	0.073	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.8	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.5	0.0009	3.7	0.00007	400	0.22	0.00016	0.0092	0.0016	0.0029	0.0003	0.036	0.43	0.21	3.0	0.03	
	Yr 87	8.15	63.7	0.2	853	10.25	1.36	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.6	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.3	0.0009	3.7	0.00007	399	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.036	0.43	0.21	3.0	0.03	
	Yr 88	8.15	63.6	0.2	851	10.23	1.36	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.4	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.2	0.0009	3.7	0.00007	398	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.037	0.43	0.21	2.9	0.03	
	Yr 89	8.15	63.6	0.2	849	10.20	1.36	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.2	0.0006	0.046	0.016	0.80	0.0020	0.0054	2.1	0.063	0.000017	0.056	0.0018	0.035	55.0	0.0009	3.7	0.00007	397	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.037	0.43	0.21	2.9	0.03	
	Yr 90	8.15	63.6	0.2	846	10.18	1.35	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	85.0	0.0006	0.046	0.016	0.80	0.0020	0.0053	2.1	0.063	0.000017	0.056	0.0018	0.035	54.9	0.0009	3.8	0.00007	396	0.22	0.00016	0.0091	0.0016	0.0029	0.0003	0.037	0.43	0.21	2.9	0.03	
	Yr 91	8.15	63.6	0.2	844	10.16	1.35	0.16	0.072	0.017	0.023	0.00006	0.0001	0.025	0.0004	84.8	0.0006	0.046	0.016	0.80	0.0020	0.0053	2.1	0.063	0.000017	0.056	0.0018	0.035	54.8	0.0009	3.8	0.00007	395	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 92	8.15	63.6	0.2	842	10.13	1.35	0.16	0.072	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.7	0.0006	0.046	0.016	0.79	0.0020	0.0053	2.1	0.063	0.000017	0.055	0.0018	0.035	54.6	0.0009	3.8	0.00007	394	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 93	8.15	63.6	0.2	840	10.11	1.34	0.16	0.071	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.5	0.0006	0.045	0.016	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.035	54.5	0.0009	3.8	0.00007	393	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 94	8.15	63.6	0.2	838	10.09	1.34	0.16	0.071	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.3	0.0006	0.045	0.016	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	54.3	0.0009	3.8	0.00007	392	0.22	0.00016	0.0090	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 95	8.15	63.6	0.2	835	10.06	1.34	0.16	0.071	0.017	0.022	0.00006	0.0001	0.025	0.0004	84.1	0.0006	0.045	0.015	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	54.2	0.0009	3.8	0.00007	391	0.22	0.00016	0.0089	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 96	8.15	63.6	0.2	833	10.04	1.33	0.16	0.071	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.9	0.0006	0.045	0.015	0.79	0.0020	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	54.0	0.0009	3.9	0.00007	390	0.22	0.00016	0.0089	0.0016	0.0029	0.0003	0.037	0.42	0.21	2.9	0.03	
	Yr 97	8.15	63.6	0.2	831	10.02	1.33	0.16	0.071	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.8	0.0006	0.045	0.015	0.79	0.0021	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	53.9	0.0009	3.9	0.00007	389	0.22	0.00016	0.0089	0.0016	0.0028	0.0003	0.038	0.42	0.21	2.9	0.03	
	Yr 98	8.15	63.5	0.2	829	10.00	1.33	0.16	0.070	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.6	0.0006	0.045	0.015	0.78	0.0021	0.0053	2.1	0.062	0.000017	0.055	0.0018	0.034	53.8	0.0009	3.9	0.00007	388	0.22	0.00016	0.0089	0.0016	0.0028	0.0003	0.038	0.42	0.21	2.9	0.03	
	Yr 99	8.15	63.5	0.2	827	9.97	1.33	0.16	0.070	0.017	0.022	0.00006	0.0001	0.024	0.0004	83.4	0.0006	0.045	0.015	0.78	0.0021	0.0053	2.1	0.062	0.000017	0.054	0.0018	0.034	53.6	0.0009	3.9	0.00007	387	0.22	0.00016	0.0089	0.0016	0.0028	0.0003	0.038	0.42	0.21	2.9	0.03	
	Yr 100	8.15	63.5	0.2	824	9.95	1.32	0.16	0.070	0.016	0.022	0.00006	0.0001	0.024	0.0004	83.2	0.0006	0.045	0.015	0.78	0.0021	0.0053	2.1	0.062	0.000017	0.054	0.0018	0.034	53.5	0.0009	3.9	0.00007	386	0.22	0.00016	0.0088	0.0016	0.0028	0.0003	0.038	0.41	0.21	2.9	0.03	

Note: SO_4 = sulphate; Al = aluminum; Sb = antimony; As = arsenic; Ba = barium; Be = beryllium; Bi = bismuth; B = boron; Cd = cadmium; Ca = calcium; Cr = chromium; Co = cobalt; Cu = copper; Fe = iron; Pb = lead; Li = lithium; Mg = magnesium; Mn = manganese; Hg = mercury; Mo = molybdenum; Ni = nickel; P = phosphorus; K = potassium; Se = selenium; Si = silicon; Ag = silver; Na = sodium; Sr = strontium; S = sulphur; Tl = thallium; Sn = tin; Ti = titanium; U = uranium; V = vanadium; Zn = zinc

Table 13: East and West Dump Runoff and Infiltration

	Acidity (mg/L)			Alkalinity (mg/L)			Sulfate (mg/L)			Al (mg/L)			Sb (mg/L)			As (mg/L)			Ba (mg/L)			Be (mg/L)			Bi (mg/L)			B (mg/L)			Cd (mg/L)			Ca (mg/L)			Cr (mg/L)		
Year	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total
Pre-prod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0.0000	0.0000	0.0000	0	0	0	0	0	0
Yr 1	0.6	15	3.4	18	196	54	0.92	142	29	0.06	0	0.13	0.00003	0.08	0.02	0.0002	0.058	0.0117	0.004	0.02	0.01	0.0001	0.0006	0.0002	0.000	0.003	0.001	0.001	0.05	0.01	0.0000	0.0011	0.0002	5.0	113	26.6	0.0002	0.003	0.001
Yr 2	1.3	31.1	7.3	26	389	99	9.2	309	69	0.07	0.86	0.23	0.005	0.17	0.04	0.004	0.125	0.028	0.004	0.04	0.011	0.00008	0.00125	0.00032	0.0004	0.0062	0.0016	0.004	0.12	0.026	0.0001	0.0024	0.0005	10.6	236	55.7	0.0003	0.0061	0.0015
Yr 3	4.6	32	11	63	399	138	43	319	105	0.15	0.87	0.31	0.02	0.18	0.06	0.017	0.13	0.043	0.007	0.04	0.014	0.00020	0.00128	0.00044	0.0010	0.0064	0.0022	0.016	0.12	0.040	0.0003	0.0025	0.0008	35.2	243	81.7	0.0009	0.0063	0.0021
Yr 4	9	6.4	8.2	116	94	110	86	57	78	0.26	0.23	0.25	0.05	0.03	0.04	0.035	0.023	0.032	0.012	0.01	0.012	0.00037	0.00030	0.00035	0.0019	0.0015	0.0018	0.033	0.02	0.030	0.0007	0.0004	0.0006	67.4	49.0	62.8	0.0018	0.0013	0.0017
Yr 5	8	6.0	7.7	108	90	103	80	53	73	0.24	0.22	0.24	0.04	0.03	0.04	0.032	0.021	0.029	0.011	0.01	0.011	0.00034	0.00029	0.00033	0.0017	0.0014	0.0016	0.030	0.02	0.028	0.0006	0.0004	0.0006	62.8	46.4	58.4	0.0016	0.0013	0.0015
Yr 6	8.1	12.0	9.2	105	160	120	79	115	89	0.24	0.36	0.27	0.04	0.06	0.05	0.032	0.047	0.036	0.011	0.02	0.013	0.00034	0.00051	0.00038	0.0017	0.0026	0.0019	0.030	0.04	0.034	0.0006	0.0009	0.0007	61.6	91.6	70.1	0.0016	0.0024	0.0018
Yr 7	10	4.0	8.3	129	66	110	98	32	79	0.29	0.17	0.25	0.05	0.02	0.04	0.040	0.013	0.032	0.013	0.01	0.012	0.00041	0.00021	0.00035	0.0021	0.0010	0.0018	0.037	0.01	0.030	0.0008	0.0003	0.0006	76.3	30.9	63.1	0.0020	0.0009	0.0017
Yr 8	9.7	2.1	7.4	125	44	101	95	13	70	0.28	0.12	0.23	0.05	0.006	0.04	0.038	0.005	0.028	0.013	0.01	0.011	0.00040	0.00014	0.00032	0.0020	0.0007	0.0016	0.036	0.01	0.027	0.0007	0.0001	0.0005	73.8	16.8	56.9	0.0019	0.0005	0.0015
Yr 9	9.0	8.3	8.8	115	115	115	89	77	85	0.26	0.27	0.26	0.05	0.04	0.05	0.036	0.031	0.034	0.012	0.01	0.012	0.00037	0.00037	0.00037	0.0018	0.0018	0.0018	0.034	0.03	0.032	0.0007	0.0006	0.0007	68.7	63.3	67.0	0.0018	0.0017	0.0018
Yr 10	11	12.1	11	134	159	142	106	116	109	0.30	0.36	0.32	0.06	0.06	0.06	0.043	0.047	0.044	0.013	0.02	0.015	0.00043	0.00051	0.00046	0.0021	0.0025	0.0023	0.040	0.04	0.042	0.0008	0.00090	0.0008	81.2	91.9	84.7	0.0021	0.0024	0.0022
Yr 11	14	3.1	10	175	55	134	139	23	100	0.38	0.14	0.30	0.08	0.01	0.05	0.057	0.0093	0.041	0.017	0.01	0.014	0.00056	0.00018	0.00043	0.0028	0.0009	0.0021	0.053	0.01	0.038	0.0011	0.00018	0.0008	106.5	24.3	78.4	0.0027	0.0007	0.0020
Yr 12	14	1.5	10	171	37	125	136	6.3	92	0.38	0.11	0.28	0.07	0.003	0.05	0.055	0.0023	0.037	0.017	0.007	0.014	0.00055	0.00012	0.00040	0.0027	0.0006	0.0020	0.051	0.003	0.035	0.0010	0.00005	0.0007	103.8	12.0	72.5	0.0027	0.0004	0.0019
Yr 13	13	1.4	9	161	36	118	127	6.0	85	0.35	0.11	0.27	0.07	0.0025	0.05	0.051	0.0022	0.035	0.016	0.01	0.013	0.00051	0.00012	0.00038	0.0026	0.0006	0.0019	0.048	0.003	0.033	0.0010	0.00005	0.0007	97.1	11.8	67.9	0.0025	0.0004	0.0018
Yr 14	12	1.0	8.3	152	32	111	120	1.6	79	0.34	0.096	0.25	0.07	0.00005	0.04	0.049	0.0004	0.032	0.015	0.006	0.012	0.00049	0.00010	0.00035	0.0024	0	0.0018	0.045	0.001	0.030	0.0009	0.00002	0.0006	91.8	8.6	63.1	0.0024	0.0003	0.0017
Yr 15	11	1.0	7.7	143	32	104	112	1.6	73	0.32	0.096	0.24	0.06	0.00005	0.04	0.045	0.0004	0.030	0.014	0.006	0.012	0.00046	0.00010	0.00033	0.0023	0	0.0017	0.042	0.001	0.028	0.0009	0.00002	0.0006	85.9	8.6	59.1	0.0022	0.0003	0.0016
Yr 16	11	1.0	7.3	136	32	98	105	1.6	69	0.30	0.096	0.23	0.06	0.00005	0.04	0.043	0.0004	0.028	0.014	0.006	0.011	0.00043	0.00010	0.00032	0.0022	0	0.0016	0.040	0.001	0.026	0.0008	0.00002	0.0005	81.1	8.6	55.5	0.0021	0.0003	0.0015
Closure Yr 1	10	1.0	6.9	129	32	93	99	1.6	65	0.29	0.096	0.22	0.05	0.00005	0.04	0.040	0.0004	0.026	0.013	0.006	0.011	0.00041	0.00010	0.00030	0.0021	0	0.0015	0.038	0.001	0.025	0.0008	0.00002	0.0005	76.6	8.6	52.4	0.0020	0.0003	0.0014
Closure Yr 2	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 3	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 4	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 5	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 6	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 7	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 8	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 9	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 10	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 11	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 12	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 13	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 14	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 15	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 16	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 17	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 18	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 19	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 20	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 21	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 22	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 23	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 24	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 25	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 26	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 27	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 28	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 29	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 30	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 31	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 32	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013
Closure Yr 33	10	1.0	6.6	126	32	91	95	1.6	62	0.28	0.096	0.21	0.05	0.00005	0.03	0.039	0.0004	0.025	0.013	0.006	0.010	0.00040	0.00010	0.00029	0.0020	0	0.0015	0.036	0.001	0.024	0.0007	0.00002	0.0005	74.3	8.6	50.8	0.0019	0.0003	0.0013

	Co (mg/L)			Cu (mg/L)			Fe (mg/L)			Pb (mg/L)			Li (mg/L)			Mg (mg/L)			Mn (mg/L)			Hg (mg/L)			Mo (mg/L)			Ni (mg/L)			P (mg/L)			K (mg/L)			Se (mg/L)		
Year	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total
Pre-prod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yr 1	0.000	0.001	0.000	0.0002	0.003	0.001	0.04	0.22	0.08	0.00003	0.005	0.001	0.001	0.04	0.01	1.0	6	2.0	0.0	1	0.2	0.000004	0.00006	0.00002	0.0003	0.005	0.001	0.00009	0.0031	0.0007	0.01	1.61	0.33	0.3	18	3.9	0.0003	0.001	0.001
Yr 2	0.0001	0.0024	0.0006	0.0003	0.0061	0.0015	0.0	0	0.1	0.0003	0.0115	0.0026	0.003	0.1	0.020	1.1	10.8	3.1	0.1	2.3	0.5	0.00001	0.00012	0.00003	0.0005	0.0110	0.0026	0.0003	0.0065	0.0015	0.1	3.5	0.8	1.3	39.6	9.0	0.0003	0.0017	0.0006
Yr 3	0.0003	0.0025	0.0008	0.0009	0.0063	0.0021	0.1	0.4	0.2	0.0016	0.0119	0.0039	0.013	0.1	0.030	2.0	10.9	4.0	0.3	2.4	0.8	0.00002	0.00013	0.00004	0.0017	0.0113	0.0038	0.0009	0.0067	0.0022	0.5	3.6	1.2	5.6	40.9	13.5	0.0004	0.0017	0.0007
Yr 4	0.0007	0.0005	0.0006	0.0018	0.0013	0.0016	0.1	0.1	0.1	0.0032	0.0021	0.0029	0.025	0.0	0.023	3.4	3.3	3.4	0.6	0.4	0.6	0.00004	0.00003	0.00003	0.0032	0.0023	0.0029	0.0018	0.0013	0.0017	1.0	0.6	0.9	11.1	7.5	10.2	0.0006	0.0008	0.0007
Yr 5	0.0006	0.0004	0.0006	0.0016	0.0012	0.0015	0.1	0.1	0.1	0.0030	0.0020	0.0027	0.023	0.0	0.021	3.2	3.1	3.2	0.6	0.4	0.5	0.00003	0.00003	0.00003	0.0029	0.0022	0.0027	0.0017	0.0012	0.0016	0.9	0.6	0.8	10.3	7.1	9.4	0.0006	0.0007	0.0006
Yr 6	0.0006	0.0009	0.0007	0.0016	0.0024	0.0018	0.1	0.2	0.1	0.0029	0.0043	0.0033	0.023	0.0	0.026	3.0	4.8	3.5	0.6	0.8	0.7	0.00003	0.00005	0.00004	0.0029	0.0043	0.0033	0.0017	0.0025	0.0019	0.9	1.3	1.0	10.2	14.9	11.5	0.0005	0.0009	0.0006
Yr 7	0.0008	0.0003	0.0006	0.0020	0.0008	0.0016	0.1	0.10	0.1	0.0036	0.0012	0.0029	0.028	0.01	0.023	3.7	2.5	3.4	0.7	0.23	0.6	0.00004	0.00002	0.00003	0.0036	0.0015	0.0030	0.0021	0.0008	0.0017	1.1	0.36	0.9	12.7	4.40	10.3	0.0006	0.0007	0.0006
Yr 8	0.0007	0.0001	0.0006	0.0019	0.0005	0.0015	0.1	0.08	0.1	0.0035	0.0005	0.0026	0.027	0.00	0.020	3.6	2.0	3.1	0.7	0.09	0.5	0.00004	0.00001	0.00003	0.0034	0.0008	0.0027	0.0020	0.0004	0.0015	1.1	0.14	0.8	12.2	1.94	9.2	0.0006	0.0006	0.0006
Yr 9	0.0007	0.0006	0.0007	0.0018	0.0017	0.0017	0.1	0.1	0.1	0.0033	0.0029	0.0032	0.026	0.0	0.025	3.3	3.7	3.4	0.7	0.6	0.6	0.00004	0.00003	0.00004	0.0032	0.0030	0.0031	0.0019	0.0017	0.0018	1.0	0.9	1.0	11.4	10.1	11.0	0.0005	0.0008	0.0006
Yr 10	0.0008	0.0009	0.0009	0.0021	0.0024	0.0022	0.1	0.2	0.2	0.0039	0.0043	0.0041	0.031	0.03	0.032	3.7	4.7	4.1	0.8	0.9	0.8	0.00004	0.00005	0.00004	0.004	0.004	0.004	0.002	0.003	0.002	1.2	1.3	1.2	13.6	15.0	14.1	0.0006	0.0009	0.0007
Yr 11	0.0011	0.0002	0.0008	0.0027	0.0007	0.0020	0.18	0.1	0.1	0.0052	0.0009	0.0037	0.040	0.0	0.029	4.8	2.2	4.0	1.0	0.2	0.7	0.000055	0.000015	0.000041	0.0050	0.0012	0.0037	0.0029	0.0006	0.0021	1.6	0.3	1.1	17.9	3.3	12.9	0.0007	0.0006	0.0007
Yr 12	0.0011	0.0001	0.0007	0.0027	0.0004	0.0019	0.18	0.070	0.1	0.0050	0.0002	0.0034	0.039	0.002	0.027	4.8	1.8	3.7	1.0	0.037	0.7	0.000054	0.000009	0.000038	0.0048	0.0006	0.0034	0.0029	0.0003	0.0020	1.5	0.064	1.0	17.4	1.1	11.8	0.0007	0.0006	0.0007
Yr 13	0.0010	0.0001	0.0007	0.0025	0.0004	0.0018	0.17	0.07	0.1	0.0047	0.0002	0.0032	0.036	0.00	0.025	4.5	1.8	3.6	0.9	0.04	0.6	0.000050	0.000009	0.000036	0.0045	0.0006	0.0032	0.0027	0.0003	0.0019	1.4	0.06	1.0	16.3	1.1	11.1	0.0007	0.0006	0.0007
Yr 14	0.0009	0.00003	0.0006	0.0024	0.0003	0.0016	0.16	0.066	0.1	0.0044	0.0001	0.0029	0.034	0.001	0.023	4.3	1.7	3.4	0.9	0.002	0.6	0.000048	0.000007	0.000034	0.0043	0.0004	0.0030	0.0025	0.0002	0.0017	1.4	0.01	0.9	15.4	0.5	10.2	0.0007	0.0006	0.0007
Yr 15	0.0009	0.00003	0.0006	0.0022	0.0003	0.0015	0.15	0.066	0.1	0.0042	0.0001	0.0027	0.032	0.001	0.021	4.0	1.7	3.2	0.8	0.002	0.5	0.000045	0.000007	0.000032	0.0040	0.0004	0.0028	0.0024	0.0002	0.0016	1.3	0.01	0.8	14.4	0.5	9.5	0.0006	0.0006	0.0006
Yr 16	0.0008	0.00003	0.0005	0.0021	0.0003	0.0015	0.14	0.066	0.1	0.0039	0.0001	0.0026	0.030	0.001	0.020	3.9	1.7	3.1	0.8	0.002	0.5	0.000042	0.000007	0.000030	0.0038	0.0004	0.0026	0.0022	0.0002	0.0015	1.2	0.01	0.8	13.5	0.5	8.9	0.0006	0.0006	0.0006
Closure Yr 1	0.0008	0.00003	0.0005	0.0020	0.0003	0.0014	0.14	0.066	0.1	0.0037	0.0001	0.0024	0.029	0.001	0.019	3.7	1.7	2.9	0.7	0.002	0.5	0.000040	0.000007	0.000028	0.0036	0.0004	0.0025	0.0021	0.0002	0.0014	1.1	0.01	0.7	12.7	0.5	8.4	0.0006	0.0006	0.0006
Closure Yr 2	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 3	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 4	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 5	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 6	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 7	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 8	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 9	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 10	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 11	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 12	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 13	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 14	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 15	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 16	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 17	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 18	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 19	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 20	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 21	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 22	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 23	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 24	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 25	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 26	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 27	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 28	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 29	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 30	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 31	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 32	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006
Closure Yr 33	0.0008	0.00003	0.0005	0.0019	0.0003	0.0013	0.14	0.066	0.1	0.0035	0.0001	0.0023	0.028	0.001	0.018	3.6	1.7	2.9	0.7	0.002	0.5	0.000039	0.000007	0.000027	0.0035	0.0004	0.0024	0.0020	0.0002	0.0014	1.1	0.01	0.7	12.3	0.5	8.1	0.0006	0.0006	0.0006

	Si (mg/L)			Ag (mg/L)			Na (mg/L)			Sr (mg/L)			S (mg/L)			Tl (mg/L)			Sn (mg/L)			Ti (mg/L)			U (mg/L)			V (mg/L)			Zn (mg/L)		
Year	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total	Infiltration	Runoff	Total
Pre-prod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yr 1	3.2	15	5.6	0.00003	0.00014	0.00005	1.4	14	3.9	0.03	0.53	0.13	0.29	50	10.2	0.00003	0.00017	0.00006	0.0001	0.0006	0.0002	0.0007	0.054	0.011	0.0001	0.0014	0.0004	0.0001	0.008	0.002	0.00	0.02	0.01
Yr 2	3.4	26.4	8.0	0.00003	0.00023	0.00007	1.9	27.4	7.0	0.1	1.1	0.3	3.2	108.7	24.3	0.00003	0.00032	0.00009	0.0001	0.0012	0.0003	0.004	0.12	0.026	0.0002	0.0029	0.0007	0.001	0.018	0.004	0.0	0.0	0.0
Yr 3	5.3	26.7	10.1	0.00005	0.00024	0.00009	4.5	28.1	9.8	0.2	1.1	0.4	15.1	112.4	36.9	0.00006	0.00032	0.00012	0.0002	0.0013	0.0004	0.017	0.12	0.040	0.0005	0.0030	0.0010	0.003	0.018	0.006	0.0	0.0	0.0
Yr 4	8.7	9.0	8.8	0.00008	0.00008	0.00008	8.2	6.8	7.8	0.3	0.2	0.3	30.2	19.9	27.6	0.00010	0.00010	0.00010	0.0004	0.0003	0.0004	0.033	0.022	0.030	0.0009	0.0007	0.0008	0.005	0.003	0.005	0.0	0.0	0.0
Yr 5	8.1	8.6	8.3	0.00007	0.00008	0.00007	7.6	6.5	7.3	0.3	0.2	0.3	28.1	18.7	25.6	0.00009	0.00009	0.00009	0.0003	0.0003	0.0003	0.030	0.021	0.028	0.0008	0.0006	0.0007	0.005	0.003	0.004	0.0	0.0	0.0
Yr 6	7.7	12.5	9.0	0.00007	0.00011	0.00008	7.4	11.3	8.5	0.3	0.4	0.3	27.8	40.5	31.4	0.00009	0.00014	0.00010	0.0003	0.0005	0.0004	0.030	0.044	0.034	0.0008	0.0012	0.0009	0.005	0.007	0.005	0.0	0.0	0.0
Yr 7	9.3	7.26	8.7	0.00008	0.00007	0.00008	9.1	4.77	7.8	0.4	0.16	0.3	34.6	11.3	27.8	0.00011	0.00007	0.00010	0.0004	0.0002	0.0004	0.037	0.013	0.030	0.0010	0.0004	0.0008	0.006	0.002	0.005	0.0	0.01	0.0
Yr 8	9.1	6.11	8.2	0.00008	0.00006	0.00007	8.8	3.27	7.2	0.3	0.09	0.3	33.3	4.5	24.8	0.00011	0.00006	0.00009	0.0004	0.0001	0.0003	0.036	0.005	0.027	0.0009	0.0003	0.0007	0.005	0.001	0.004	0.0	0.00	0.0
Yr 9	8.2	9.8	8.7	0.00007	0.00009	0.00008	8.1	8.2	8.2	0.3	0.3	0.3	31.2	27.0	29.9	0.00010	0.00011	0.00010	0.0004	0.0004	0.0004	0.034	0.030	0.032	0.0009	0.0008	0.0008	0.005	0.004	0.005	0.0	0.0	0.0
Yr 10	9.1	12.1	10.1	0.0001	0.0001	0.0001	9.4	11.3	10.0	0.4	0.4	0.4	37.4	40.9	38.5	0.00011	0.00014	0.00012	0.0004	0.0005	0.0005	0.04	0.04	0.04	0.001	0.001	0.001	0.006	0.007	0.006	0.0	0.0	0.0
Yr 11	11.8	6.6	10.0	0.00010	0.00006	0.00009	12.3	4.0	9.5	0.5	0.1	0.4	49.1	8.2	35.2	0.00014	0.000066	0.00012	0.0006	0.0002	0.0004	0.05	0.01	0.04	0.0013	0.0004	0.0010	0.008	0.001	0.006	0.0	0.0	0.0
Yr 12	11.7	5.7	9.6	0.00010	0.00005	0.00009	12.1	2.7	8.9	0.5	0.073	0.3	47.8	2.2	32.2	0.00014	0.000053	0.00011	0.0005	0.0001	0.0004	0.05	0.003	0.03	0.0013	0.0002	0.0009	0.008	0.0004	0.005	0.0	0.003	0.0
Yr 13	11.0	5.7	9.2	0.00010	0.00005	0.00008	11.3	2.7	8.4	0.4	0.07	0.3	44.6	2.1	30.1	0.00013	0.000053	0.00011	0.0005	0.0001	0.0004	0.05	0.003	0.03	0.0012	0.0002	0.0009	0.007	0.0004	0.005	0.0	0.00	0.0
Yr 14	10.5	5.5	8.8	0.00009	0.00005	0.00008	10.7	2.4	7.9	0.4	0.059	0.3	42.1	1	27.8	0.00013	0.000050	0.00010	0.0005	0.0001	0.0004	0.05	0.001	0.03	0.0011	0.0002	0.0008	0.007	0.0002	0.005	0.02	0.003	0.0
Yr 15	9.9	5.5	8.4	0.00009	0.00005	0.00007	10.1	2.4	7.4	0.4	0.059	0.3	39.3	1	25.9	0.00012	0.000050	0.00009	0.0005	0.0001	0.0003	0.04	0.001	0.03	0.0011	0.0002	0.0008	0.006	0.0002	0.004	0.01	0.003	0.0
Yr 16	9.6	5.5	8.0	0.00009	0.00005	0.00007	9.6	2.4	7.0	0.4	0.059	0.3	37.0	1	24.2	0.00011	0.000050	0.000090	0.0004	0.0001	0.0003	0.04	0.001	0.03	0.0010	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 1	9.3	5.5	7.7	0.00008	0.00005	0.00007	9.1	2.4	6.7	0.4	0.059	0.2	34.7	1	22.7	0.00011	0.000050	0.000086	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0010	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 2	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 3	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 4	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 5	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 6	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 7	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 8	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 9	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 10	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 11	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 12	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 13	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 14	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 15	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 16	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 17	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 18	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 19	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 20	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 21	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 22	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 23	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 24	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 25	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 26	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 27	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 28	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 29	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 30	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 31	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 32	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01
Closure Yr 33	9.1	5.5	7.5	0.00008	0.00005	0.00007	8.9	2.4	6.5	0.3	0.059	0.2	33.6	1	22.0	0.00011	0.000050	0.000084	0.0004	0.0001	0.0003	0.04	0.001	0.02	0.0009	0.0002	0.0007	0.006	0.0002	0.004	0.01	0.003	0.01

Note: SO_4 = sulphate; Al = Aluminum; Sb = antimony; As = arsenic; Ba = barium; Be = beryllium; Bi = bismuth; B = boron; Cd = cadmium; Ca = calcium; Cr = chromium; Co = cobalt; Cu = copper; Fe = iron; Pb = lead; Li = lithium; Mg = magnesium; Mn = manganese; Hg = mercury; Mo = molybdenum; Ni = nickel; P = phosphorus; K = potassium; Se = selenium; Si = silicon; Ag = silver; Na = sodium; Sr = strontium; S = sulphur; Tl = thallium; Sn = tin; Ti = titanium; U = uranium; V = vanadium; Zn = zinc

3.3.7 Neutralization of PAG Rock (Average and 95th Percentile)

Neutralization of leachate from potentially acid-generating (PAG) rock HCTs are provided in the Geochemistry Baseline Report (**Appendix 5.3.1A**). Neutralization results were used in the low grade ore (LGO) stockpile runoff and infiltration loading calculation, since LGO stockpile drainage will be neutralized with lime to about pH 10 prior to discharge to the TSF. Total metals concentrations were not provided in the pH neutralization results, but were assumed to equal dissolved metals concentrations. Cyanide species concentrations from the neutralization tests were all below method detection limits. For the purpose of water quality model calculation, where no potential source of cyanide species are anticipated, concentrations of the cyanide species are set to 0 mg/L. **Table 14** and **Table 15** show the average and 95th percentile concentration obtained from the neutralization tests, respectively.

3.3.8 Background Water Quality

Background surface water quality at each of the catchment areas was obtained from the baseline study conducted from 2011 to 2013. The average and 95th percentile concentrations of the baseline water quality results were used in the analysis of the best estimate and worst-case scenarios, respectively. Detailed results are shown in the Water Quality Baseline Report included in **Appendix 5.1.2.2A**.

3.3.9 Landfill Leachate

Landfill runoff is assumed the same as the water quality in the baseline study in the catchment area (WQ10).

Landfill infiltration water quality was obtained from a conventional municipal solid waste landfill leachate quality (**Table 16**). Chemical parameters that were not available in the landfill leachate quality were assumed to be the same as background water quality at WQ10.

Table 14: Neutralization of PAG HCT Leachate Water Chemistry – Average

General Parameters	Unit		Dissolved Metals	Unit	
pH	pH units	10.1	D-Aluminum	mg/L	1.586
Conductivity	mS/cm	77.8	D-Antimony	mg/L	0.0004
TDS	mg/L	56.3	D-Arsenic	mg/L	0.0002
TSS	mg/L	2.5	D-Barium	mg/L	0.009
Turbidity	mg/L	1.05	D-Beryllium	mg/L	0.00011
Total hardness	mg/L	34.3	D-Boron	mg/L	0.011
Total alkalinity	mg/L	38.0	D-Cadmium	mg/L	0.00082
Fluoride	mg/L	0.05	D-Calcium	mg/L	99.4
Sulphate	mg/L	2.32	D-Chromium	mg/L	0.00083
Chloride	mg/L	0.29	D-Cobalt	mg/L	0.0005
Ammonia	mg/L	0.02	D-Copper	mg/L	0.001
Nitrate	mg/L	0.02	D-Iron	mg/L	0.08
Nitrite	mg/L	0.003	D-Lead	mg/L	0.0092
TKN	mg/L	0.14	D-Lithium	mg/L	0.010
Ortho-phosphate	mg/L	0.011	D-Magnesium	mg/L	0.39
Total dissolved phosphorus	mg/L	0.01	D-Manganese	mg/L	0.037
TOC	mg/L	5.76	D-Mercury	mg/L	0.00001
DOC	mg/L	5.64	D-Molybdenum	mg/L	0.00006
Temperature	°C	4	D-Nickel	mg/L	0.001
Cyanide	**Unit**		D-Phosphorus	mg/L	0.300
Total cyanide	mg/L	<0.005	D-Potassium	mg/L	3.3
WAD cyanide	mg/L	<0.005	D-Selenium	mg/L	0.0001
Cyanate	mg/L	<0.2	D-Silicon	mg/L	0.9
Thiocyanate	mg/L	<0.5	D-Silver	mg/L	0.00001
			D-Sodium	mg/L	0.11
			D-Strontium	mg/L	0.08
			D-Thallium	mg/L	0.0001
			D-Tin	mg/L	0.00011
			D-Titanium	mg/L	0.01129
			D-Uranium	mg/L	0.00004
			D-Vanadium	mg/L	0.00114
			D-Zinc	mg/L	0.1143

Note: °C = degrees Celsius; D = dissolved; mg/L = milligrams per litre; mS/cm = milliSiemens per centimetre; NTU = Nephelometric Turbidity Unit; T = total; TDS = total dissolved solids; TOC = total organic carbon; TSS = total suspended solids; *italics* = method detection limit used; < = less than method detection limit; TKN = Total Kjeldahl Nitrogen; DOC = dissolved organic carbon; WAD = week acid dissociable

Table 15: Neutralization of PAG HCT Leachate Water Chemistry – 95th Percentile

General Parameters	Unit		Dissolved Metals	Unit	
pH	pH units	10.8	D-Aluminum	mg/L	3.642
Conductivity	mS/cm	108.7	D-Antimony	mg/L	0.0008
TDS	mg/L	76.2	D-Arsenic	mg/L	0.0003
TSS	mg/L	4.3	D-Barium	mg/L	0.020
Turbidity	mg/L	2.58	D-Beryllium	mg/L	0.00017
Total Hardness	mg/L	49.1	D-Boron	mg/L	0.017
Total Alkalinity	mg/L	54.5	D-Cadmium	mg/L	0.00282
Fluoride	mg/L	0.06	D-Calcium	mg/L	291.3
Sulphate	mg/L	3.50	D-Chromium	mg/L	0.00179
Chloride	mg/L	0.51	D-Cobalt	mg/L	0.001
Ammonia	mg/L	0.0205	D-Copper	mg/L	0.002
Nitrate	mg/L	0.04	D-Iron	mg/L	0.27
Nitrite	mg/L	0.004	D-Lead	mg/L	0.0442
TKN	mg/L	0.24	D-Lithium	mg/L	0.028
Ortho-phosphate	mg/L	0.043	D-Magnesium	mg/L	0.91
Total dissolved phosphorus	mg/L	0.01	D-Manganese	mg/L	0.162
TOC	mg/L	11.58	D-Mercury	mg/L	0.00001
DOC	mg/L	11.27	D-Molybdenum	mg/L	0.00009
Temperature	°C	8.3	D-Nickel	mg/L	0.002
Cyanide	**Unit**		D-Phosphorus	mg/L	0.300
Total cyanide	mg/L	<0.005	D-Potassium	mg/L	4.9
WAD cyanide	mg/L	<0.005	D-Selenium	mg/L	0.0002
Cyanate	mg/L	<0.2	D-Silicon	mg/L	2.1
Thiocyanate	mg/L	<0.5	D-Silver	mg/L	0.00002
			D-Sodium	mg/L	0.11
			D-Strontium	mg/L	0.08
			D-Thallium	mg/L	0.0001
			D-Tin	mg/L	0.00011
			D-Titanium	mg/L	0.01129
			D-Uranium	mg/L	0.00004
			D-Vanadium	mg/L	0.00114
			D-Zinc	mg/L	0.1143

Note: °C = degrees Celsius; D = dissolved; mg/L = milligrams per litre; mS/cm = milliSiemens per centimetre; NTU = Nephelometric Turbidity Unit; T = total; TDS = total dissolved solids; TOC = total organic carbon; TSS = total suspended solids; *italics* = method detection limit used; TKN = Total Kjeldahl Nitrogen; DOC = dissolved organic carbon; WAD = week acid dissociable

Table 16: Landfill Leachate Chemistry

General Parameters	Unit		Total Metals	Unit		Dissolved Metals	Unit	
pH	pH units	10.9	T-Aluminum	mg/L	-	D-Aluminum	mg/L	-
Conductivity	mS/cm	-	T-Antimony	mg/L	-	D-Antimony	mg/L	-
TDS	mg/L	-	T-Arsenic	mg/L	0.01	D-Arsenic	mg/L	0.01
TSS	mg/L	-	T-Barium	mg/L	-	D-Barium	mg/L	-
Turbidity	mg/L	-	T-Beryllium	mg/L	-	D-Beryllium	mg/L	-
Total hardness	mg/L	-	T-Boron	mg/L	-	D-Boron	mg/L	-
Total alkalinity	mg/L	-	T-Cadmium	mg/L	0.0499	D-Cadmium	mg/L	0.0499
Fluoride	mg/L	-	T-Calcium	mg/L	-	D-Calcium	mg/L	-
Sulphate	mg/L	-	T-Chromium	mg/L	-	D-Chromium	mg/L	-
Chloride	mg/L	-	T-Cobalt	mg/L	-	D-Cobalt	mg/L	-
Ammonia	mg/L	-	T-Copper	mg/L	-	D-Copper	mg/L	-
Nitrate	mg/L	-	T-Iron	mg/L	-	D-Iron	mg/L	-
Nitrite	mg/L	-	T-Lead	mg/L	-	D-Lead	mg/L	-
TKN	mg/L	-	T-Lithium	mg/L	-	D-Lithium	mg/L	-
Ortho-phosphate	mg/L	-	T-Magnesium	mg/L	-	D-Magnesium	mg/L	-
Total dissolved phosphorus	mg/L	-	T-Manganese	mg/L	-	D-Manganese	mg/L	-
TOC	mg/L	-	T-Mercury	mg/L	-	D-Mercury	mg/L	-
DOC	mg/L	-	T-molybdenum	mg/L	-	D-Molybdenum	mg/L	-
Temperature	°C	-	T-Nickel	mg/L	-	D-Nickel	mg/L	-
Cyanide	**Unit**	-	T-Phosphorus	mg/L	-	D-Phosphorus	mg/L	-
Total cyanide	mg/L	-	T-Potassium	mg/L	-	D-Potassium	mg/L	-
WAD cyanide	mg/L	-	T-Selenium	mg/L	0.2837	D-Selenium	mg/L	0.2837
Cyanate	mg/L	-	T-Silicon	mg/L	-	D-Silicon	mg/L	-
Thiocyanate	mg/L	-	T-Silver	mg/L	-	D-Silver	mg/L	-
			T-Sodium	mg/L	-	D-Sodium	mg/L	-
			T-Strontium	mg/L	-	D-Strontium	mg/L	-
			T-Thallium	mg/L	-	D-Thallium	mg/L	-
			T-Tin	mg/L	-	D-Tin	mg/L	-
			T-Titanium	mg/L	-	D-Titanium	mg/L	-
			T-Uranium	mg/L	-	D-Uranium	mg/L	-
			T-Vanadium	mg/L	-	D-Vanadium	mg/L	-
			T-Zinc	mg/L	-	D-Zinc	mg/L	-

Note: °C = degrees Celsius; D = dissolved; mg/L = milligrams per litre; mS/cm = milliSiemens per centimetre; NTU = Nephelometric Turbidity Unit; T = total; TDS = total dissolved solids; TOC = total organic carbon; TSS = total suspended solids; *italics* = method detection limit used; TKN = Total Kjeldahl Nitrogen; DOC = dissolved organic carbon; WAD = week acid dissociable

3.3.10 Waste Rock and Tailings Tonnage in TSF C and TSF D

The estimated tonnages of PAG and NAG3 waste rock and tailings produced and then placed in TSF C and TSF D were provided by Norwest Mining, and are discussed in the Project Overview (**Section 2.2.3.2.13.2**). The amounts of waste rock and tailings located in each TSF were used

to calculate the chemistry loading deposited into the TSF, proportioned to a monthly rate for each year. The total amounts of tailings and waste rock deposited in each TSF were also used to calculate the proportionate concentration of the TSF embankment/foundation seepage loss in the water quality model.

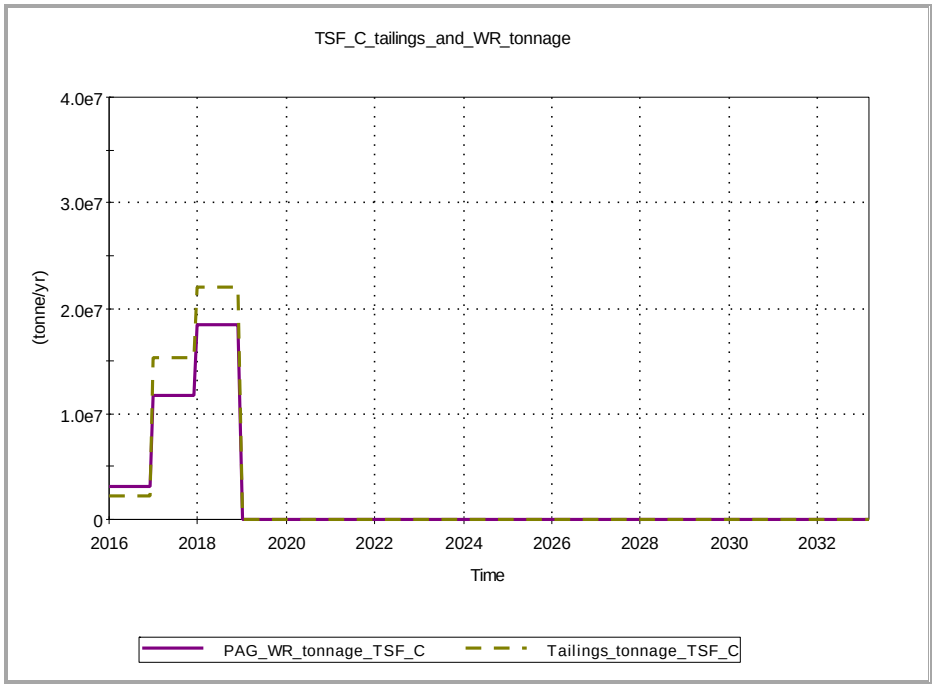
Table 17 presents a summary of the amounts of PAG and NAG3 waste rock and tailings placed in TSF C and TSF D.

Table 17: Amounts of Waste Rock and Tailings placed in TSF C and TSF D

Mine Year	TSF C		TSF D	
	Tailings (tonnes)	**Waste Rock (tonnes)**	**Tailings (tonnes)**	**Waste Rock (tonnes)**
-1	2,210,000	3,180,000	2,210,000	0
1	15,260,000	11,790,000	15,260,000	0
2	22,000,000	18,510,000	22,000,000	0
3	22,000,000	0	22,000,000	16,670,000
4	22,000,000	0	22,000,000	28,680,000
5	21,770,000	0	21,770,000	33,410,000
6	21,770,000	0	21,770,000	39,110,000
7	22,000,000	0	22,000,000	36,880,000
8	22,000,000	0	22,000,000	33,950,000
9	22,000,000	0	22,000,000	35,490,000
10	22,000,000	0	22,000,000	25,810,000
11	22,000,000	0	22,000,000	17,970,000
12	22,000,000	0	22,000,000	10,780,000
13	22,000,000	0	22,000,000	0
14	22,000,000	0	22,000,000	0
15	22,000,000	0	22,000,000	0
16	22,000,000	0	22,000,000	0
17	5,500,000	0	5,500,000	0
Total	**352,510,000**	**33,480,000**	**352,510,000**	**278,750,000**

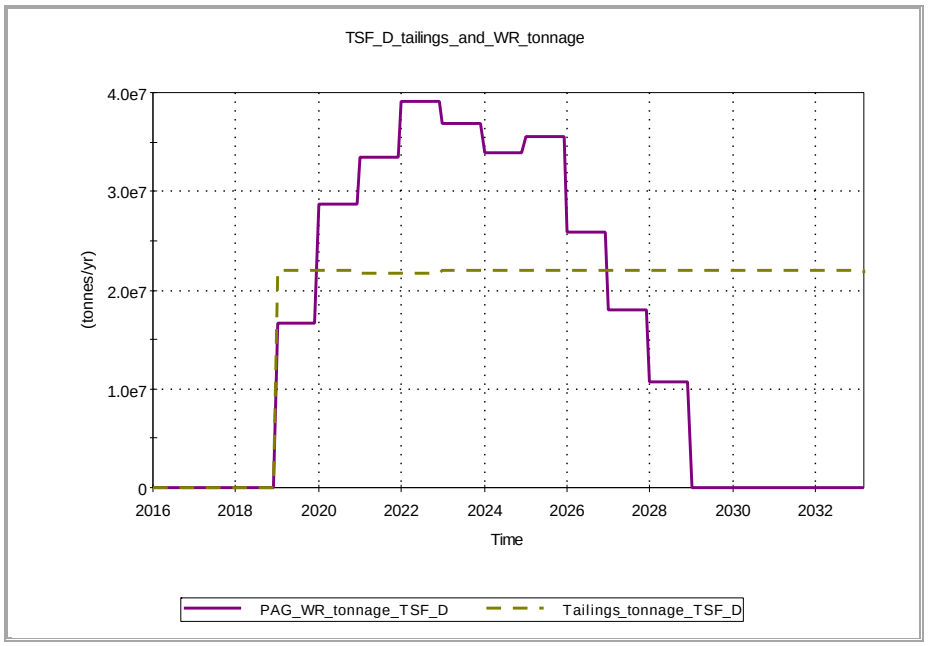
Note: PAG = potentailly acid generating, TSF = tailings storage facility

Figure 3 and Figure 4 graphically show the amounts of waste rock and tailings deposited in each TSF, respectively.



Note: PAG = potentailly acid generating, TSF = tailings storage facility

Figure 3: Amount of Waste Rock and Tailings Deposited in TSF C during Operations



Note: PAG = potentailly acid generating, TSF = tailings storage facility

Figure 4: Amount of Waste Rock and Tailings Deposited in TSF D during Operations

3.3.11 Nitrogen Species Deposition due to Explosives Use

The amount of nitrogen species deposited to the receiving water from the use of explosives is based on the annual explosives consumption schedule. Three types of explosives are proposed to be used in the Project: ANFO, 25/75 emulsion/ANFO, and 70/30 emulsion/ANFO mixtures. Explosives will be used from construction (Year -1) to Year 13 of operations, when open pit mining ends (LGO will be processed for the remaining 3 years). The annual explosives consumption is proportioned by month for the water quality model. **Table 18** presents the annual explosives consumption by type of explosives.

Table 18: Explosives Use Schedule

Mine Year	Explosives Type (kg)			% of Slurry Explosives	Total Explosives Used (kg)
	ANFO	25/75 Emulsion/ANFO	70/30 Emulsion/ANFO		
-1	2,050,000	620,000	740,000	40%	3,410,000
1	5,610,000	3,560,000	2,860,000	53%	12,030,000
2	6,480,000	5,400,000	3,780,000	59%	15,660,000
3	7,820,000	6,720,000	4,680,000	59%	19,220,000
4	8,710,000	5,460,000	4,580,000	54%	18,750,000
5	9,440,000	4,750,000	4,600,000	50%	18,790,000
6	10,160,000	4,770,000	4,860,000	49%	19,790,000
7	9,500,000	4,870,000	4,660,000	50%	19,030,000
8	8,460,000	5,990,000	4,950,000	56%	19,400,000
9	9,470,000	5,500,000	5,140,000	53%	20,110,000
10	8,490,000	6,770,000	5,220,000	59%	20,480,000
11	5,620,000	6,170,000	4,010,000	64%	15,800,000
12	3,360,000	6,210,000	3,230,000	74%	12,800,000
13	2,330,000	5,370,000	2,590,000	77%	10,290,000

The prediction of annual nutrient release loading and effluent and receiving water concentration for nitrogen species was based on the calculation by Ferguson and Leask (1988). The annual explosives loss as inorganic nitrogen for mines, which will use more than 20% slurry explosive, is expressed as:

Explosive loss as N = 0.94% (projected ANFO use as N) + 5.1% (projected slurry use as N)

The apportioning of the inorganic nitrogen load for effluents into nitrogen species (Ferguson & Leask, 1988) are 87% as nitrate-N, 11% as ammonia-N, and 2% as nitrite-N.

4 MODEL OUTPUTS

The graphical outputs of the two modelled scenario (best estimate and worst-case) at each modelled nodes are presented in **Annex A**.

The detailed predicted water quality outputs for each modelled nodes are presented in **Annex B**. **Figure 5** shows the interconnections of the various model inputs and outputs at a high level.

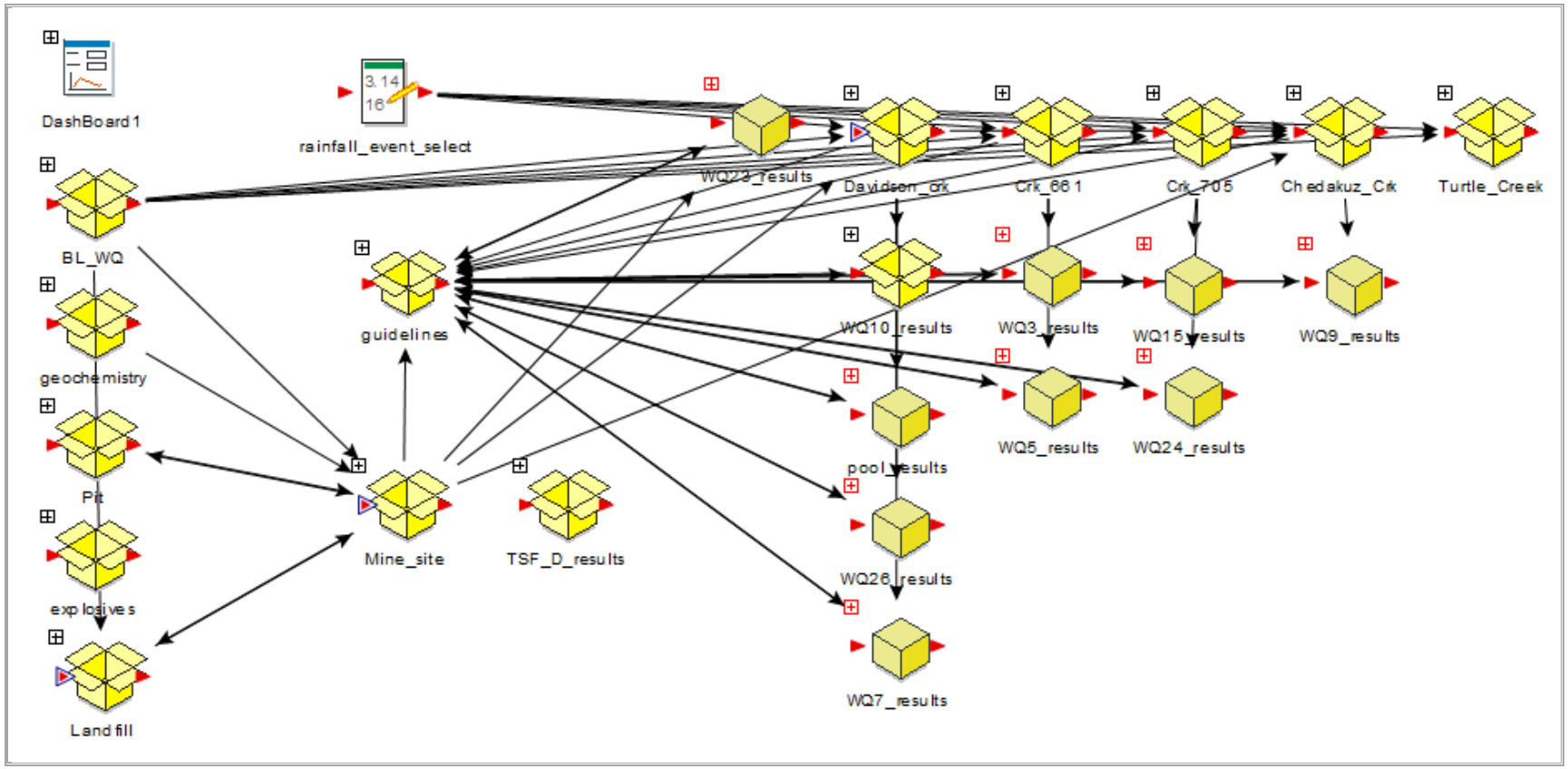


Figure 5: Model Inputs and Output Containers in the Goldsim Algorithm

REFERENCES

Ferguson, K. D., & Leask, S. M. (1988). *The Export of Nutrients from Surface Coal Mines.* West Vancouver, BC: Environment Canada.

Annexes

Abbreviation	Definition
Aquatic_maximum_guideline	British Columbia Ministry of Environment Working Water Quality Guidelines for Freshwater Aquatics – Aquatic maximum value
BC_ FWG_Lower	British Columbia Water Quality Guidelines for Freshwater Aquatics – Lower limit
BC_FWG_Upper	British Columbia Water Quality Guidelines for Freshwater Aquatics – Upper limit
BC_WQG_FWA	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics
BC_WQG_FWA_30_Day	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics (30-day average)
BC_WQG_FWA_Max	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics (Maximum)
BCMOE_FWA_30day_guideline	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics (30-day average)
BCMOE_FWA_guideline	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics
BCMOE_FWA_max_guideline	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics (Maximum)
BL	Baseline water quality
CEQG_FWA_guideline	Canadian Environmental Quality Guidelines for Fresh Water Aquatics
CEQG_FWA_long_term_guideline	Canadian Environmental Quality Guidelines for Fresh Water Aquatics (long term)
CEQG_FWA_short_term_guideline	Canadian Environmental Quality Guidelines for Fresh Water Aquatics (short term)
Chromium_III_BCMOE_CEQG_FWA	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics for Chromium (III) and Canadian Environmental Quality Guidelines for Fresh Water Aquatics for Chromium (III)
Chromium_VI_BCMOE_CEQG_FWA	British Columbia Ministry of Environment Water Quality Guidelines for Freshwater Aquatics for Chromium (VI) and Canadian Environmental Quality Guidelines for Fresh Water Aquatics for Chromium (VI)
DW_Guideline	Health Canada Guidelines for Canadian Drinking Water Quality
Final_chronic_guideline	British Columbia Ministry of Environment Working Water Quality Guidelines for Freshwater Aquatics – Final chronic value
HC_DW_guideline	Health Canada Guidelines for Canadian Drinking Water Quality
HC_DW_Lower	Health Canada Guidelines for Canadian Drinking Water Quality - Lower limit
HC_DW_Upper	Health Canada Guidelines for Canadian Drinking Water Quality - Upper limit
Ontario_WQO	British Columbia Ministry of Environment Working Water Quality Guidelines for Freshwater Aquatics – based on Ontario's water quality objective
Secondary_chronic_guideline	British Columbia Ministry of Environment Working Water Quality Guidelines for Freshwater Aquatics – Secondary chronic value
Secondary_chronic_value	British Columbia Ministry of Environment Working Water Quality Guidelines for Freshwater Aquatics – Secondary Chronic value
Site_Performance_Objectives	Site Performance Objectives
T_Hardness_DW_lower_limit	Health Canada Guidelines for Canadian Drinking Water Quality – Lower limit for Total Hardness
T_Hardness_DW_upper_limit	Health Canada Guidelines for Canadian Drinking Water Quality – Upper limit for Total Hardness

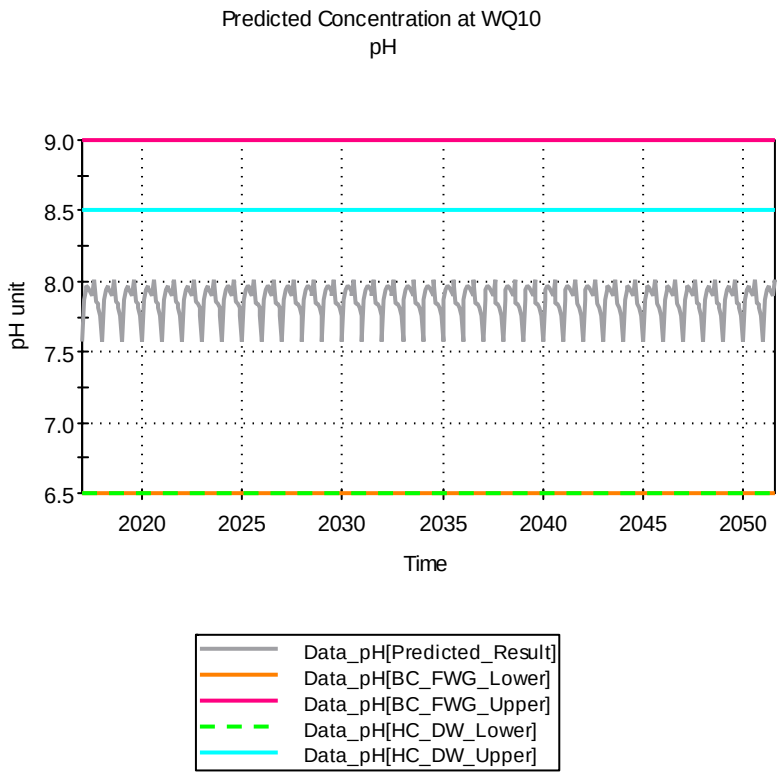
Annex A

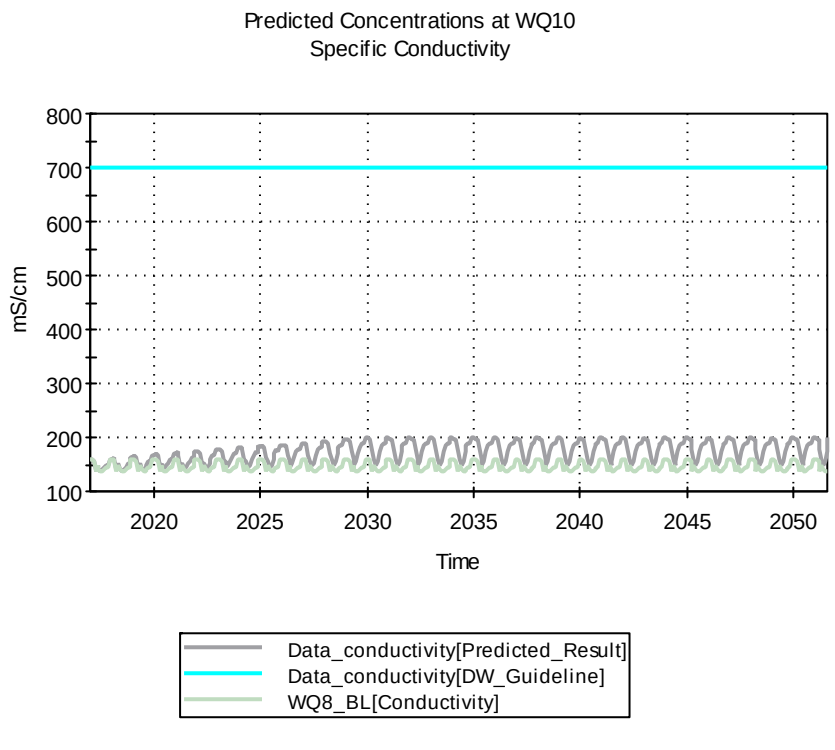
Graphical Presentation of the Predicated Water Quality at Modelled Water Quality Nodes

Annex A-1

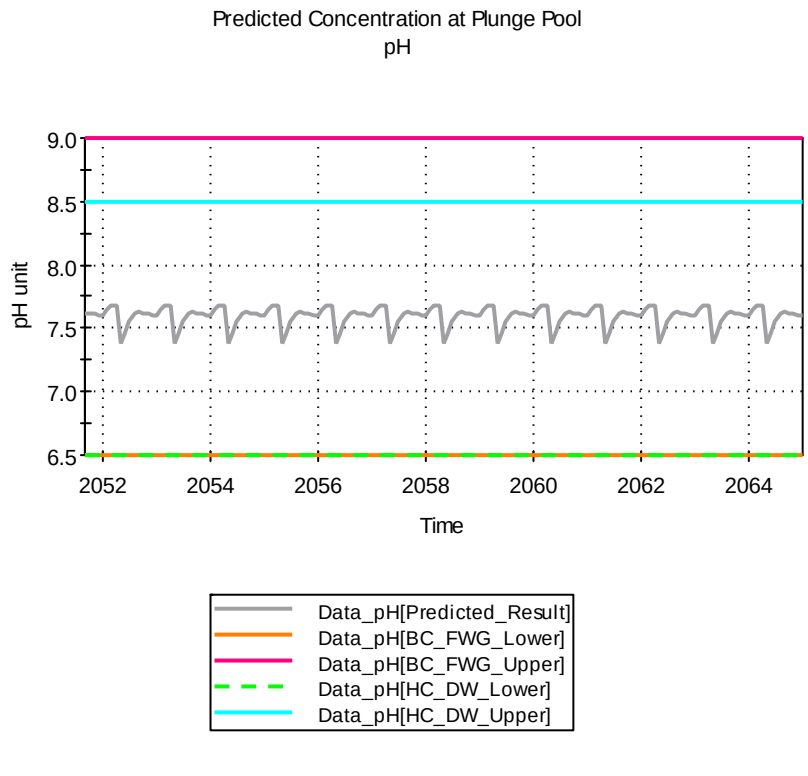
Graphical Outputs of the Predicted Water Quality at WQ10 (construction, operation, and closure) and Plunge Pool (post-closure) – Best Estimate and Worst Case

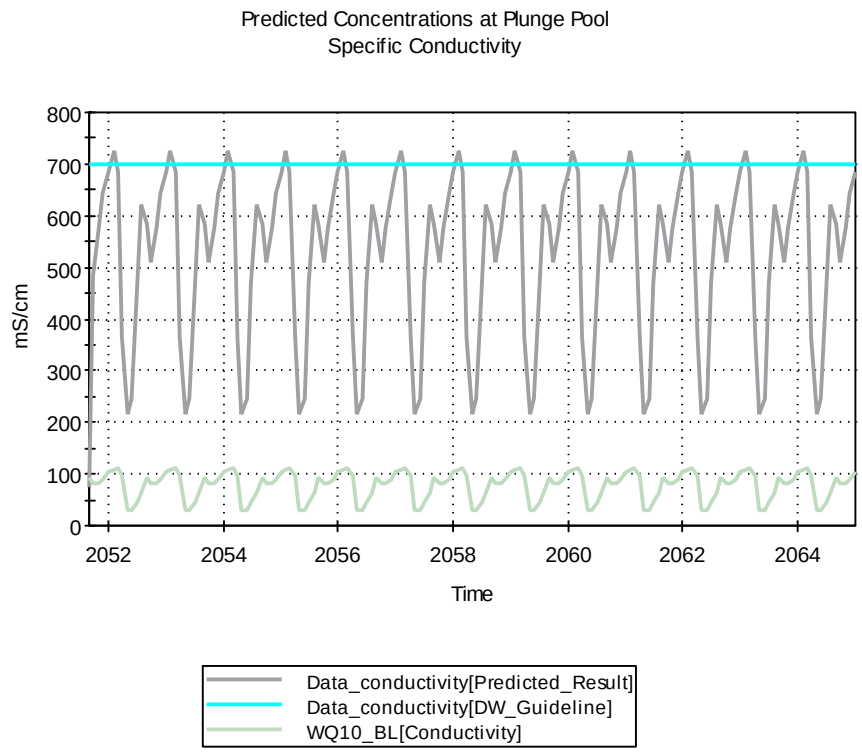
WQ10 - Best estimates (Construction, Operation,Closure)



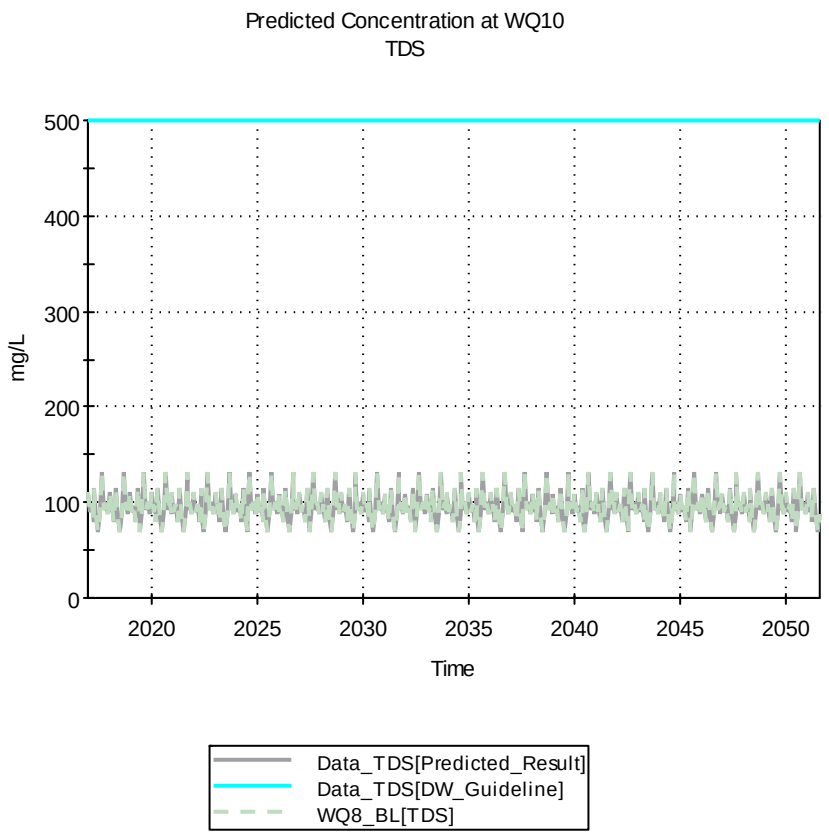


Plunge Pool – Best estimates (Post-closure)

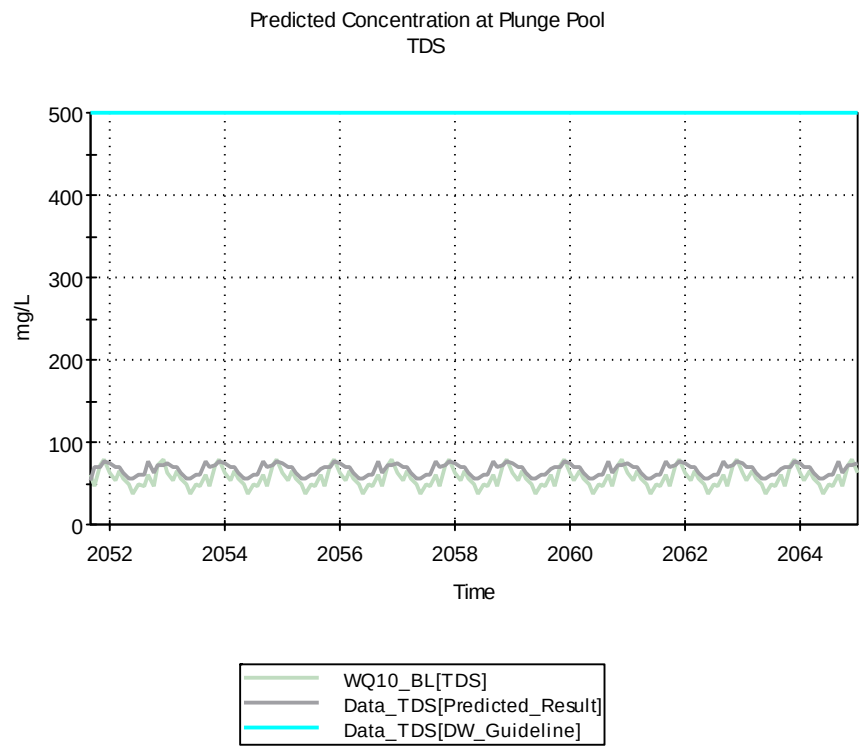


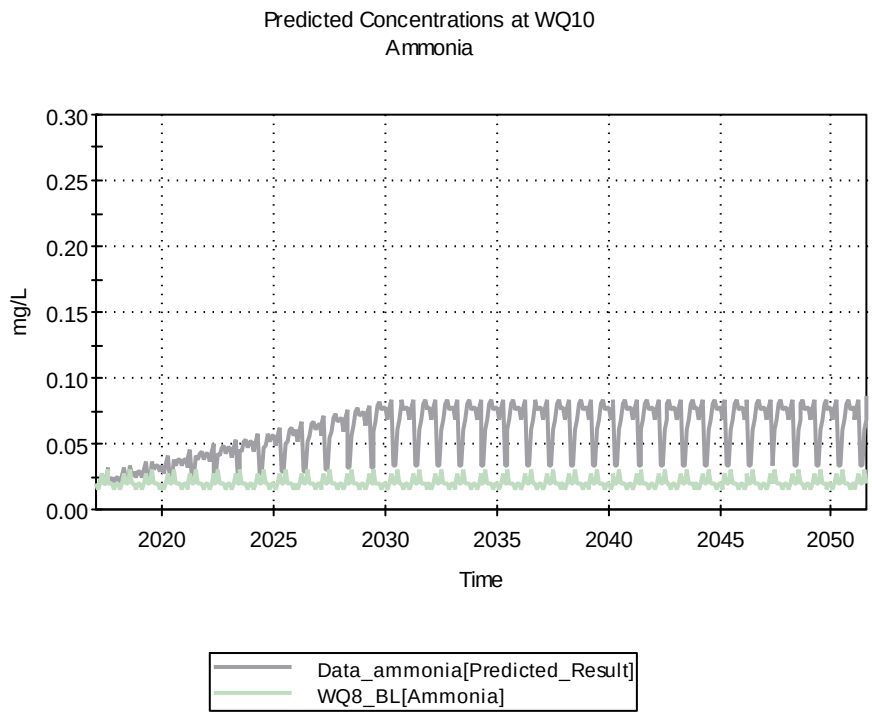


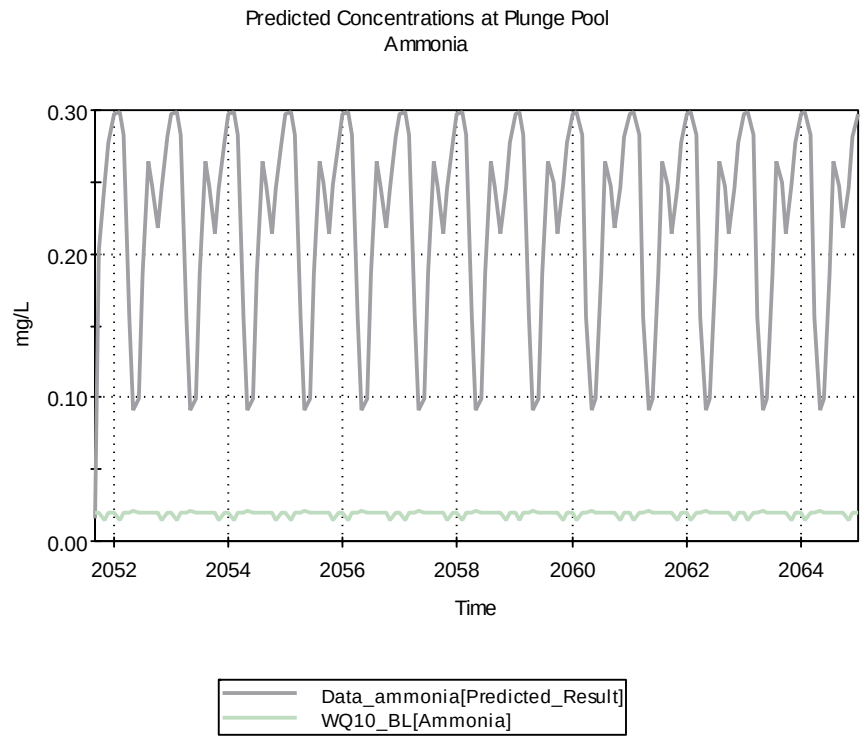
WQ10 - Best estimates (Construction, Operation,Closure)

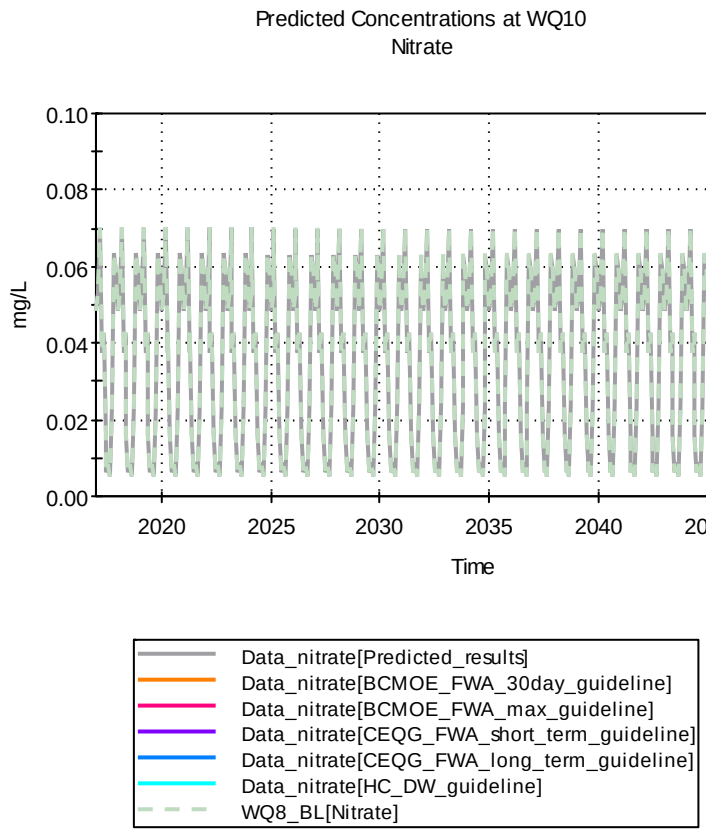


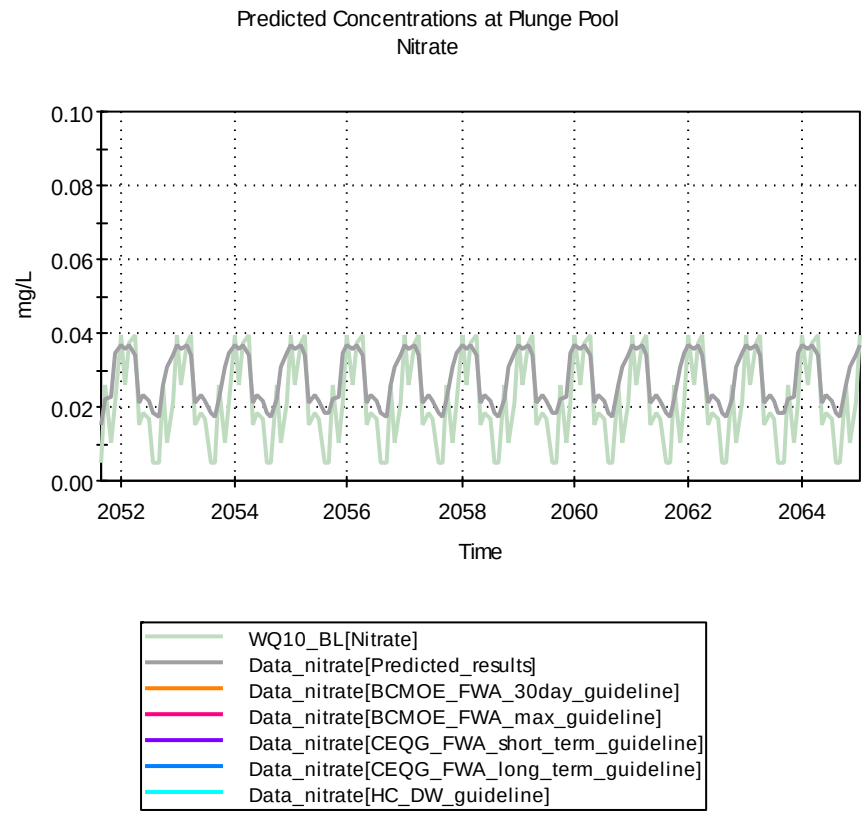
Plunge Pool – Best estimates (Post-closure)



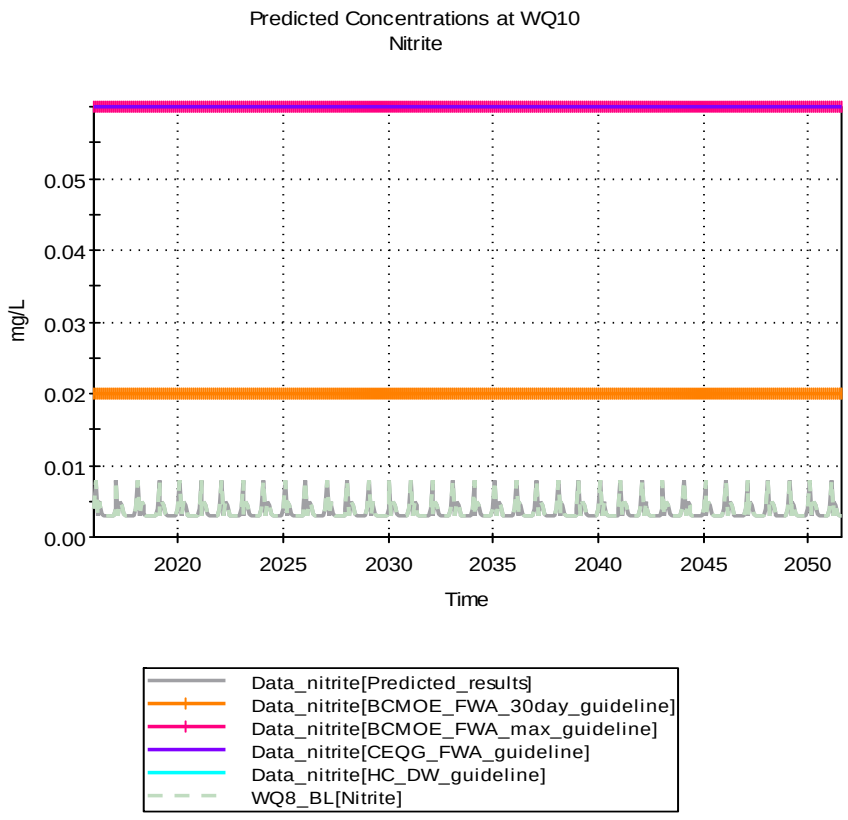




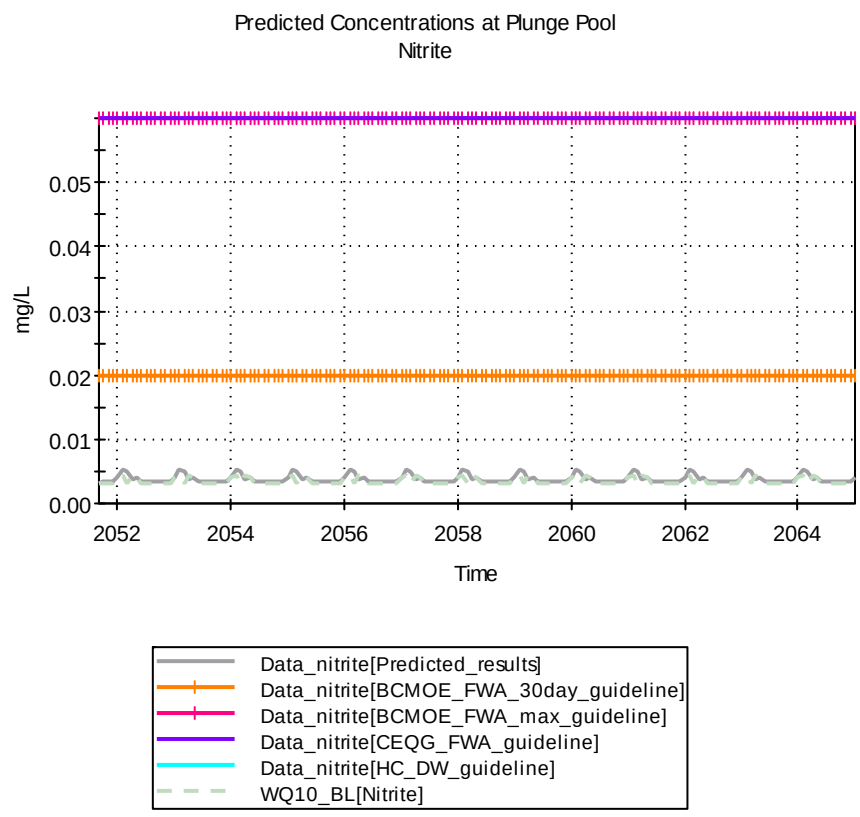


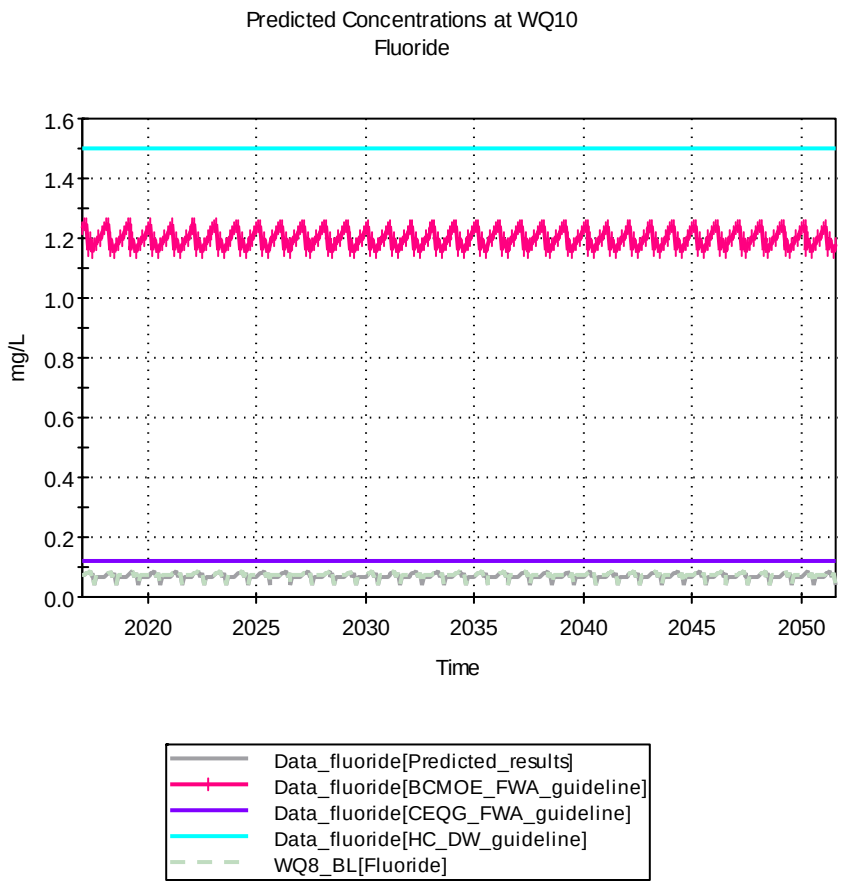


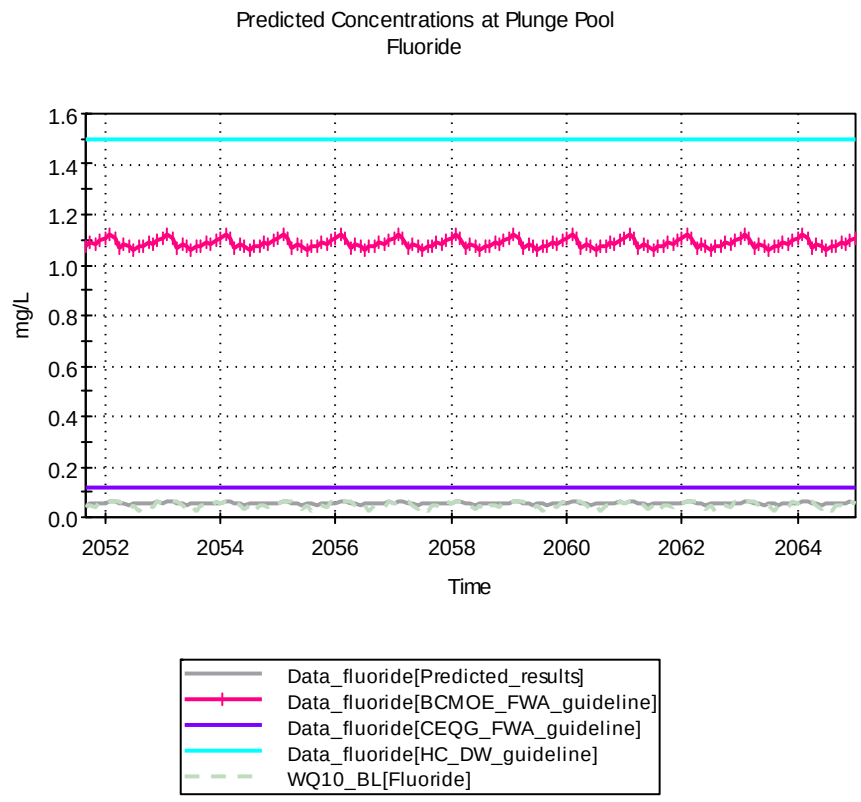
WQ10 - Best estimates (Construction, Operation,Closure)

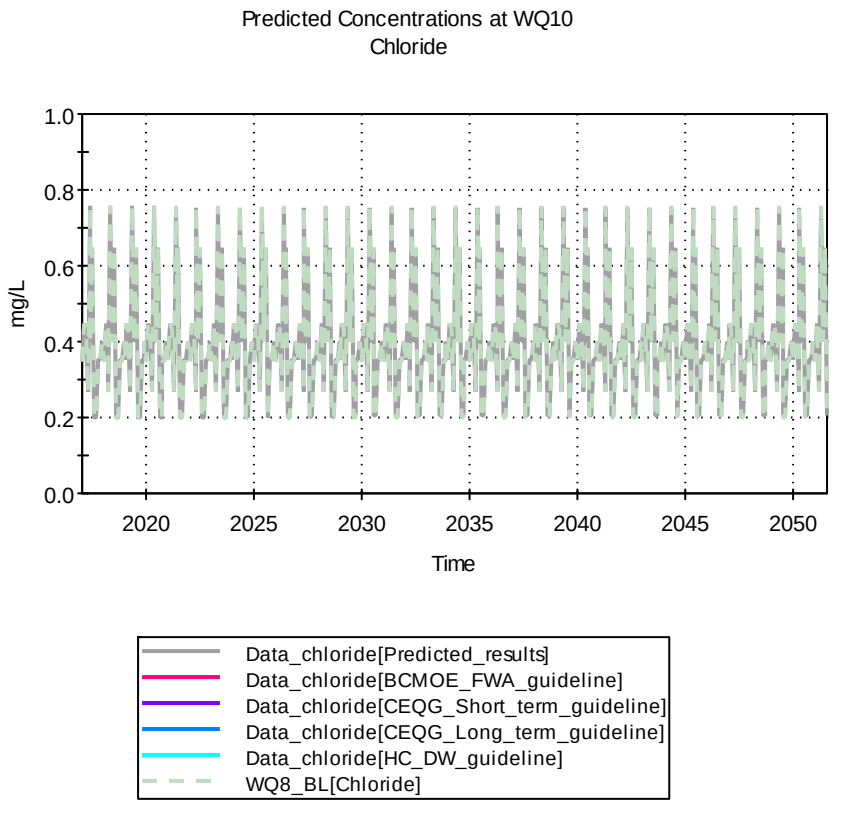


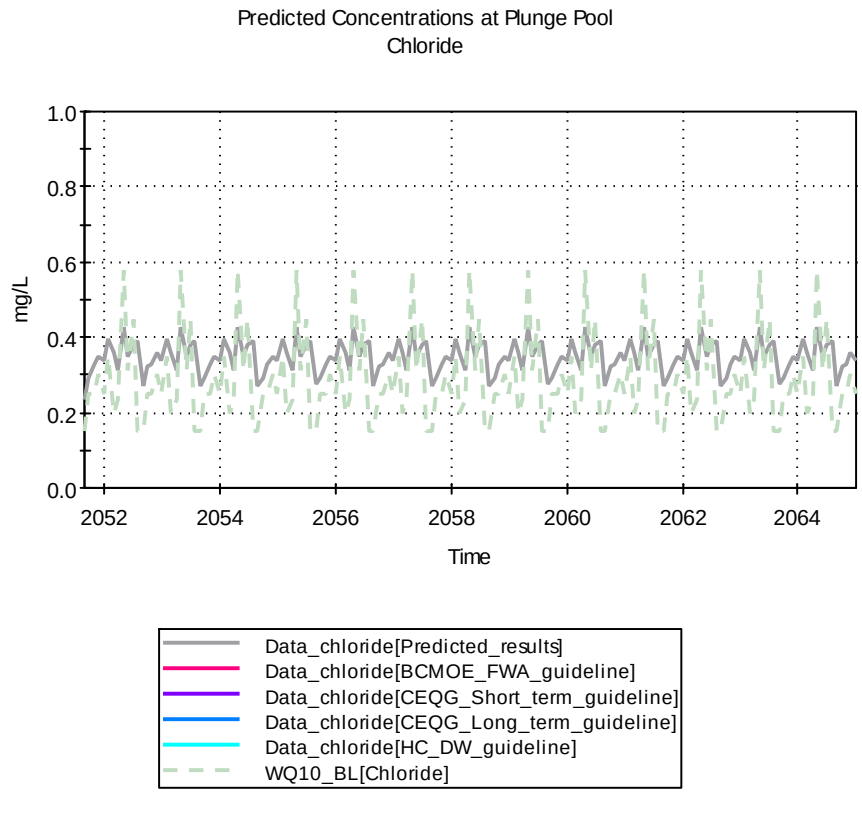
Plunge Pool – Best estimates (Post-closure)



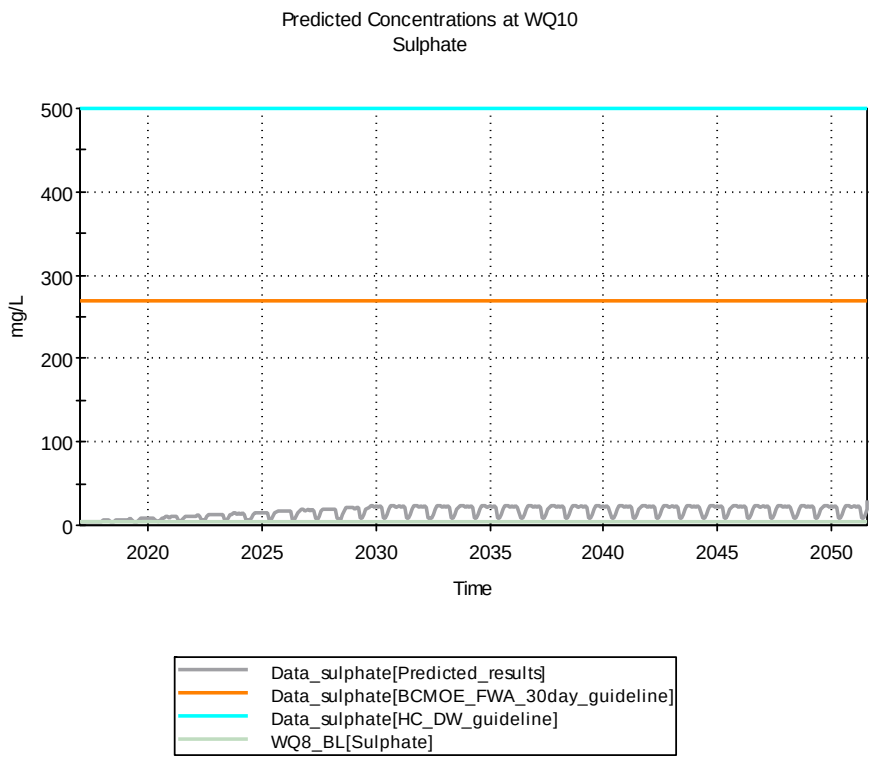


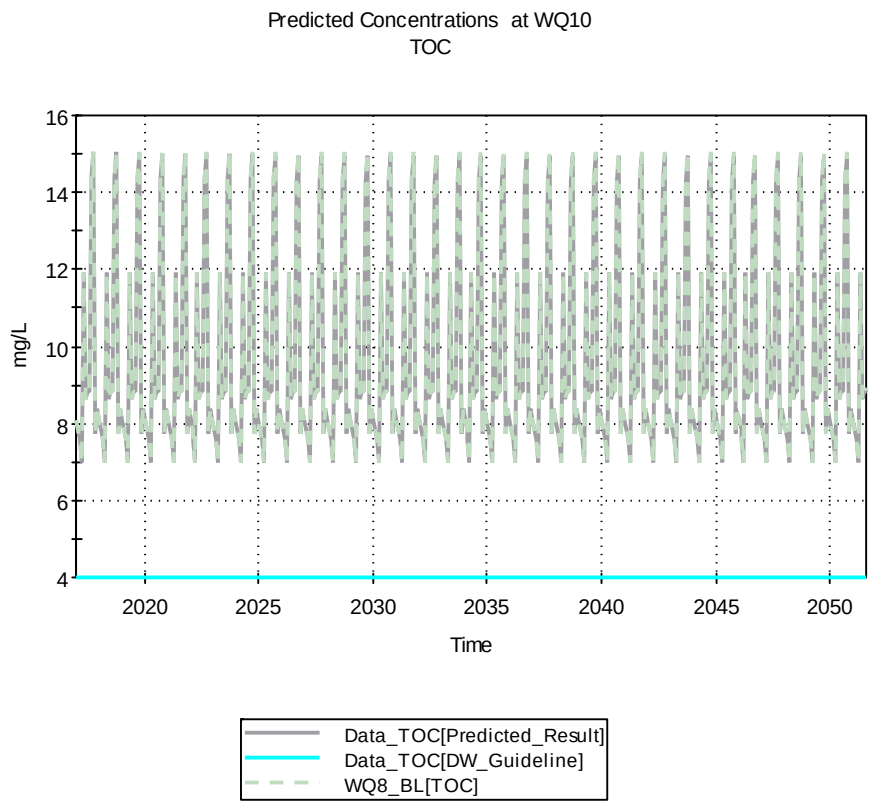


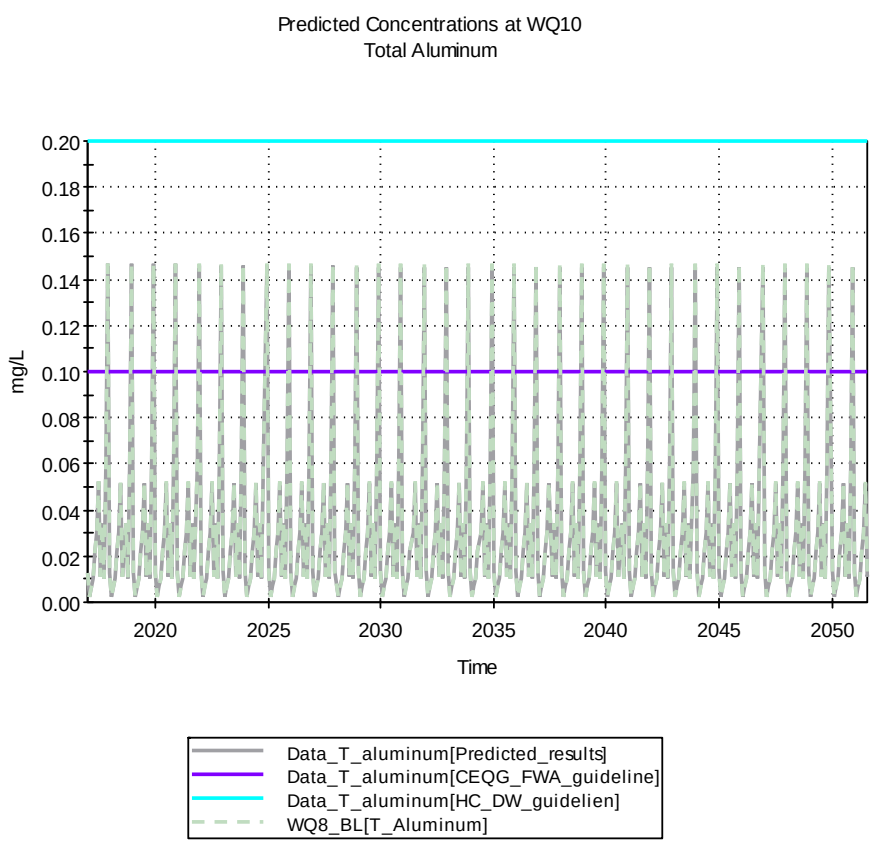




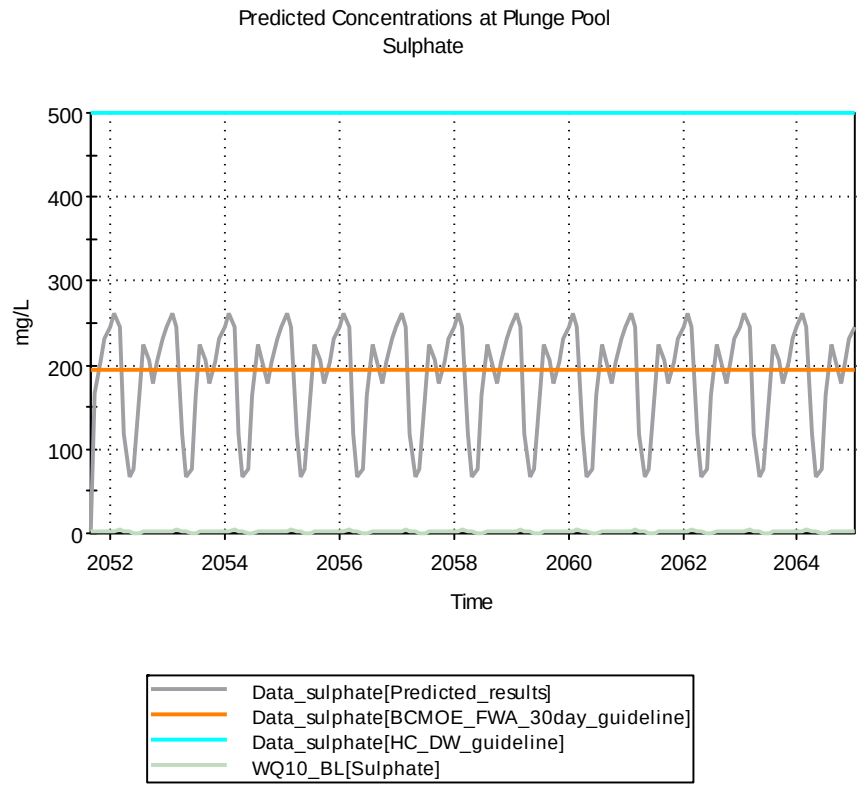
WQ10 - Best estimates (Construction, Operation,Closure)

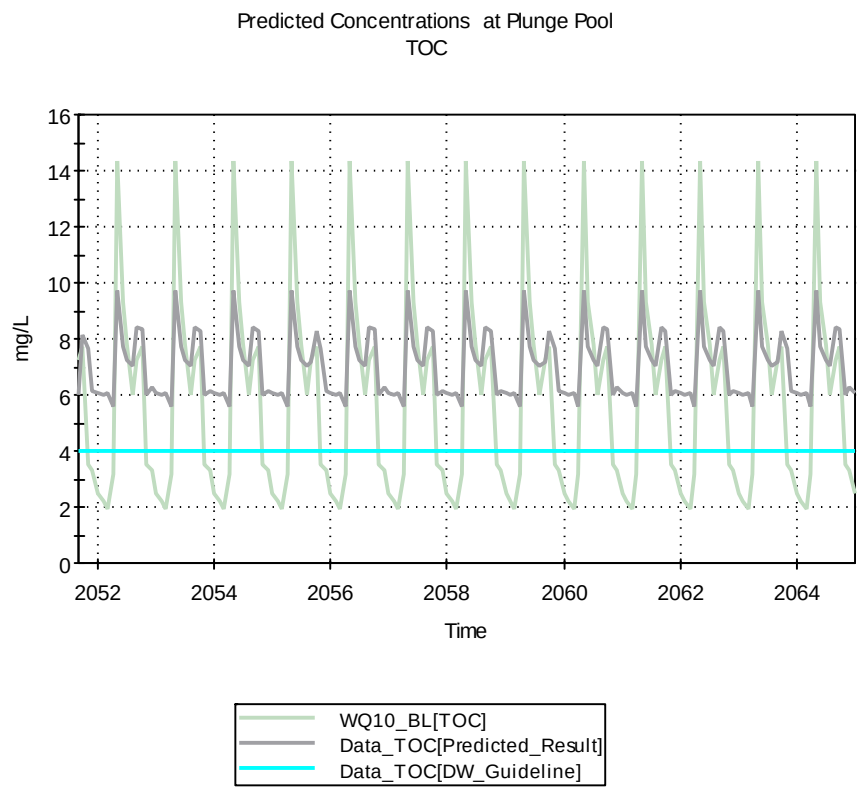


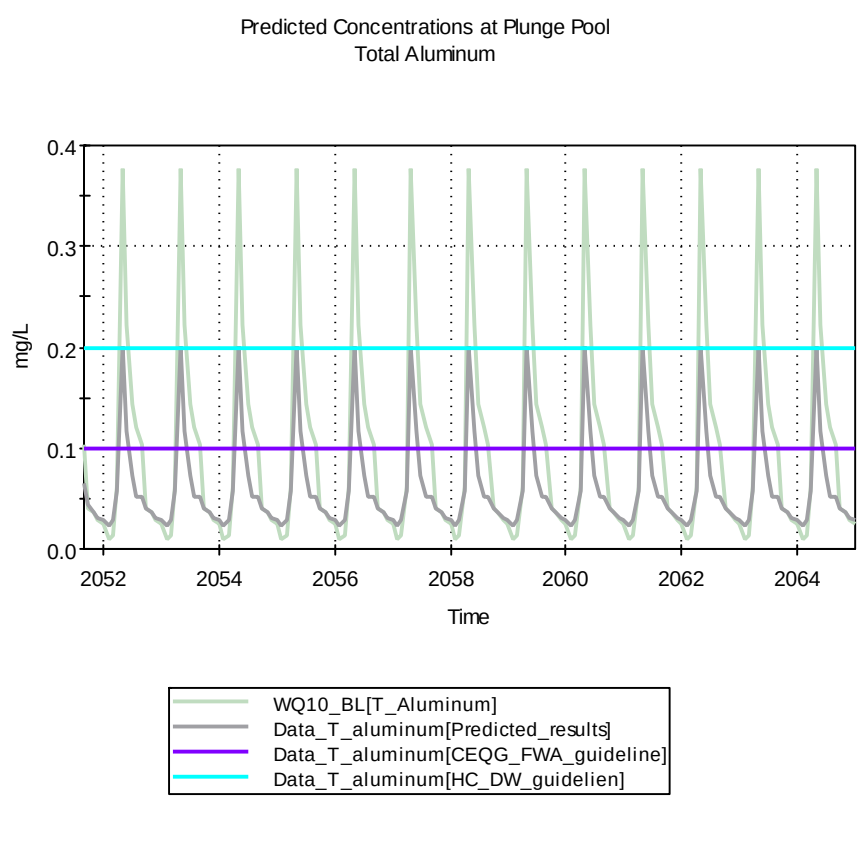




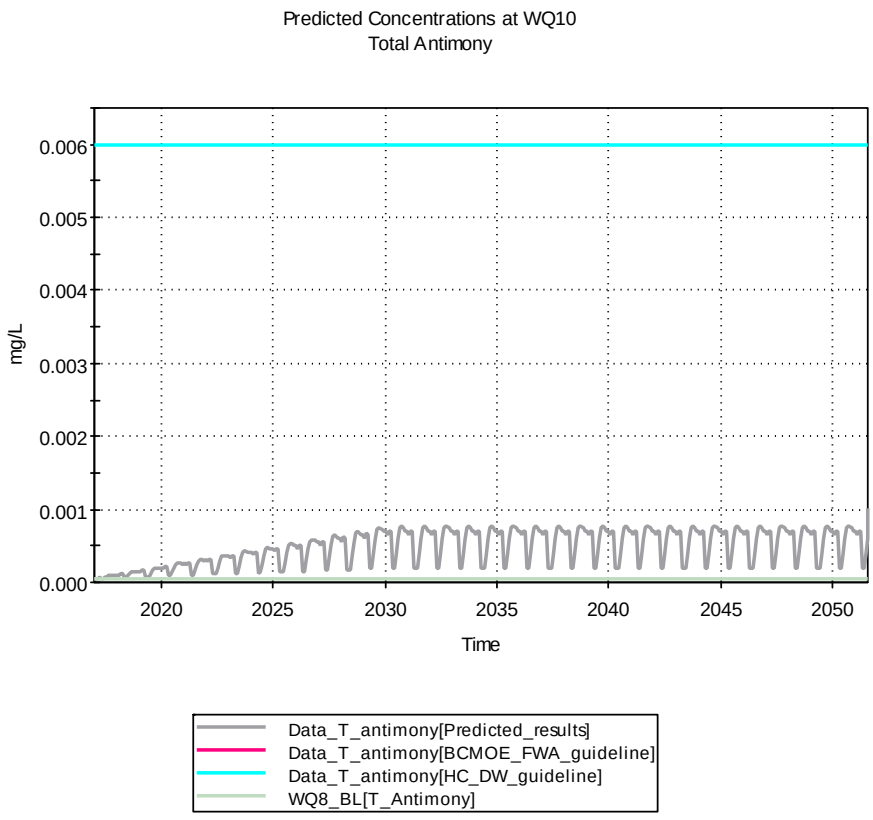
Plunge Pool – Best estimates (Post-closure)



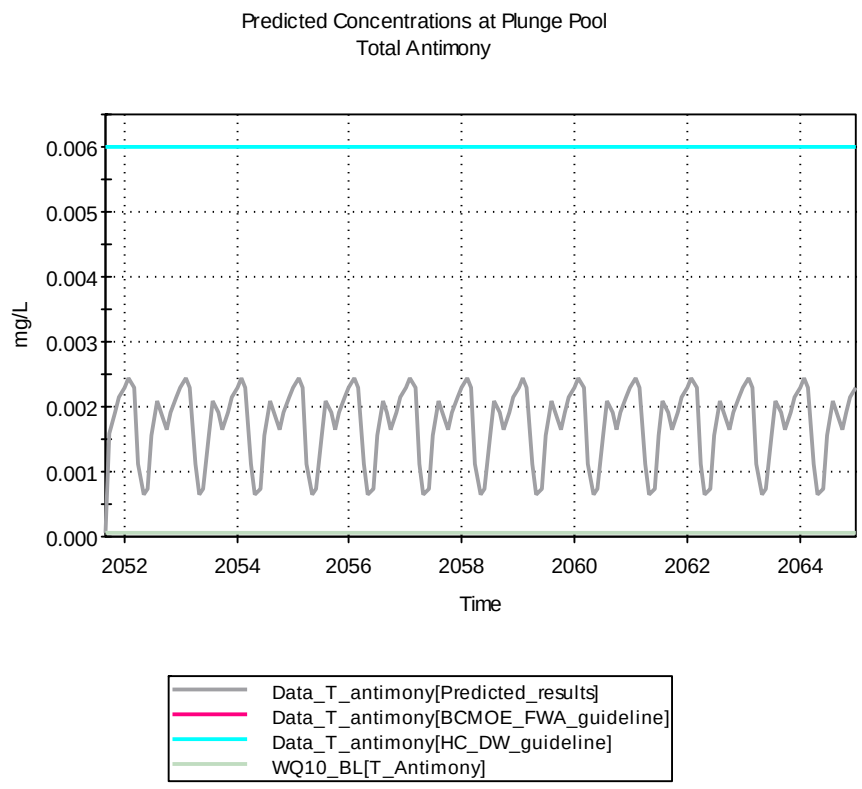


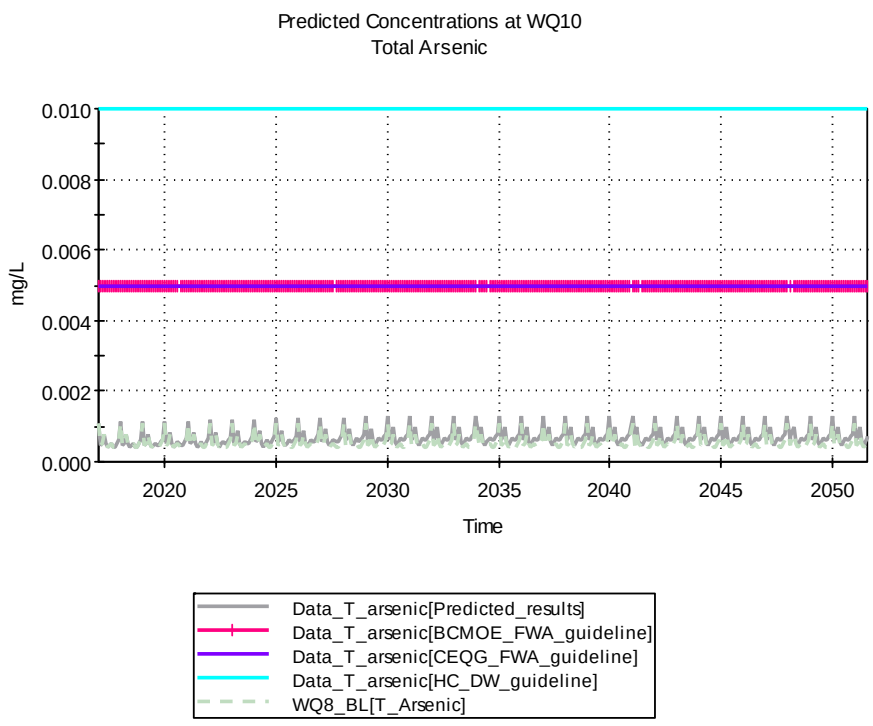


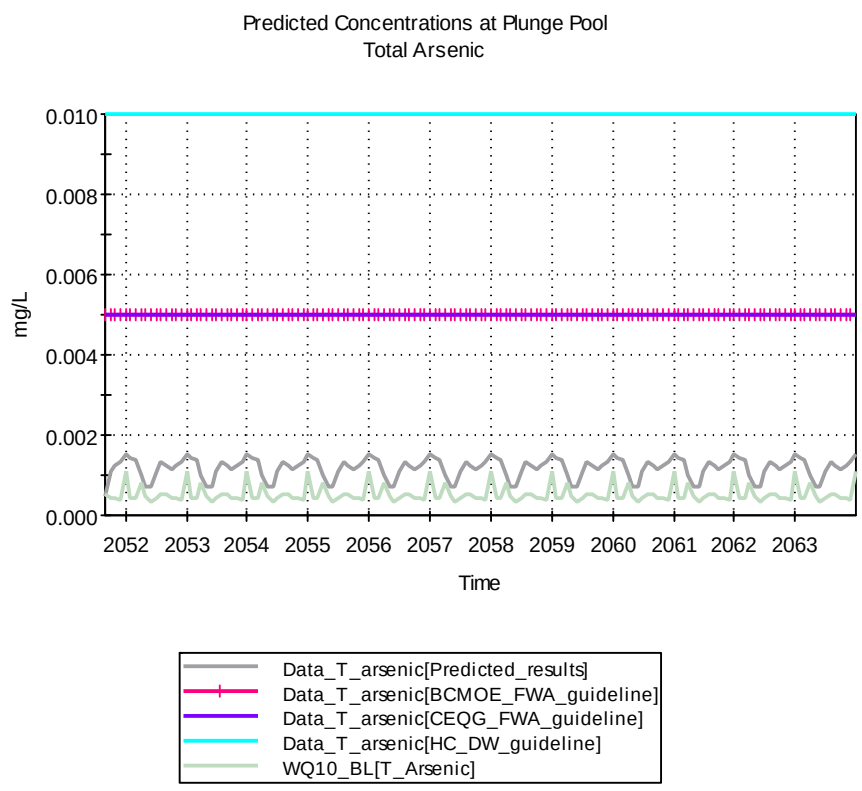
WQ10 - Best estimates (Construction, Operation,Closure)

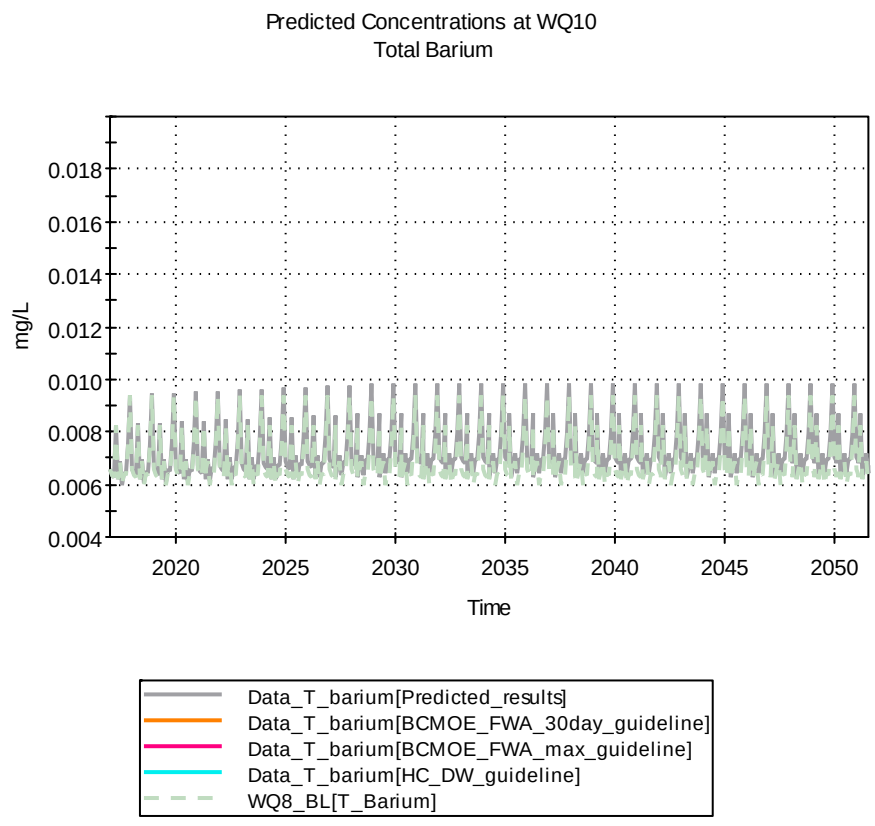


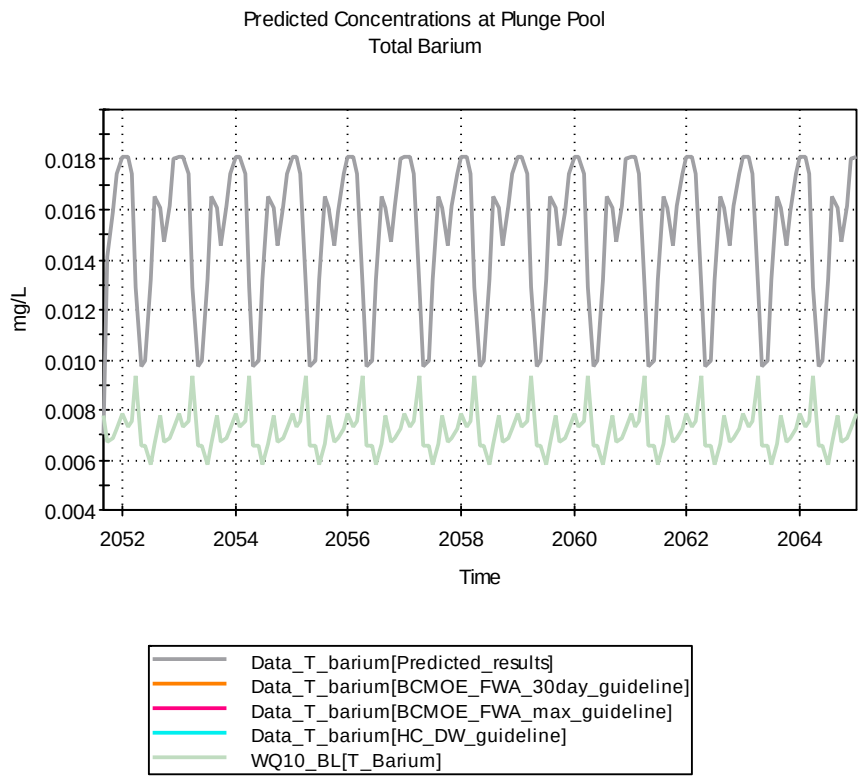
Plunge Pool – Best estimates (Post-closure)



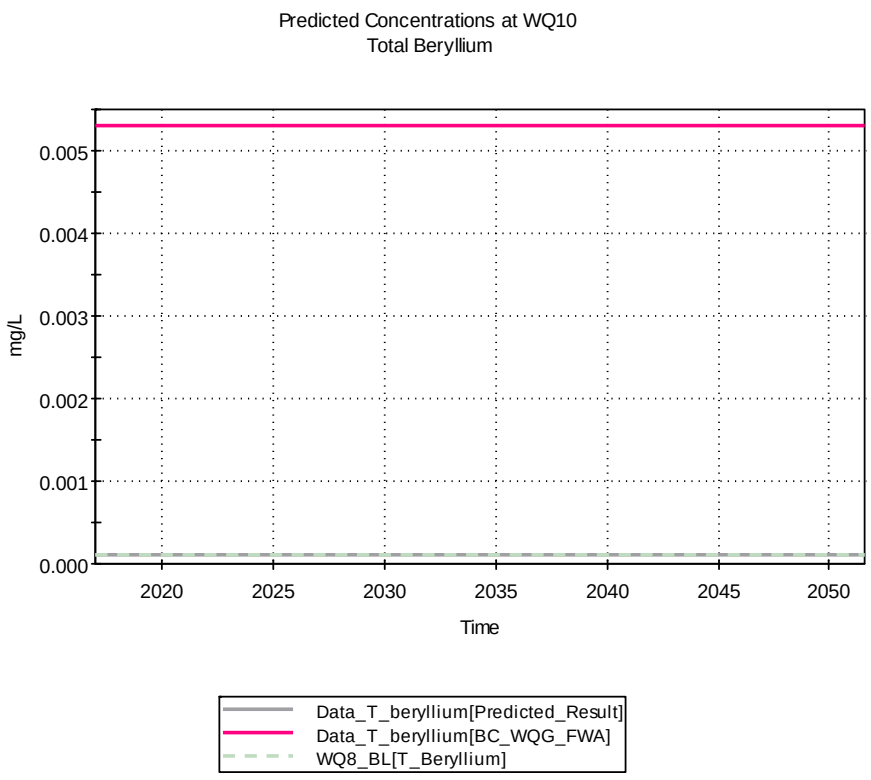


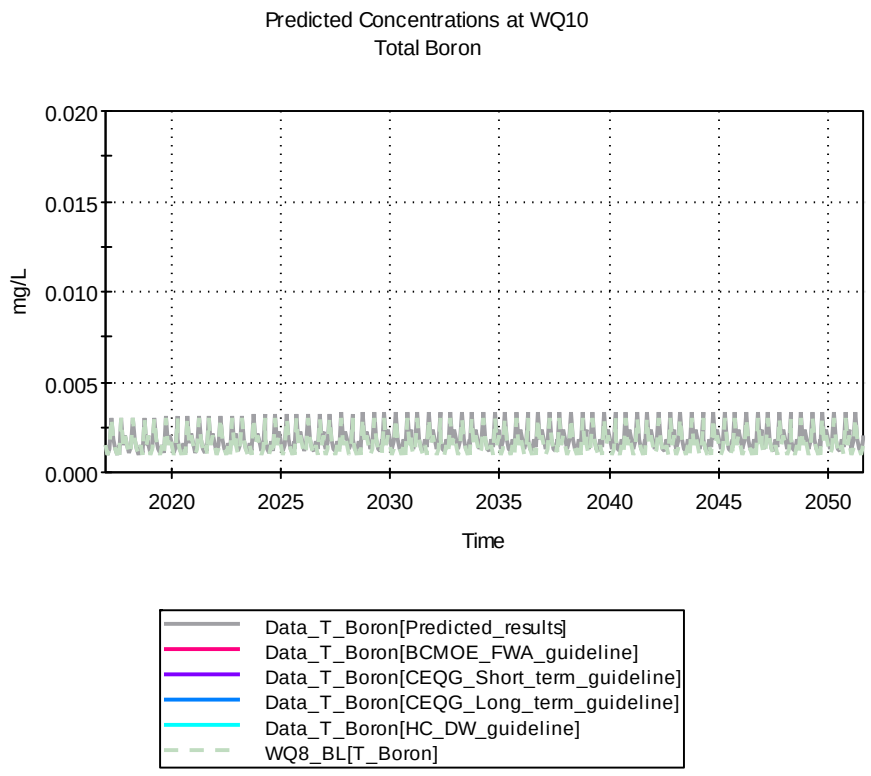


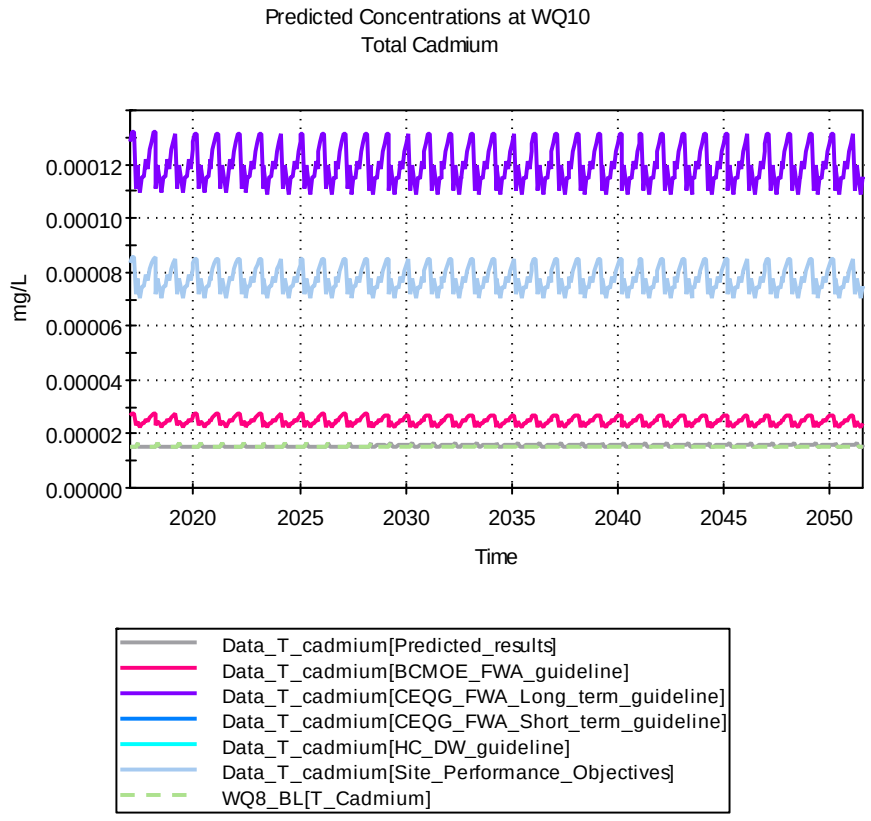




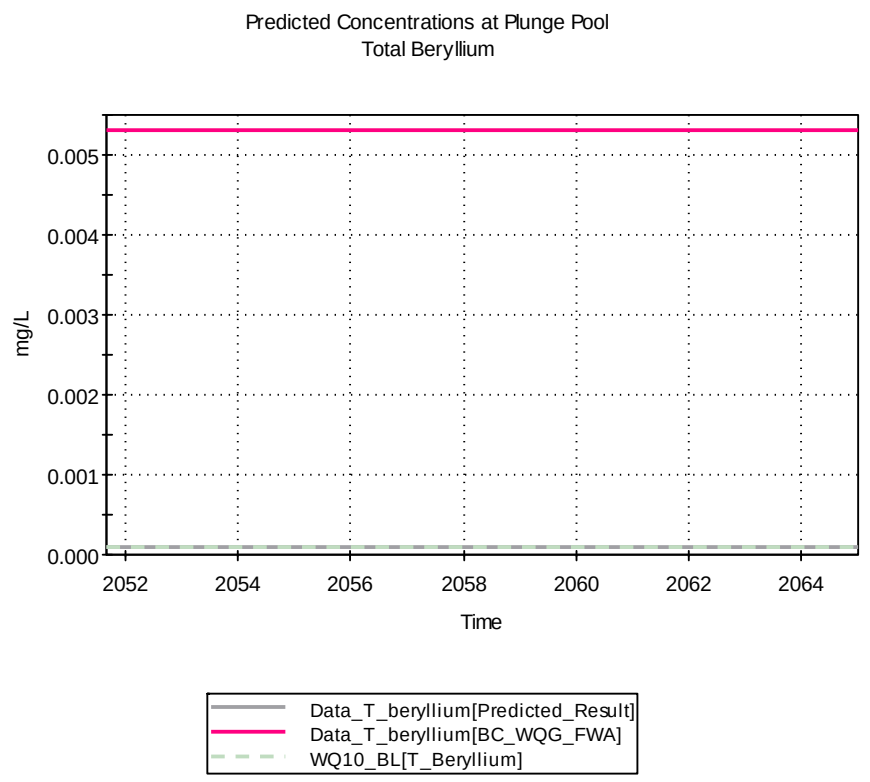
WQ10 - Best estimates (Construction, Operation,Closure)

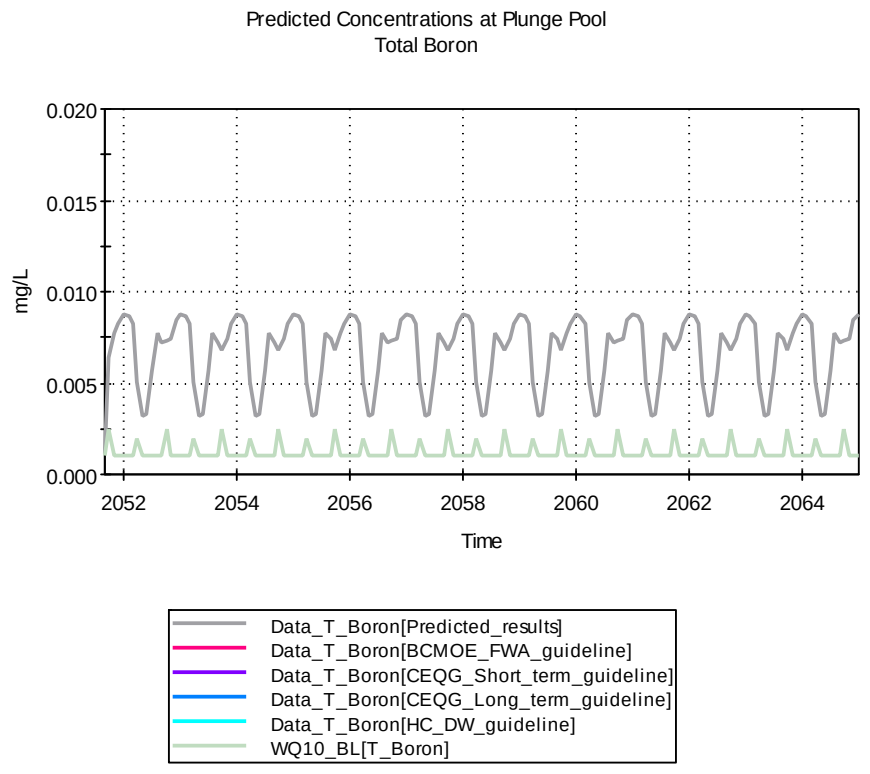


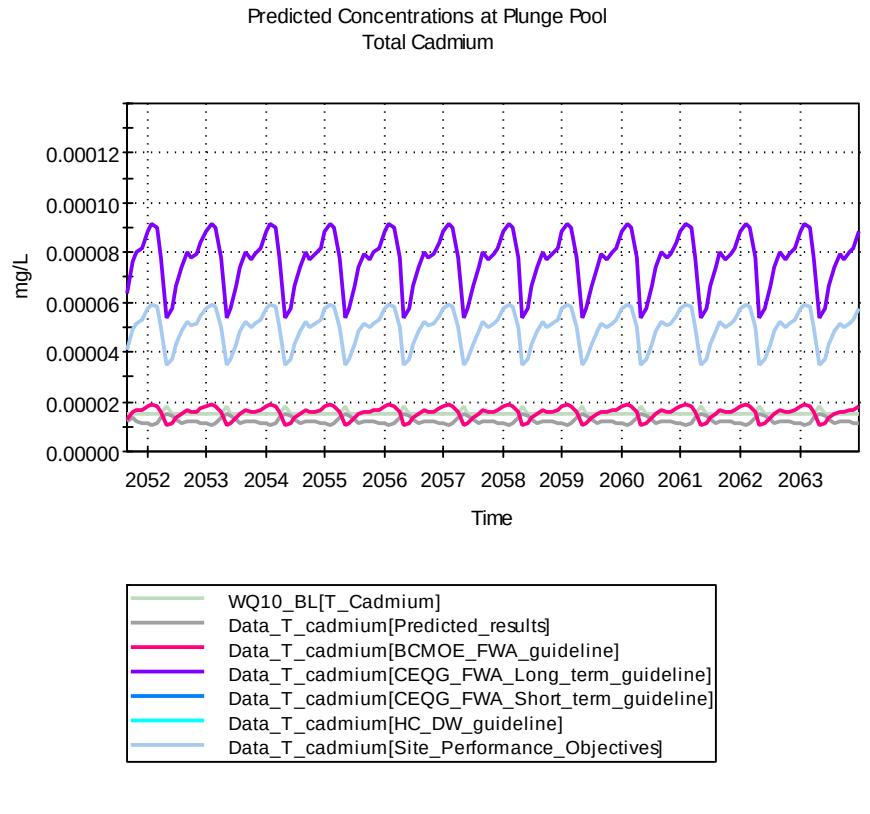




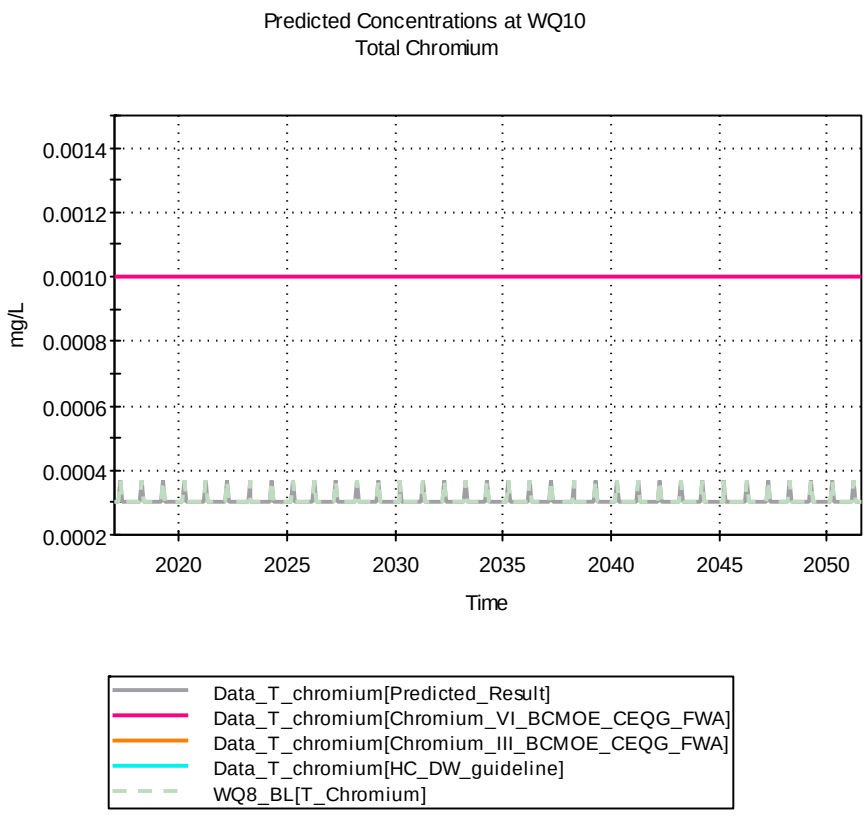
Plunge Pool – Best estimates (Post-closure)

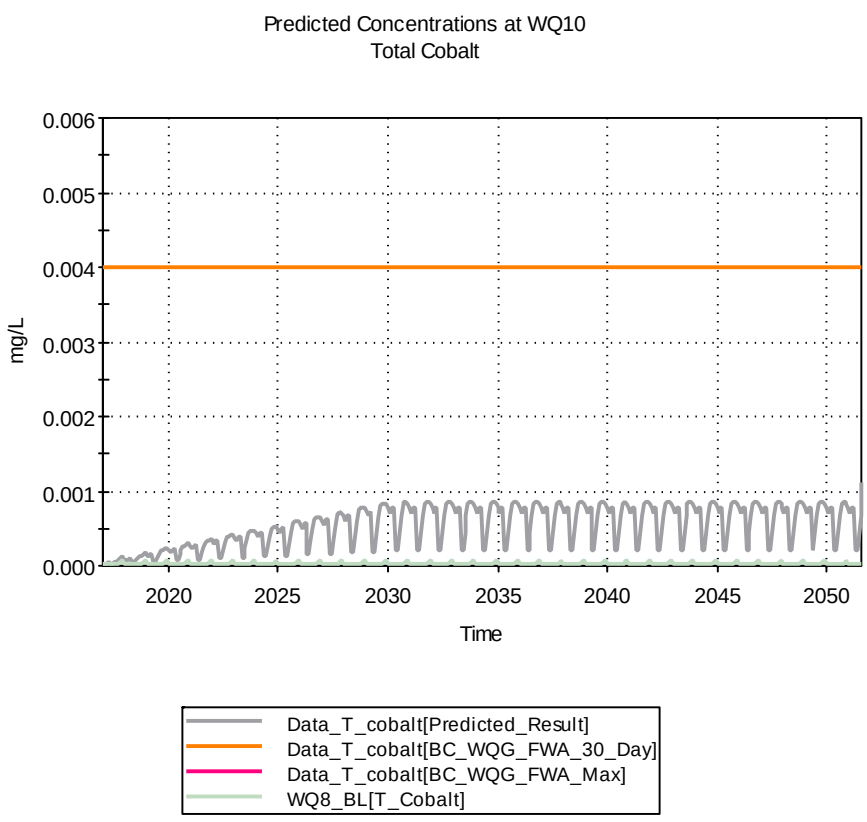


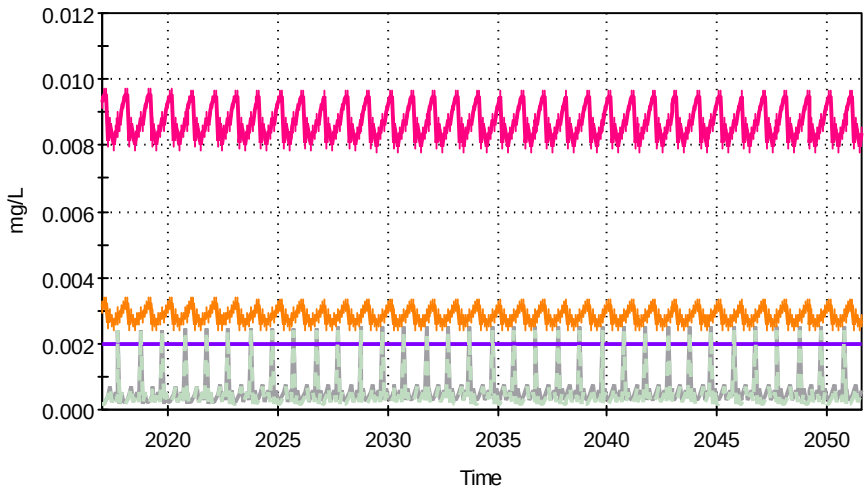




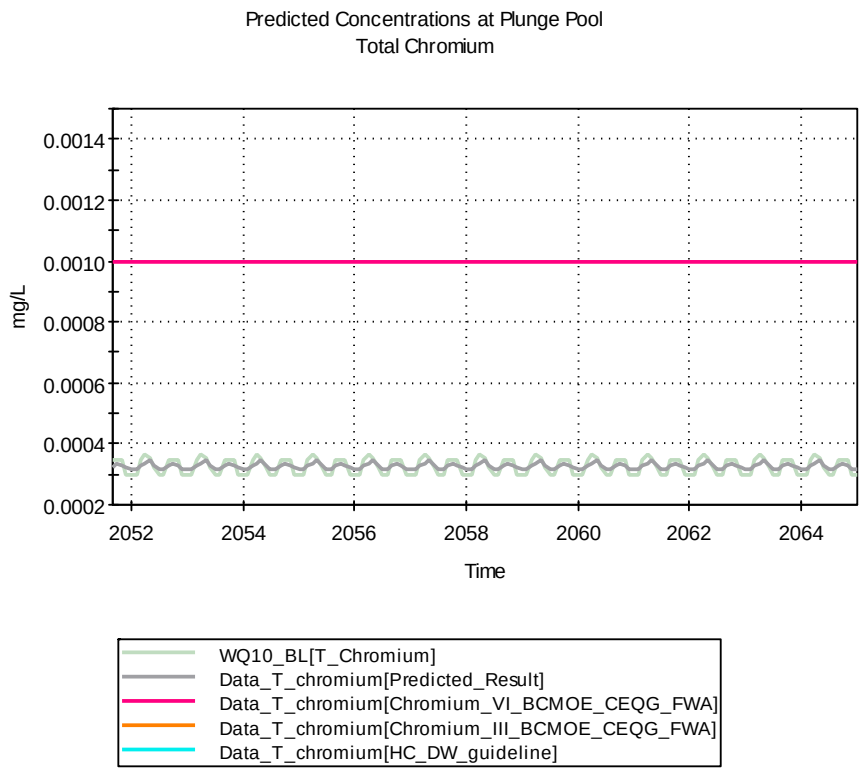
WQ10 - Best estimates (Construction, Operation,Closure)

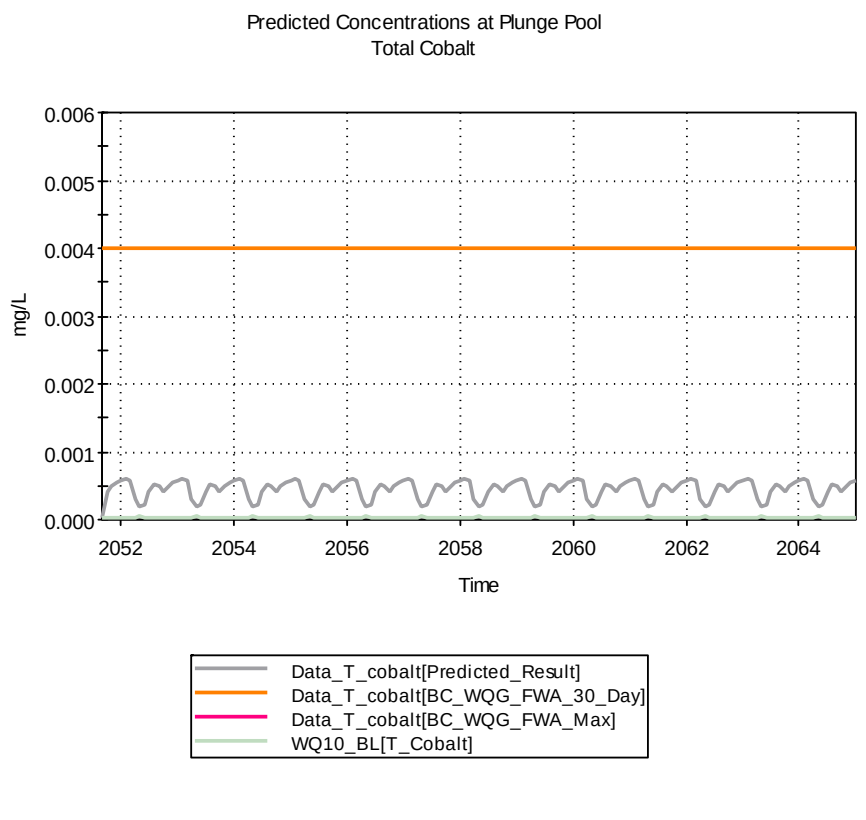


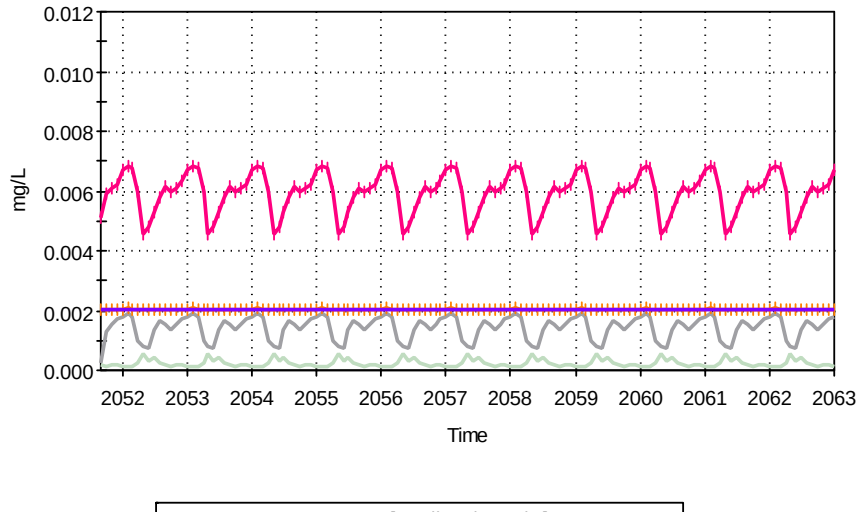




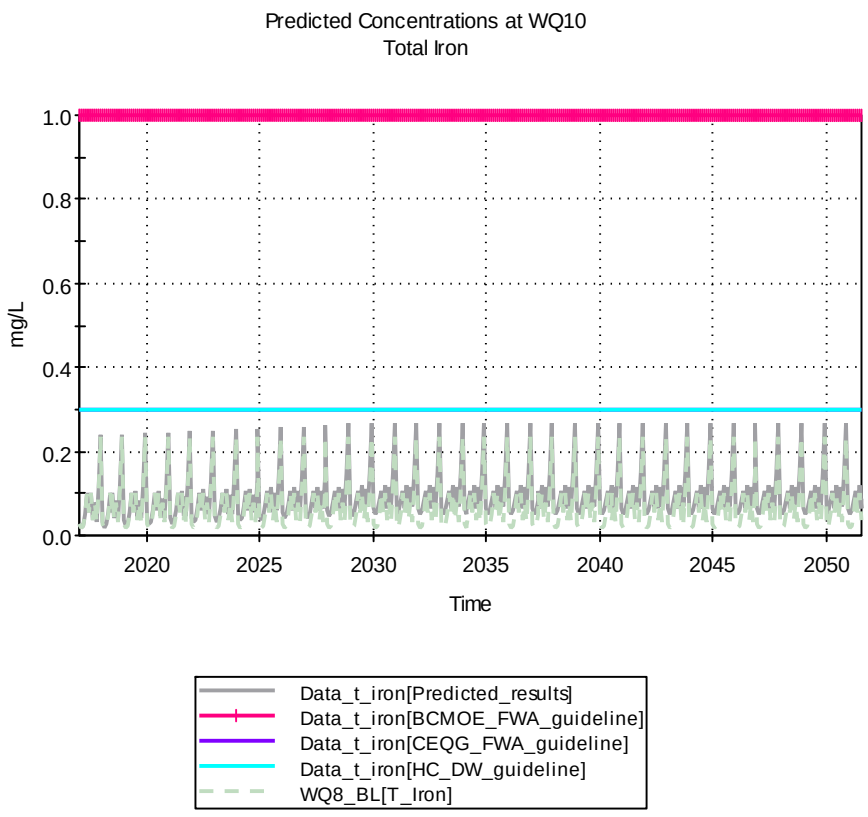
Plunge Pool – Best estimates (Post-closure)

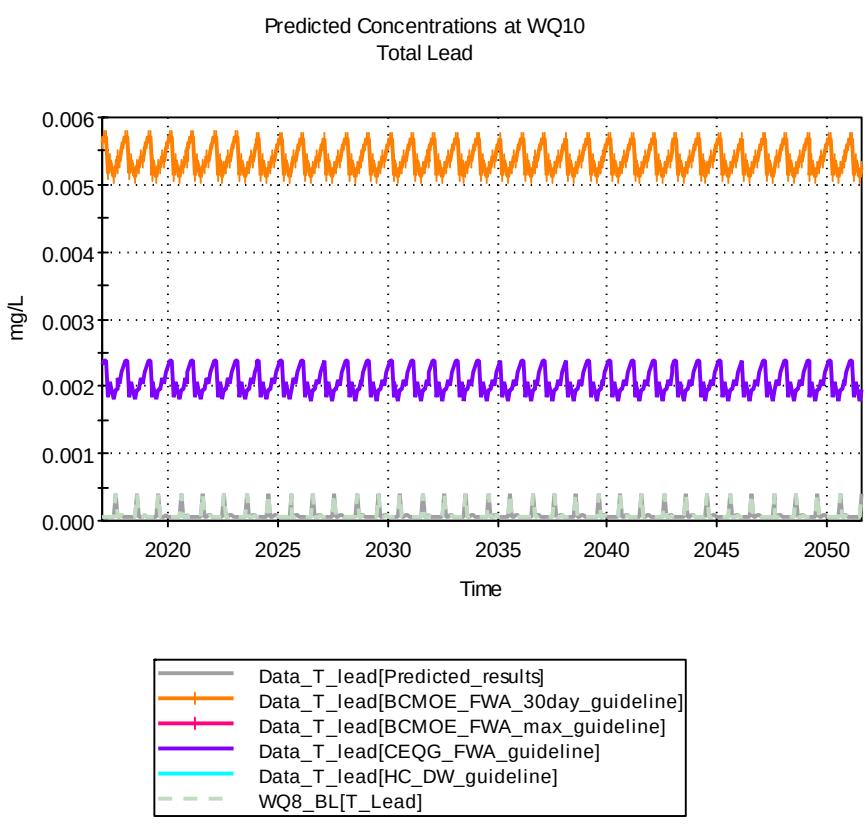


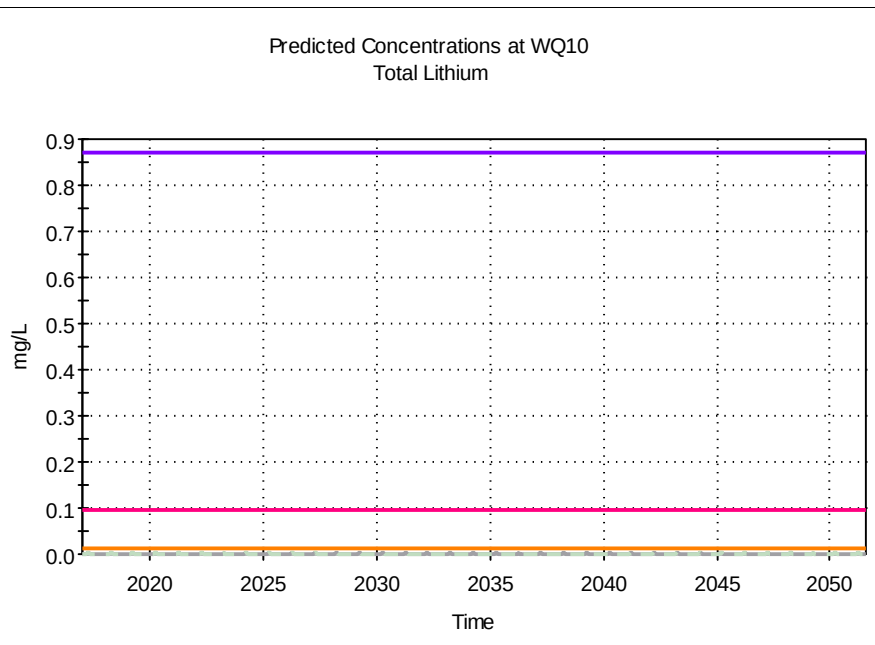




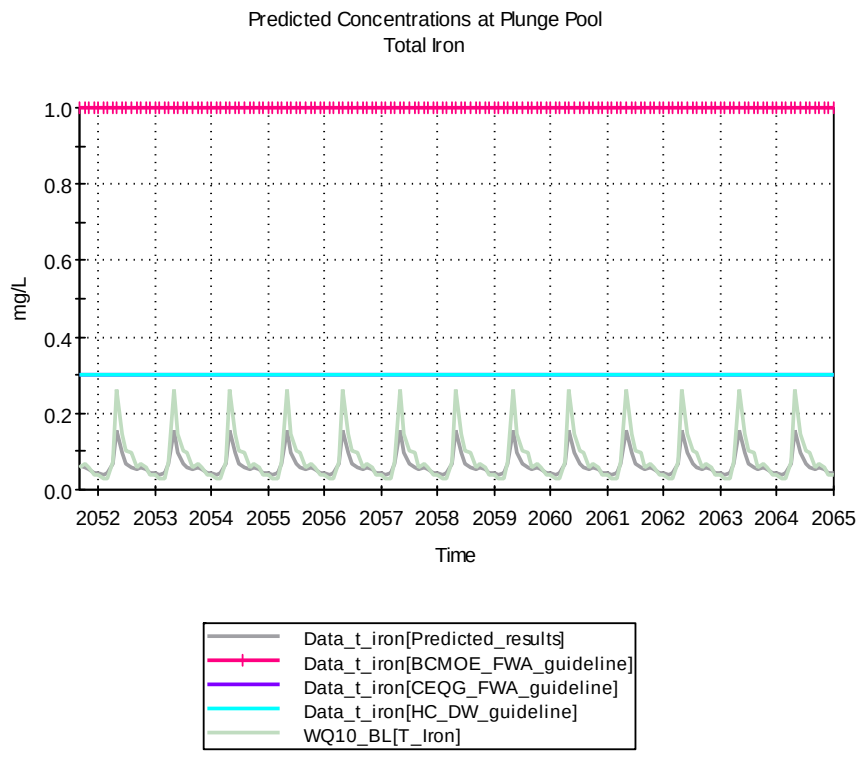
WQ10 - Best estimates (Construction, Operation,Closure)

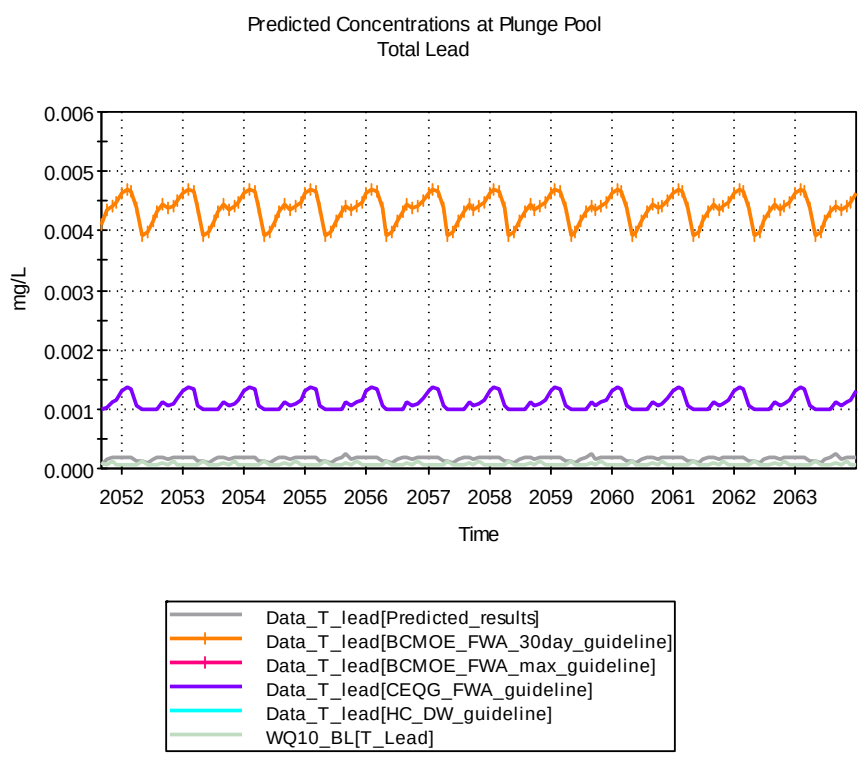


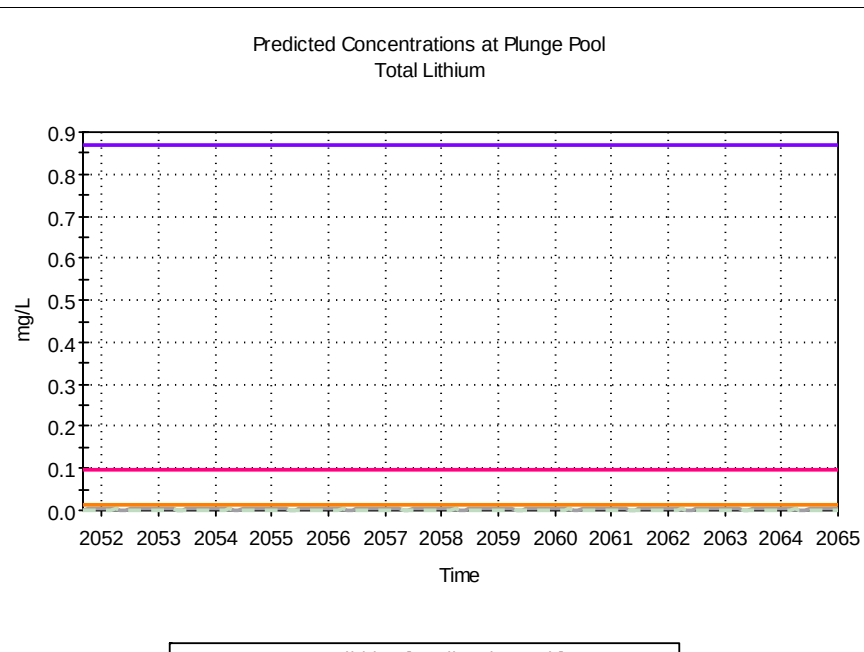




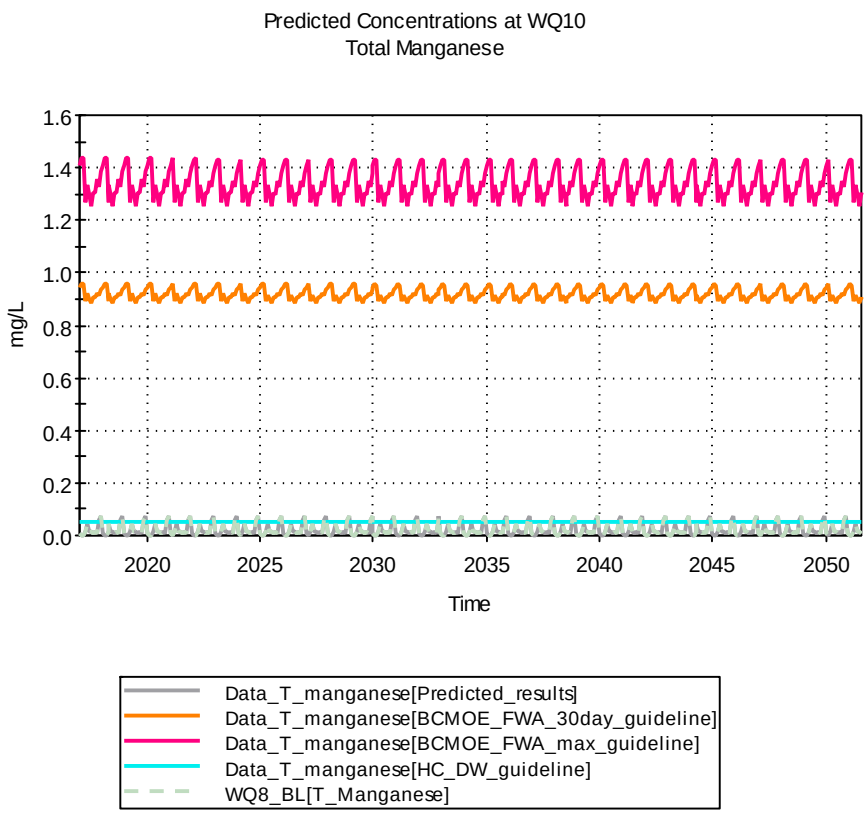
Plunge Pool – Best estimates (Post-closure)



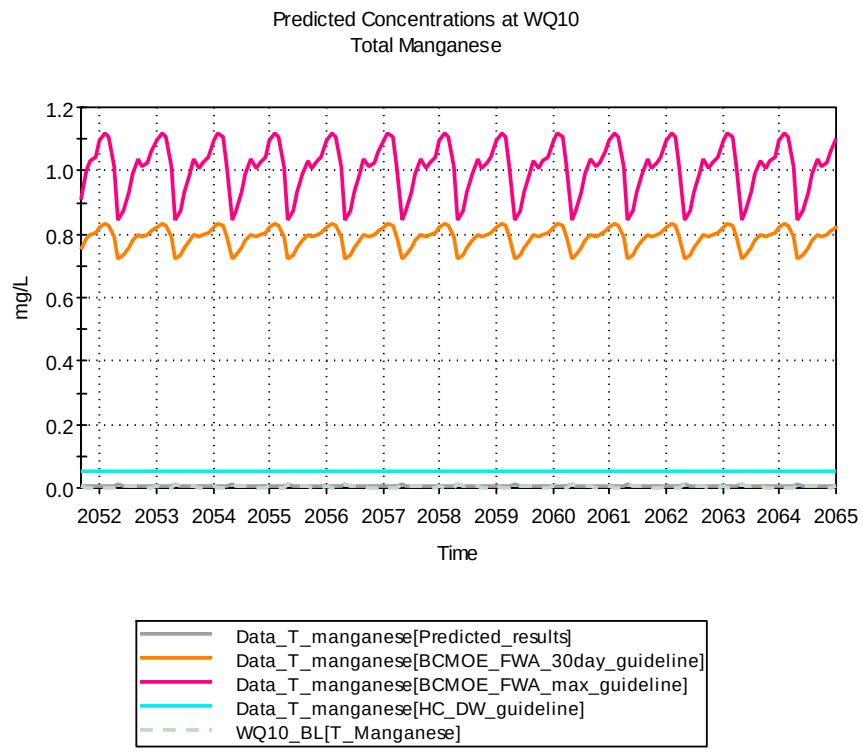


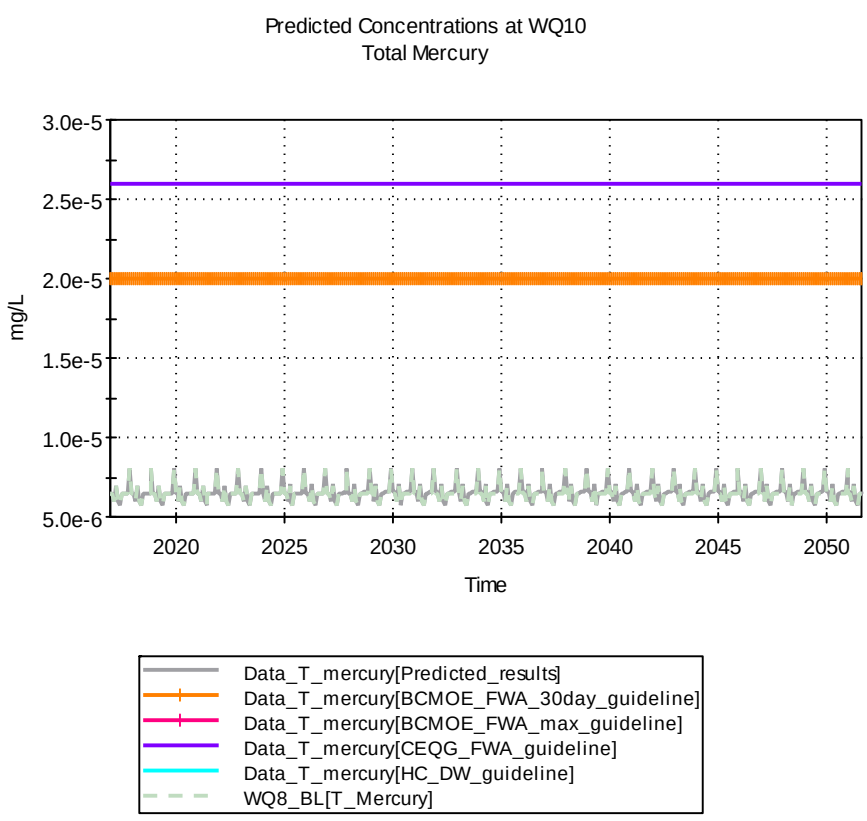


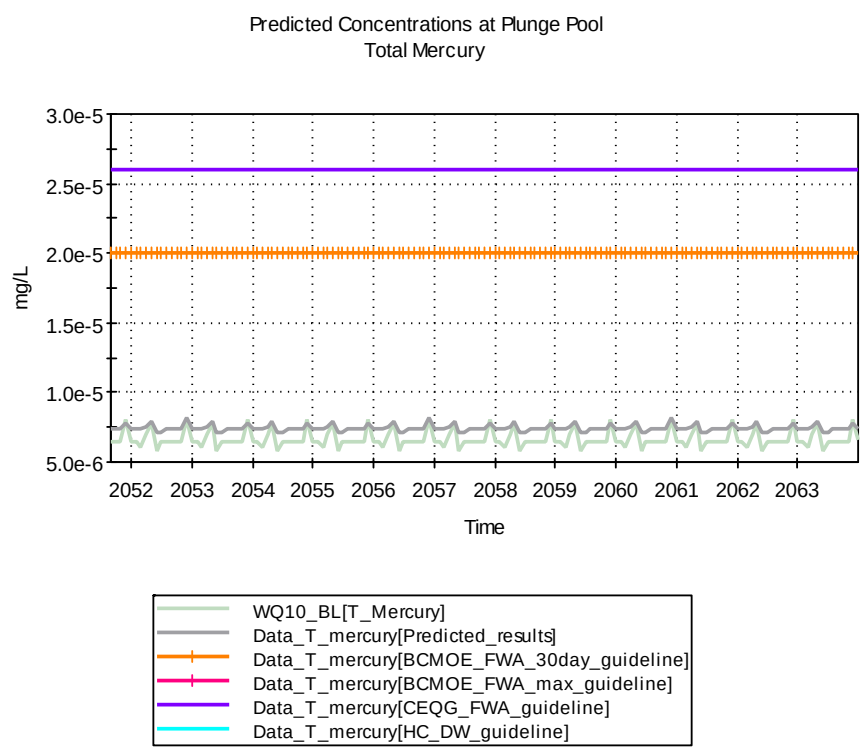
WQ10 - Best estimates (Construction, Operation,Closure)

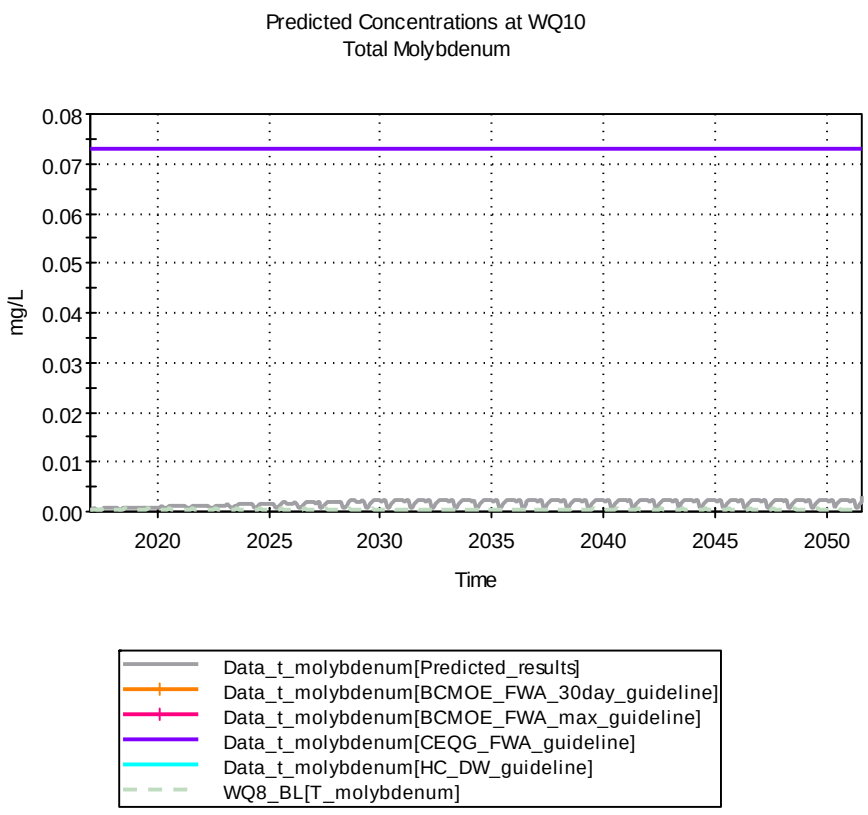


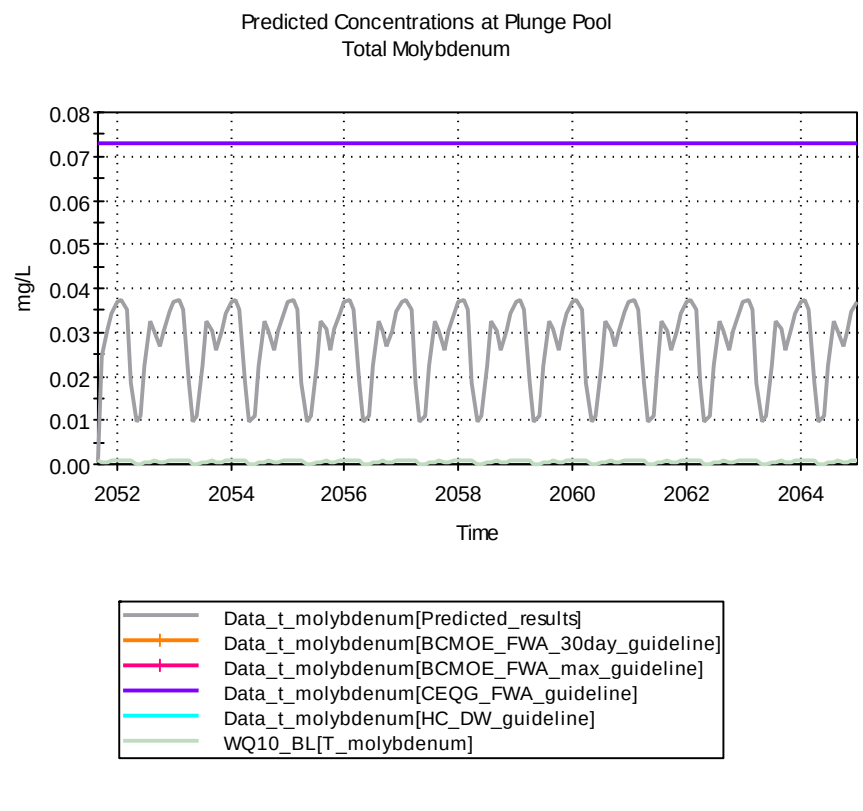
Plunge Pool – Best estimates (Post-closure)



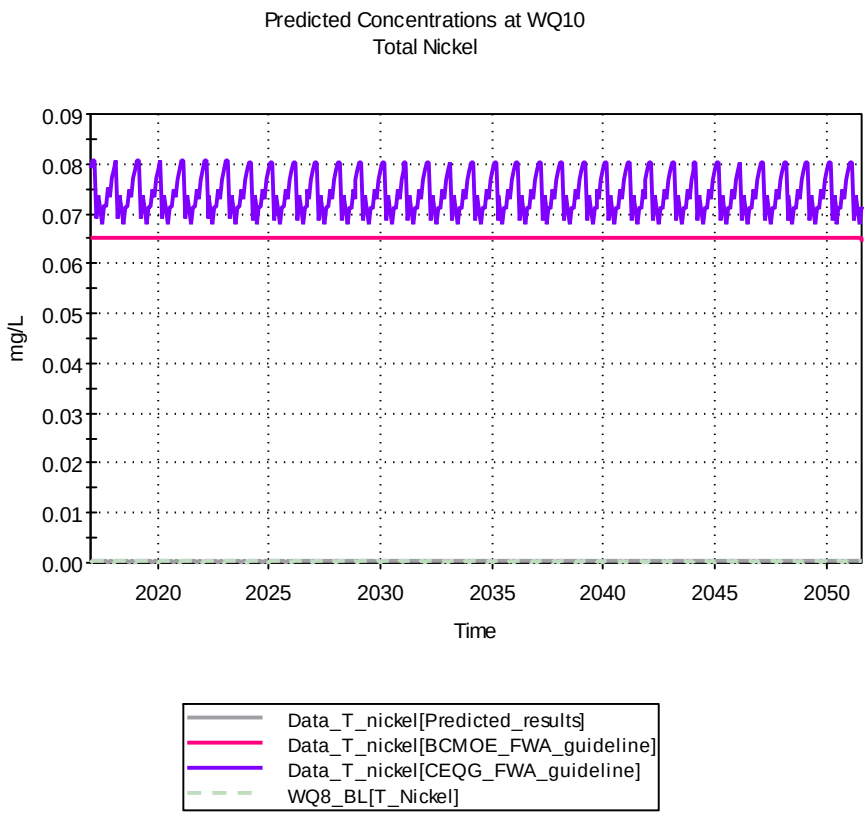








WQ10 - Best estimates (Construction, Operation,Closure)



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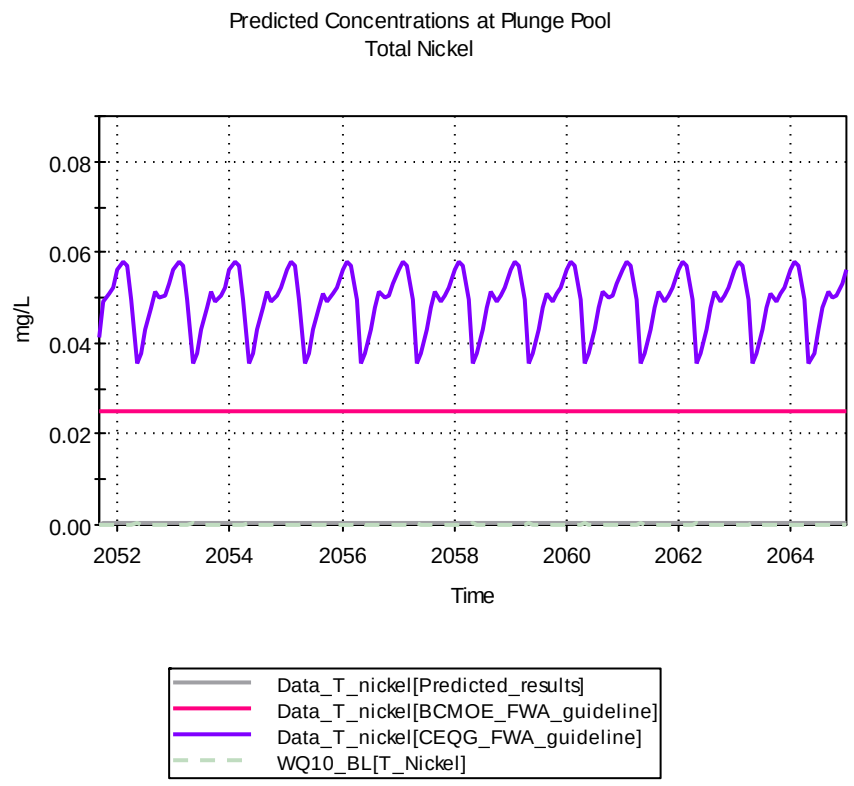

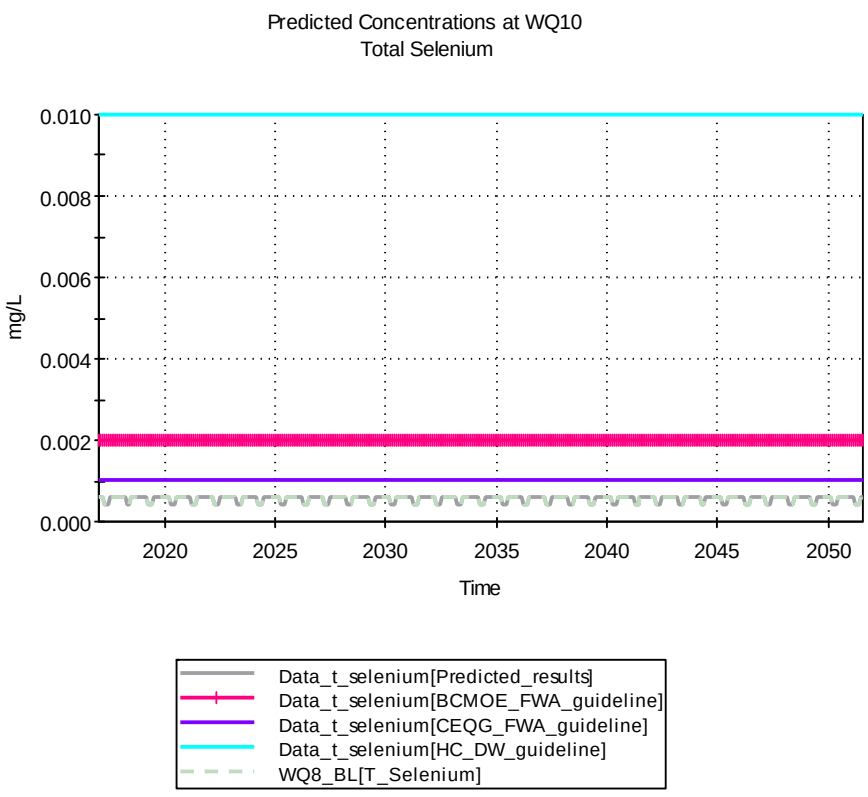

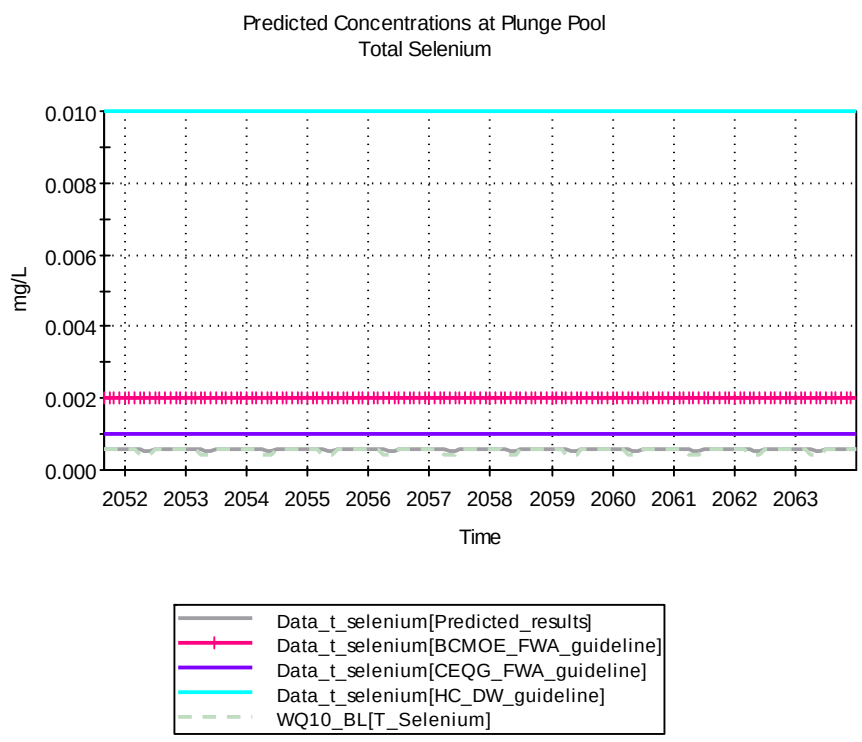

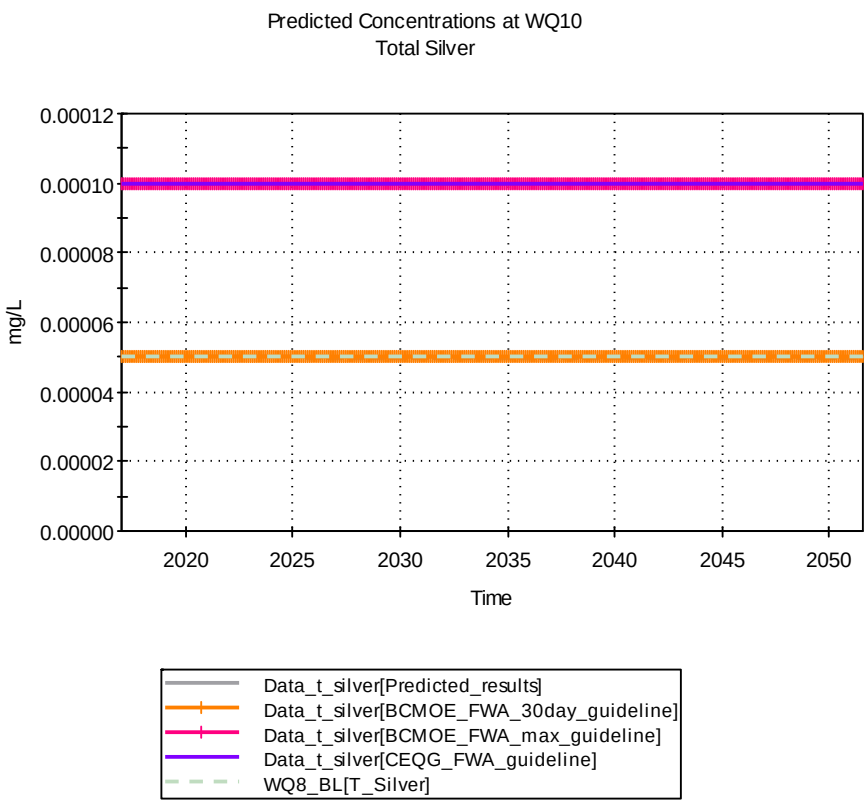

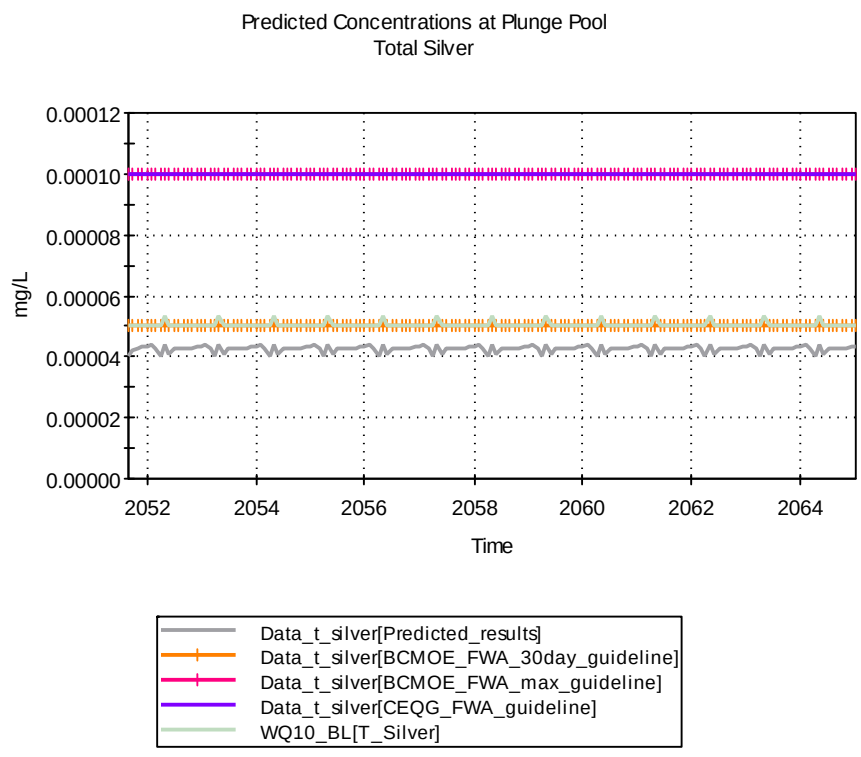

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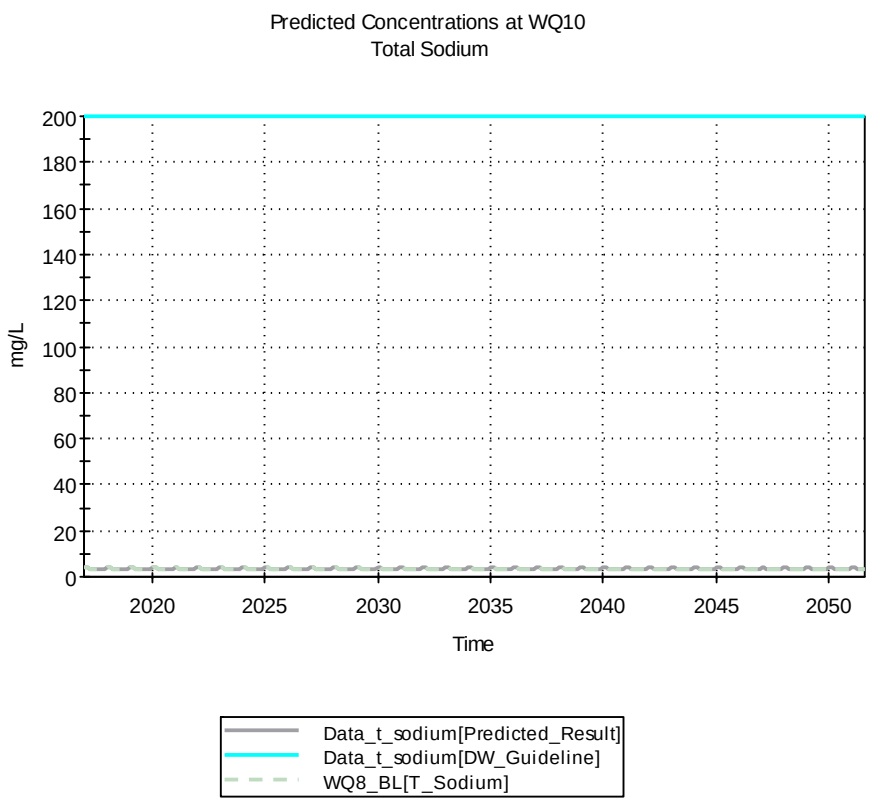
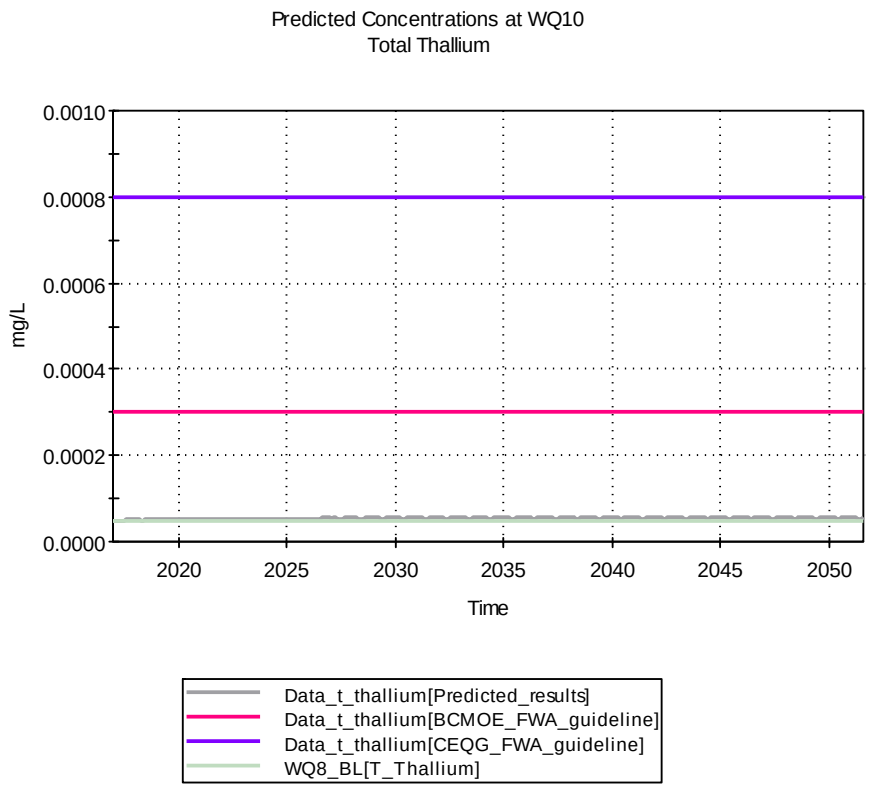
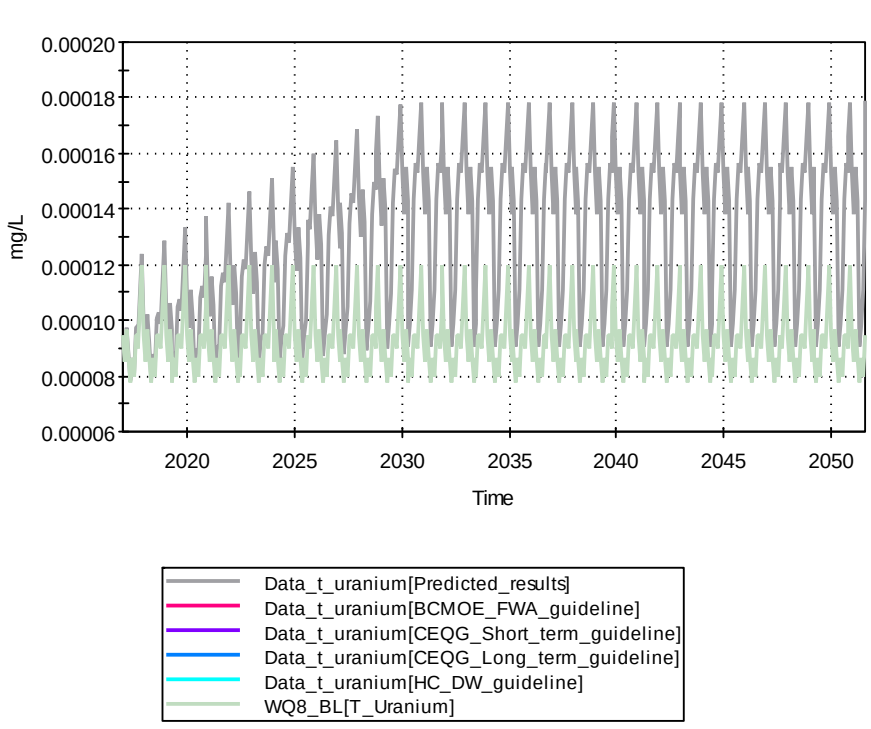
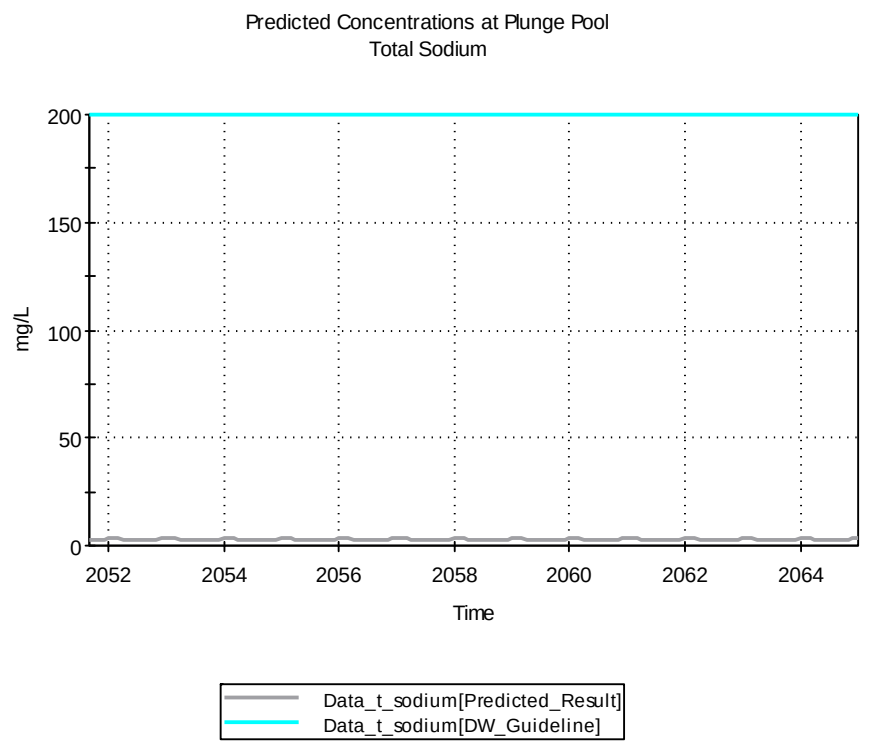
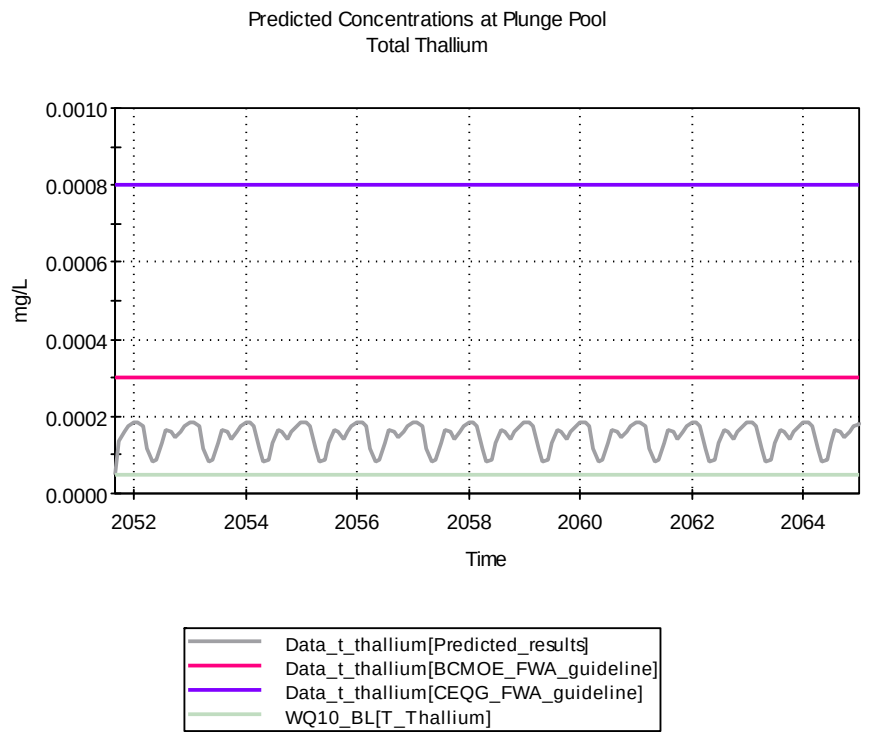


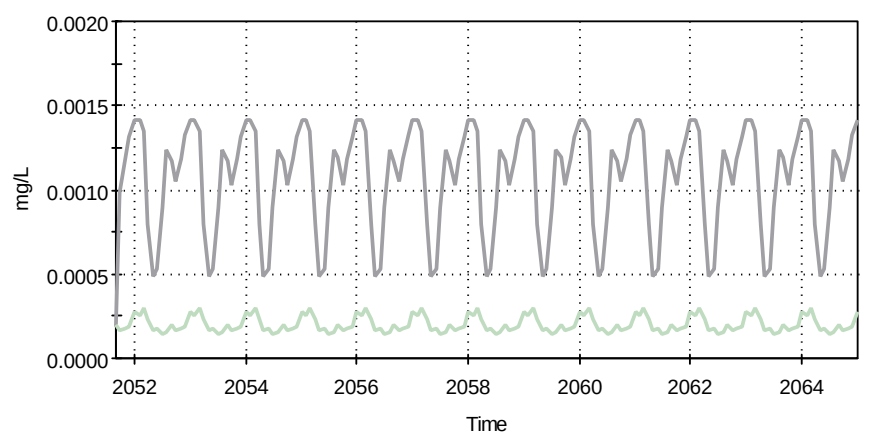




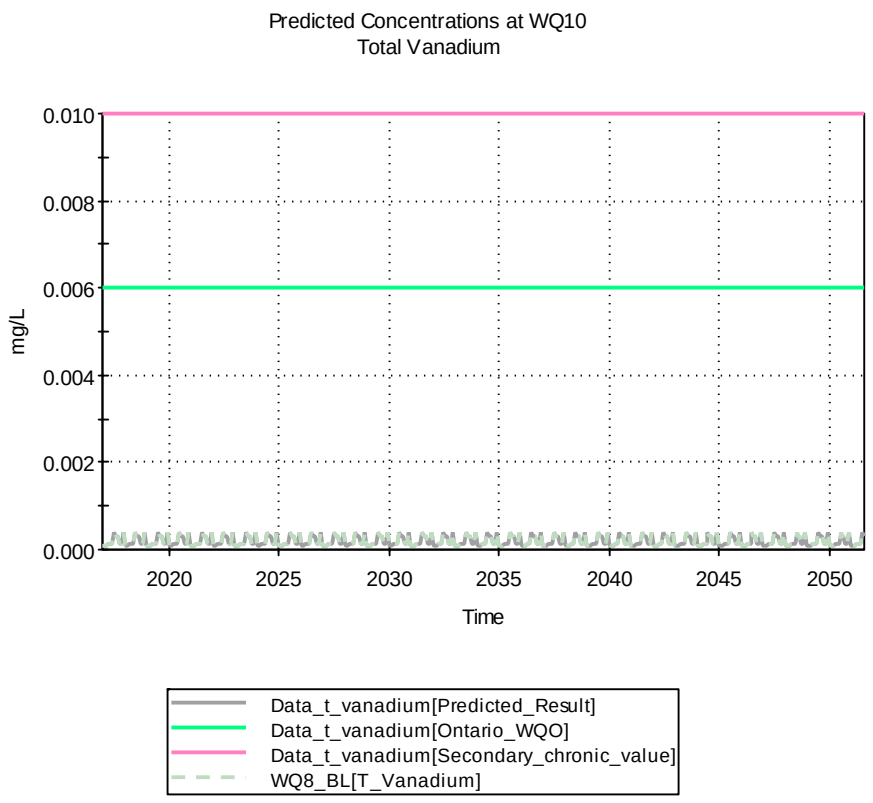
Plunge Pool – Best estimates (Post-closure)



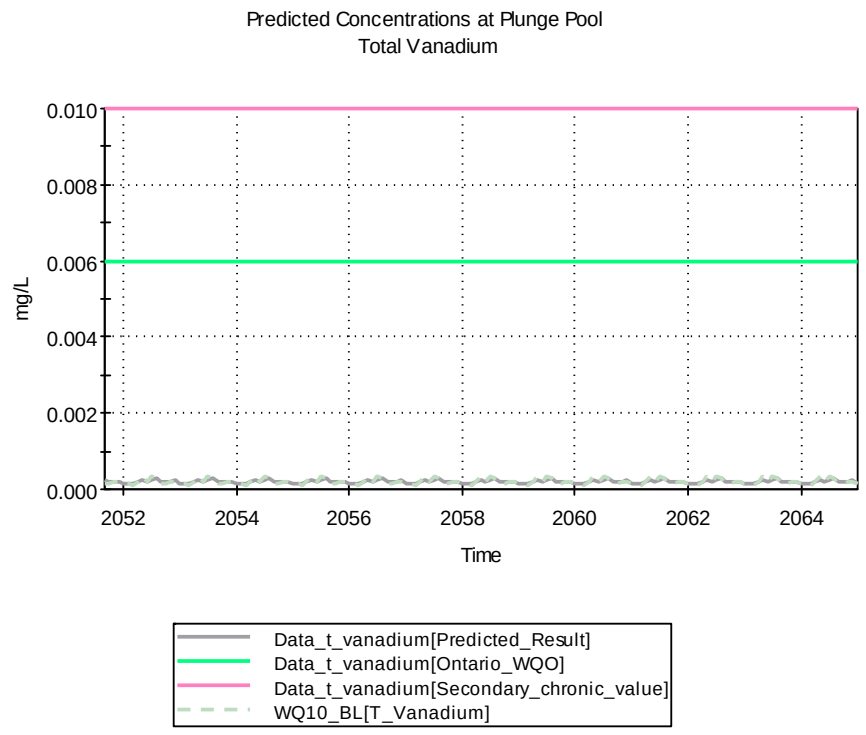


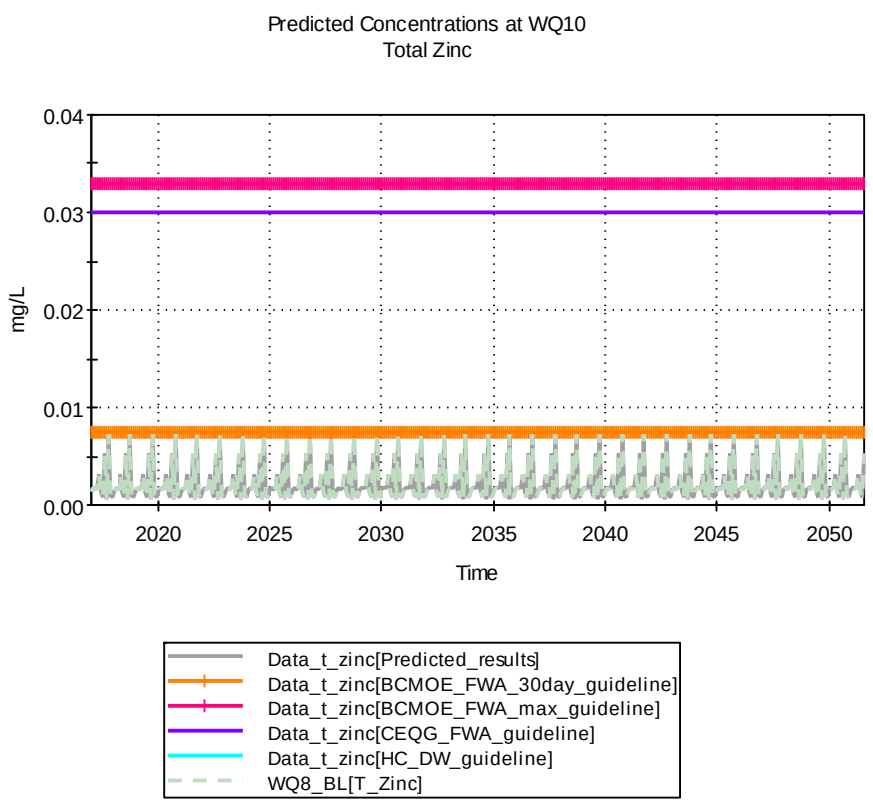


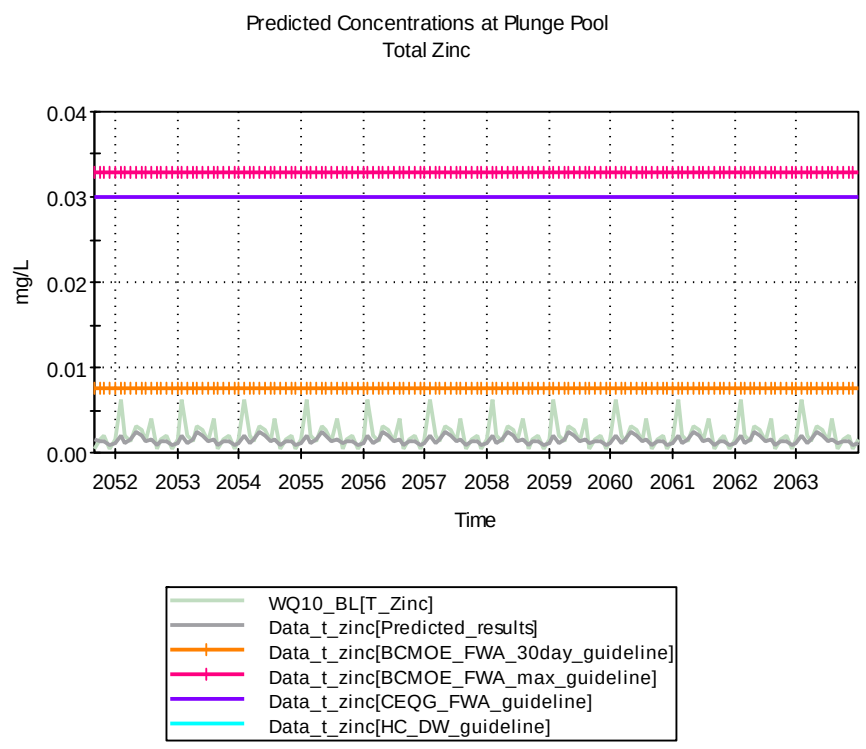
WQ10 - Best estimates (Construction, Operation,Closure)

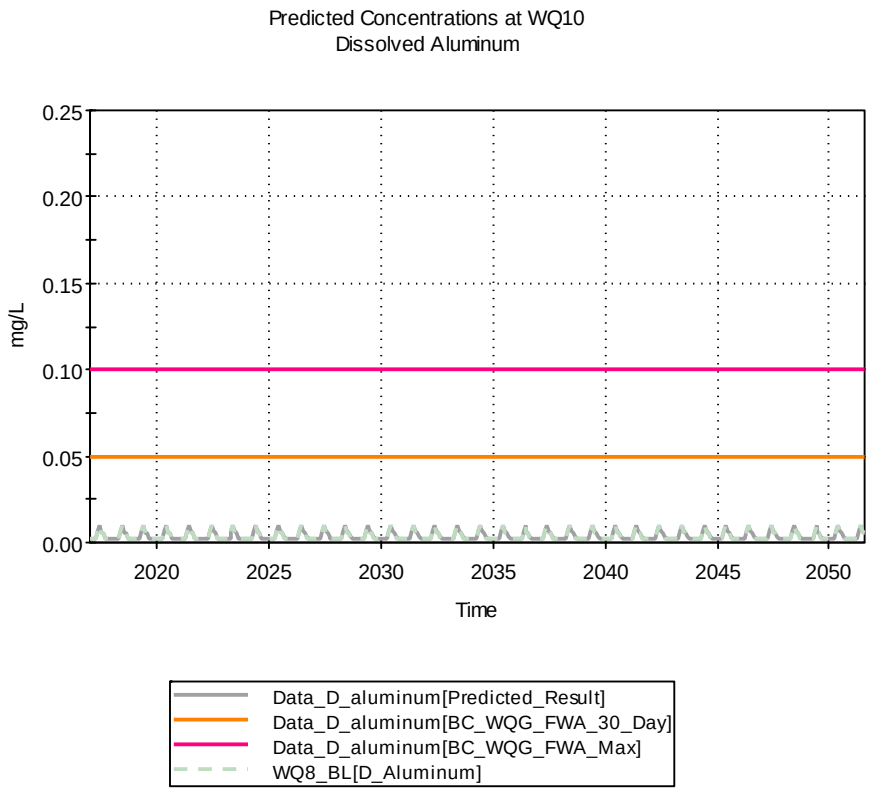


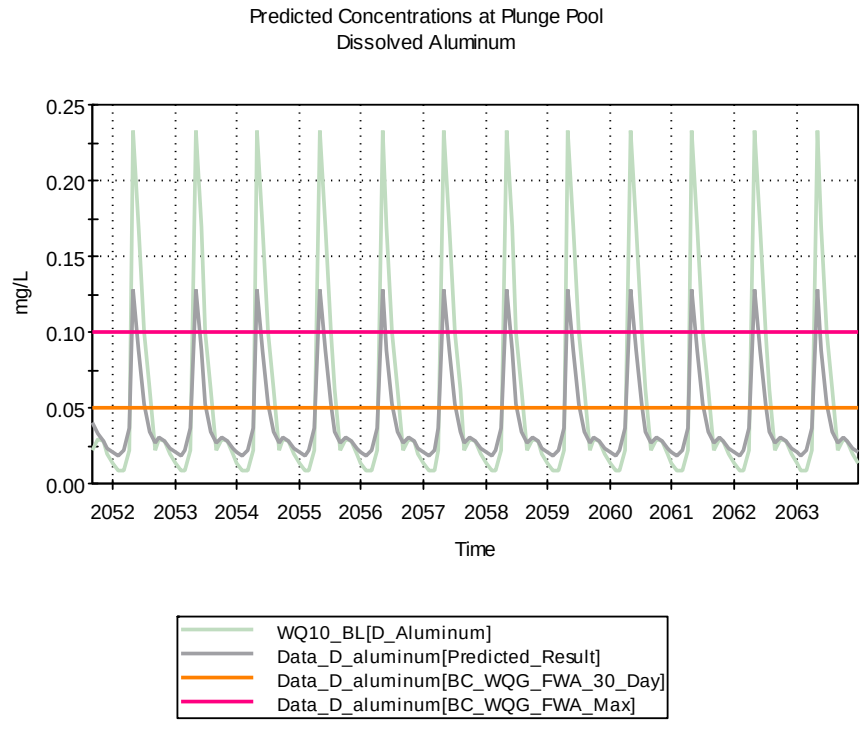
Plunge Pool – Best estimates (Post-closure)











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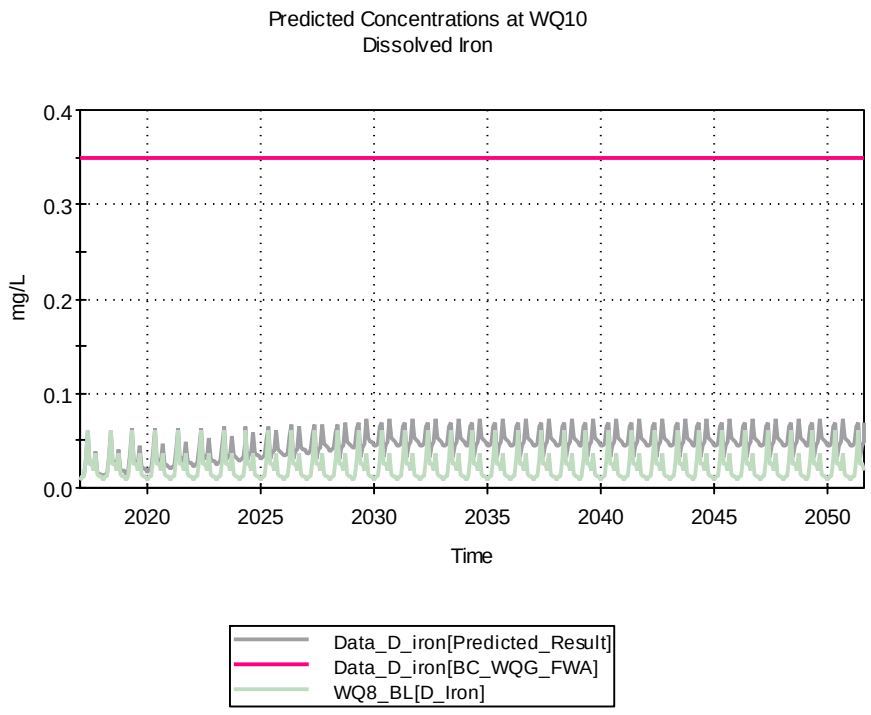
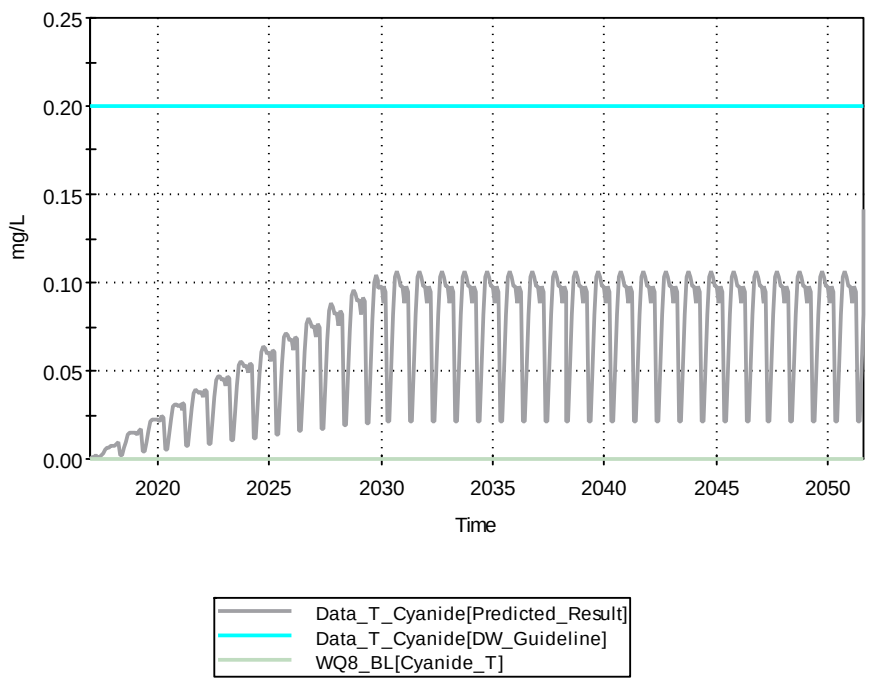
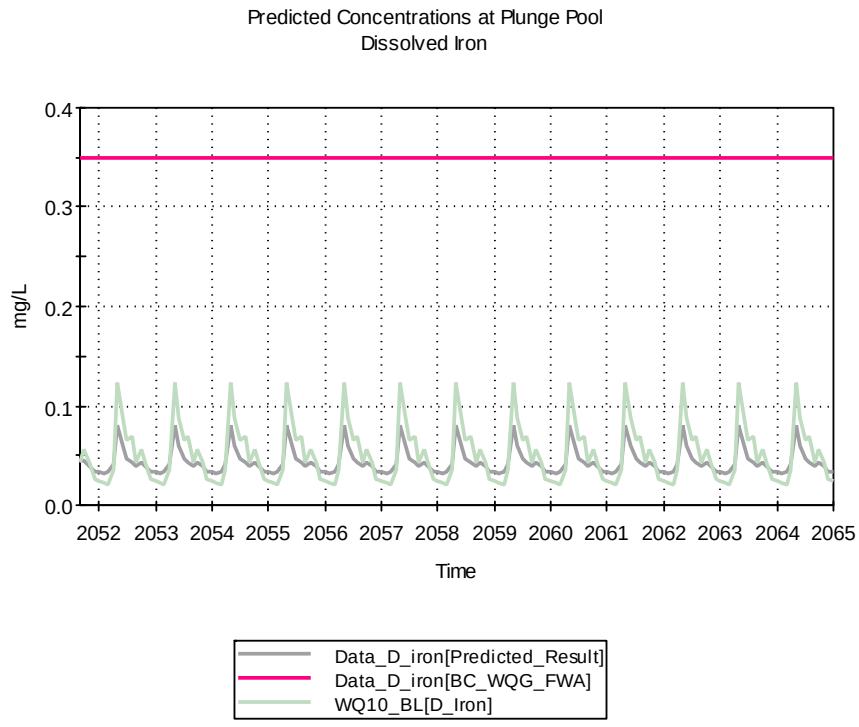
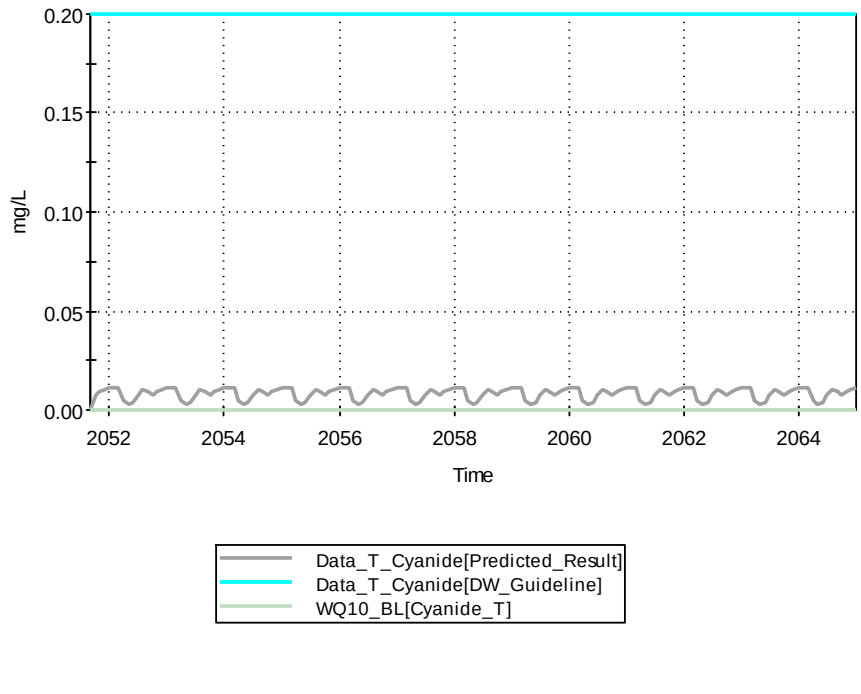
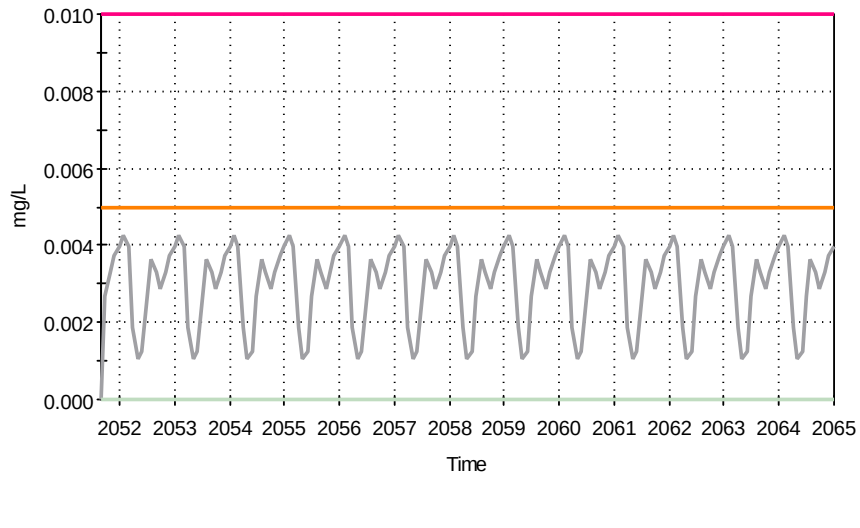




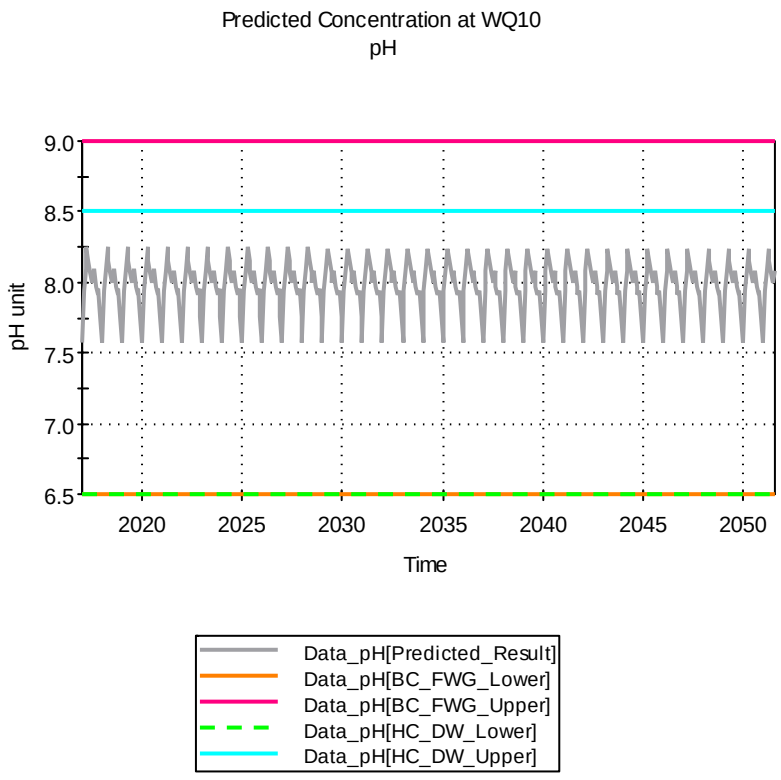
Plunge Pool – Best estimates (Post-closure)

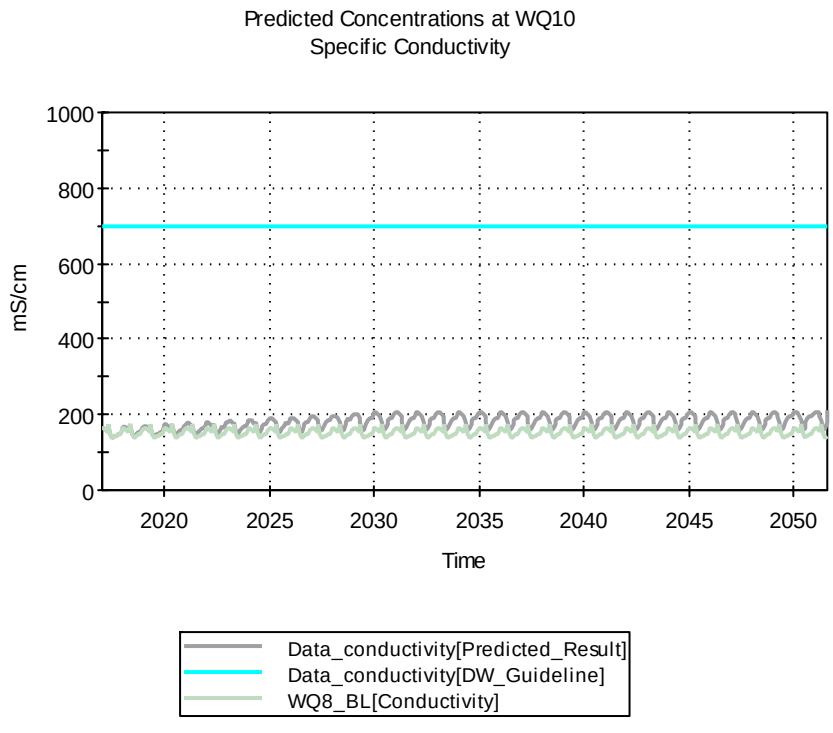


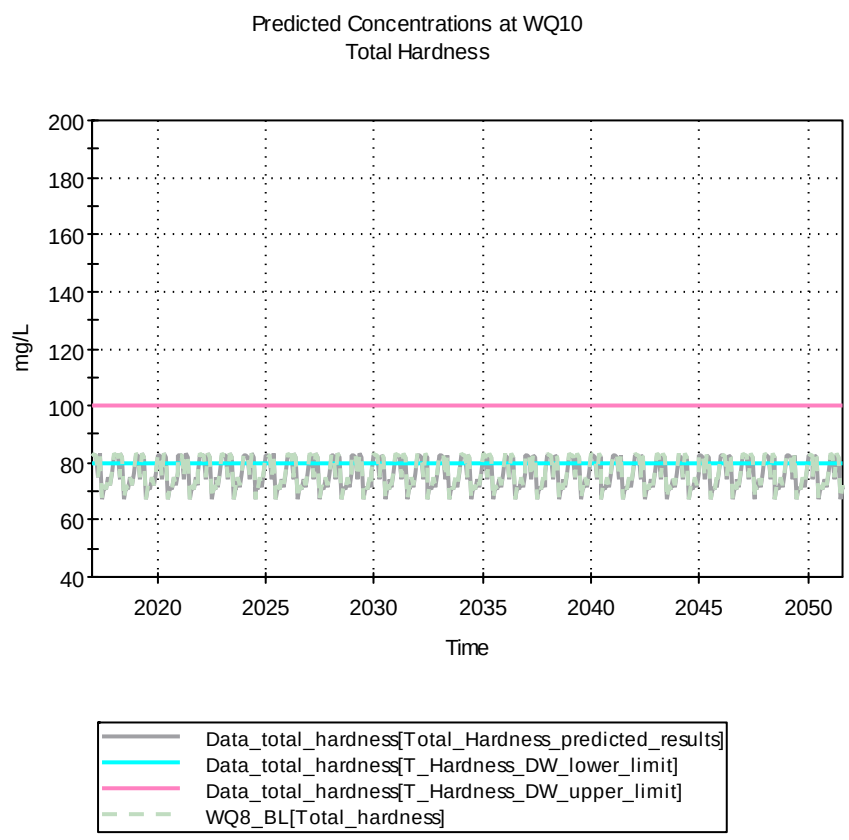




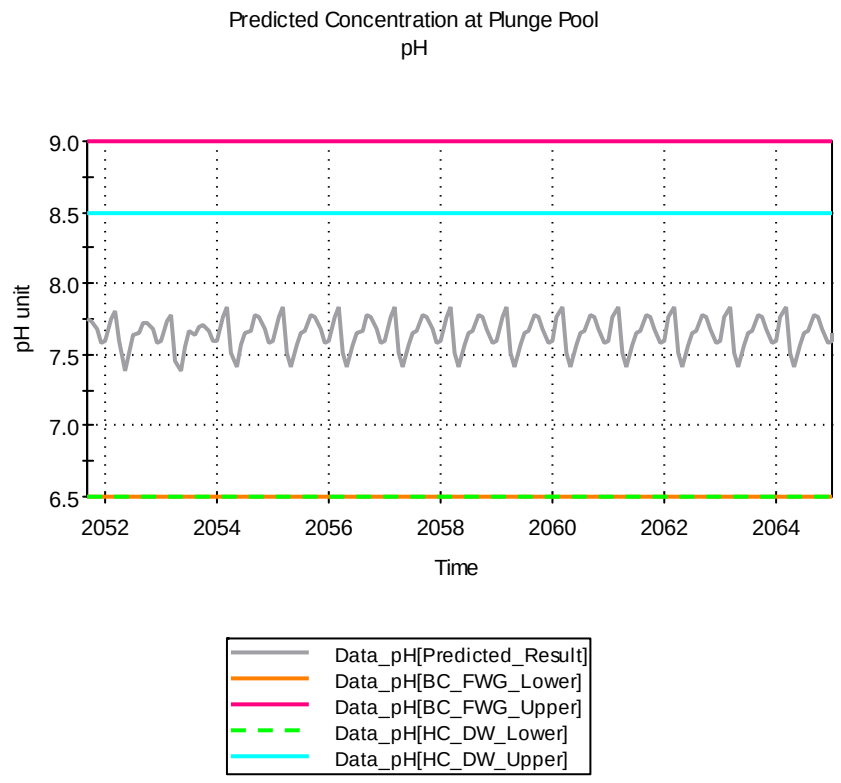
WQ10 – Worst Case (Construction, Operation, Closure)

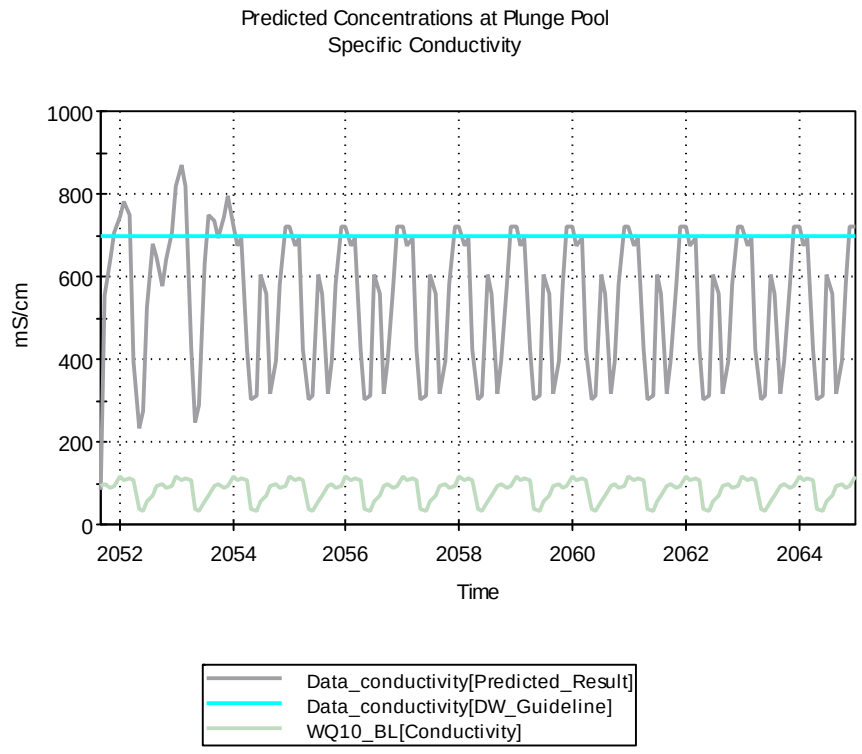


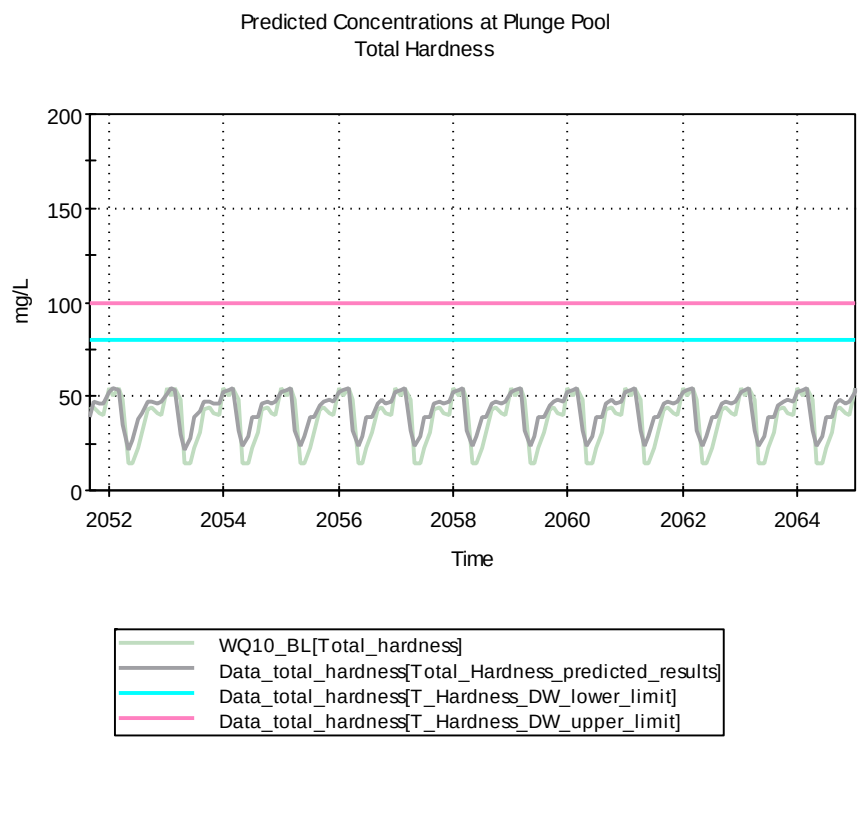




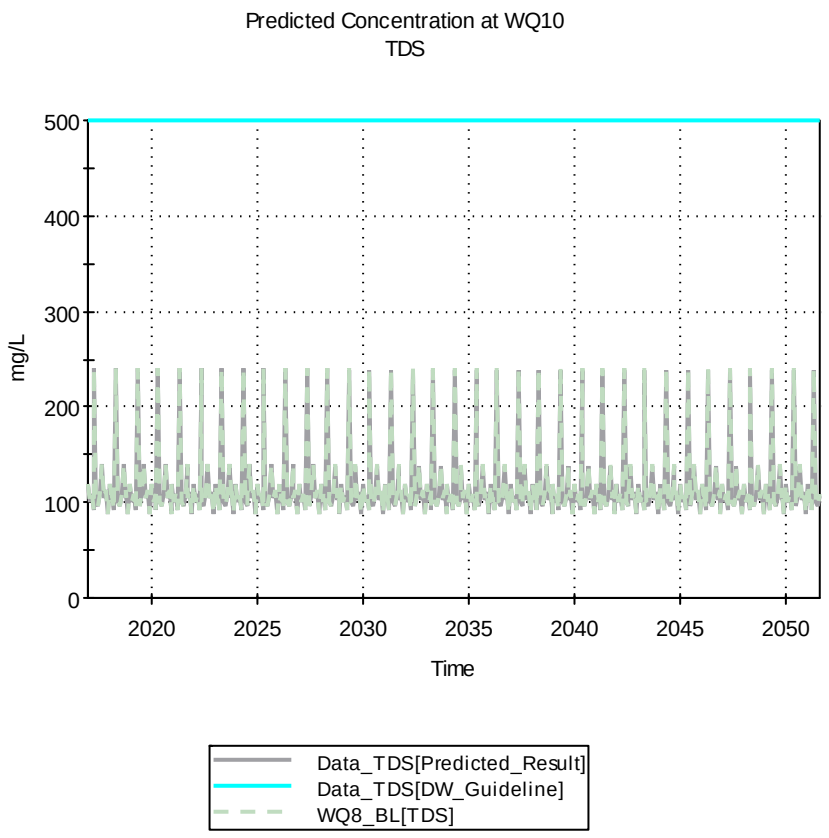
Plunge Pool – Worst Case (Post-closure)

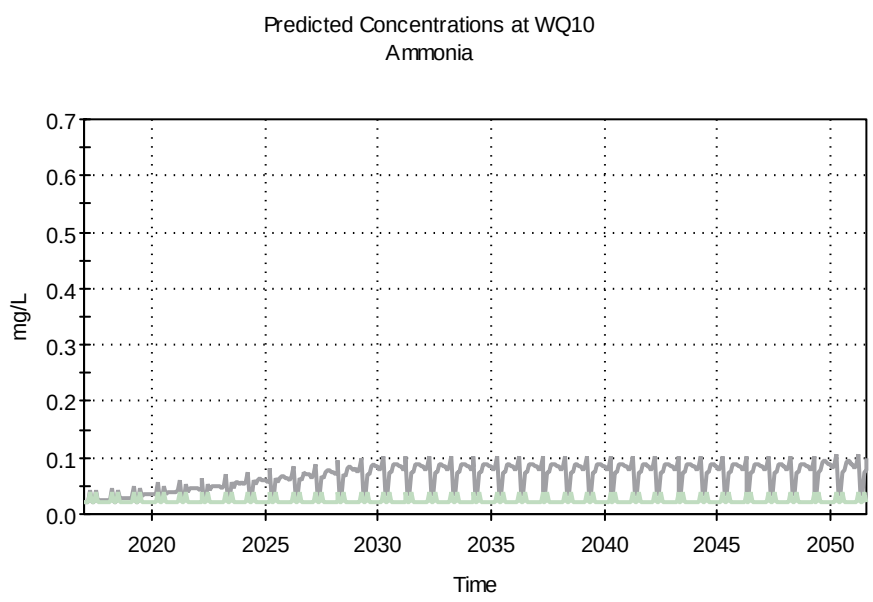


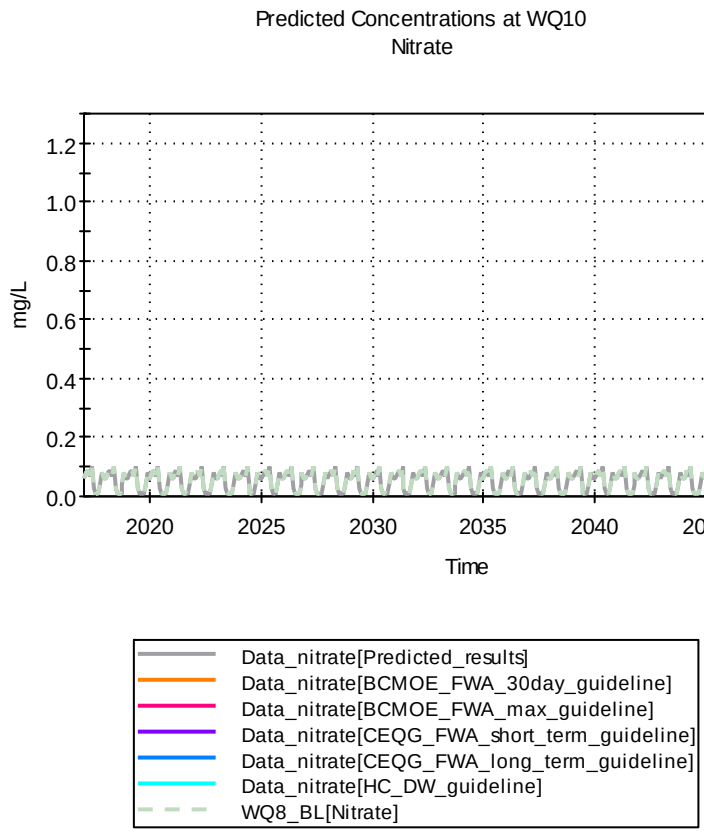




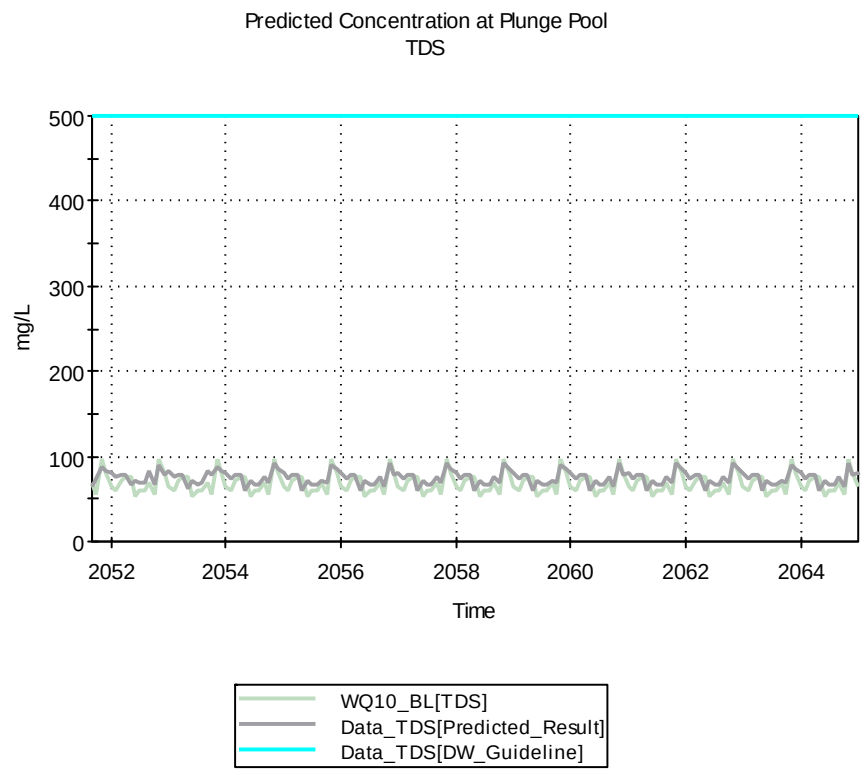
WQ10 – Worst Case (Construction, Operation, Closure)

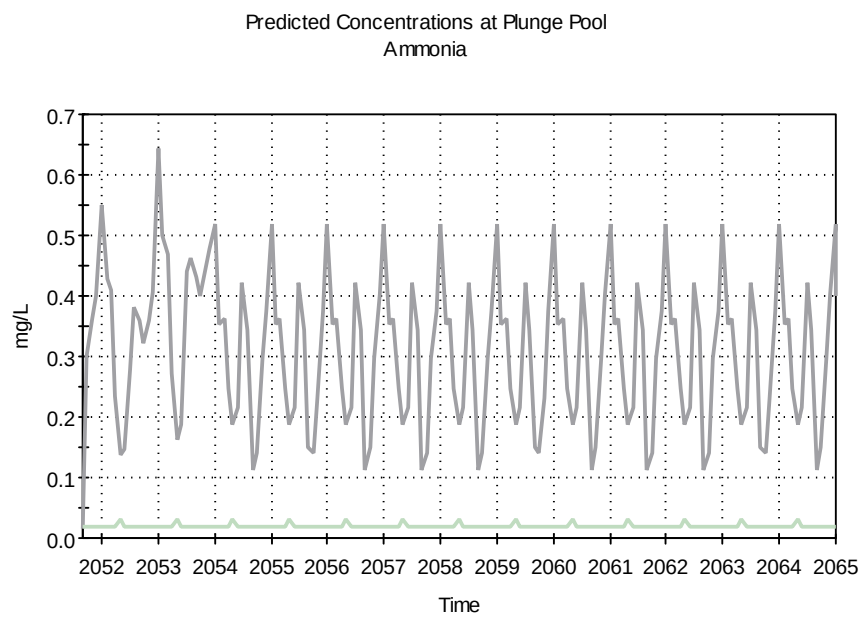


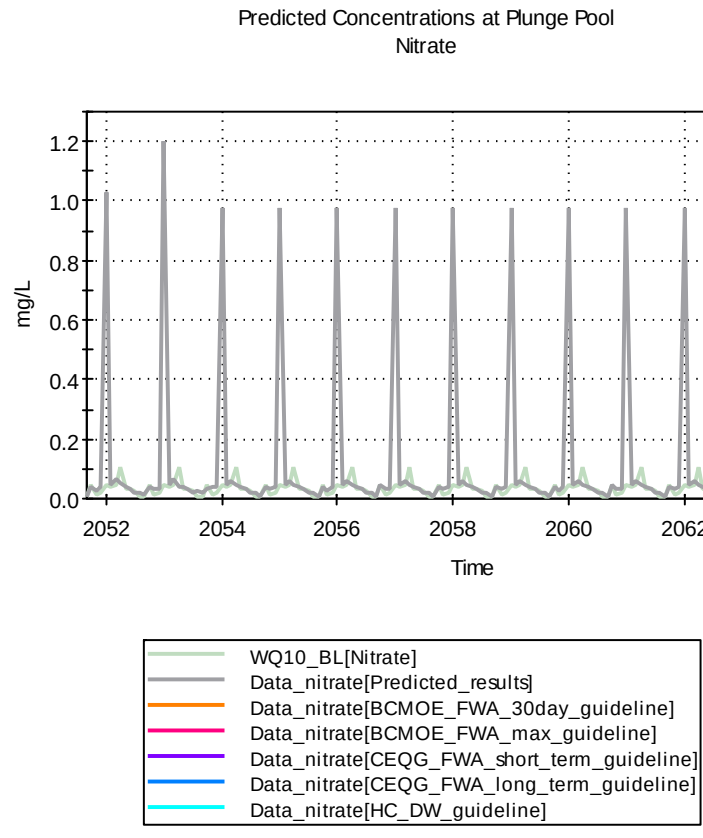




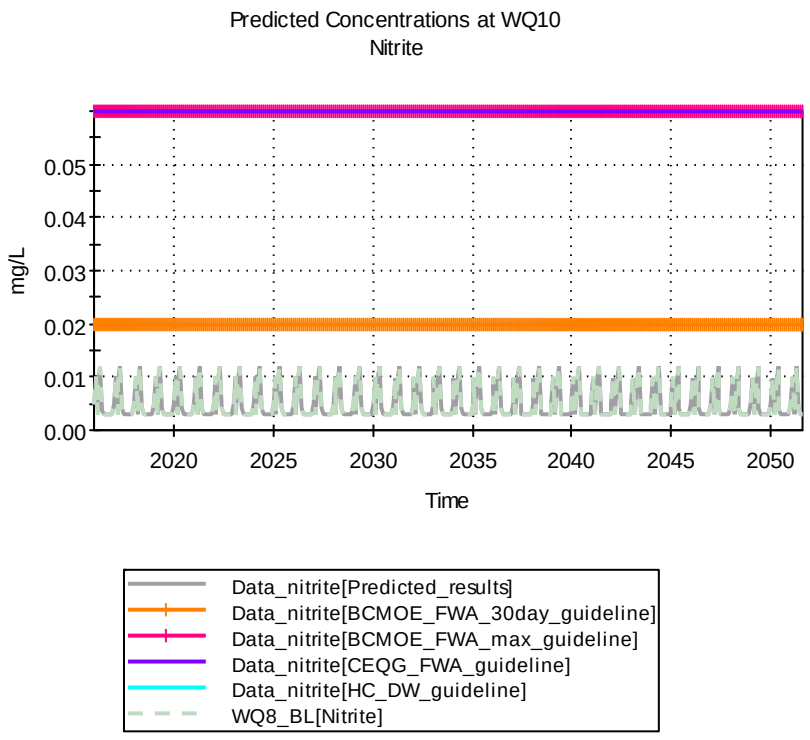
Plunge Pool – Worst Case (Post-closure)

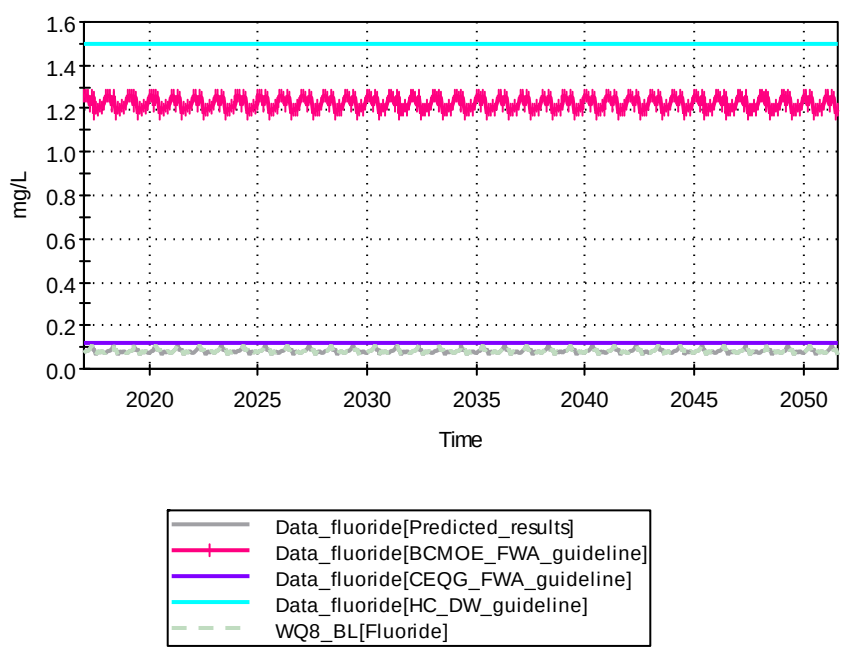


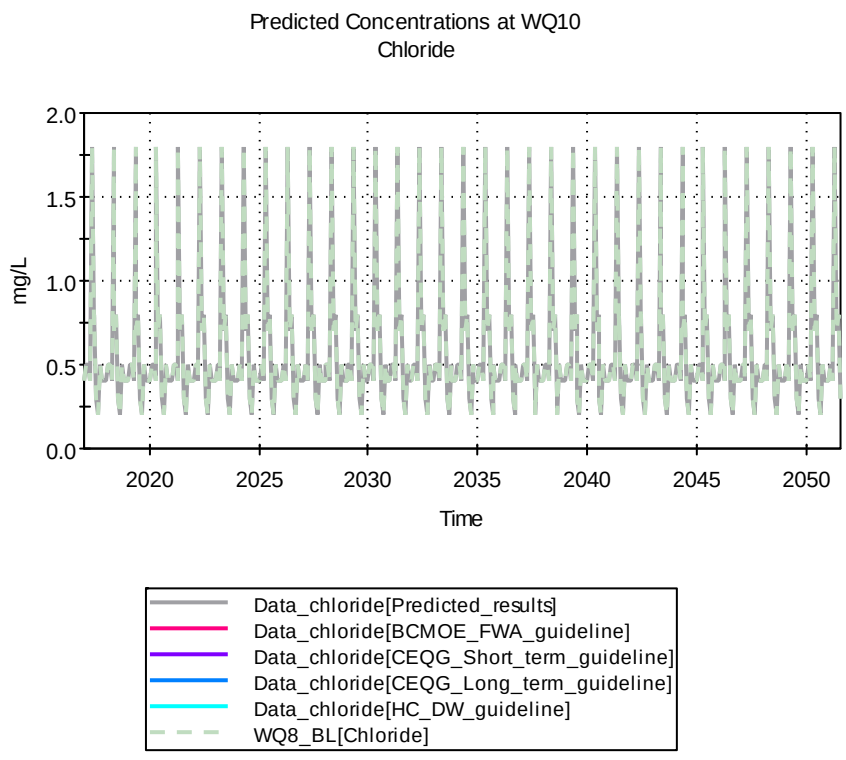




WQ10 – Worst Case (Construction, Operation, Closure)







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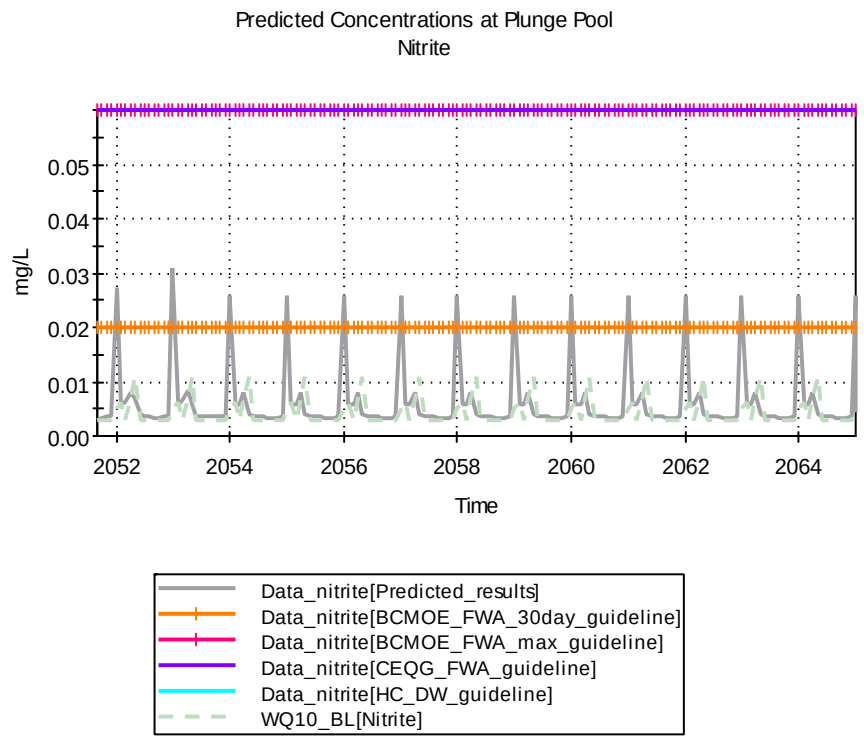
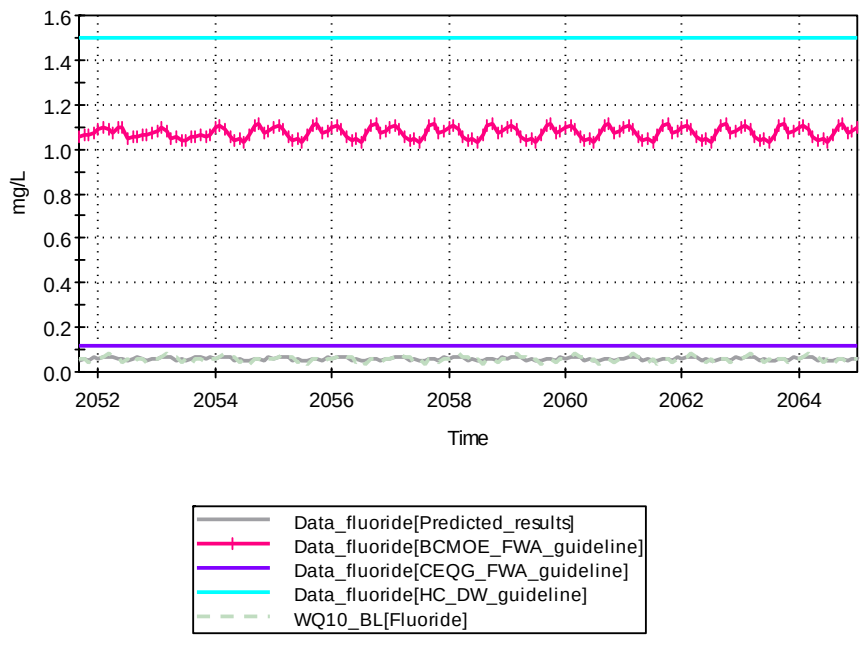
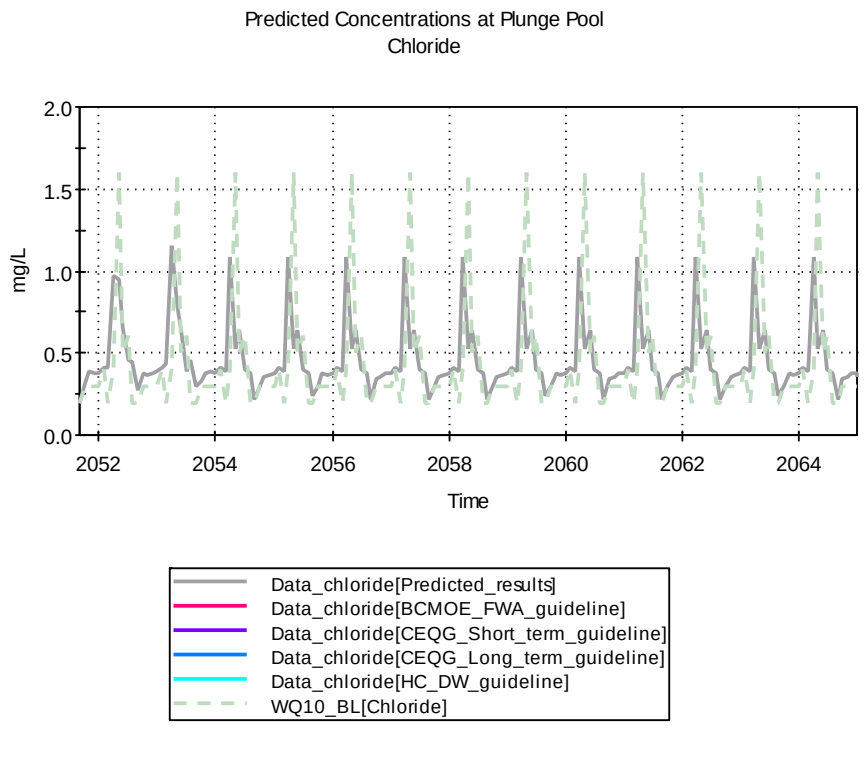
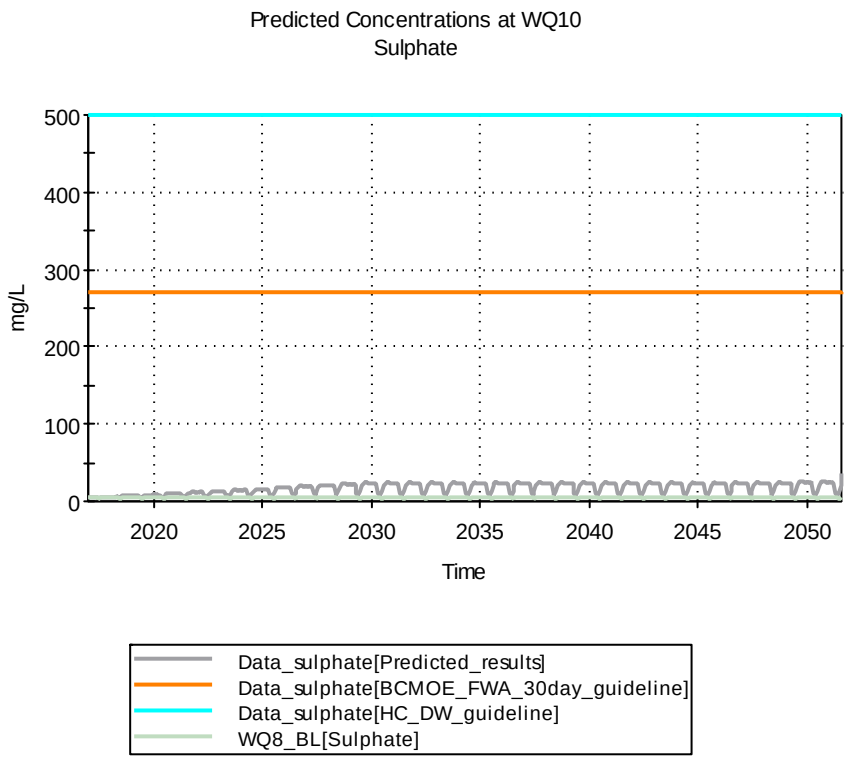
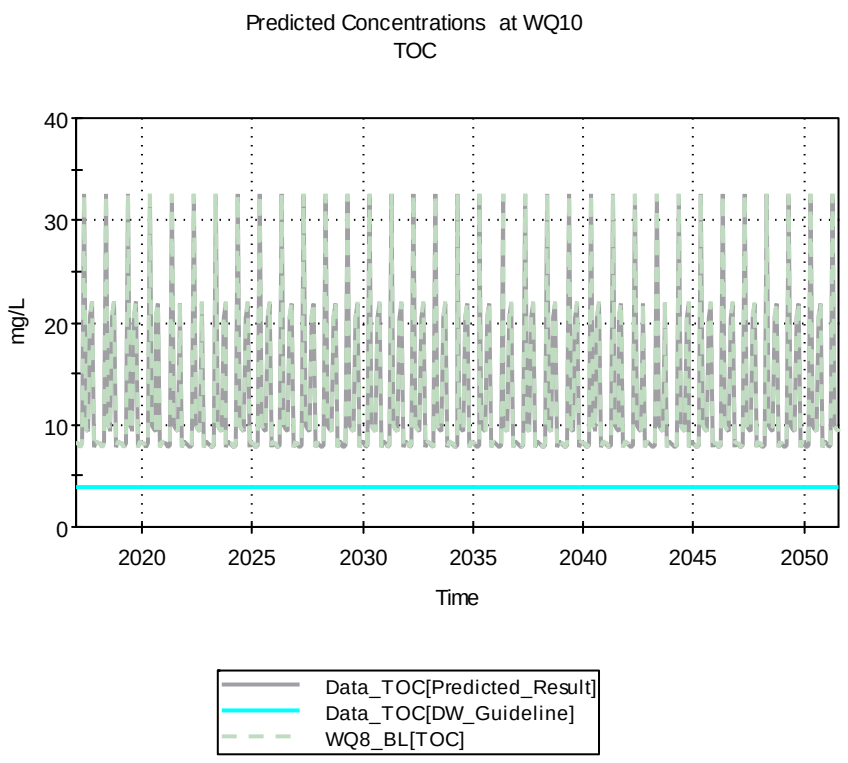


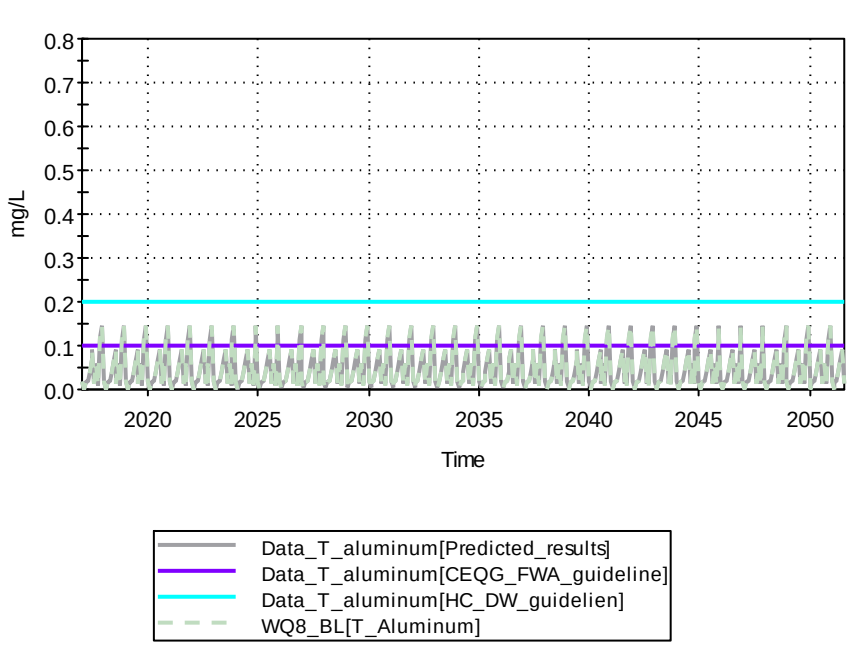




WQ10 – Worst Case (Construction, Operation, Closure)







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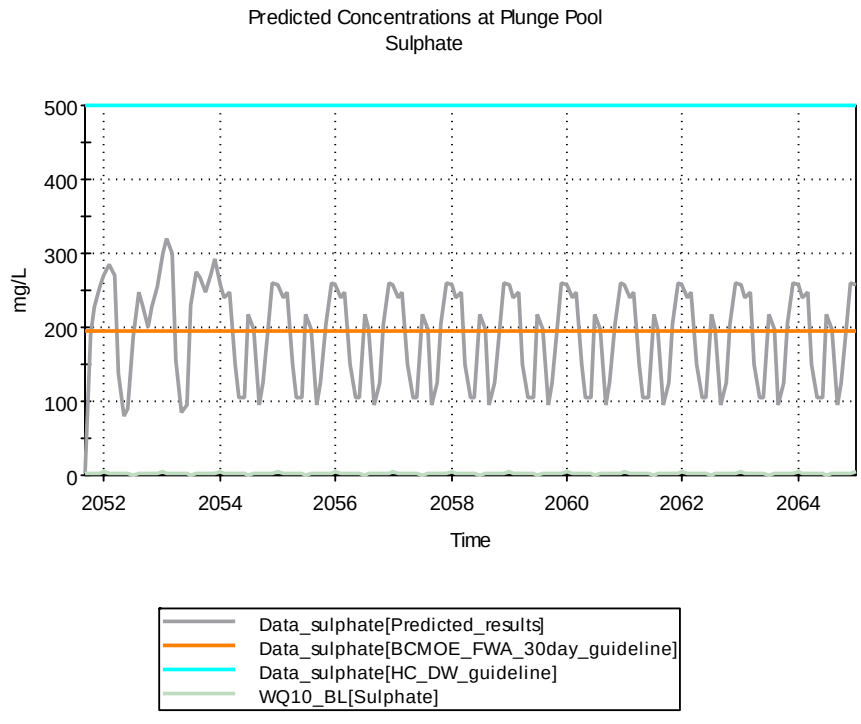
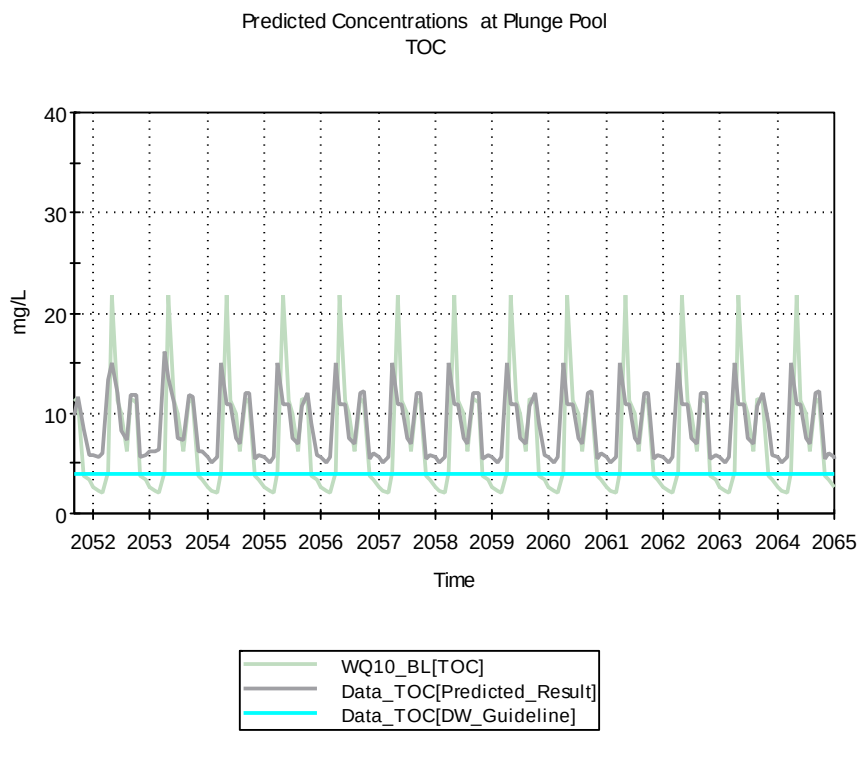
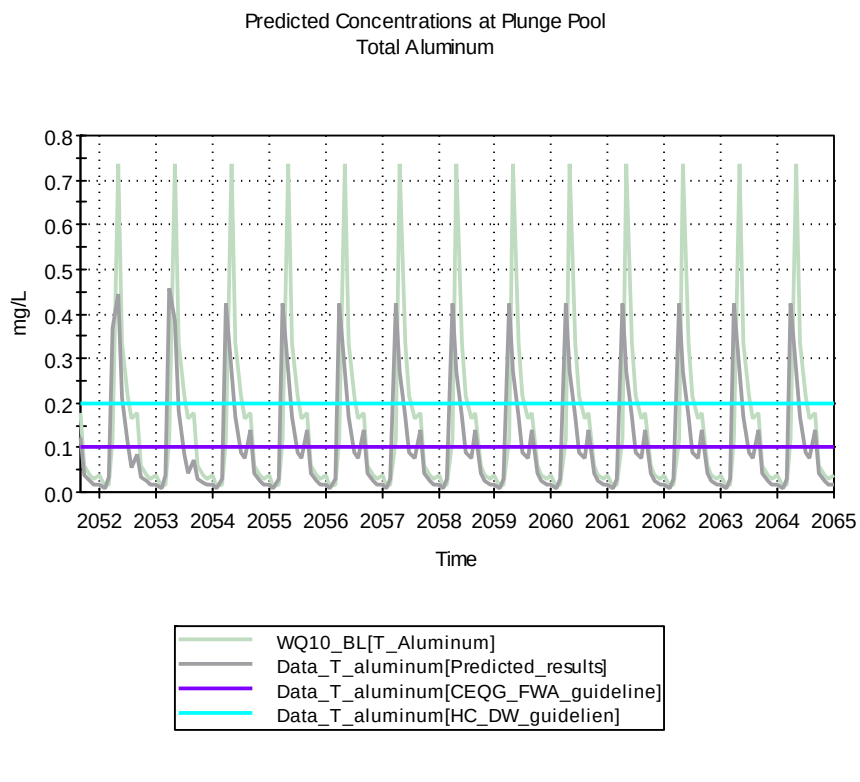
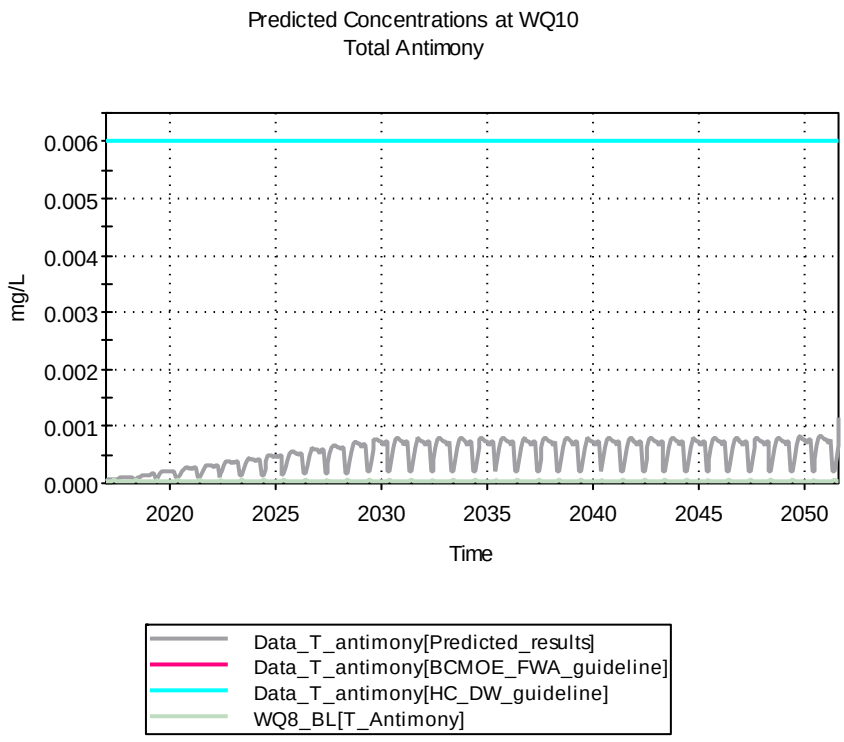
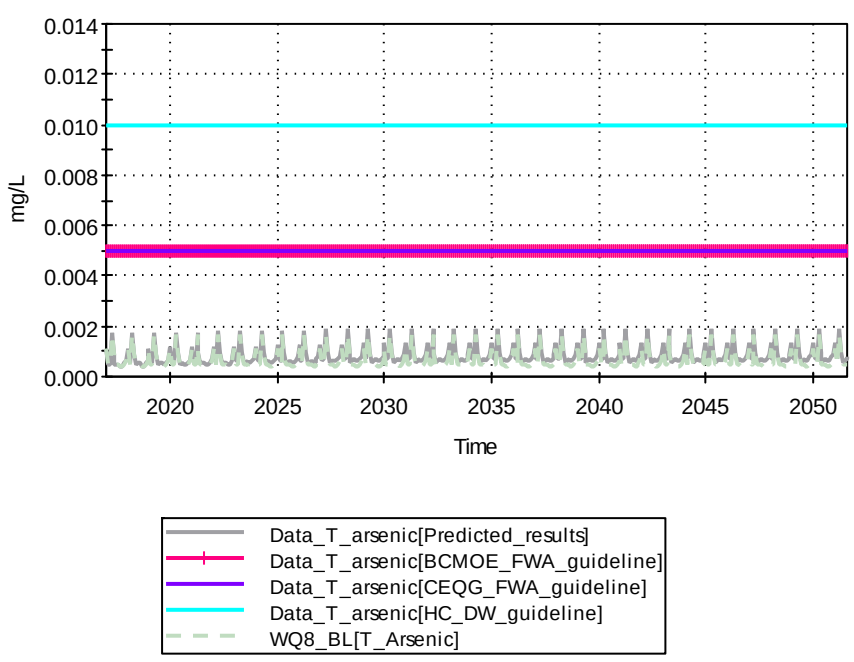


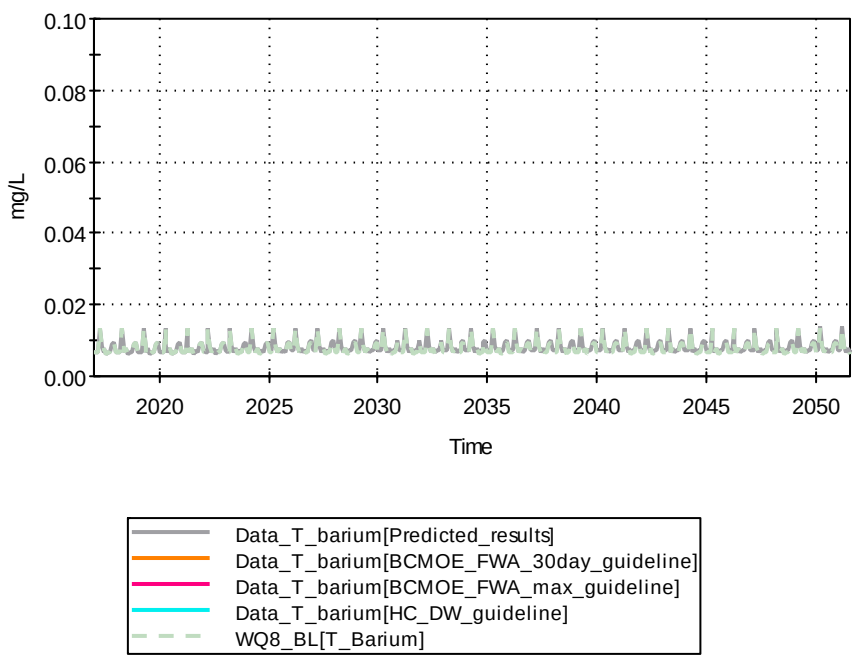




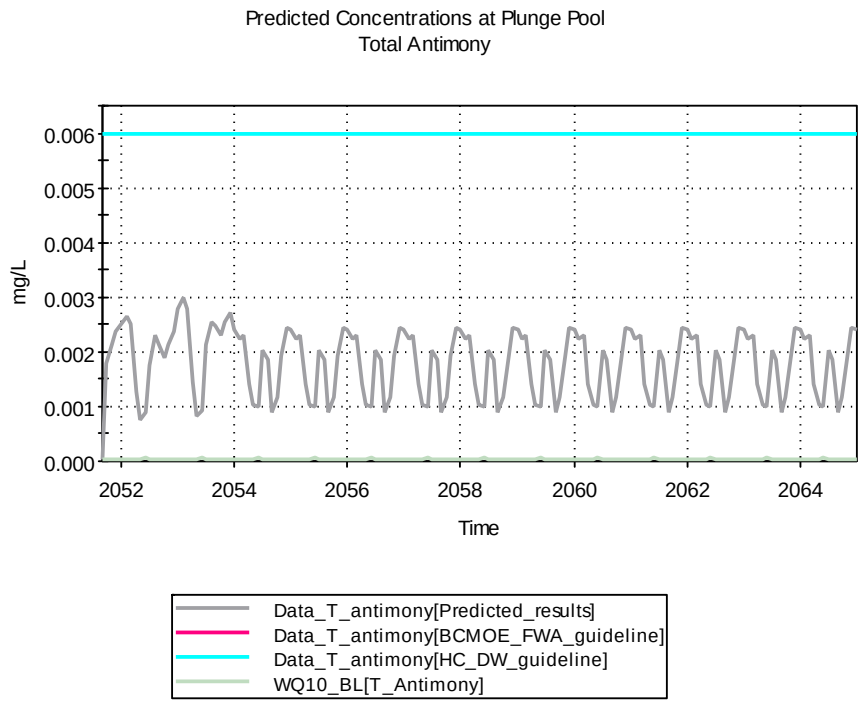
WQ10 – Worst Case (Construction, Operation, Closure)

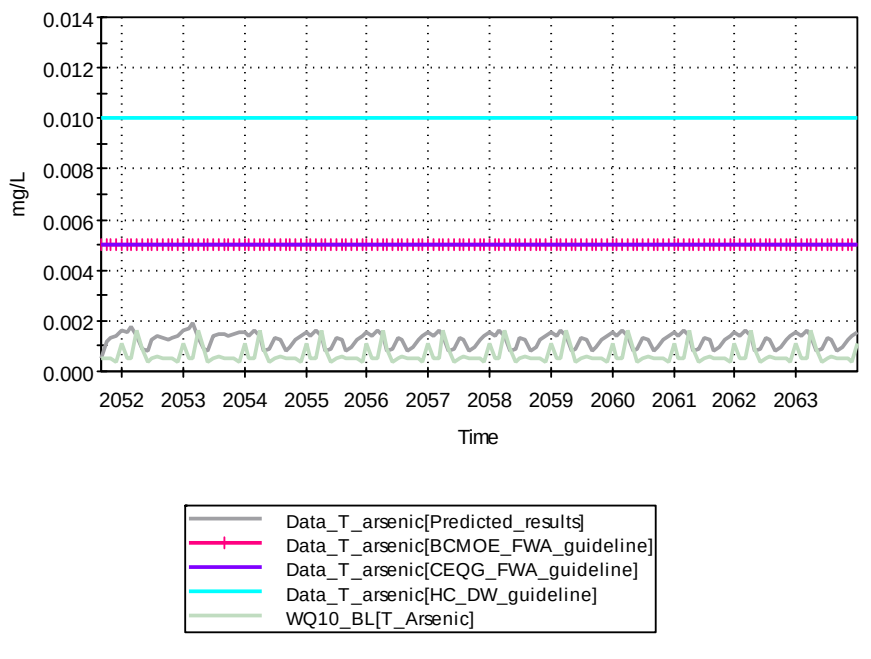


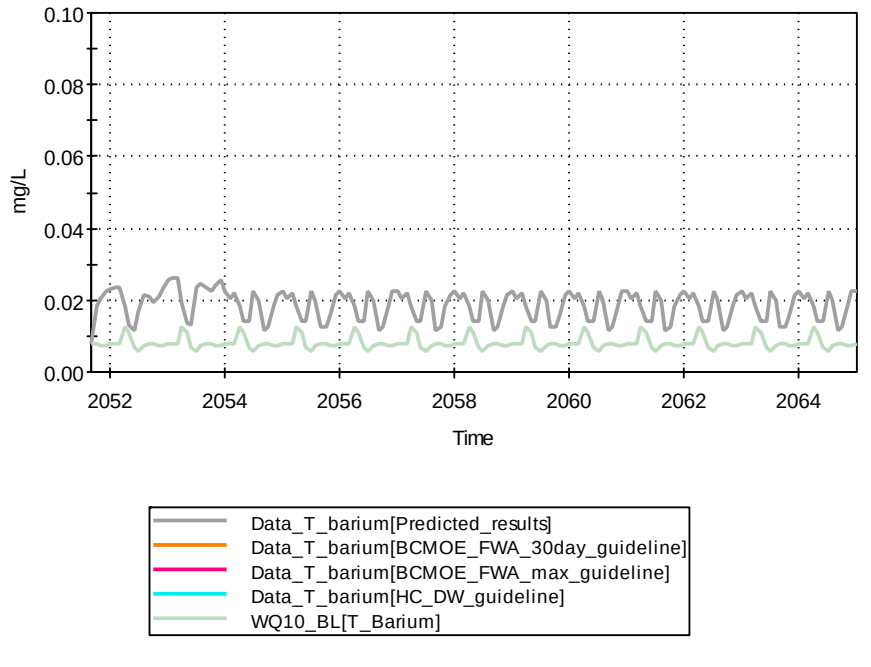




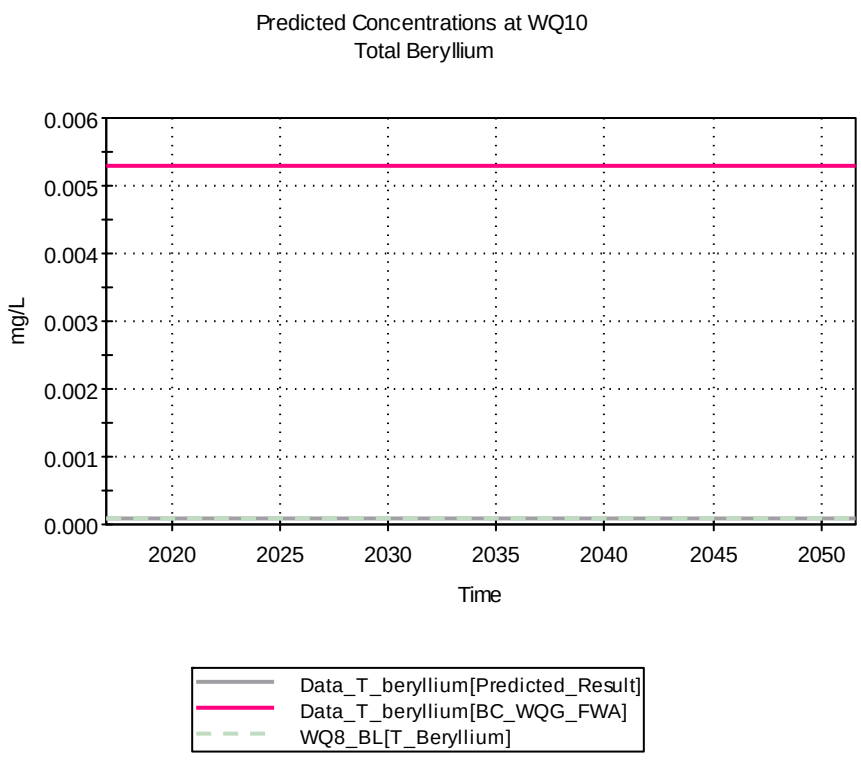
Plunge Pool – Worst Case (Post-closure)

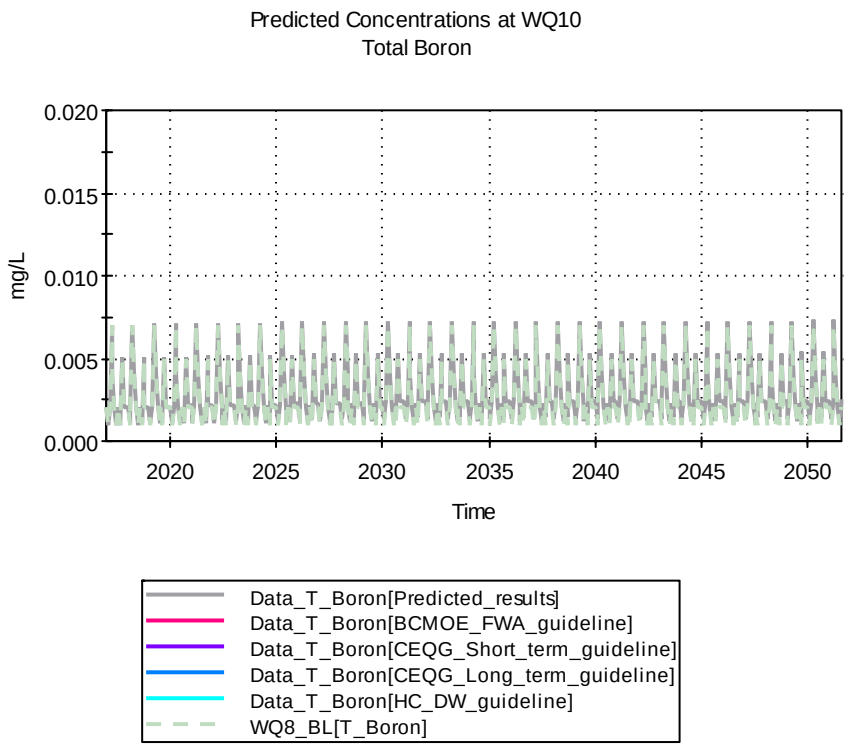


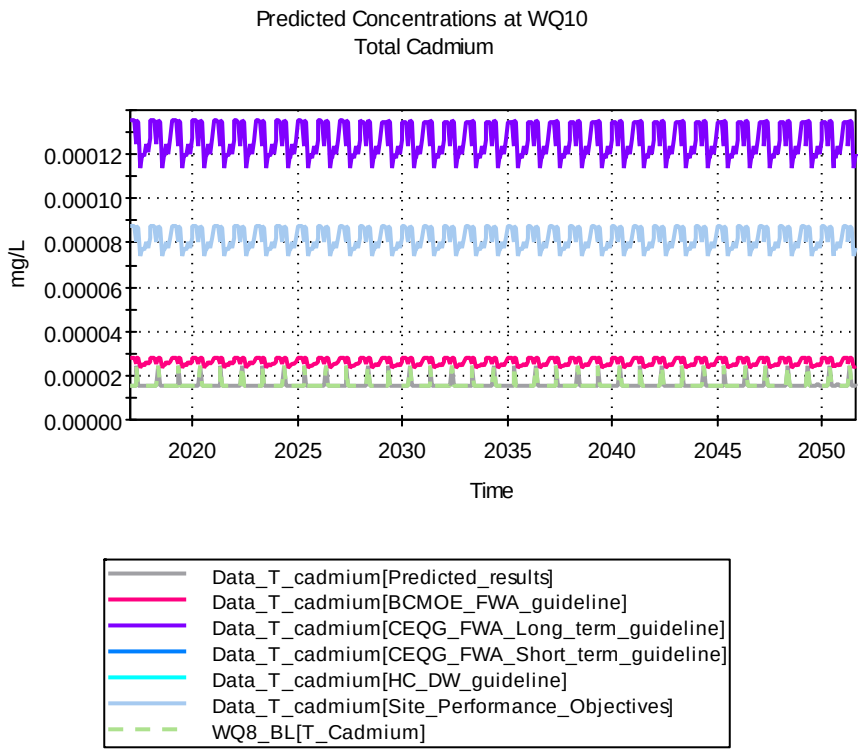




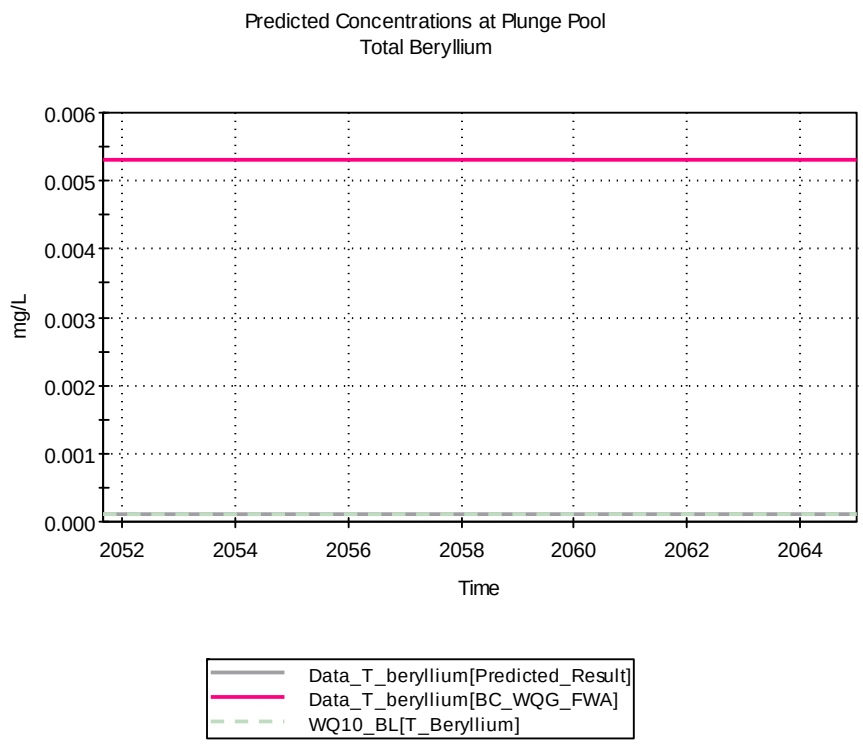
WQ10 – Worst Case (Construction, Operation, Closure)

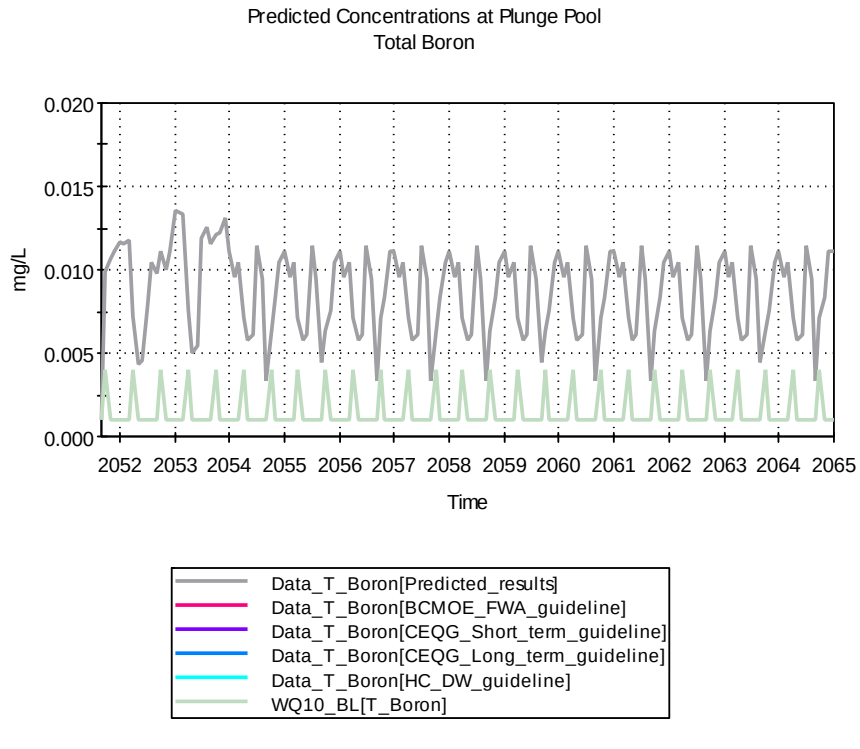


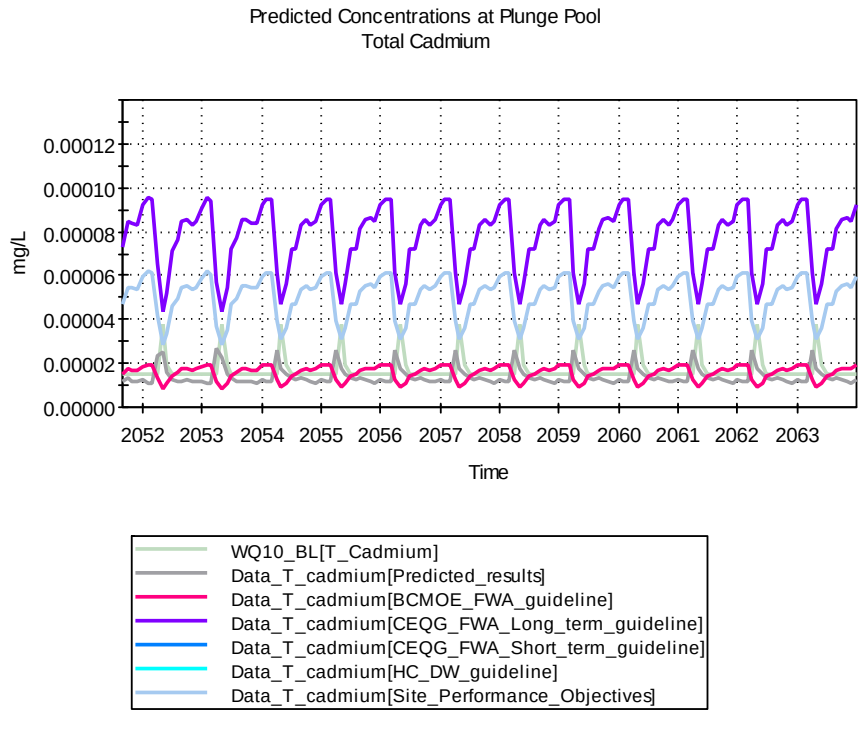




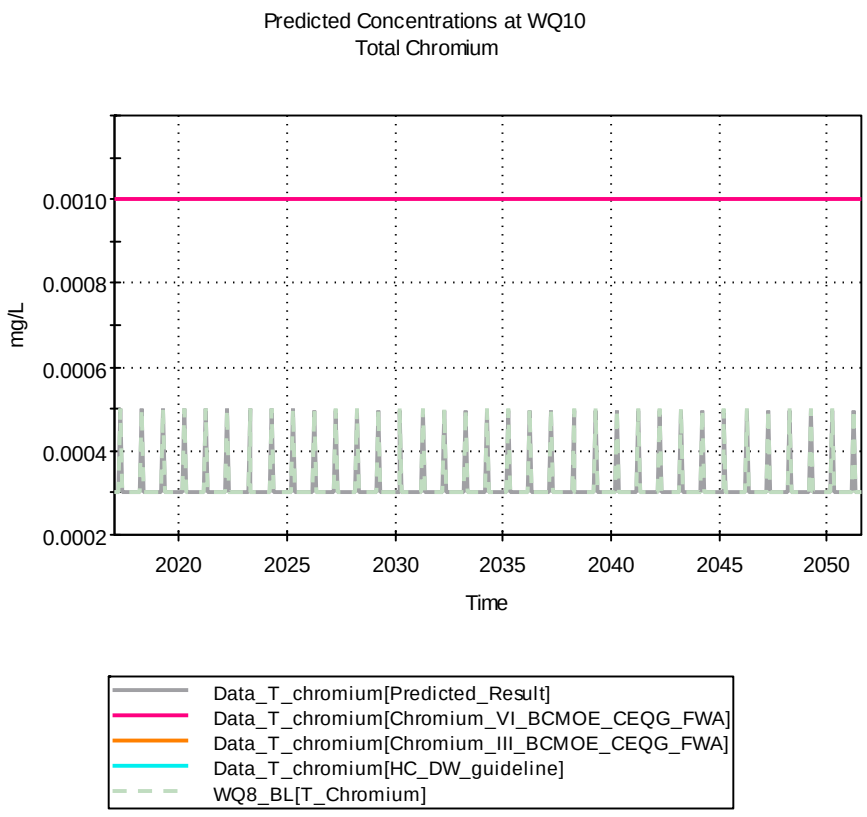
Plunge Pool – Worst Case (Post-closure)

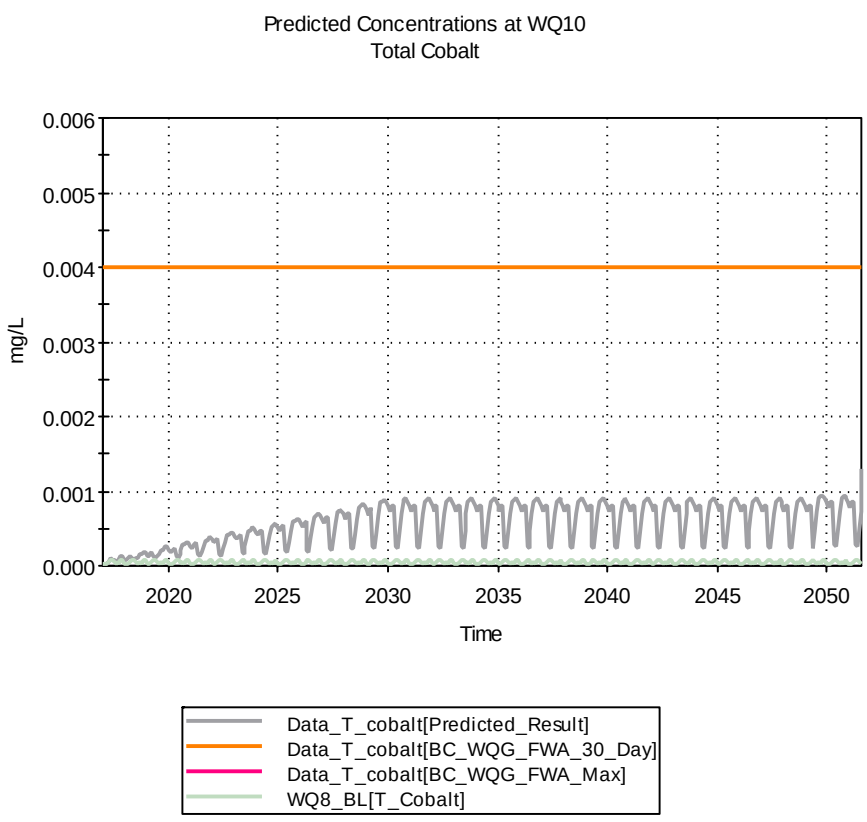


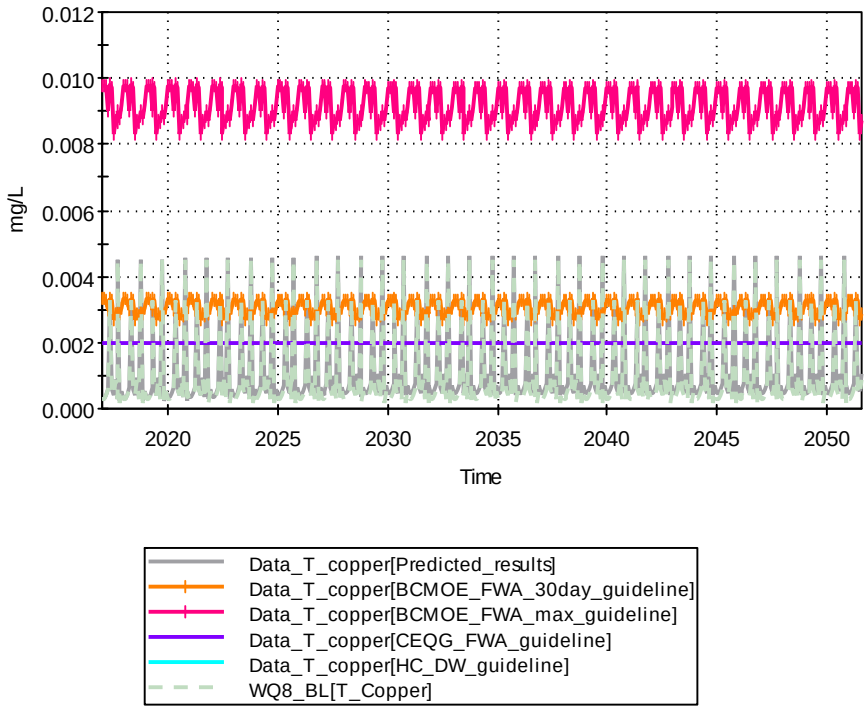




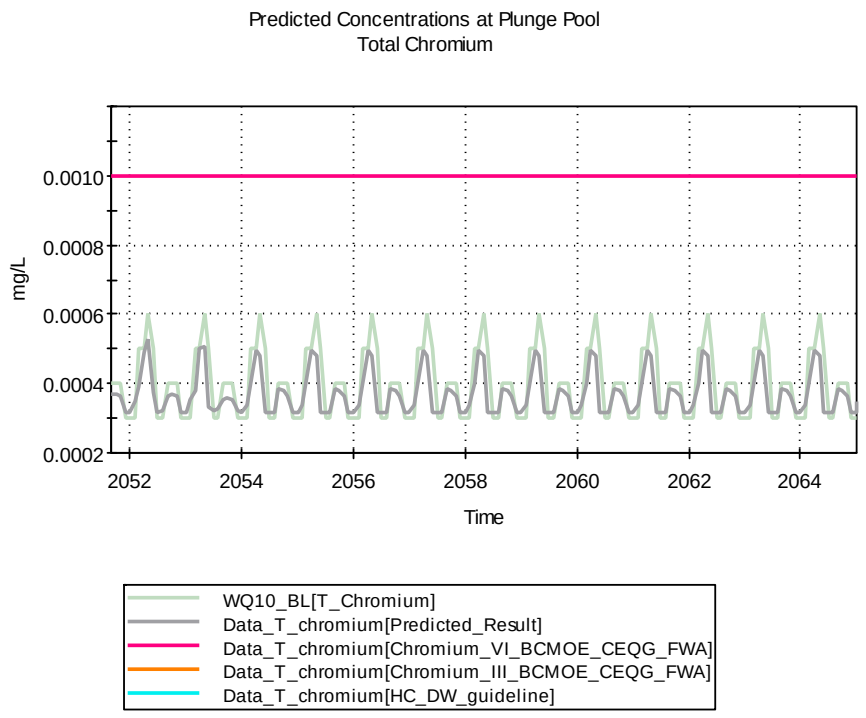
WQ10 – Worst Case (Construction, Operation, Closure)

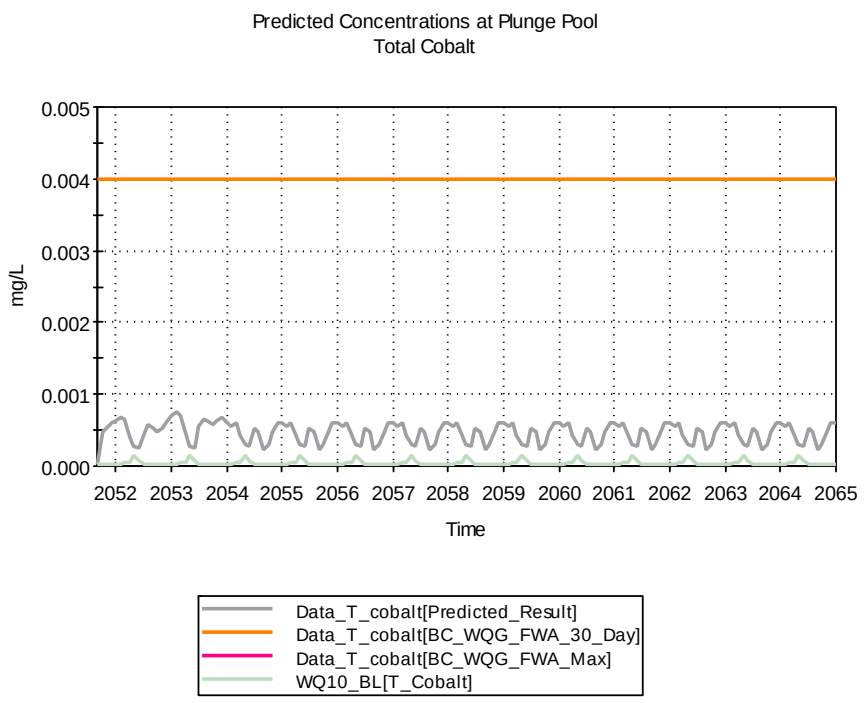


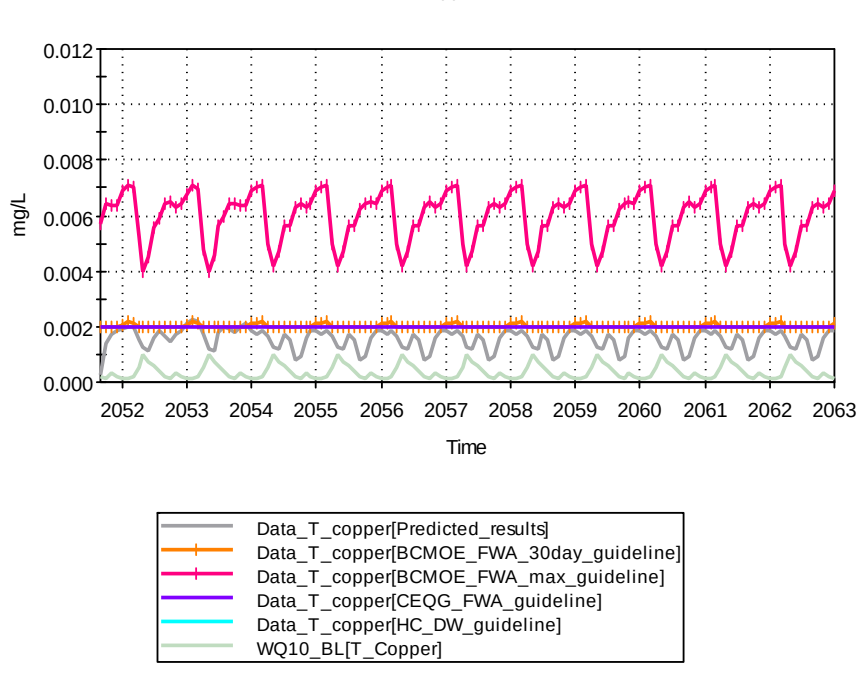




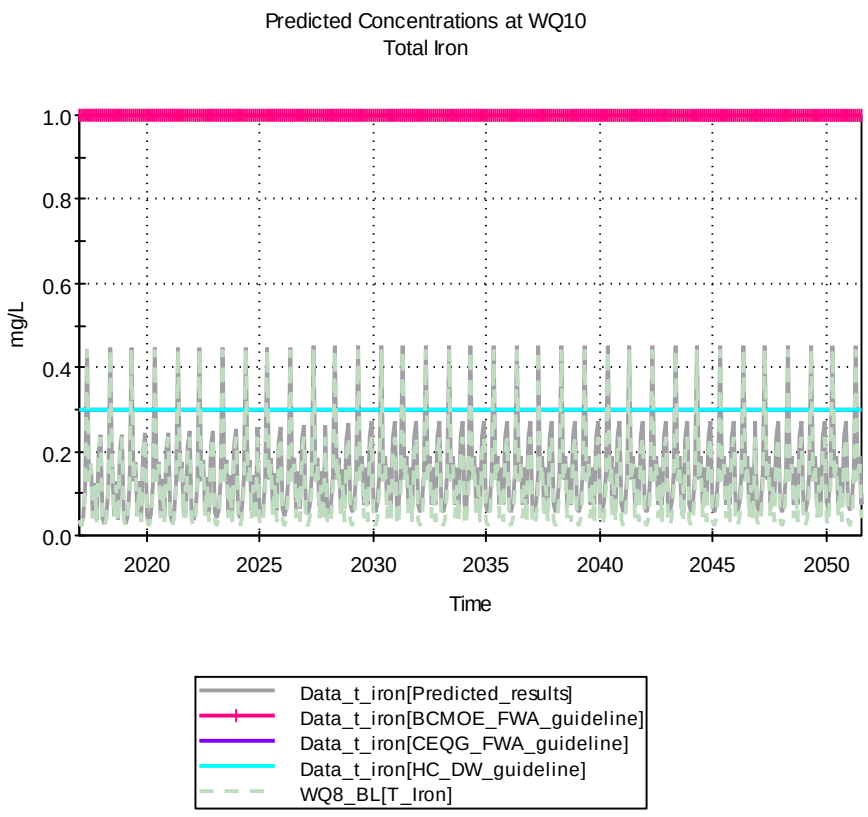
Plunge Pool – Worst Case (Post-closure)

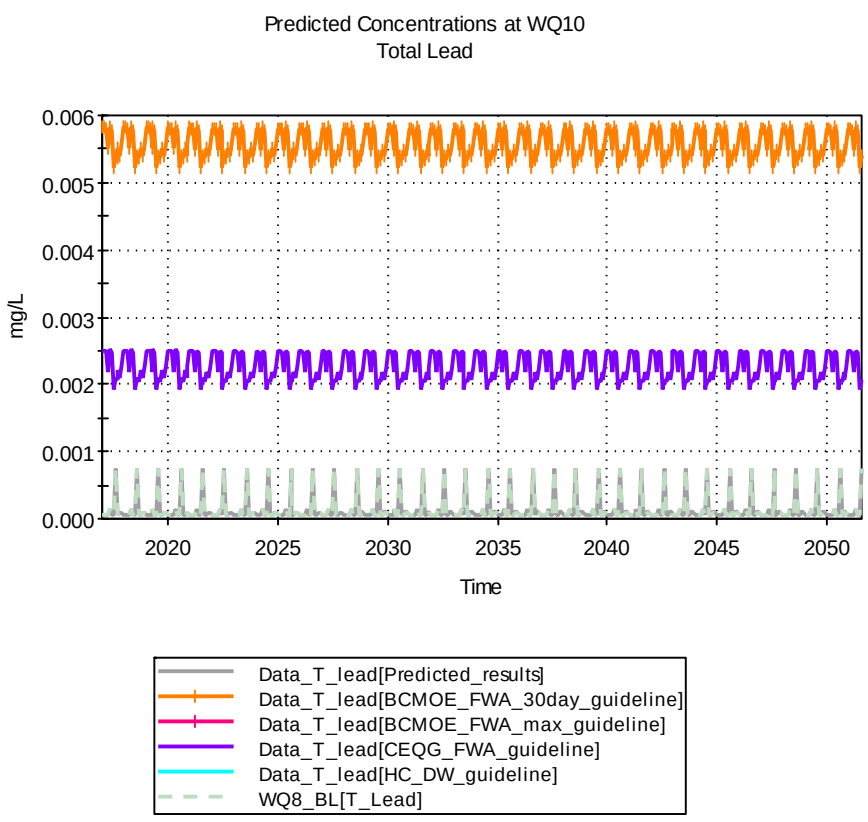


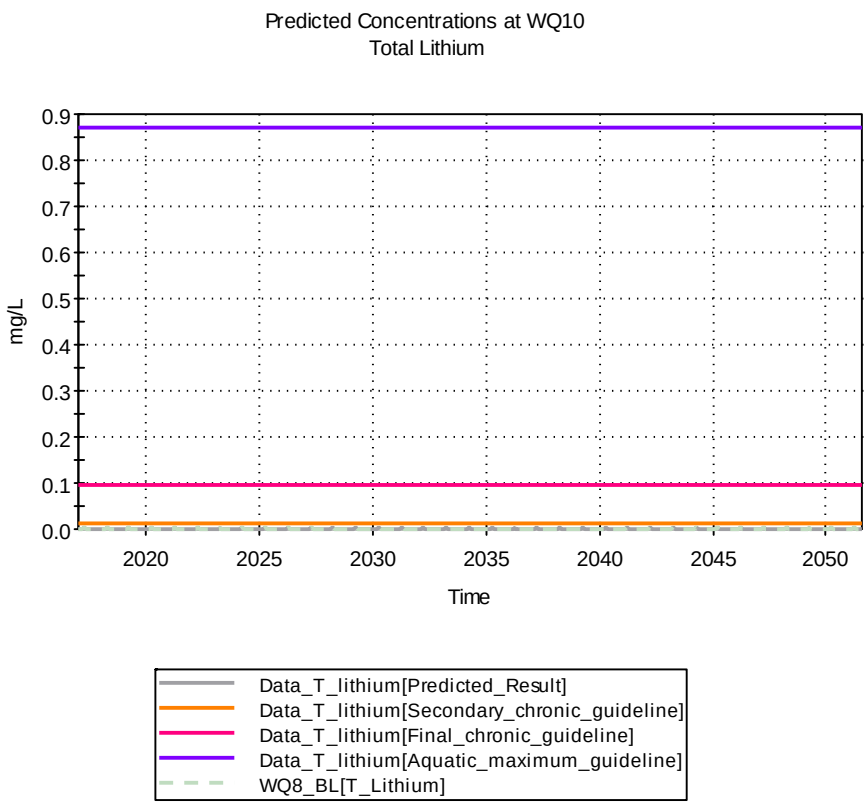




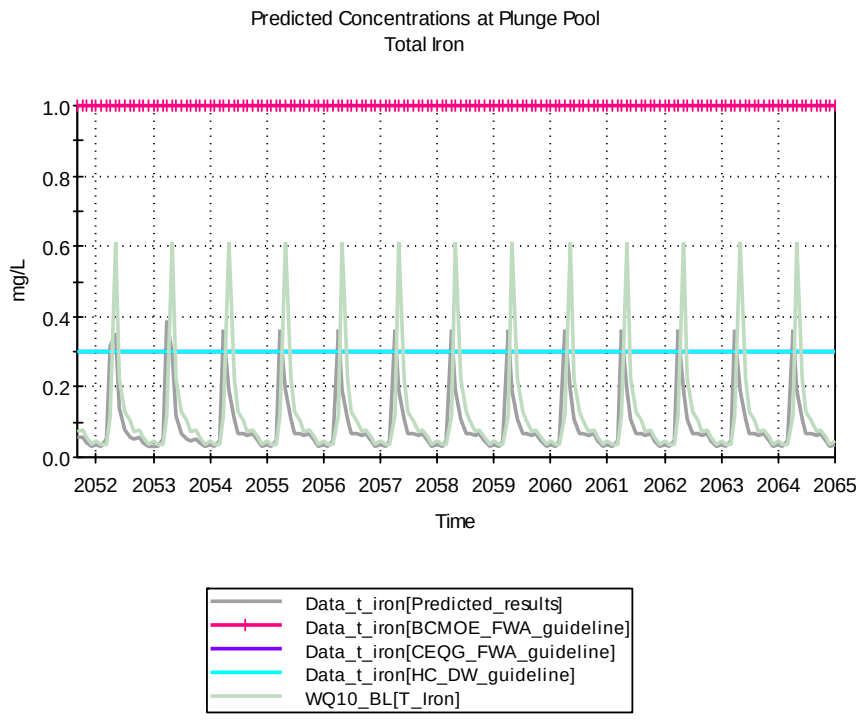
WQ10 – Worst Case (Construction, Operation, Closure)

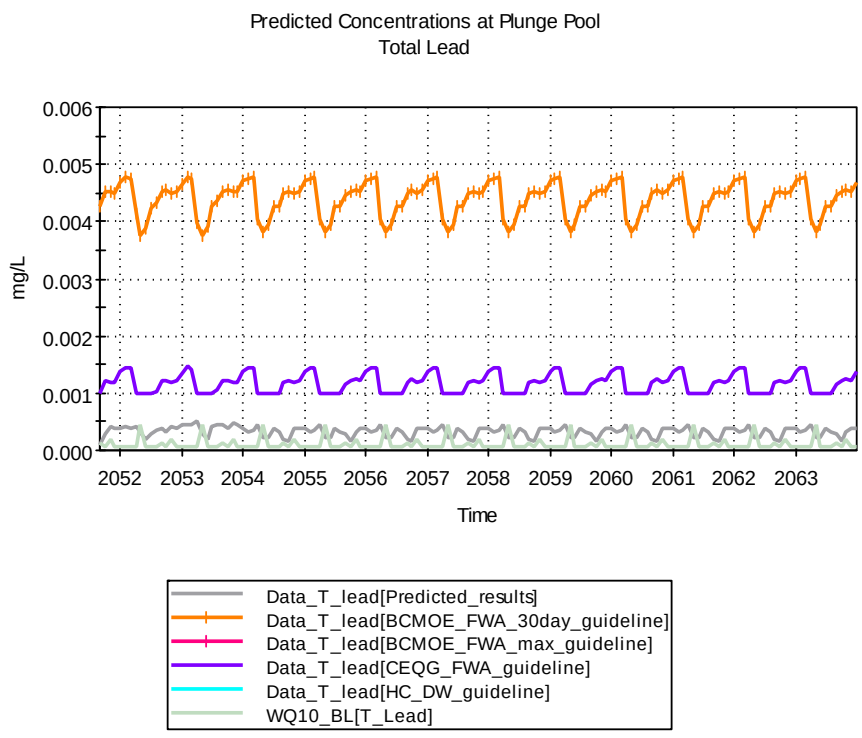


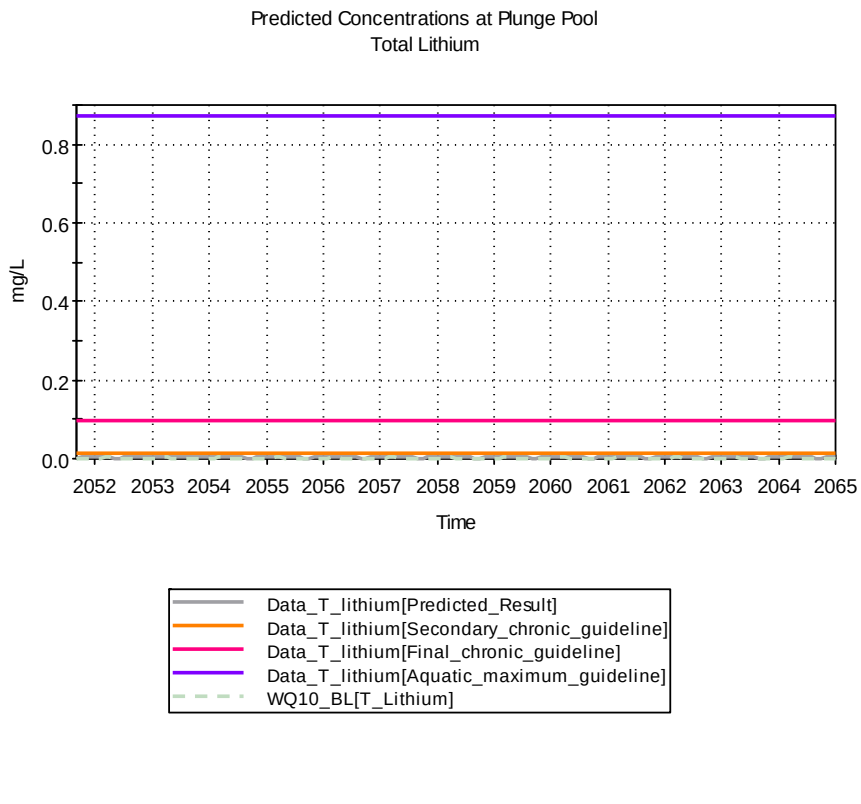




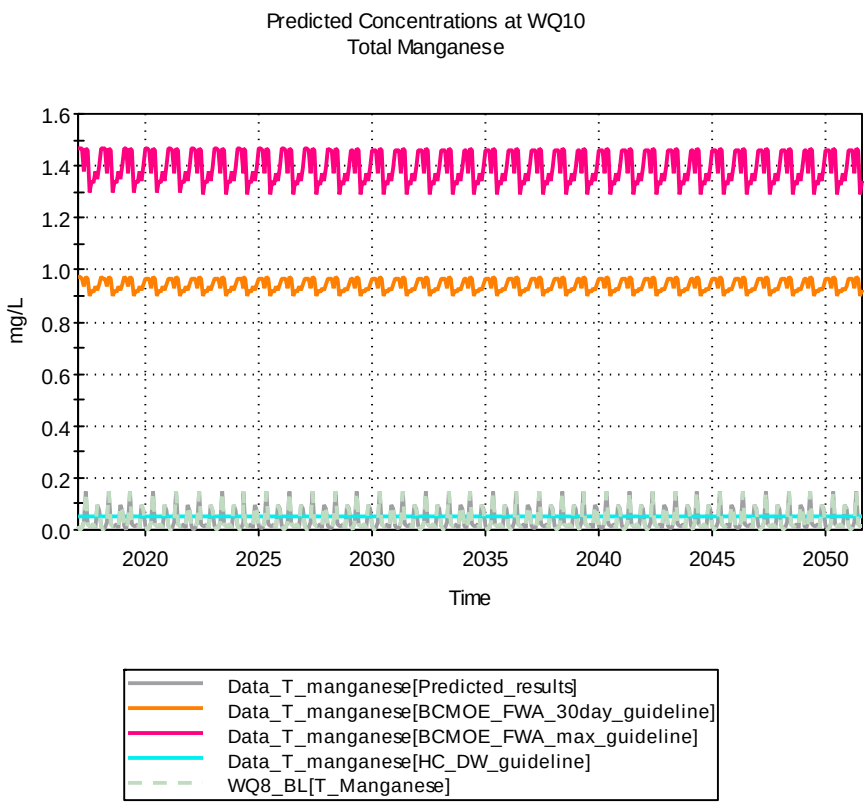
Plunge Pool – Worst Case (Post-closure)

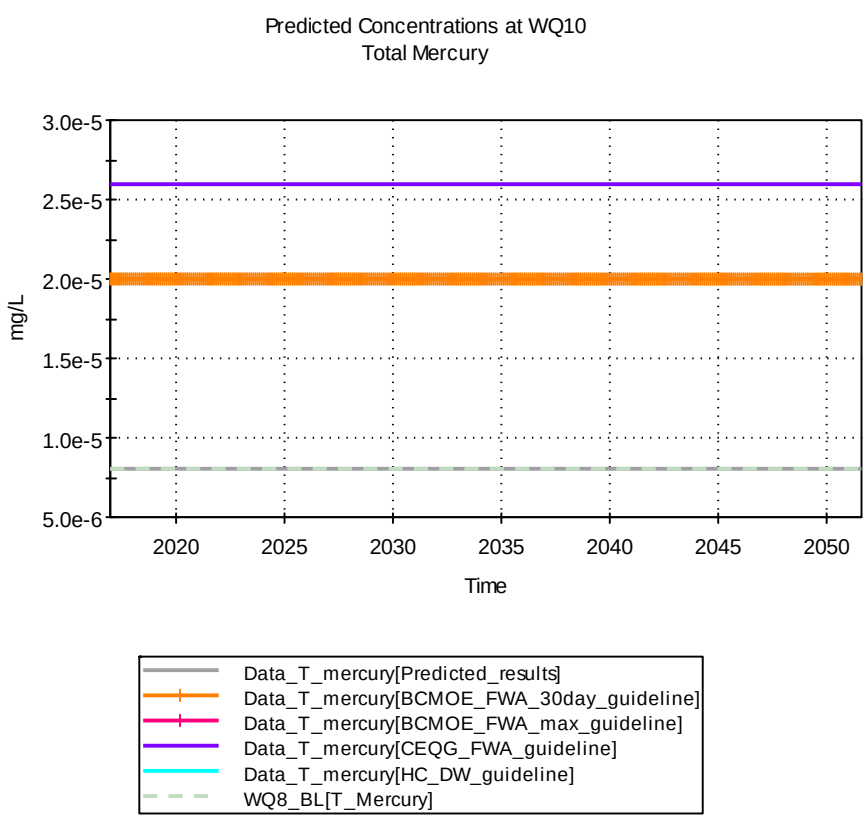


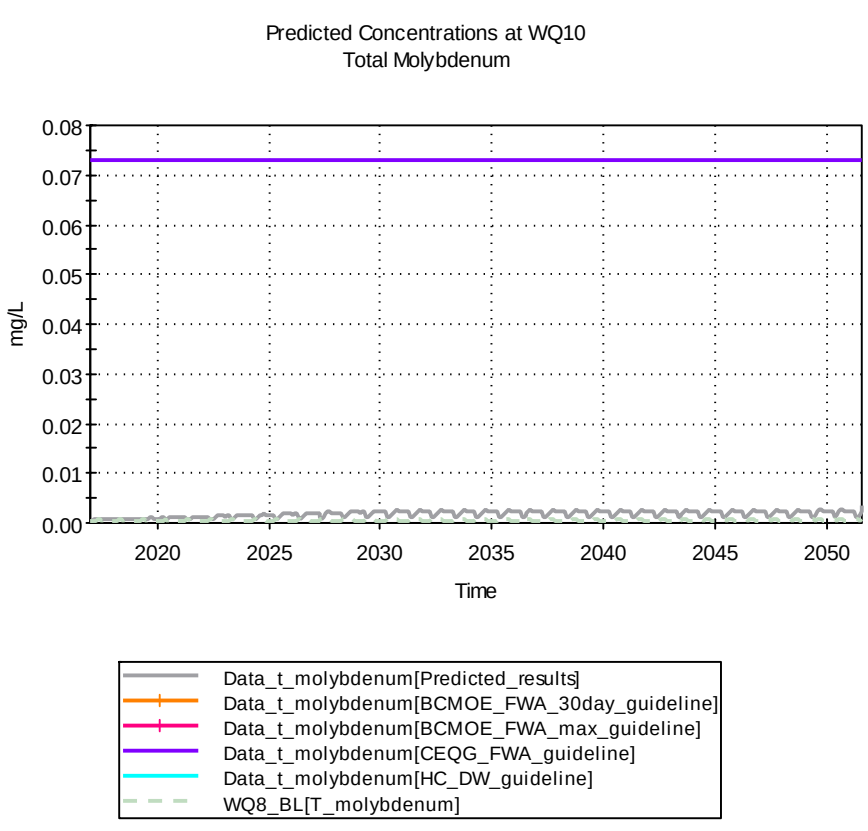




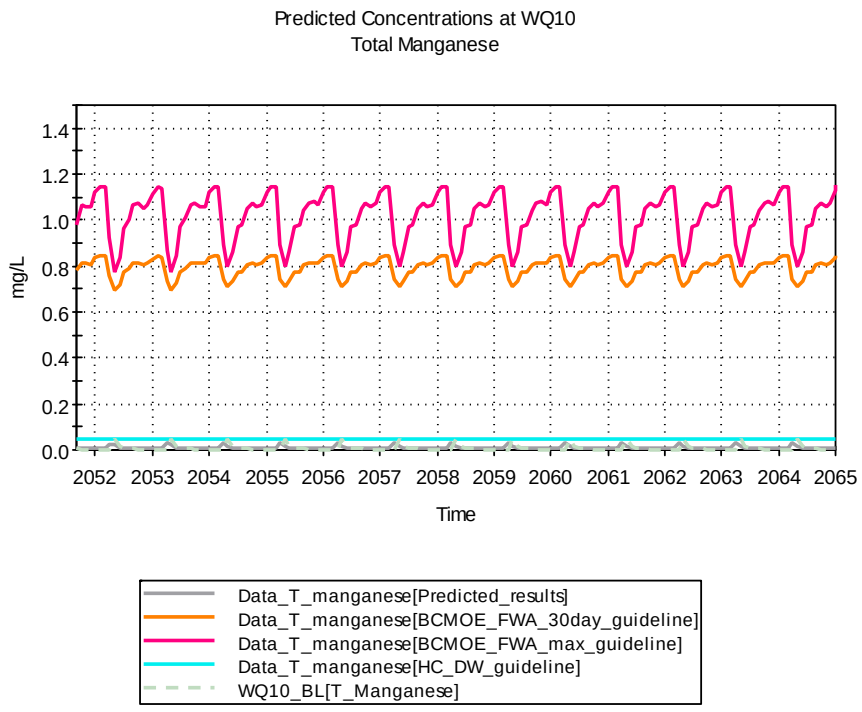
WQ10 – Worst Case (Construction, Operation, Closure)

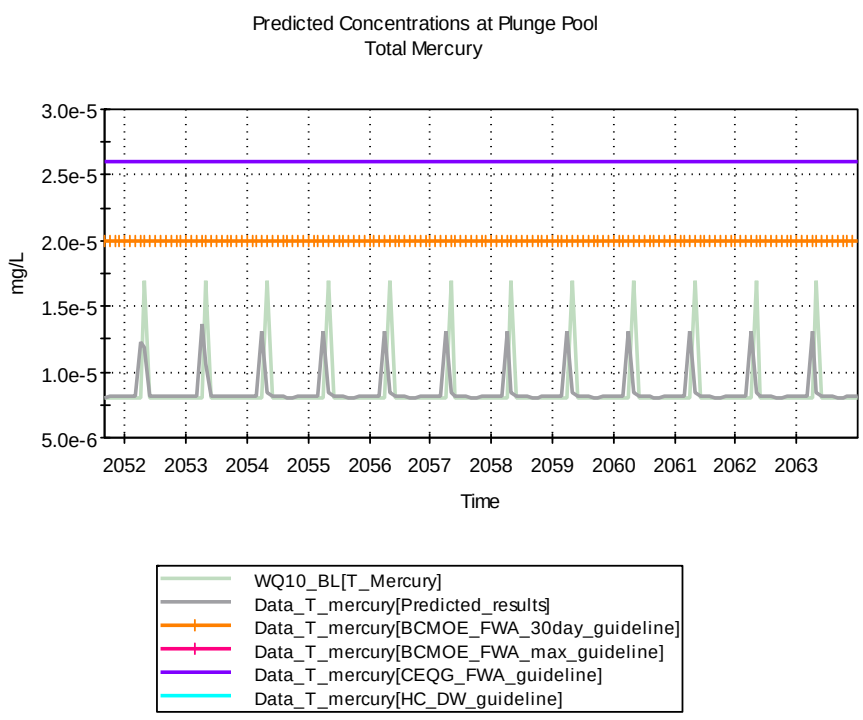


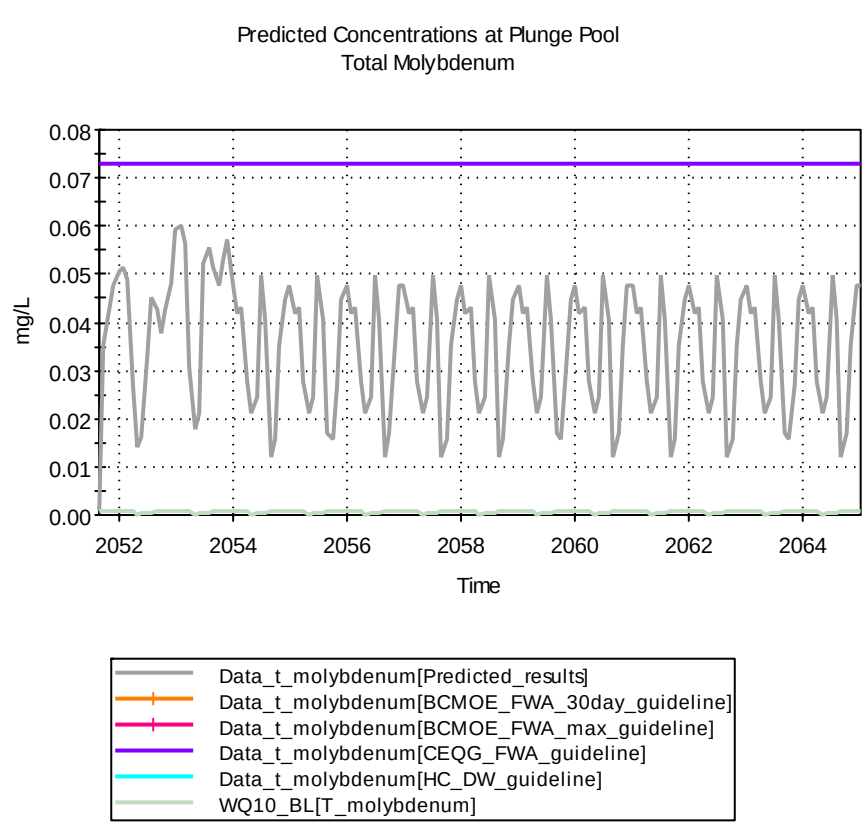




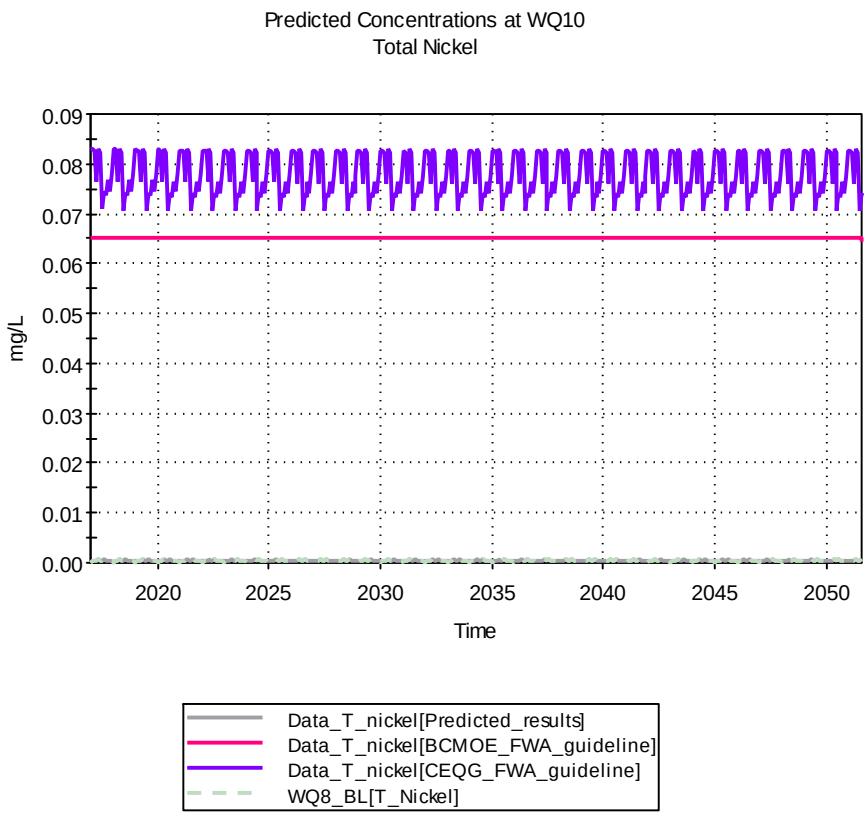
Plunge Pool – Worst Case (Post-closure)



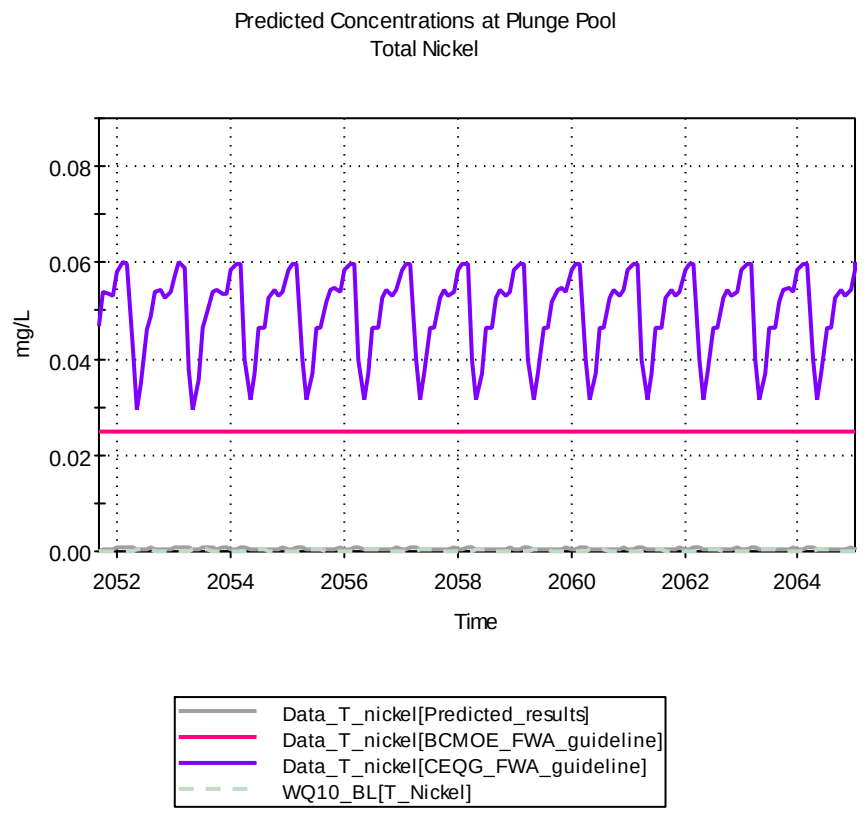


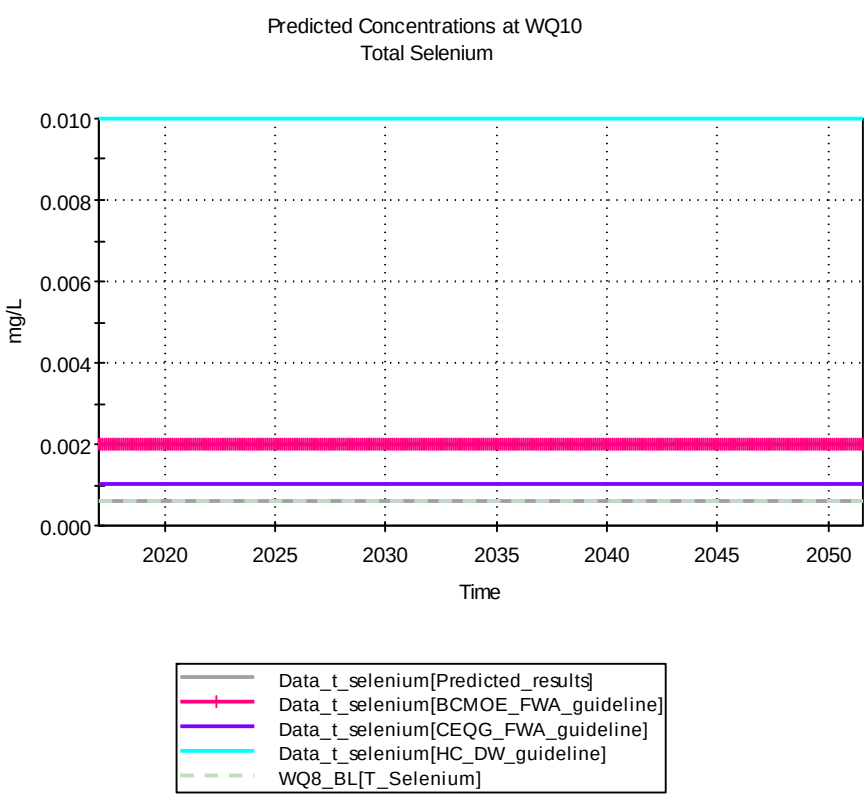


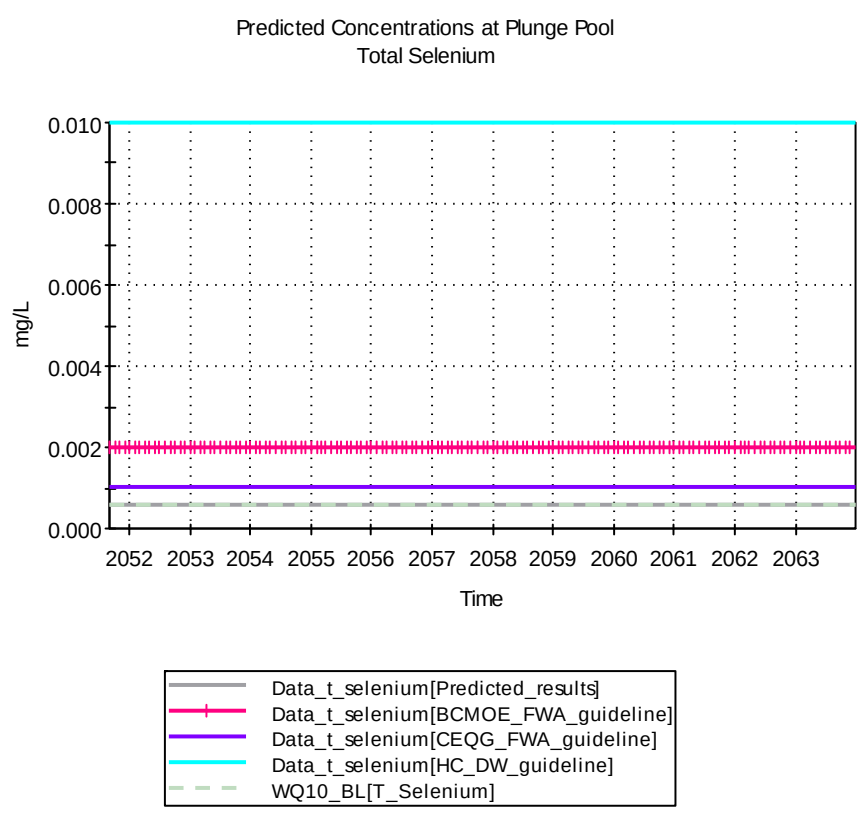
WQ10 – Worst Case (Construction, Operation, Closure)

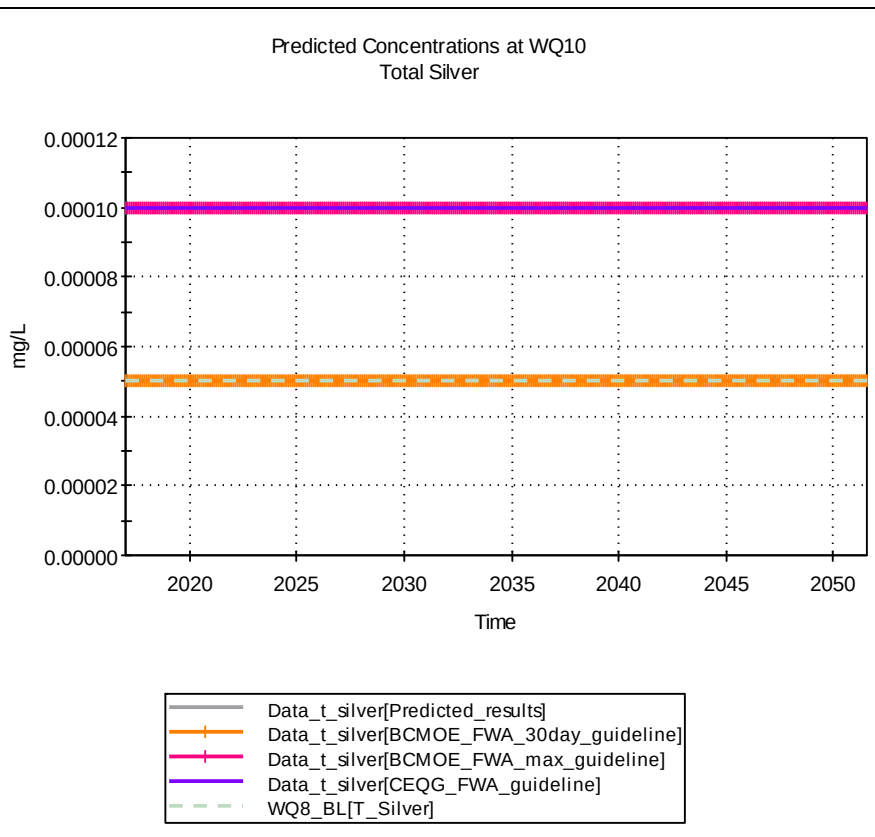


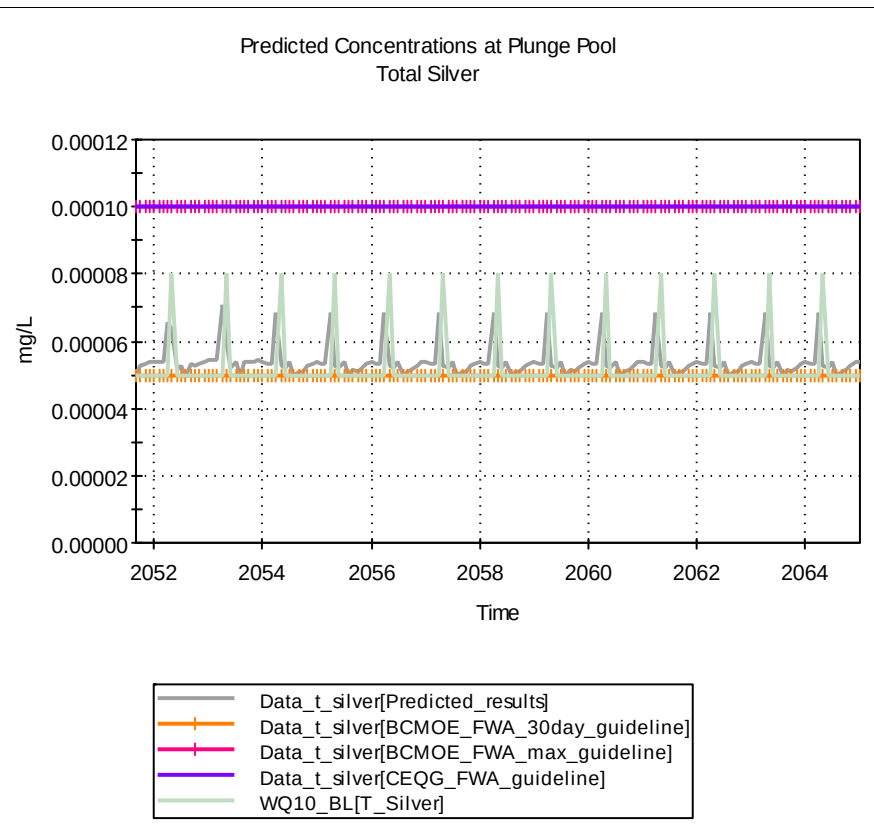
Plunge Pool – Worst Case (Post-closure)



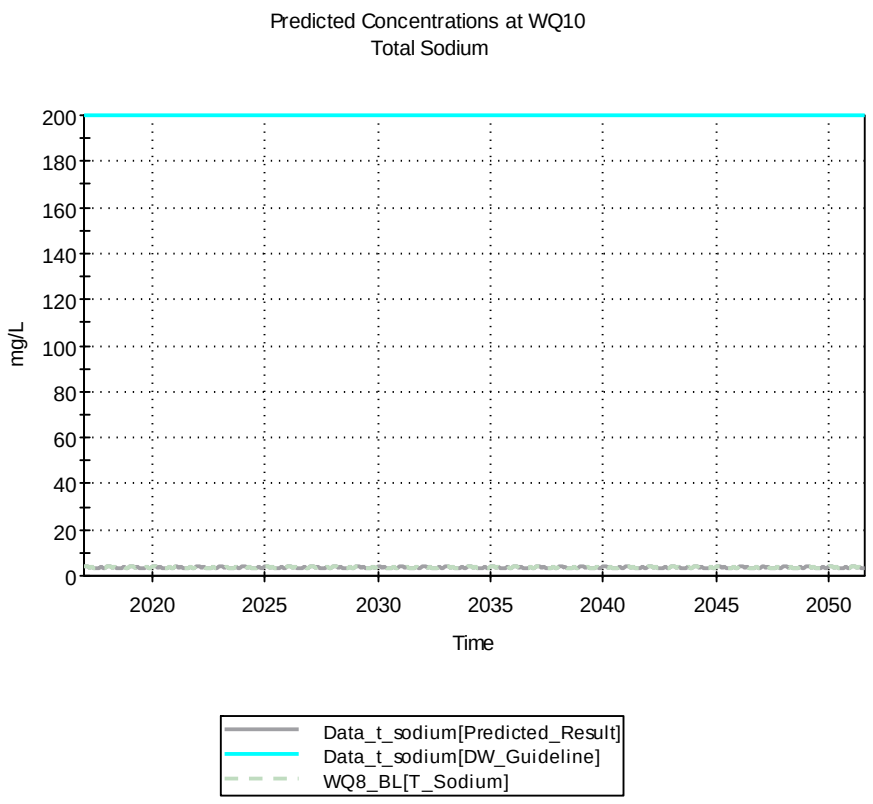


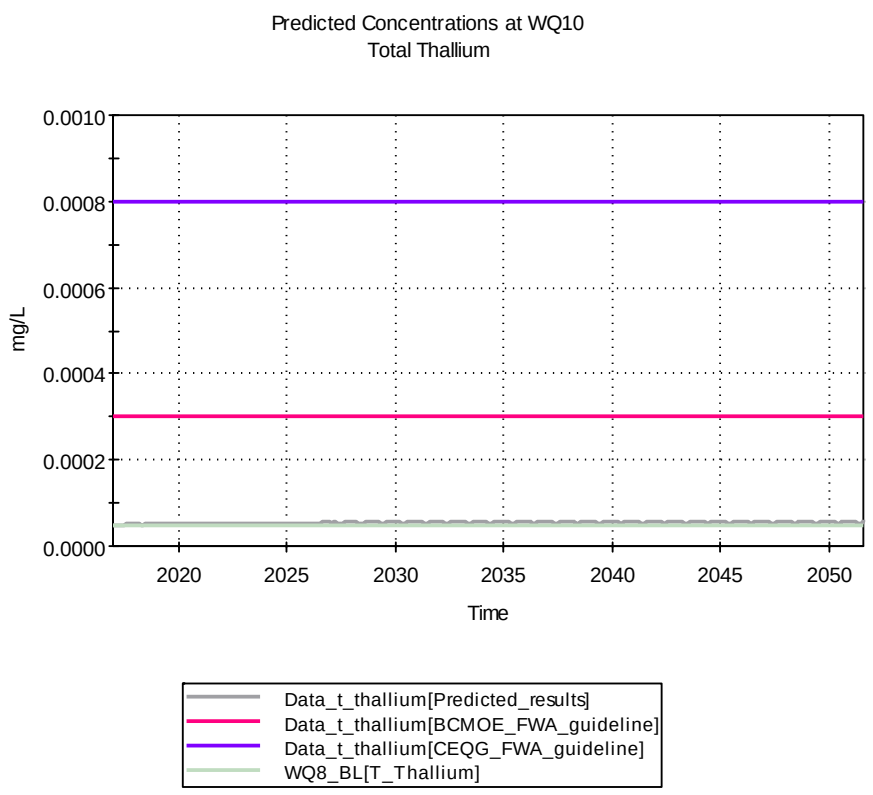


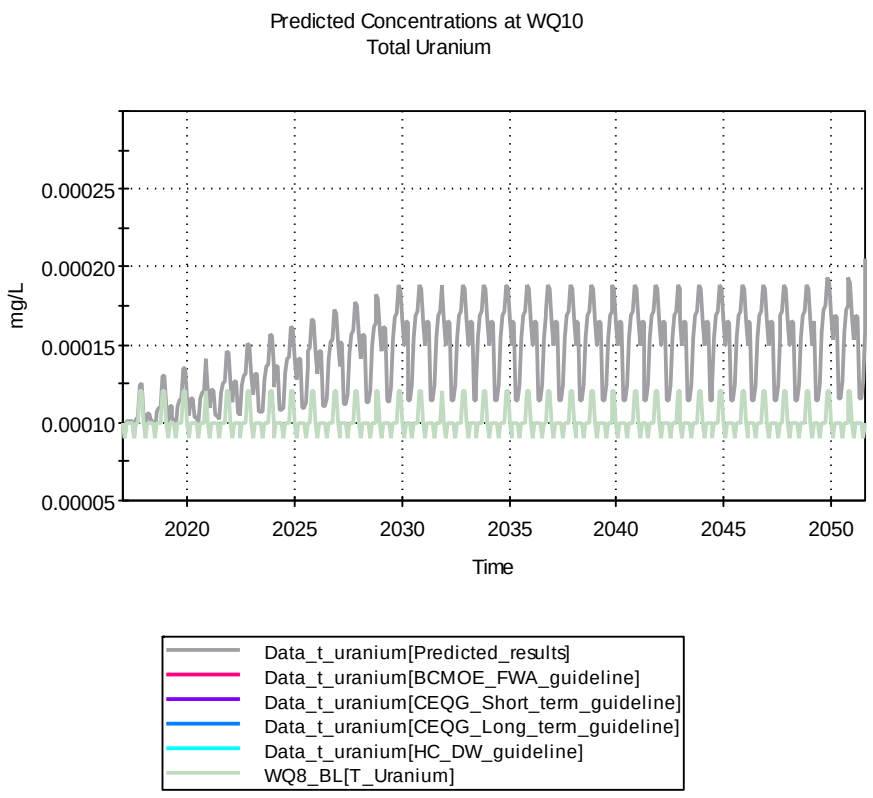




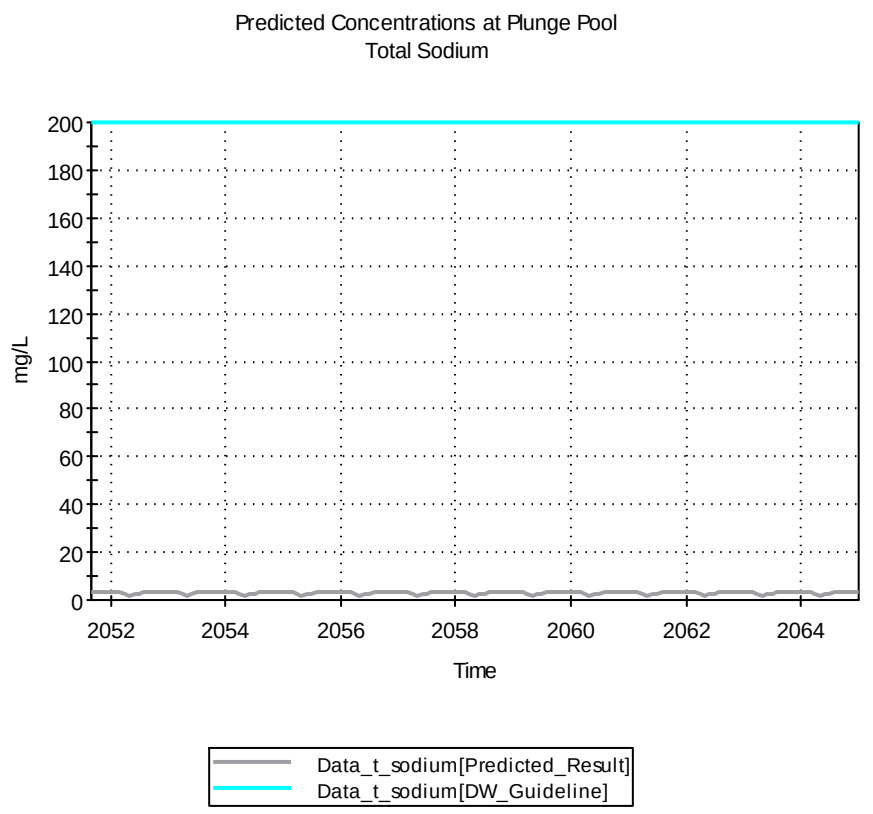
WQ10 – Worst Case (Construction, Operation, Closure)

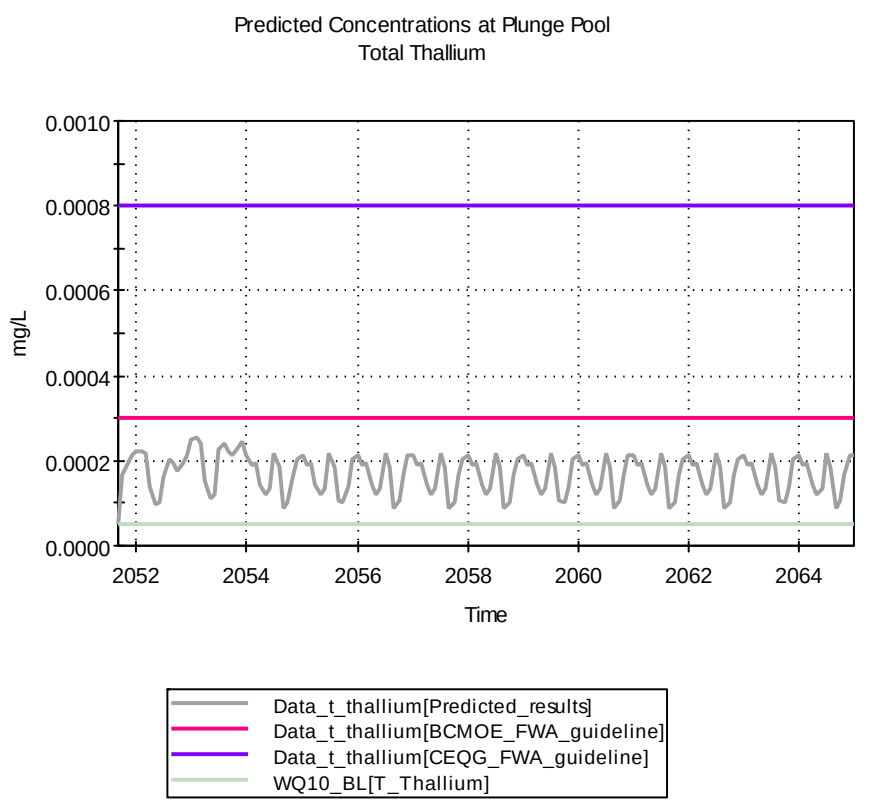


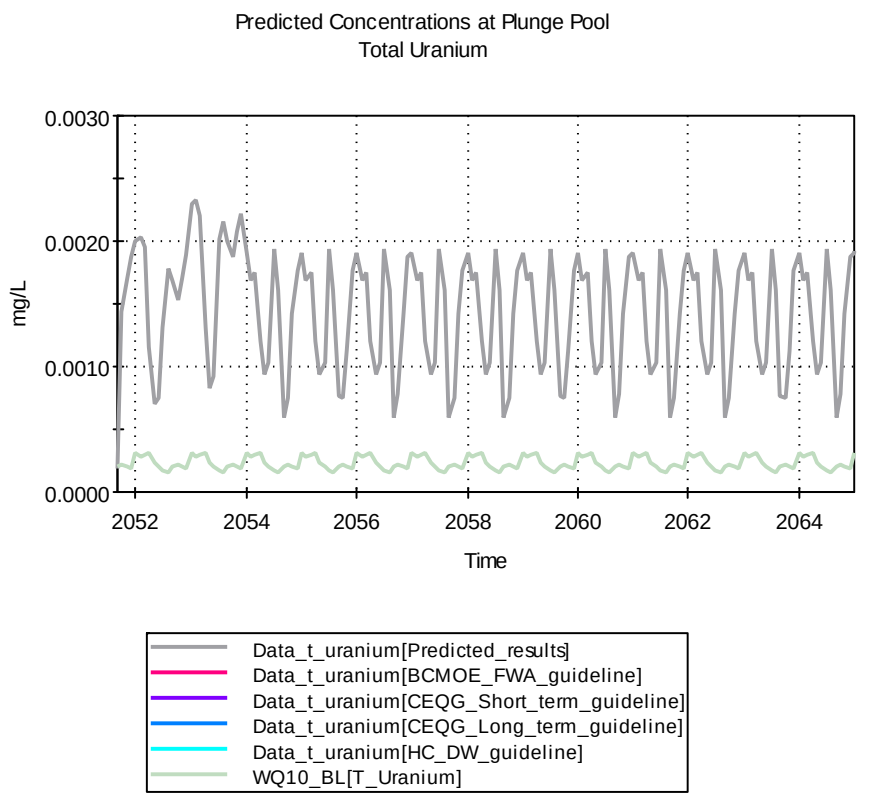




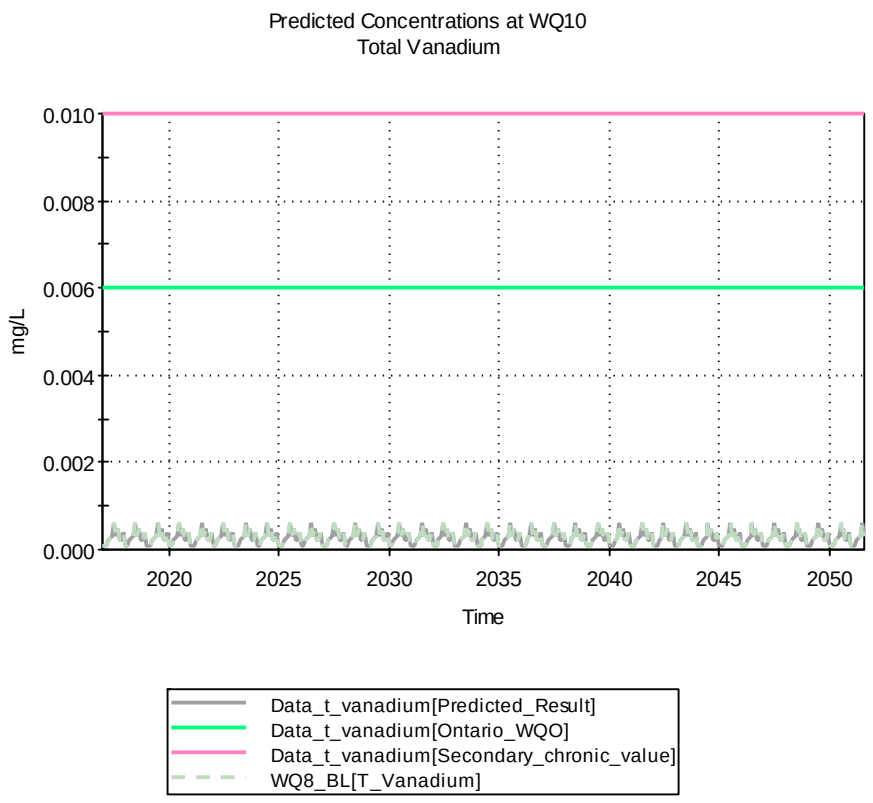
Plunge Pool – Worst Case (Post-closure)



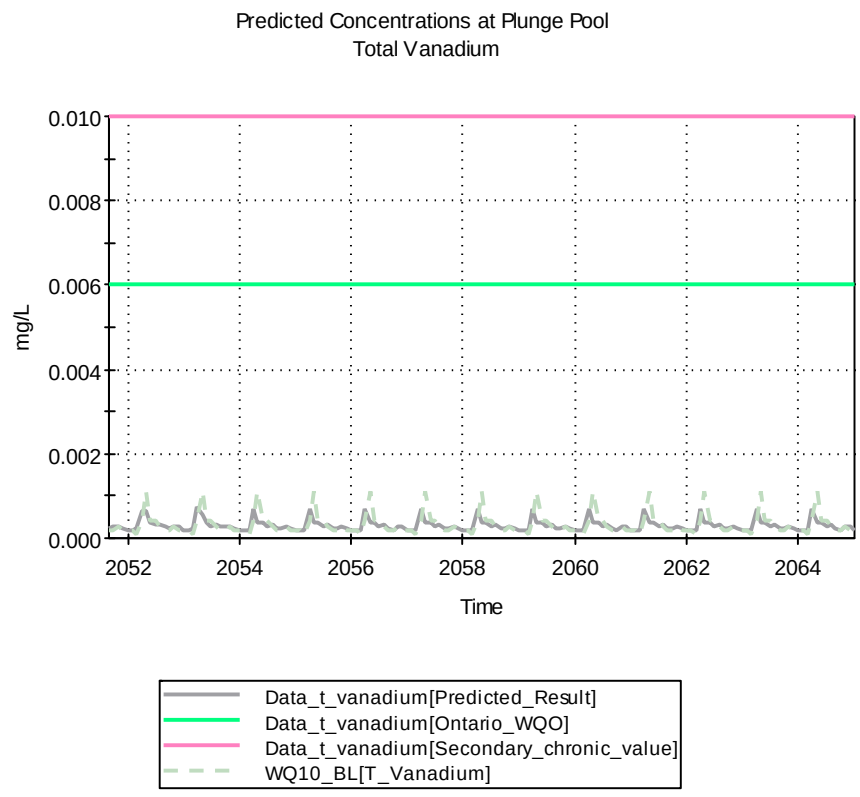


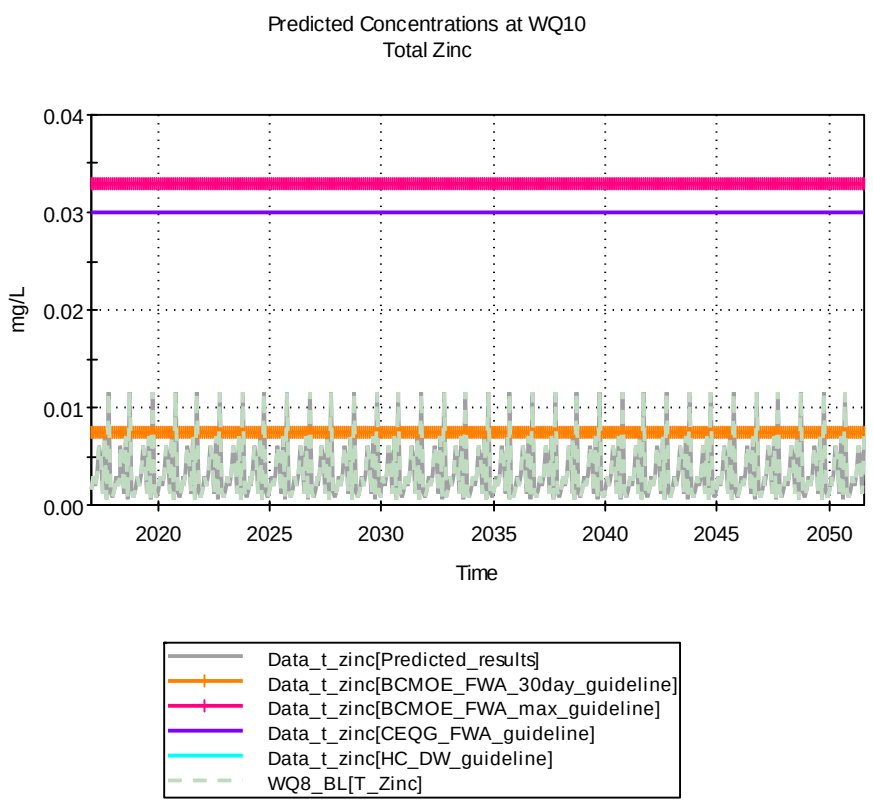


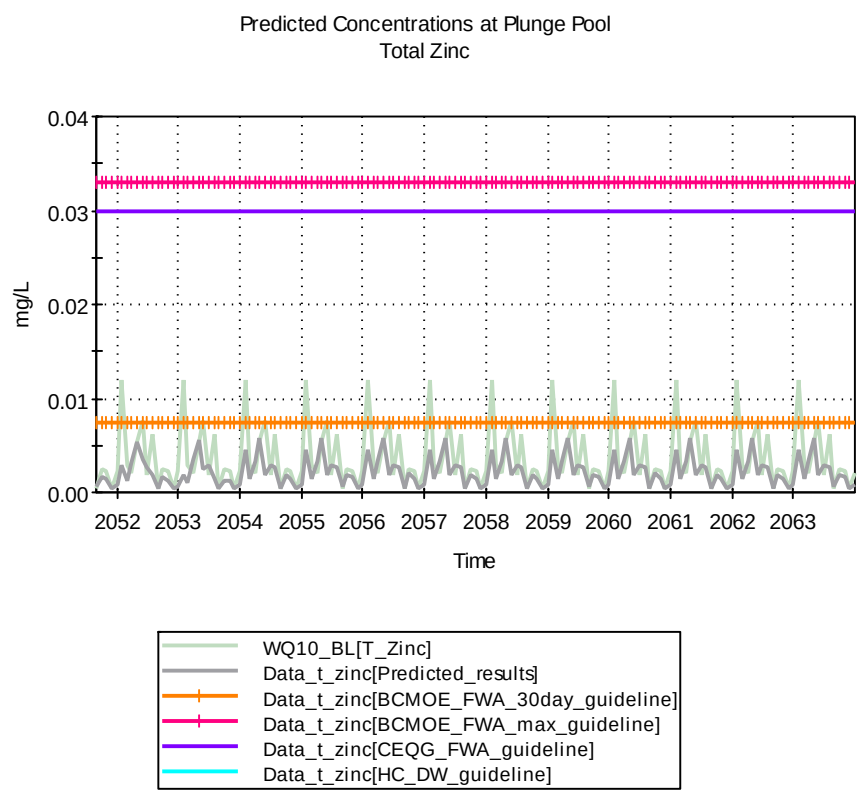
WQ10 – Worst Case (Construction, Operation, Closure)

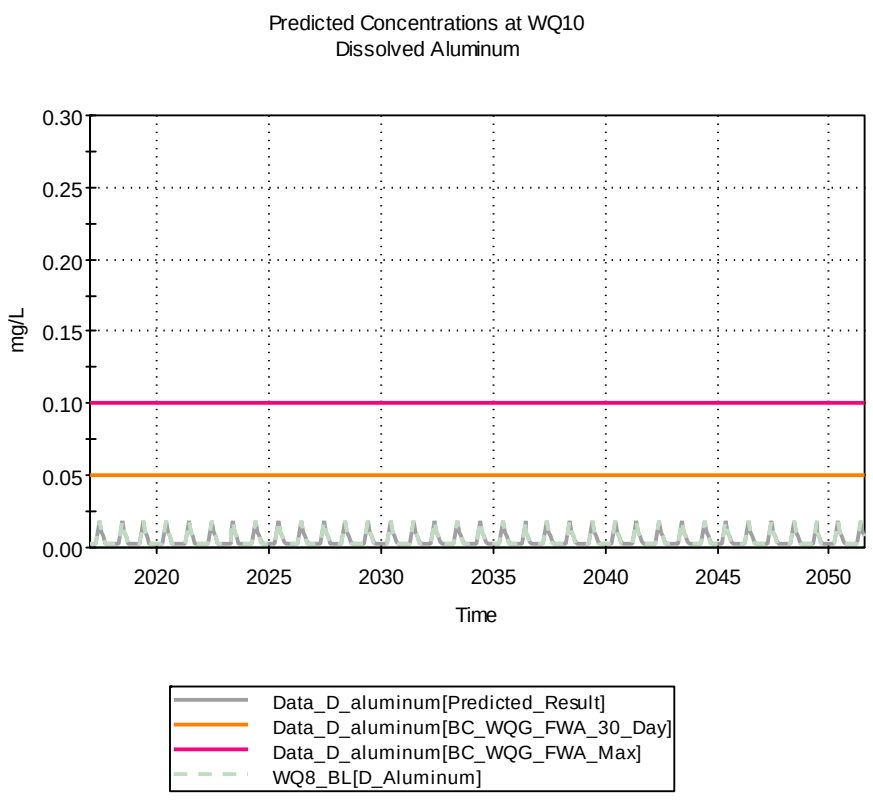


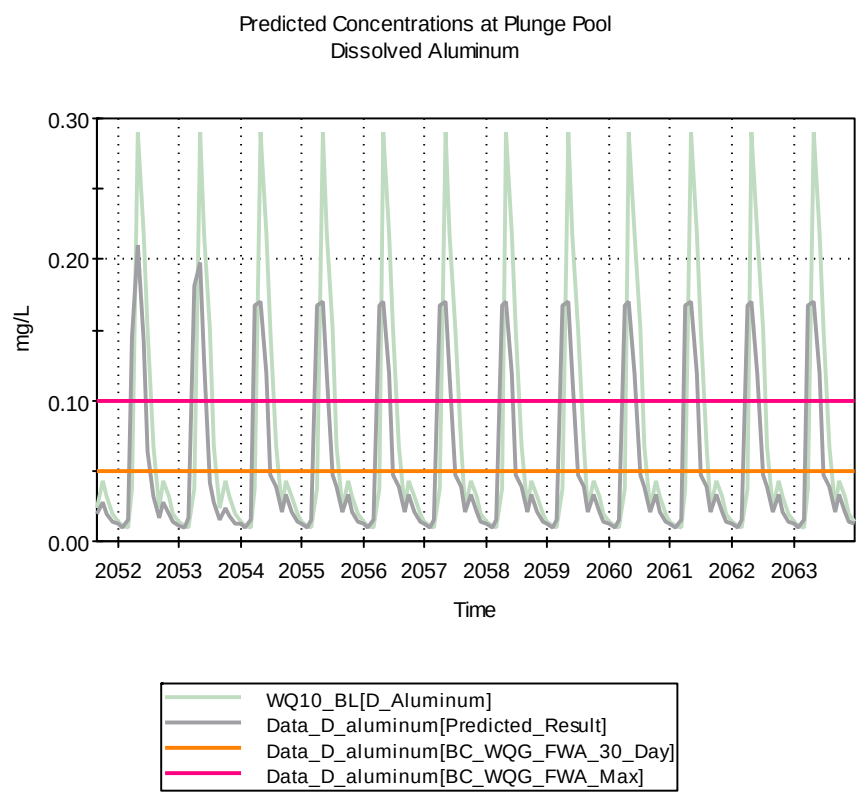
Plunge Pool – Worst Case (Post-closure)



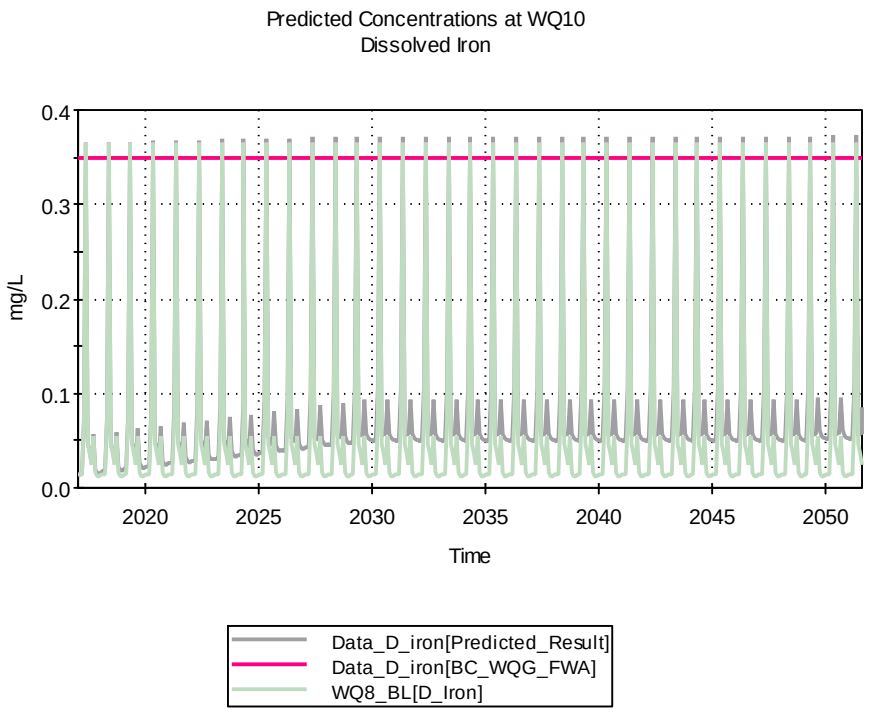


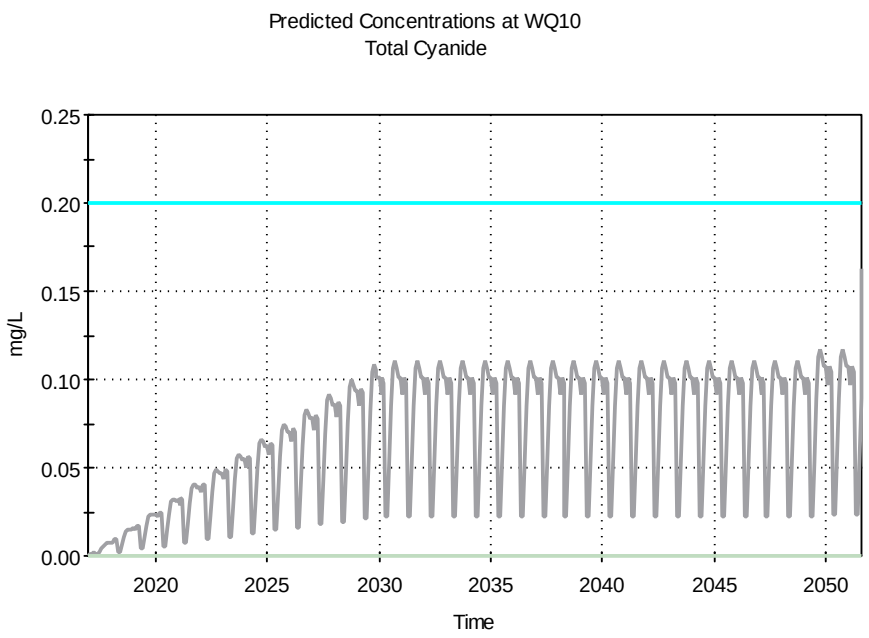


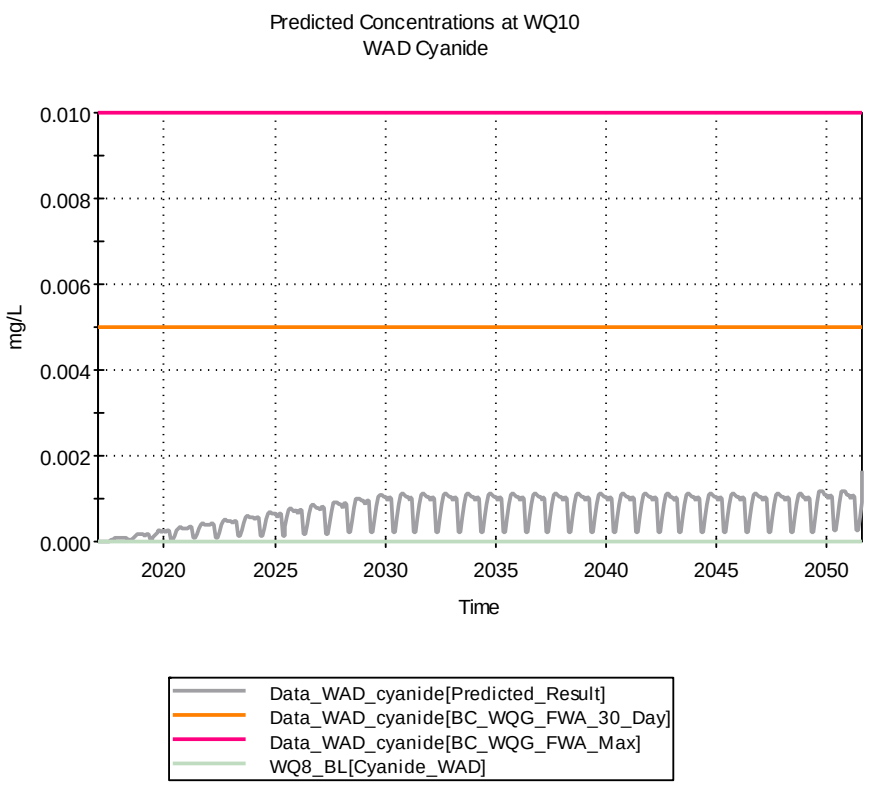




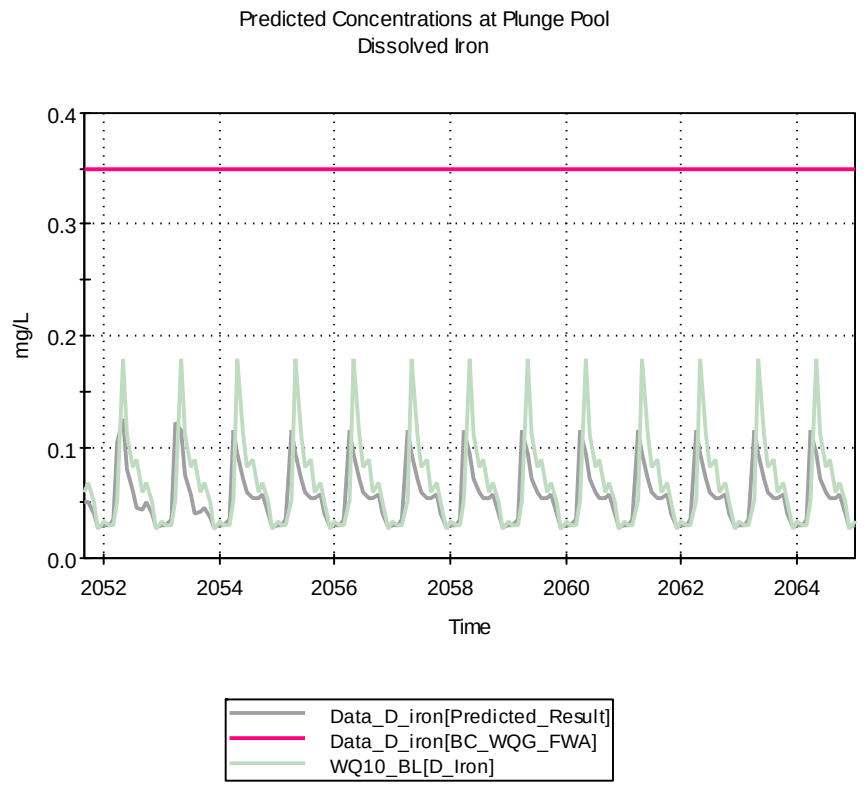
WQ10 – Worst Case (Construction, Operation, Closure)

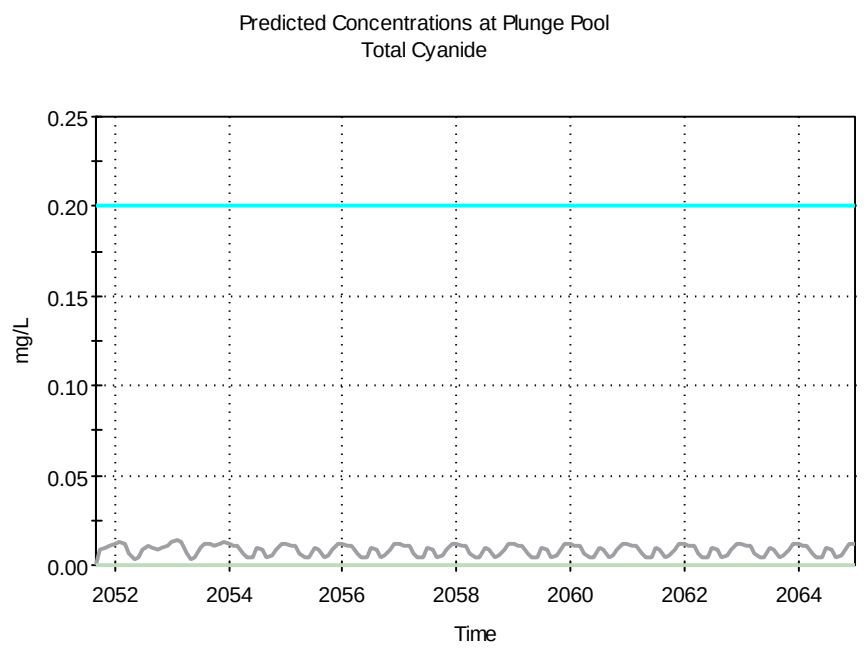


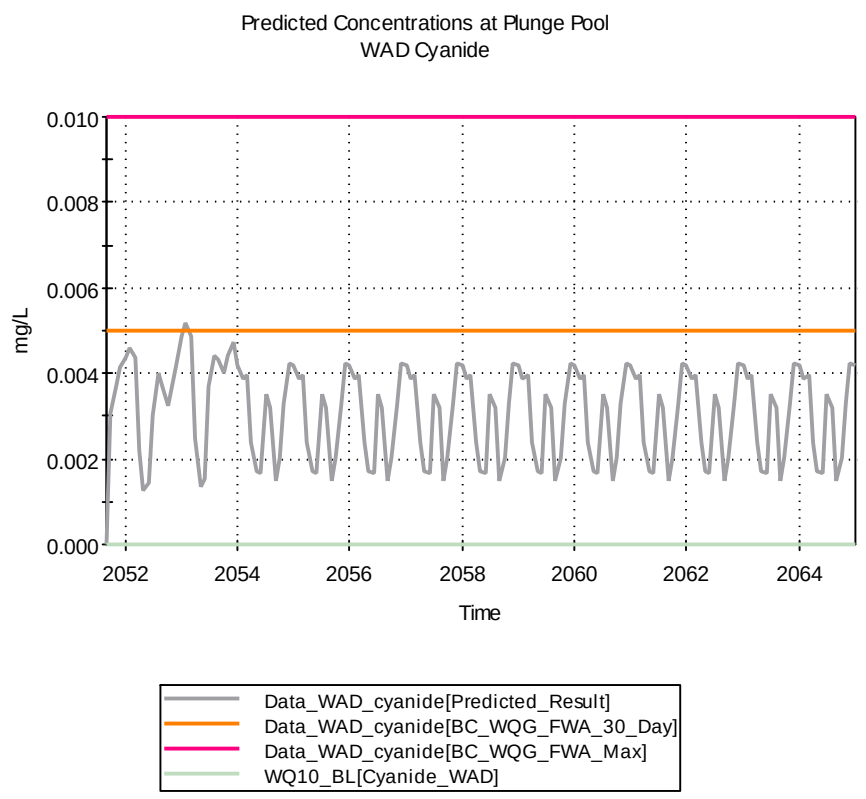




Plunge Pool – Worst Case (Post-closure)



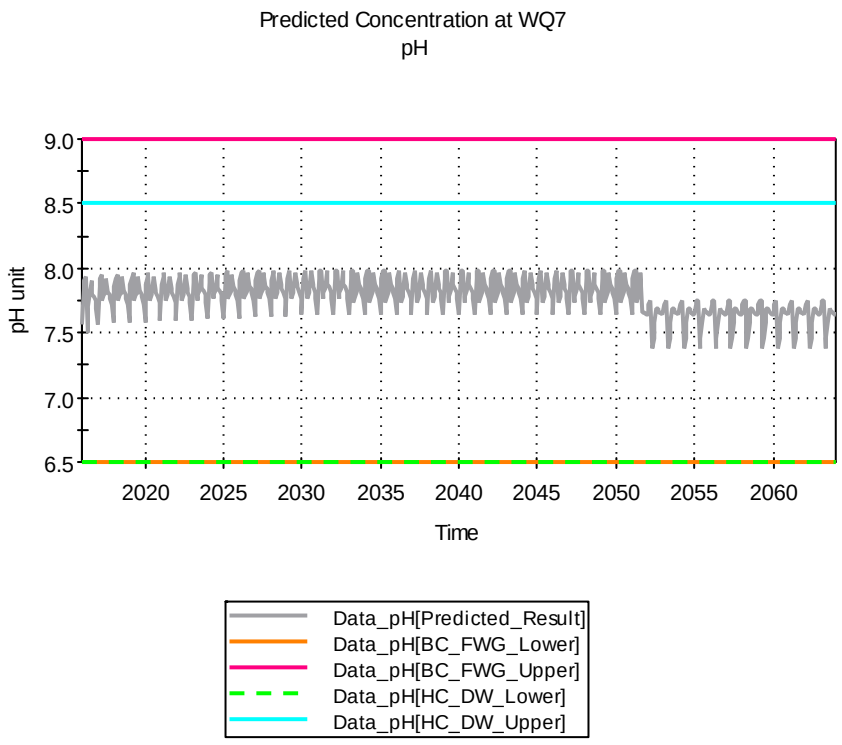


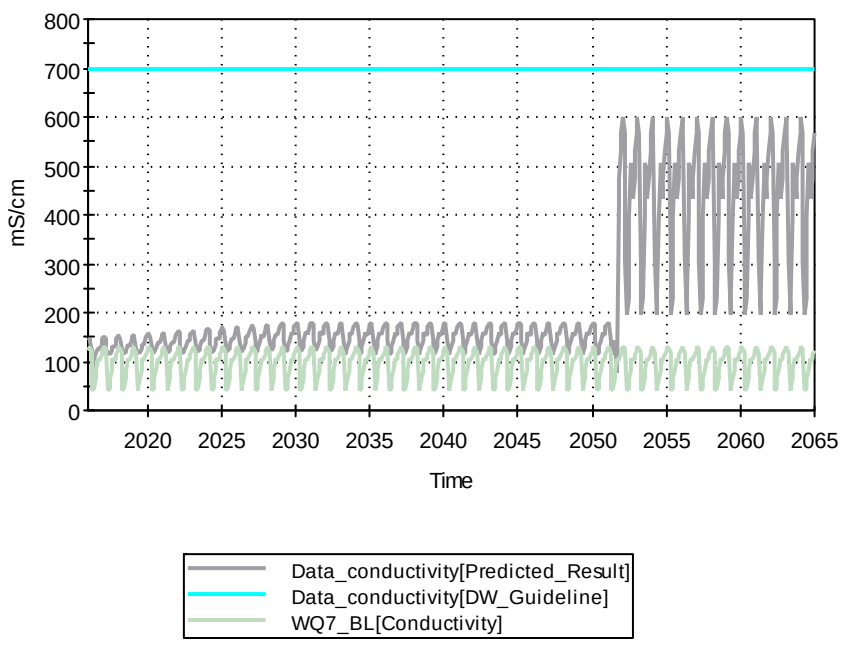


Annex A-2

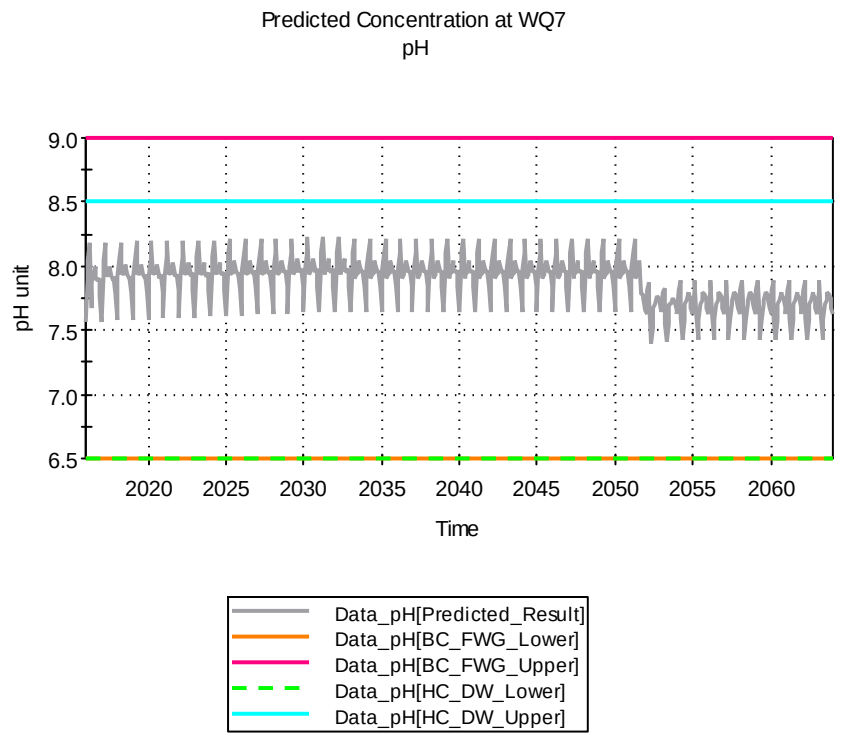
Graphical Outputs of the Predicted Water Quality at WQ7 – Best Estimate and Worst Case

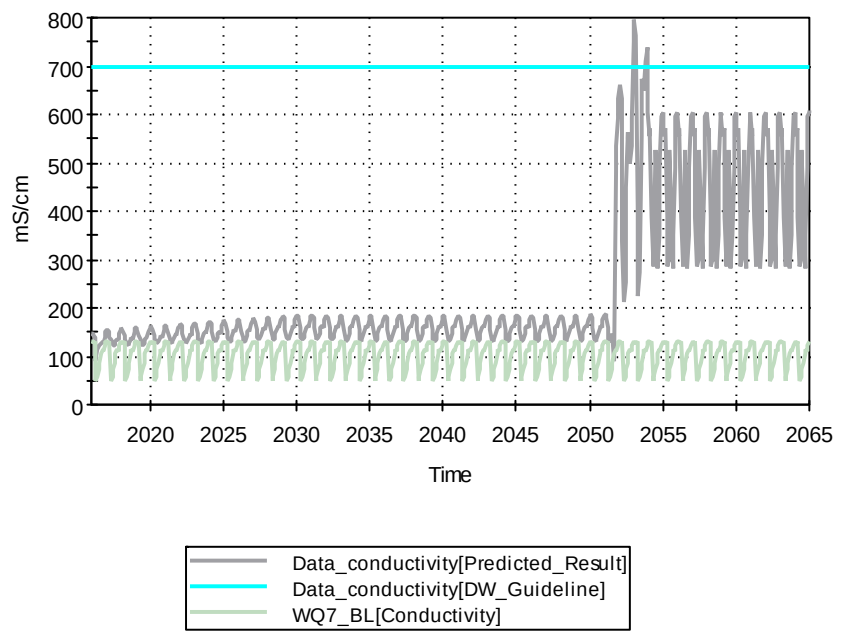
WQ7 – Best estimate



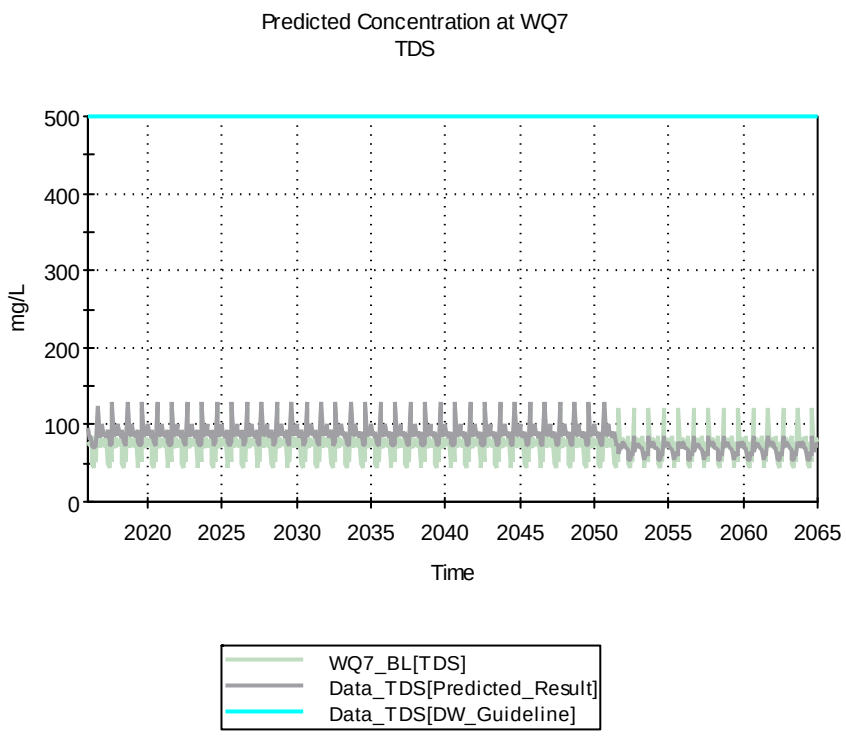


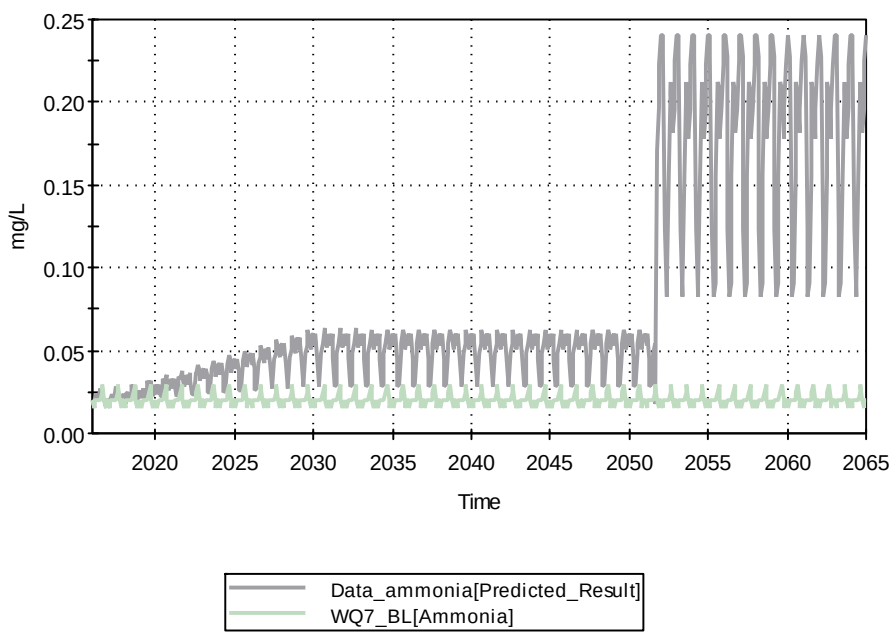
WQ7 –Worst Case

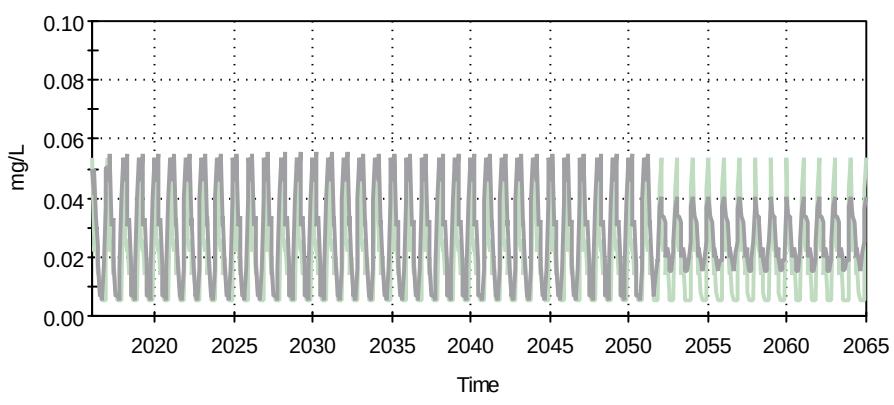




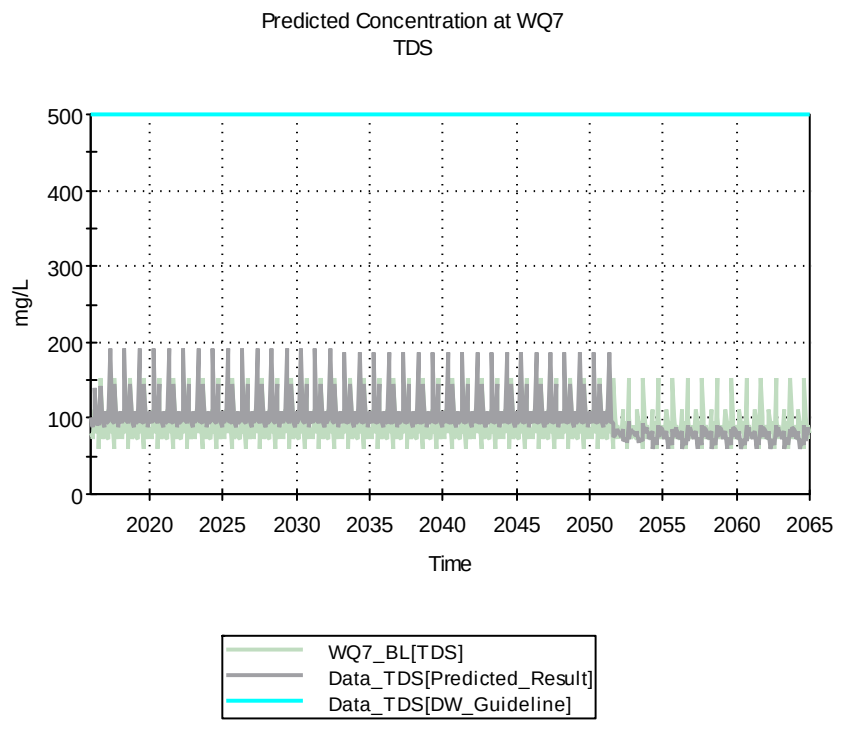
WQ7 – Best estimate

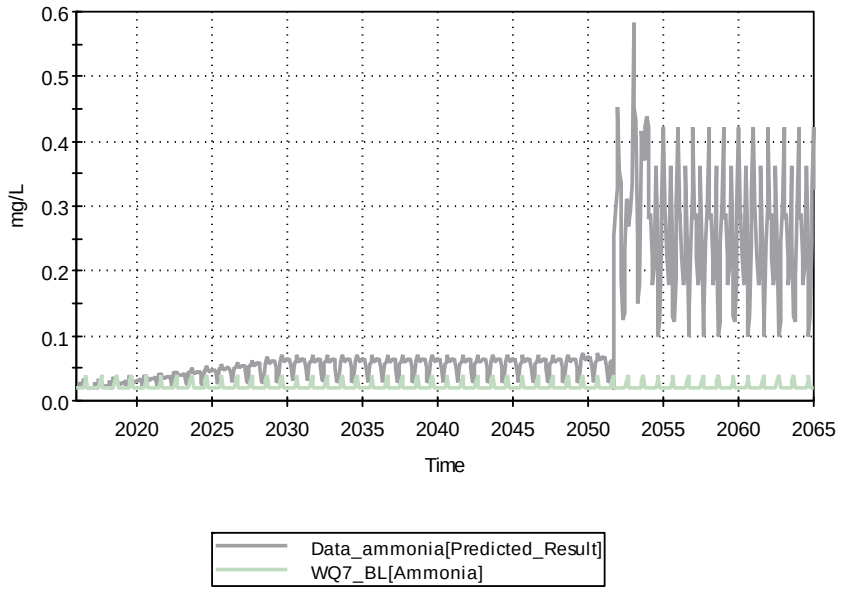


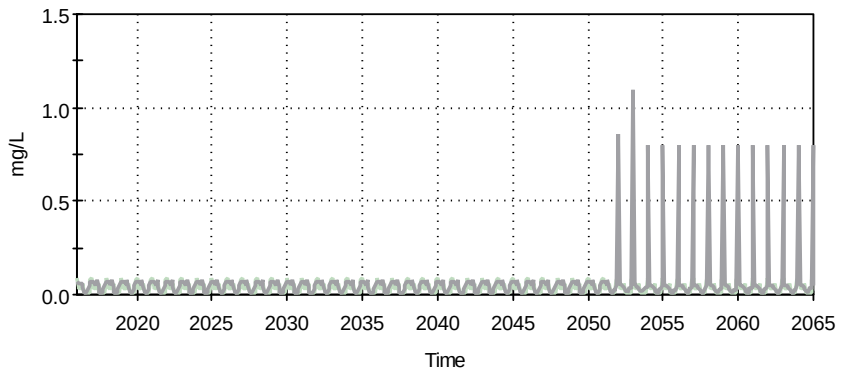




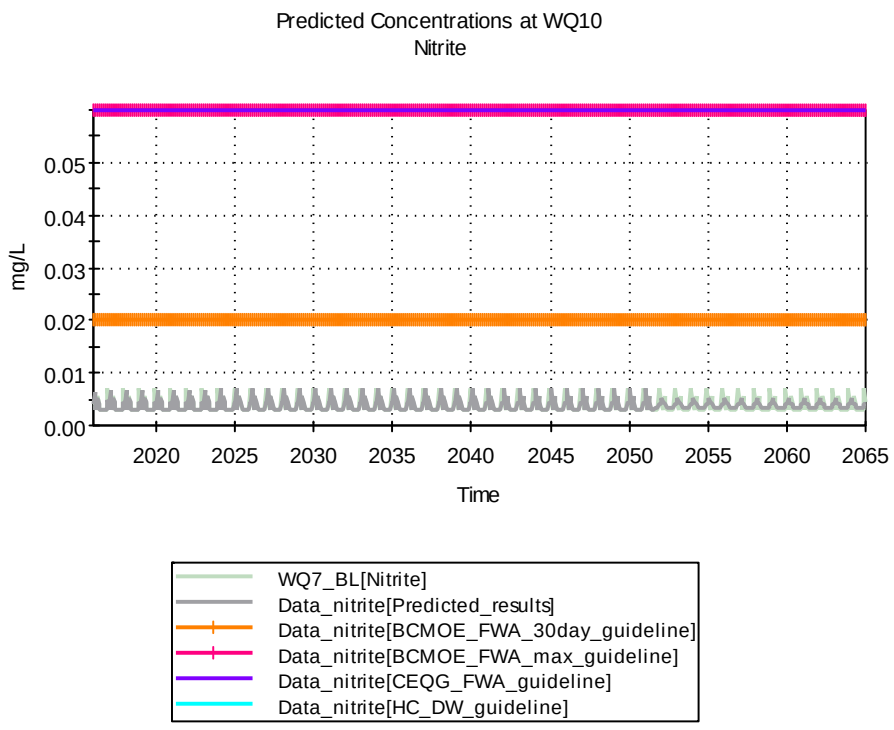
WQ7 –Worst Case

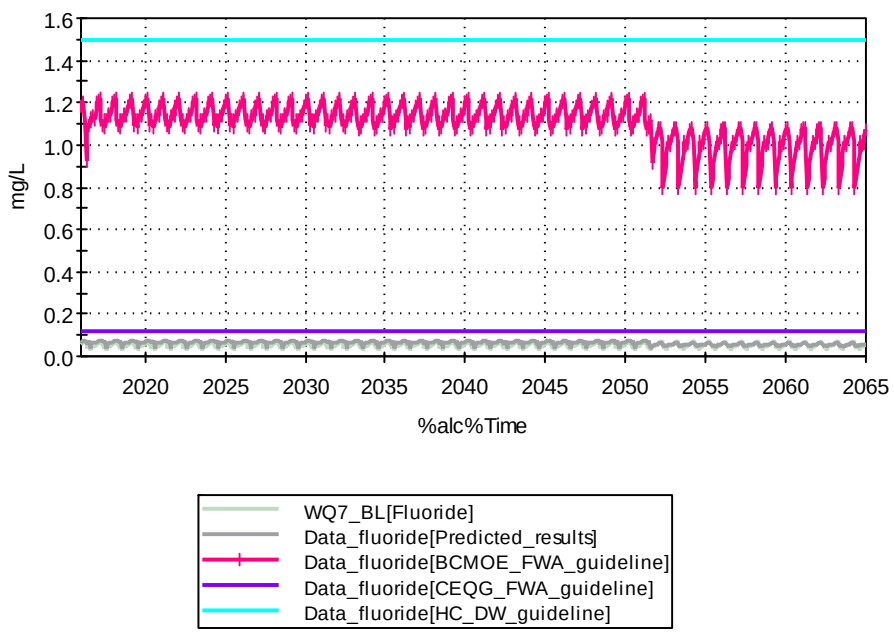


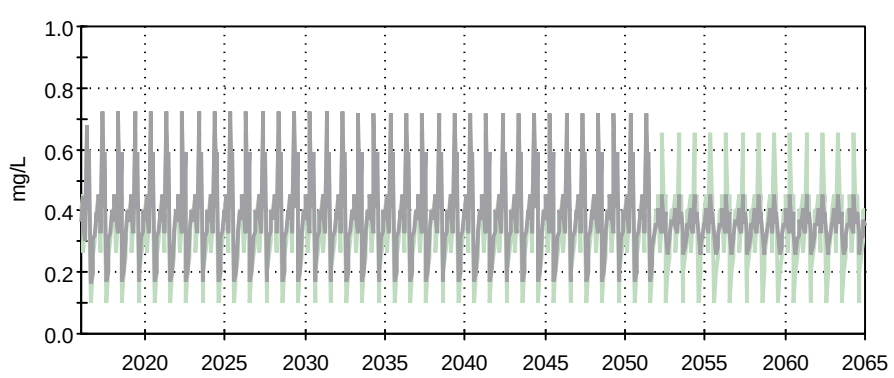




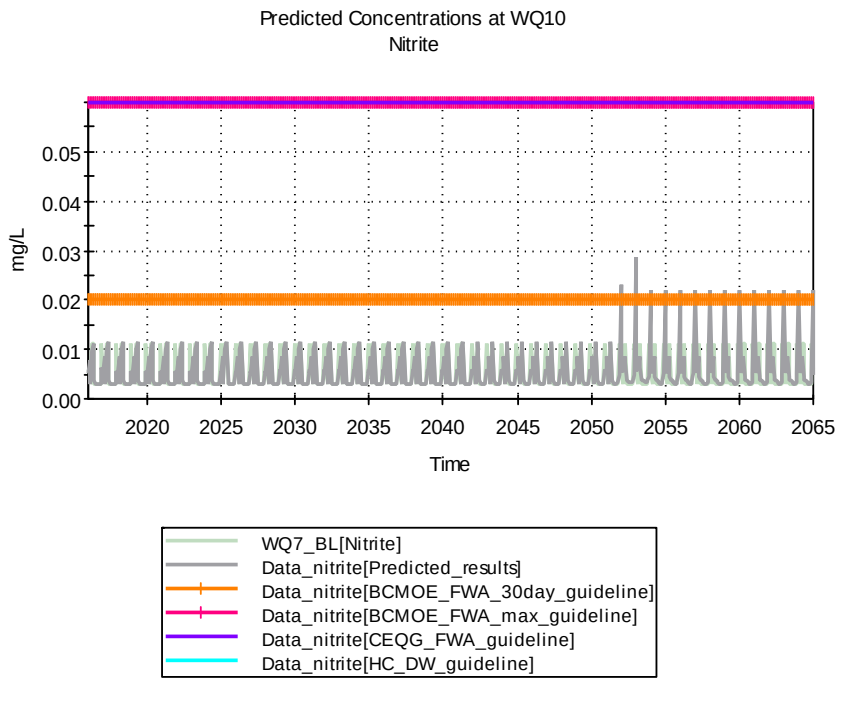
WQ7 – Best estimate

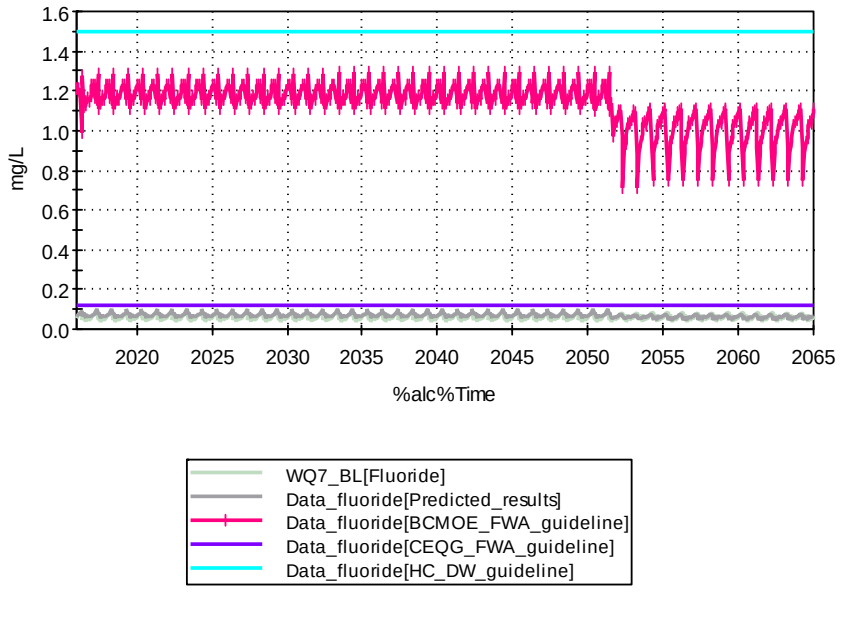


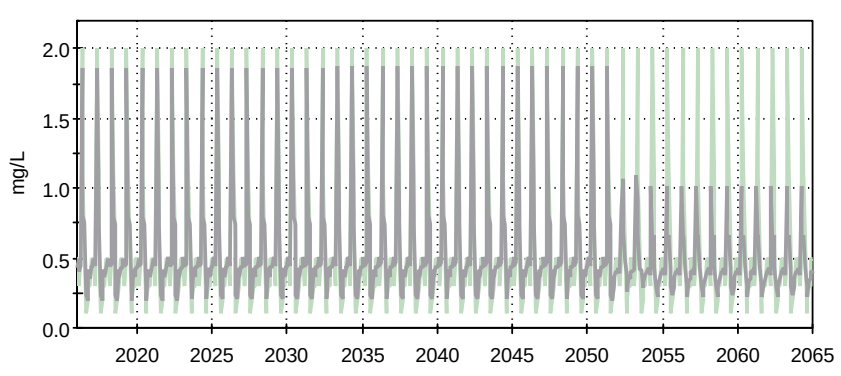




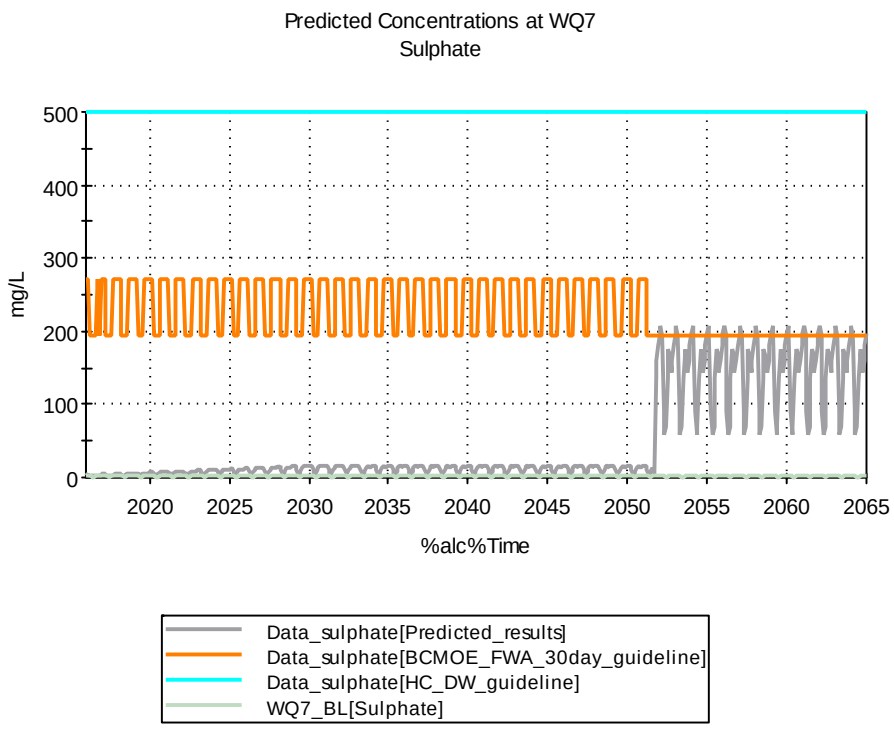
WQ7 –Worst Case



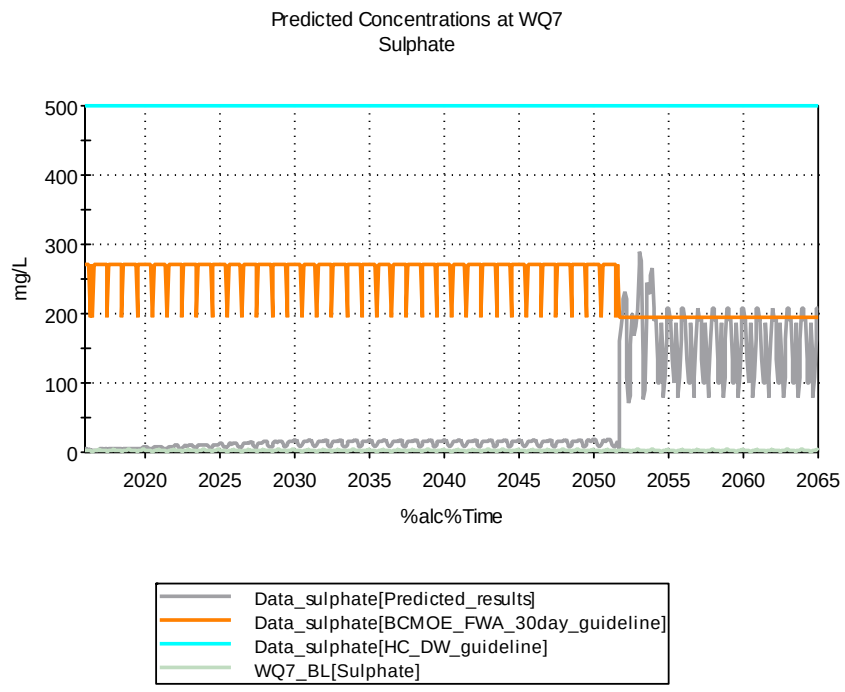


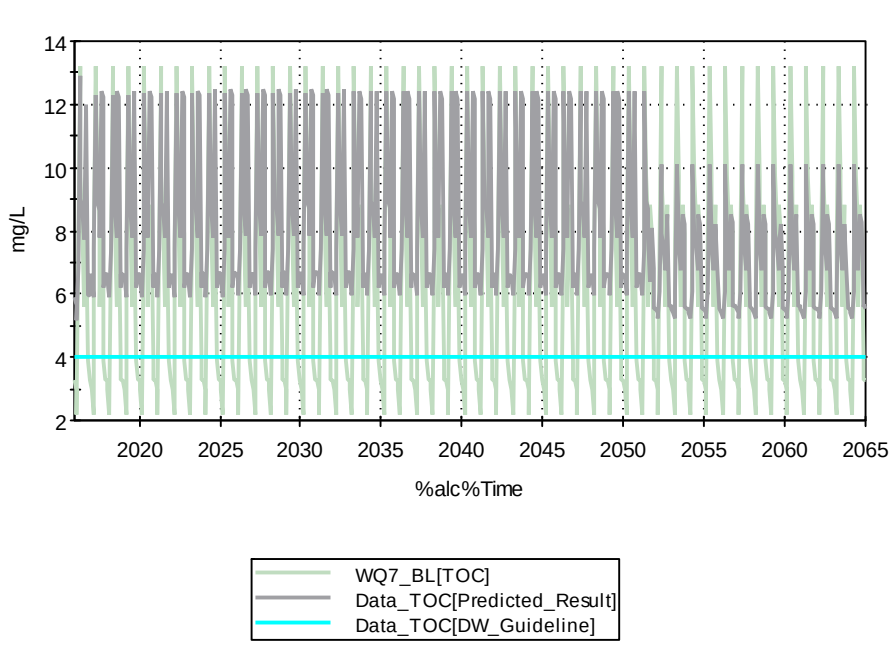


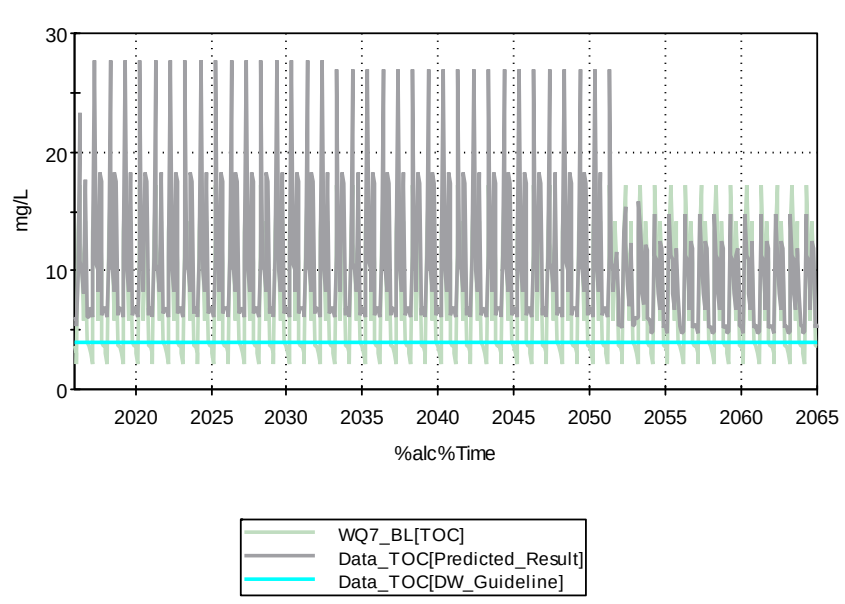
WQ7 – Best estimate

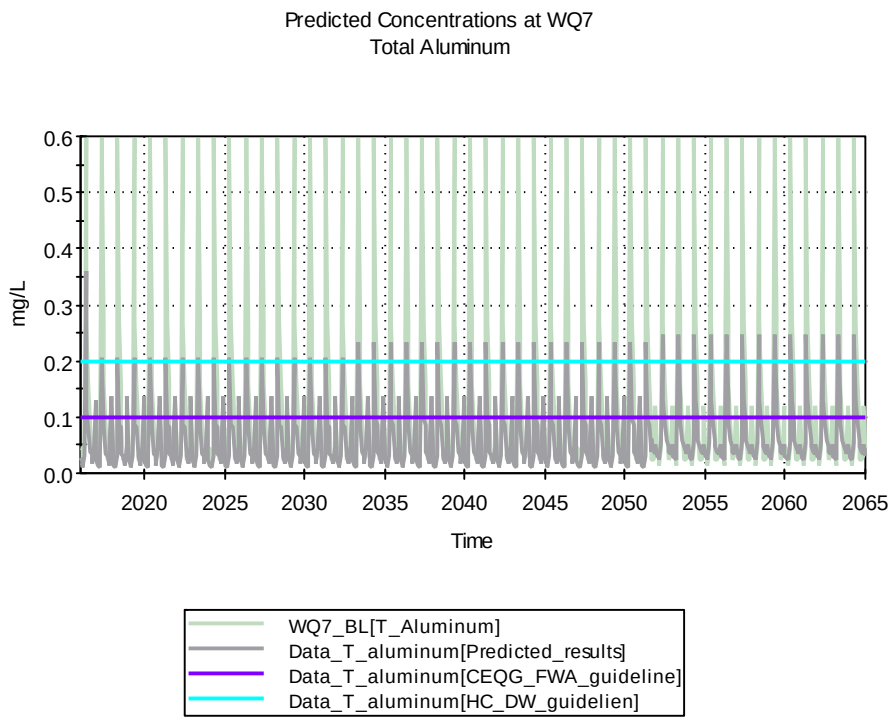


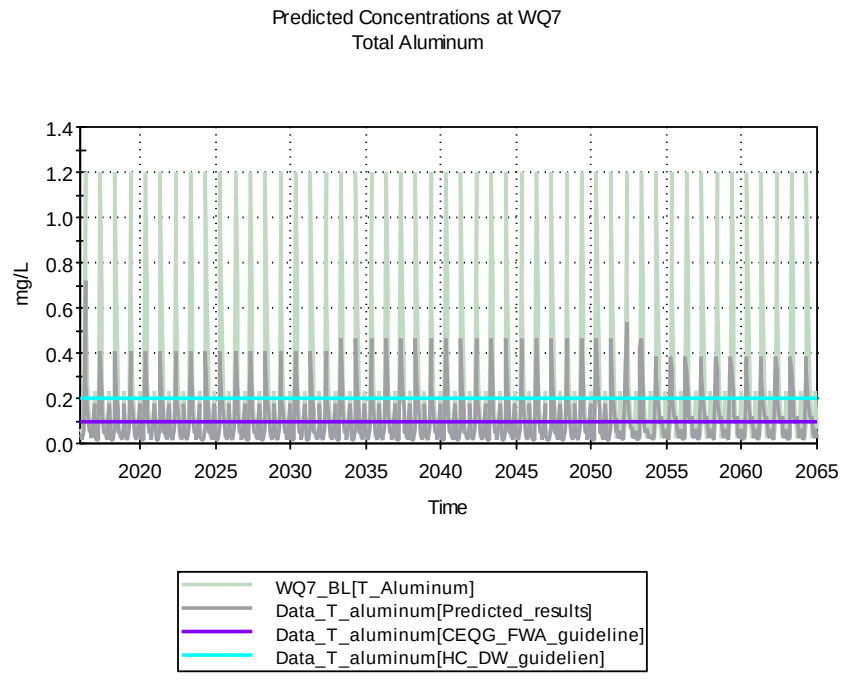
WQ7 –Worst Case



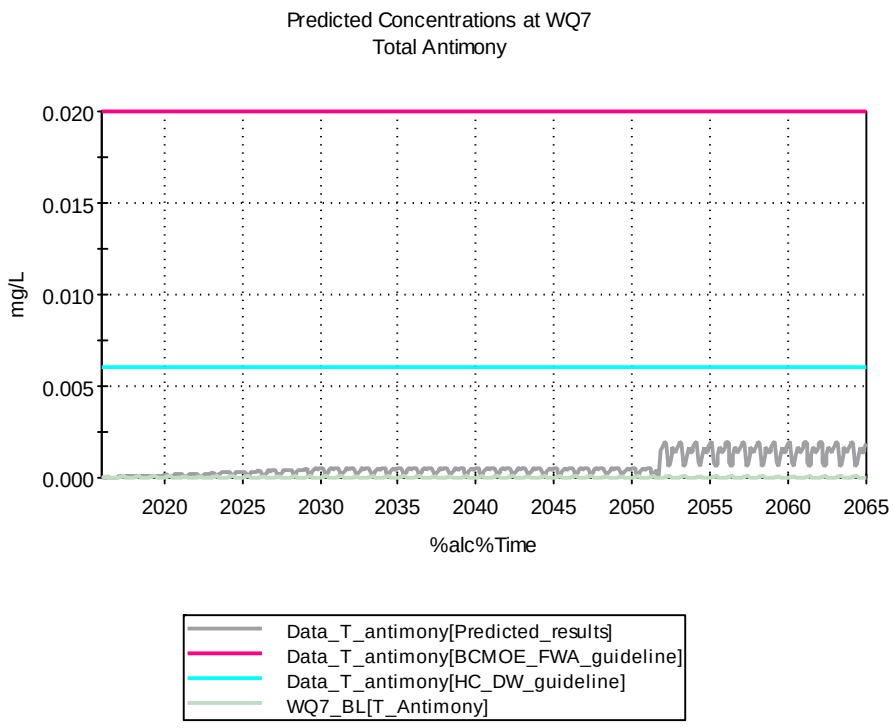




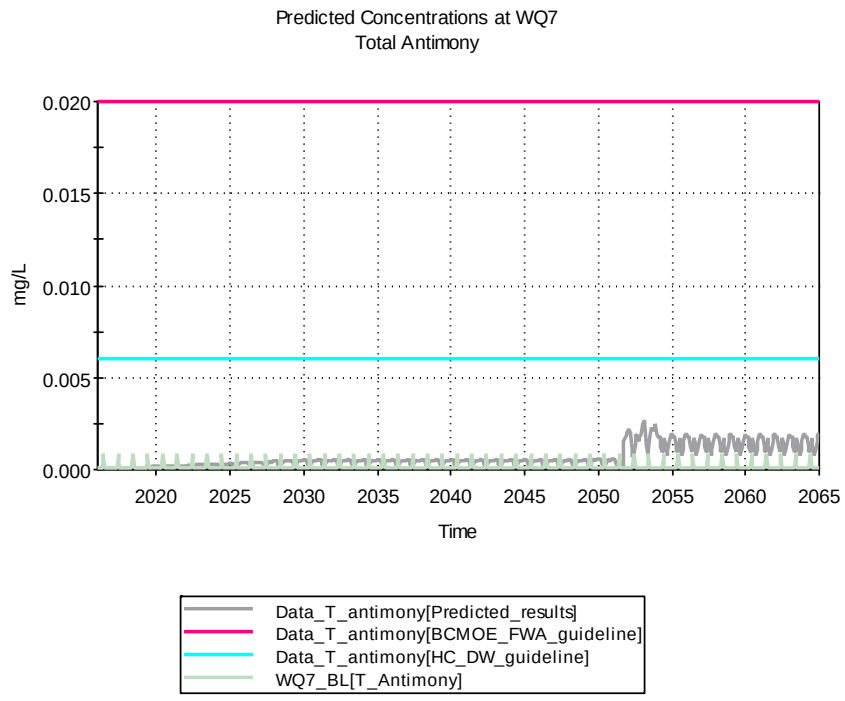


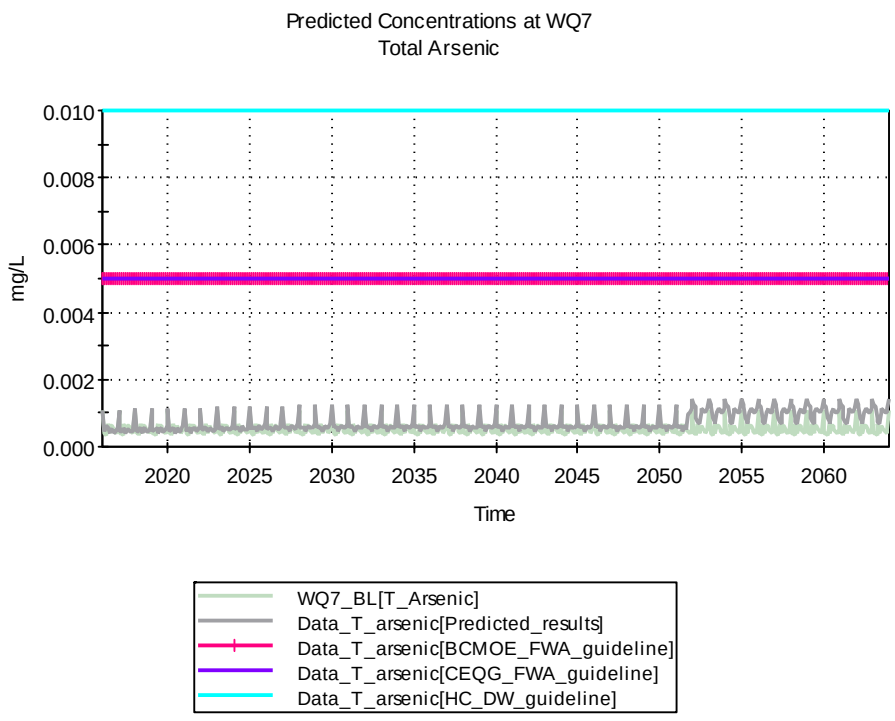


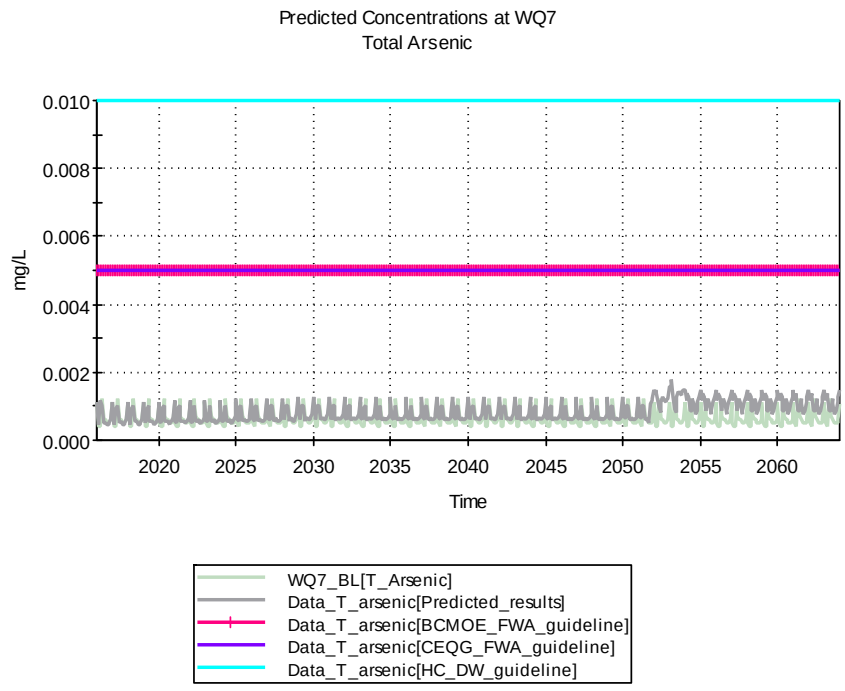
WQ7 – Best estimate

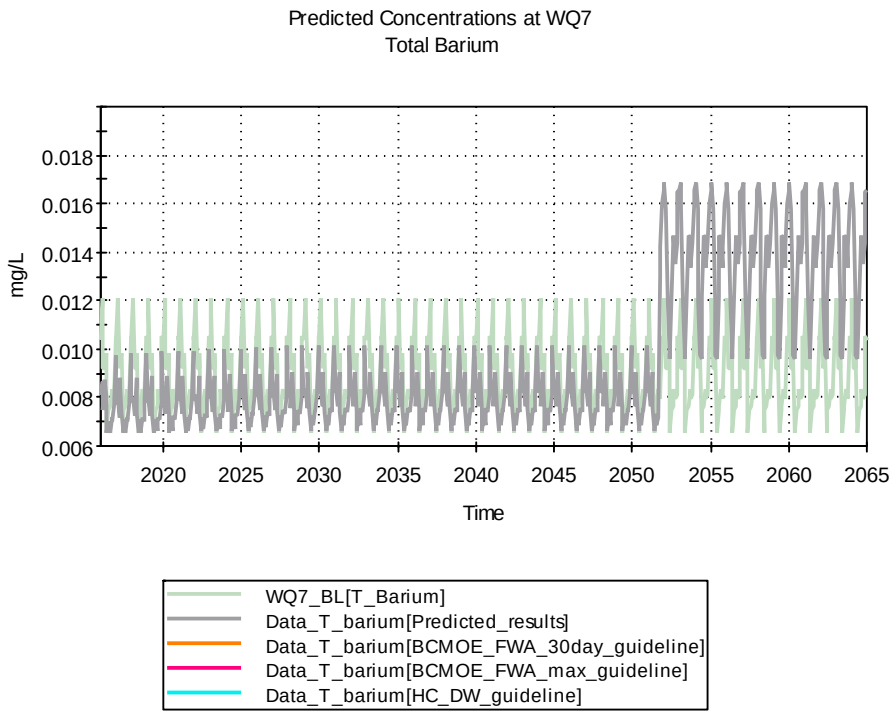


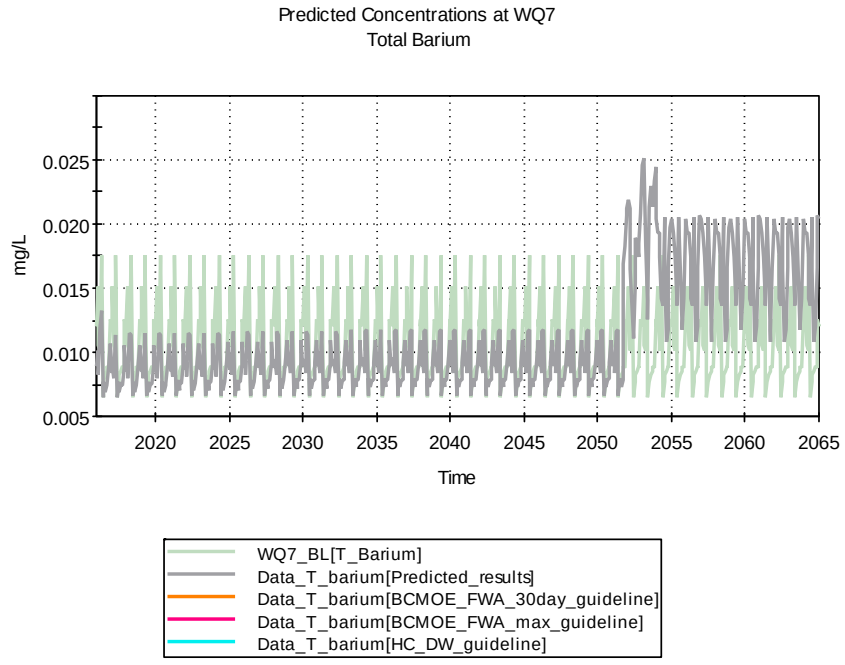
WQ7 –Worst Case



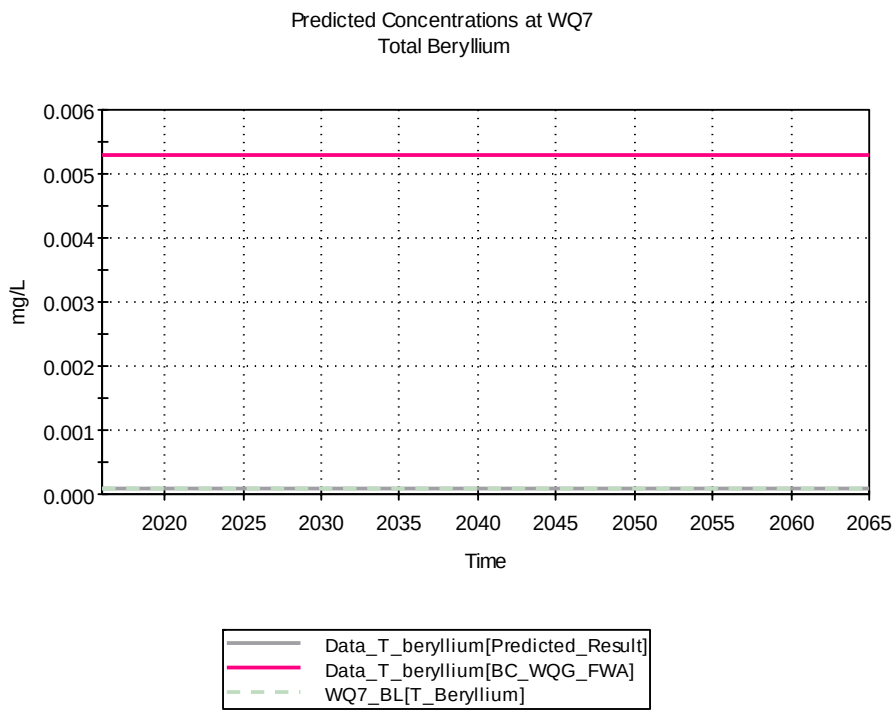




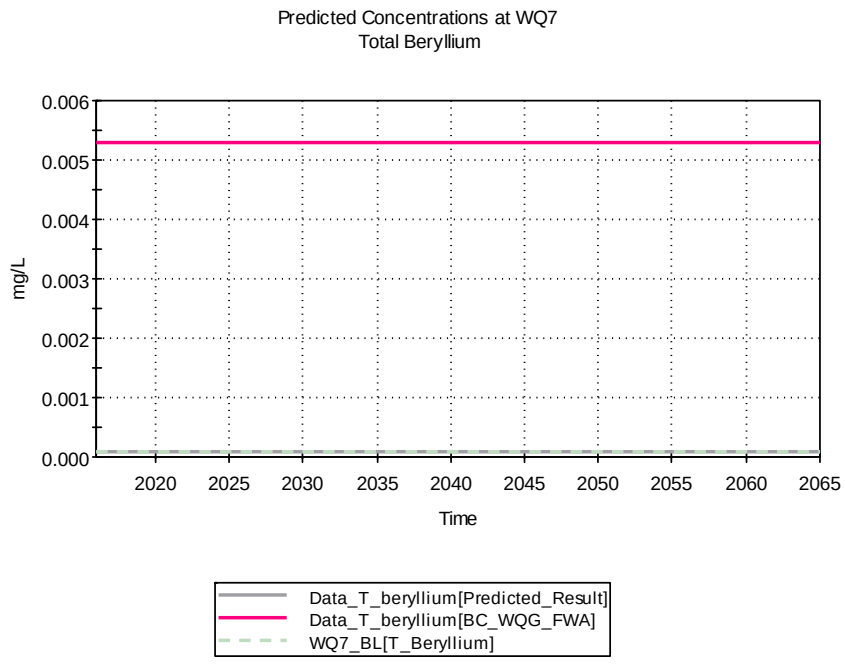


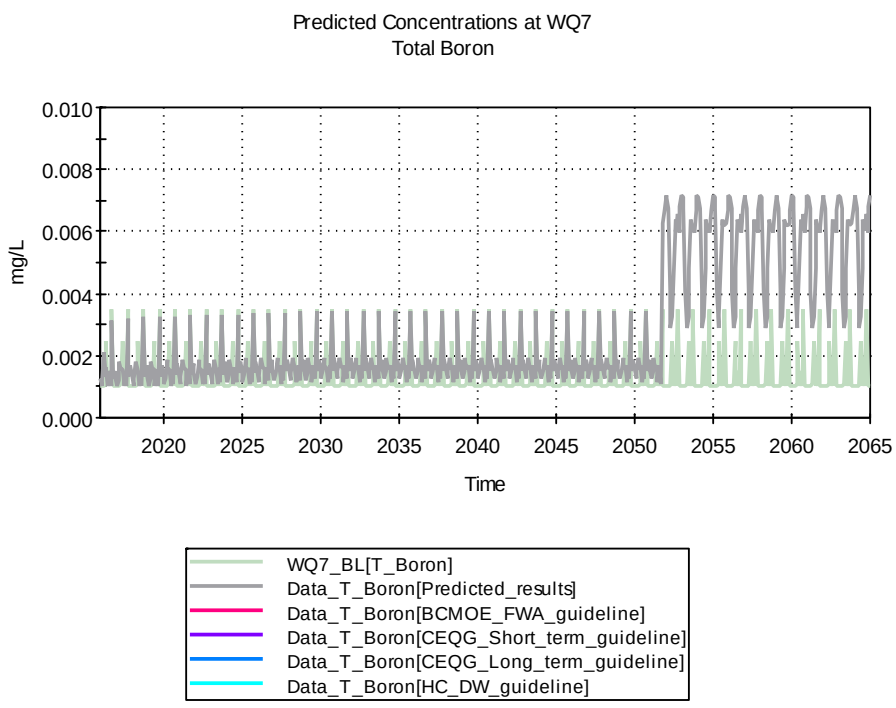


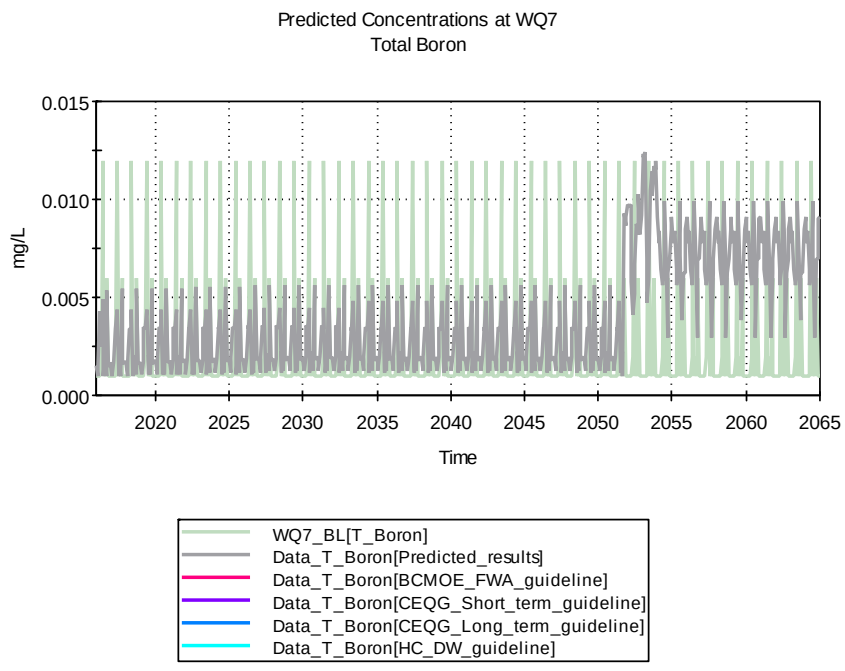
WQ7 – Best estimate

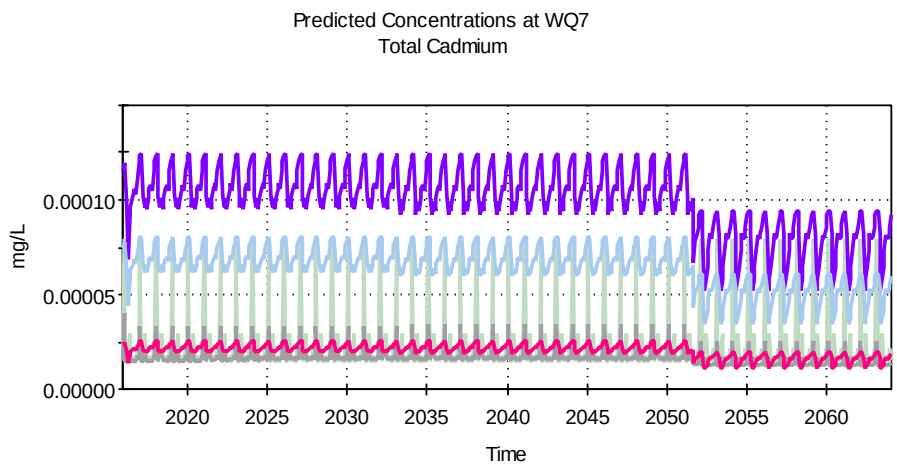


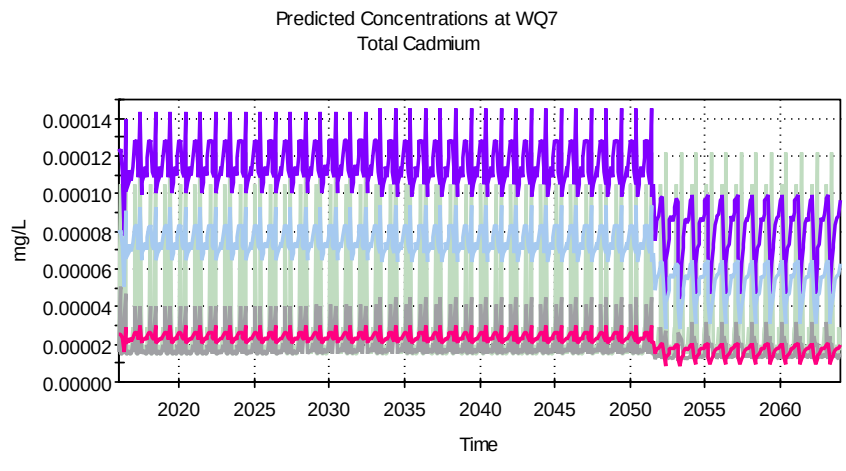
WQ7 –Worst Case



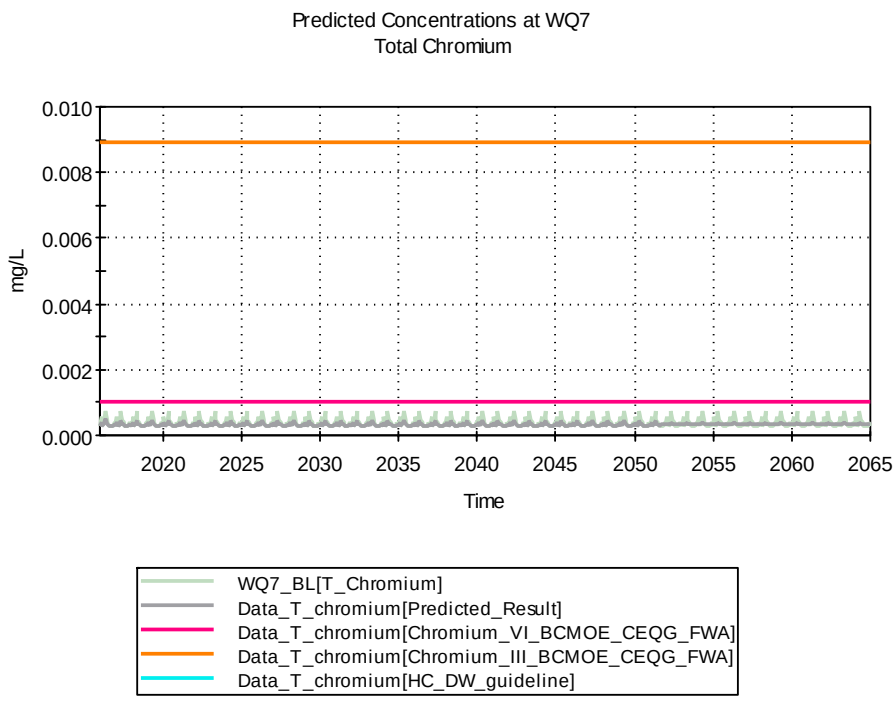




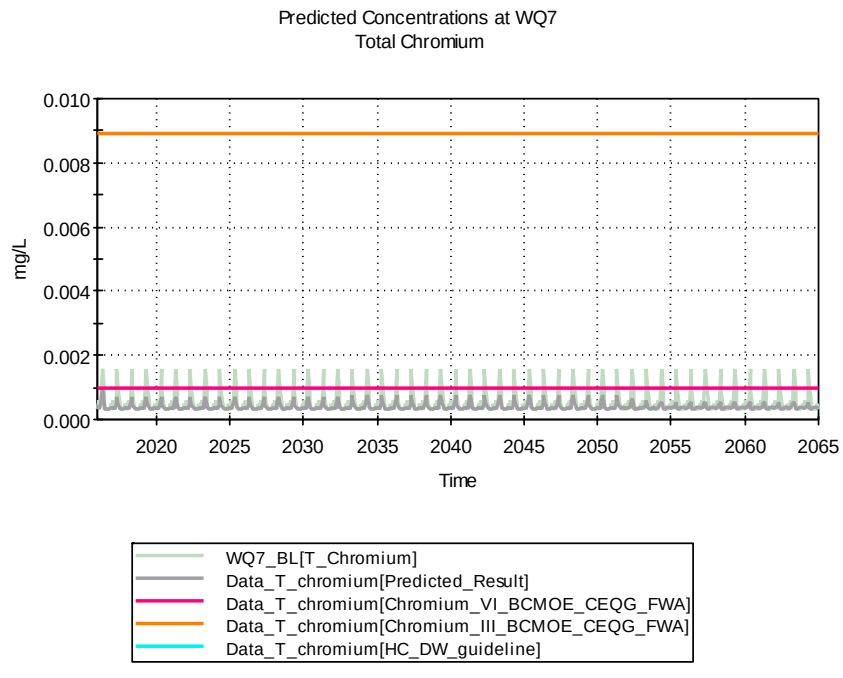


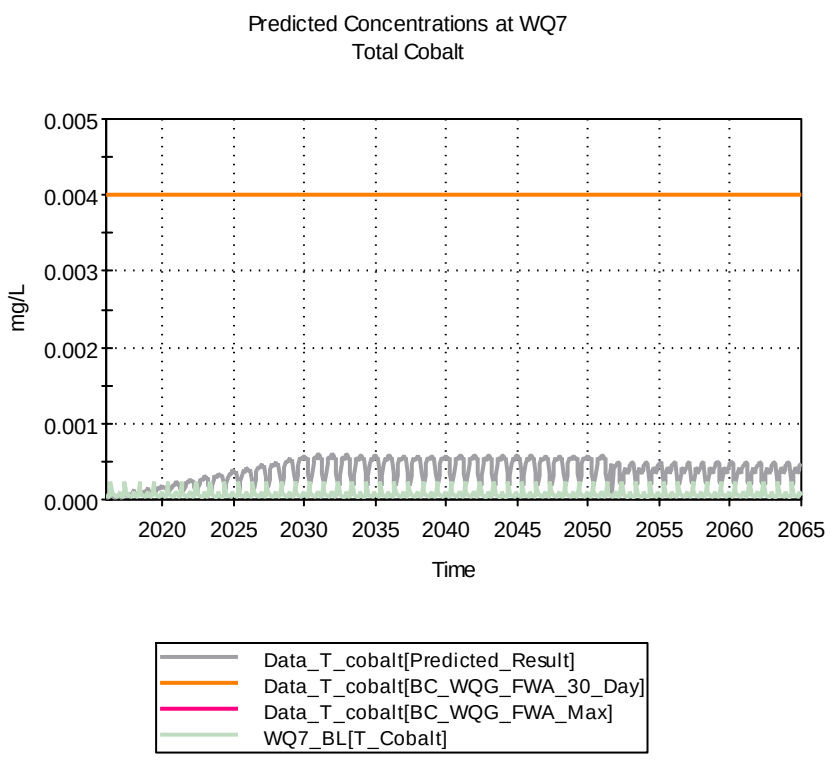


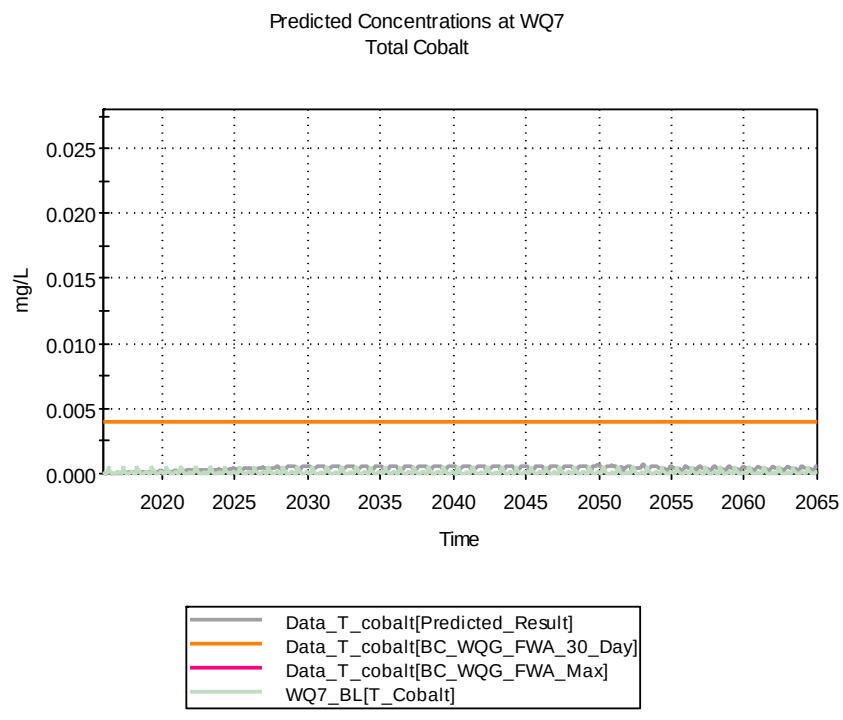
WQ7 – Best estimate

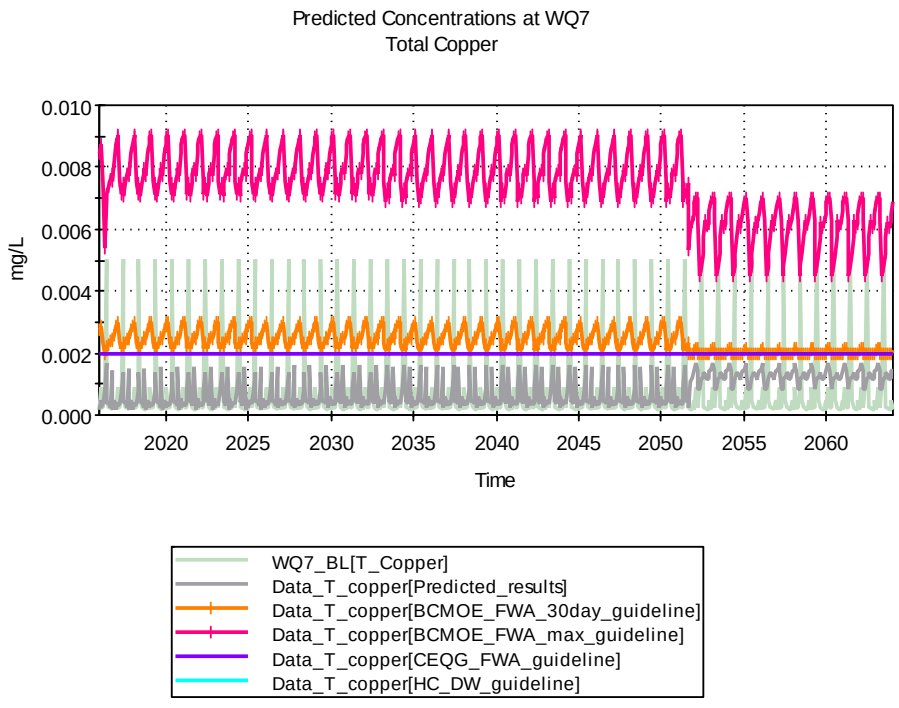


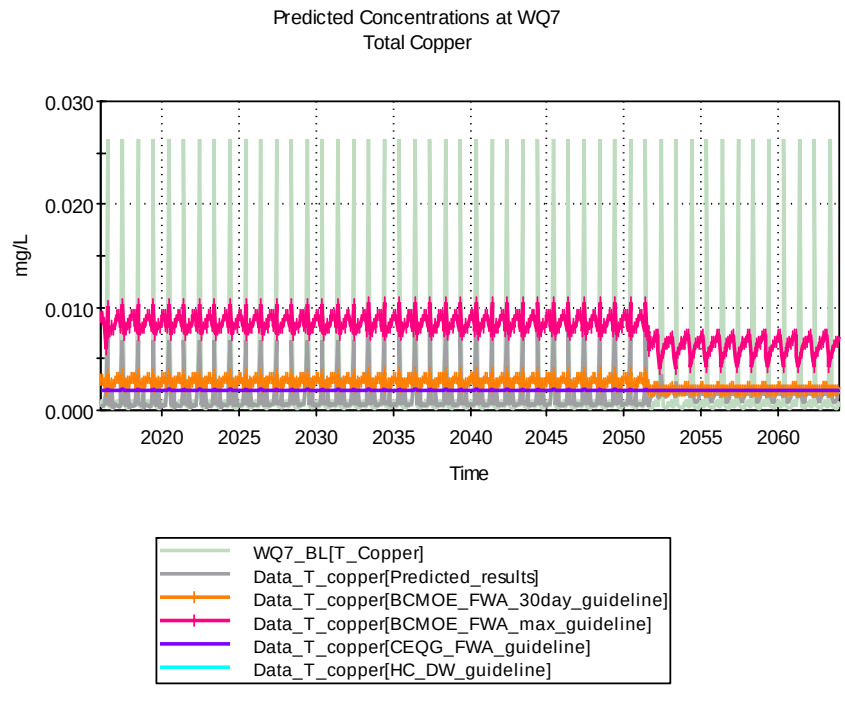
WQ7 –Worst Case



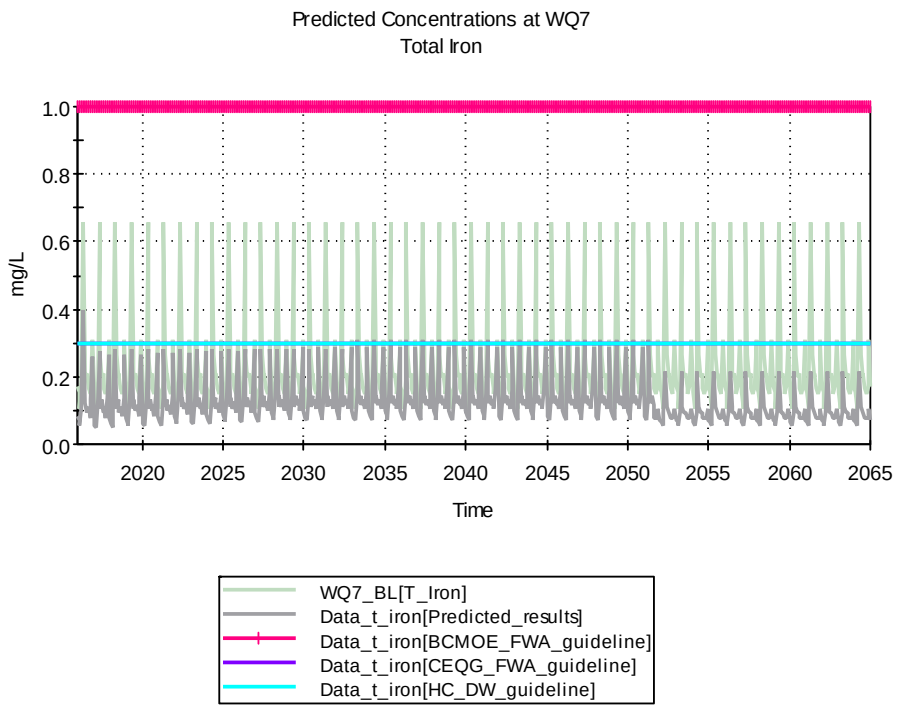




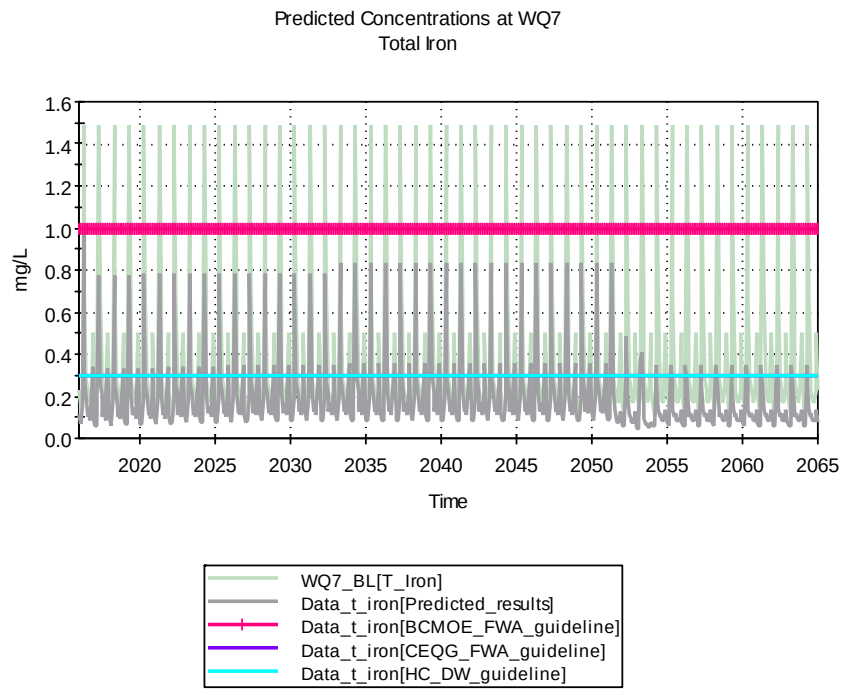


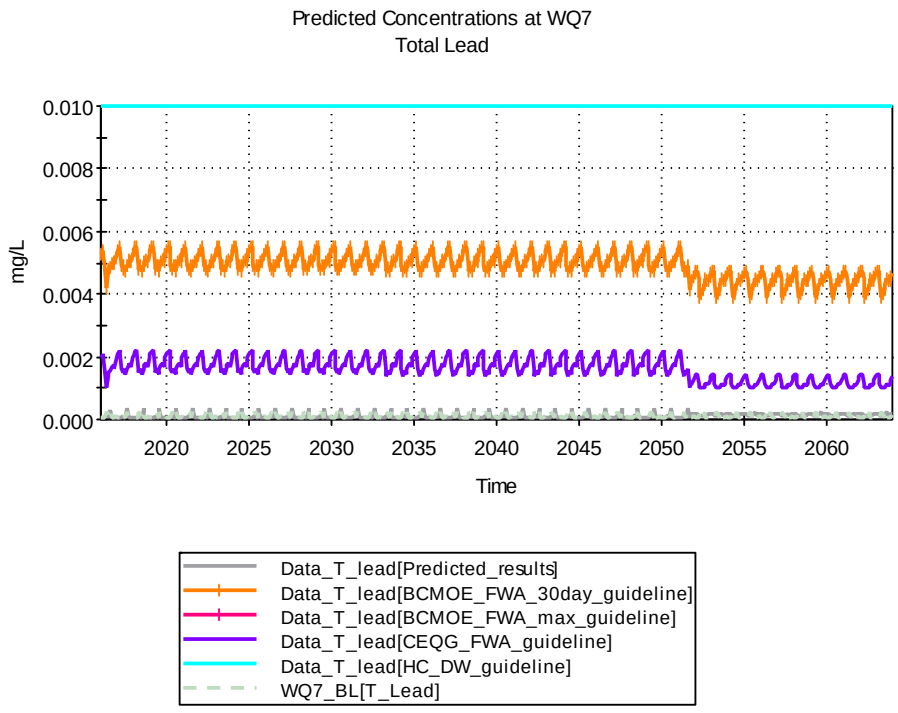


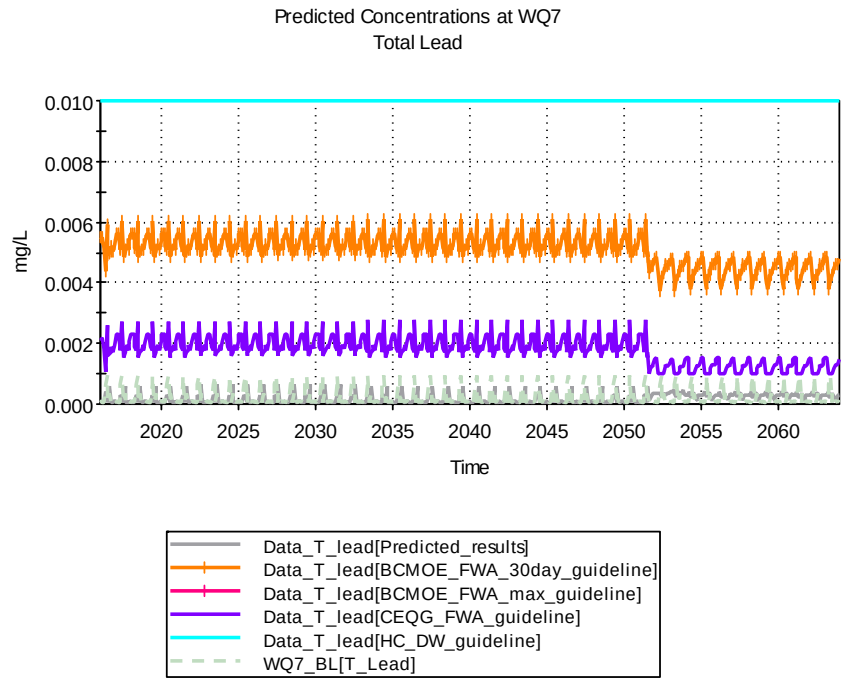
WQ7 – Best estimate

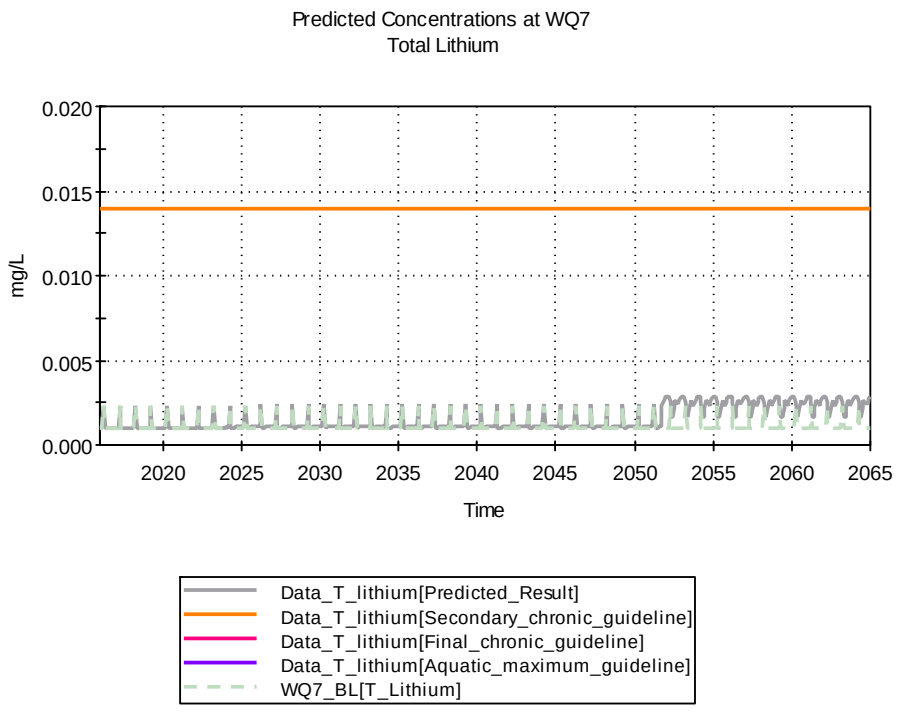


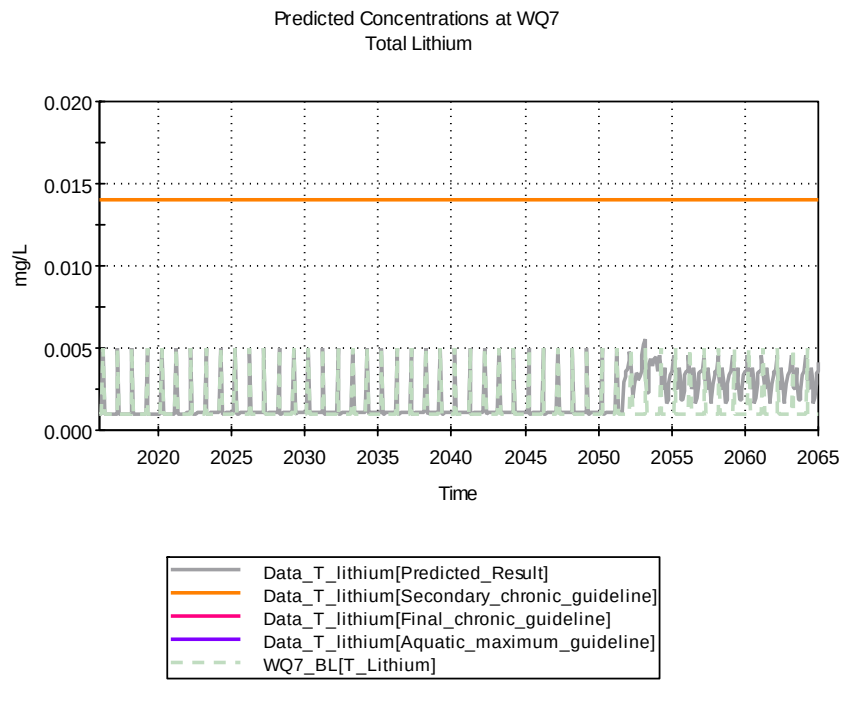
WQ7 –Worst Case



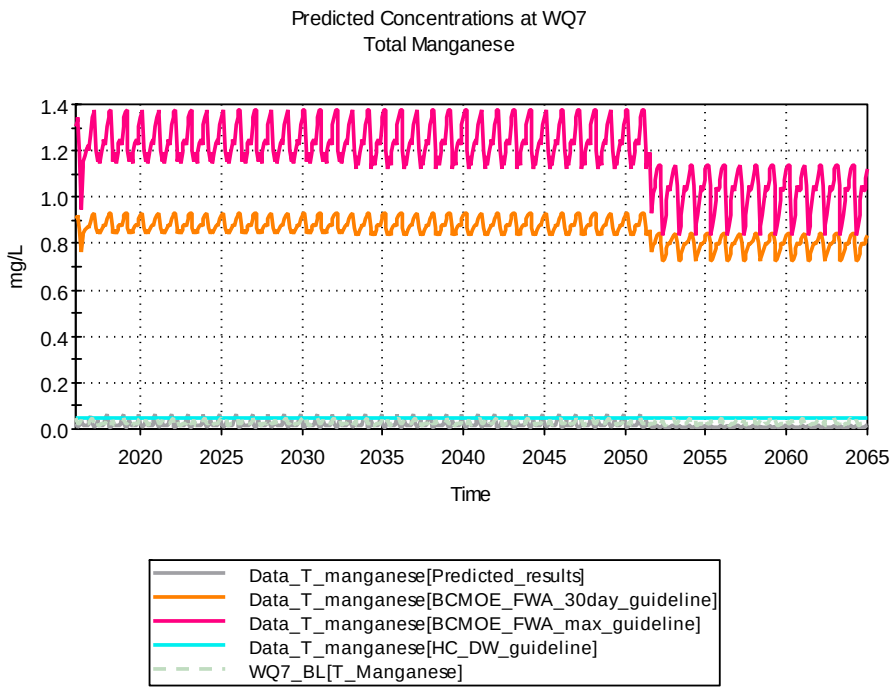


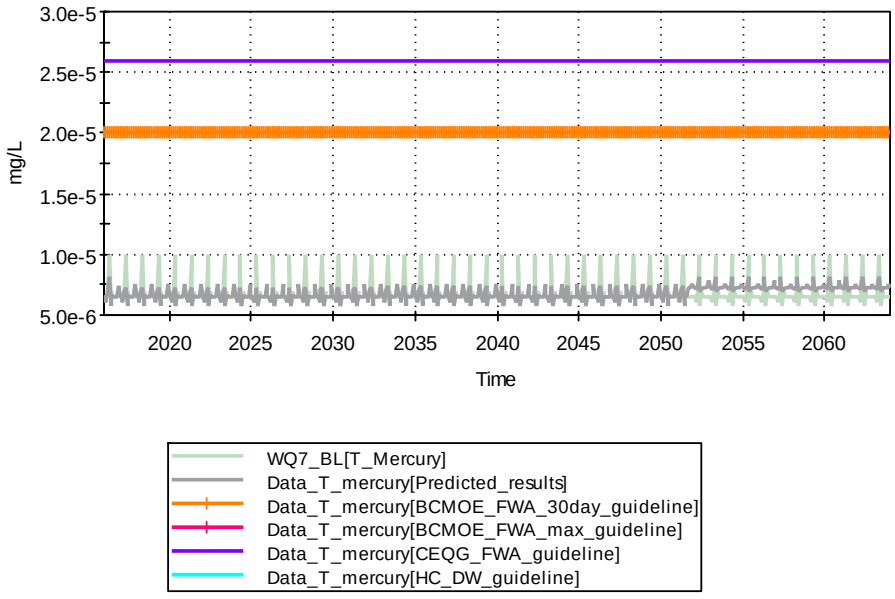




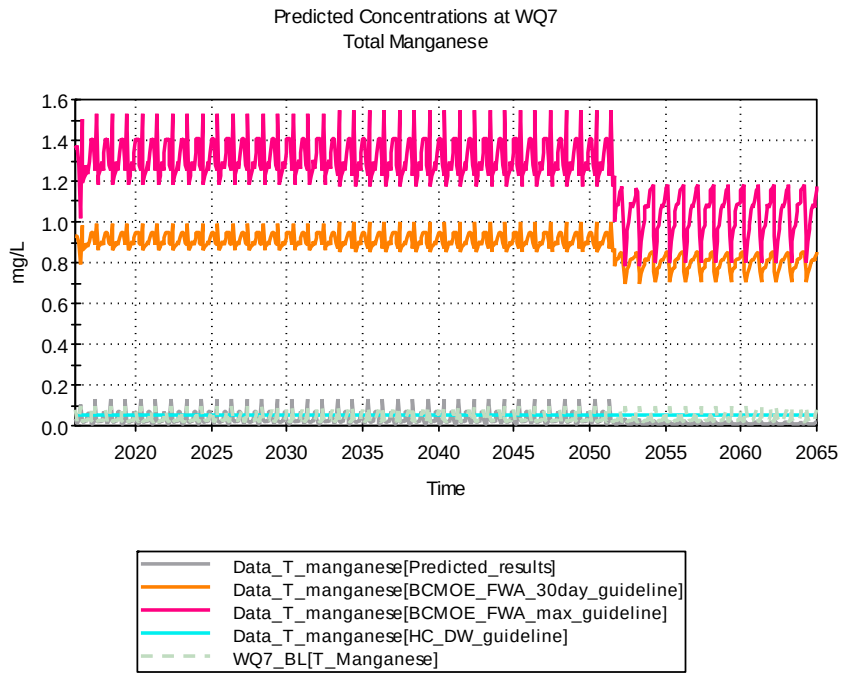


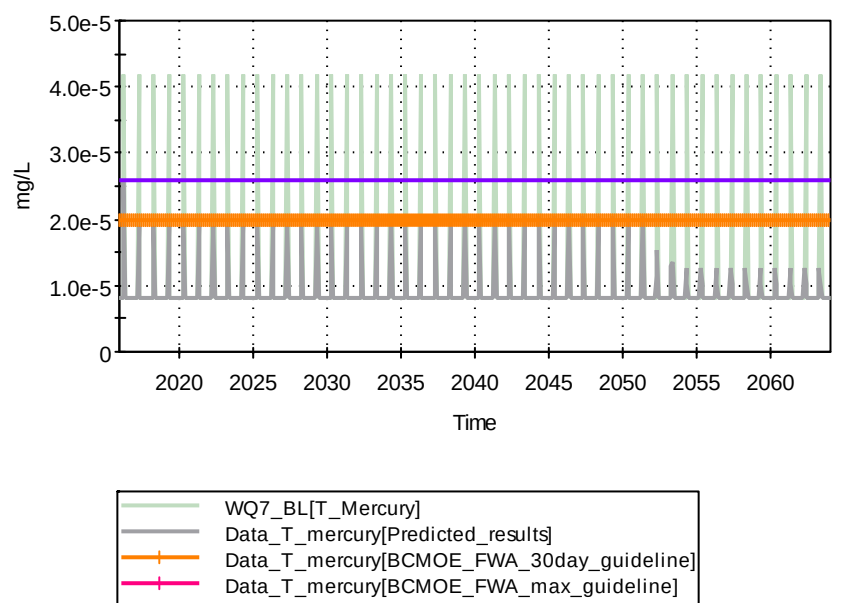
WQ7 – Best estimate



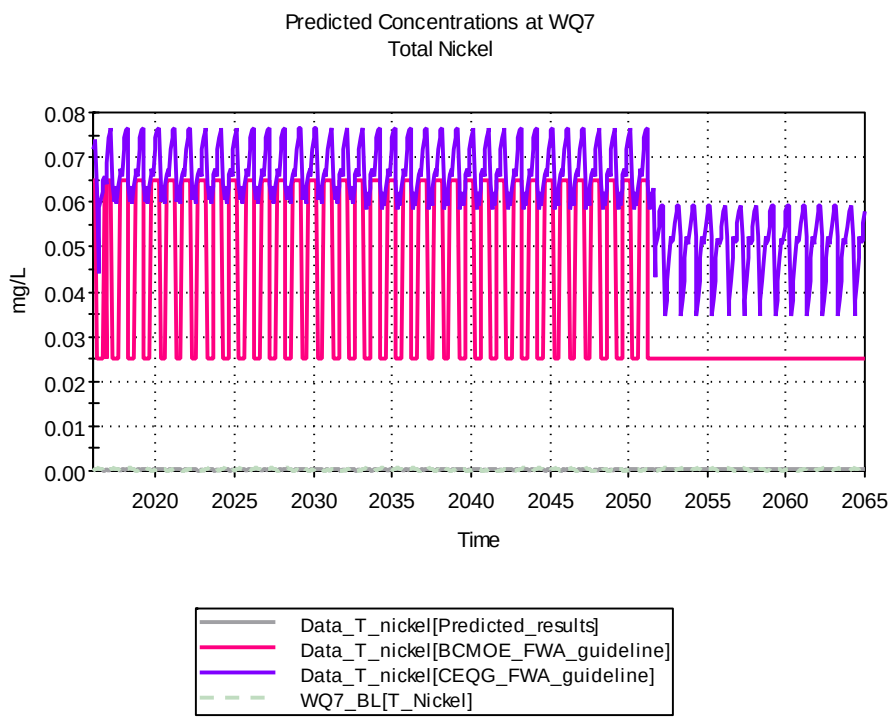


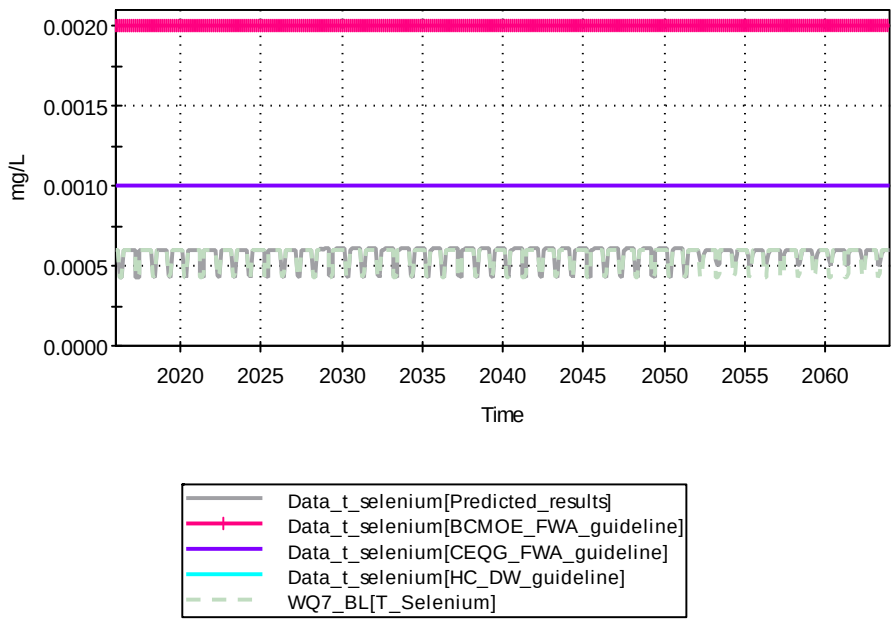
WQ7 –Worst Case



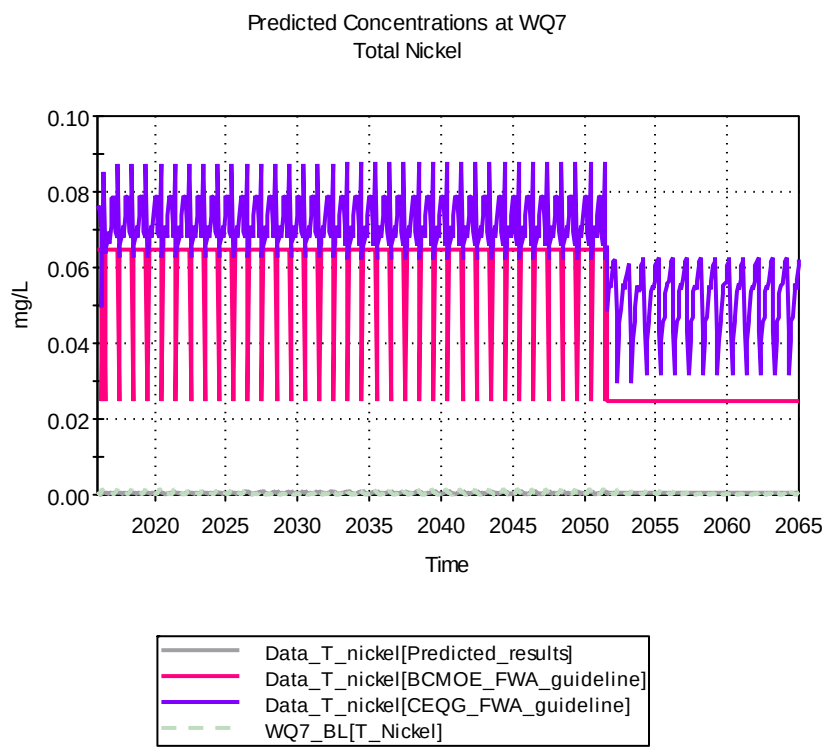


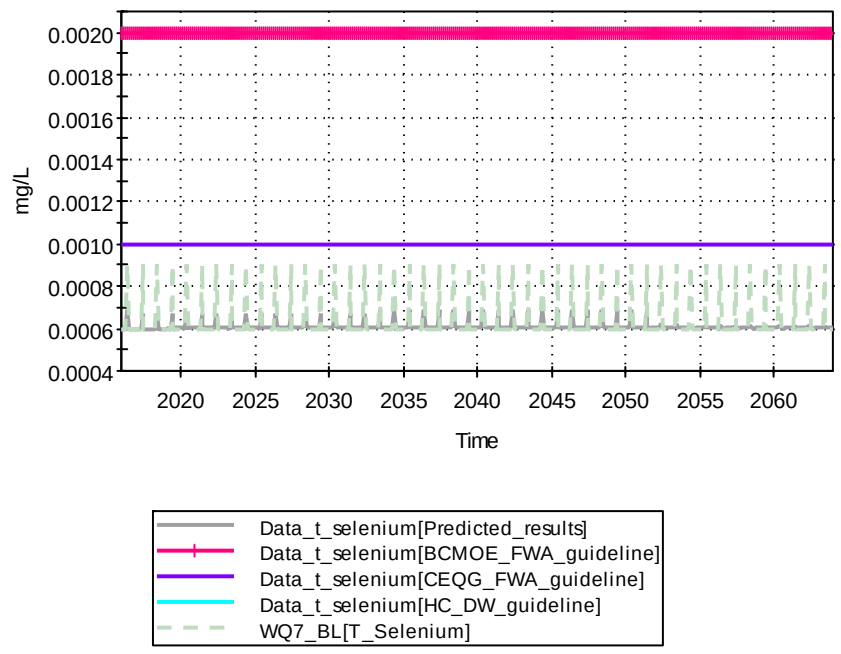
WQ7 – Best estimate



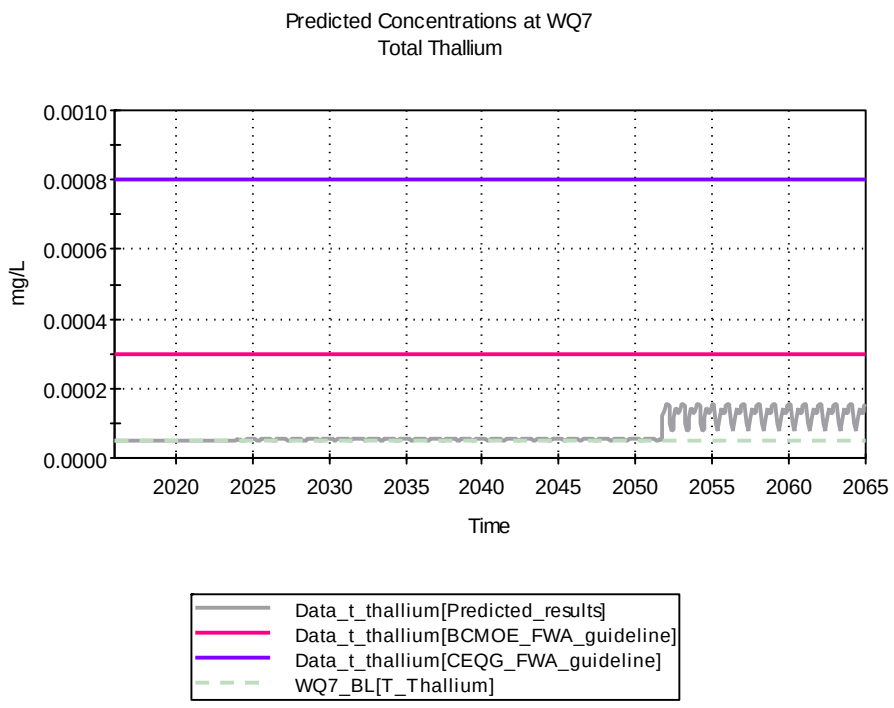


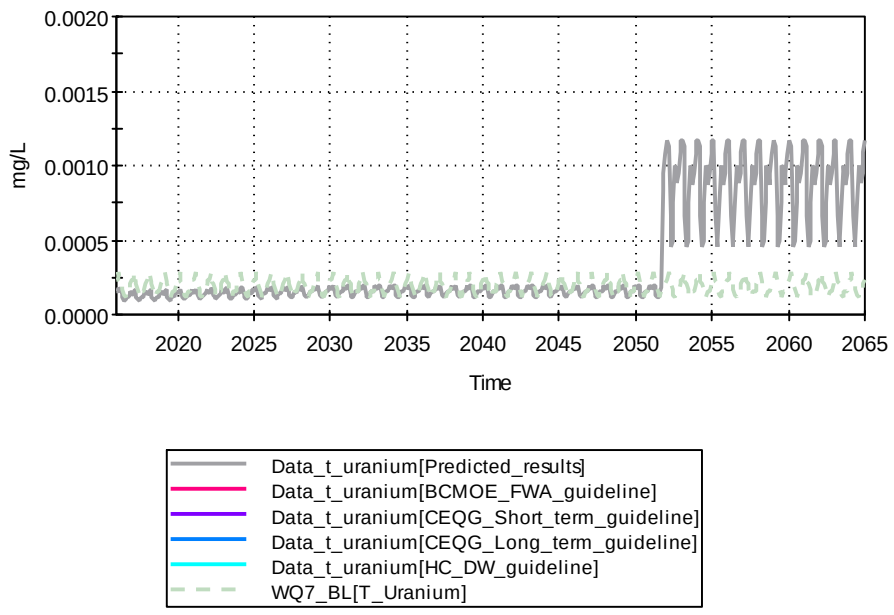
WQ7 –Worst Case



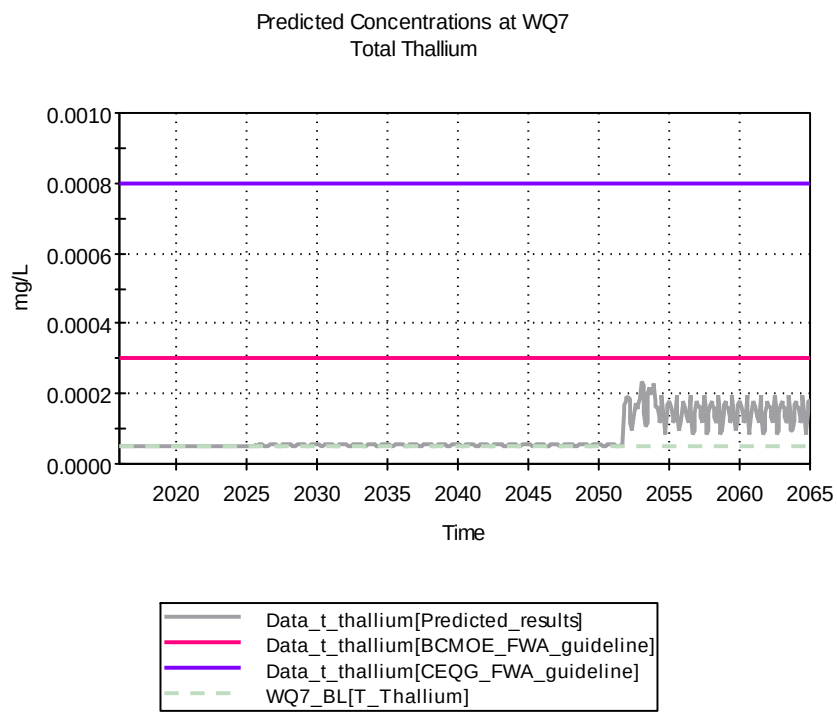


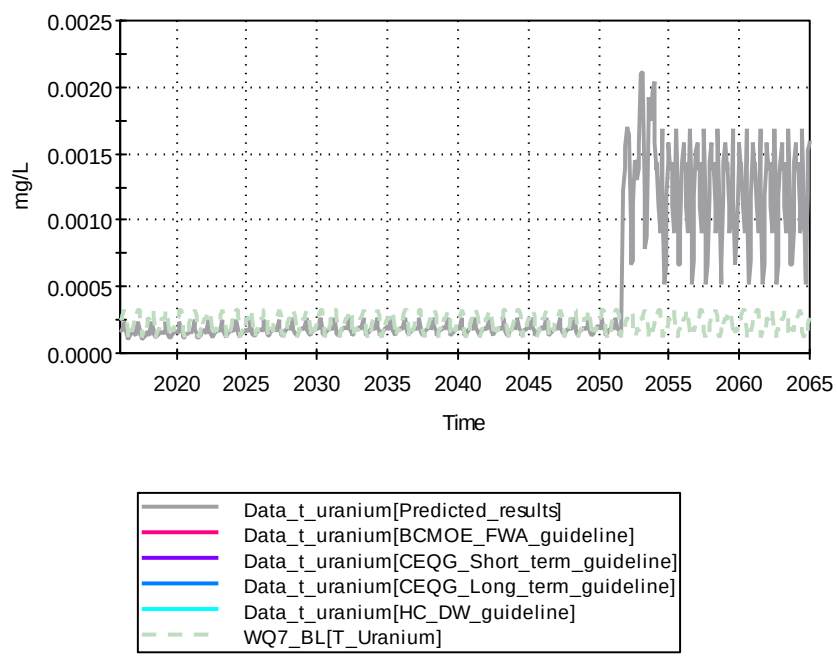
WQ7 – Best estimate



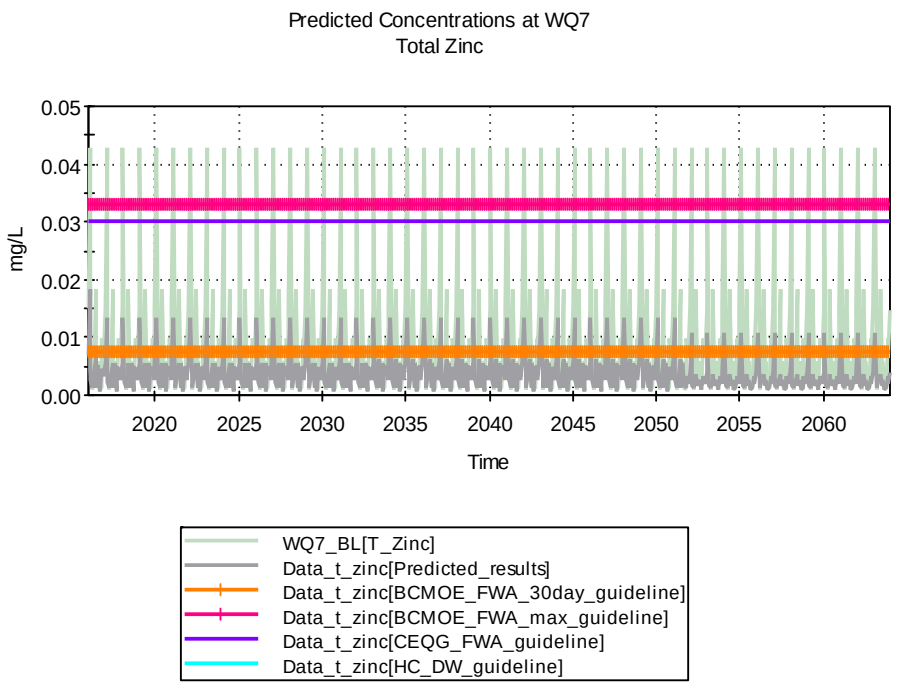


WQ7 –Worst Case

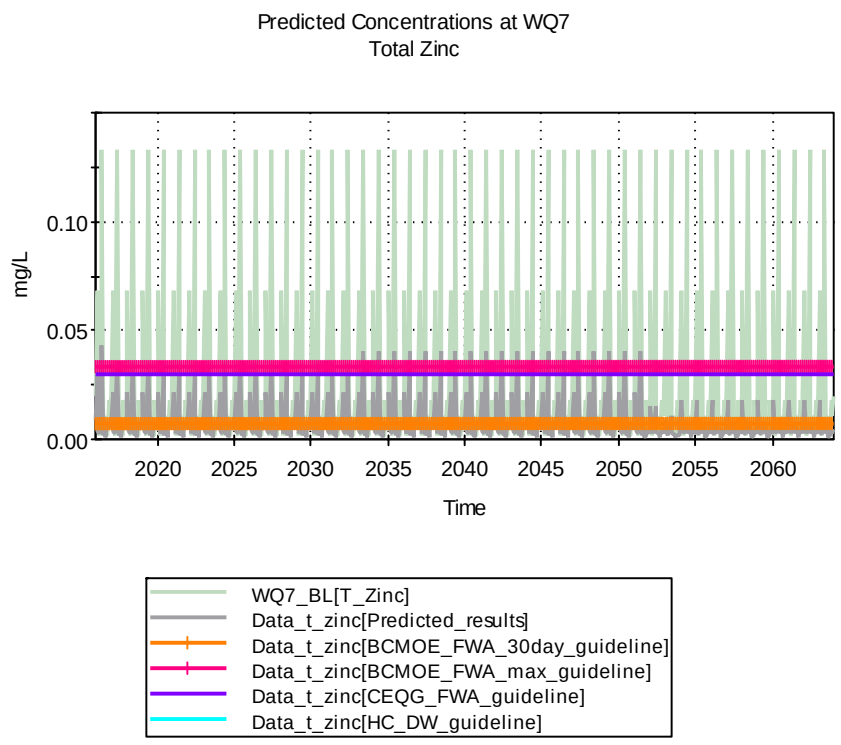


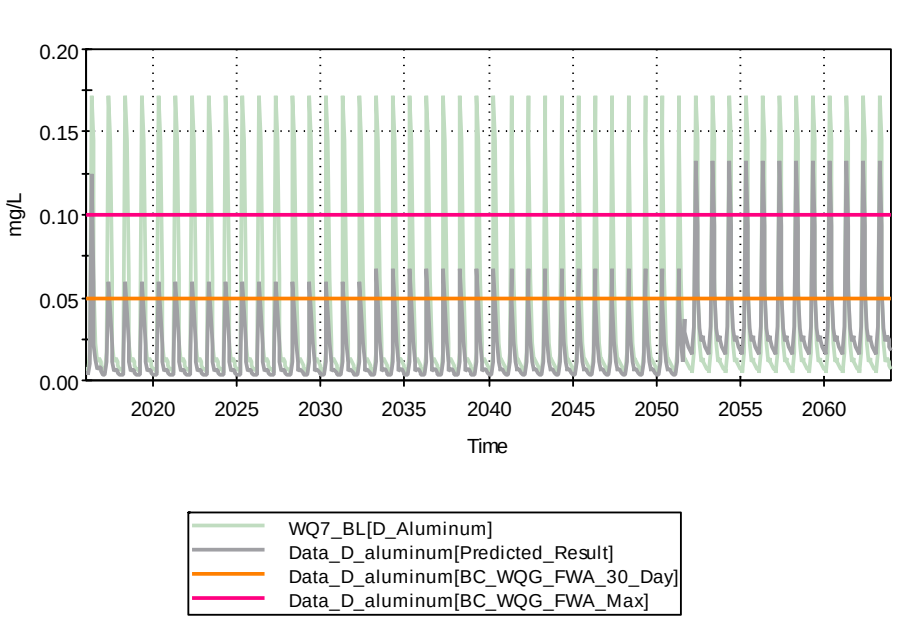


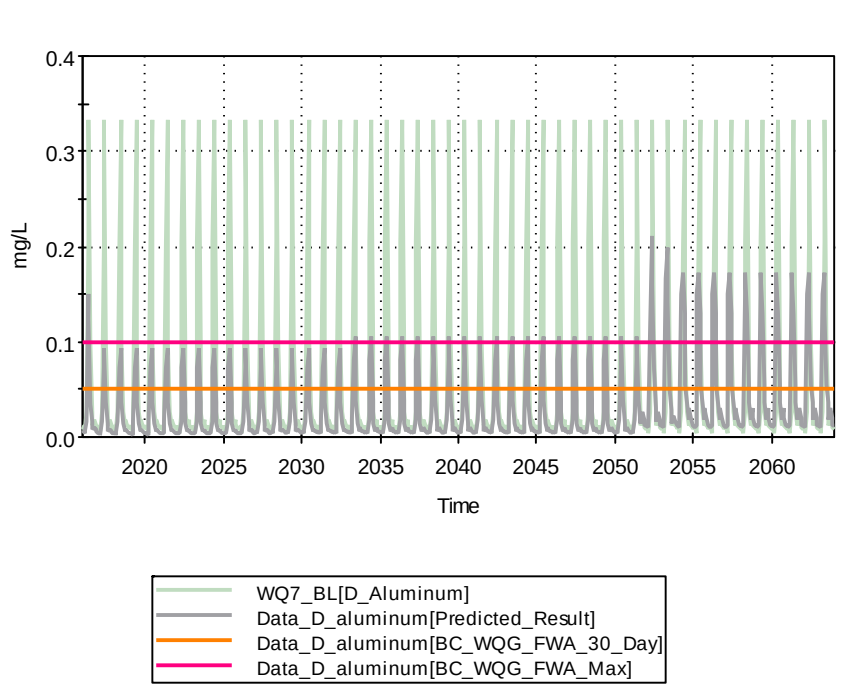
WQ7 – Best estimate

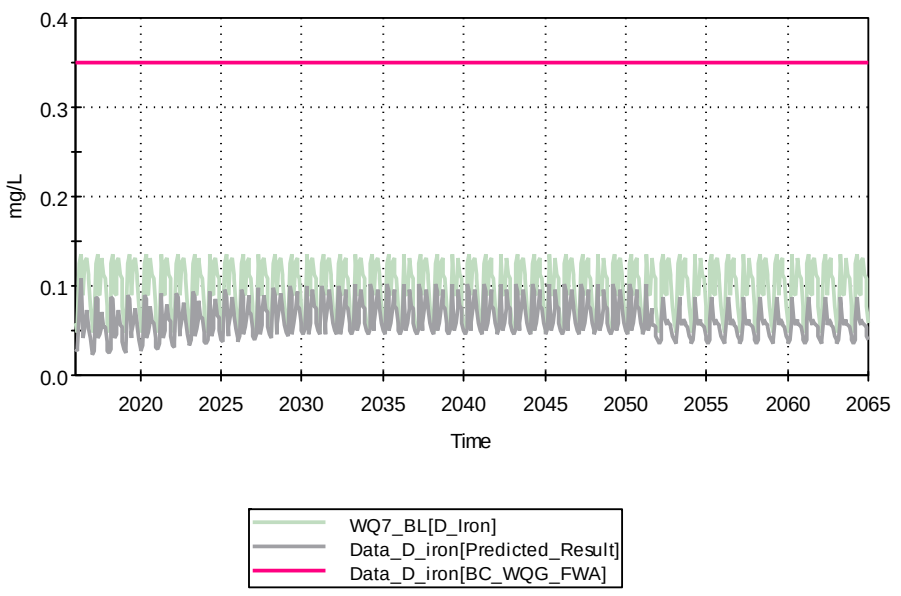


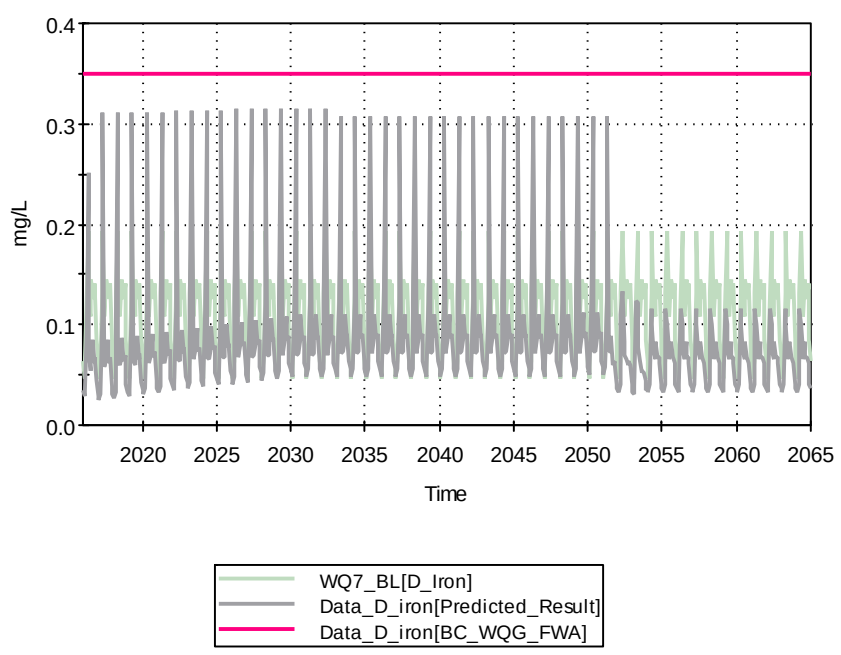
WQ7 –Worst Case



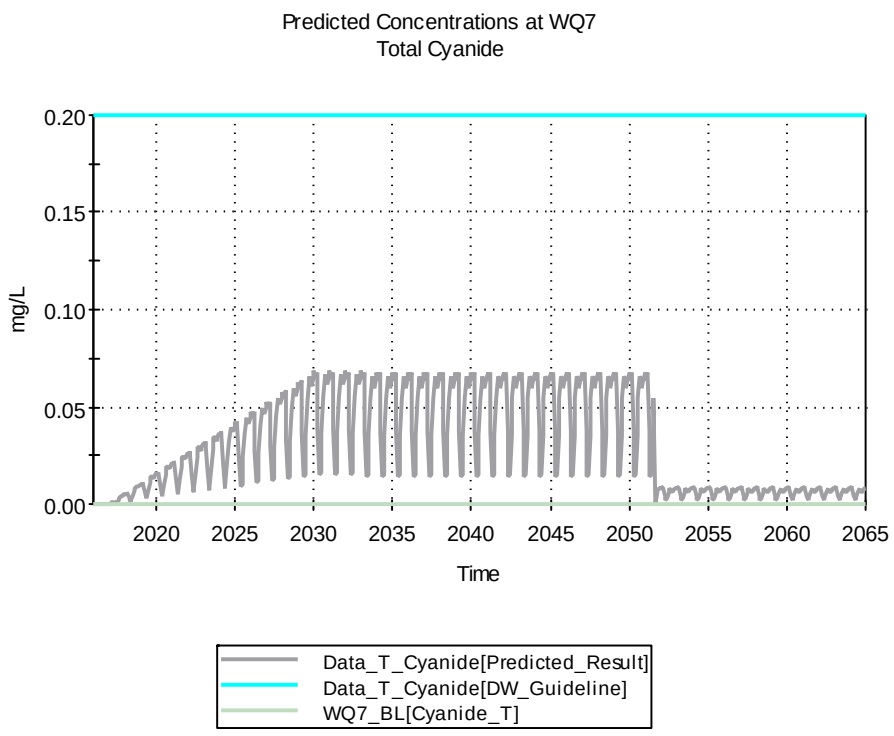


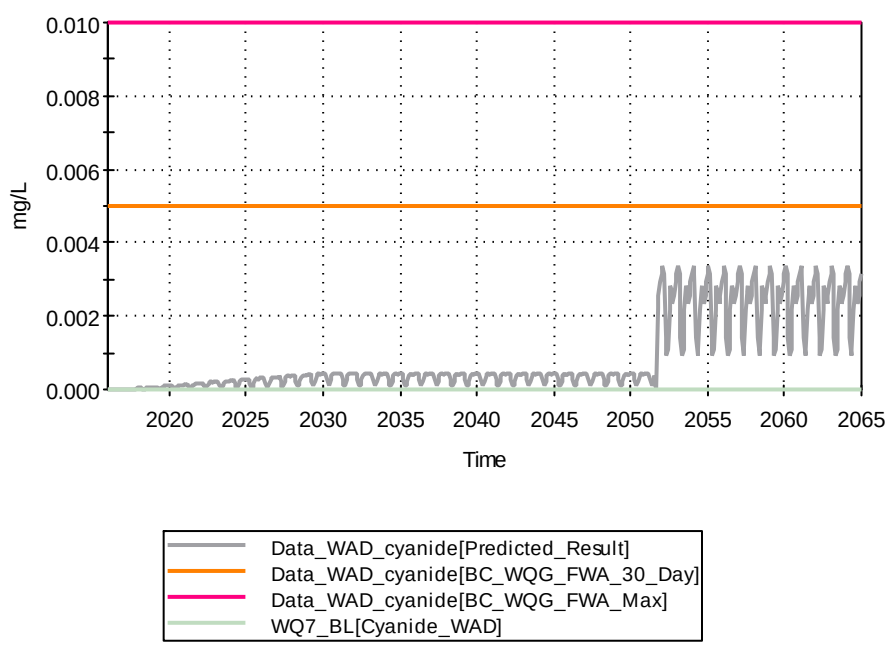




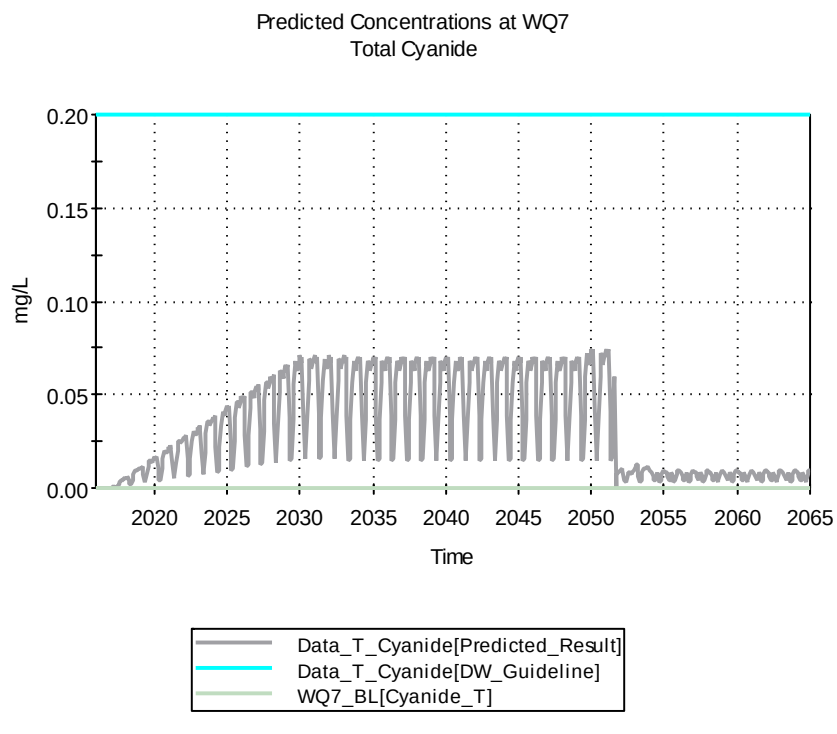


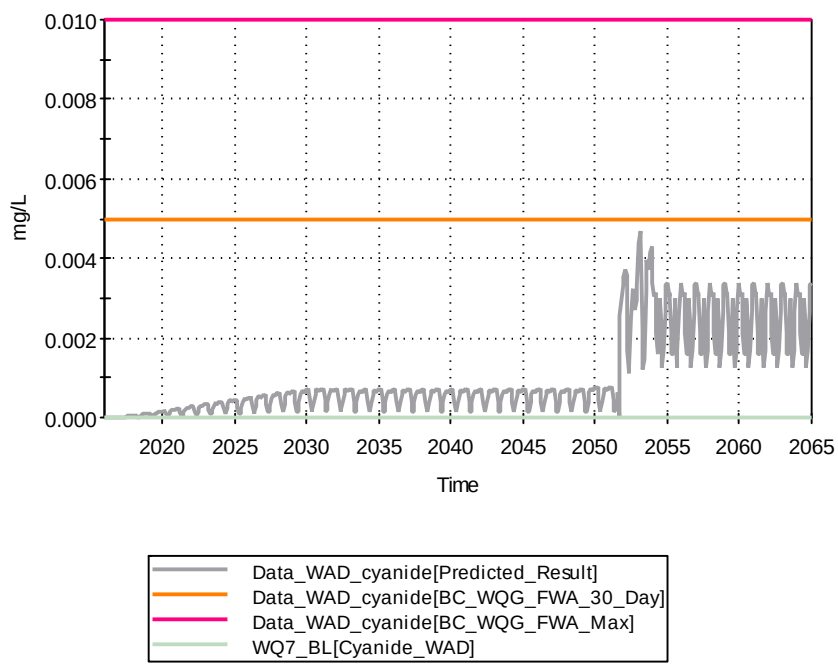
WQ7 – Best estimate





WQ7 –Worst Case

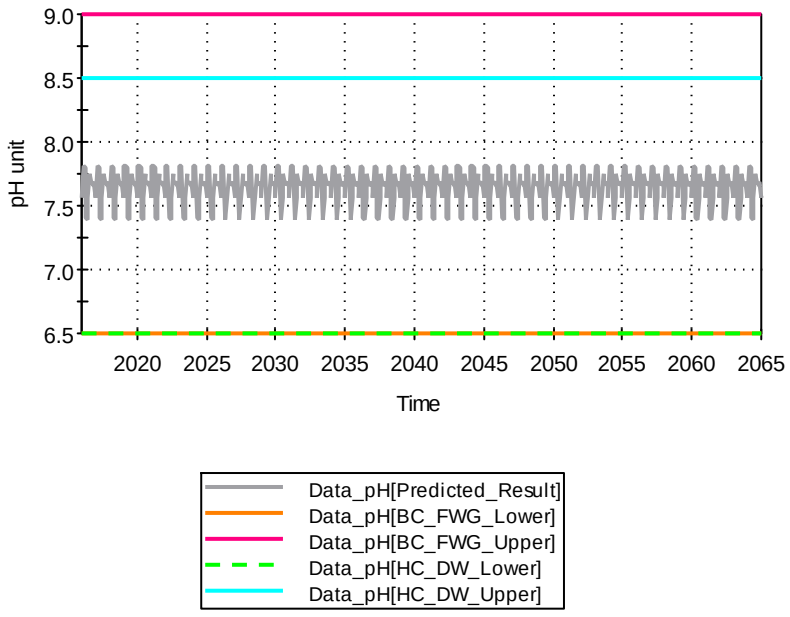


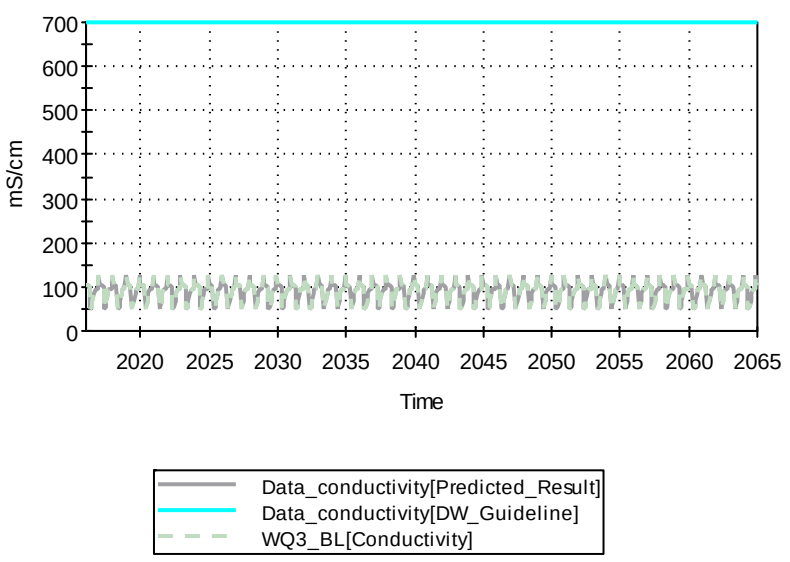


Annex A-3

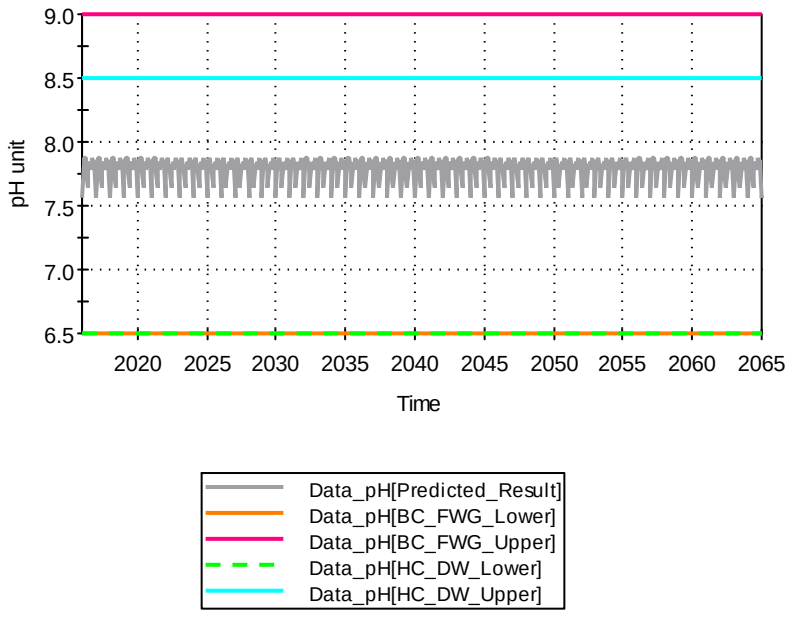
Graphical Outputs of the Predicted Water Quality at WQ3 – Best Estimate and Worst Case

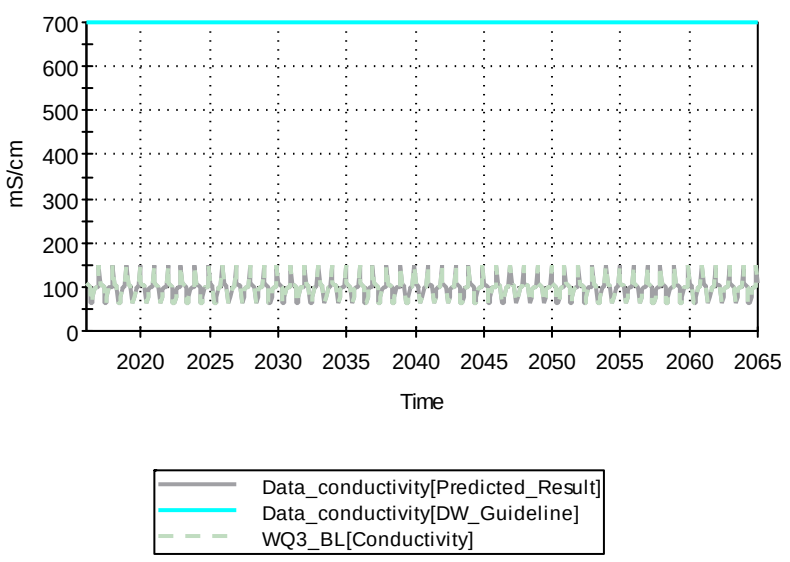
WQ3 – Best Estimate



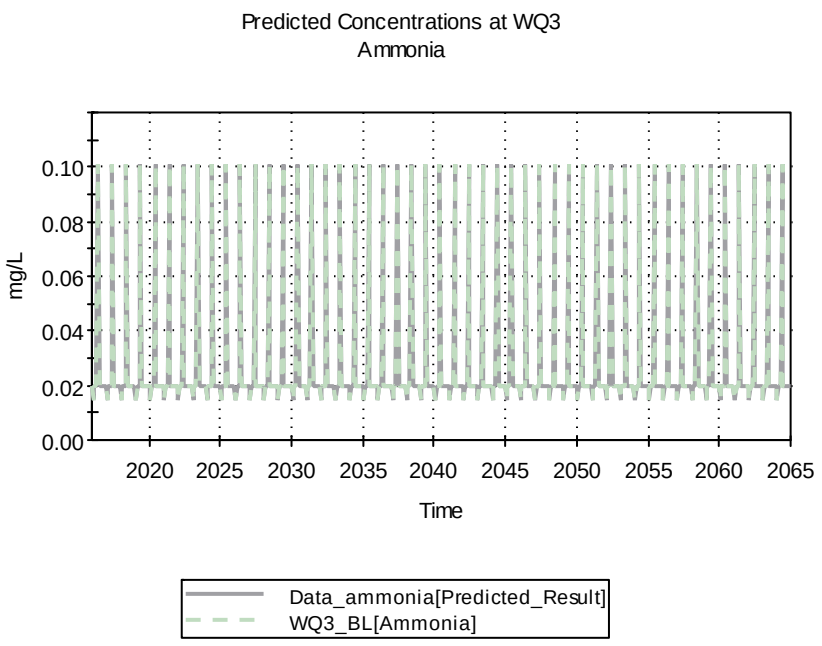


WQ3 – Worst Case

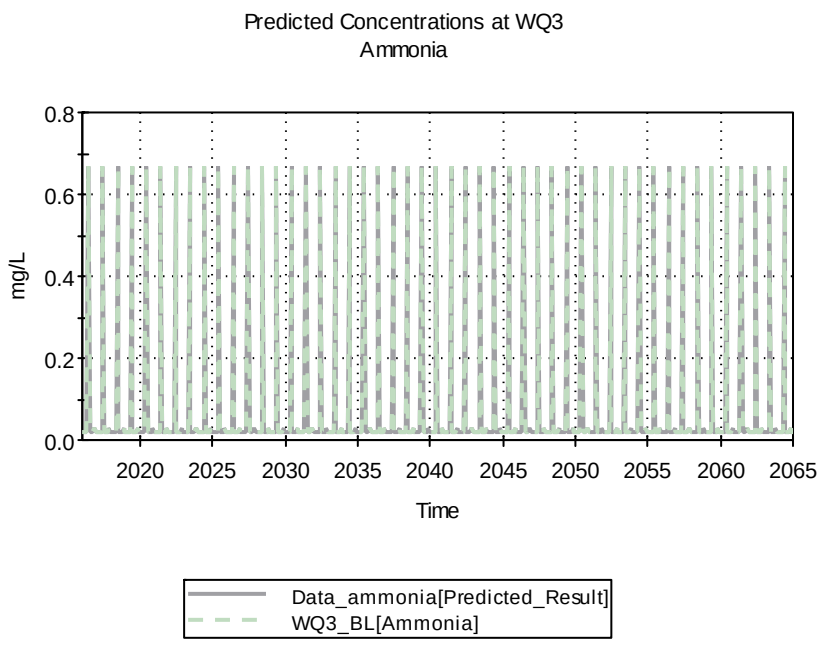


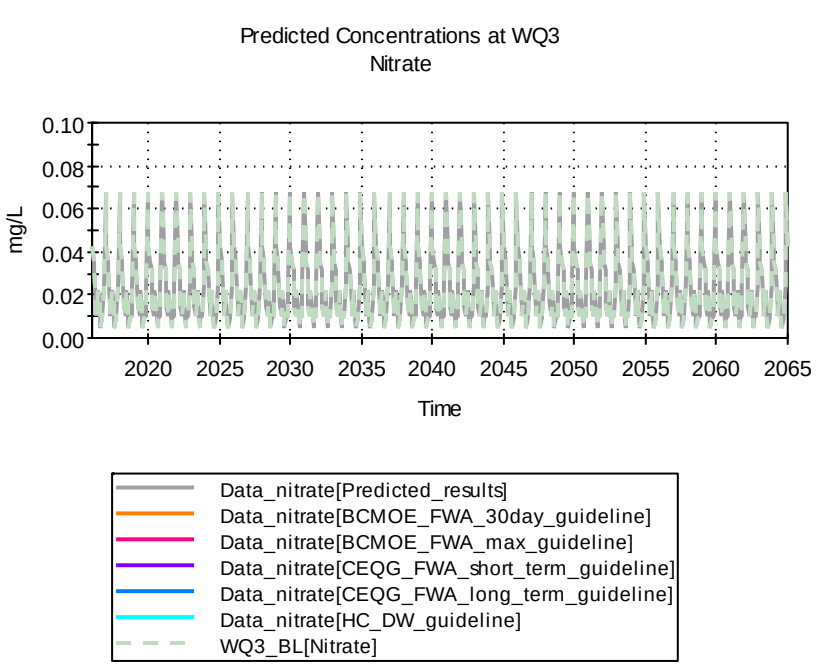


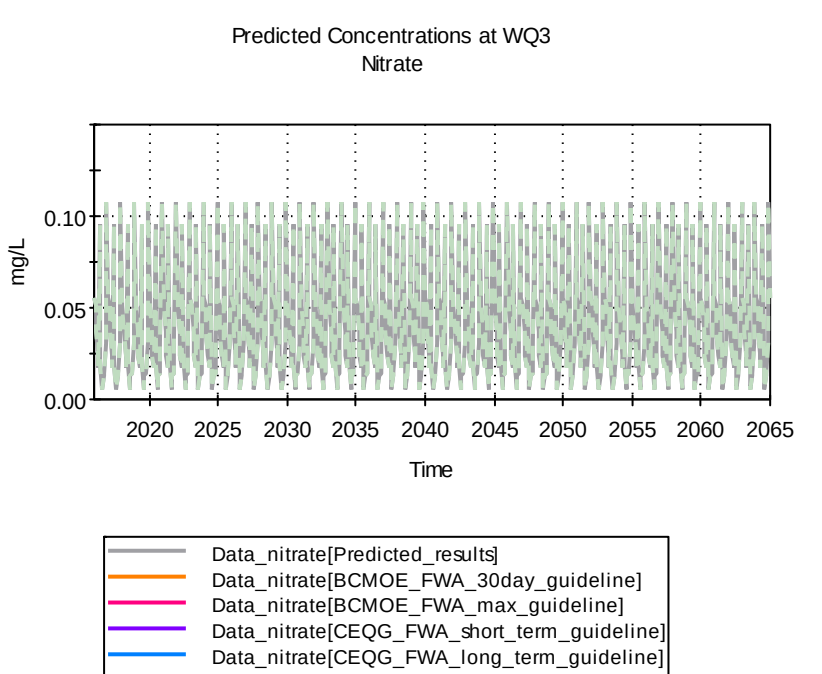
WQ3 – Best Estimate

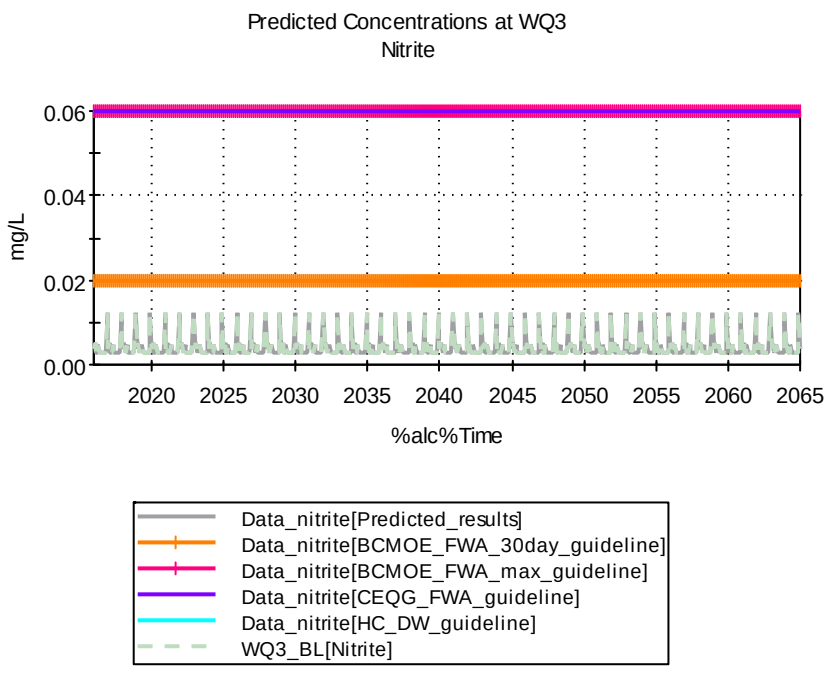


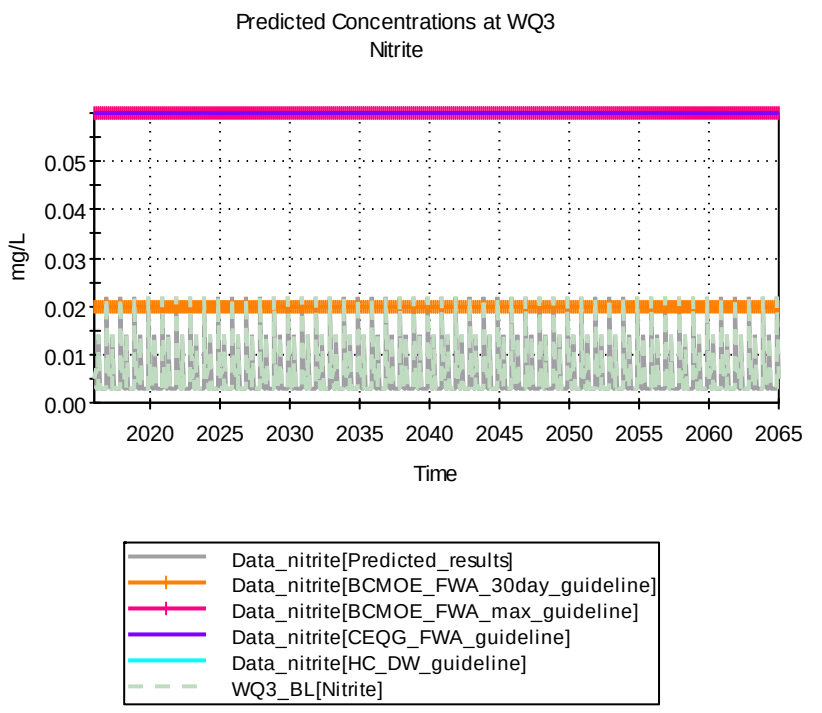
WQ3 – Worst Case



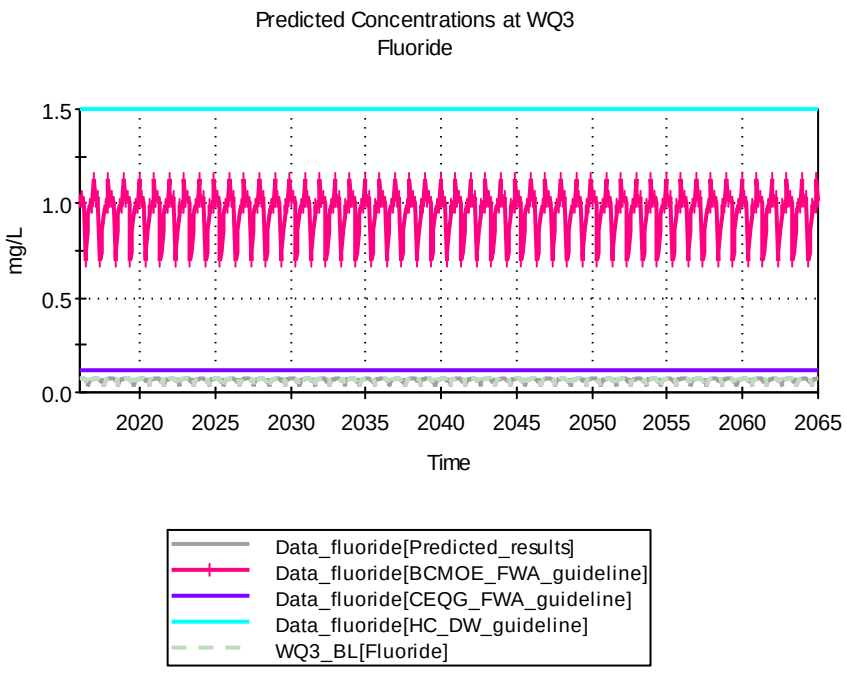




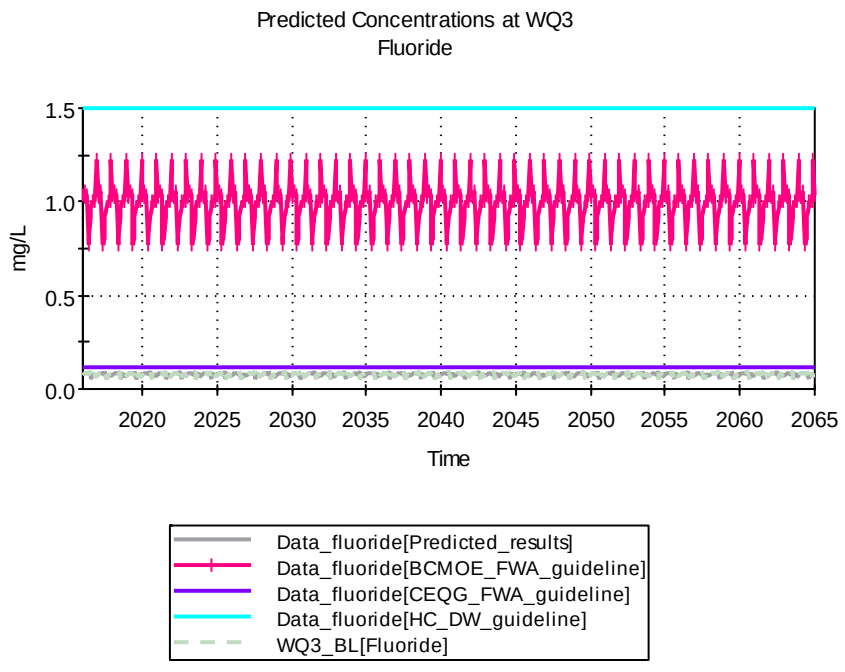


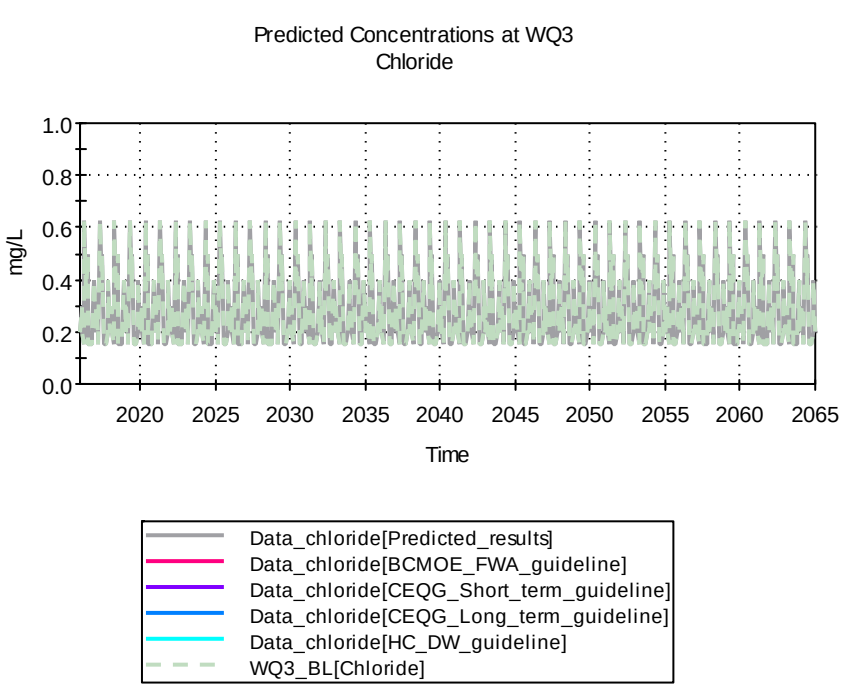


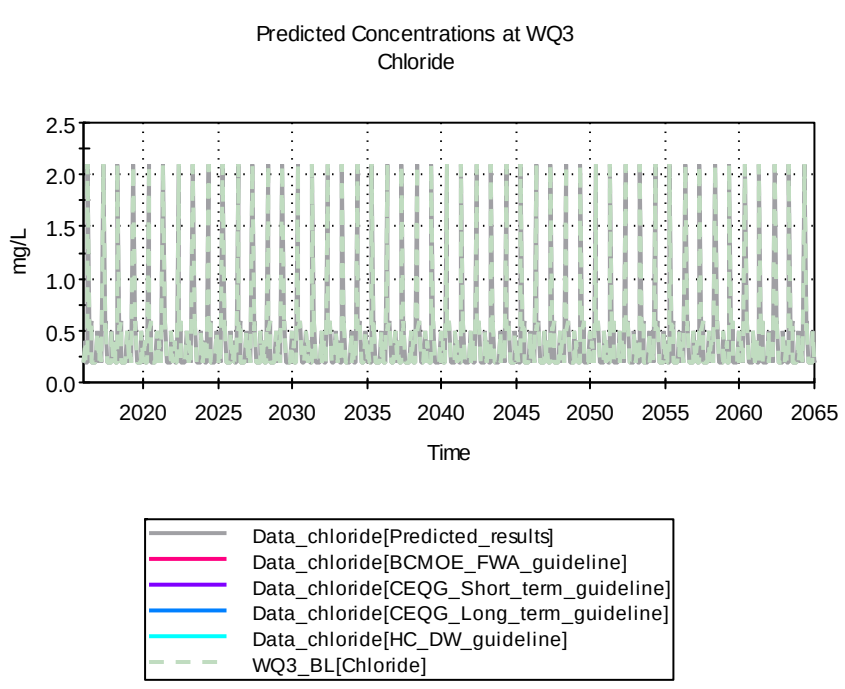
WQ3 – Best Estimate

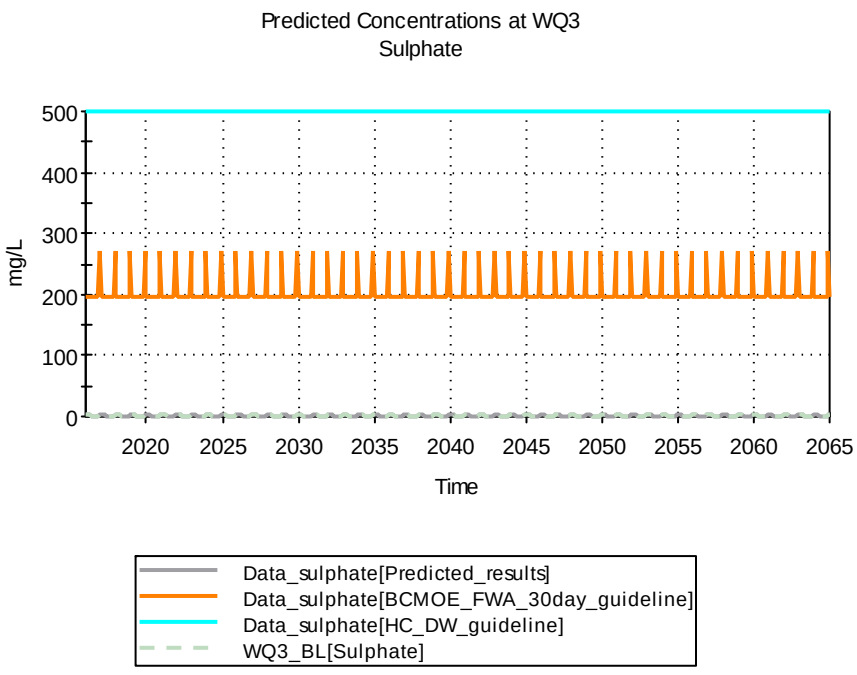


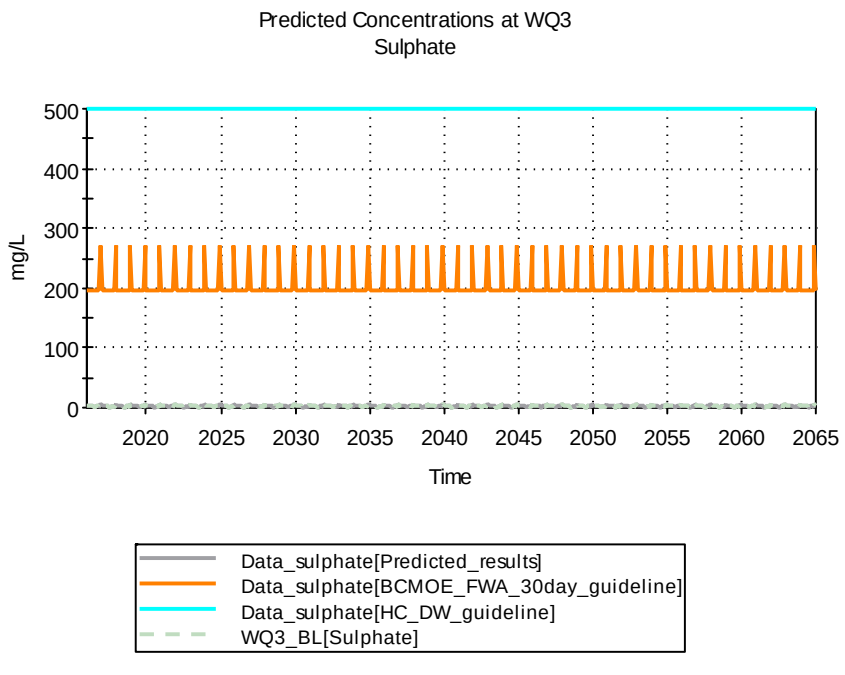
WQ3 – Worst Case



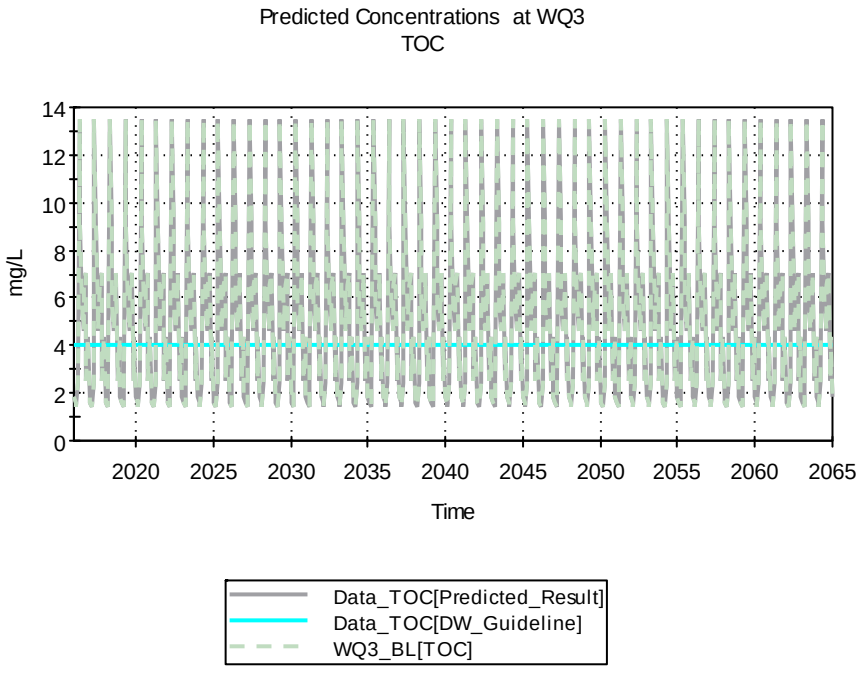


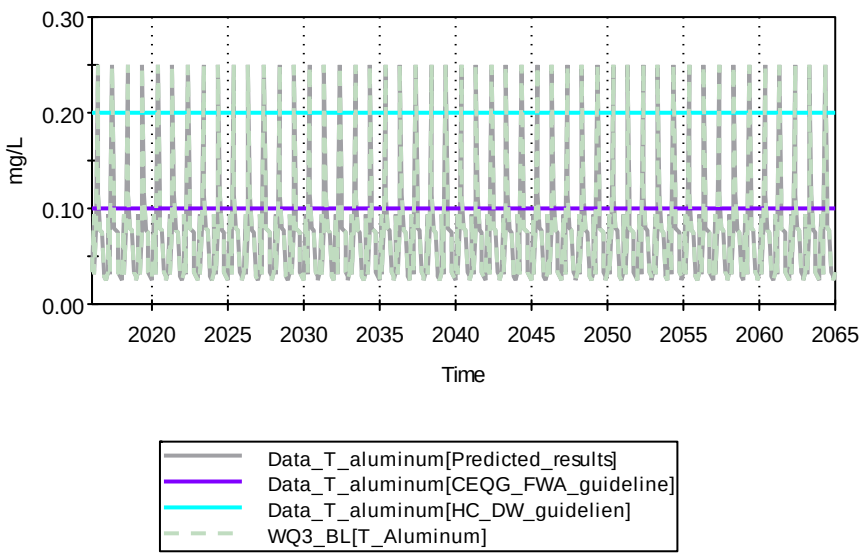




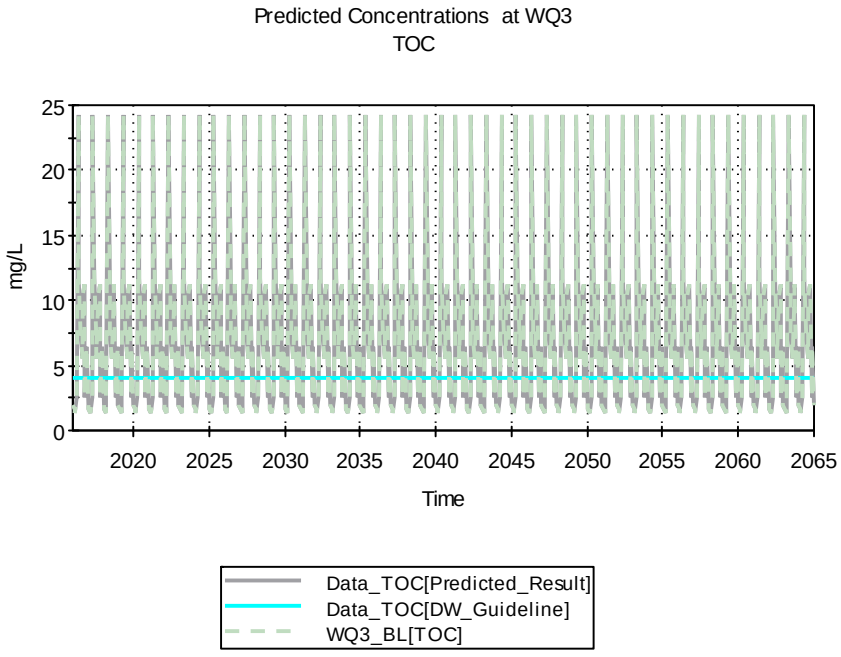


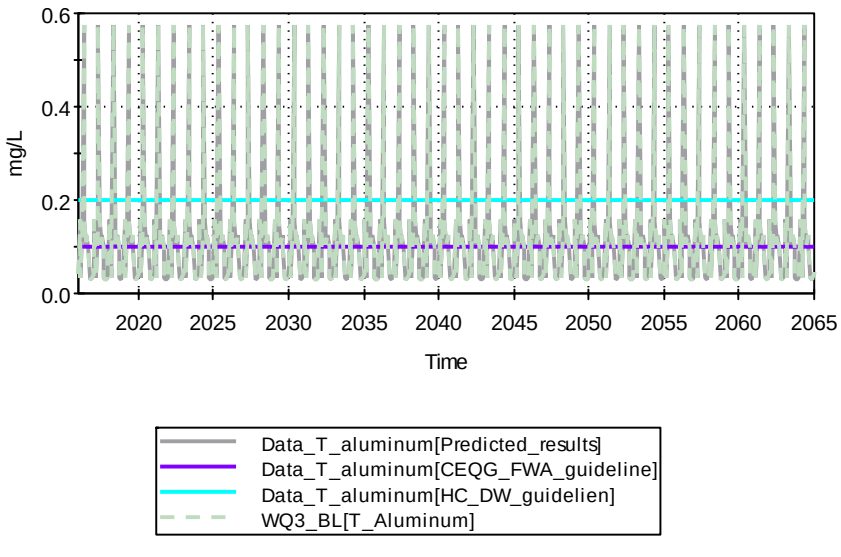
WQ3 – Best Estimate



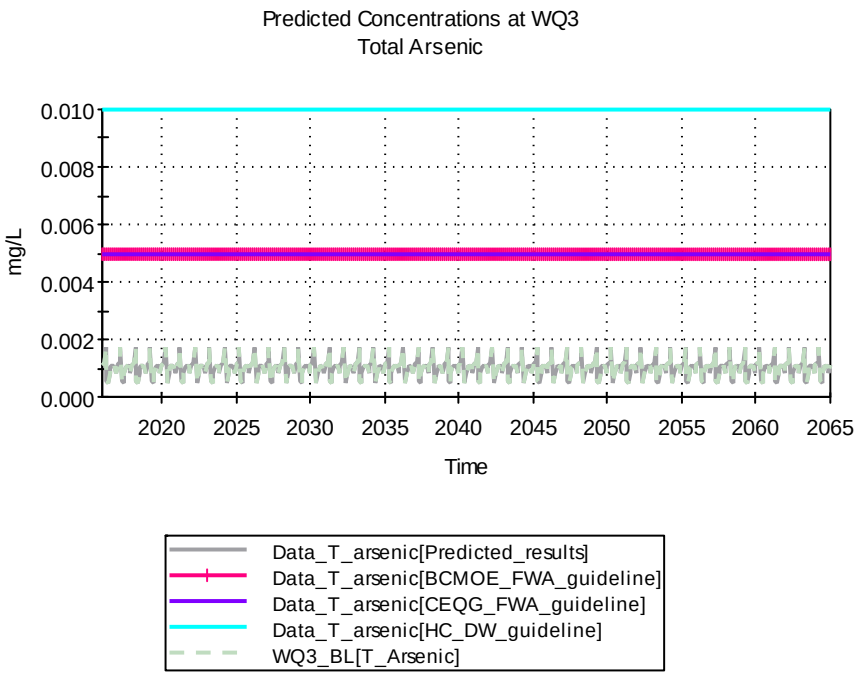


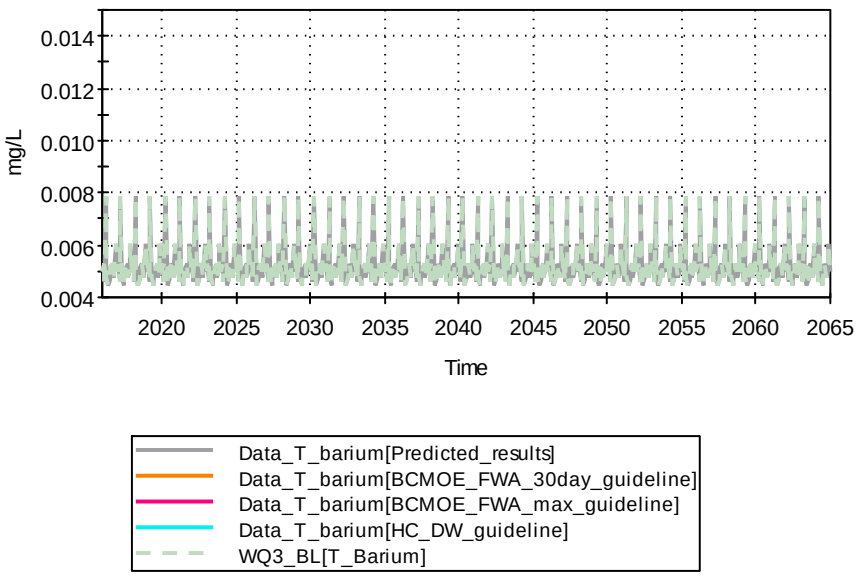
WQ3 – Worst Case

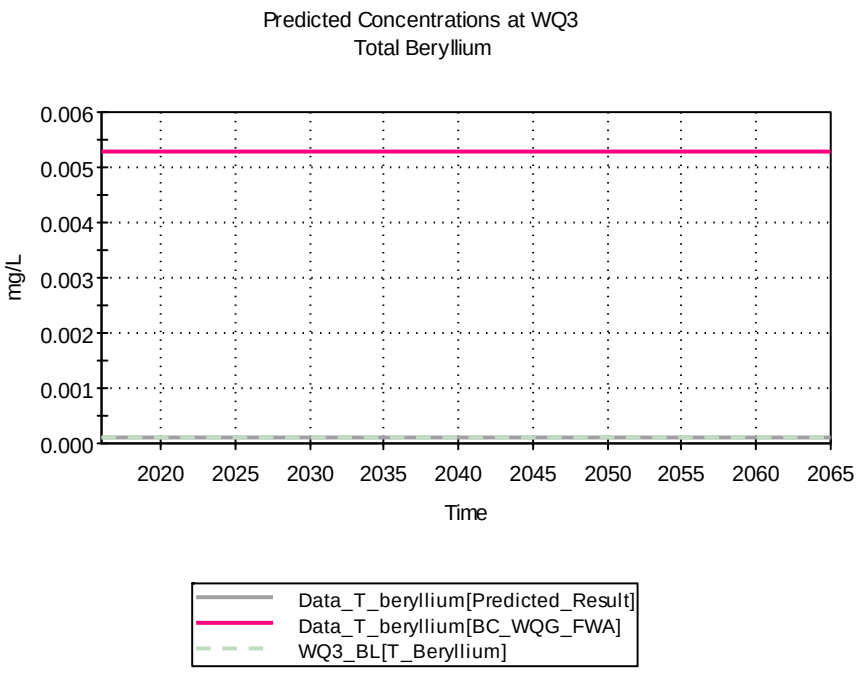




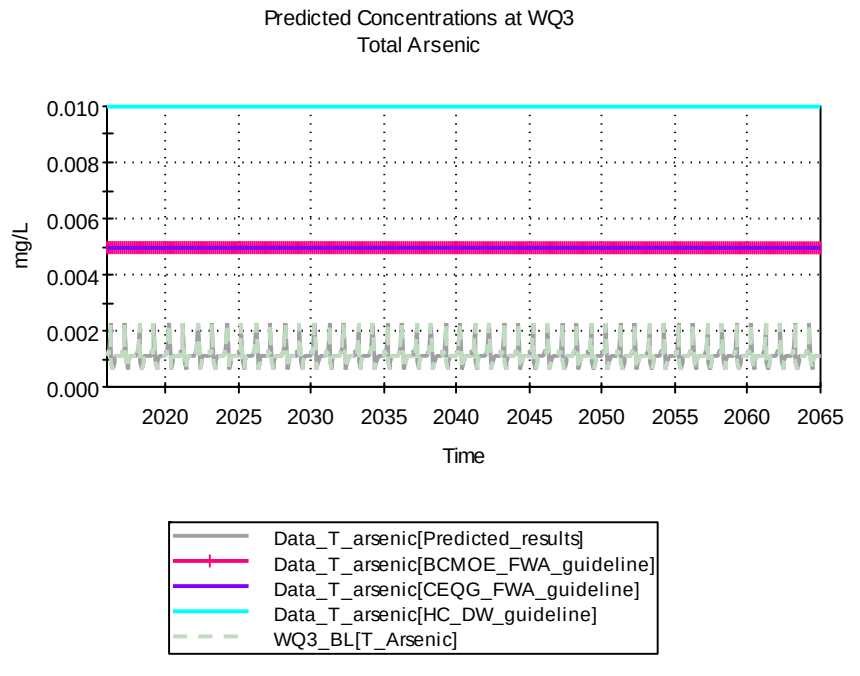
WQ3 – Best Estimate

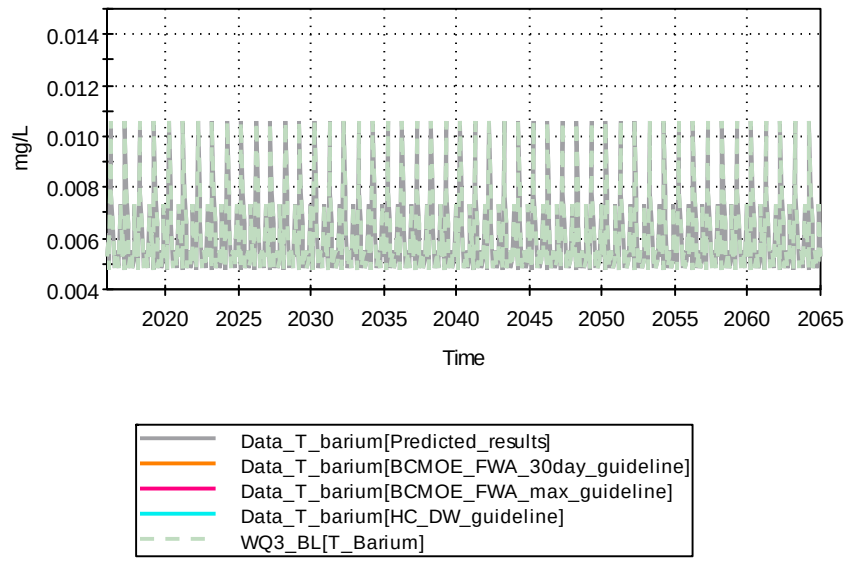


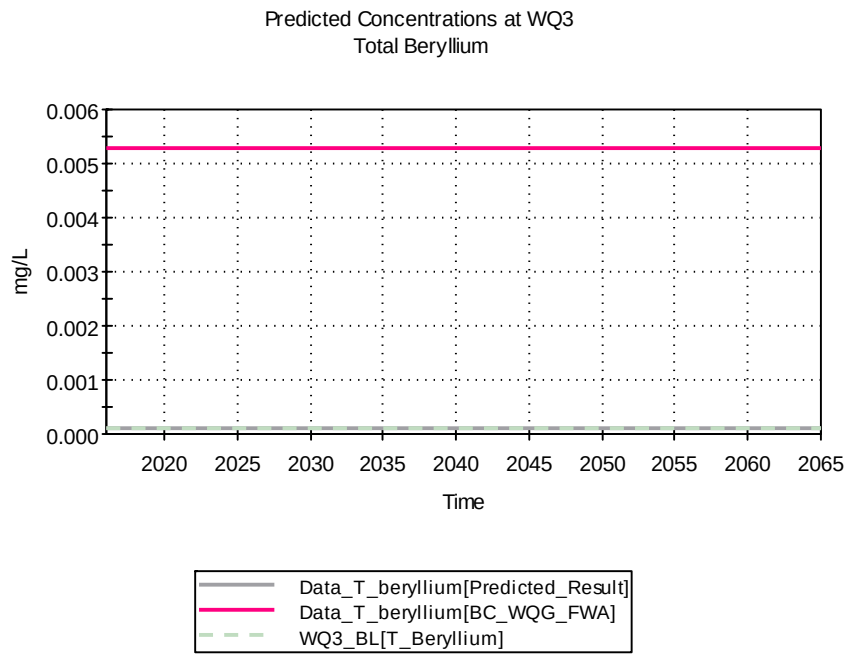




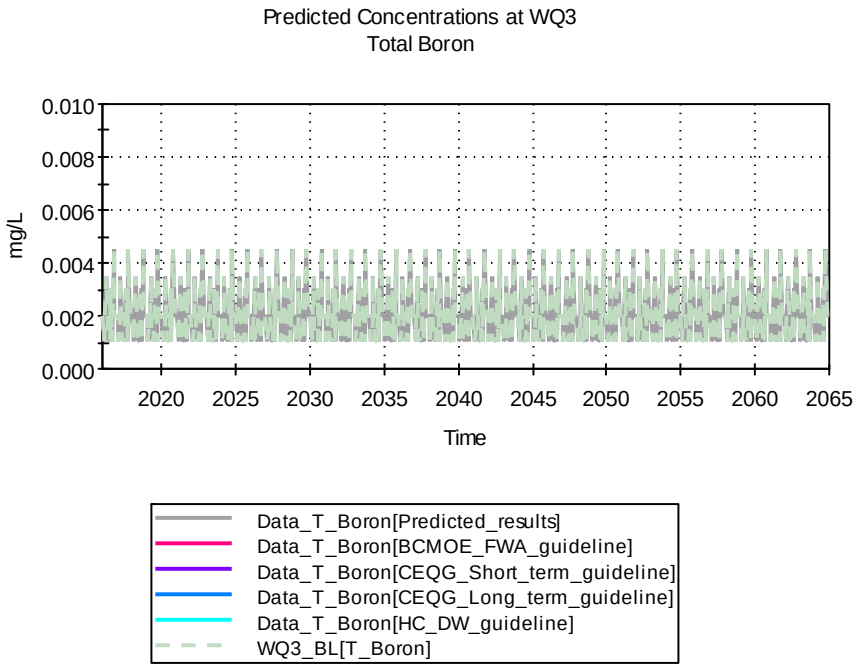
WQ3 – Worst Case



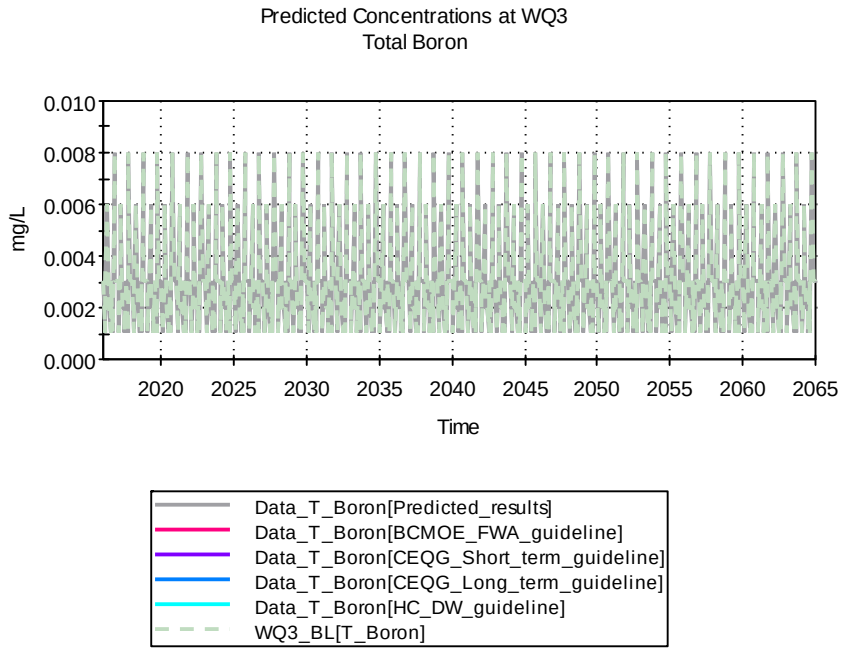


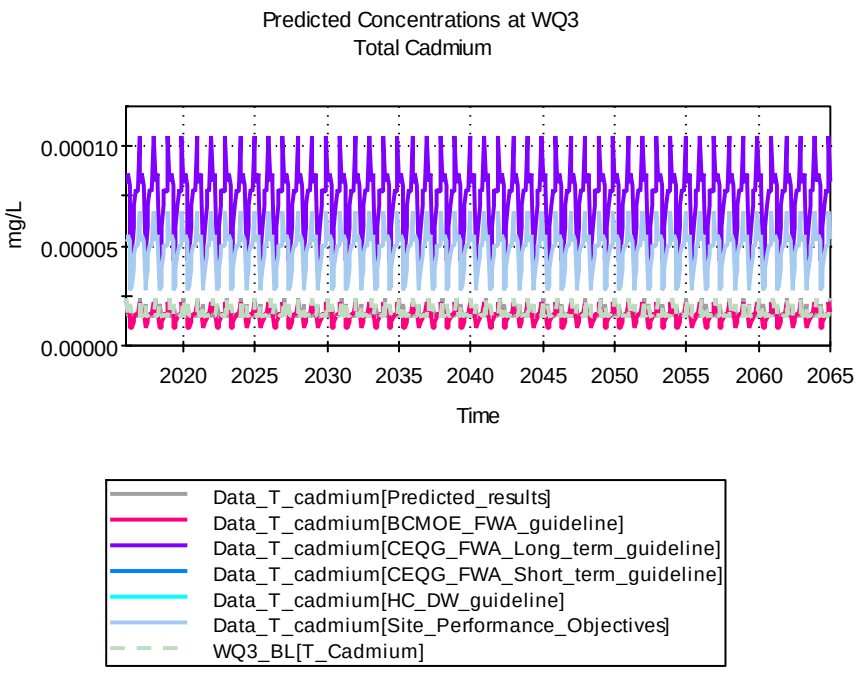


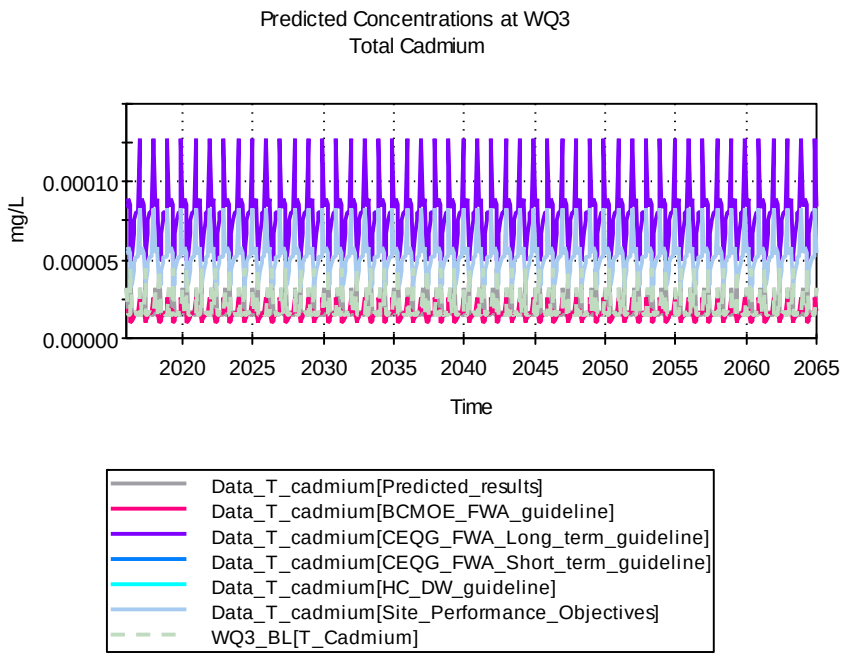
WQ3 – Best Estimate

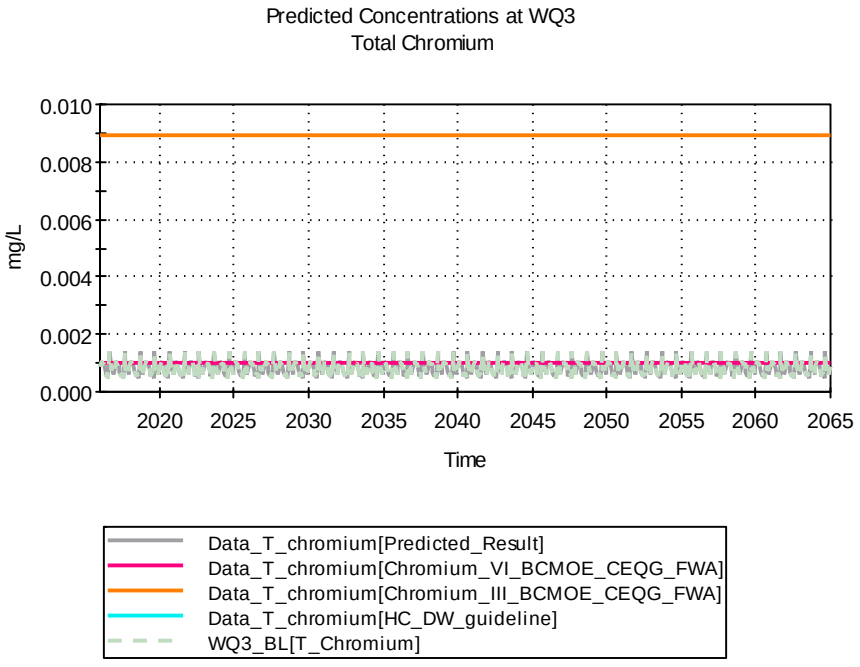


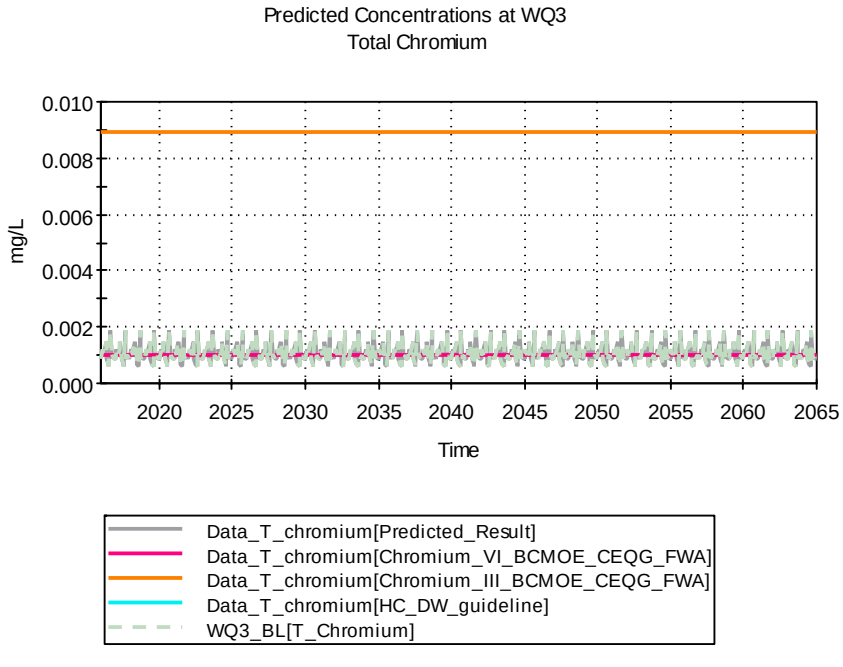
WQ3 – Worst Case

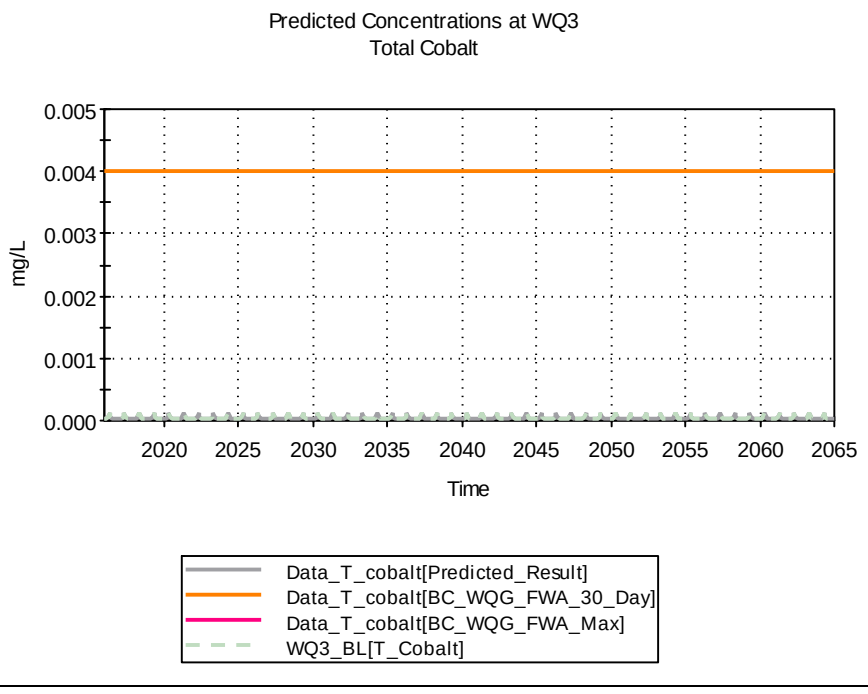


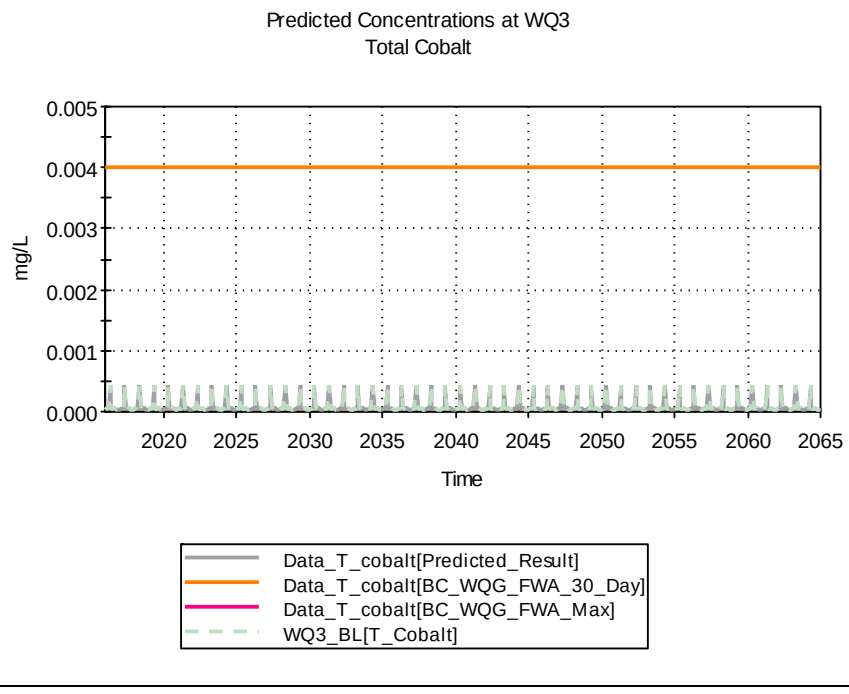




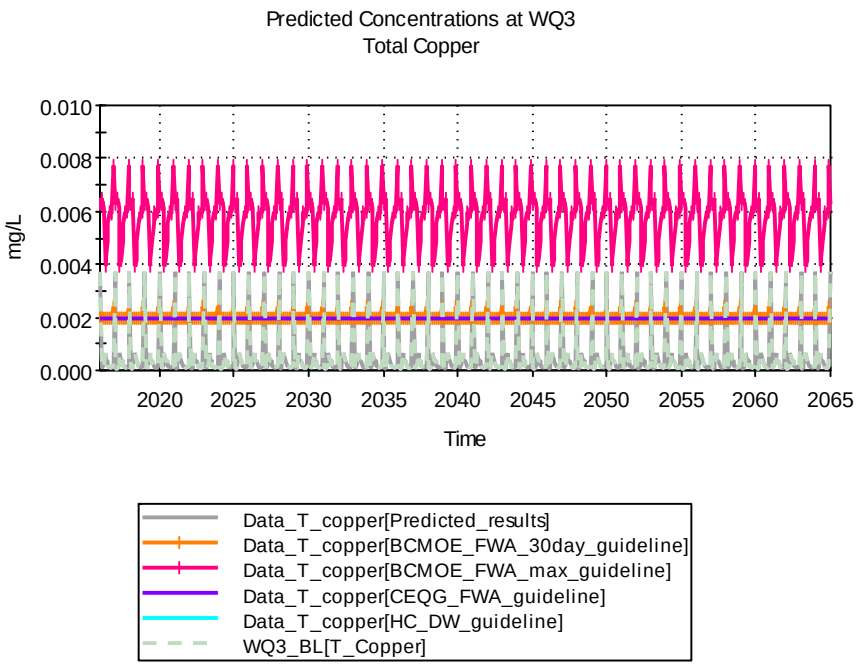




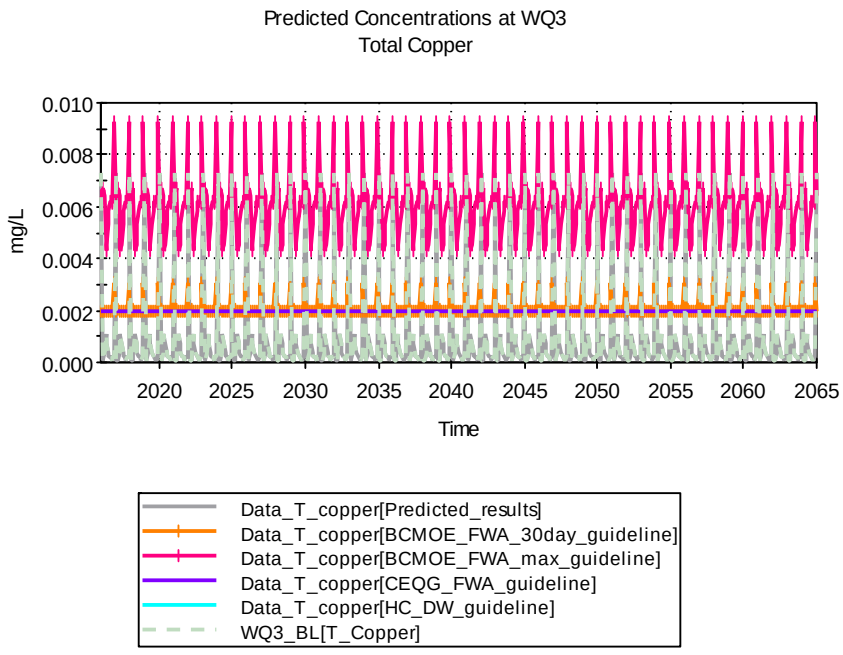


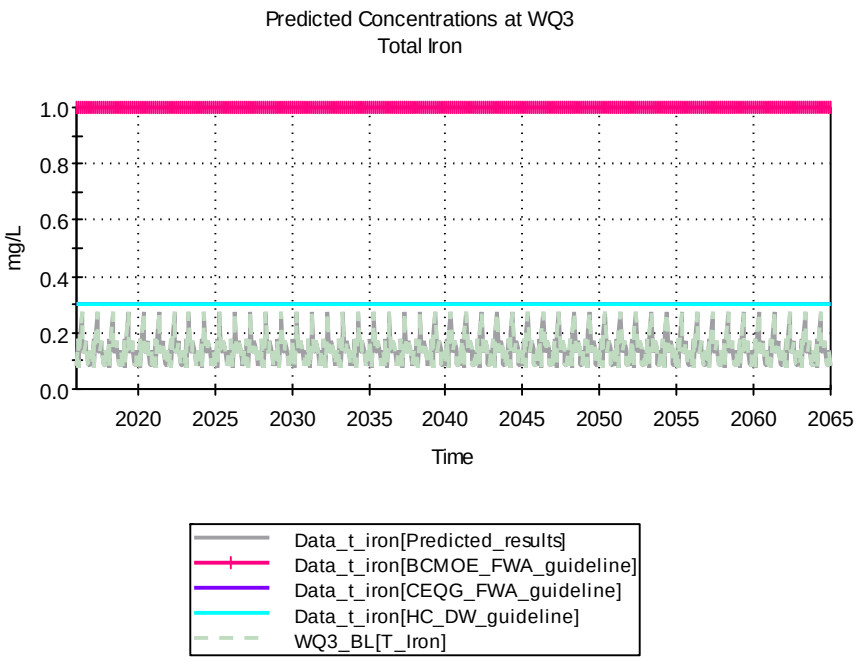


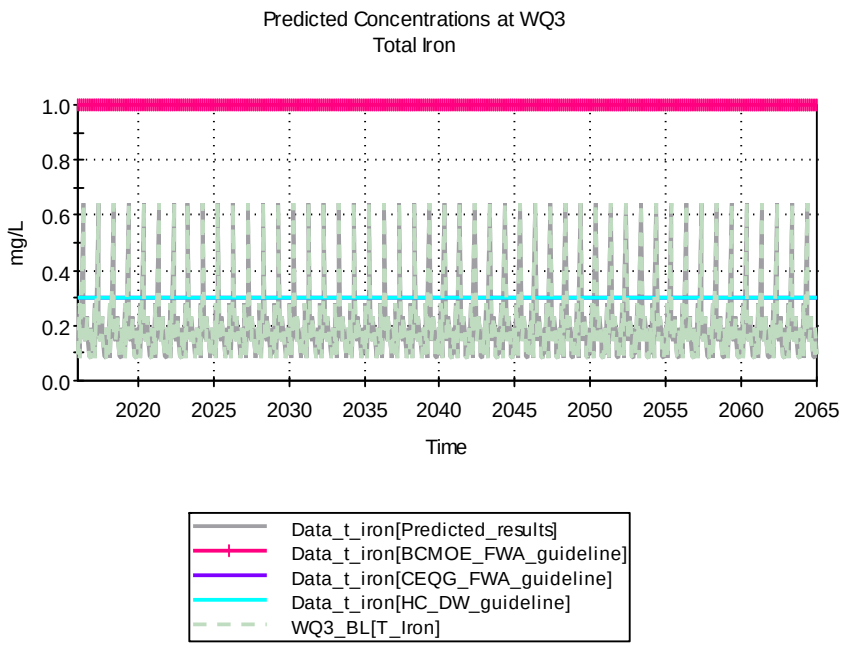
WQ3 – Best Estimate

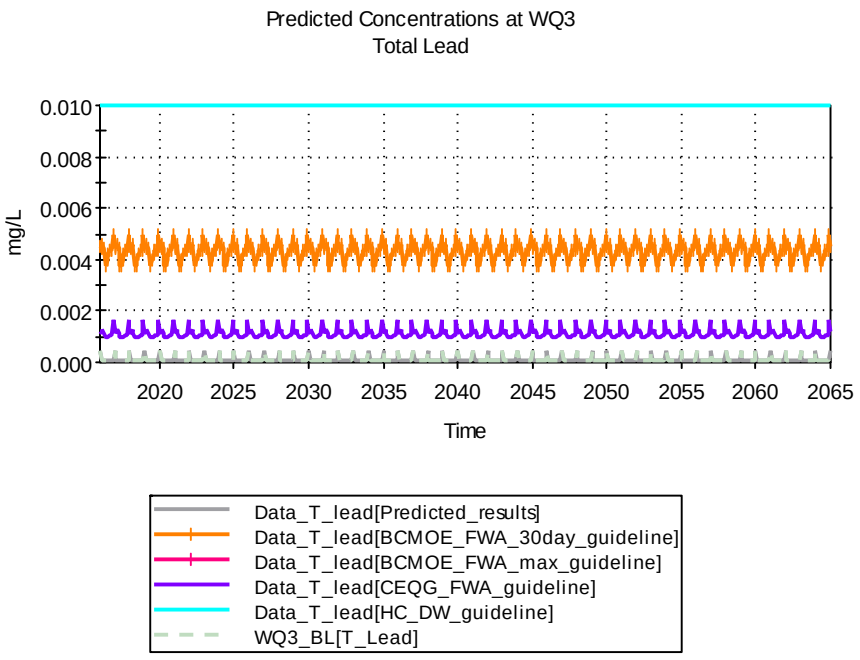


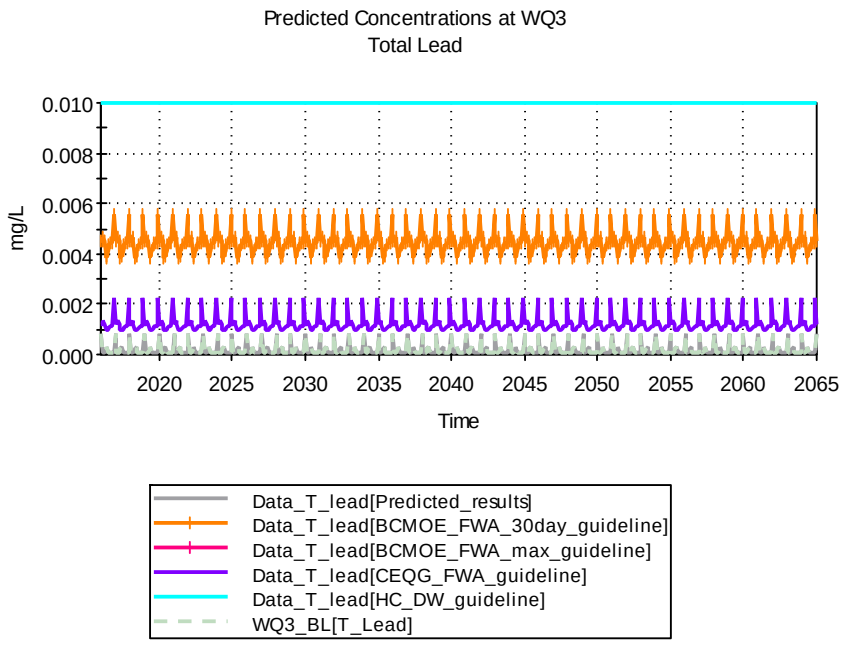
WQ3 – Worst Case

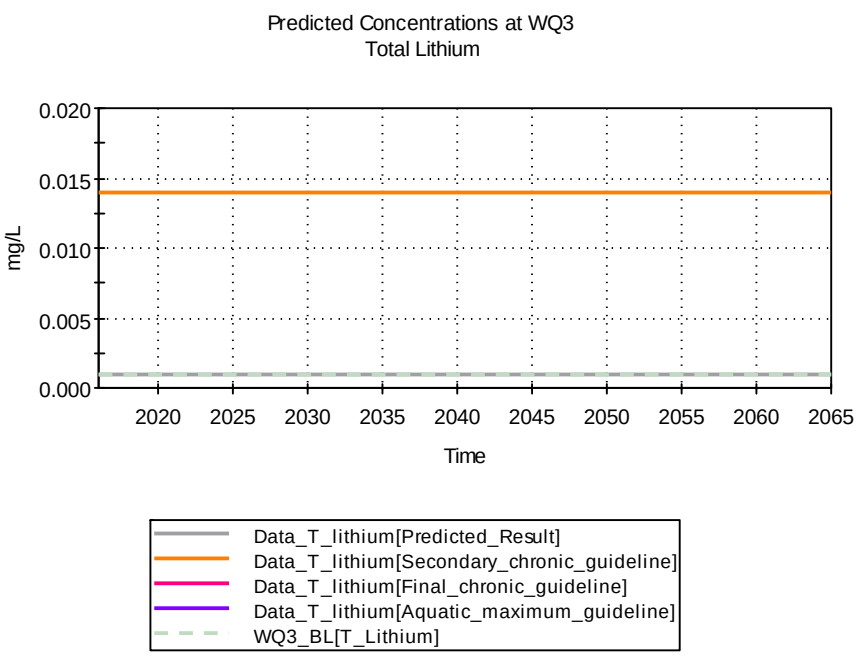


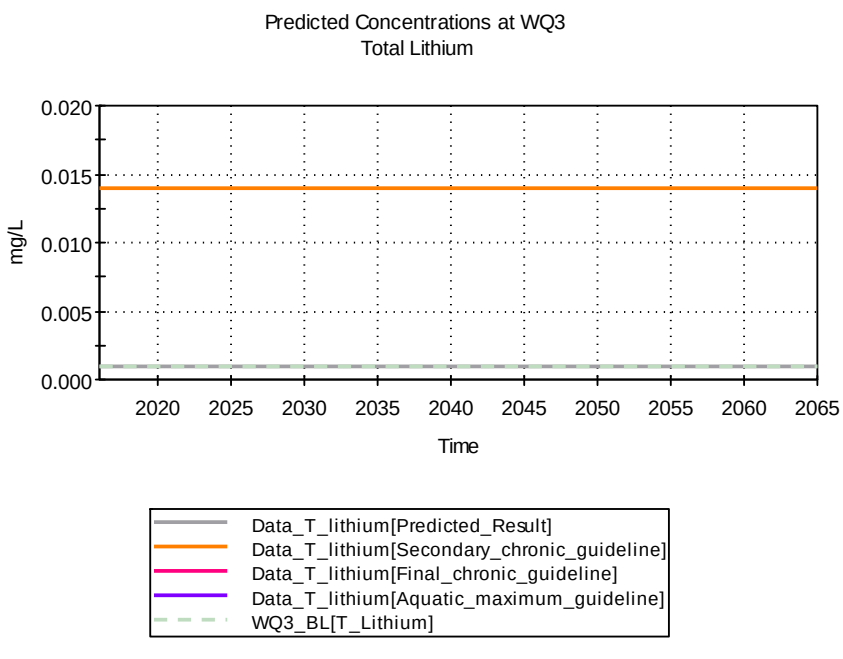




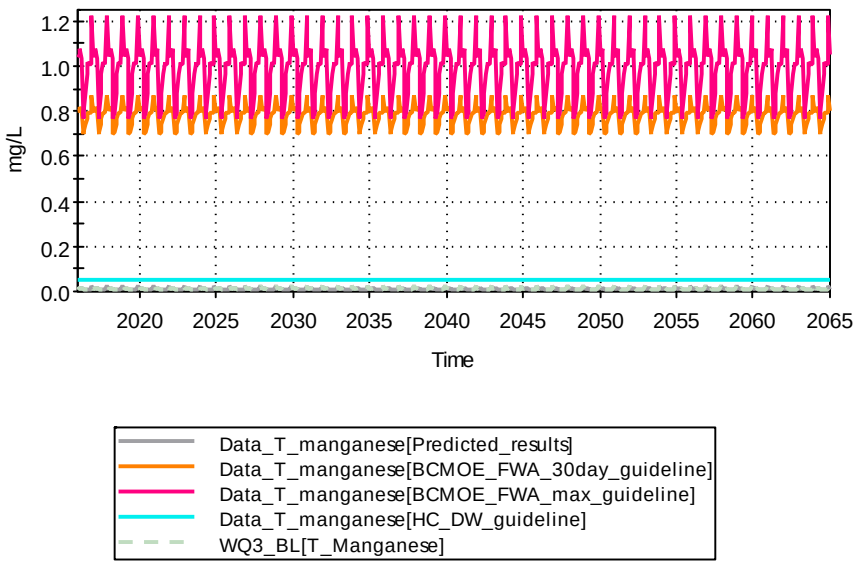




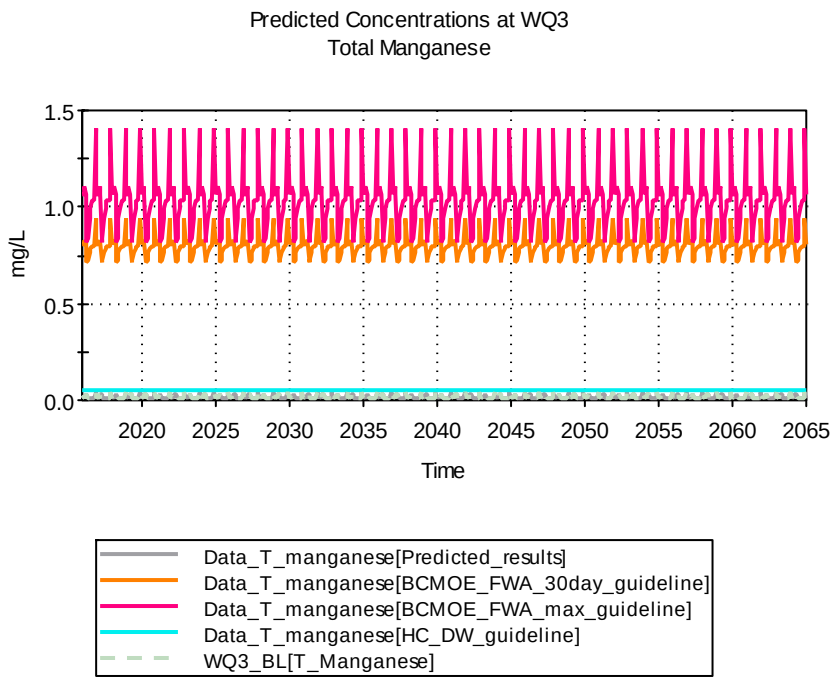


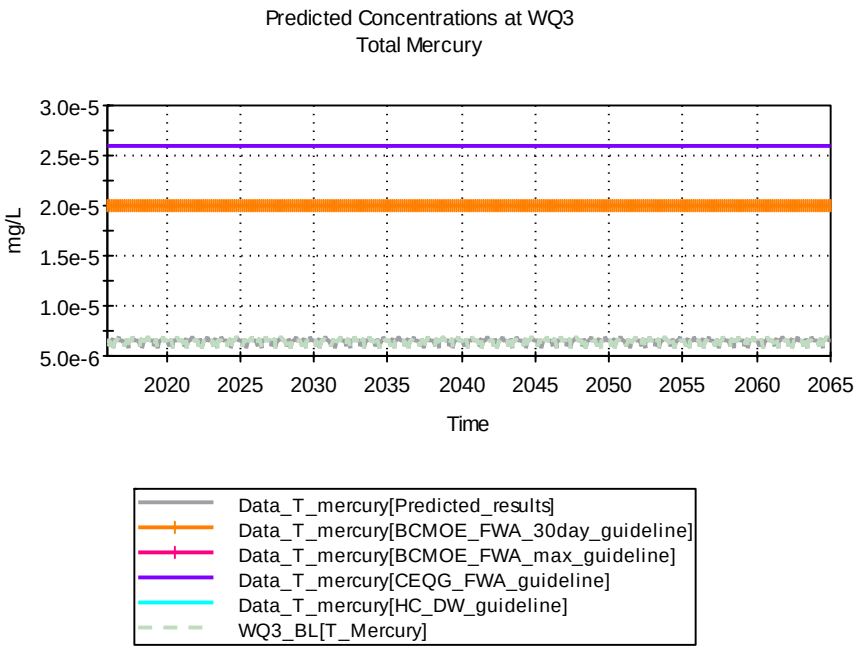


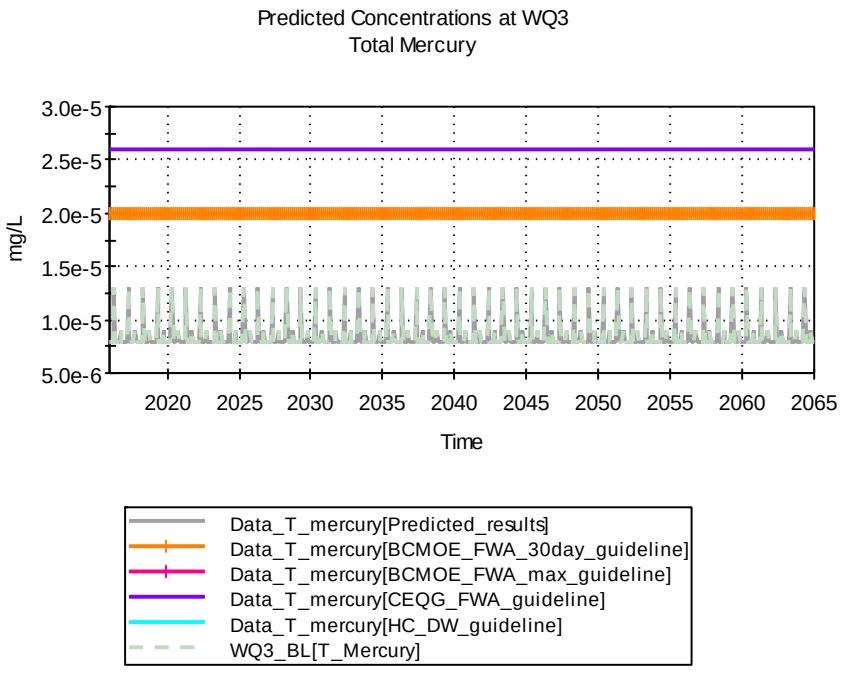
WQ3 – Best Estimate

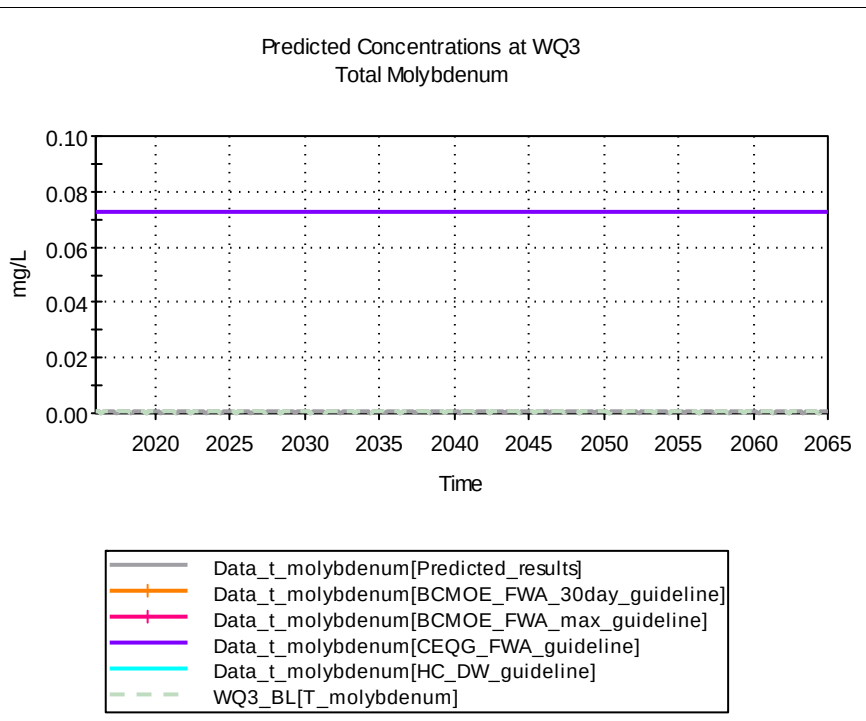


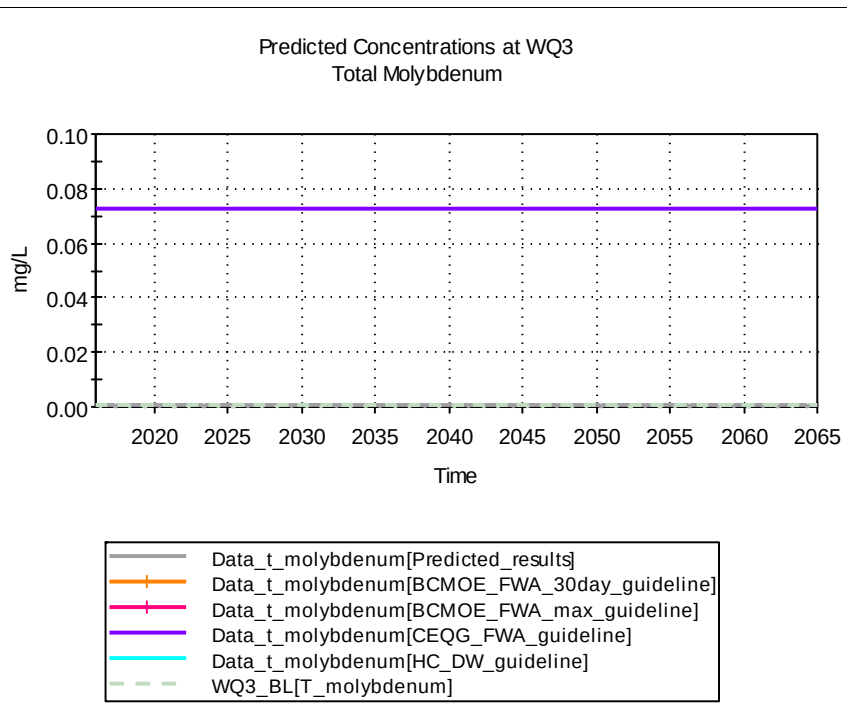
WQ3 – Worst Case



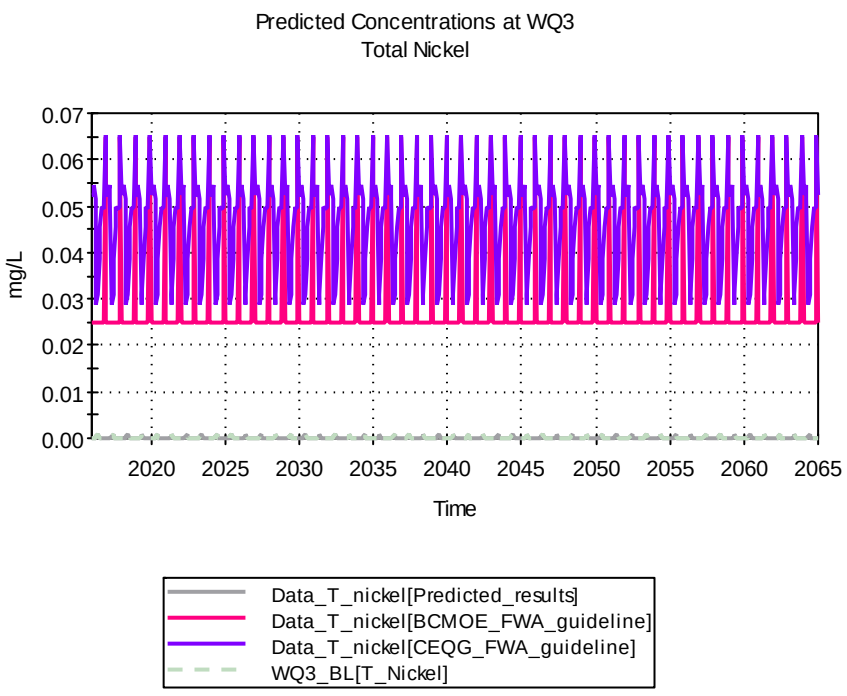


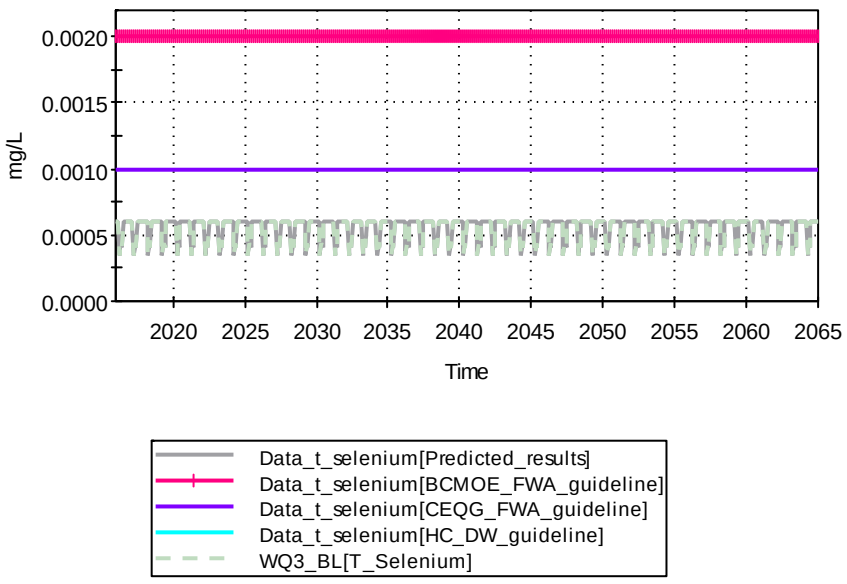


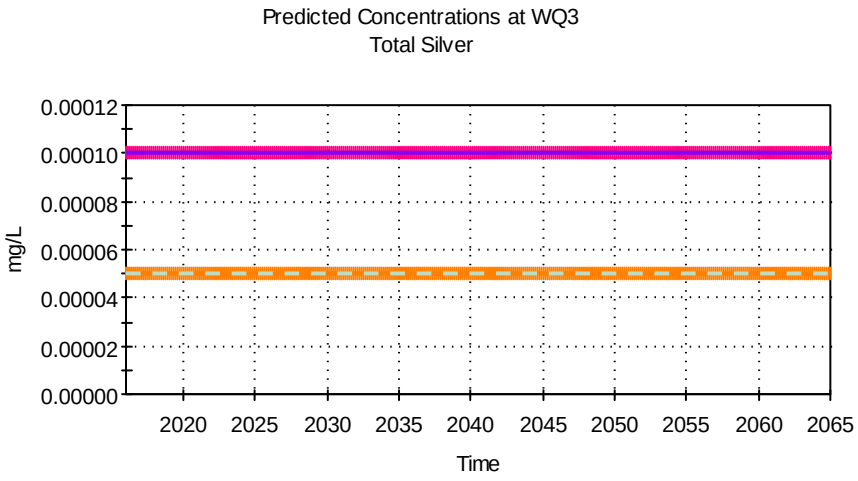




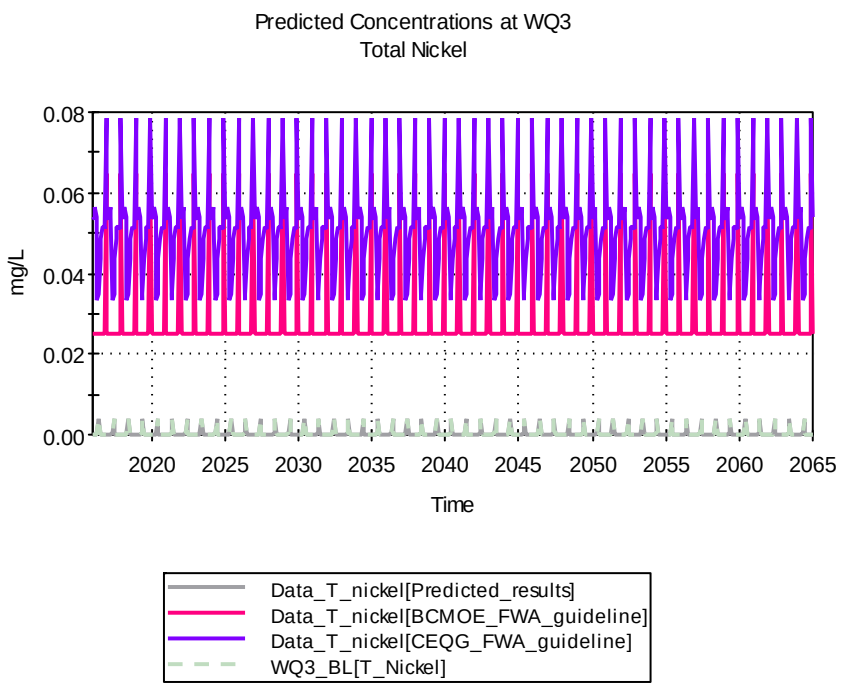
WQ3 – Best Estimate

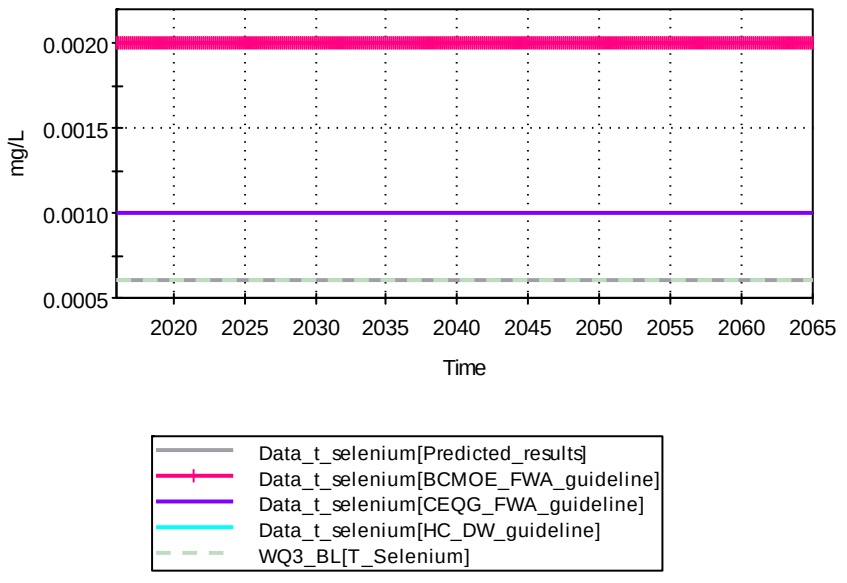


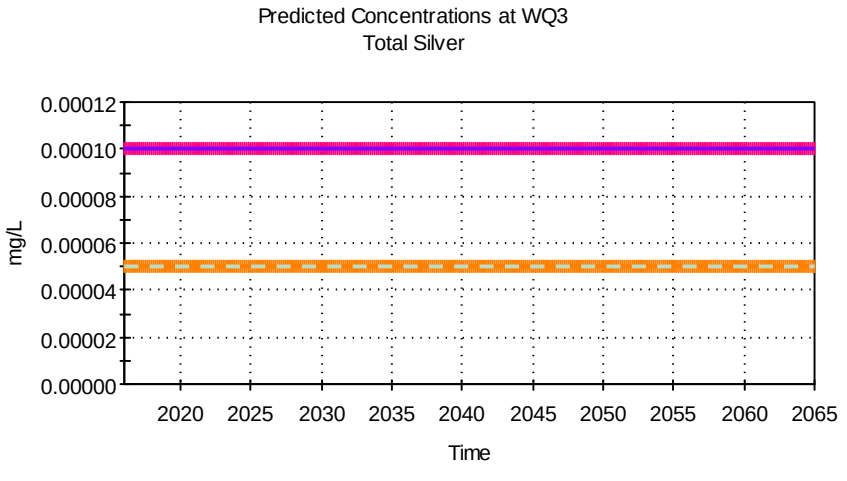




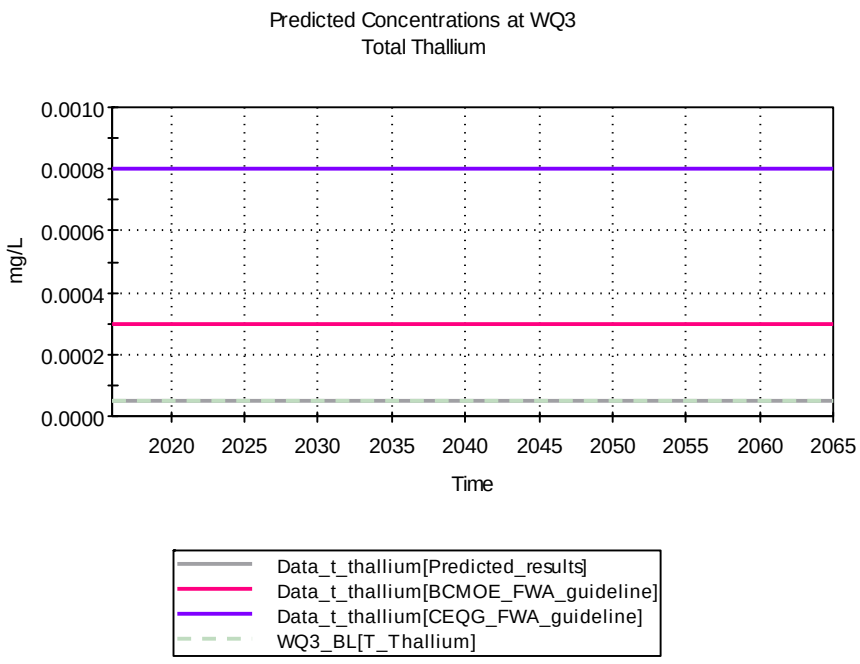
WQ3 – Worst Case

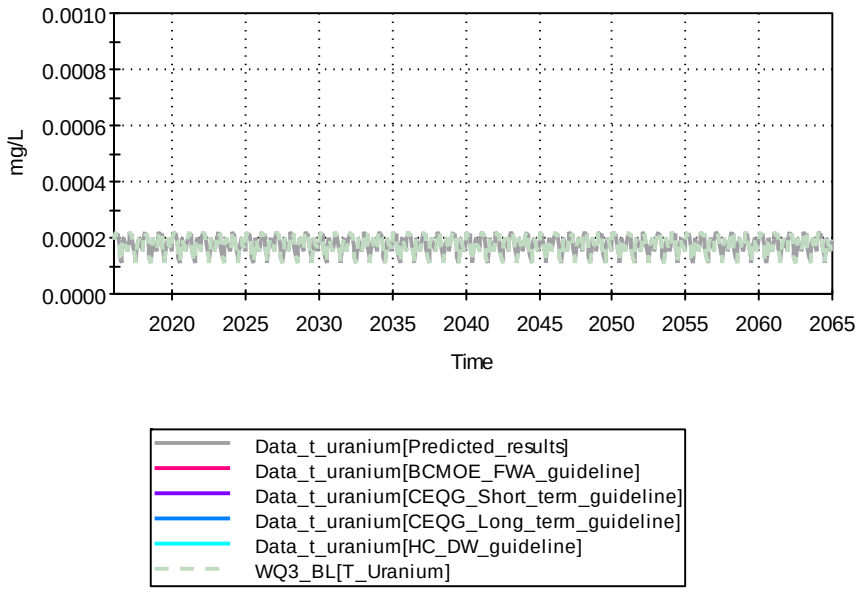


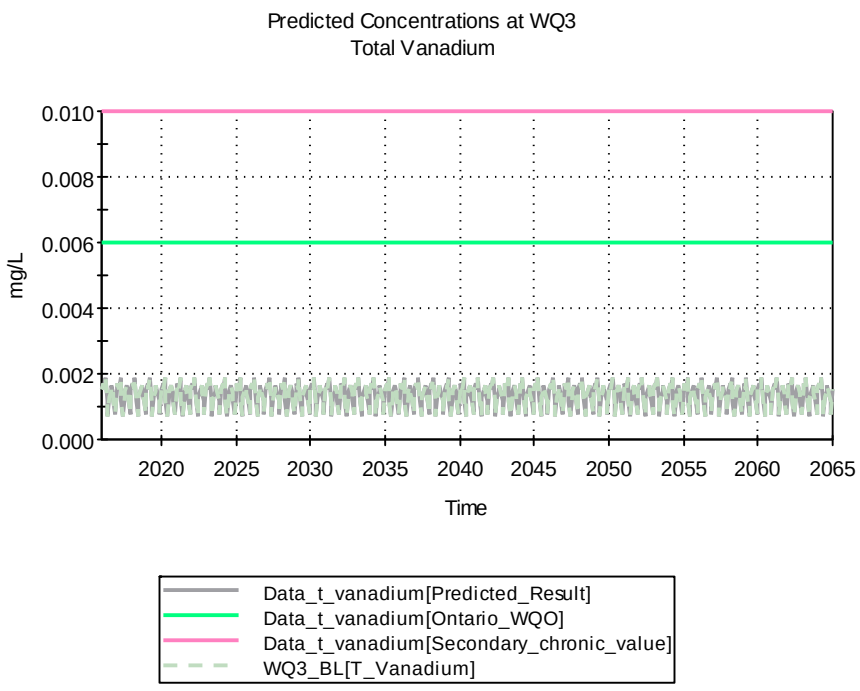




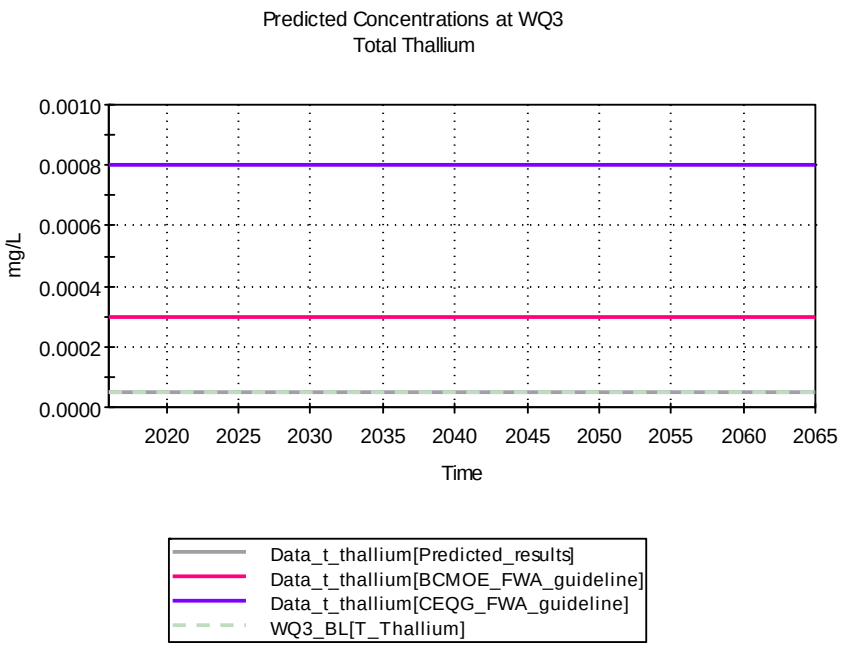
WQ3 – Best Estimate

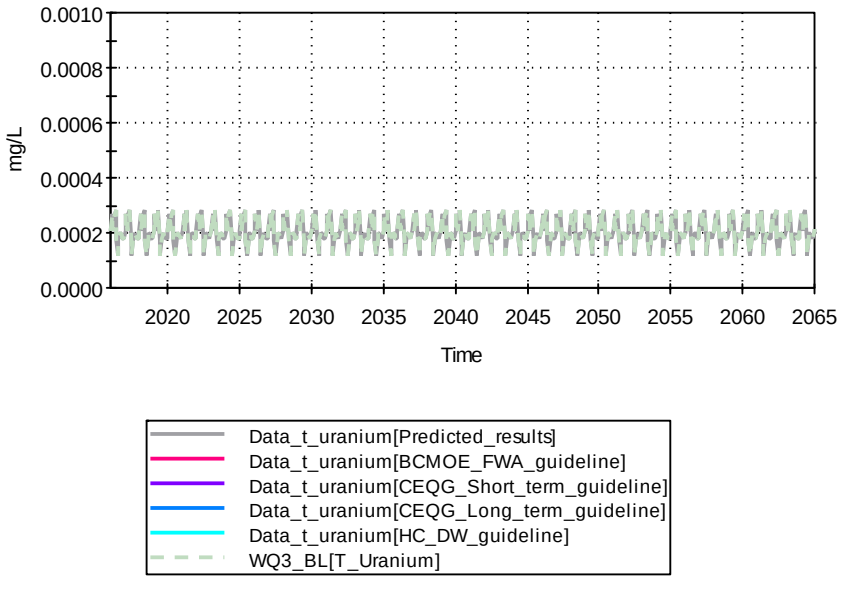


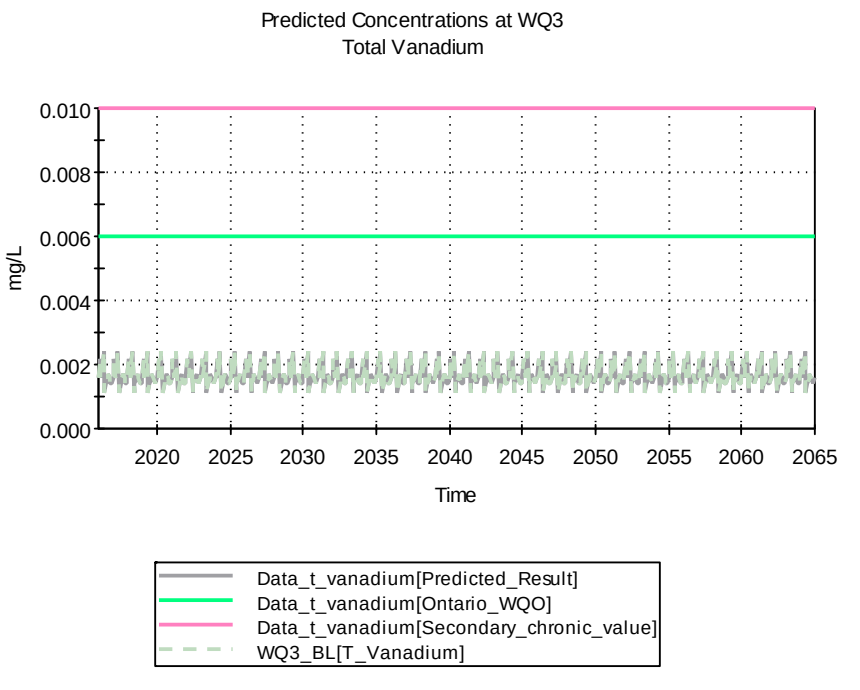




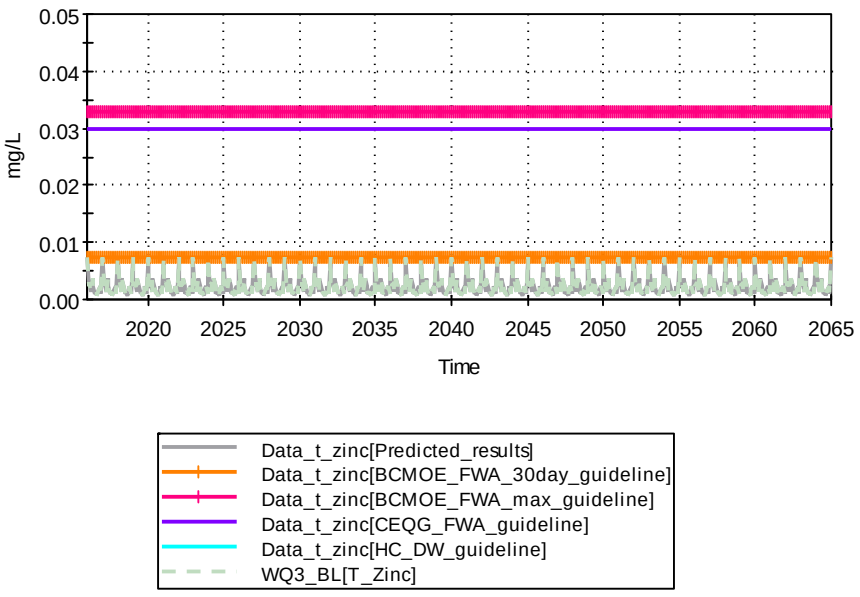
WQ3 – Worst Case



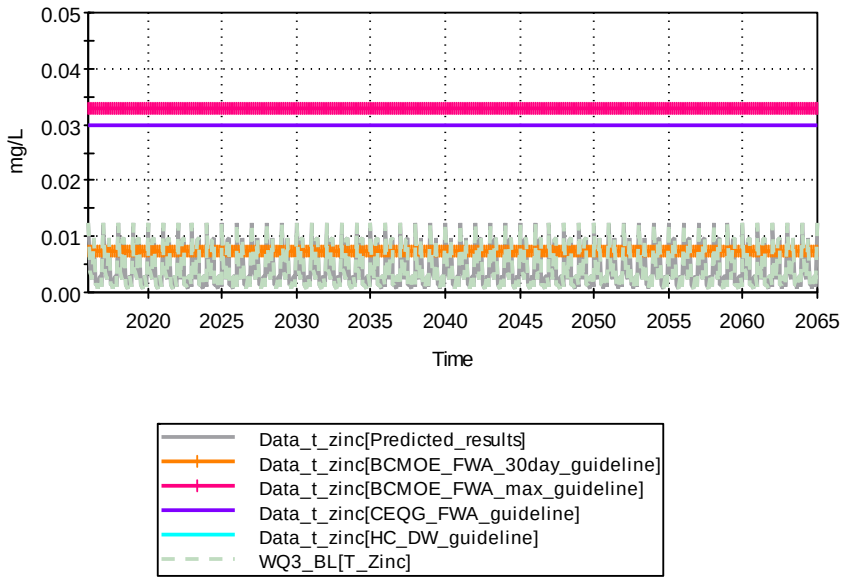


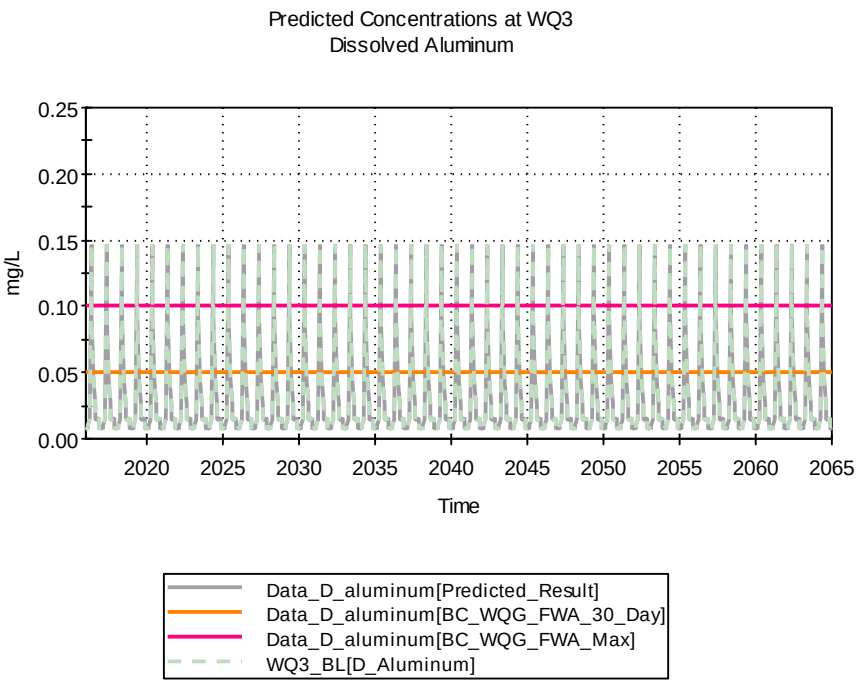


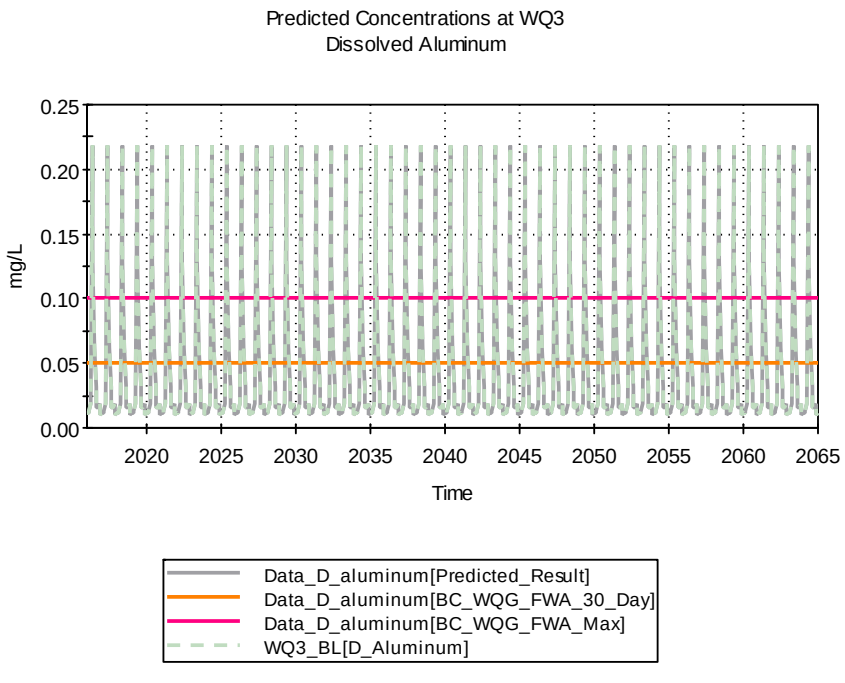
WQ3 – Best Estimate

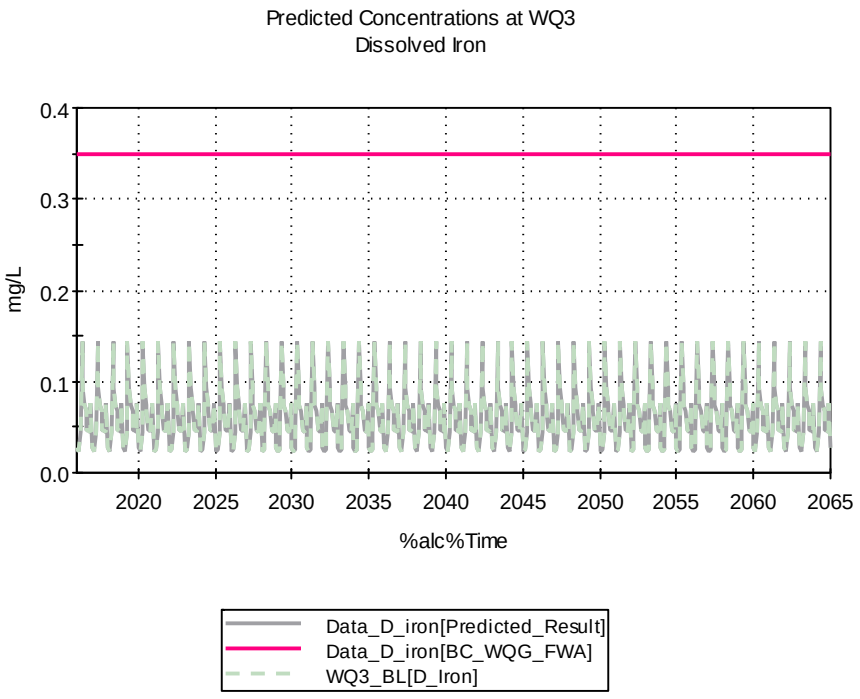


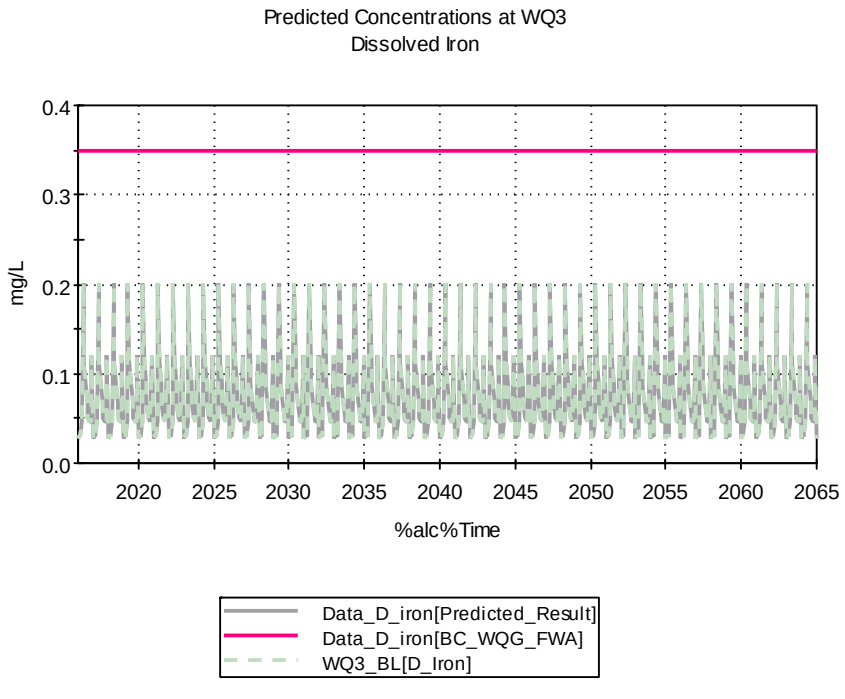
WQ3 – Worst Case



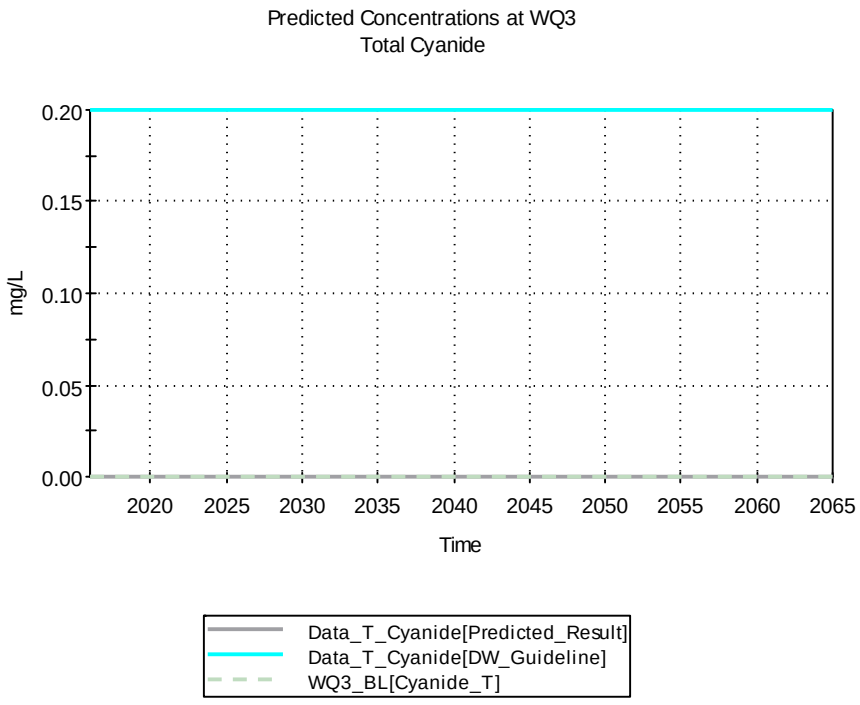




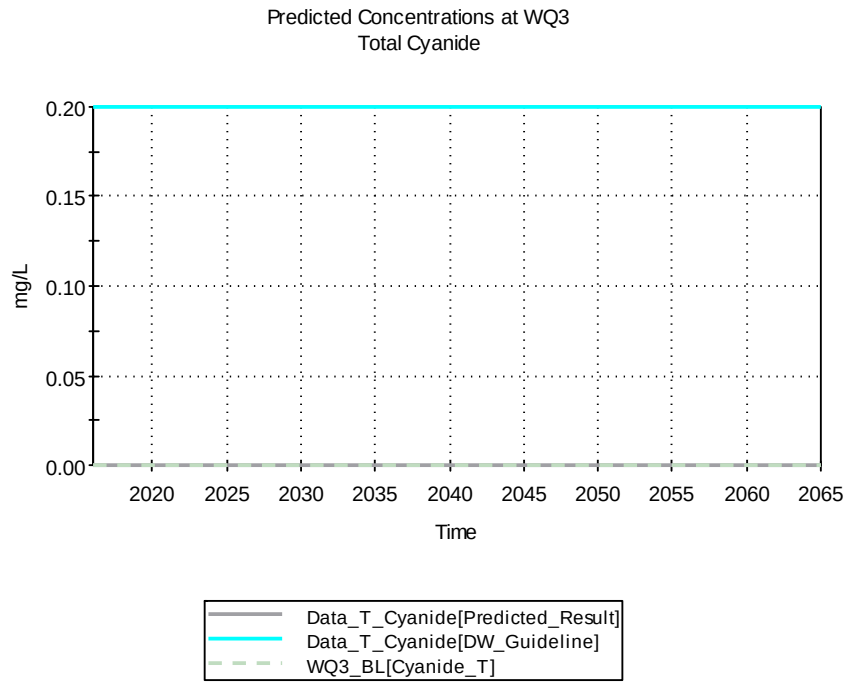


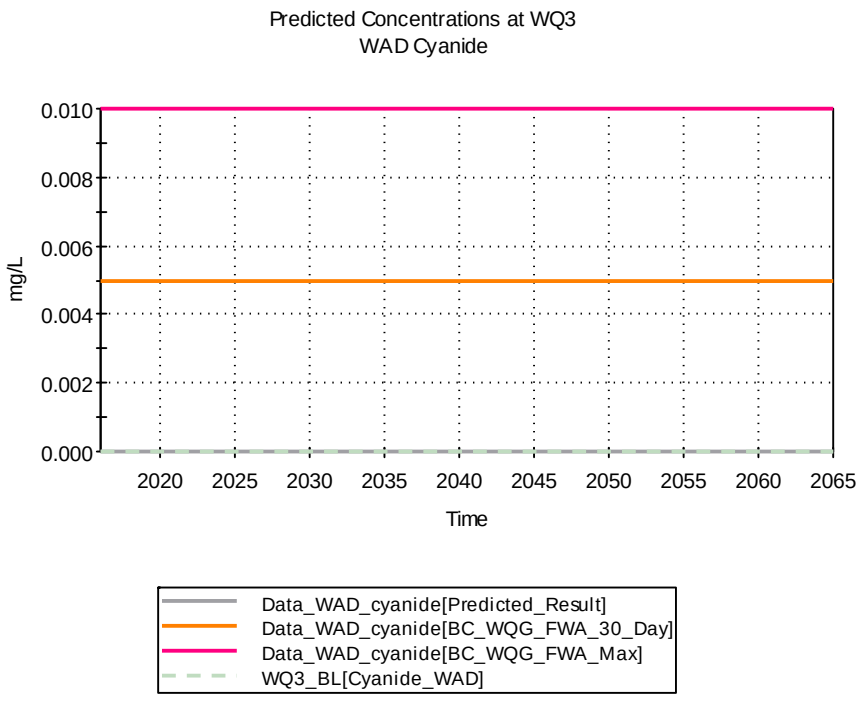


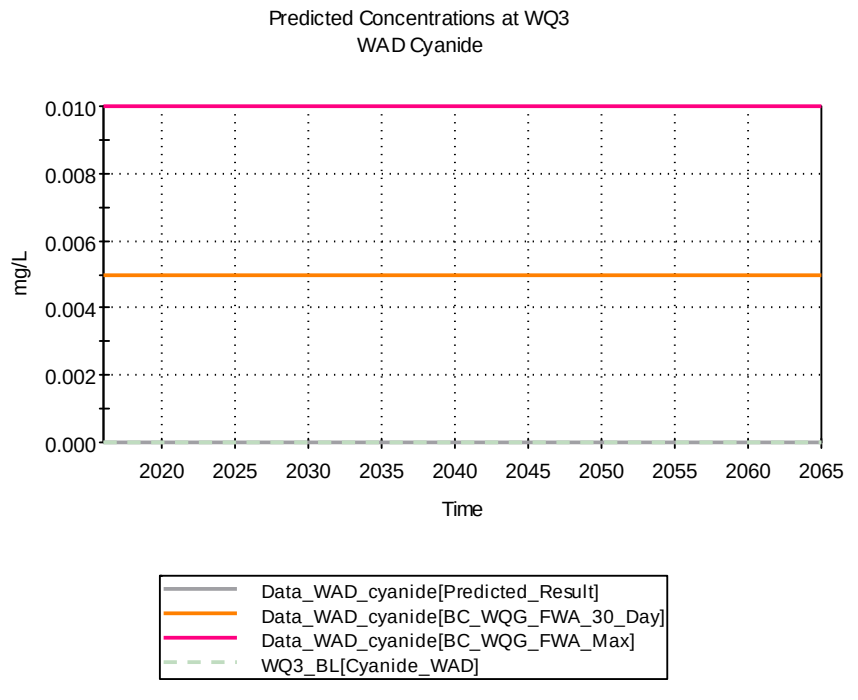
WQ3 – Best Estimate



WQ3 – Worst Case



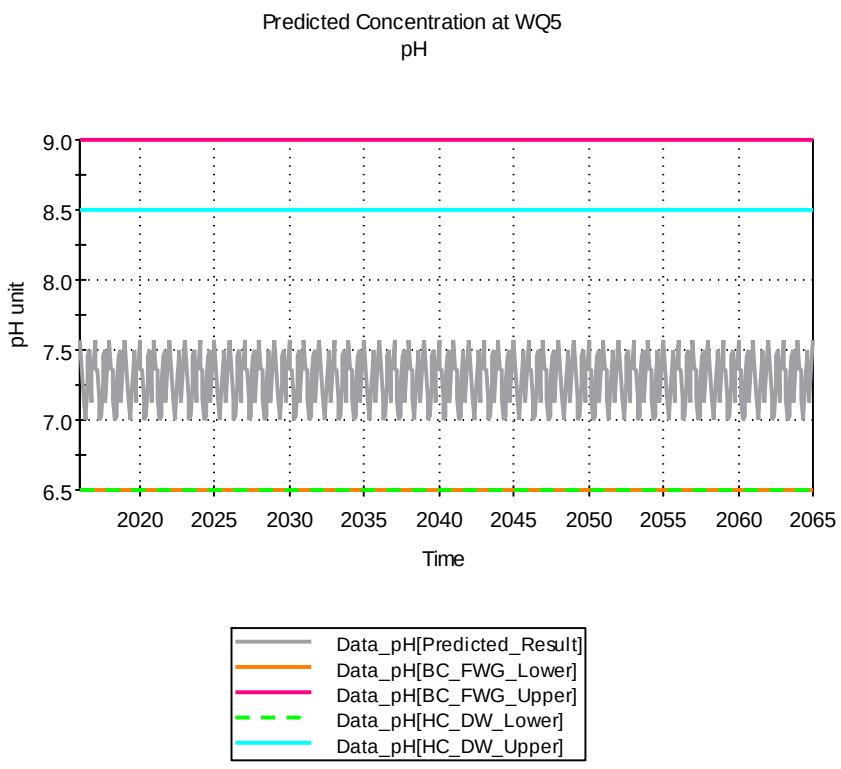


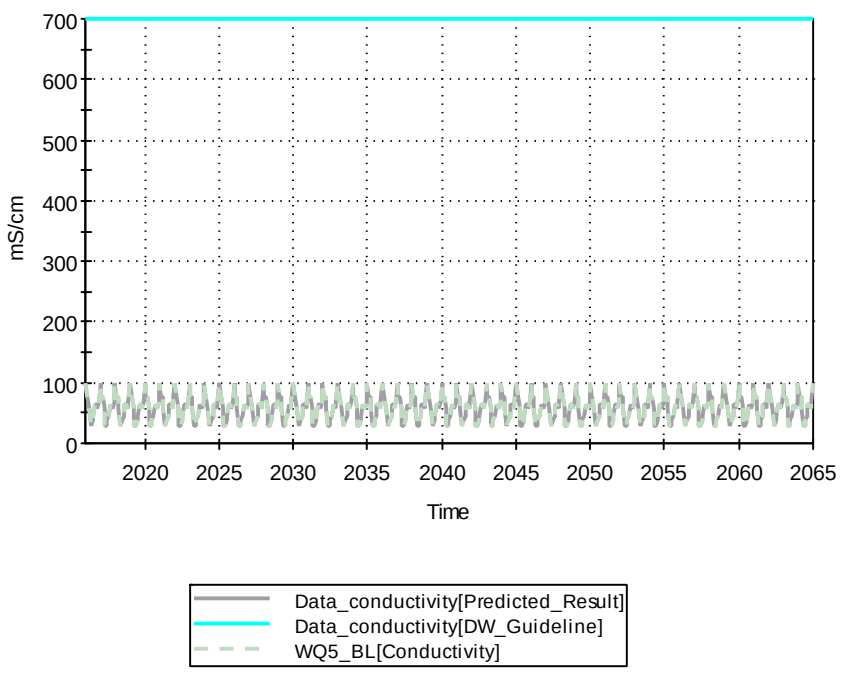


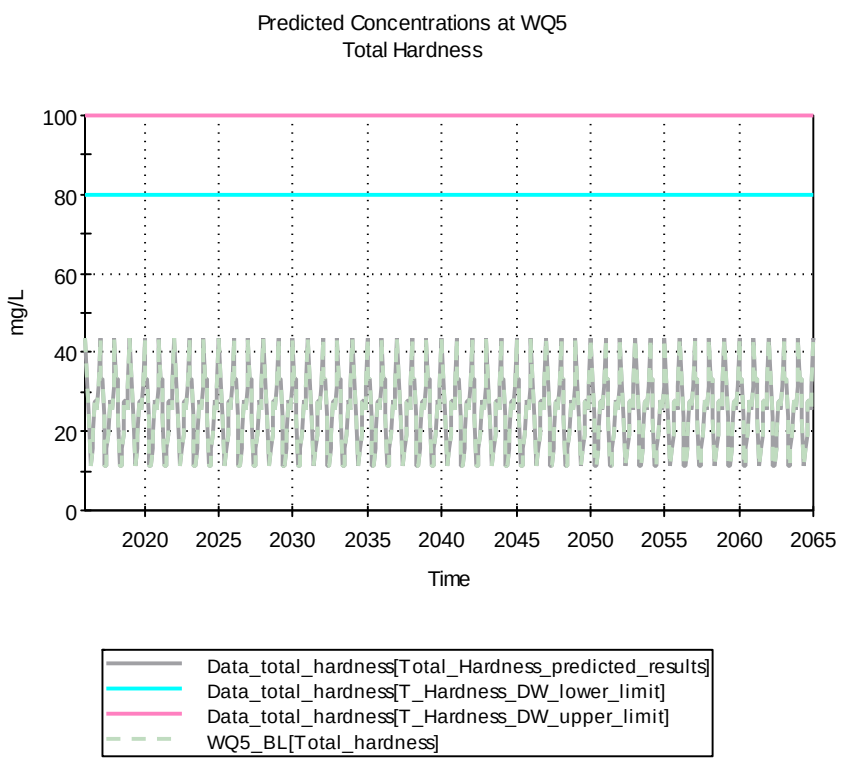
Annex A-4

Graphical Outputs of the Predicted Water Quality at WQ5 – Best Estimate and Worst Case

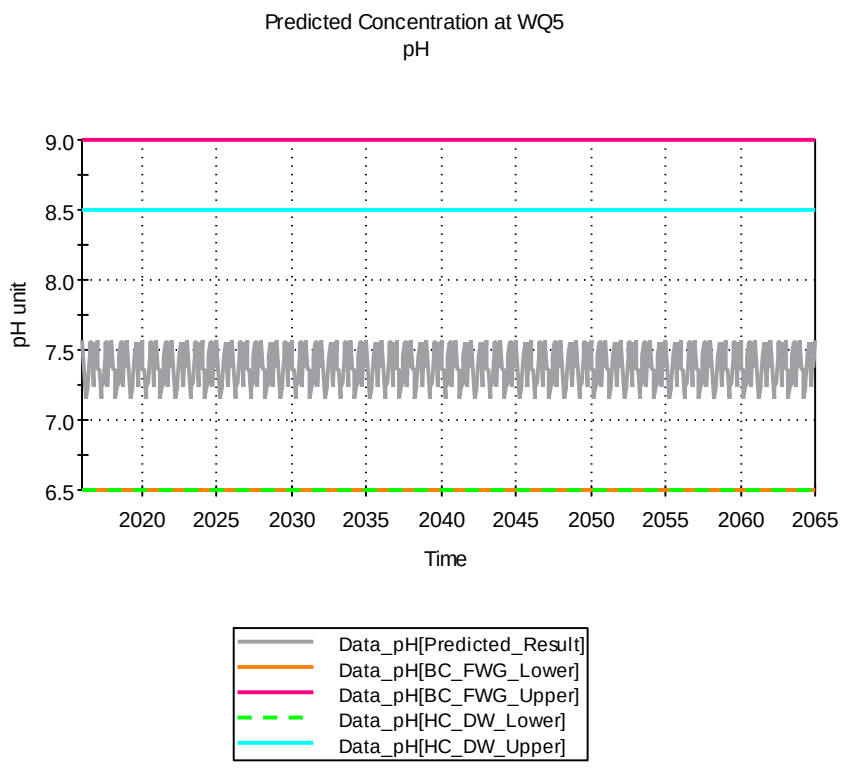
WQ5 – Best Estimate

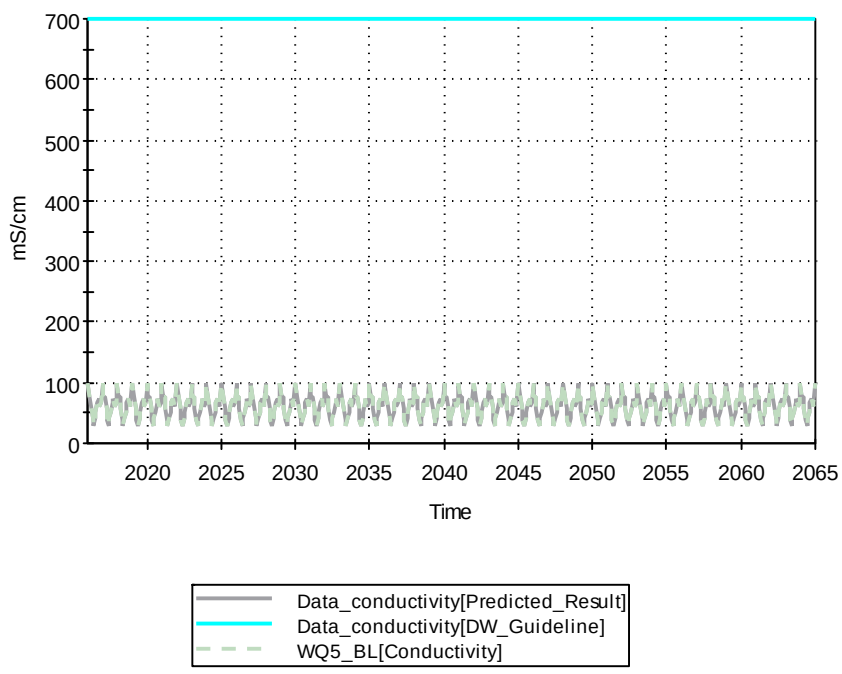


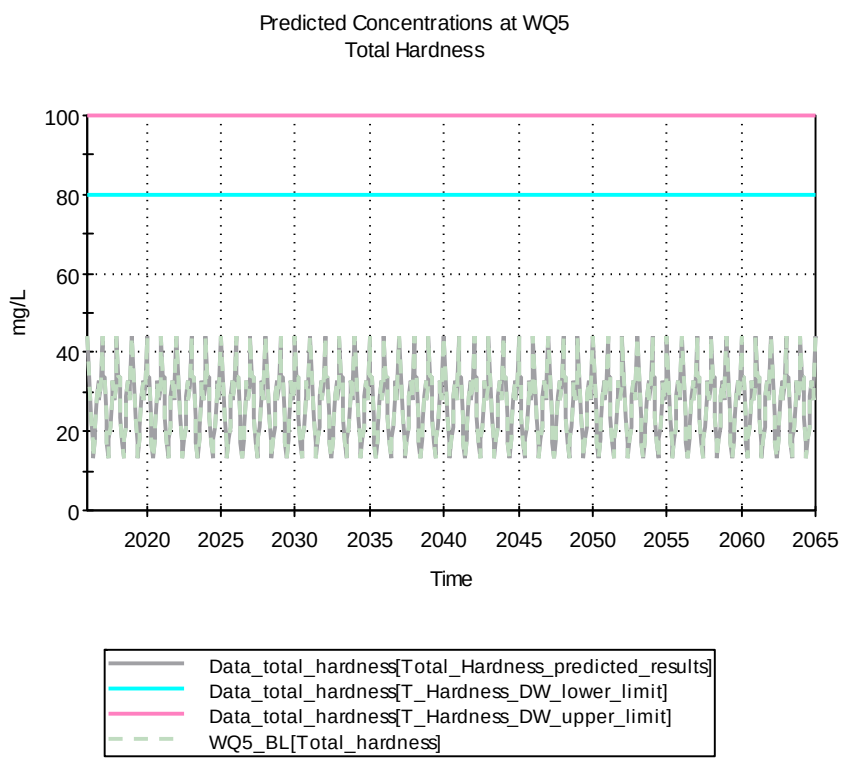




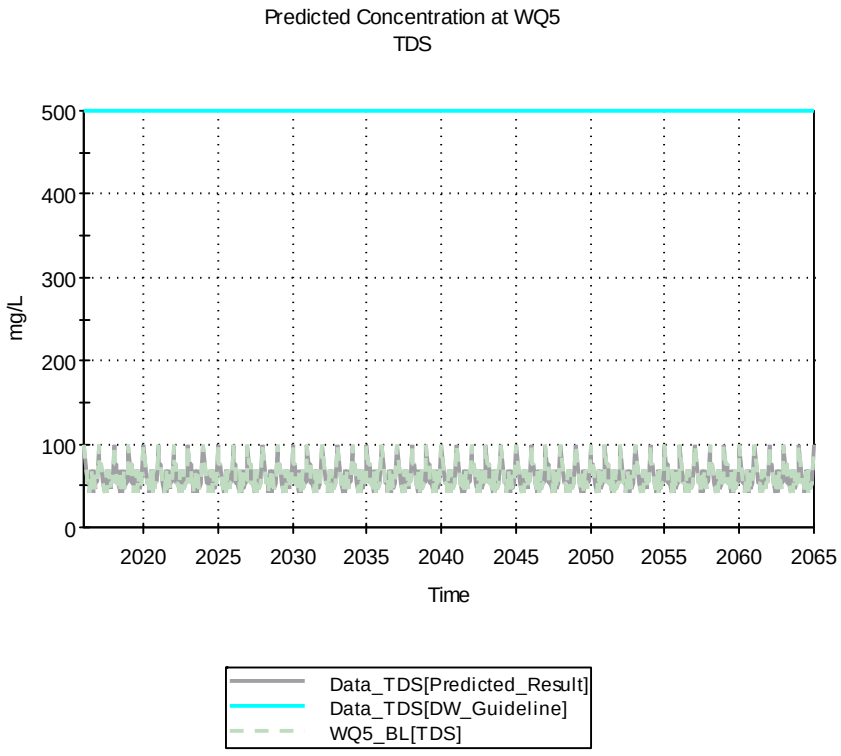
WQ5 – Worst Case

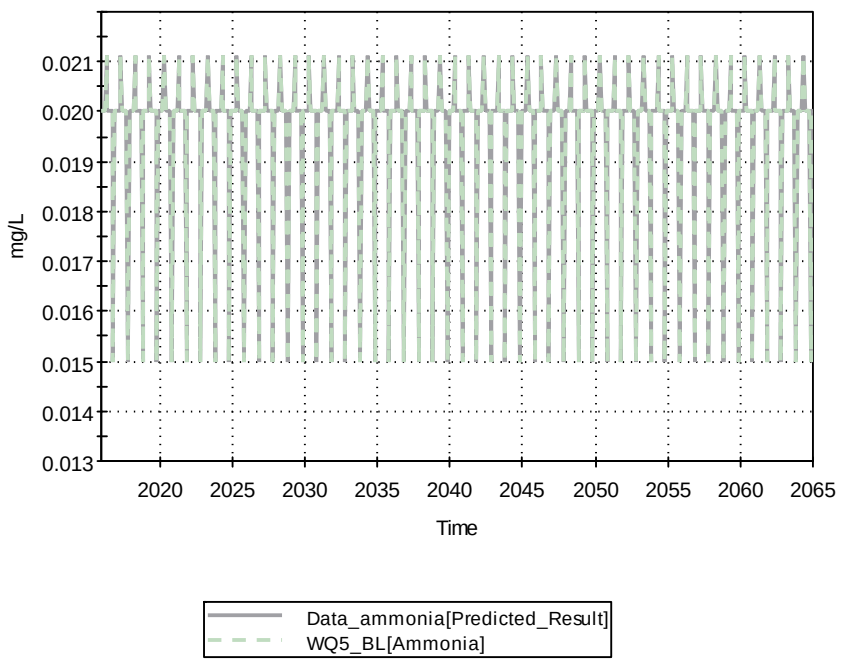


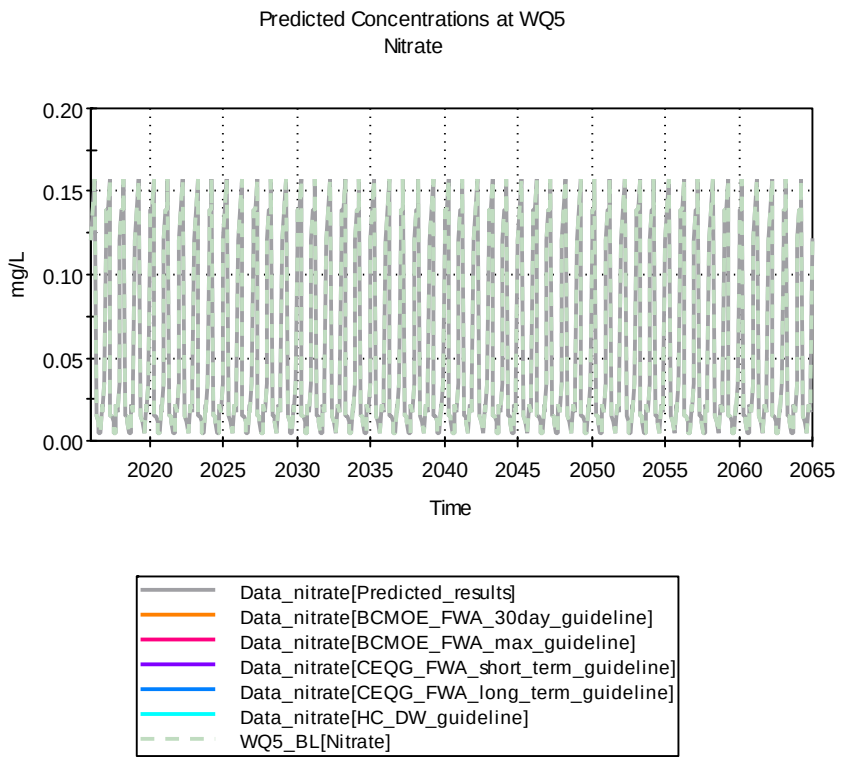




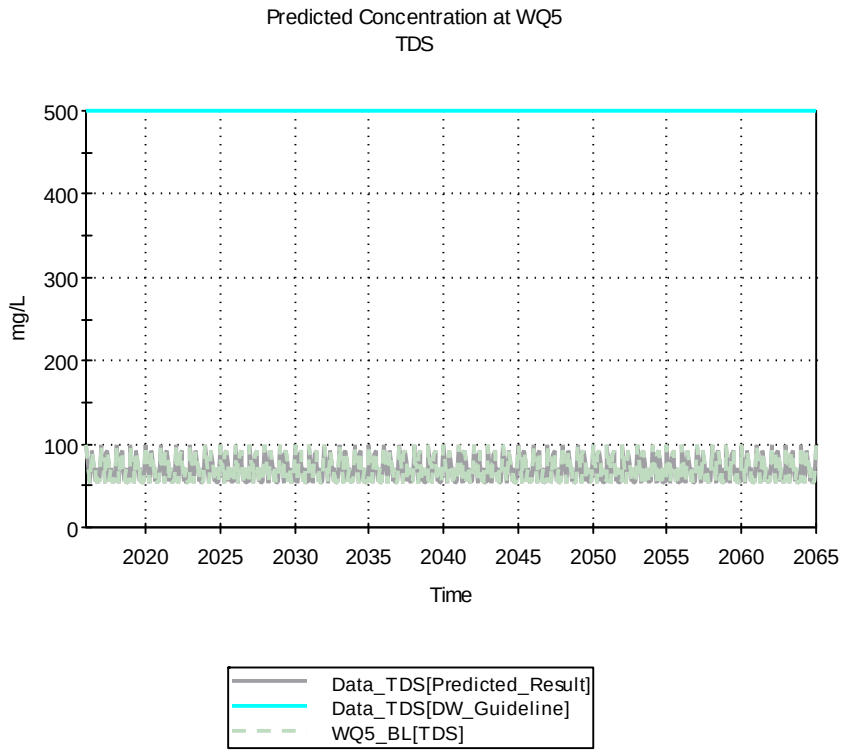
WQ5 – Best Estimate

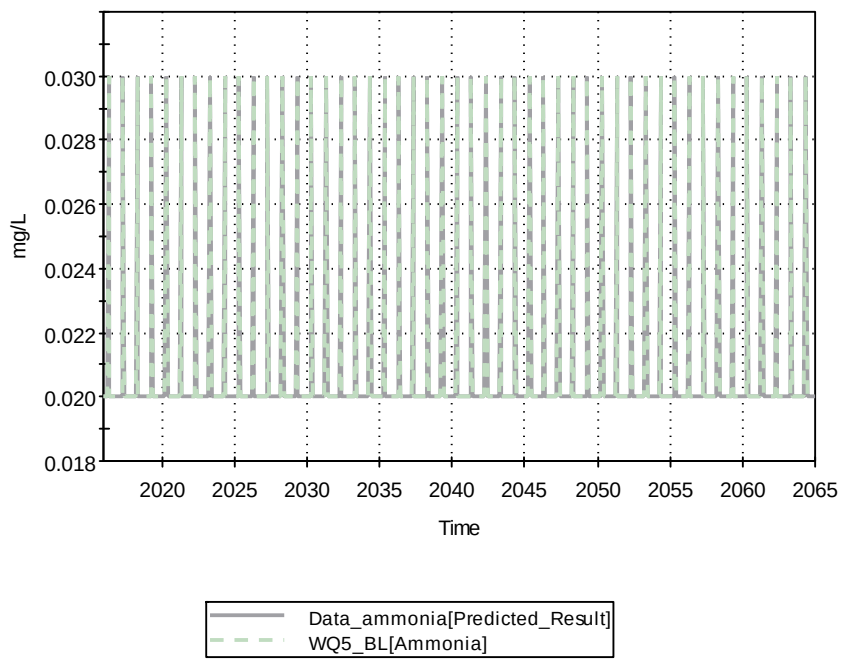


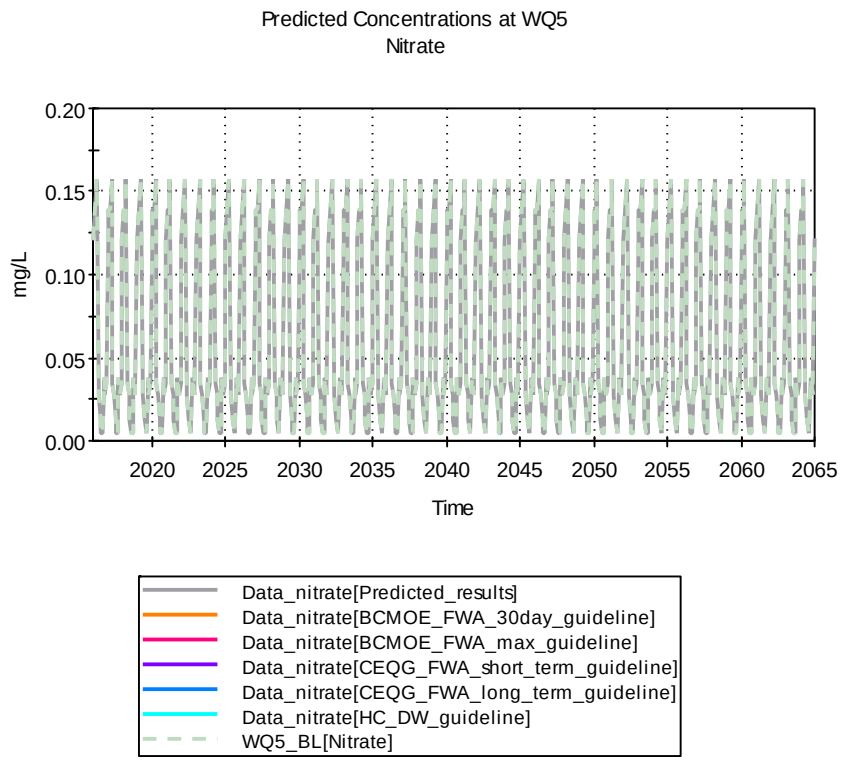




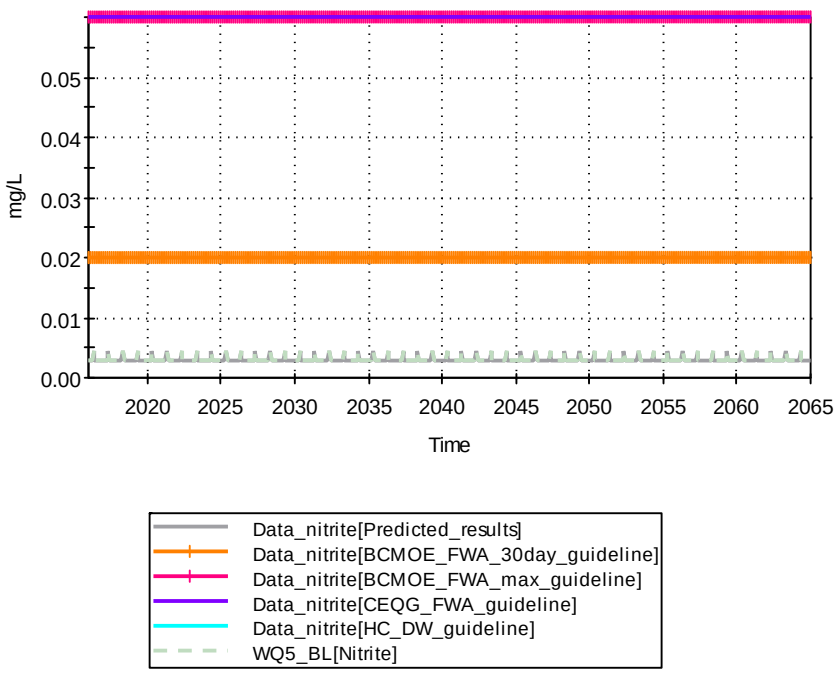
WQ5 – Worst Case

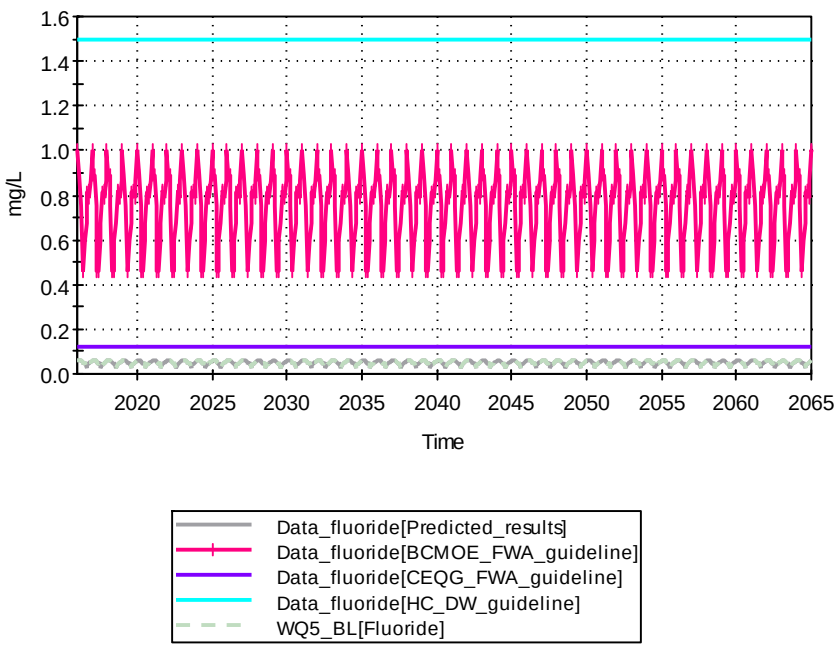


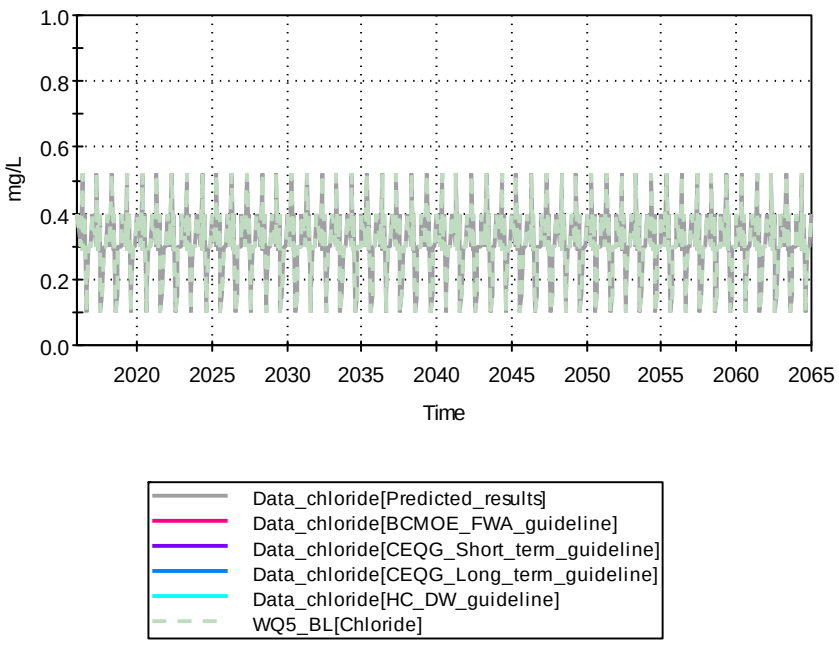




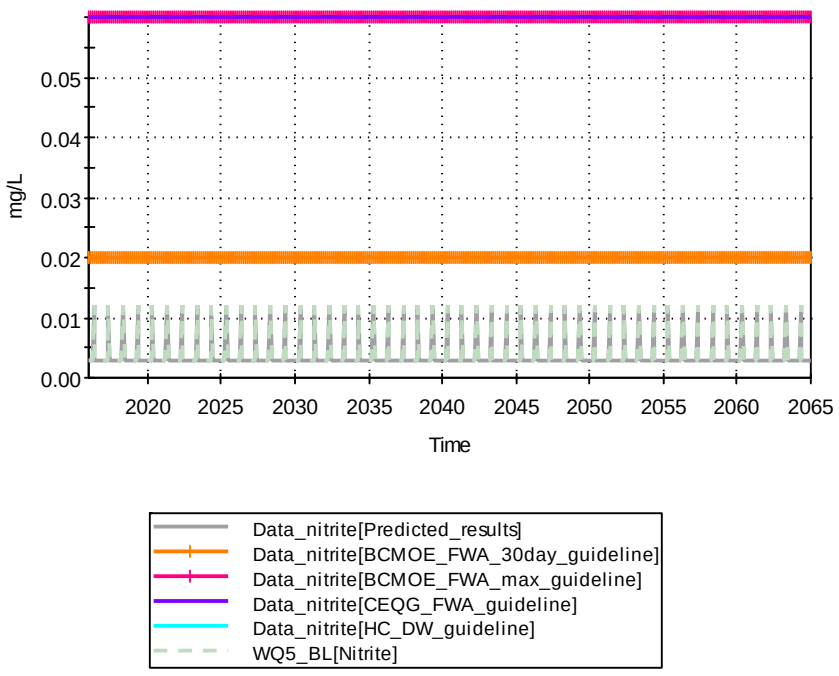
WQ5 – Best Estimate

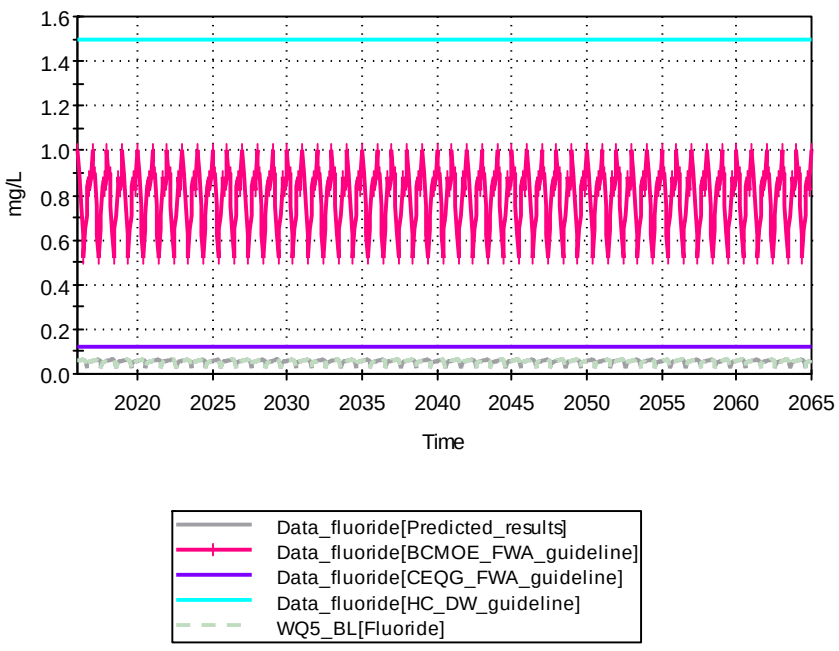


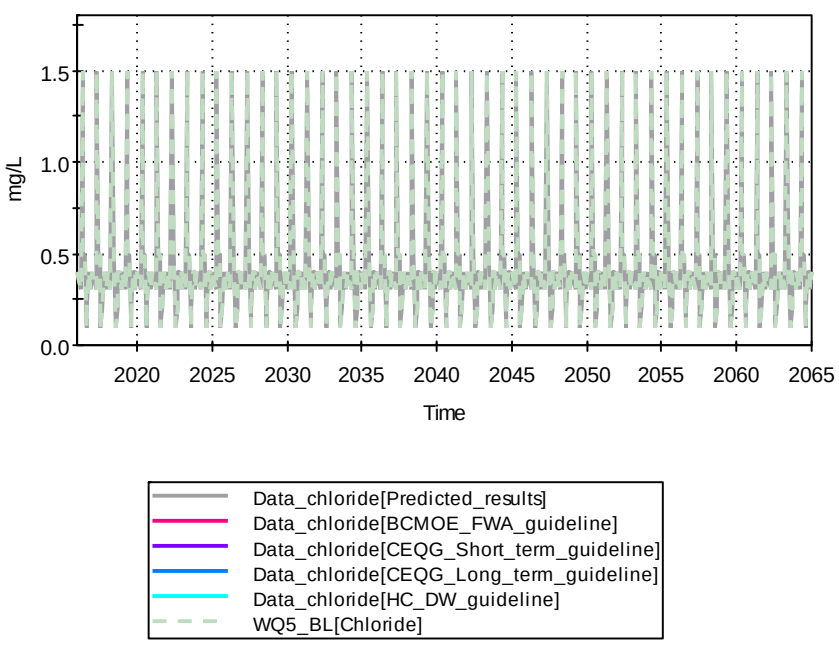




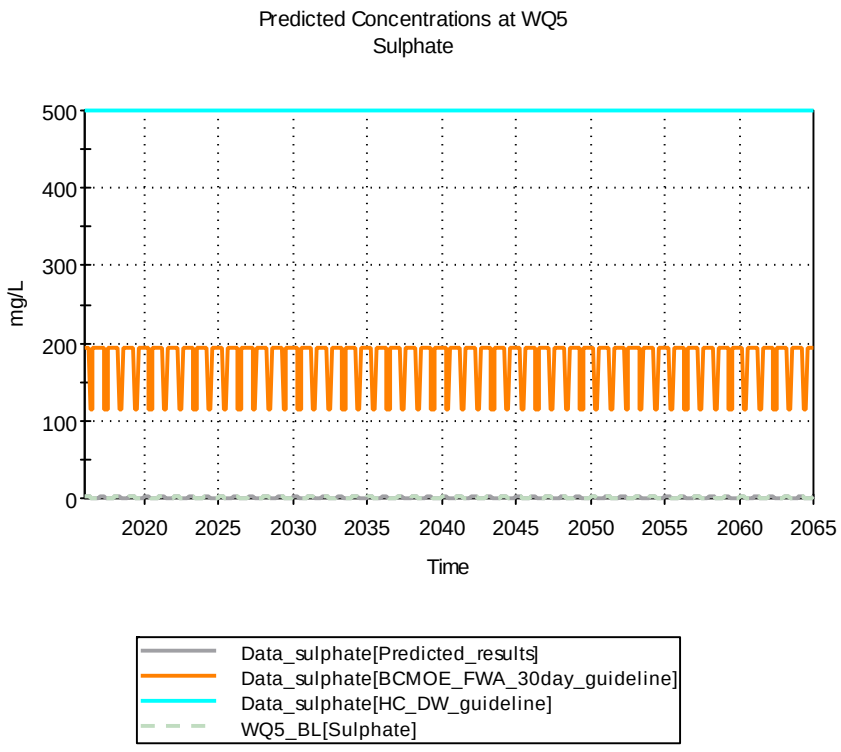
WQ5 – Worst Case

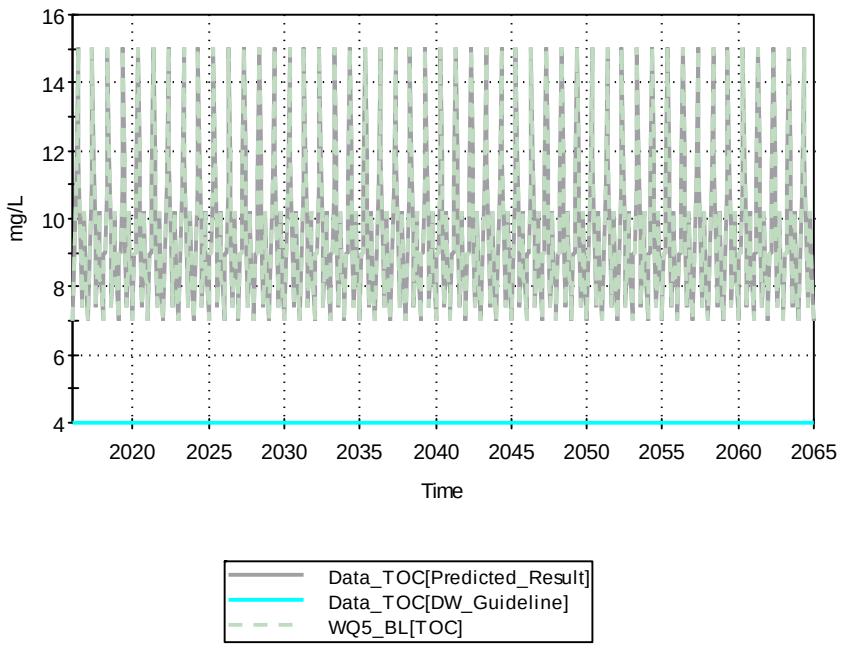


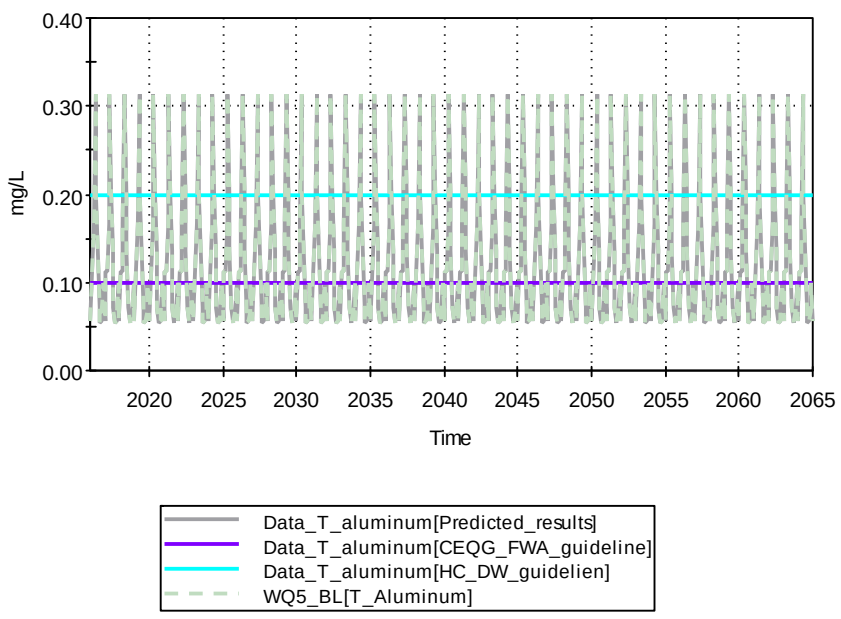




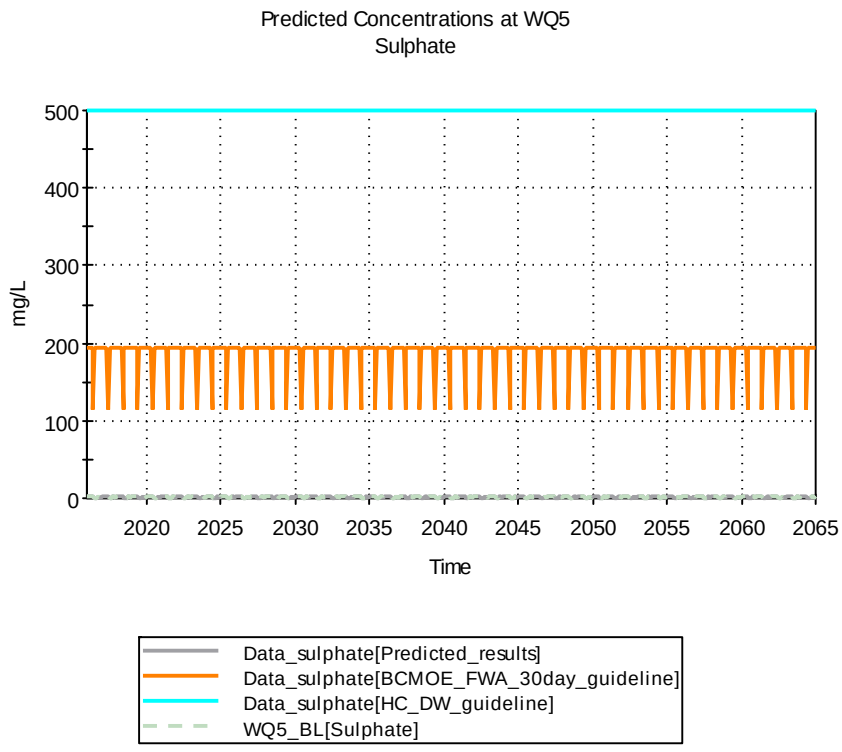
WQ5 – Best Estimate

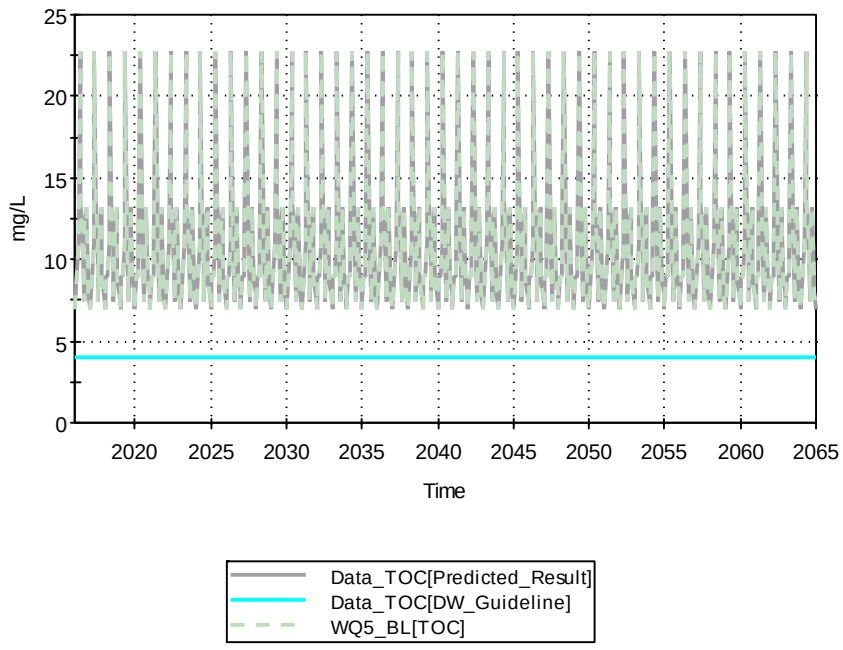


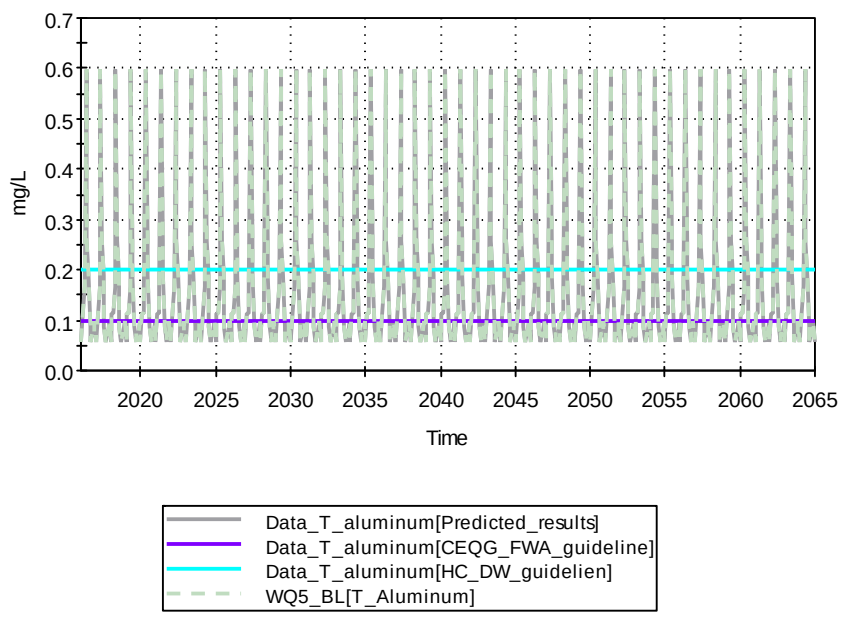




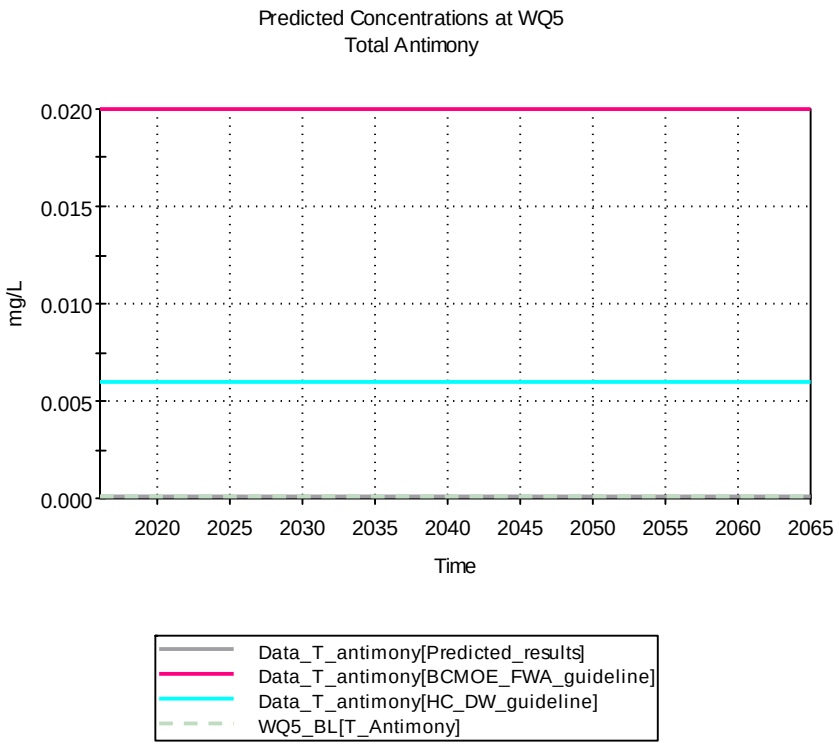
WQ5 – Worst Case

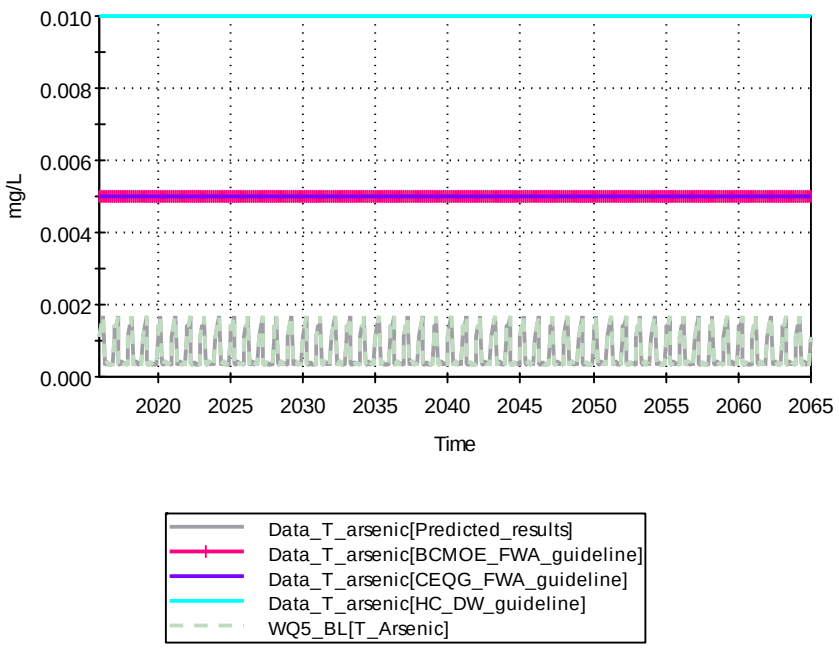


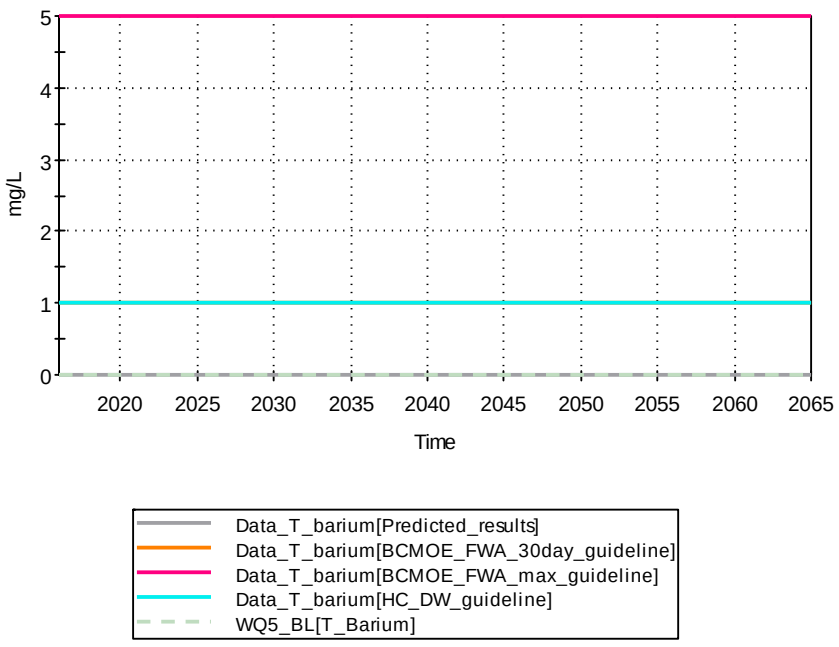




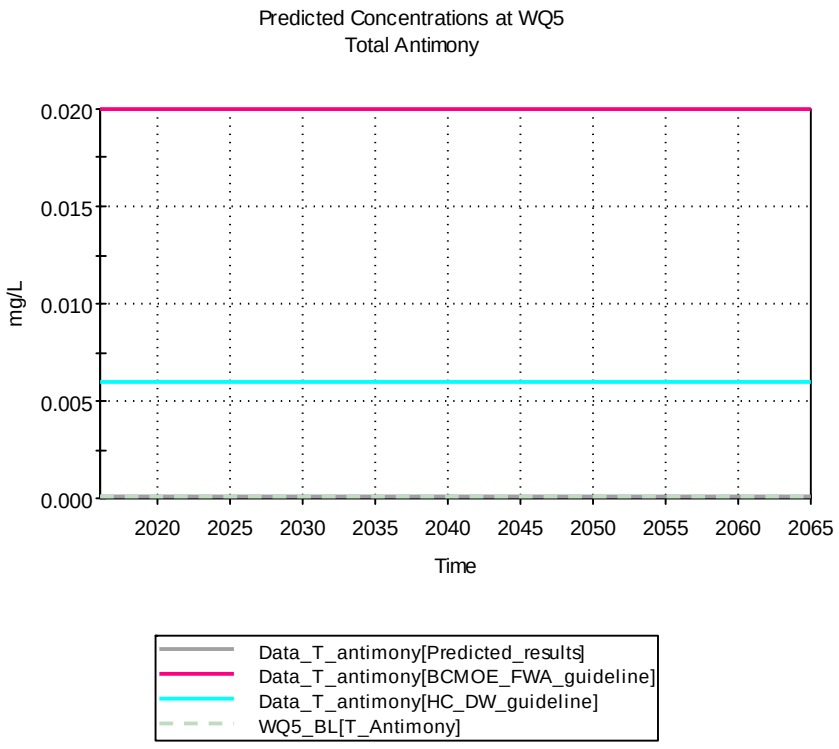
WQ5 – Best Estimate

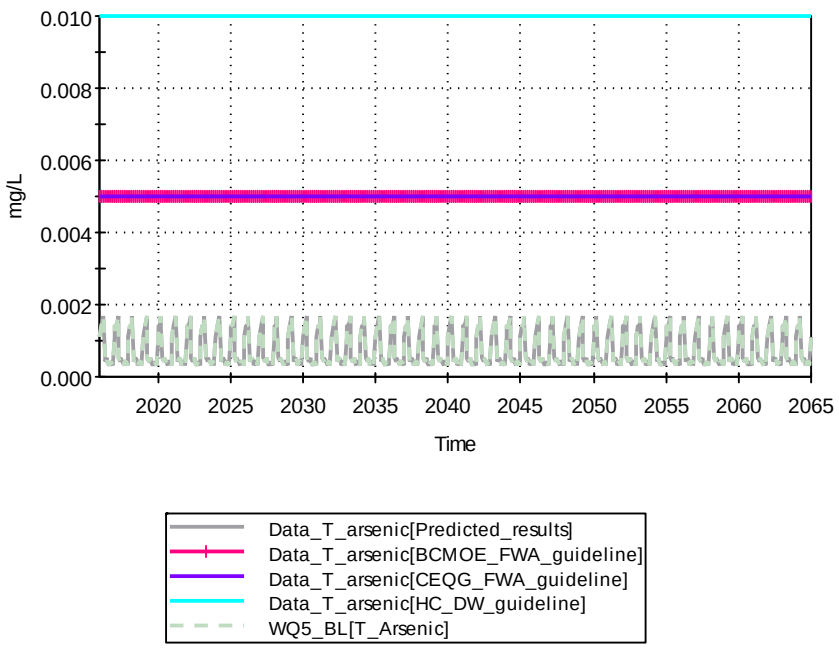


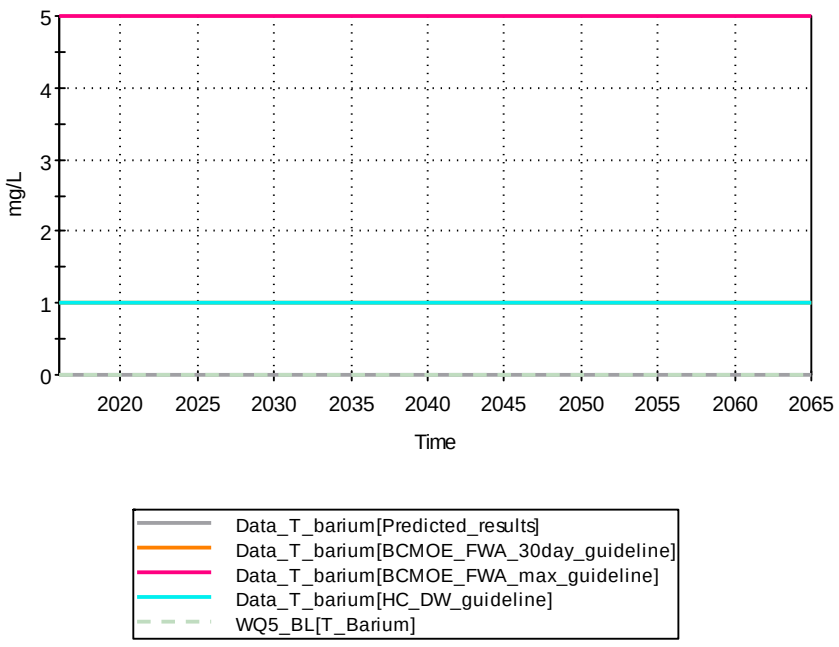




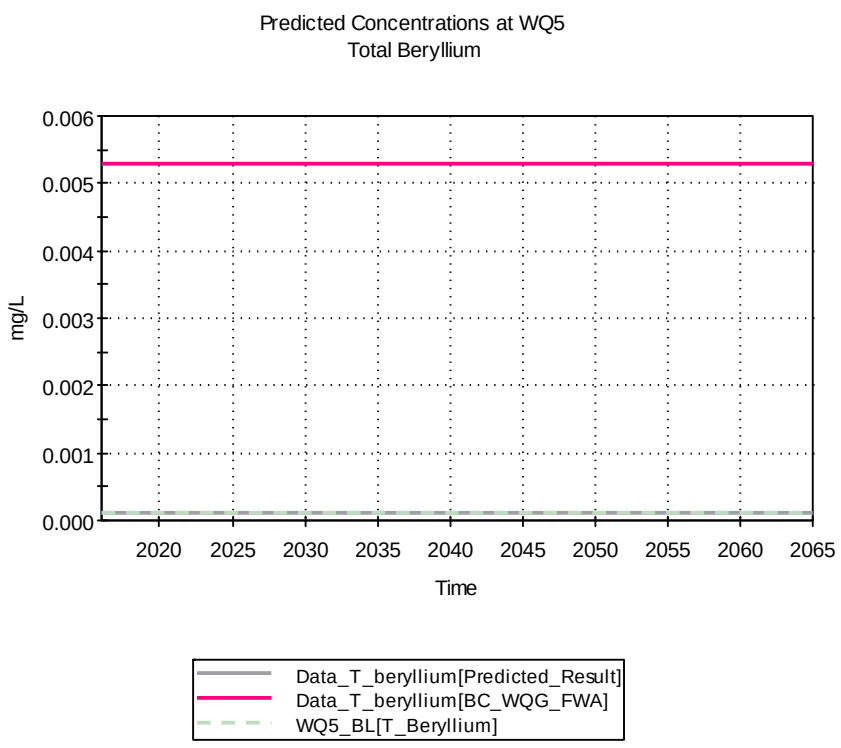
WQ5 – Worst Case

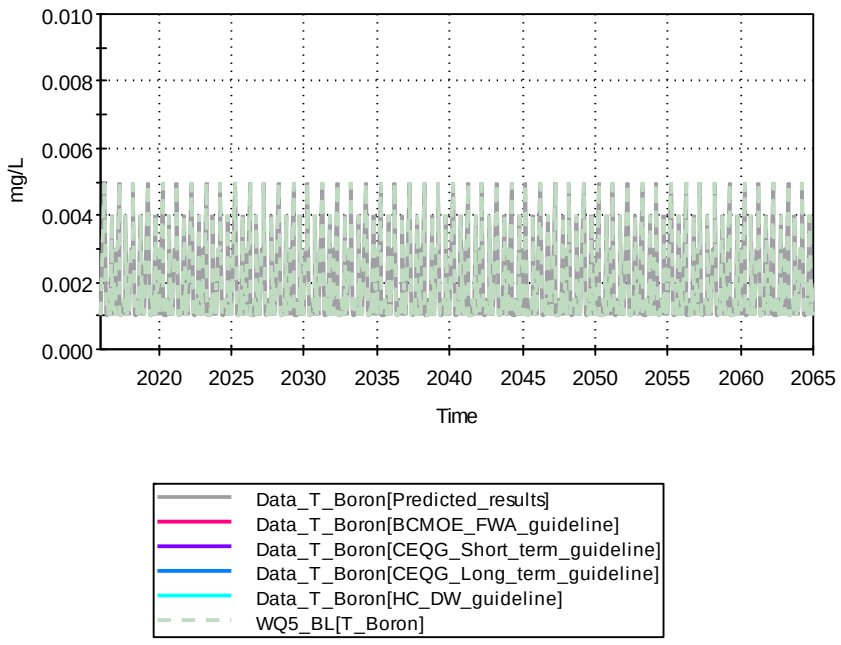


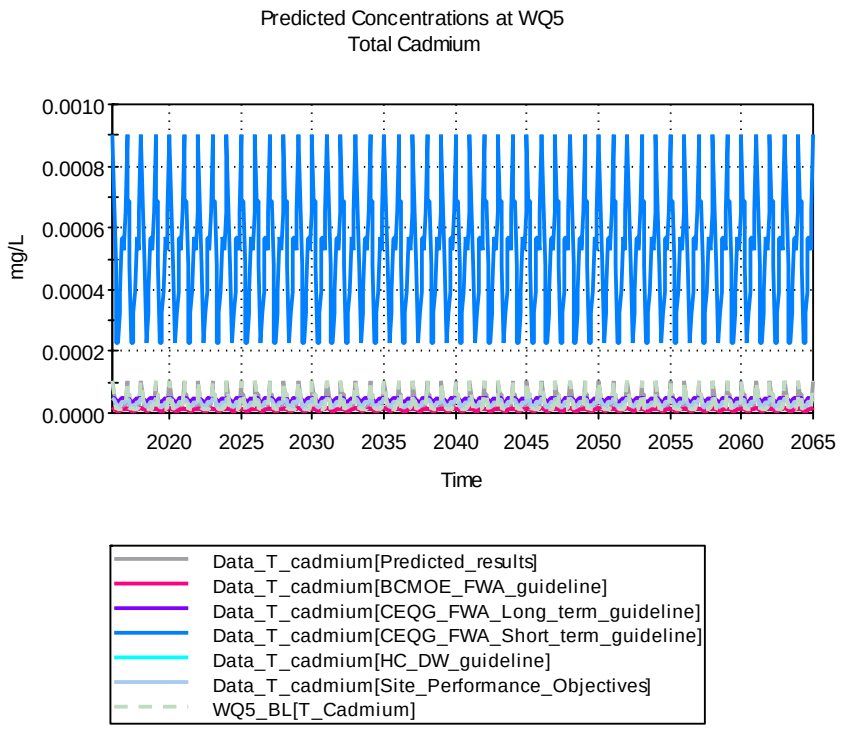




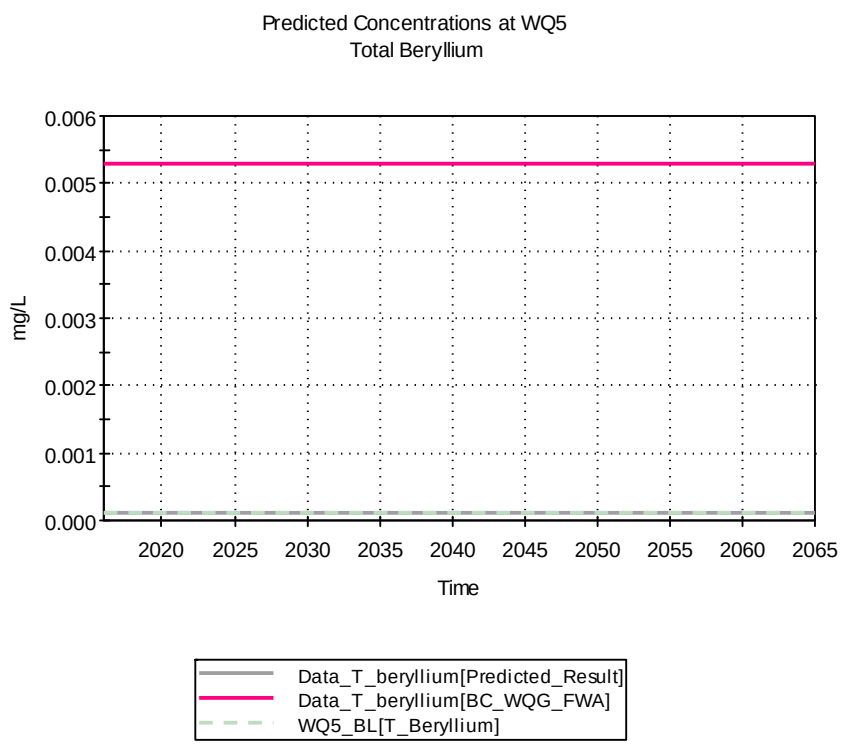
WQ5 – Best Estimate

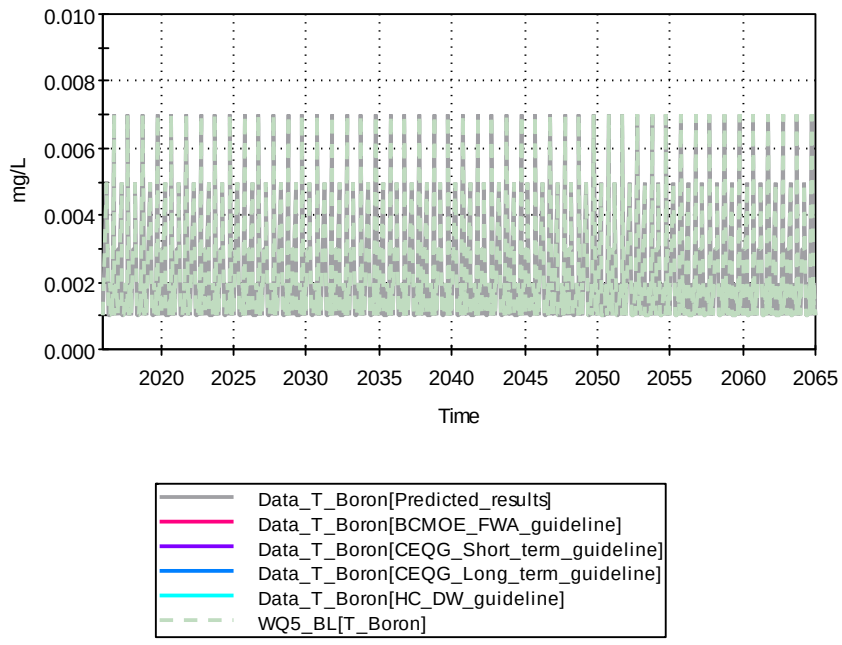


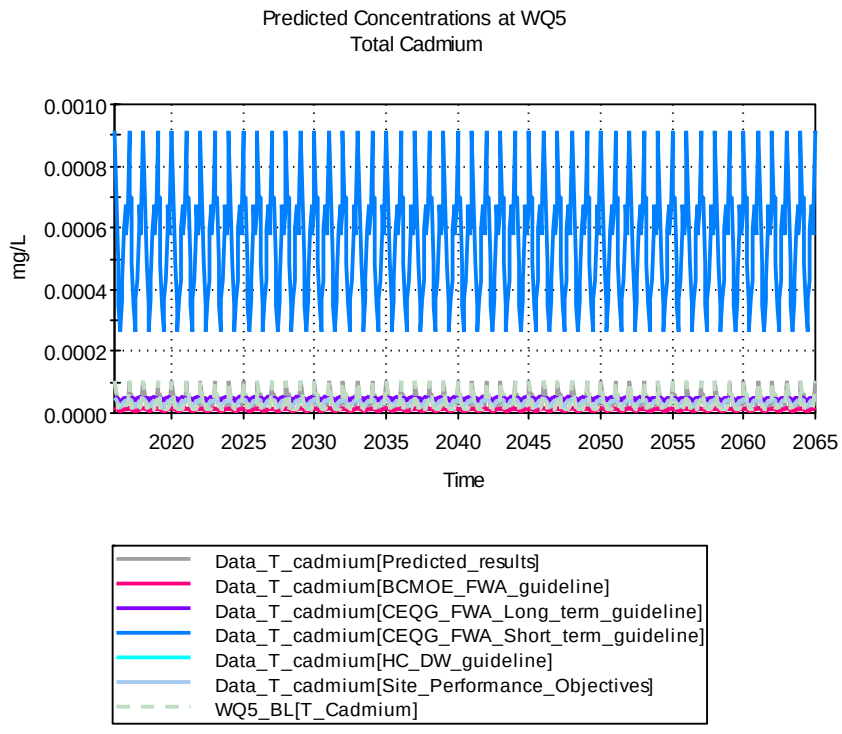




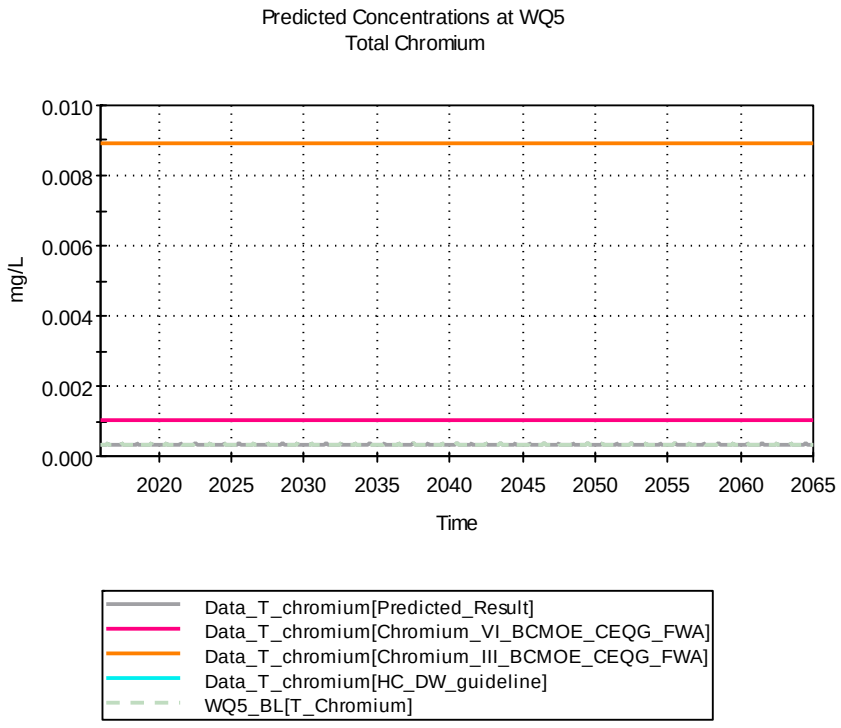
WQ5 – Worst Case

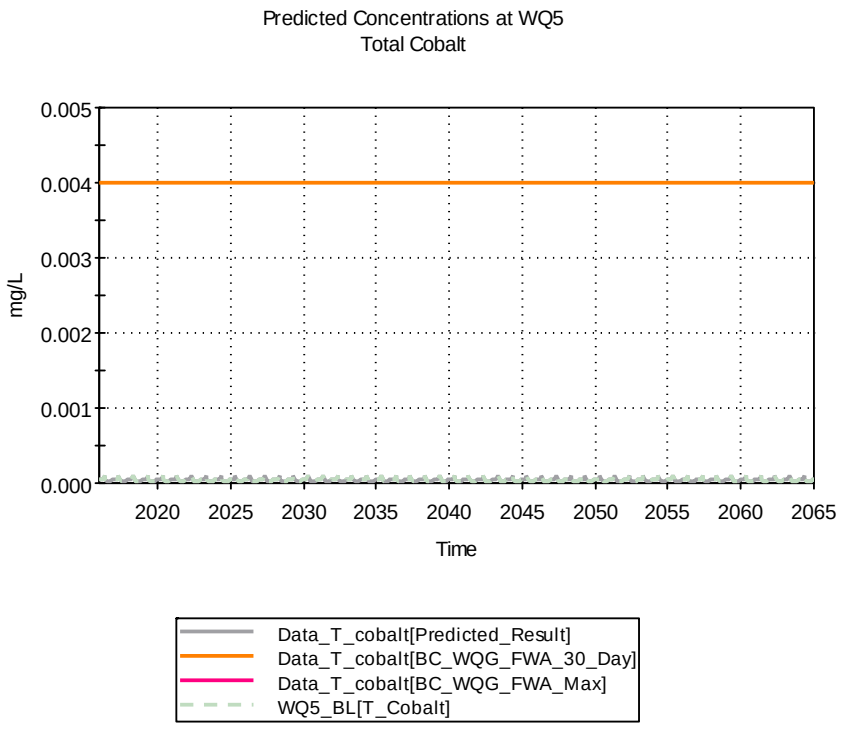


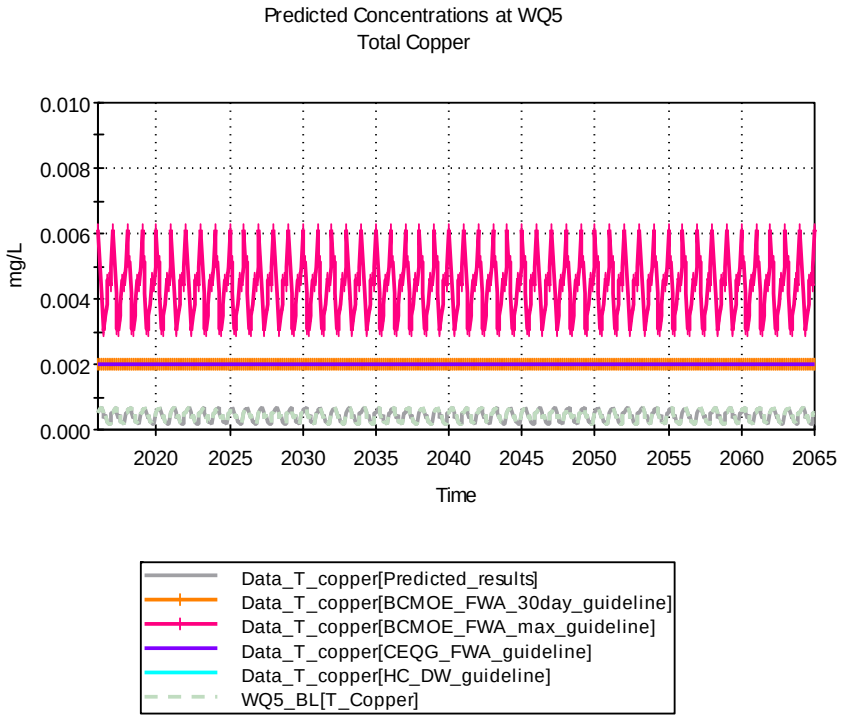




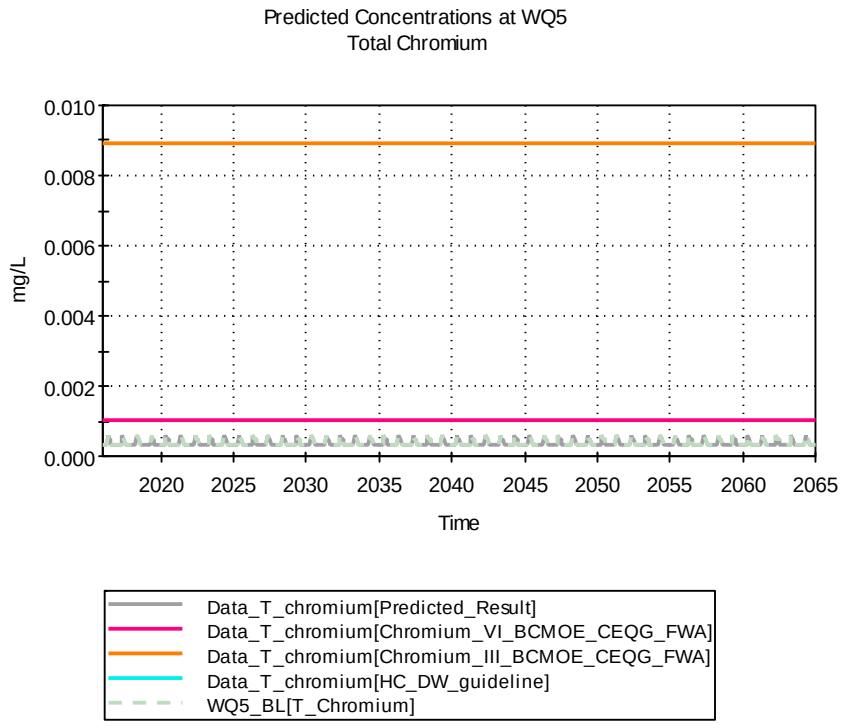
WQ5 – Best Estimate

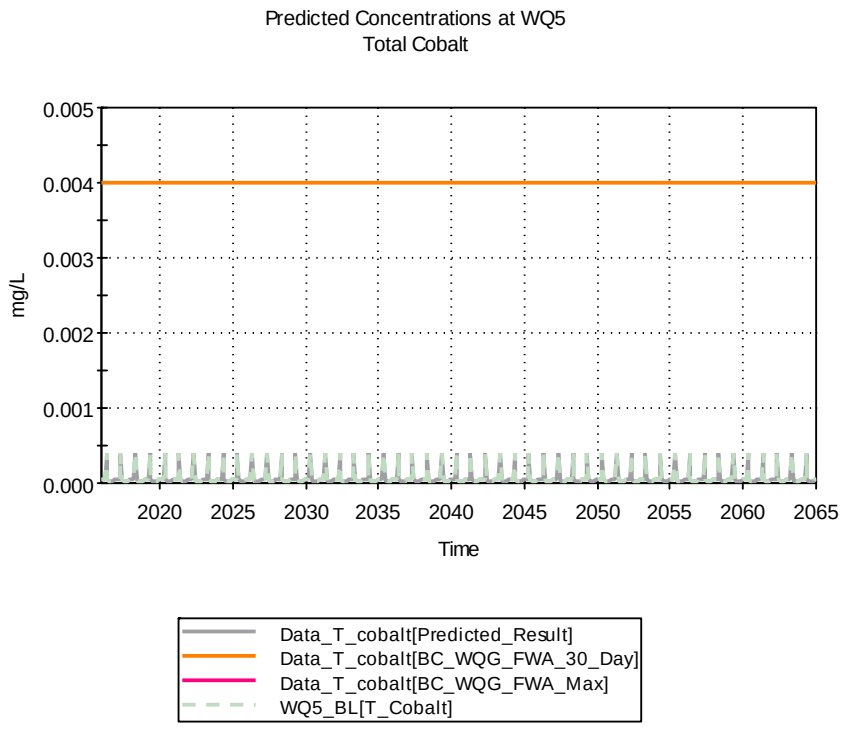


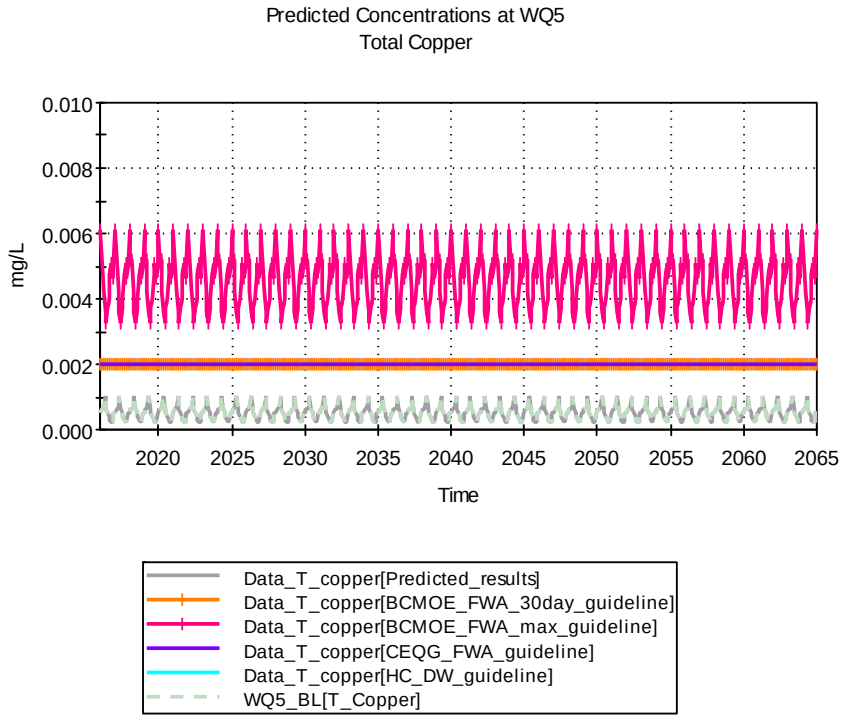




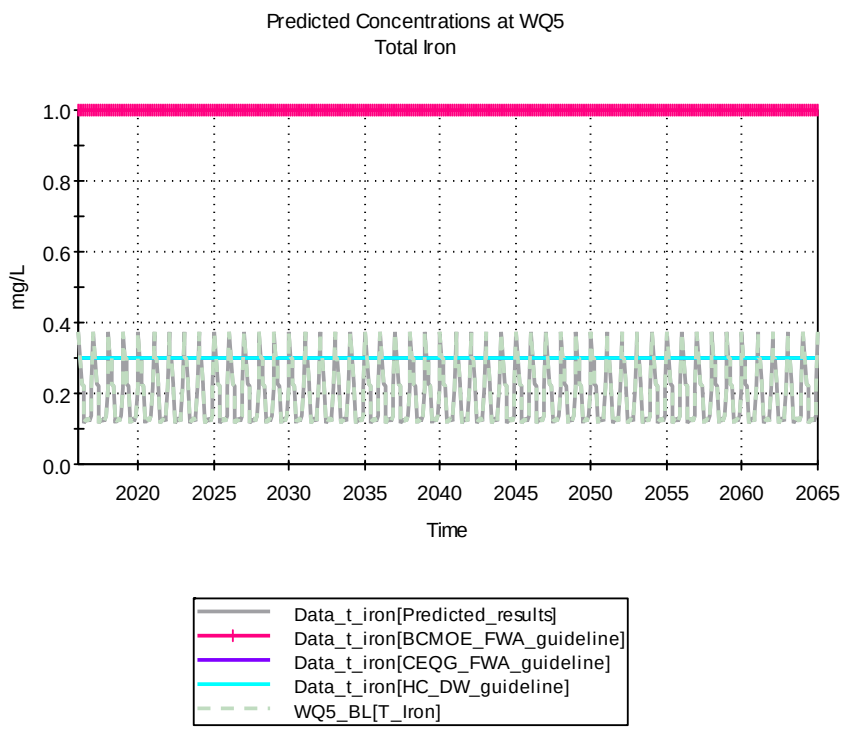
WQ5 – Worst Case

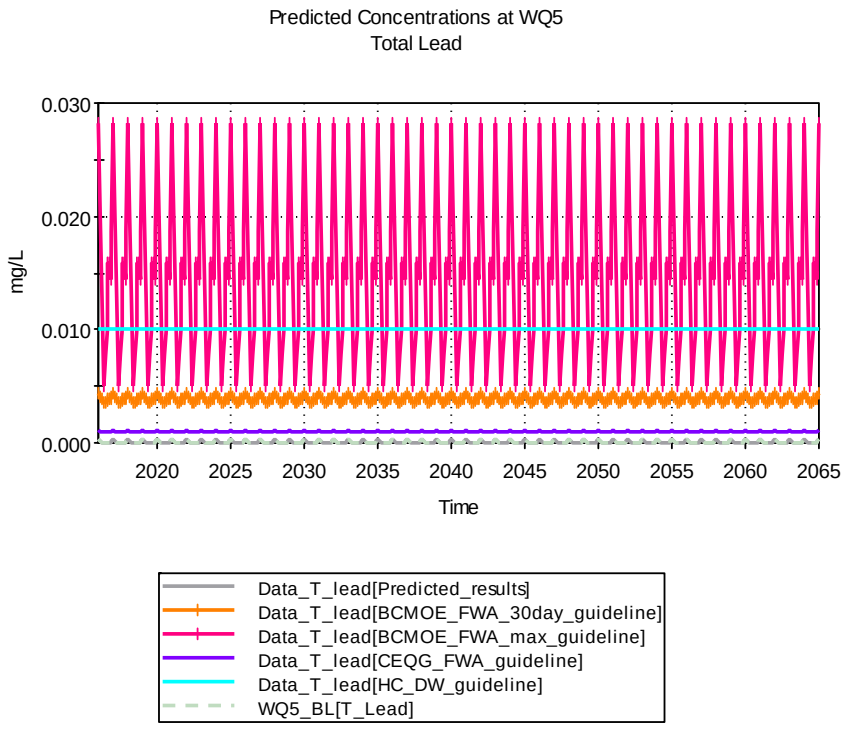


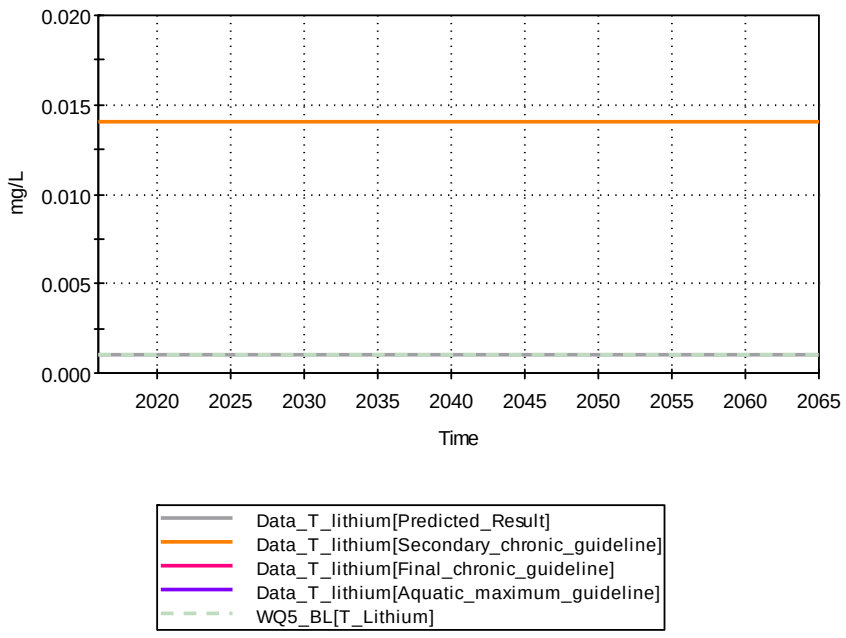




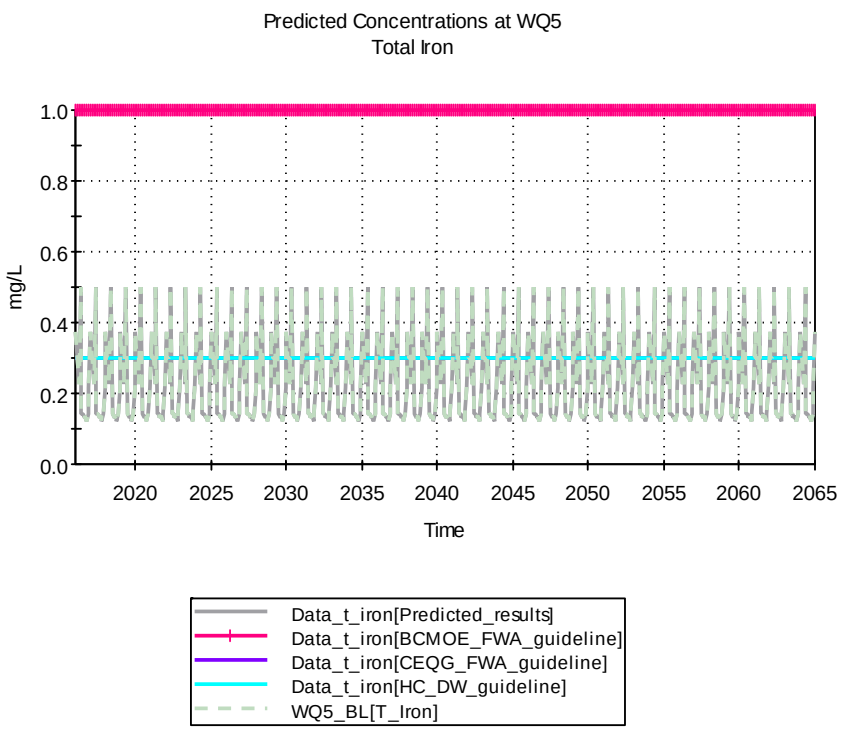
WQ5 – Best Estimate

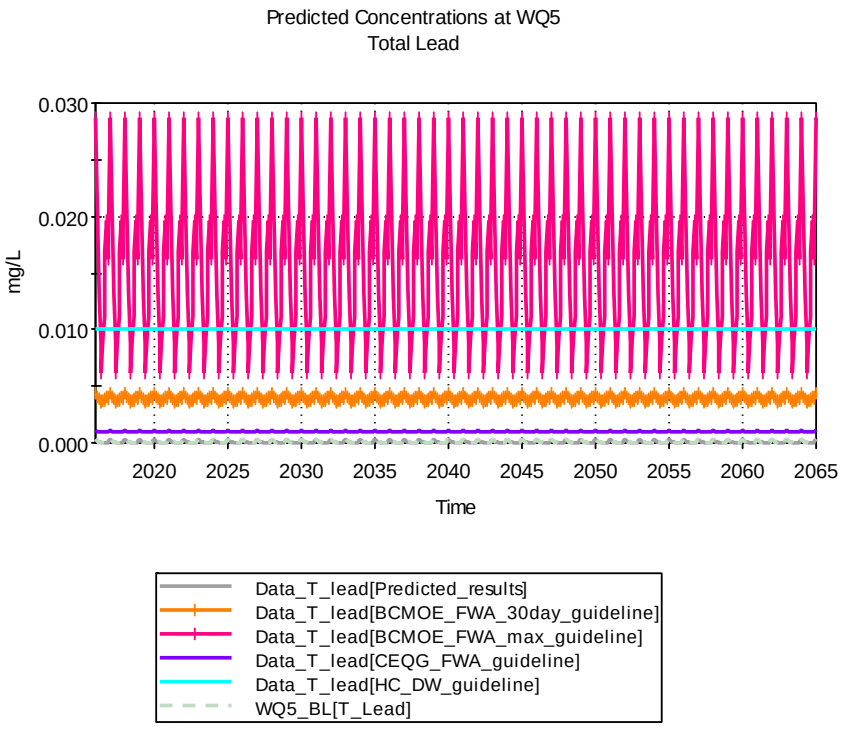


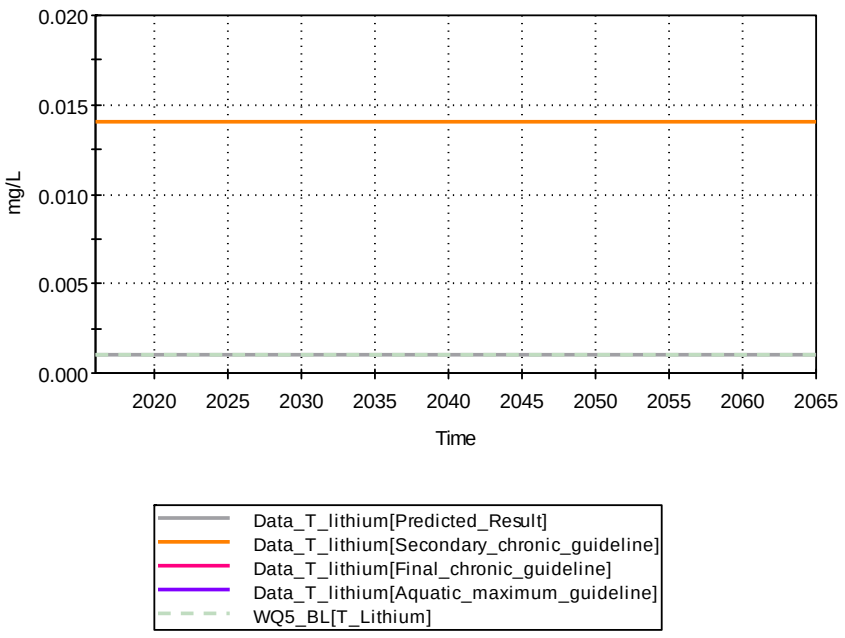




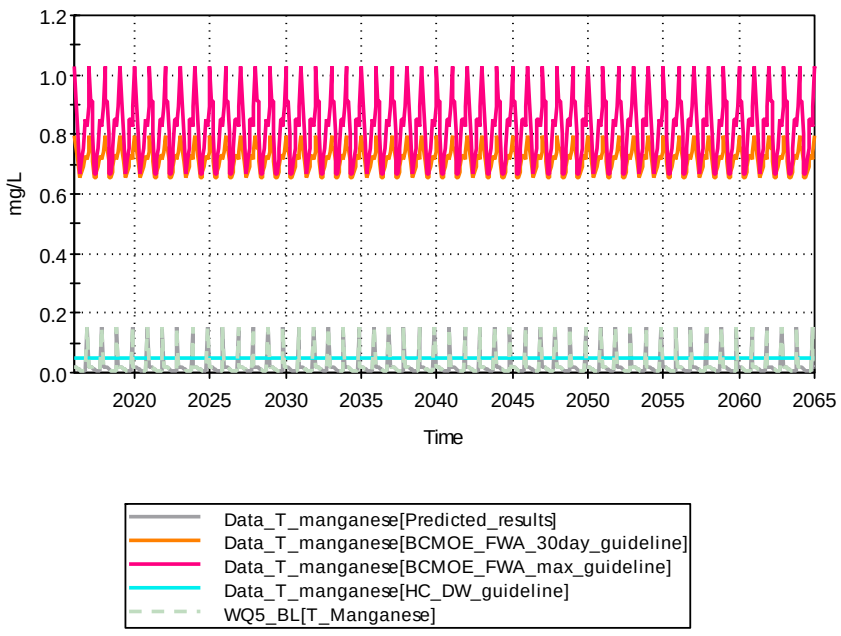
WQ5 – Worst Case

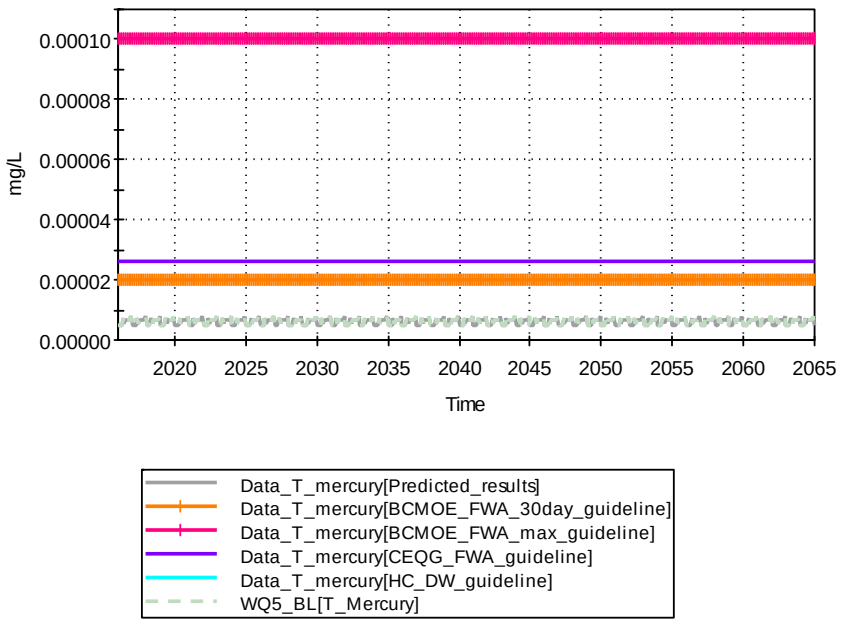


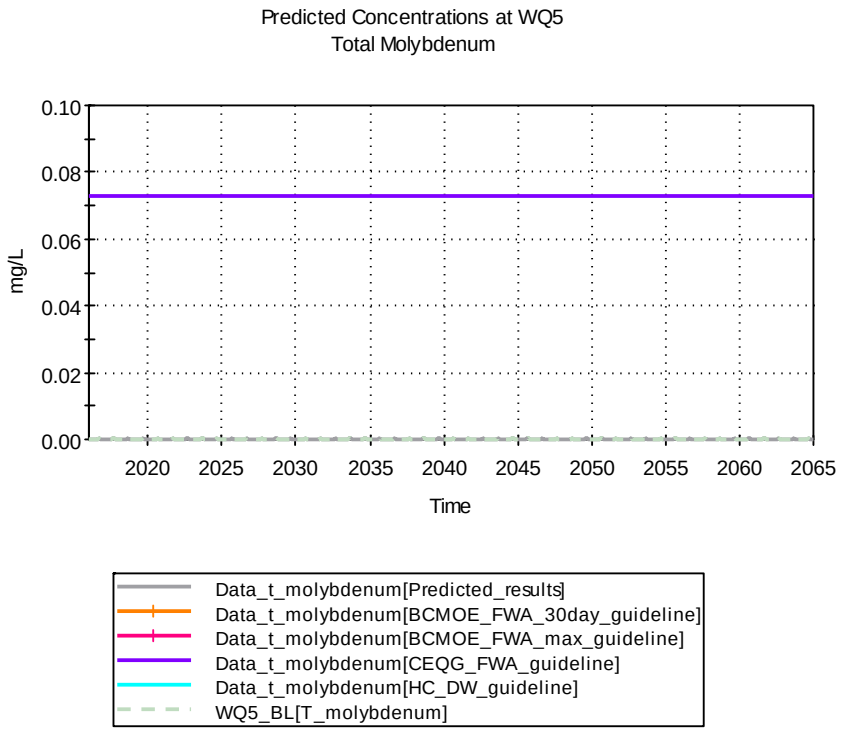




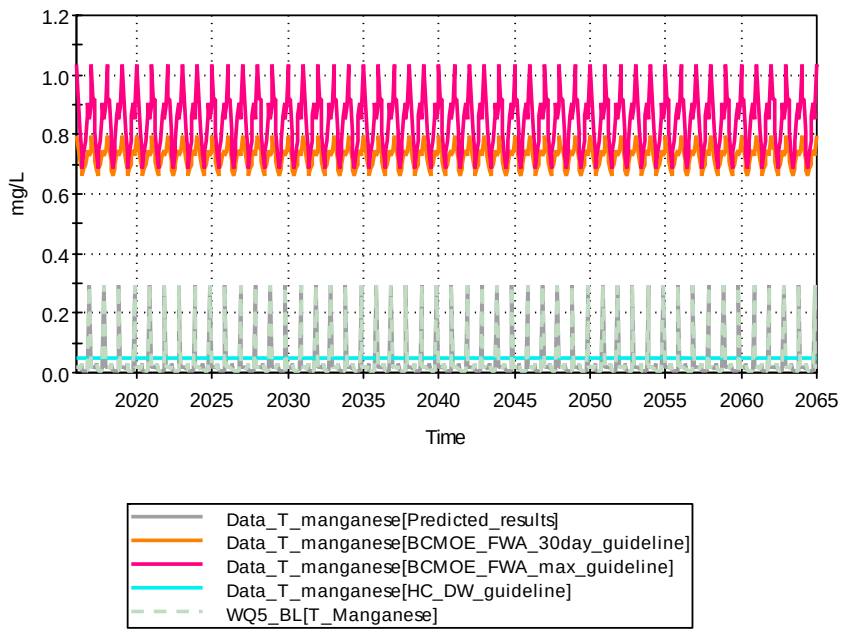
WQ5 – Best Estimate

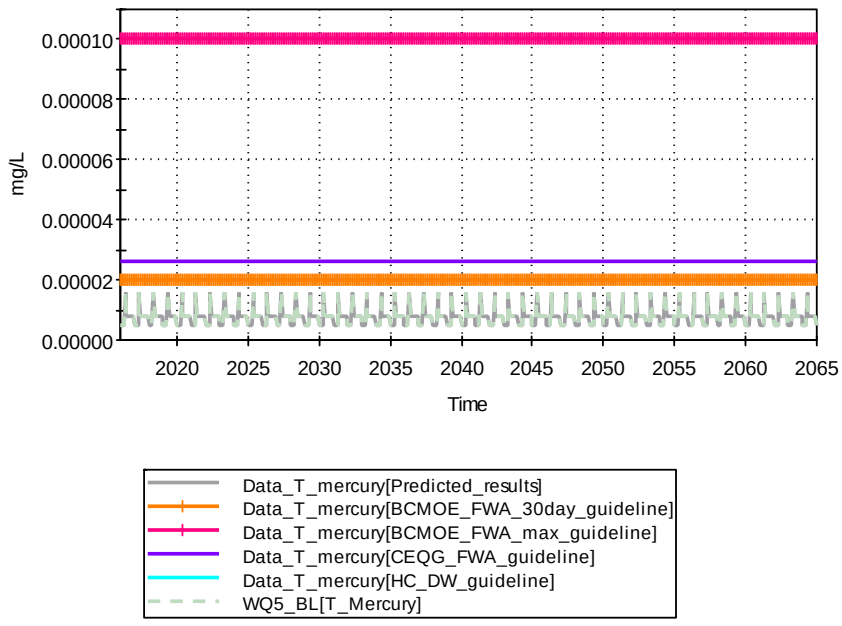


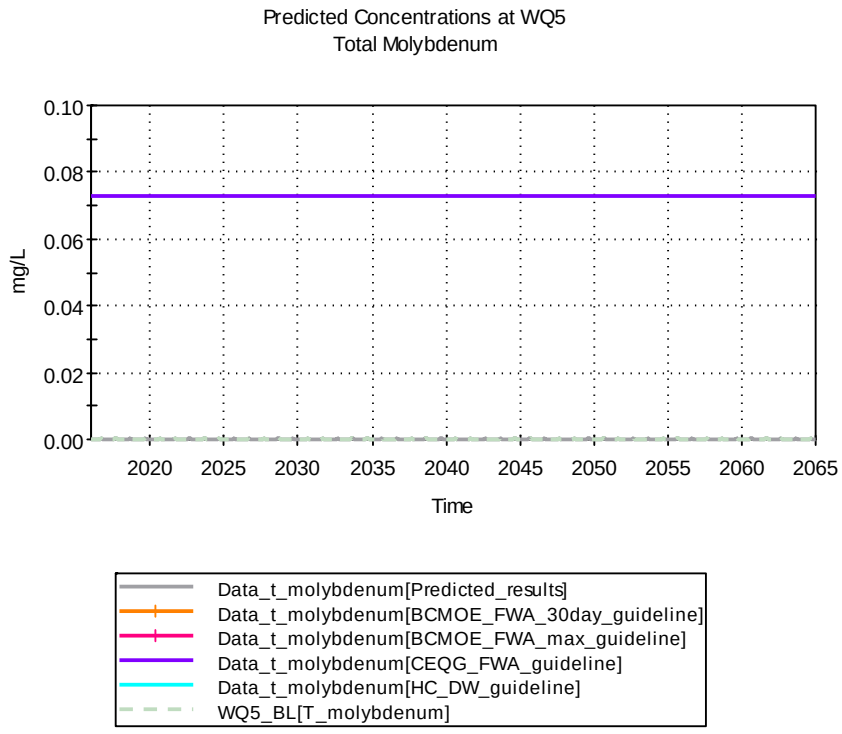




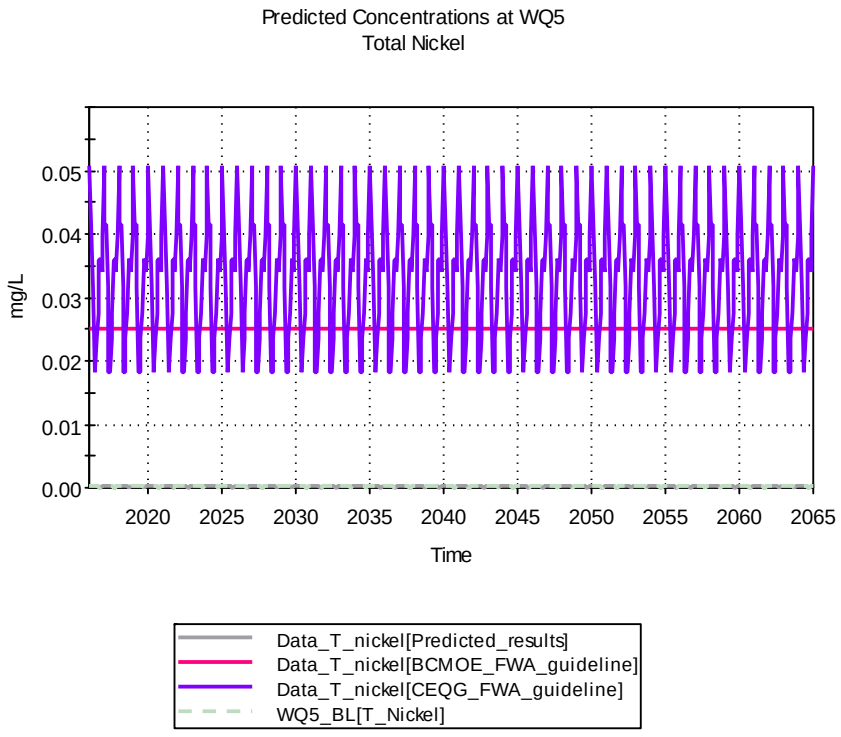
WQ5 – Worst Case

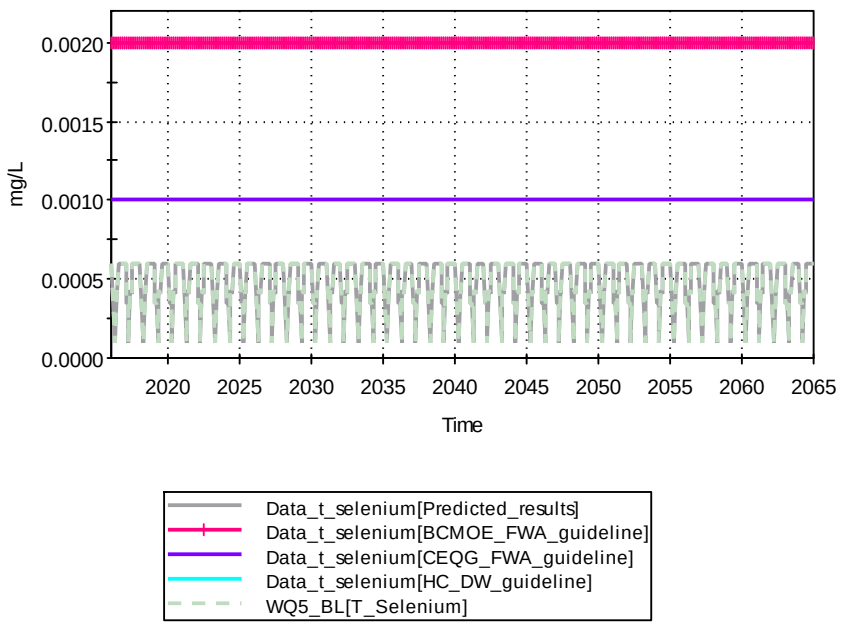


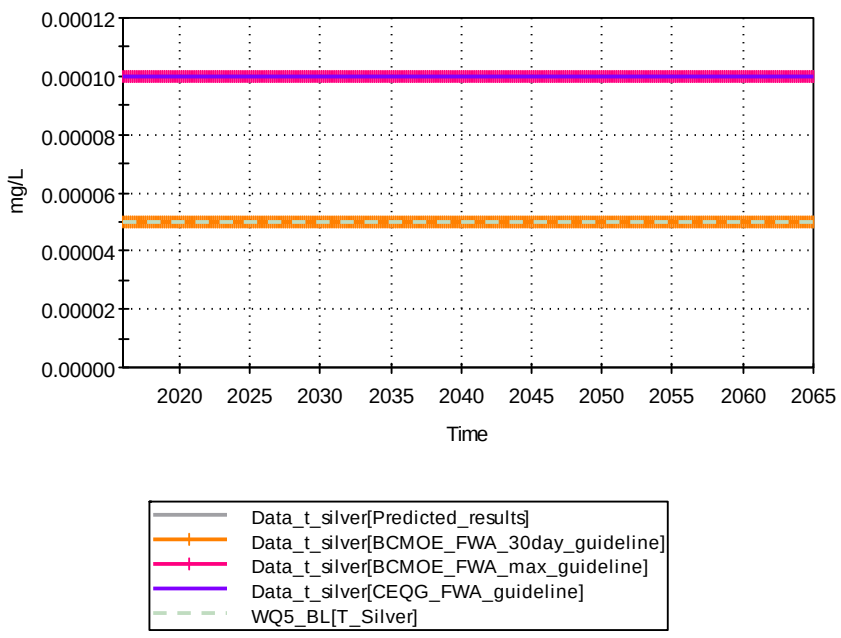




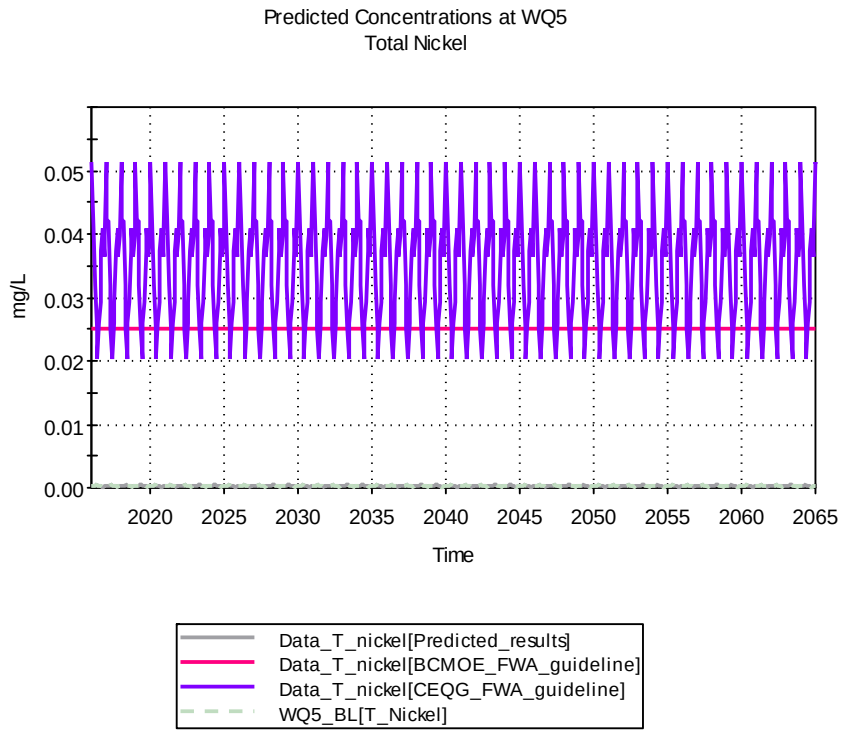
WQ5 – Best Estimate

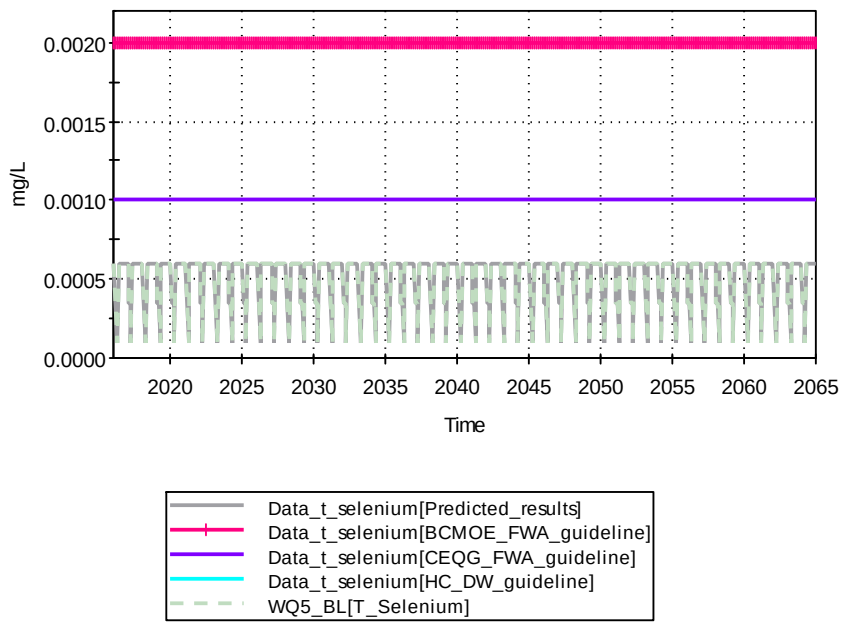


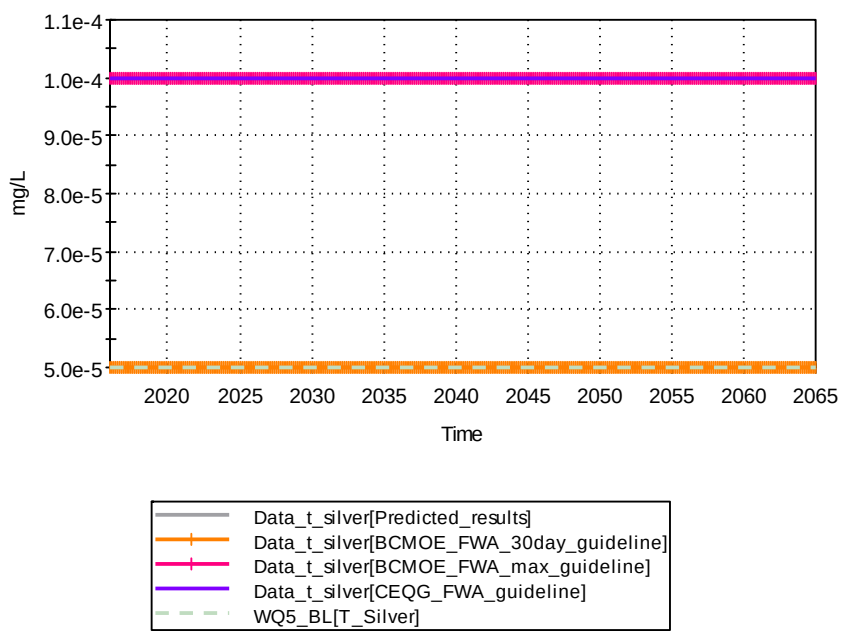




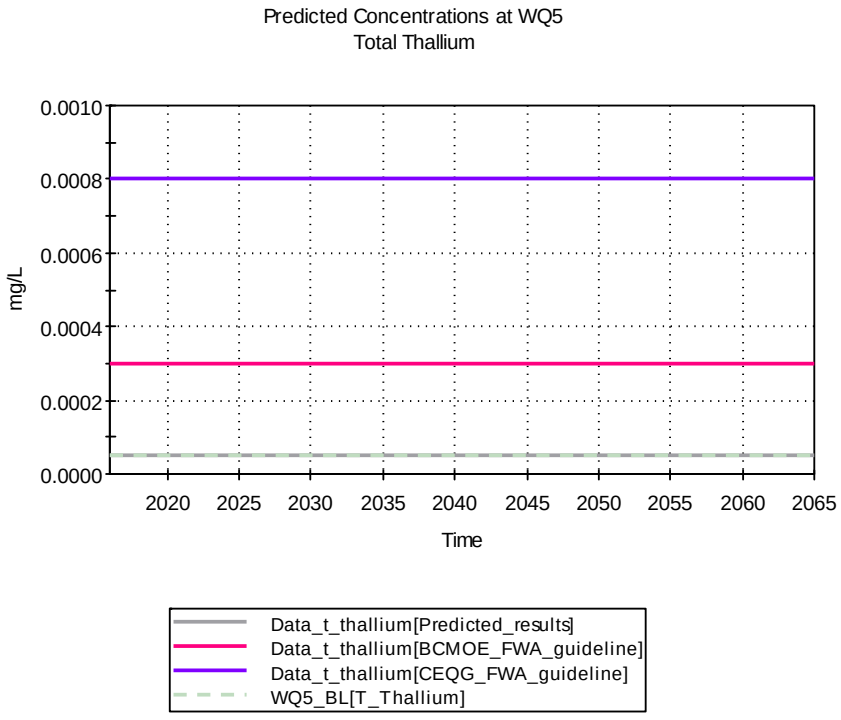
WQ5 – Worst Case

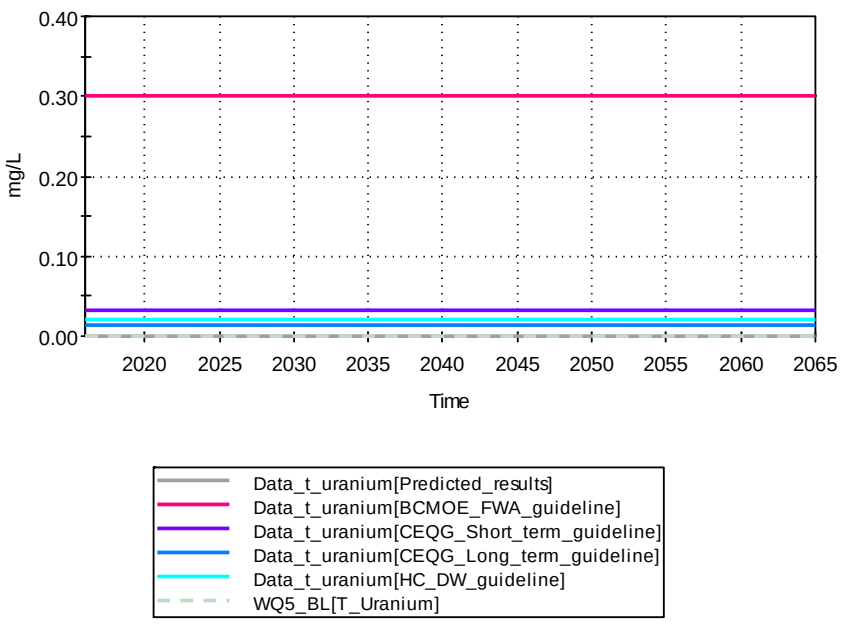


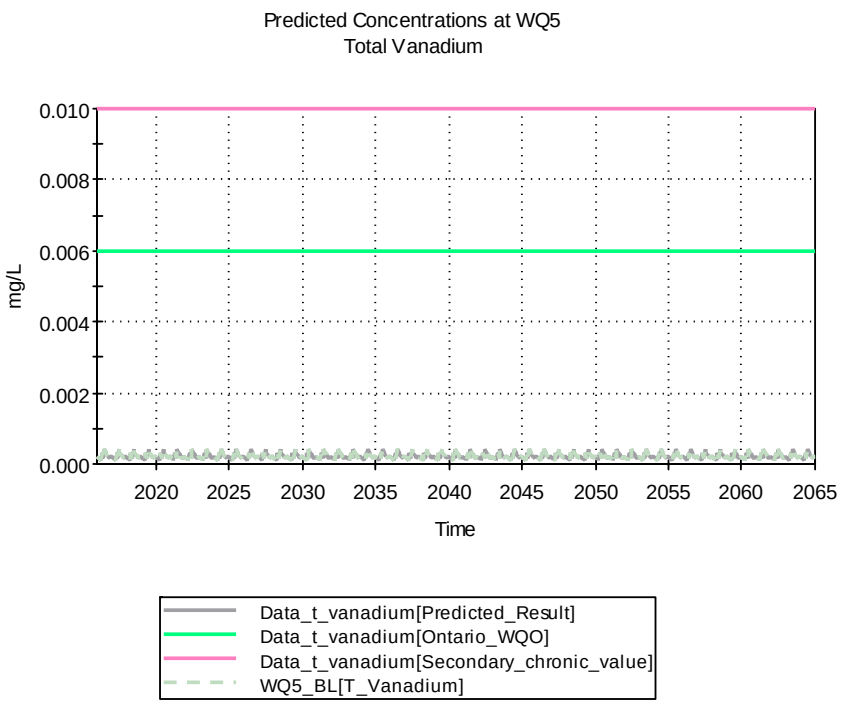




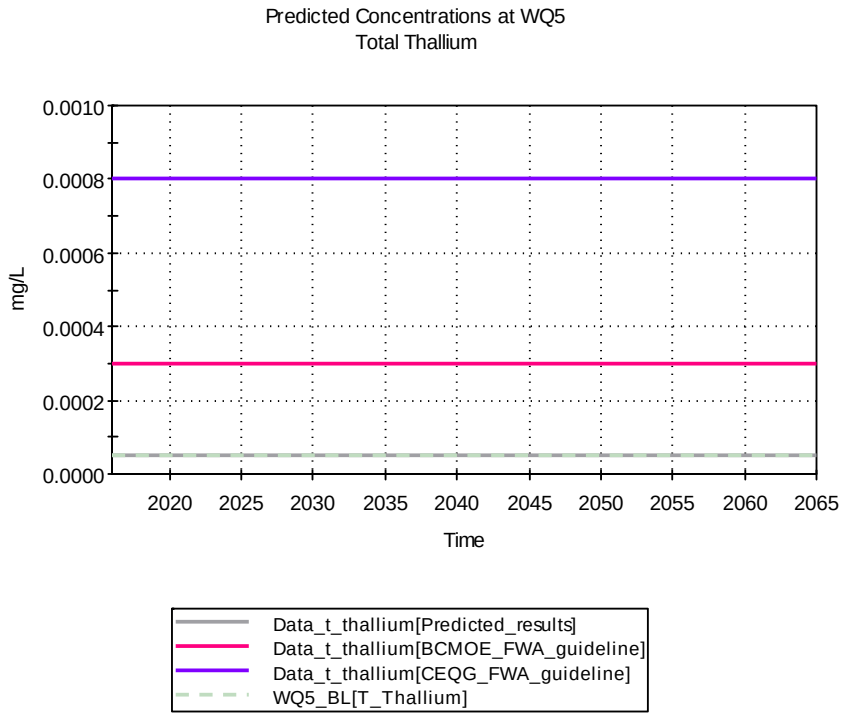
WQ5 – Best Estimate

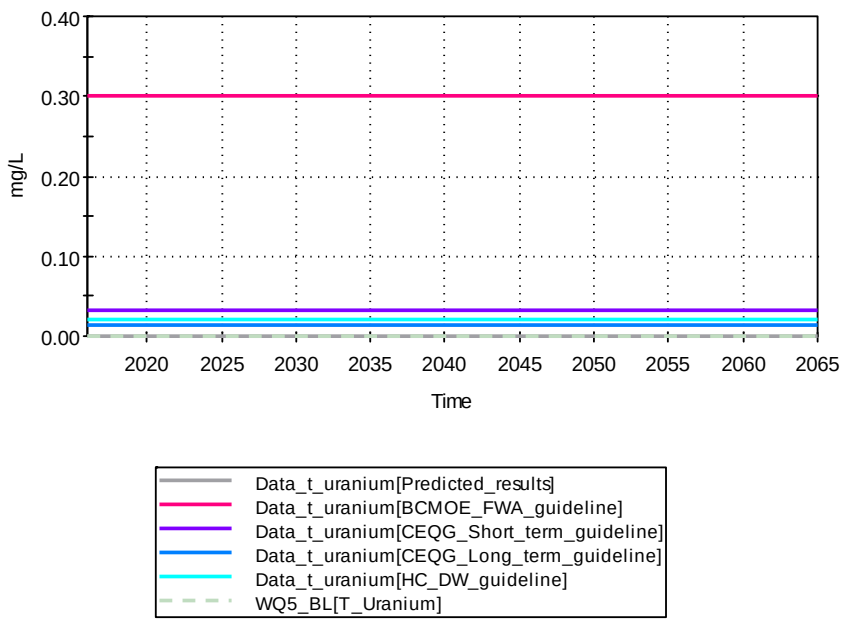


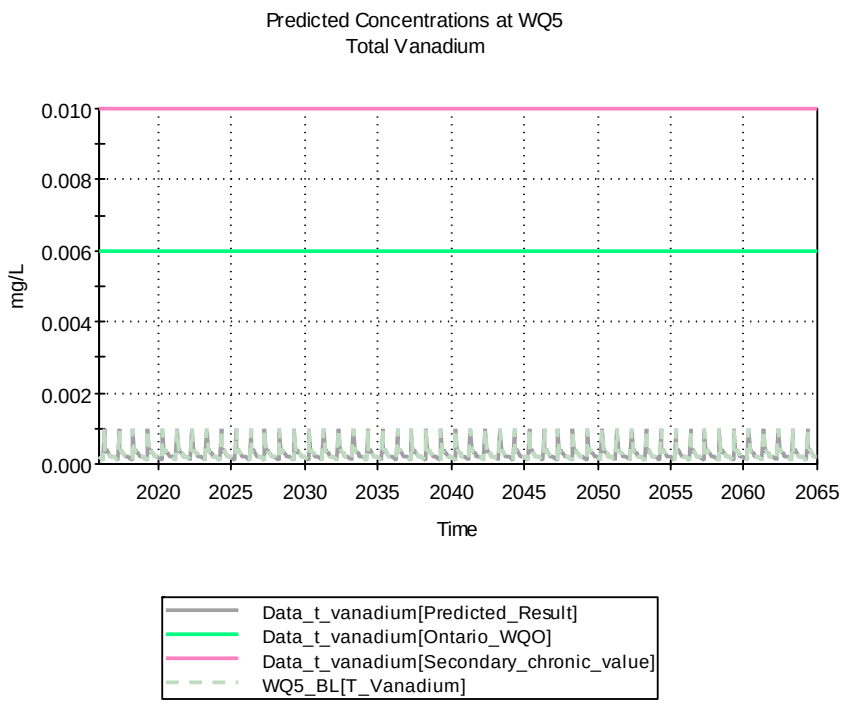




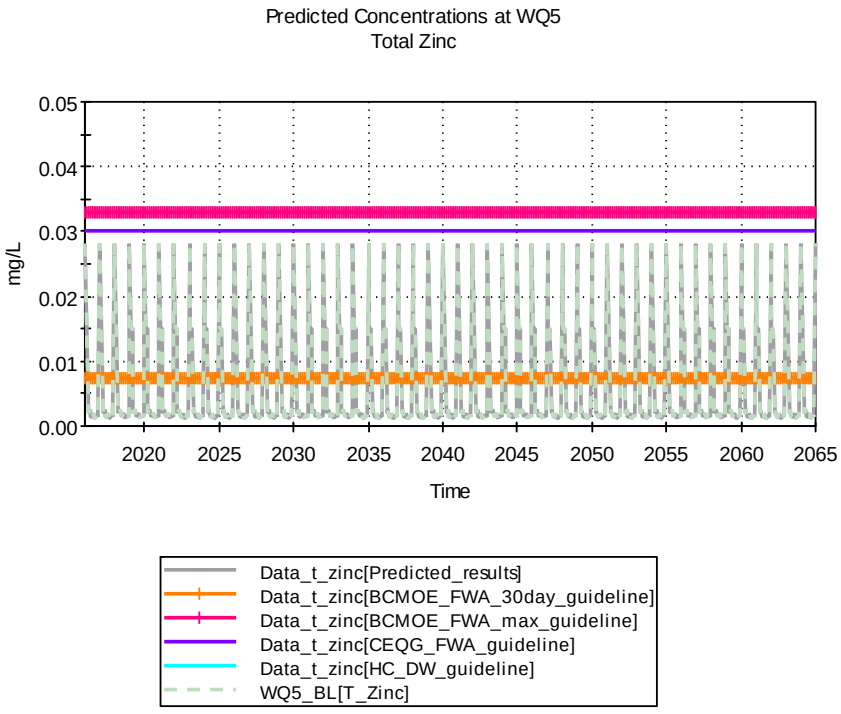
WQ5 – Worst Case

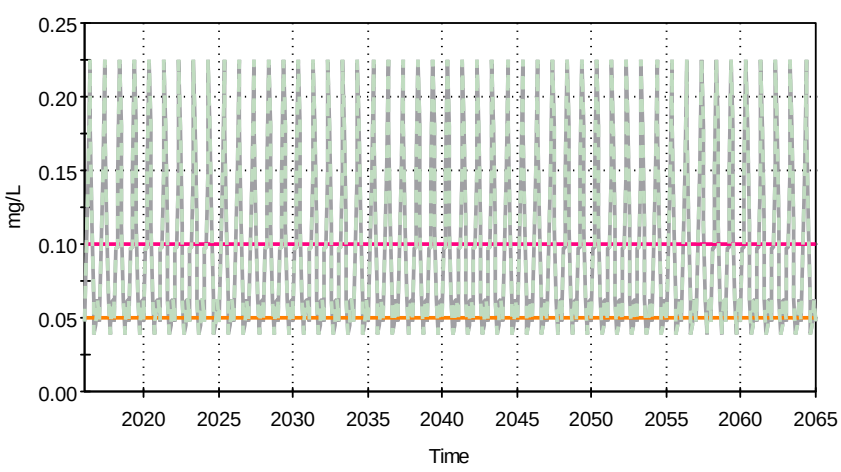


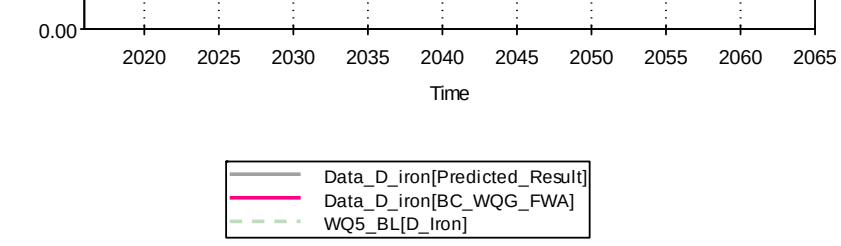




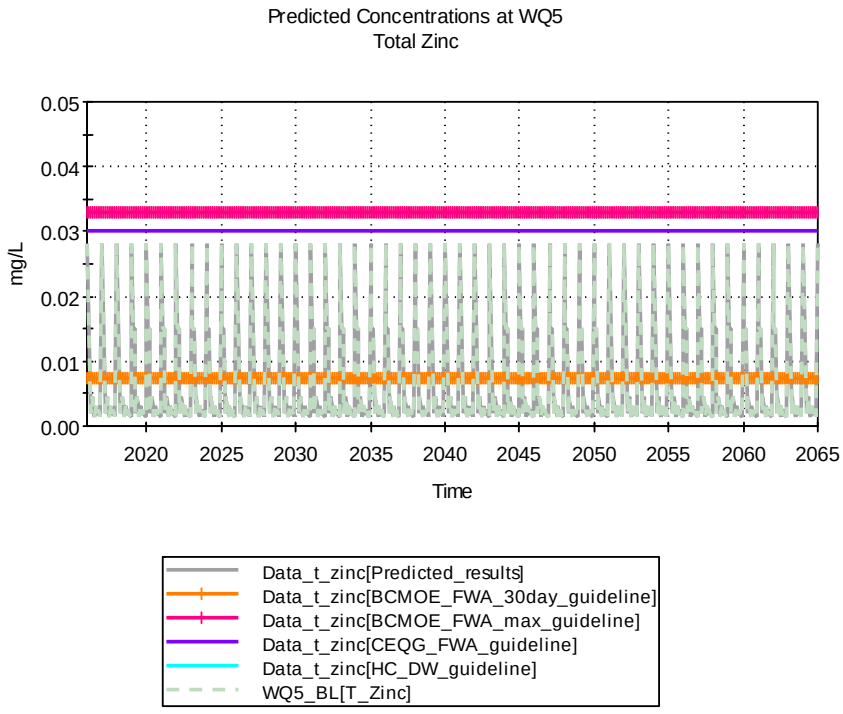
WQ5 – Best Estimate

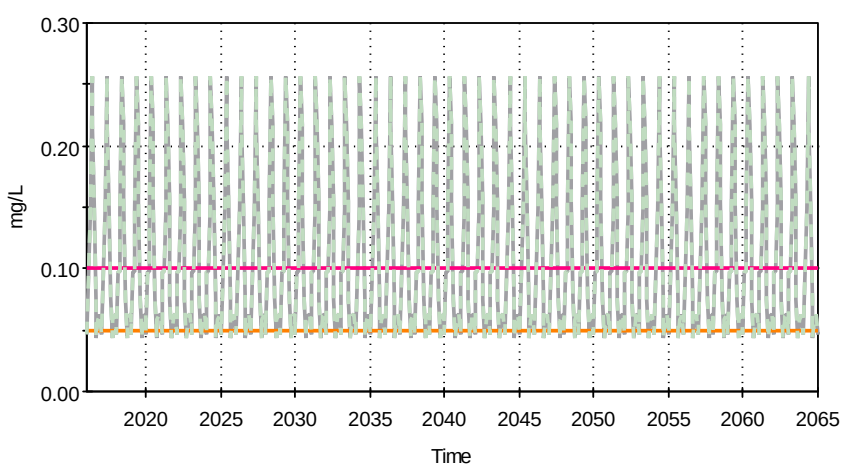


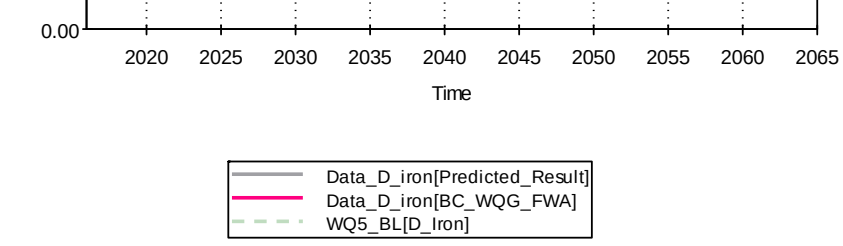




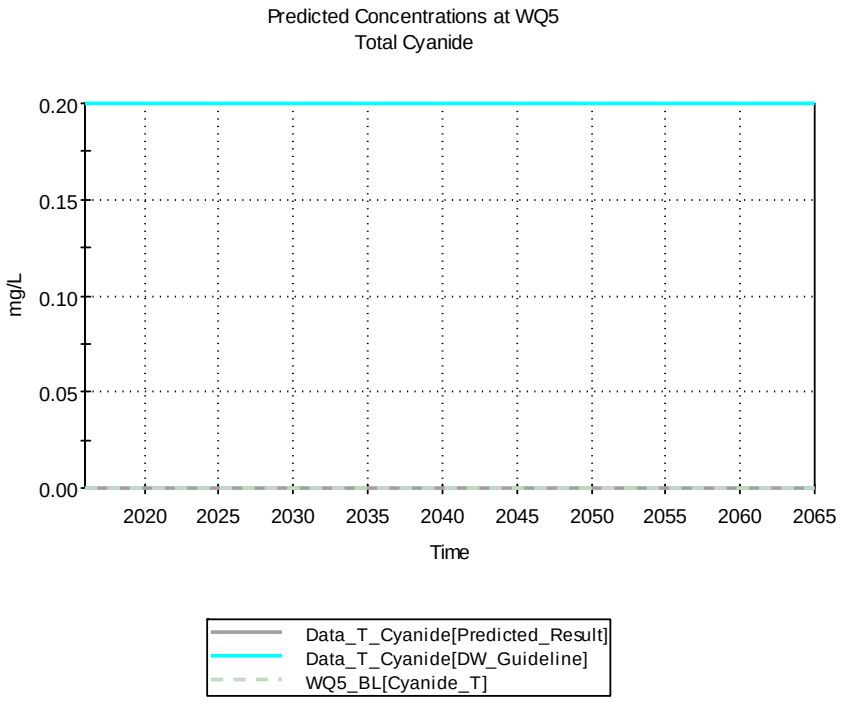
WQ5 – Worst Case

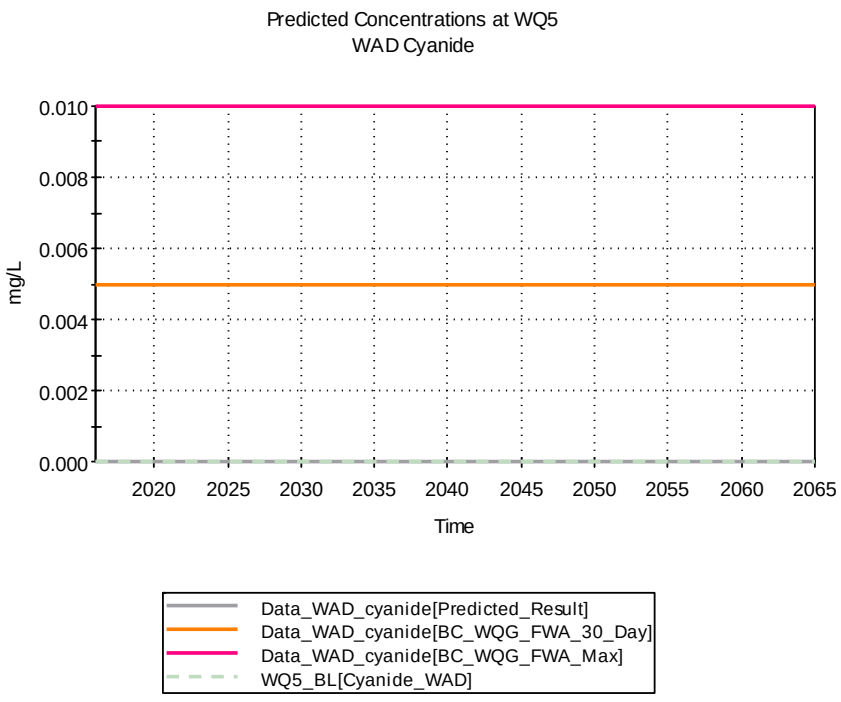




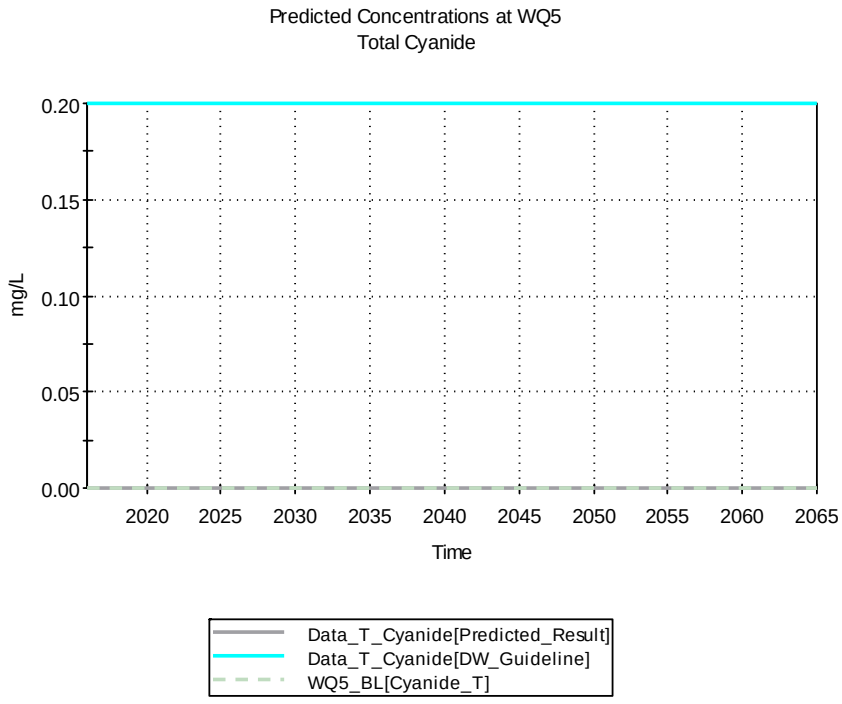


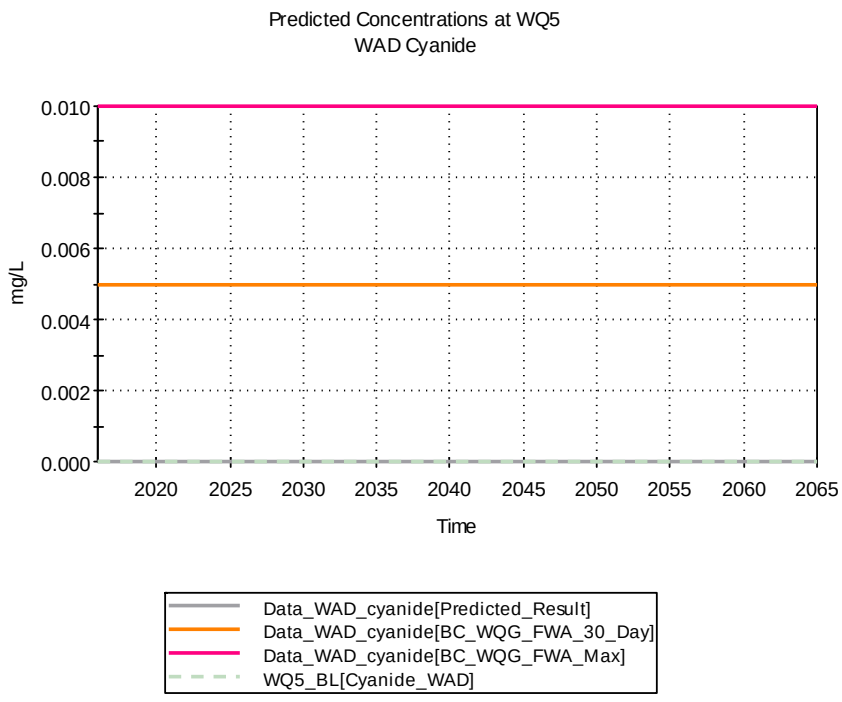
WQ5 – Best Estimate





WQ5 – Worst Case

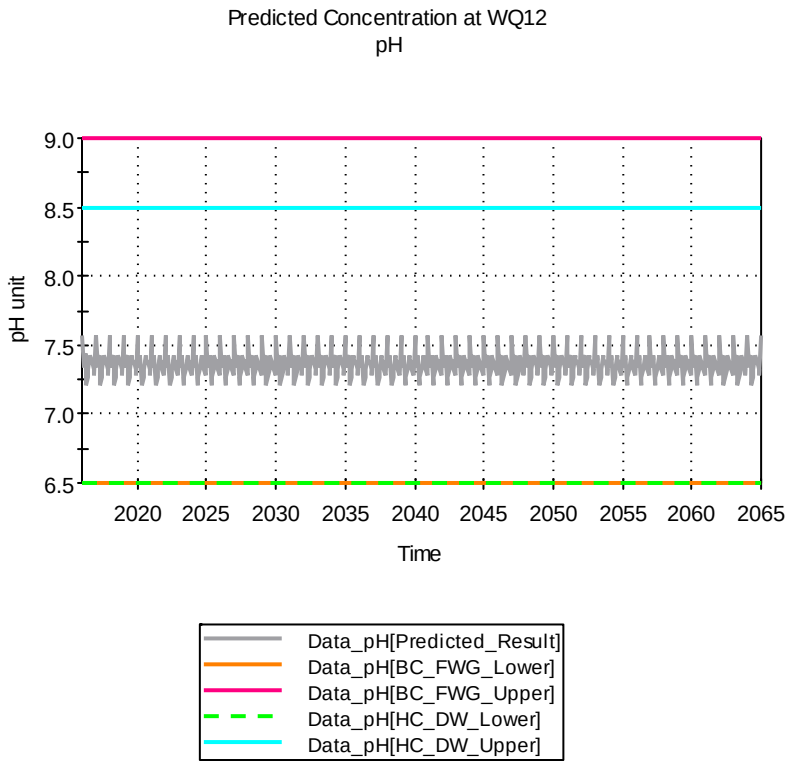


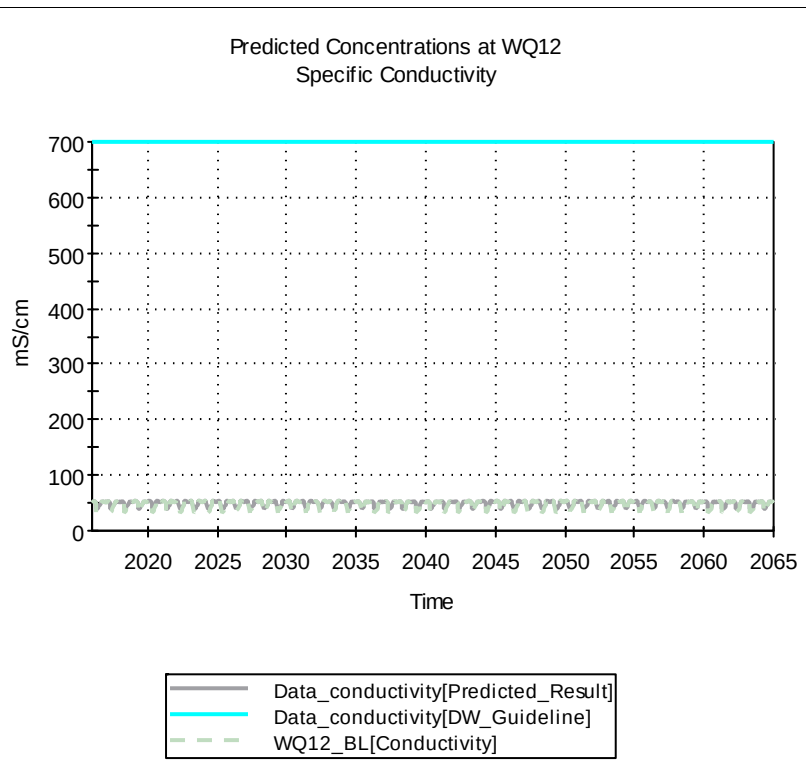


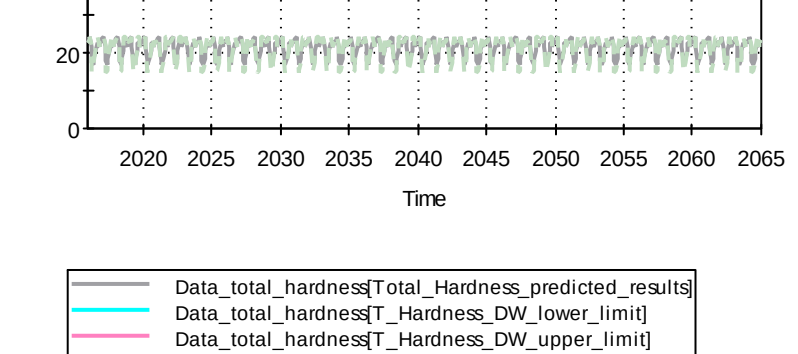
Annex A-5

Graphical Outputs of the Predicted Water Quality at WQ12 – Best Estimate and Worst Case

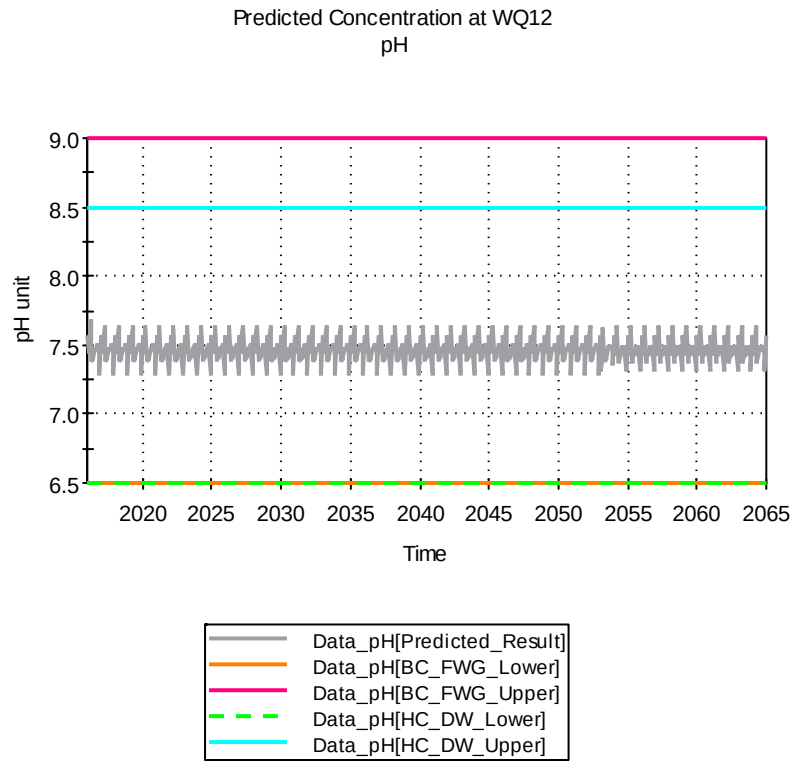
WQ12 – Best Estimate

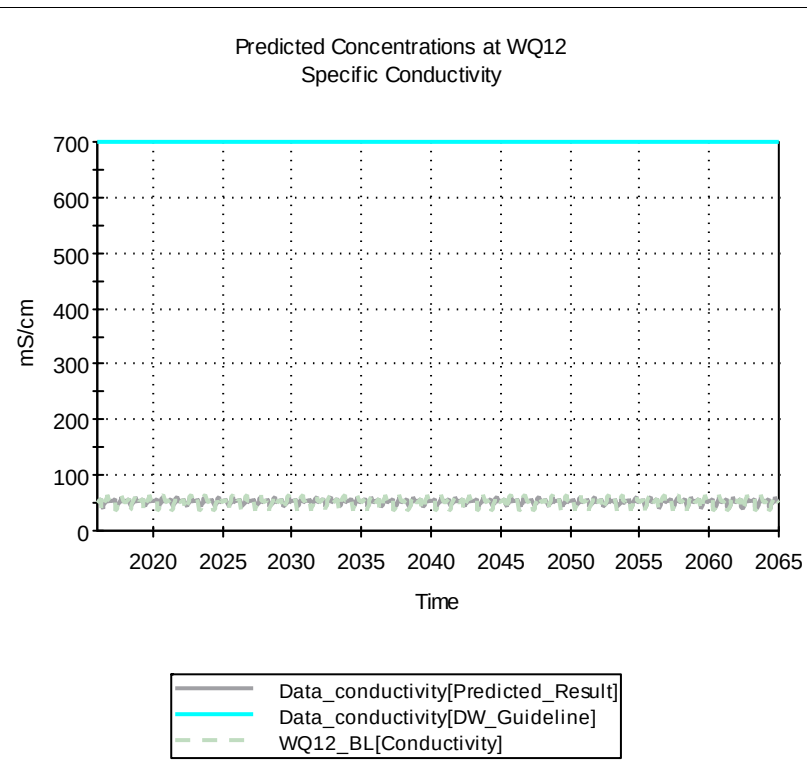


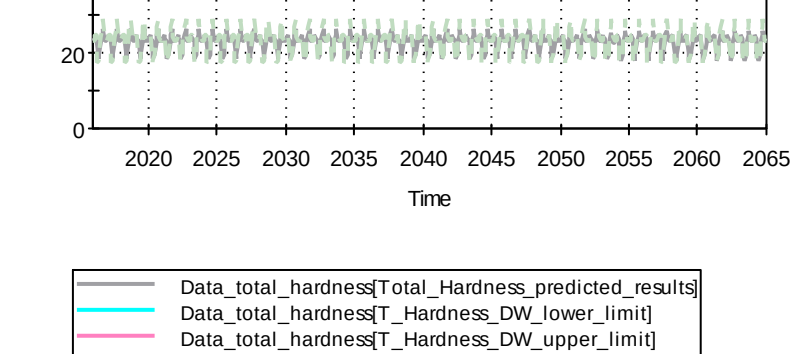




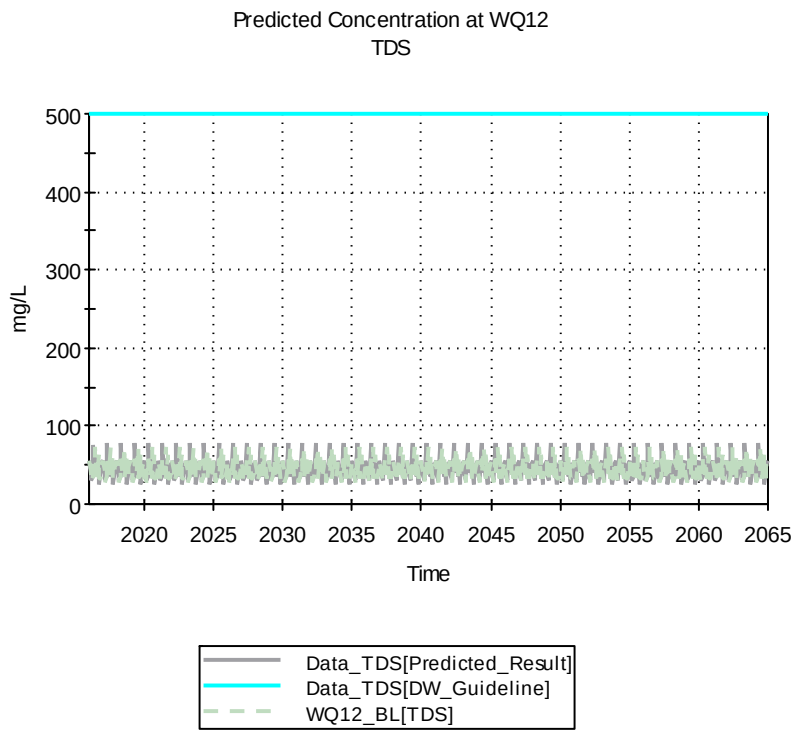
WQ12 –Worst Case

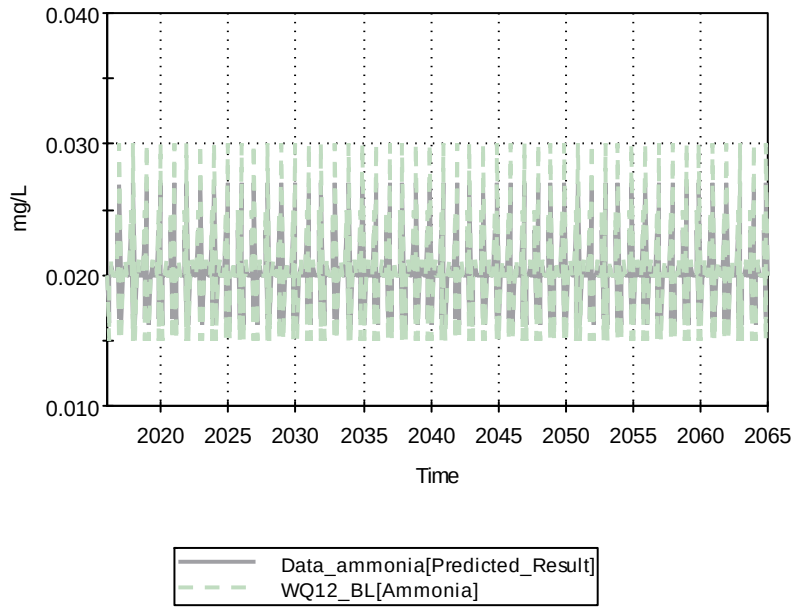


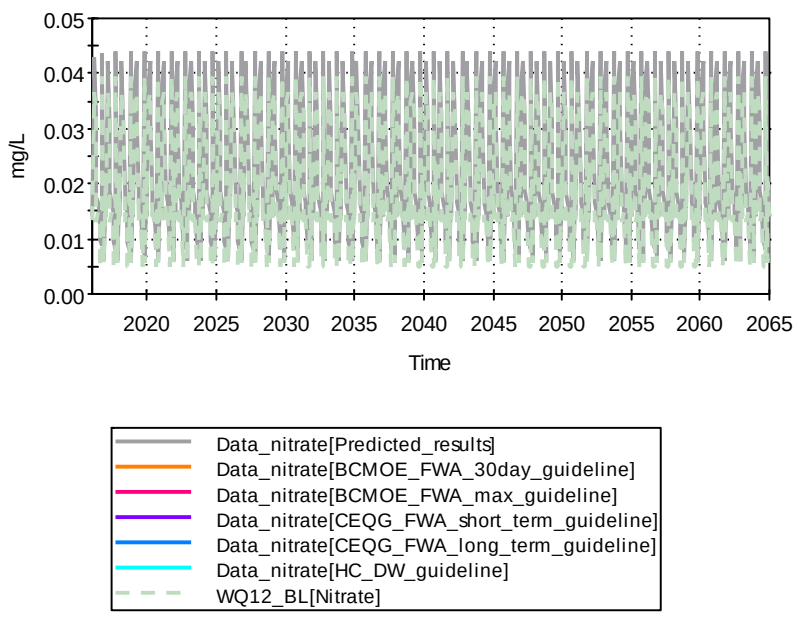




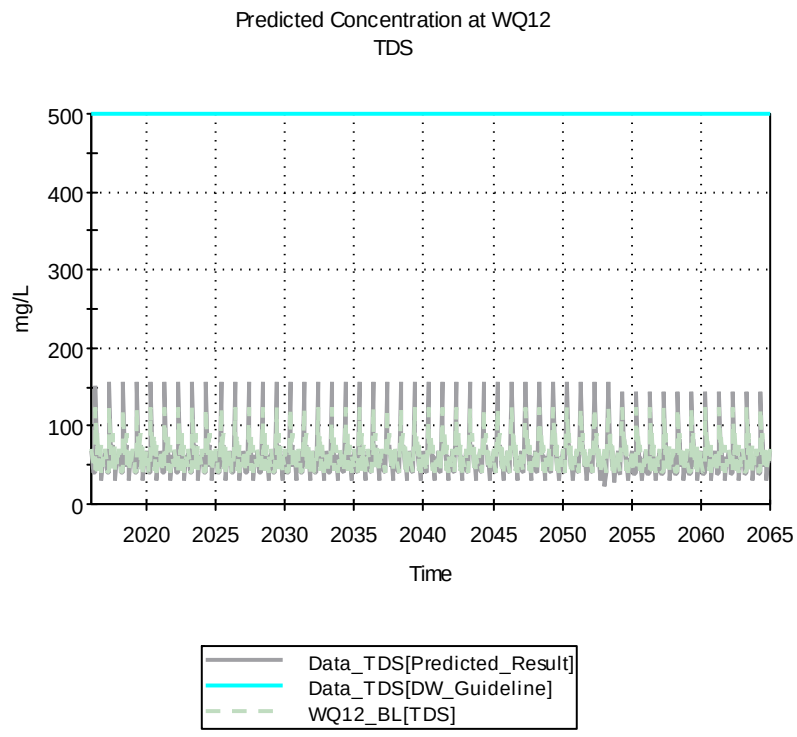
WQ12 – Best Estimate

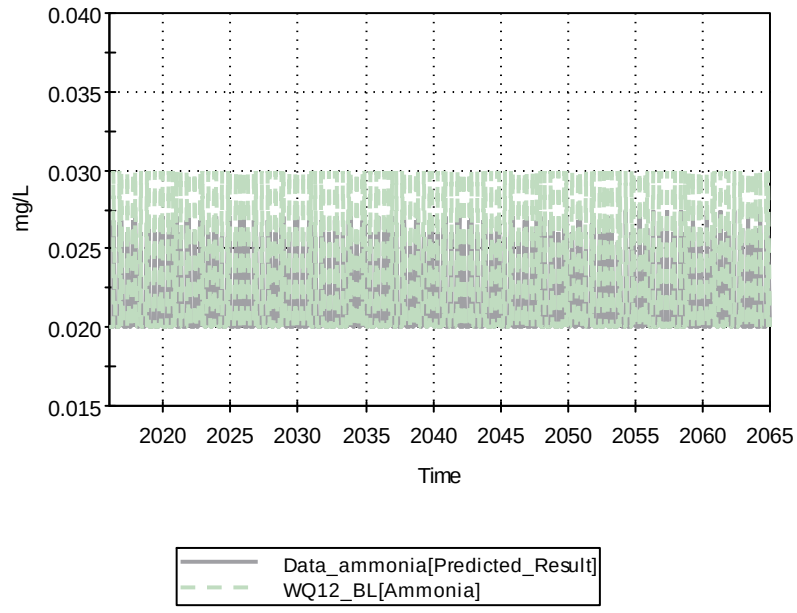


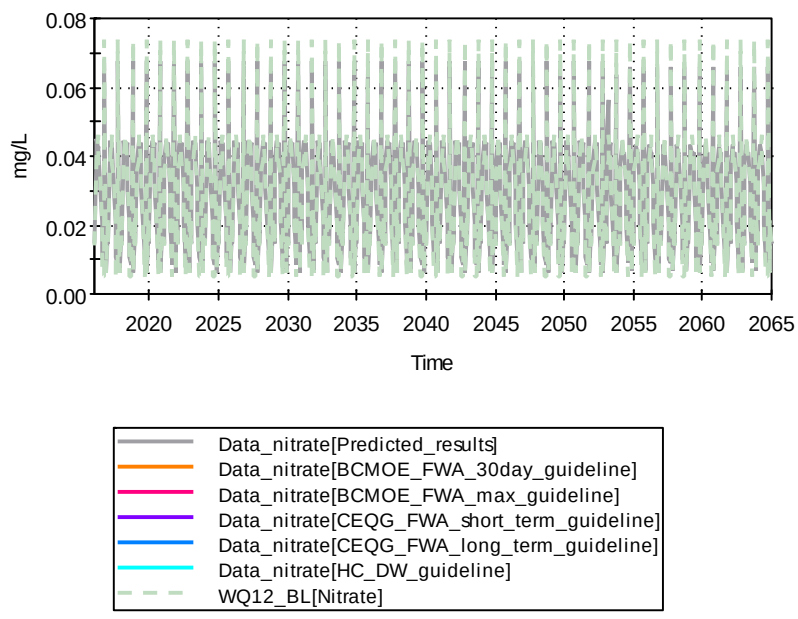




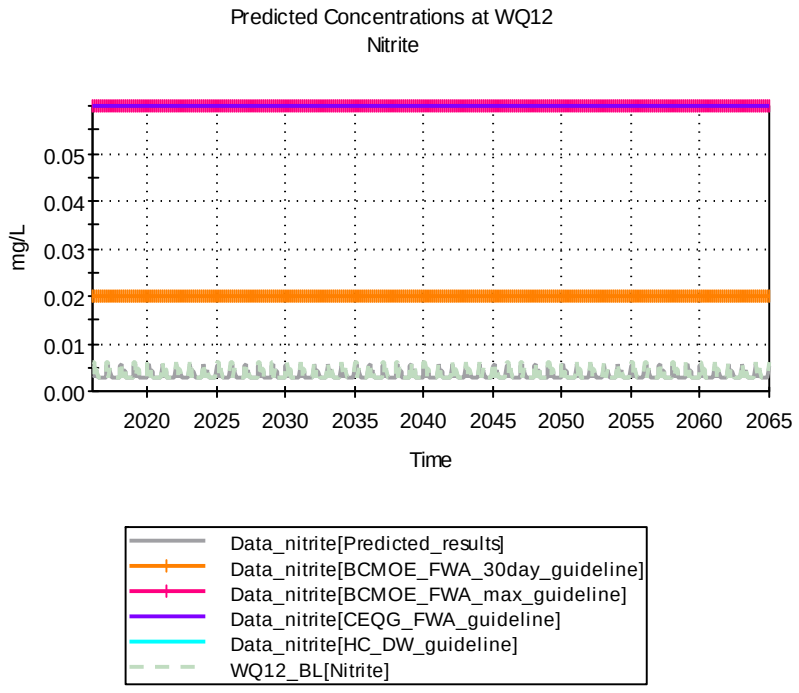
WQ12 –Worst Case

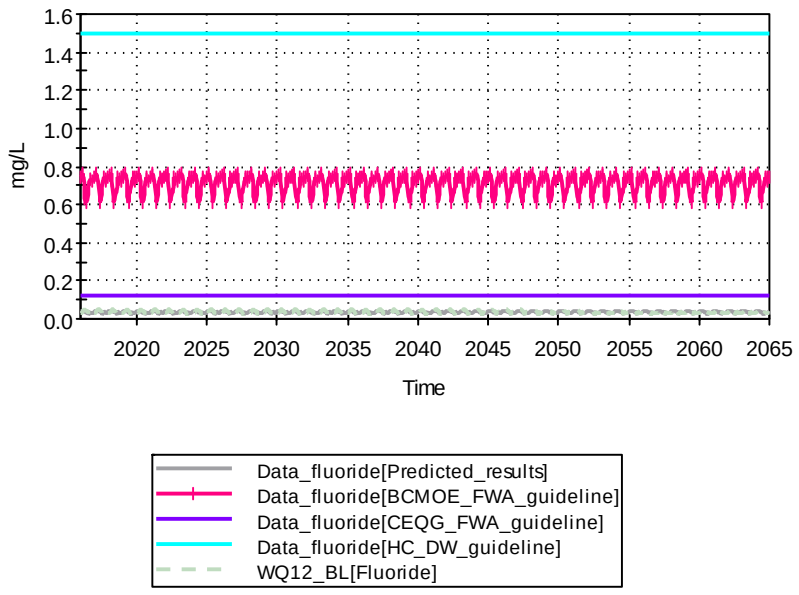


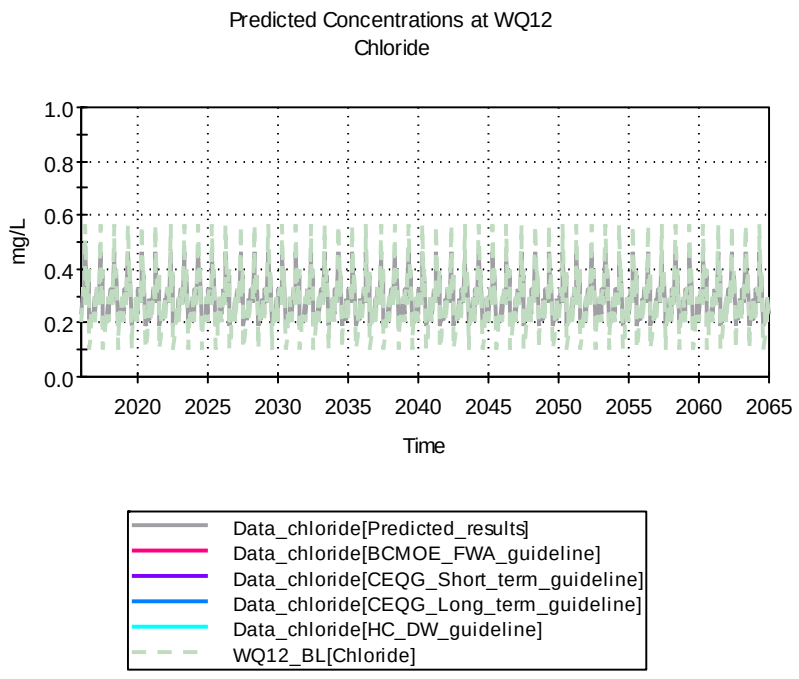




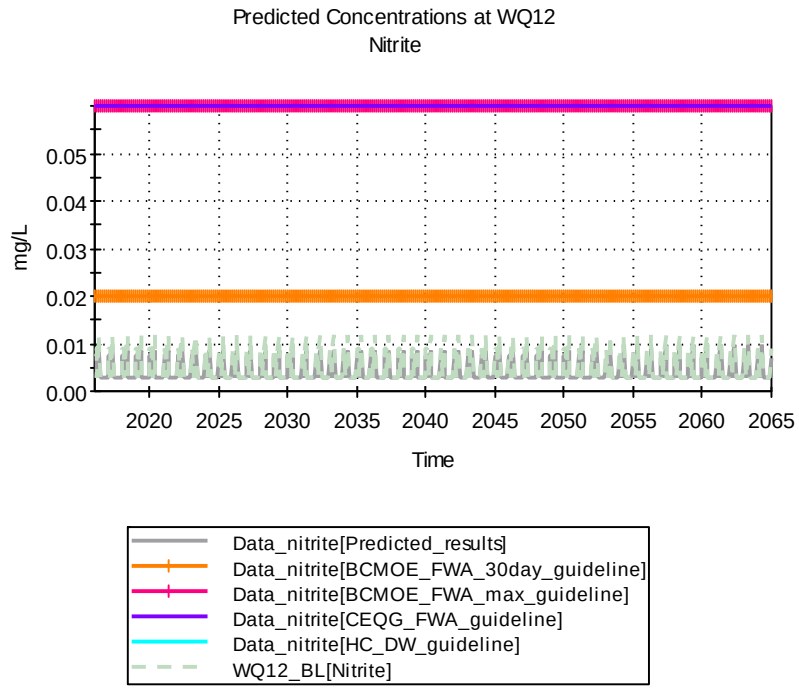
WQ12 – Best Estimate

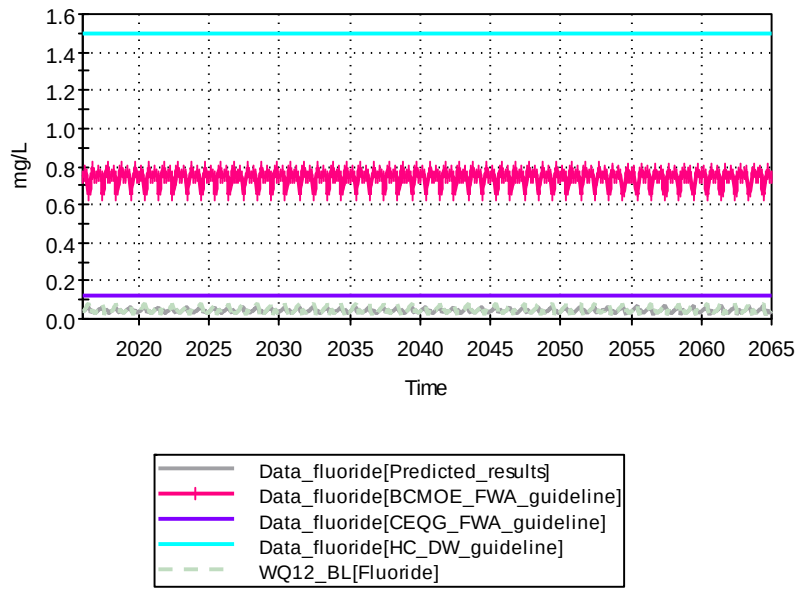


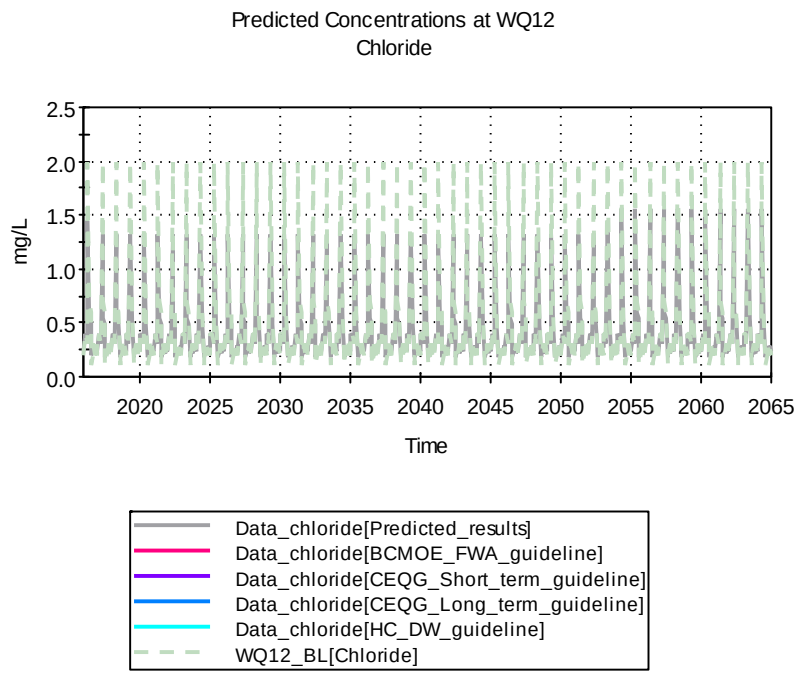




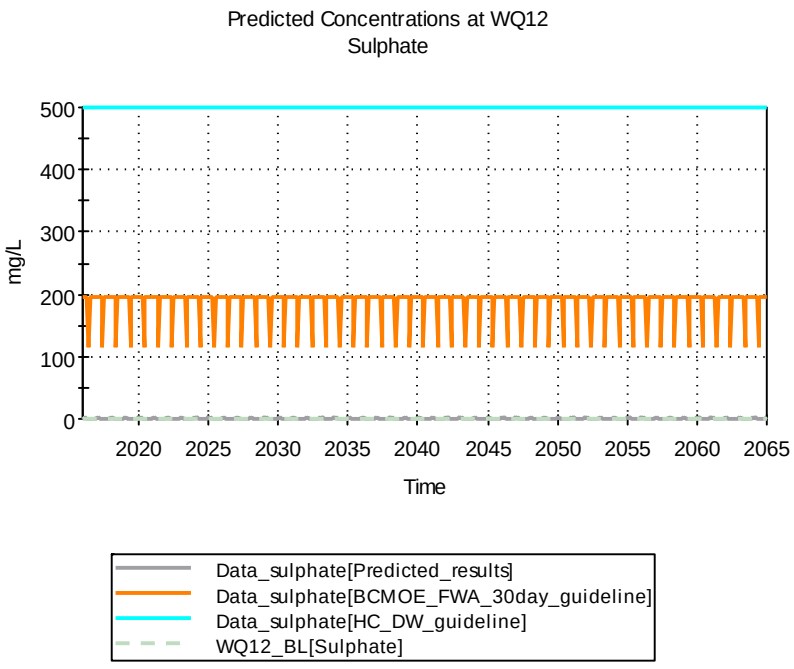
WQ12 –Worst Case

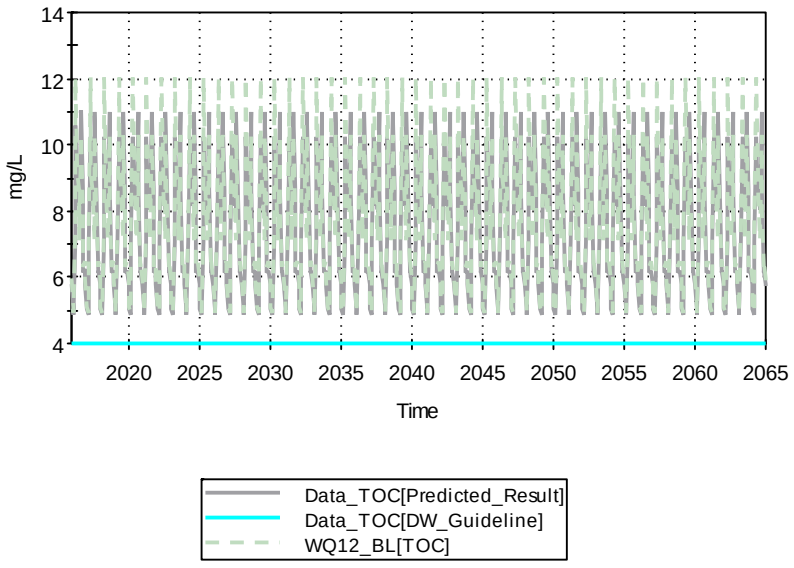


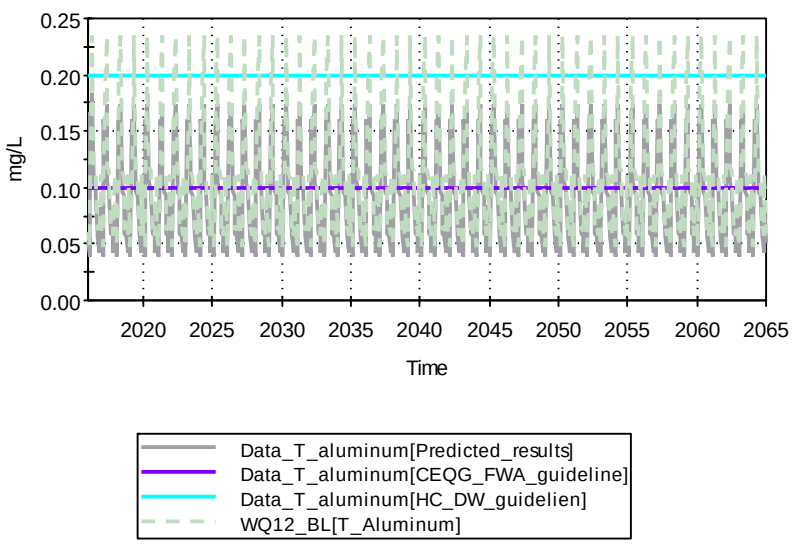


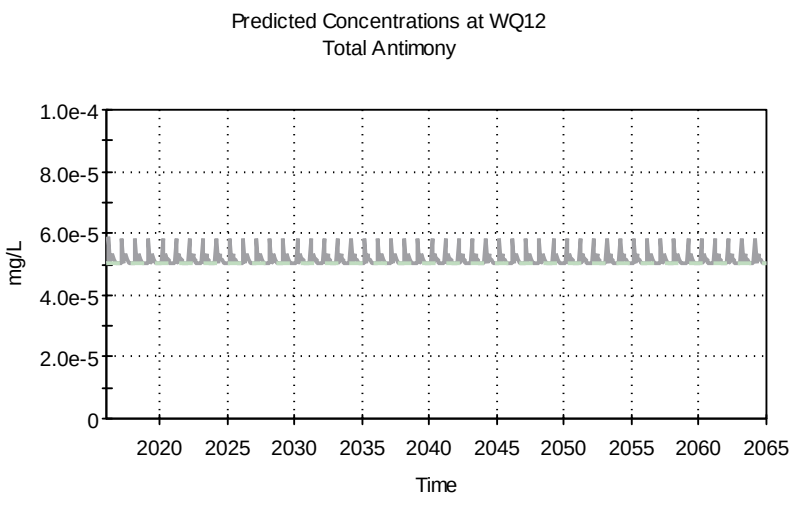


WQ12 – Best Estimate

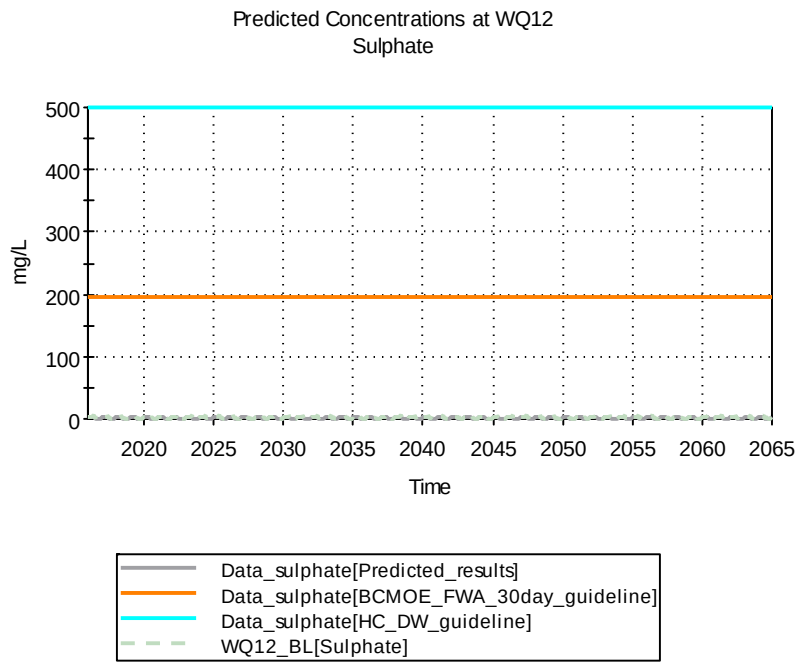


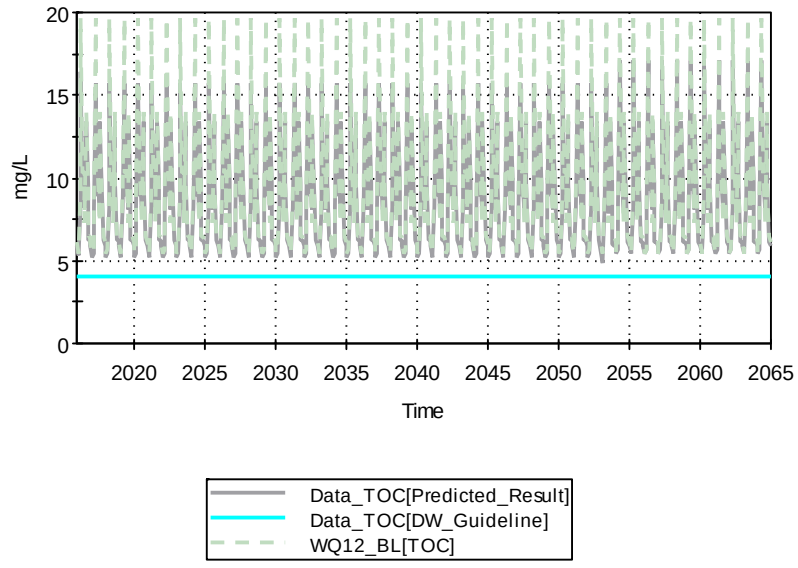


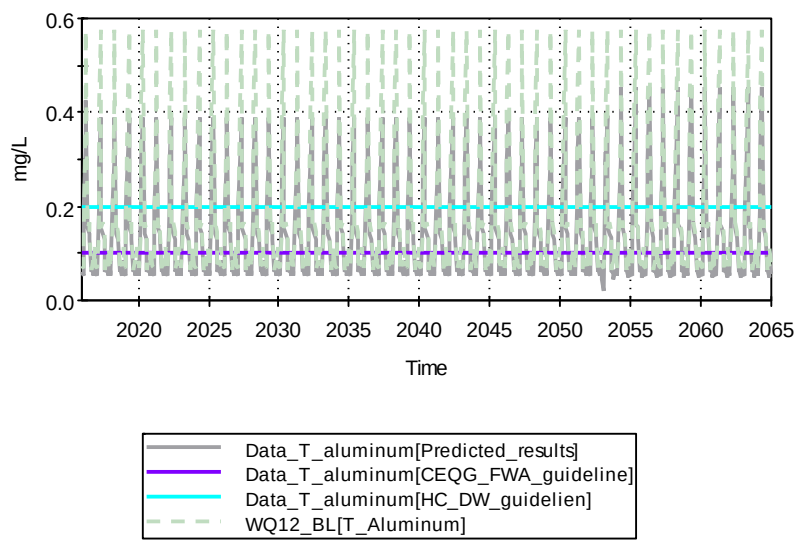


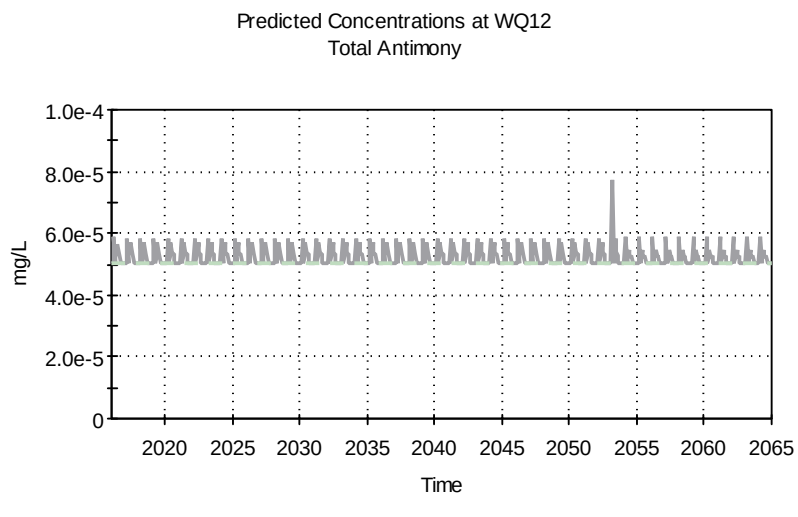


WQ12 –Worst Case

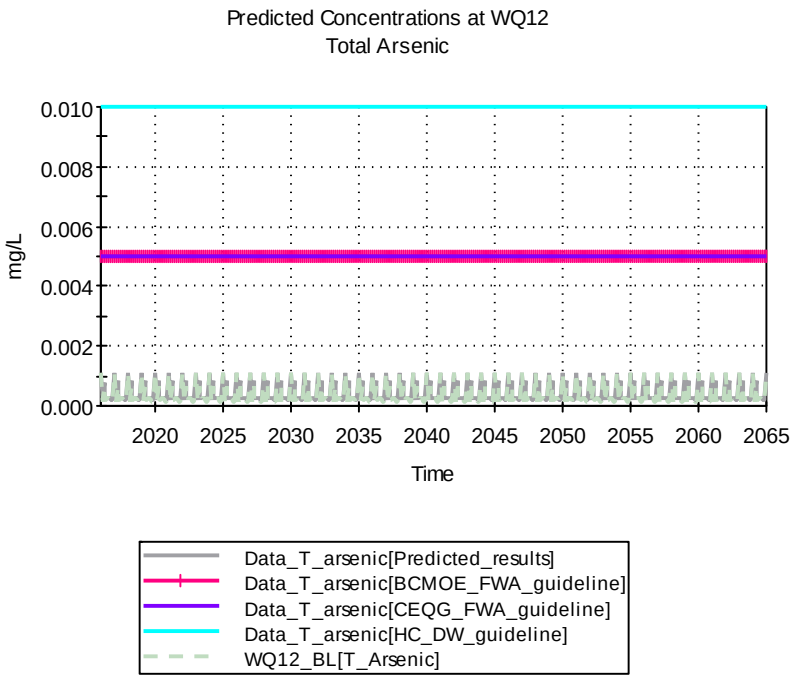


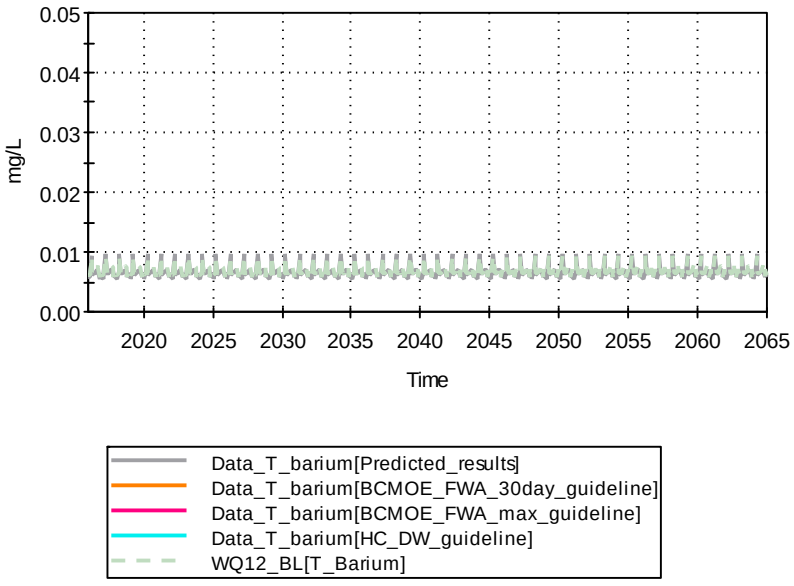


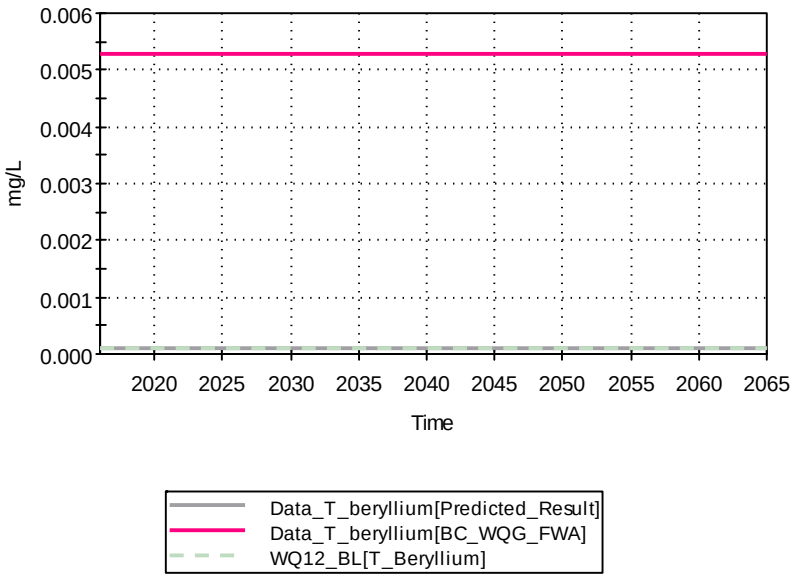




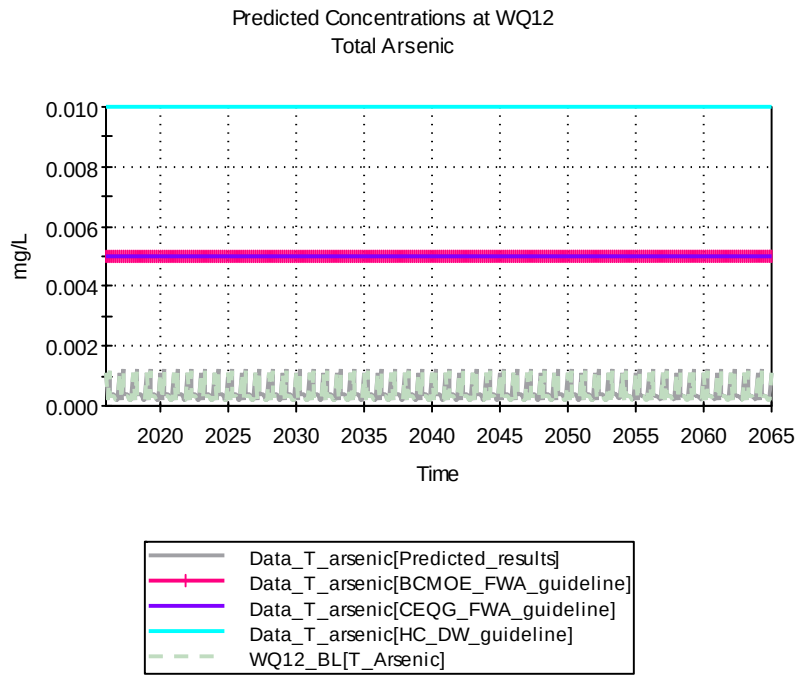
WQ12 – Best Estimate

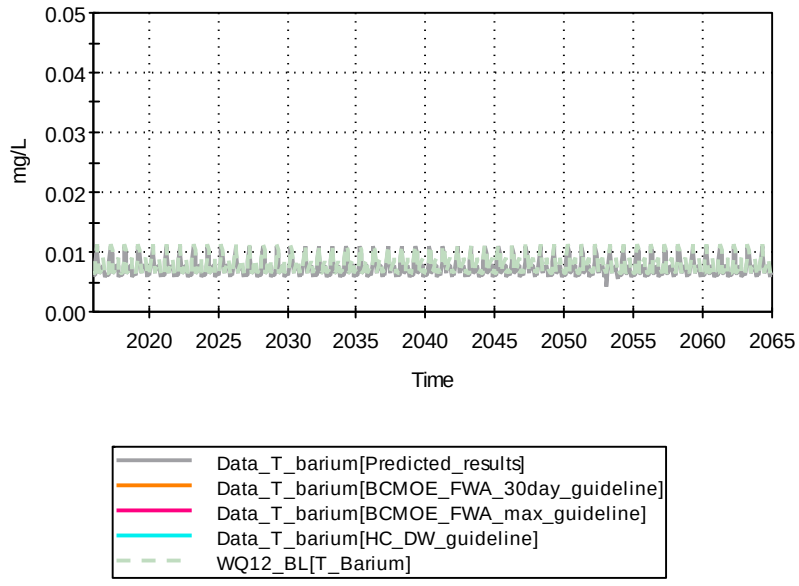


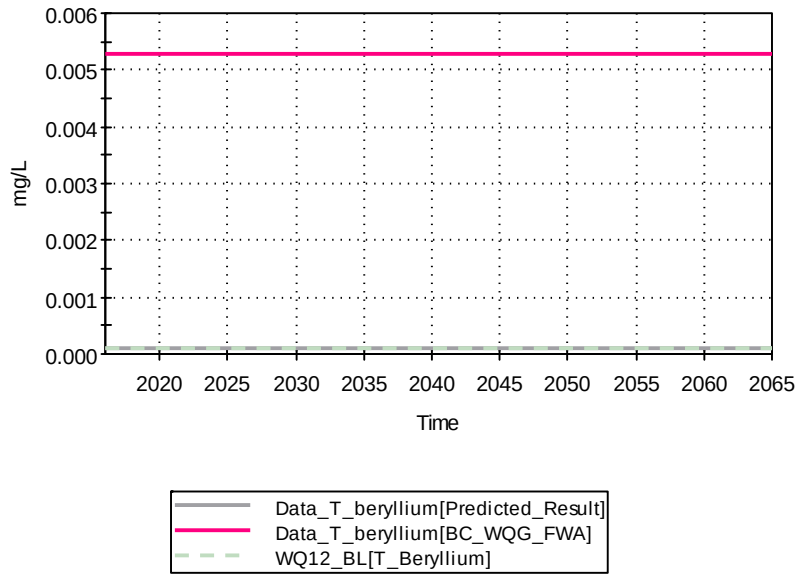




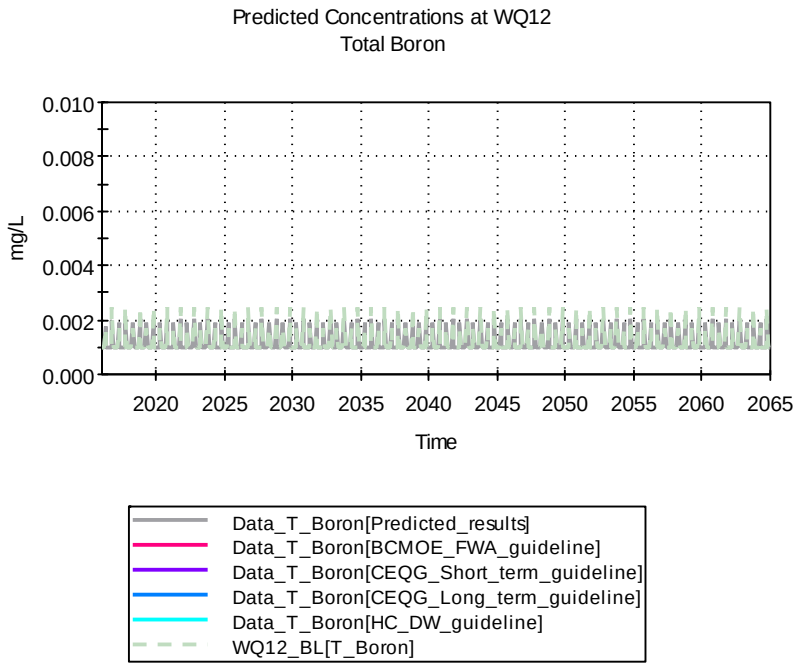
WQ12 –Worst Case



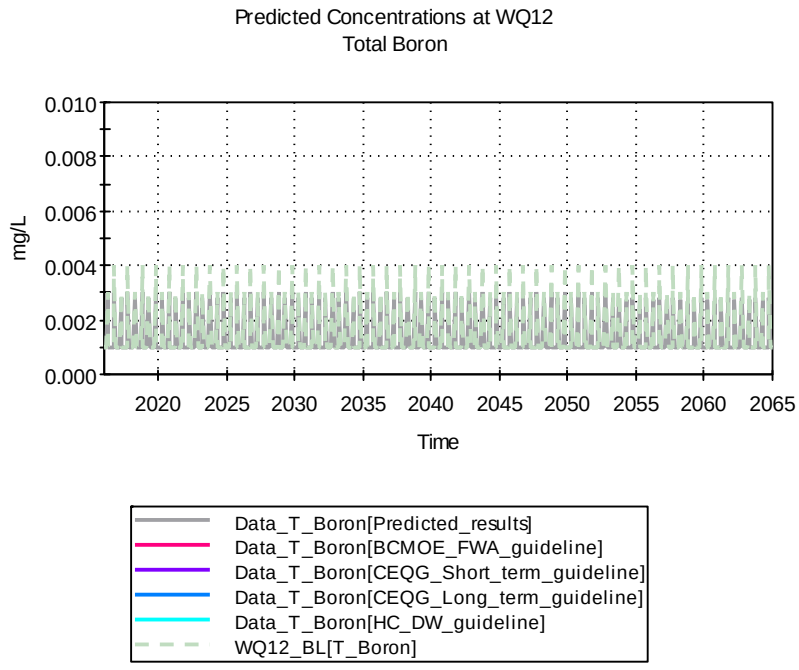


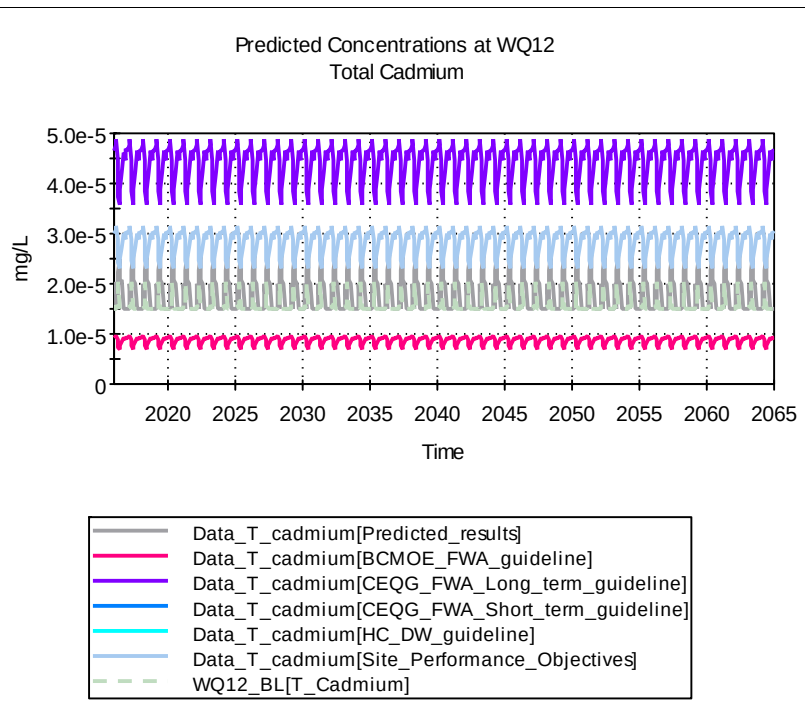


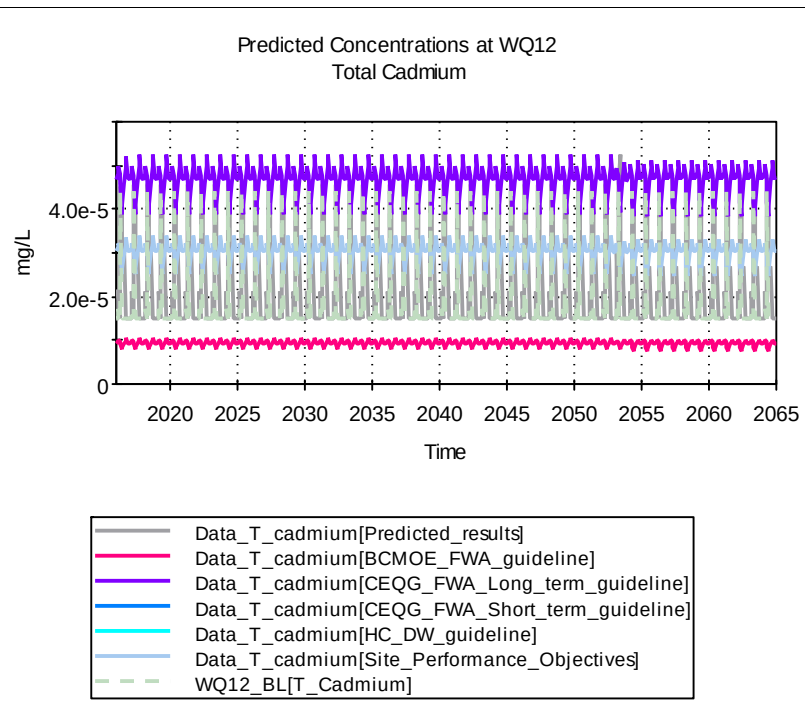
WQ12 – Best Estimate

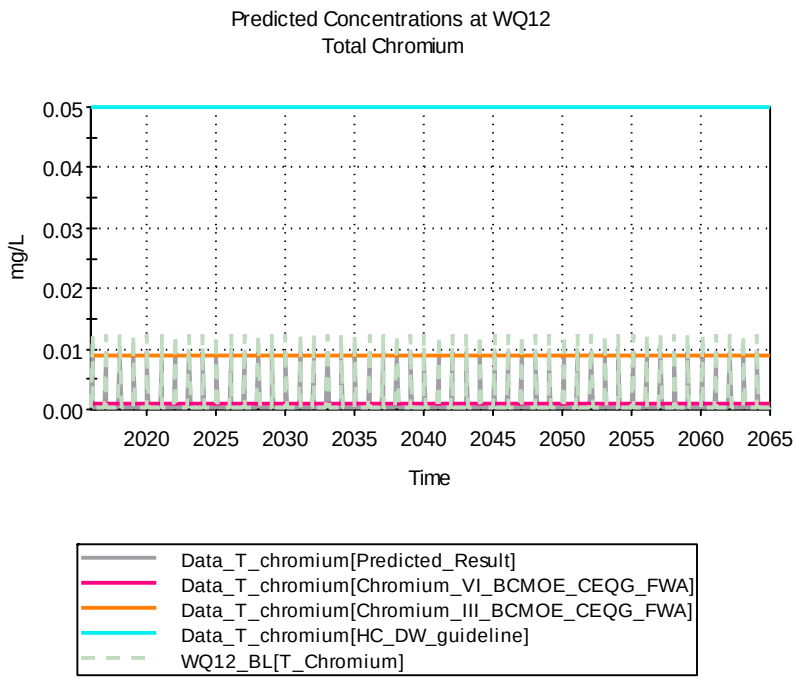


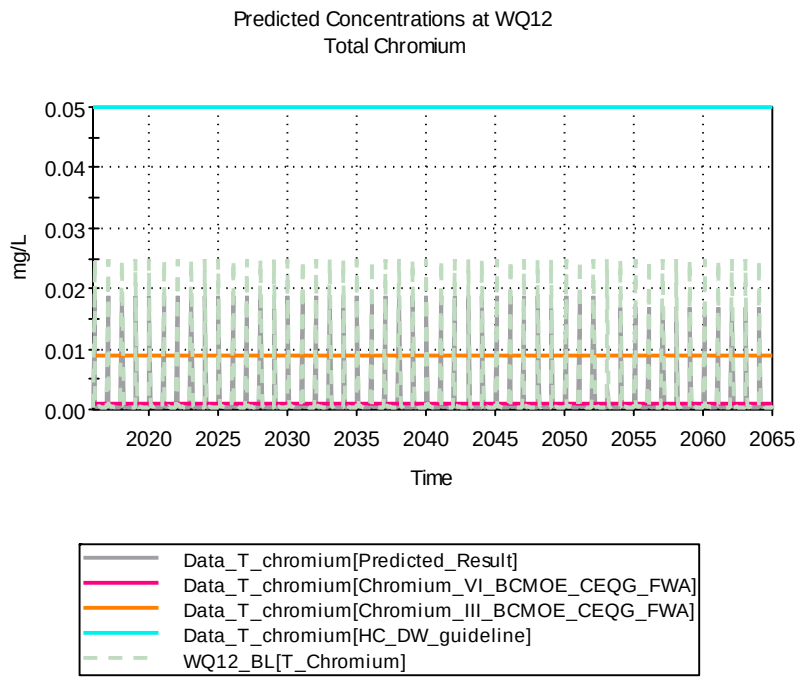
WQ12 –Worst Case



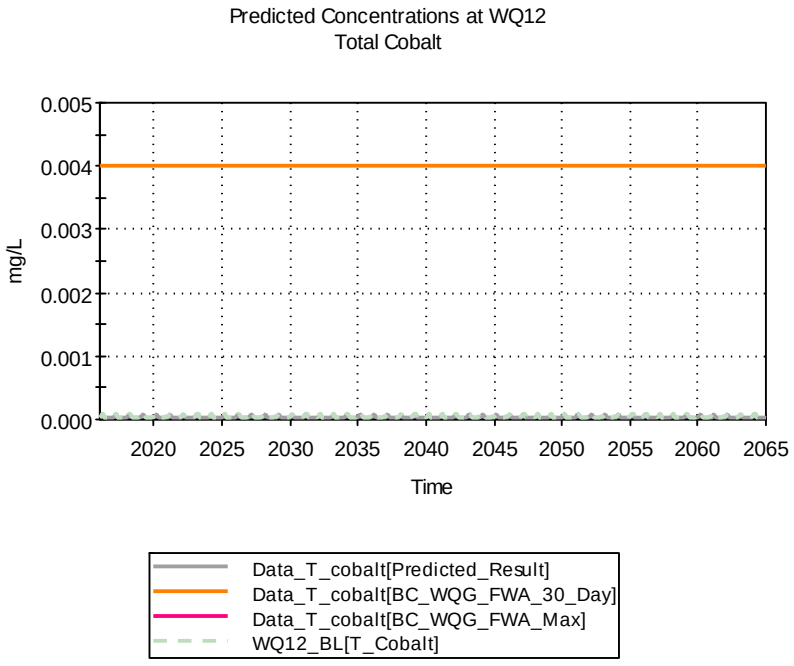


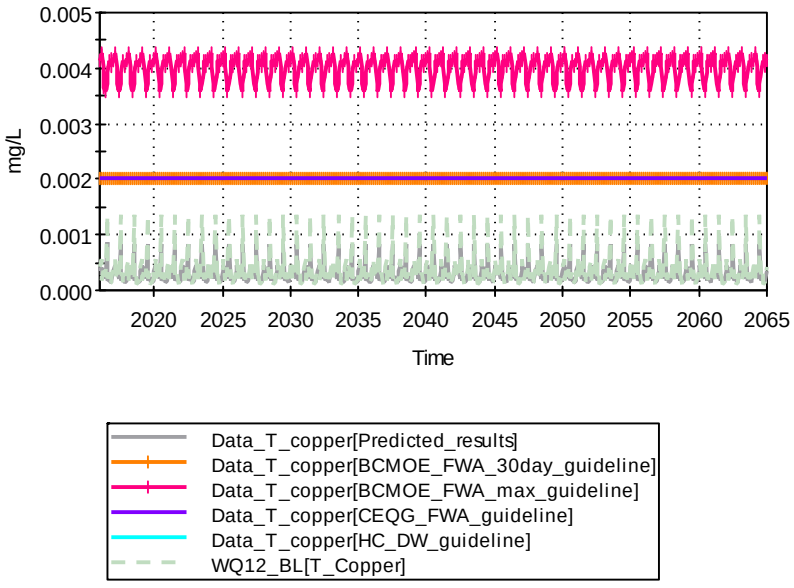


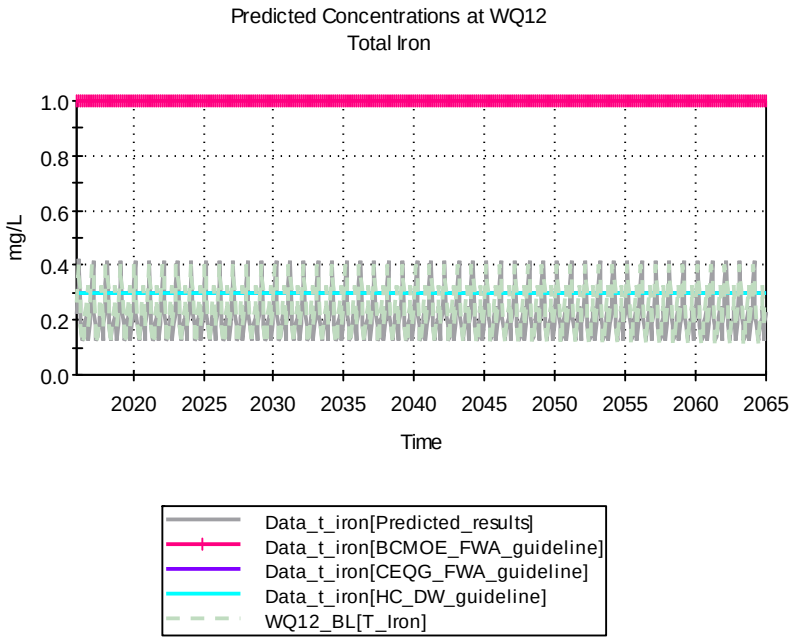


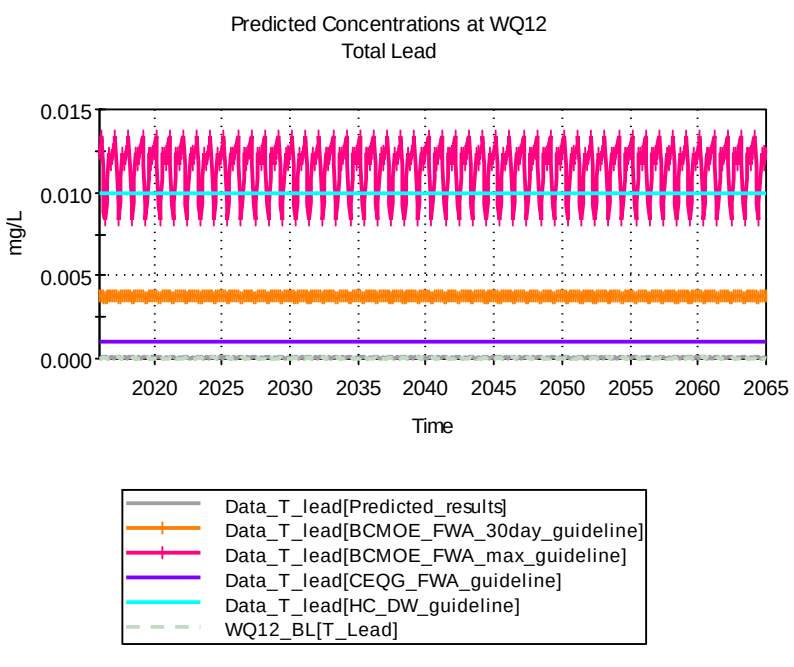


WQ12 – Best Estimate

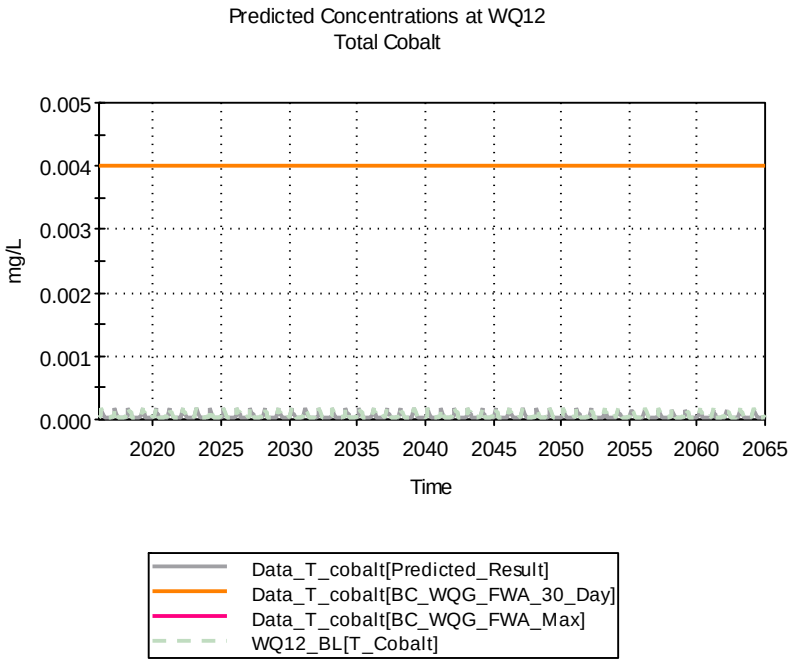


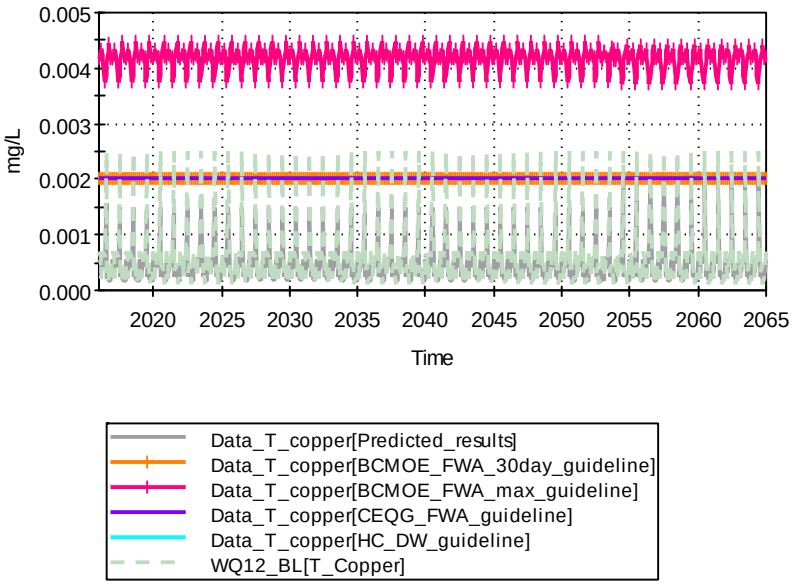


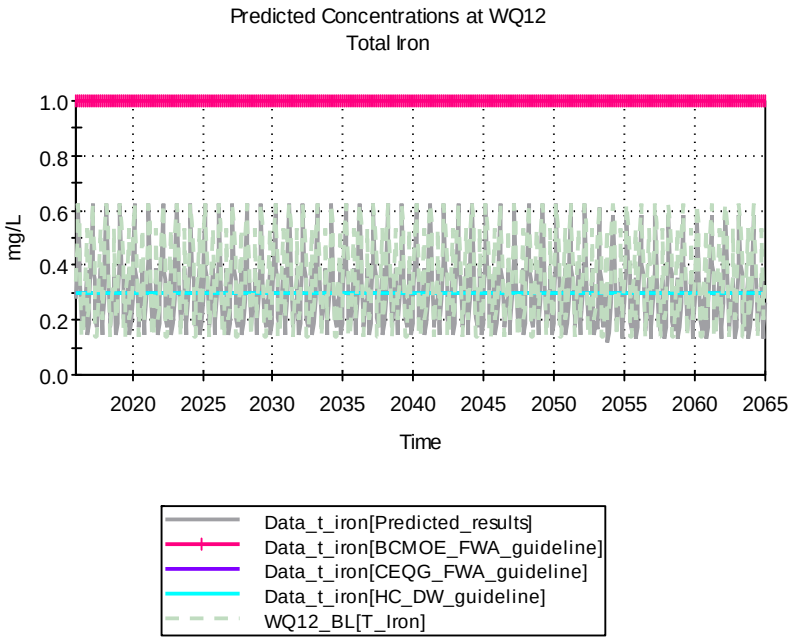


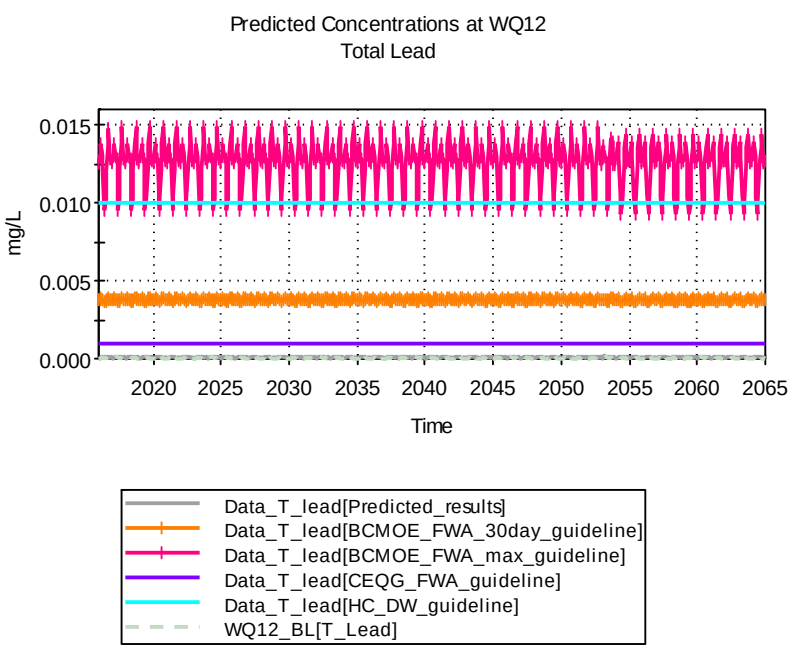


WQ12 –Worst Case

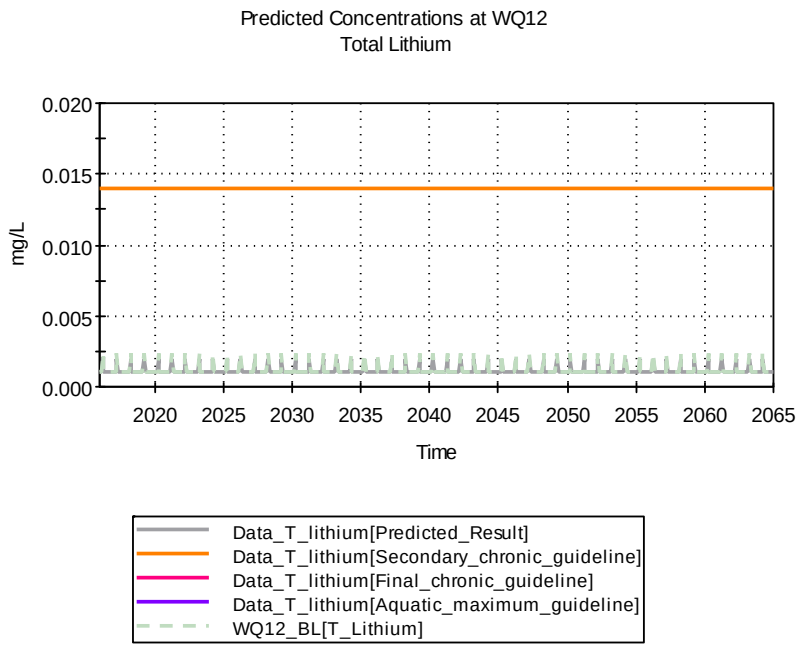


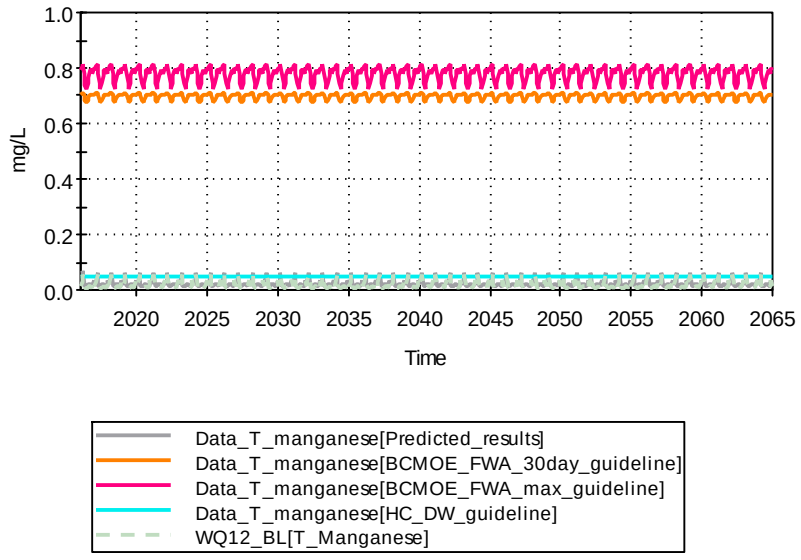


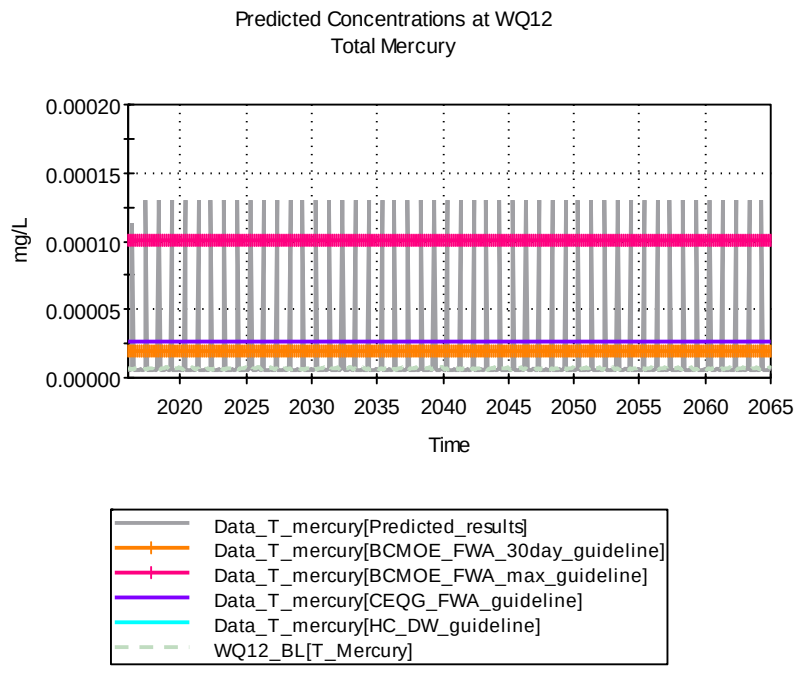


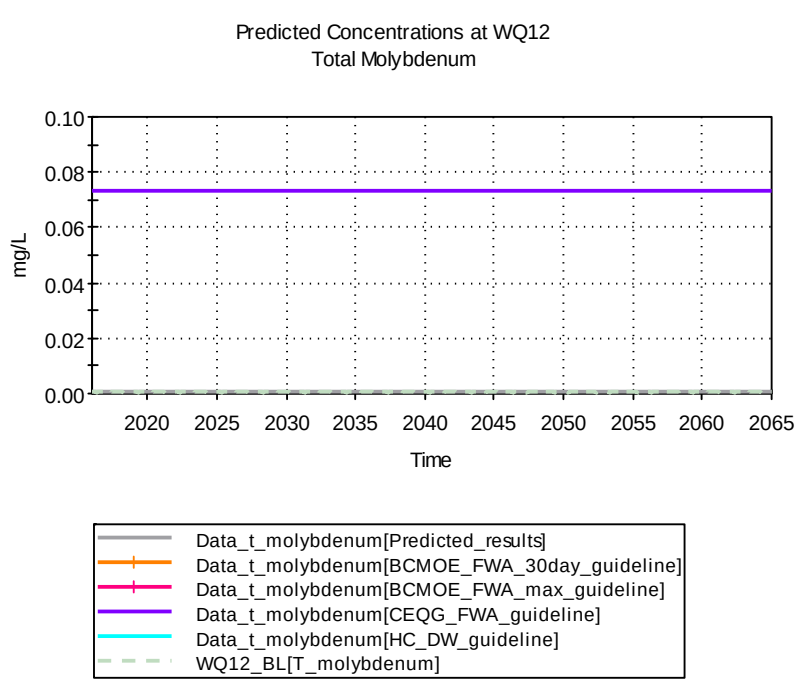


WQ12 – Best Estimate

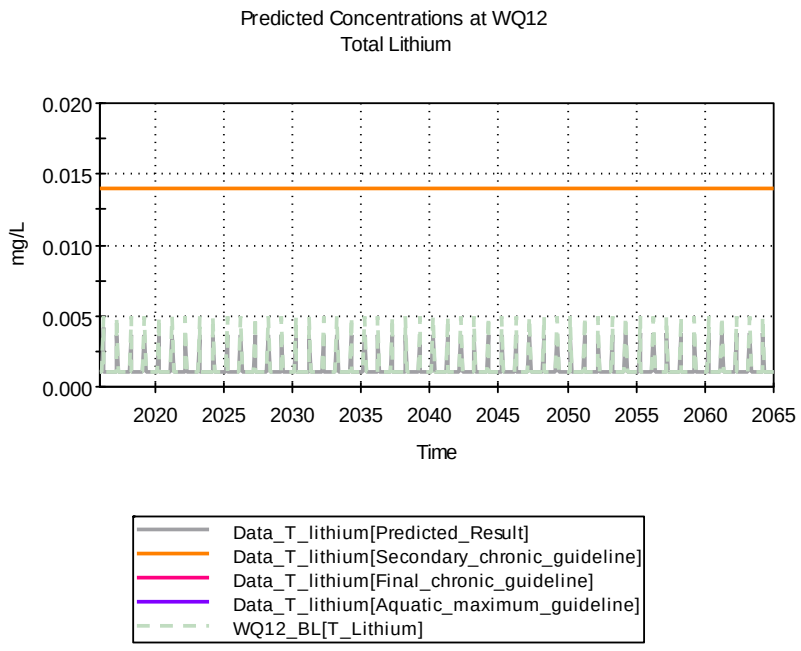


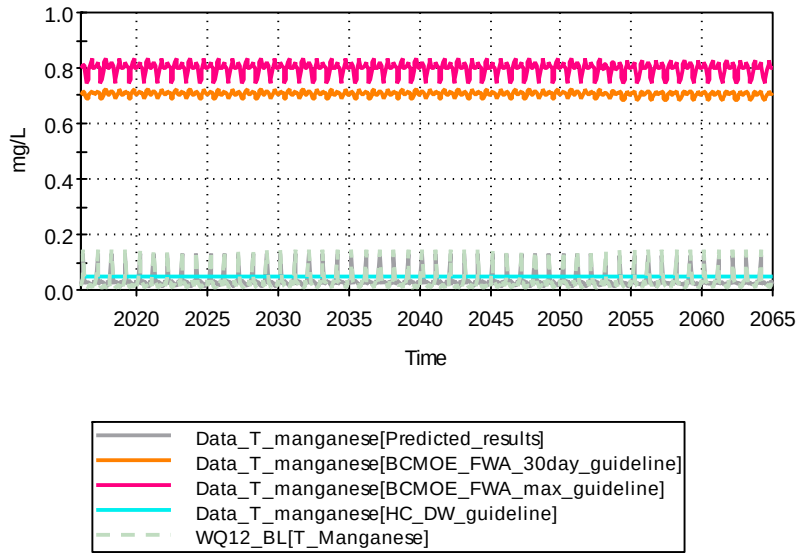


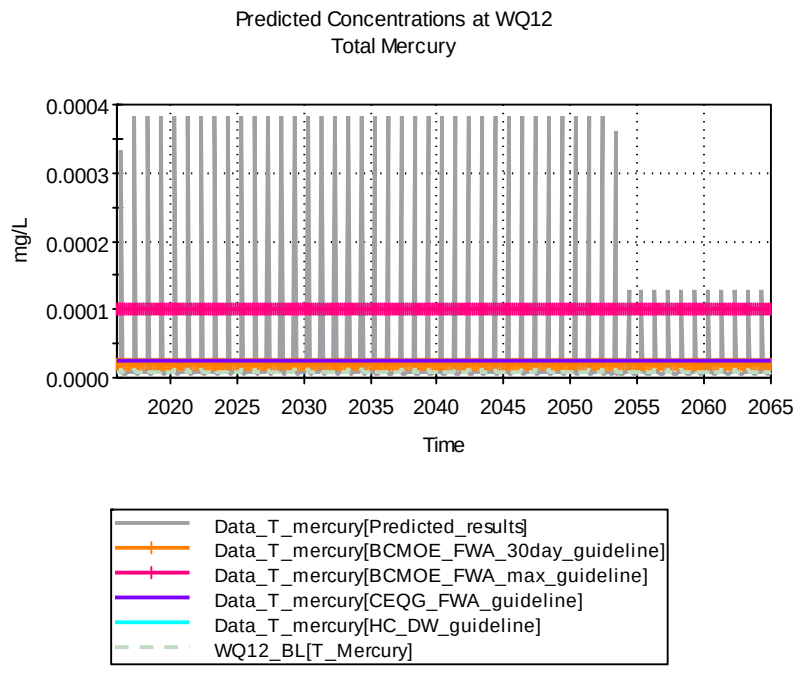


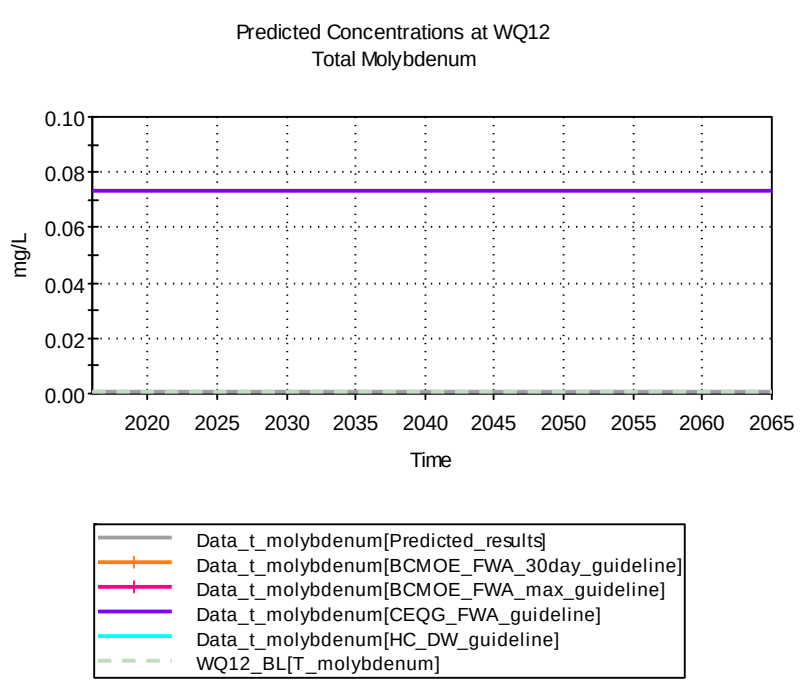


WQ12 –Worst Case

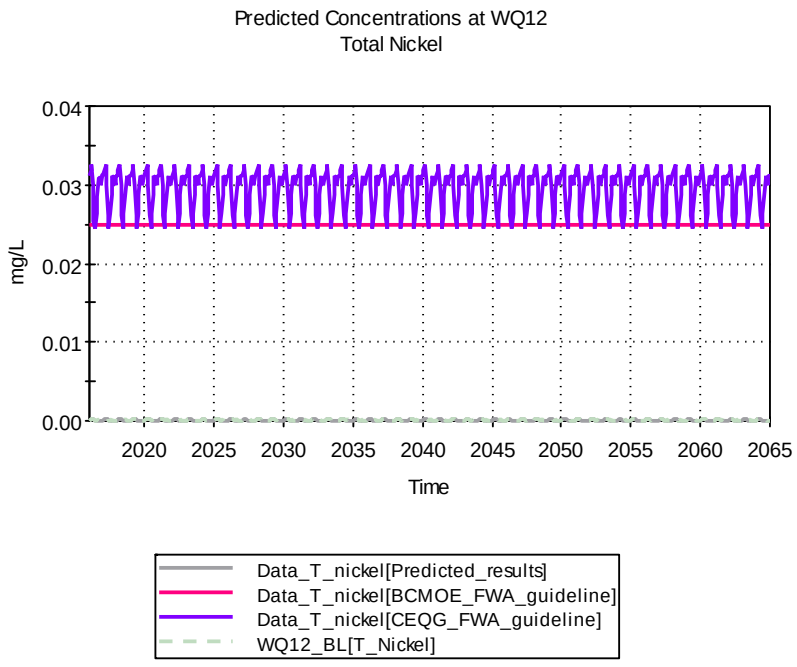


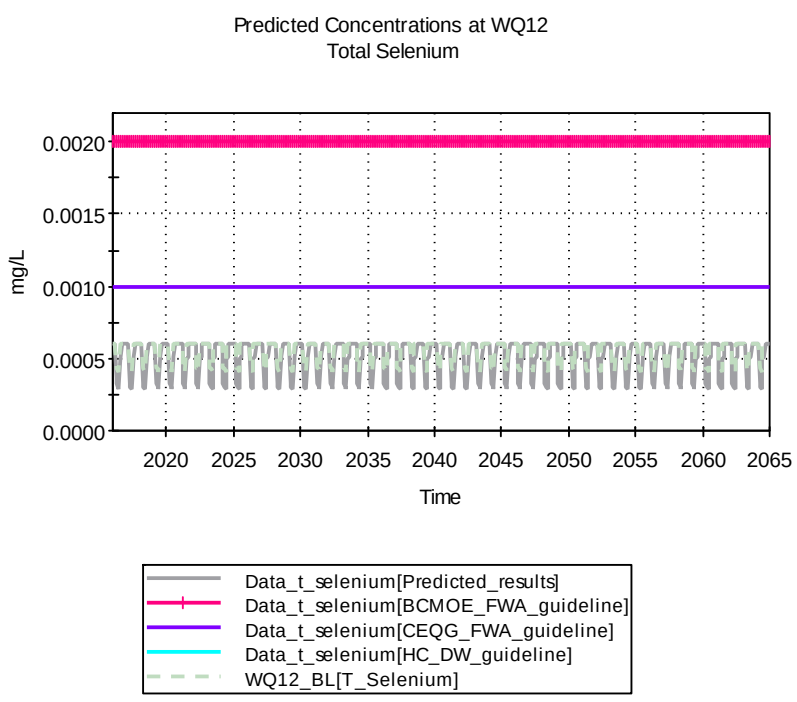


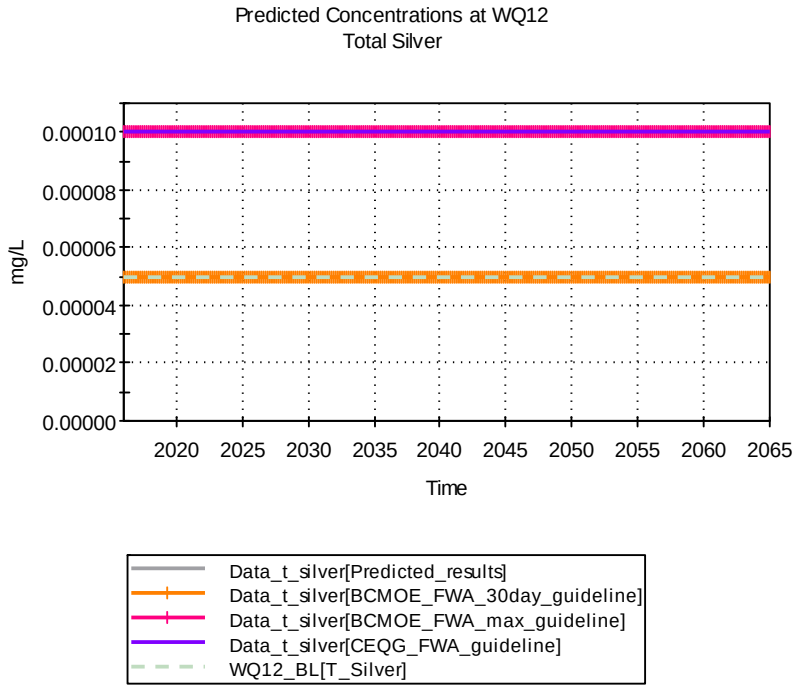




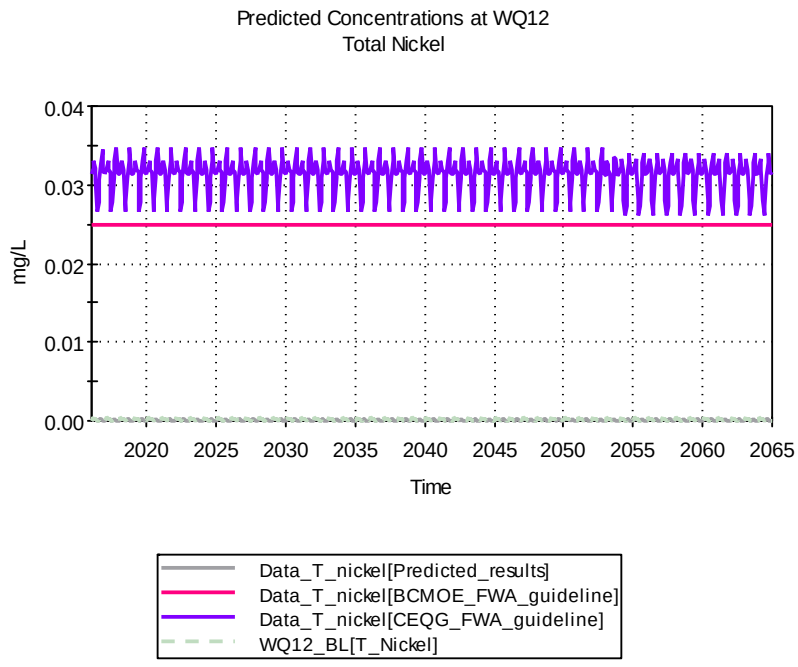
WQ12 – Best Estimate

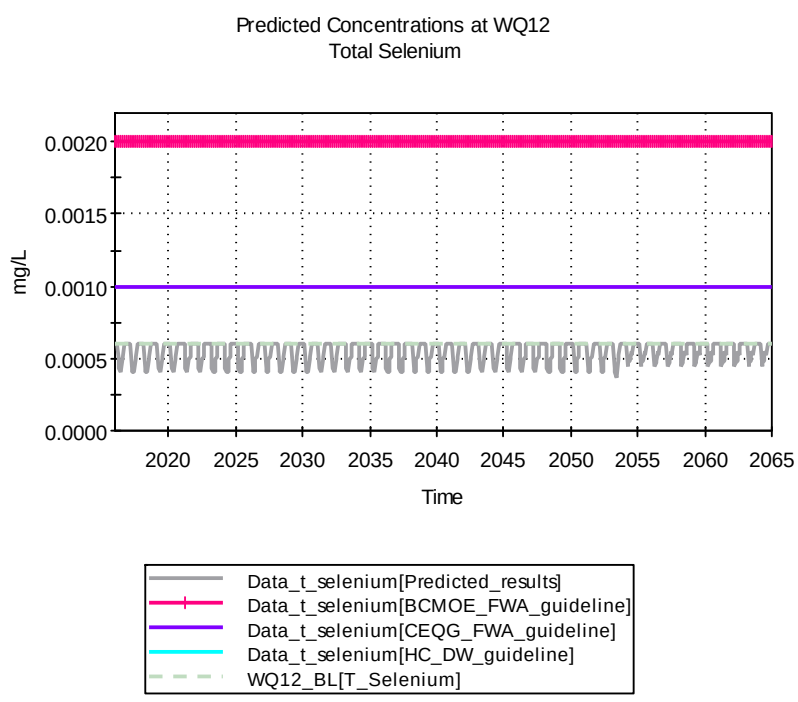


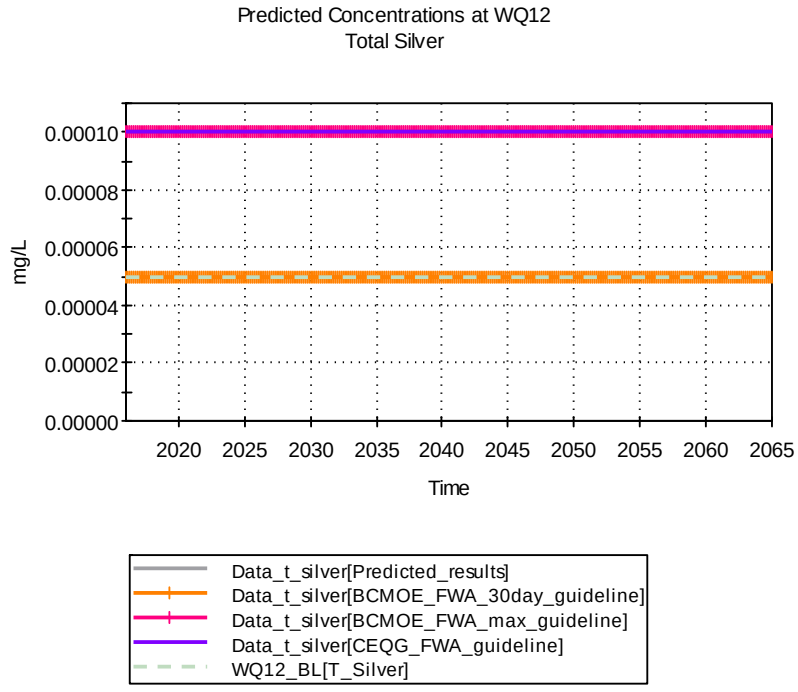




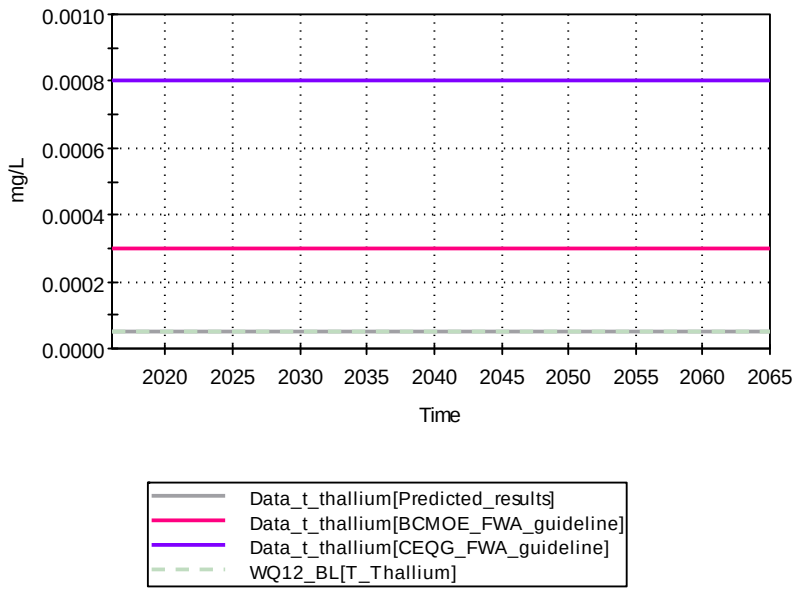
WQ12 –Worst Case

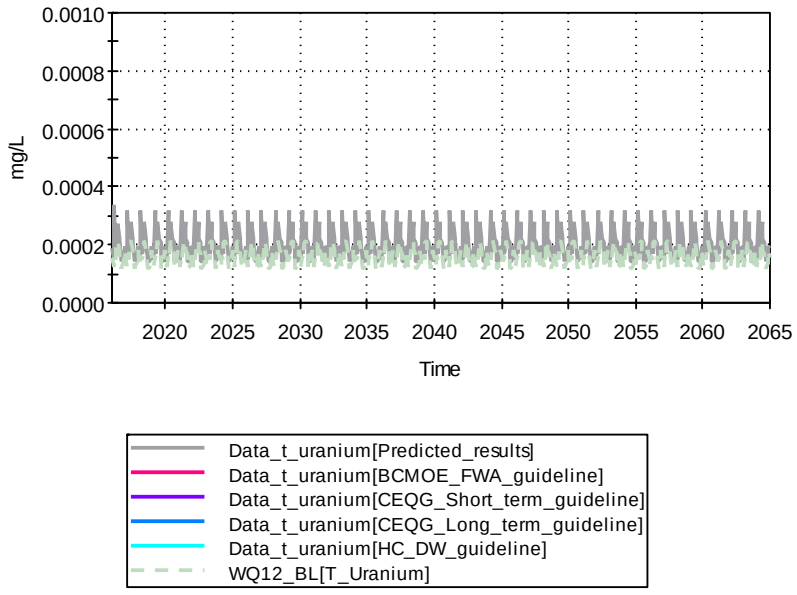


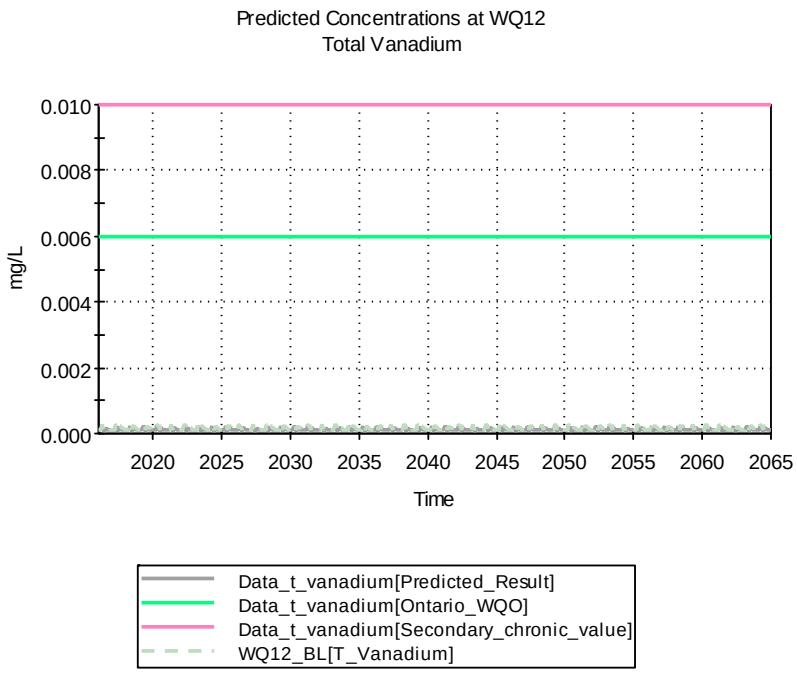




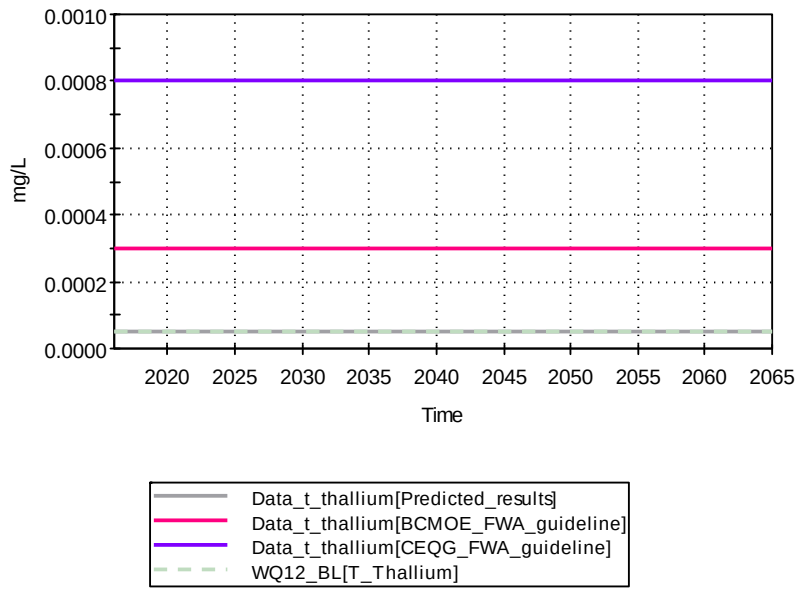
WQ12 – Best Estimate

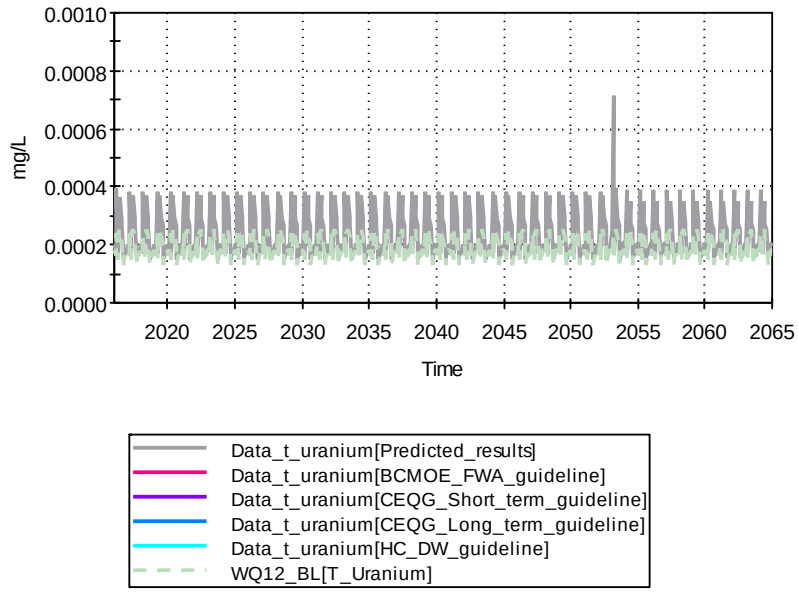


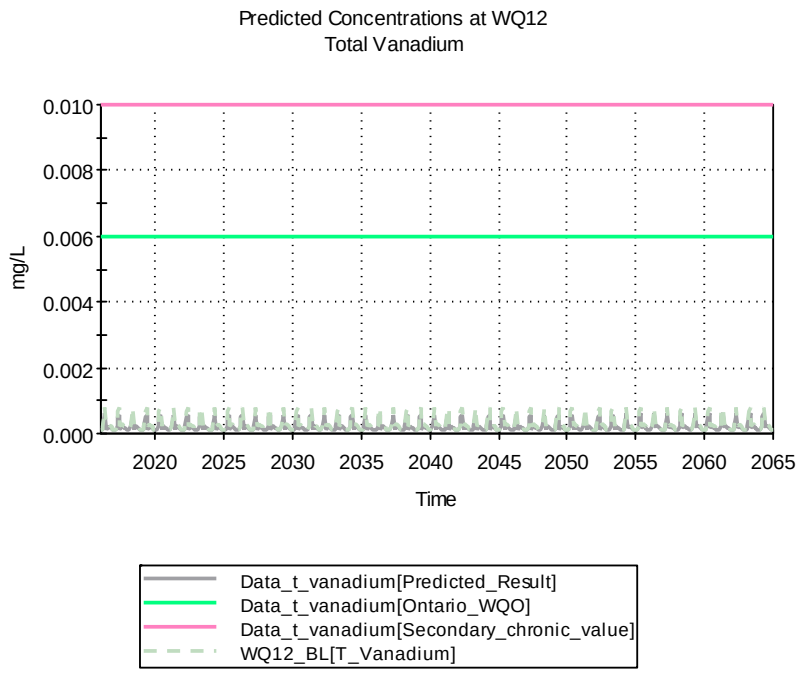




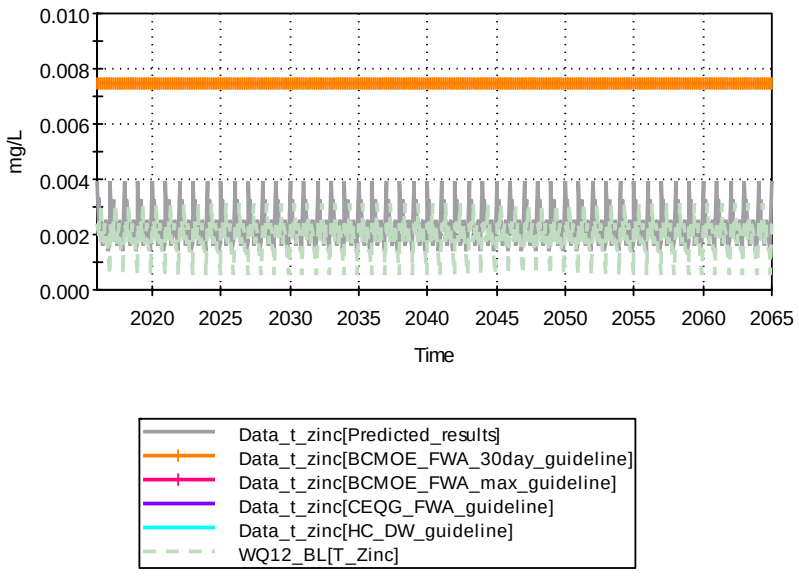
WQ12 –Worst Case

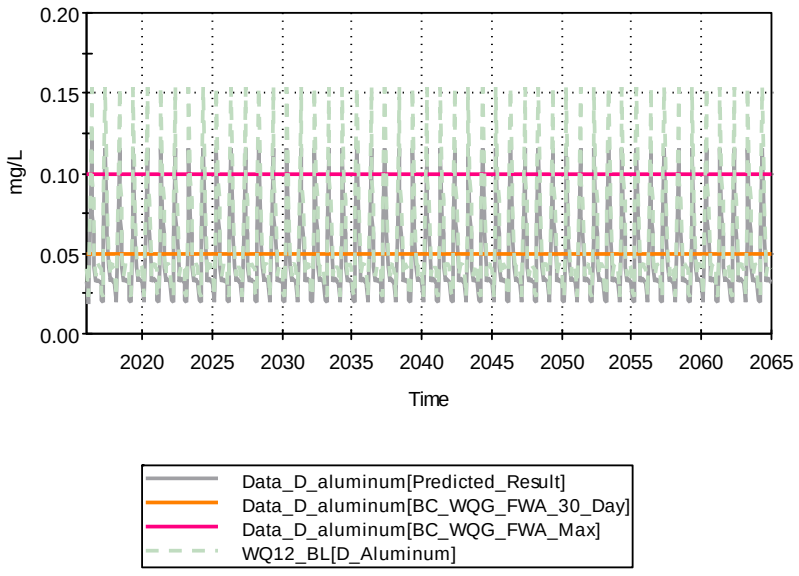


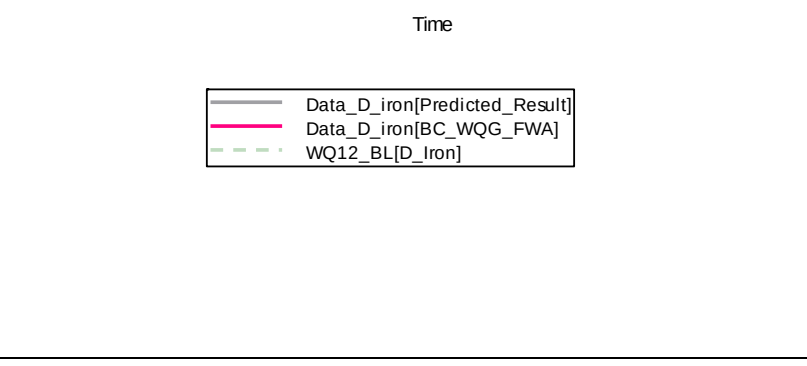




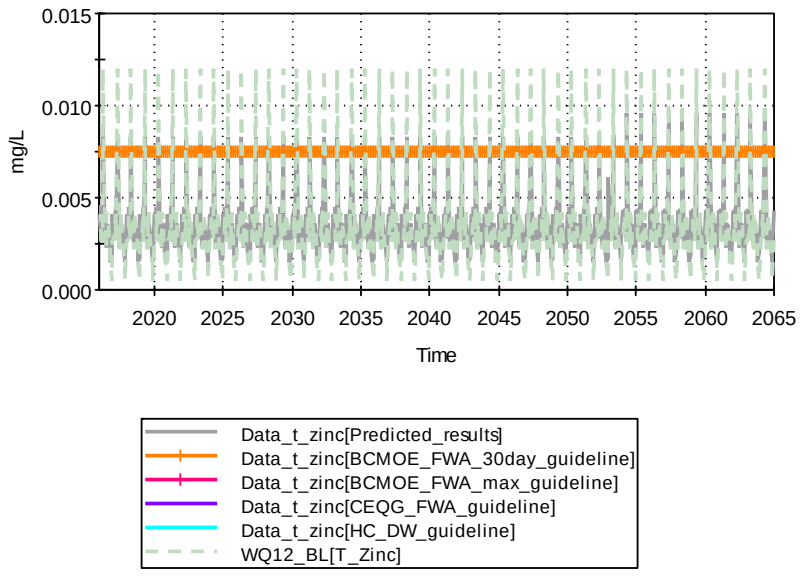
WQ12 – Best Estimate

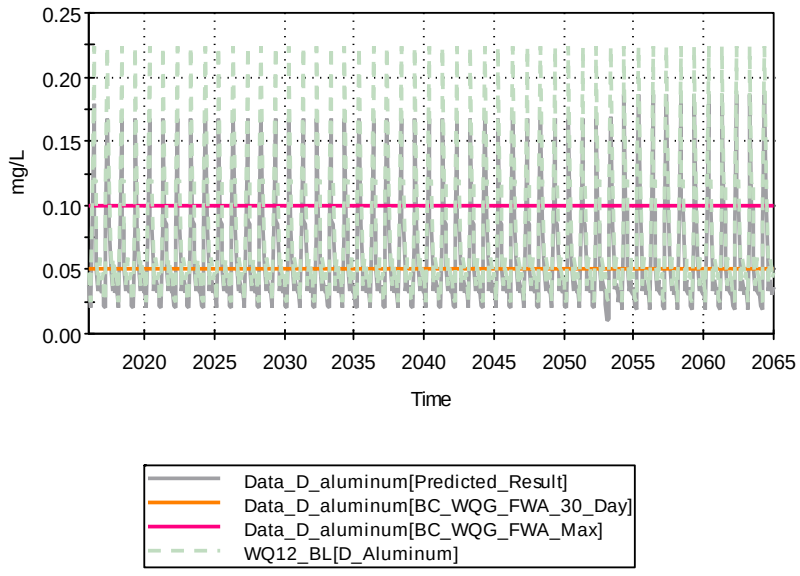


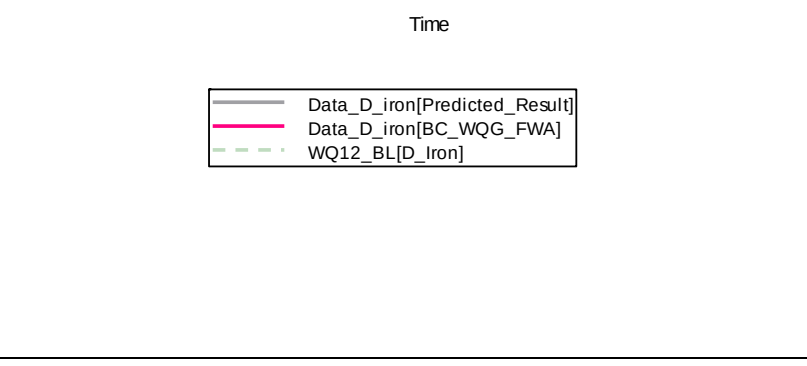




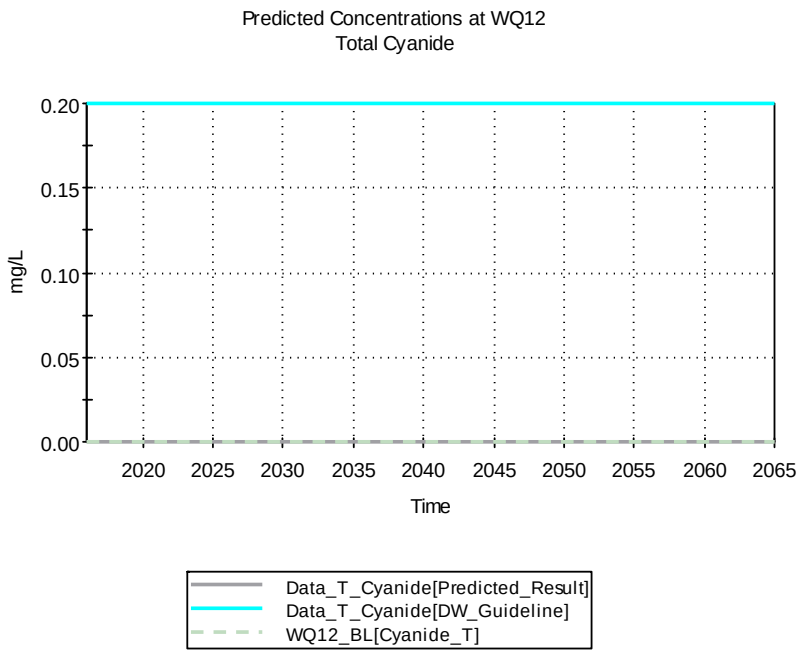
WQ12 –Worst Case

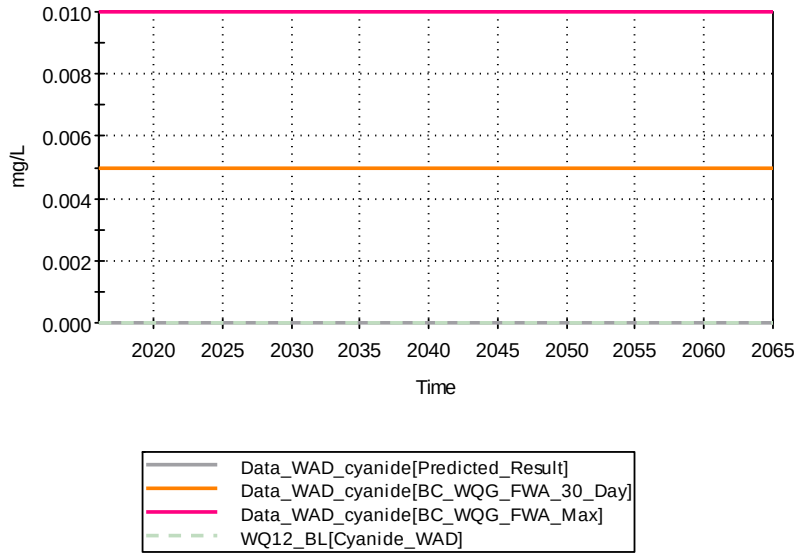




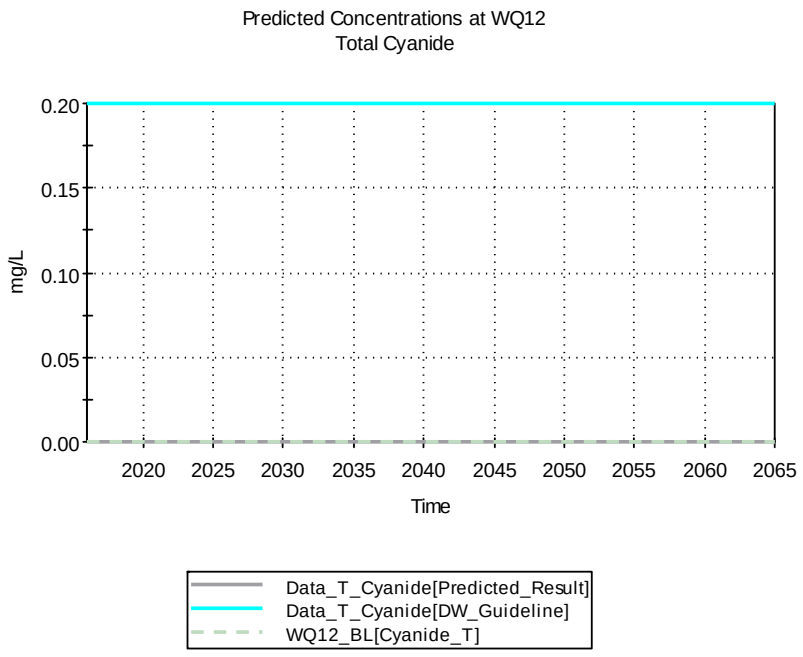


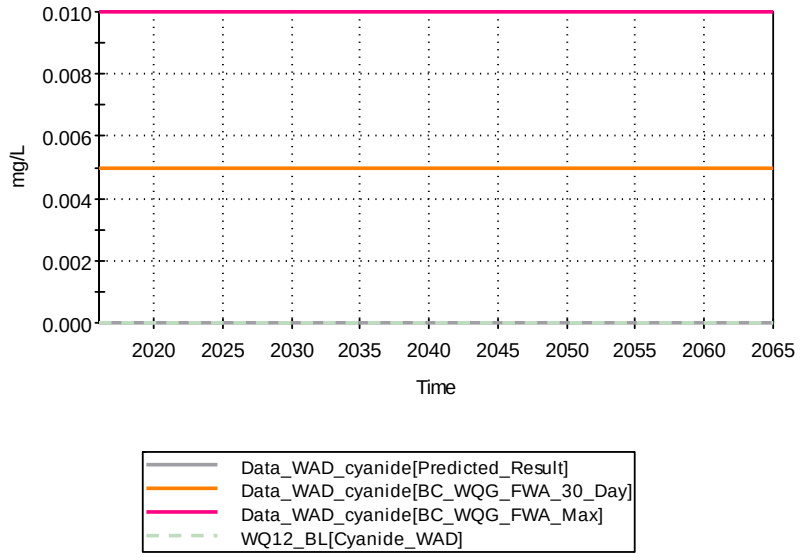
WQ12 – Best Estimate





WQ12 –Worst Case

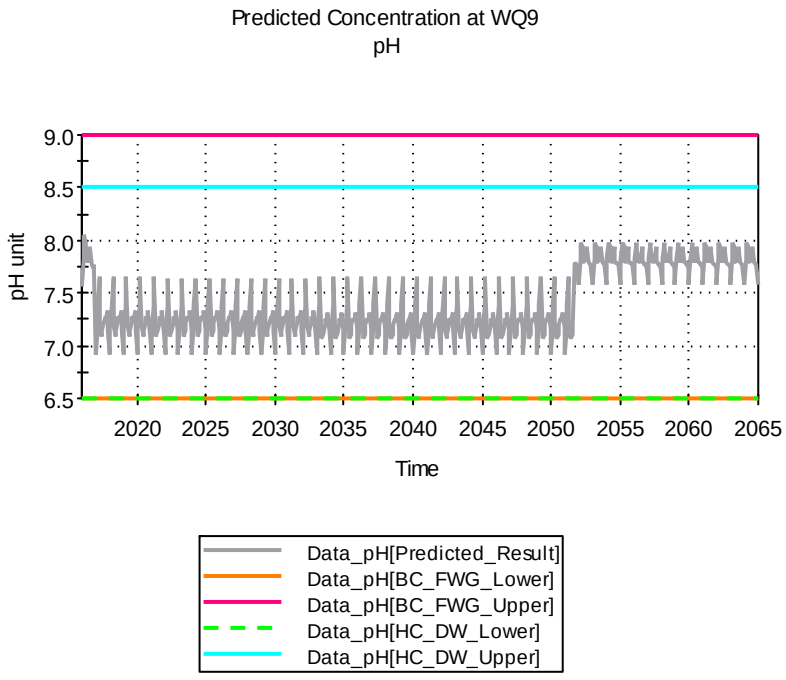


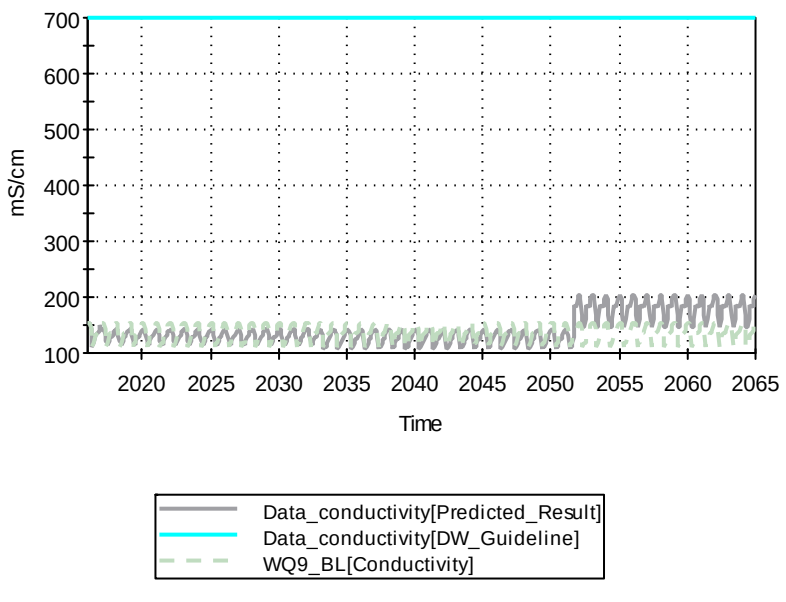


Annex A-6

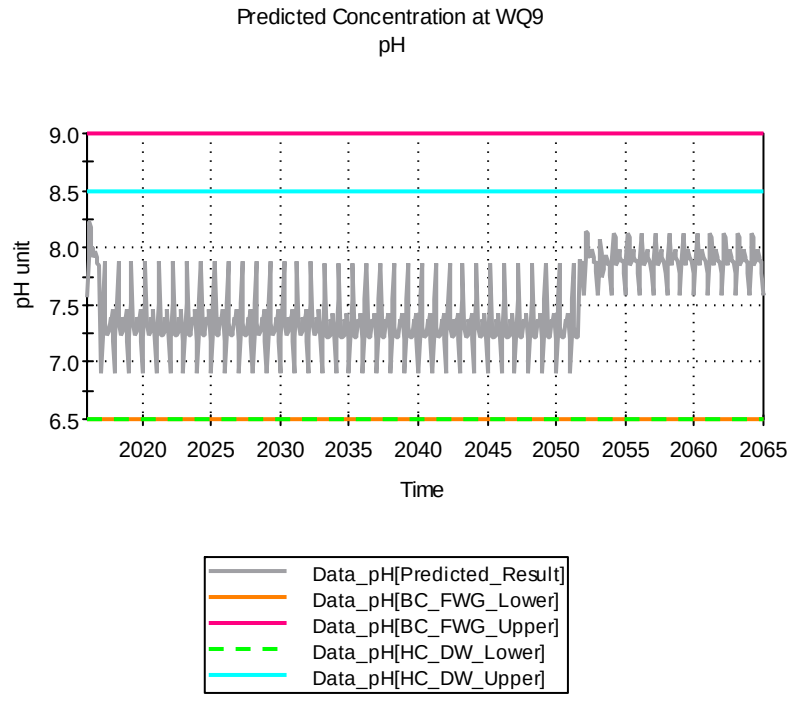
Graphical Outputs of the Predicted Water Quality at WQ9 – Best Estimate and Worst Case

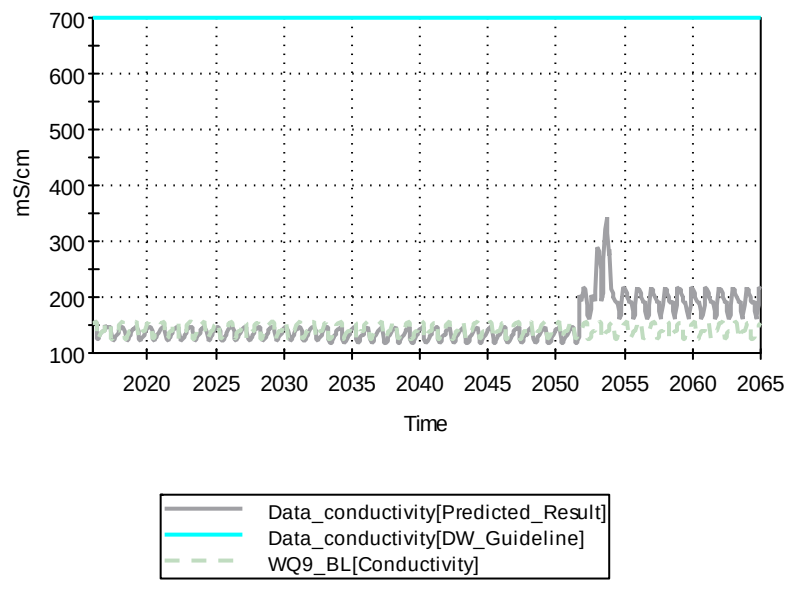
WQ9 – Best estimate



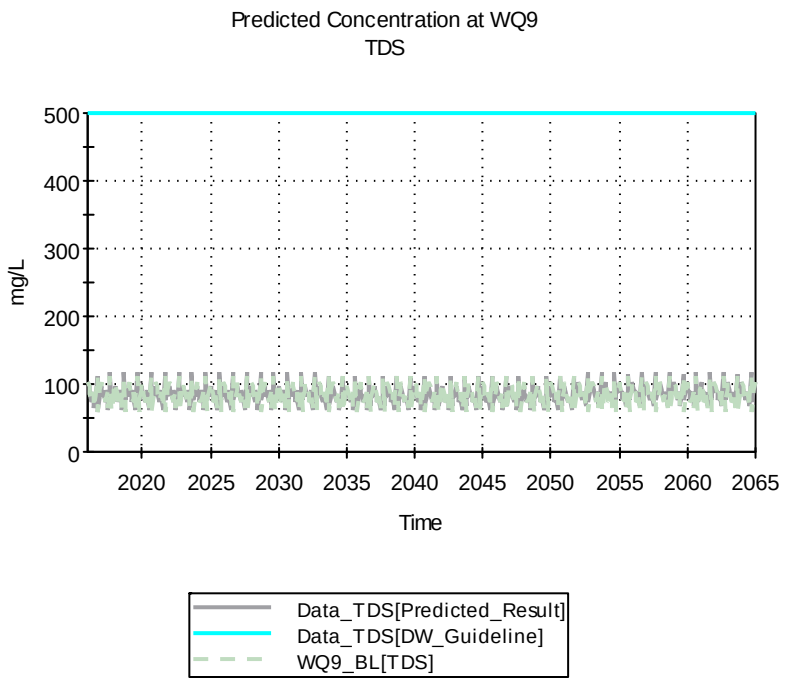


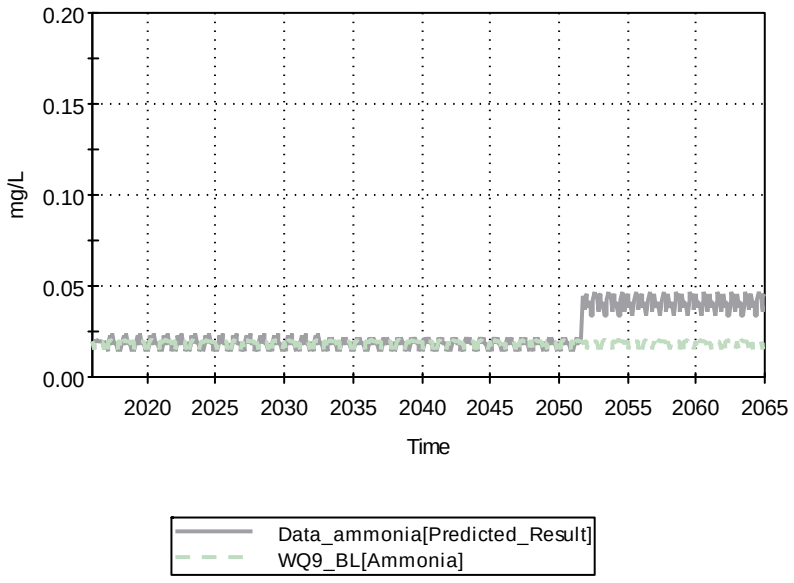
WQ9 – Worst Case

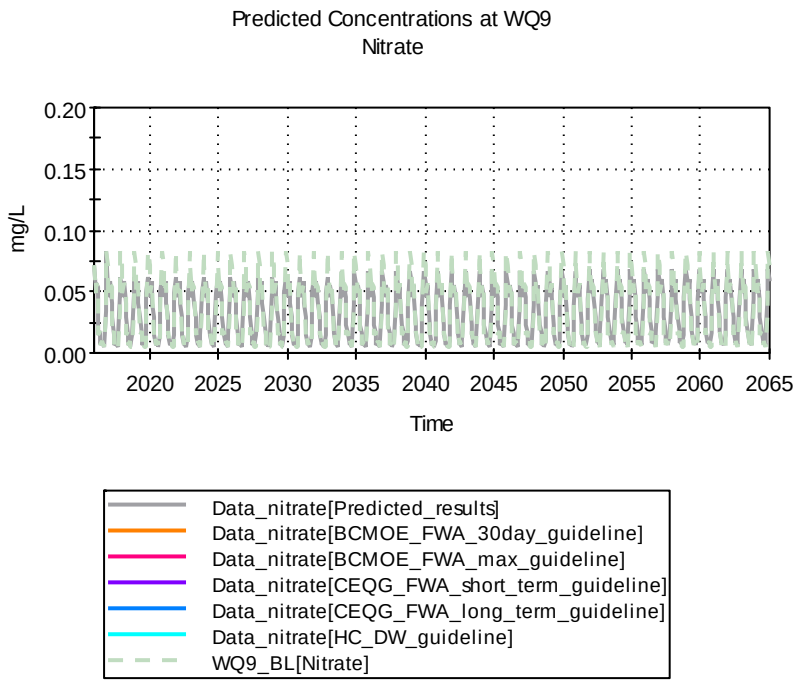




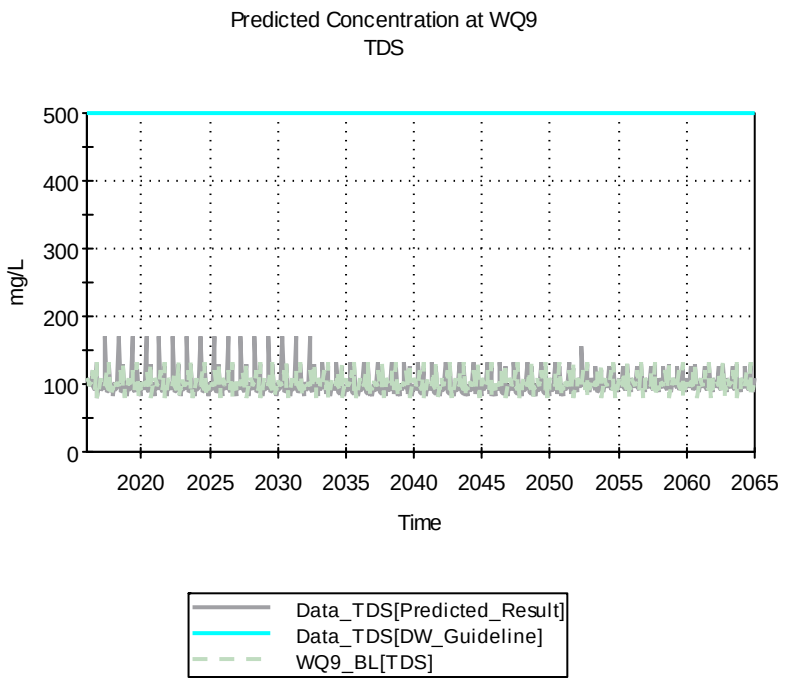
WQ9 – Best estimate

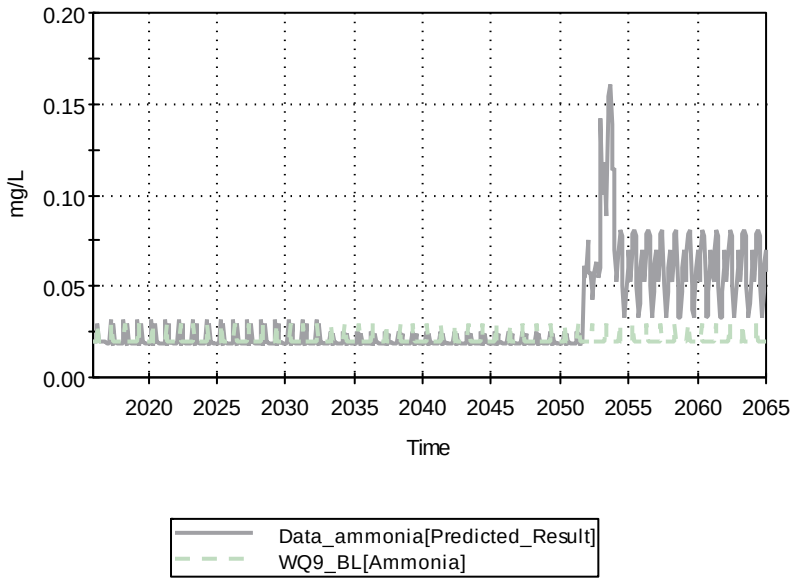


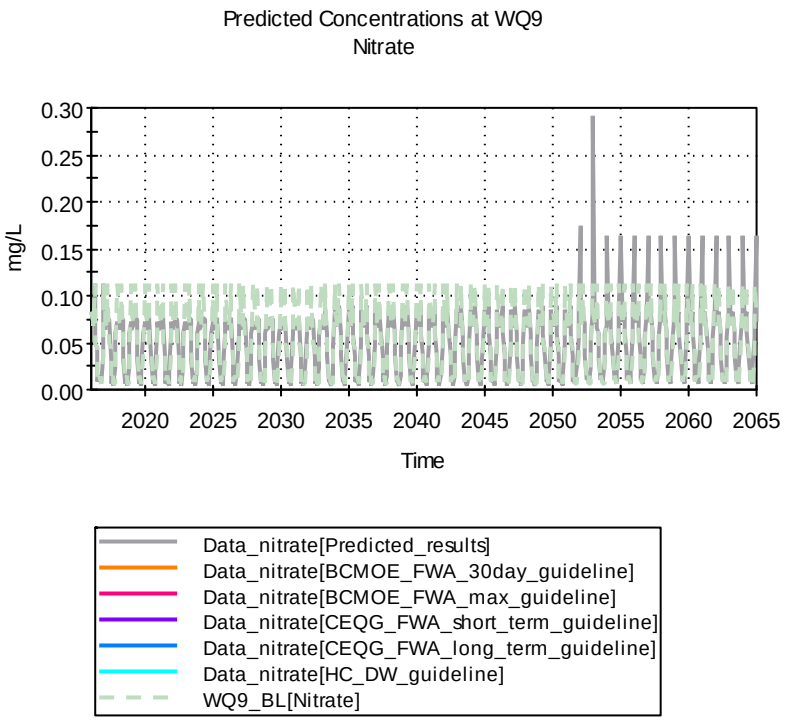




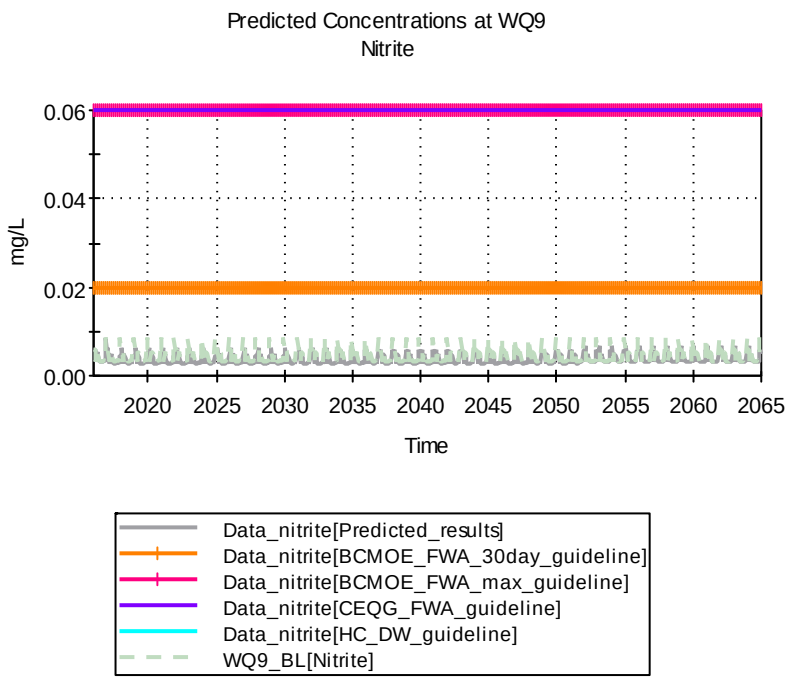
WQ9 – Worst Case

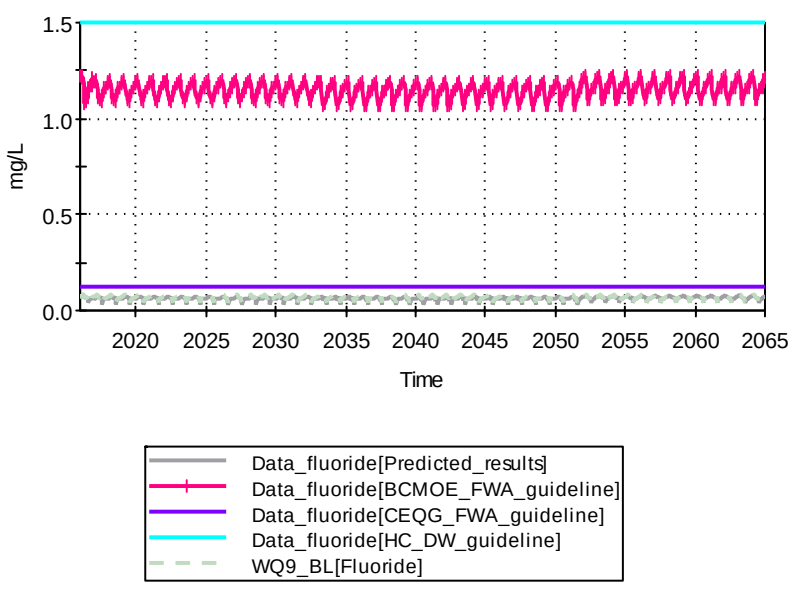


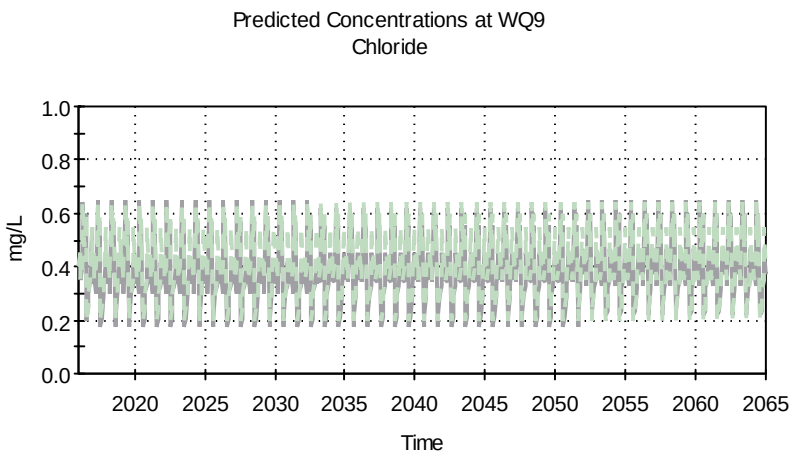




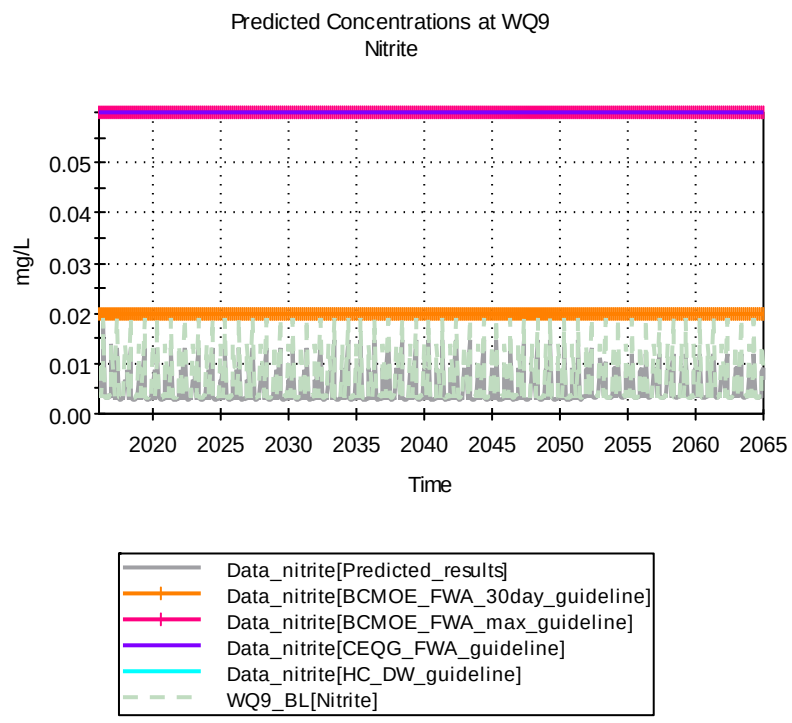
WQ9 – Best estimate

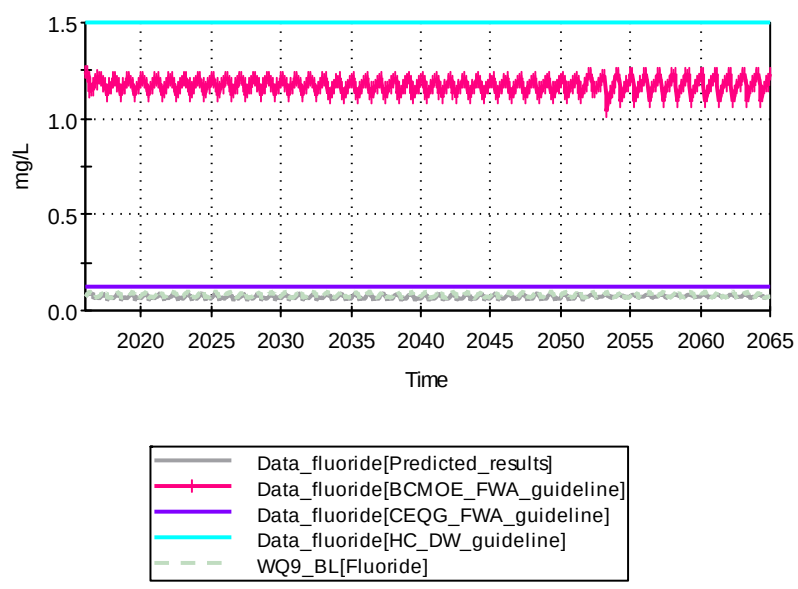


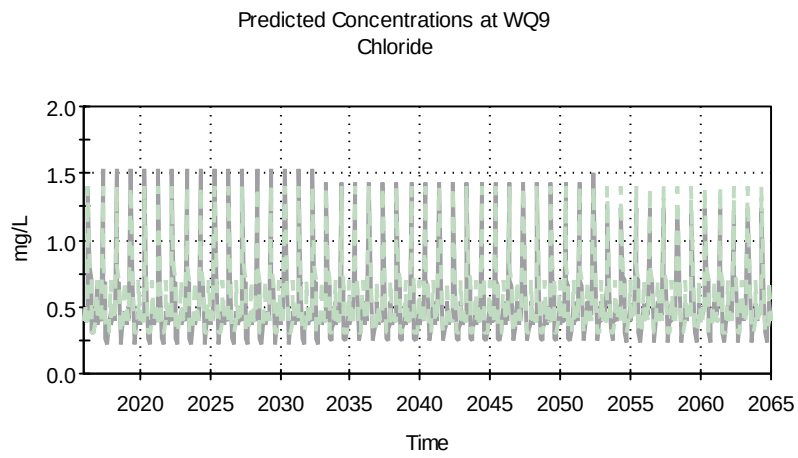




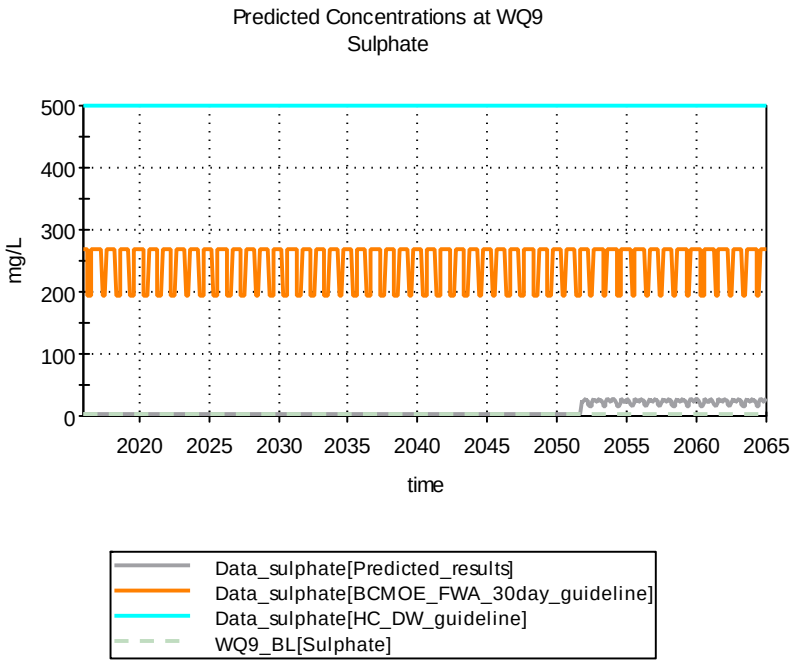
WQ9 – Worst Case

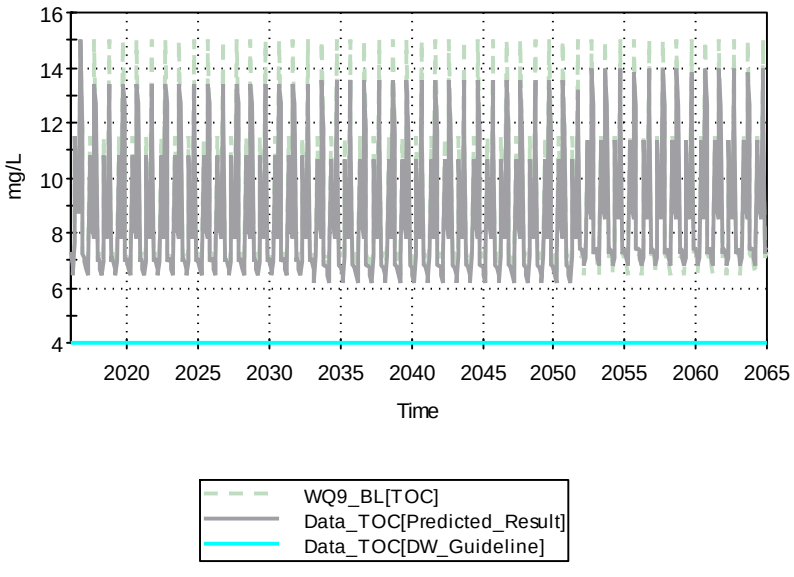


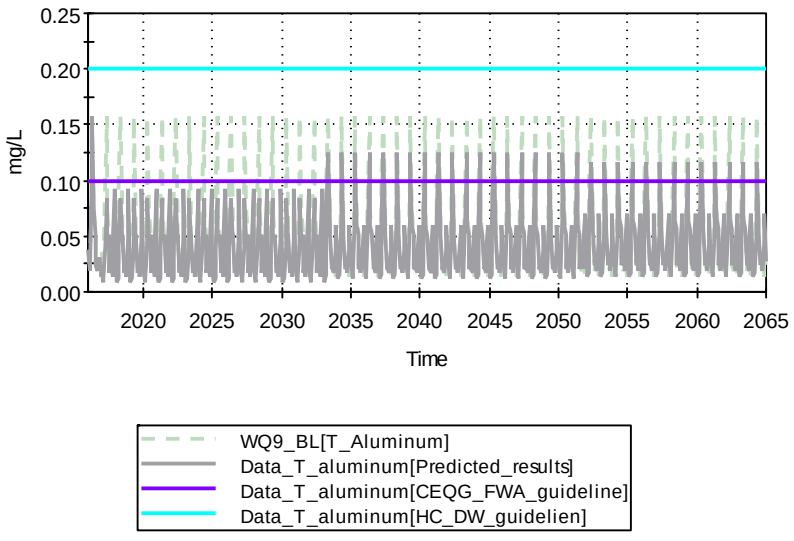


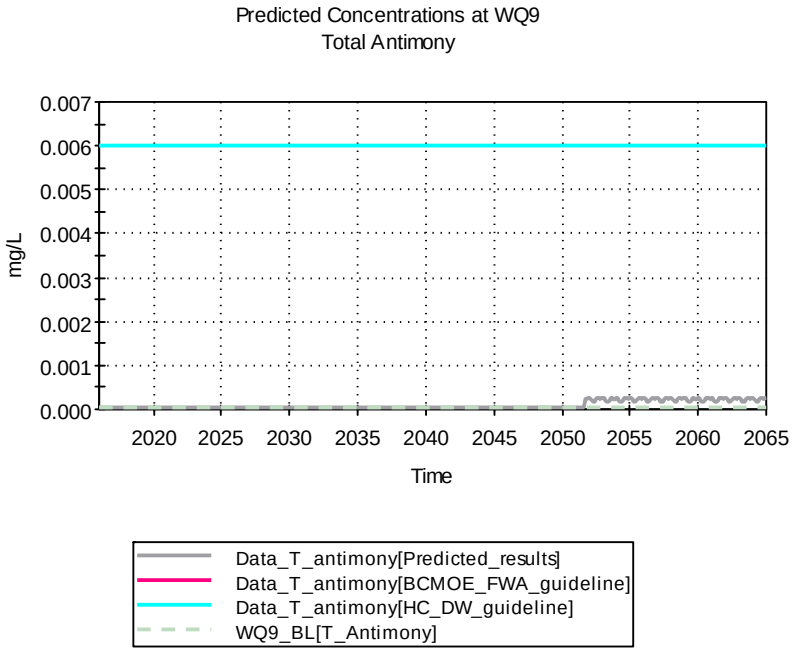


WQ9 – Best estimate

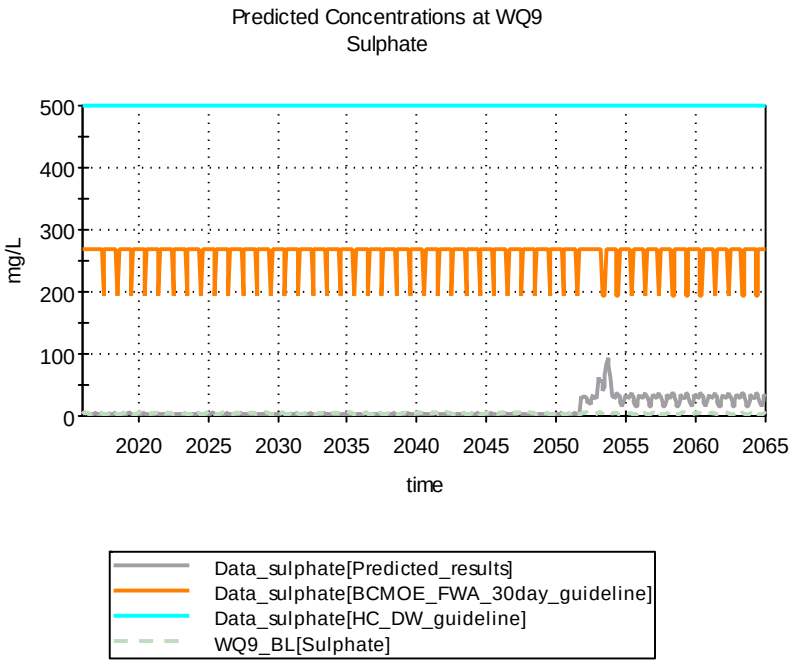


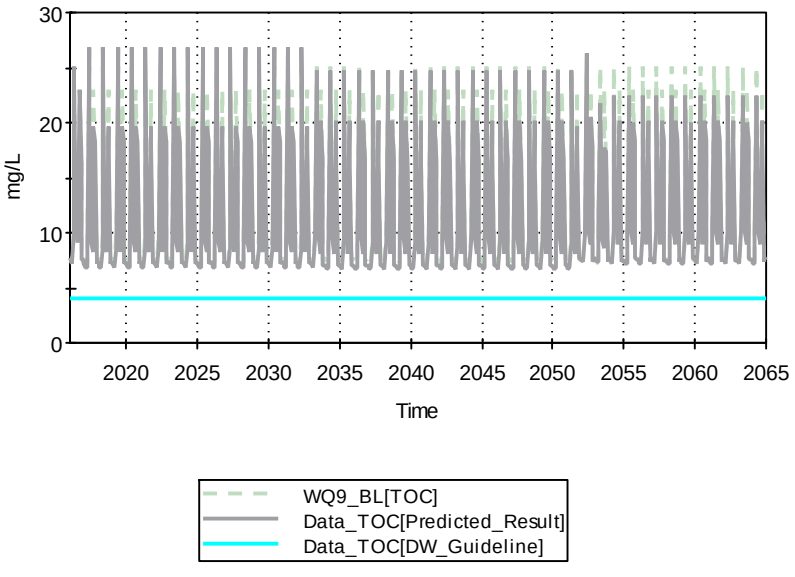


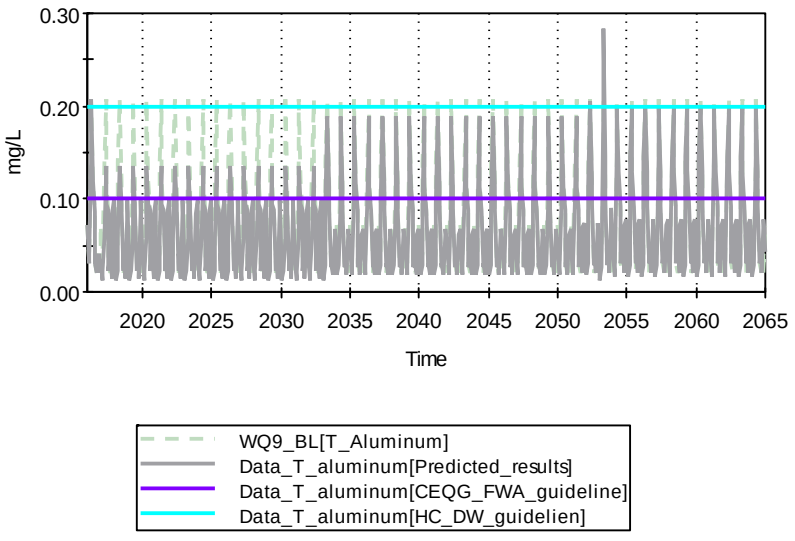


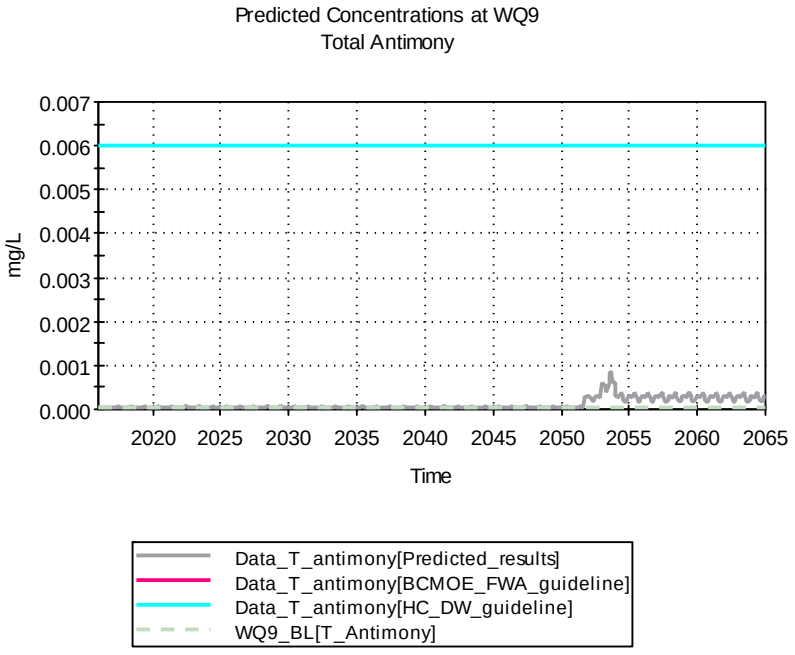


WQ9 – Worst Case

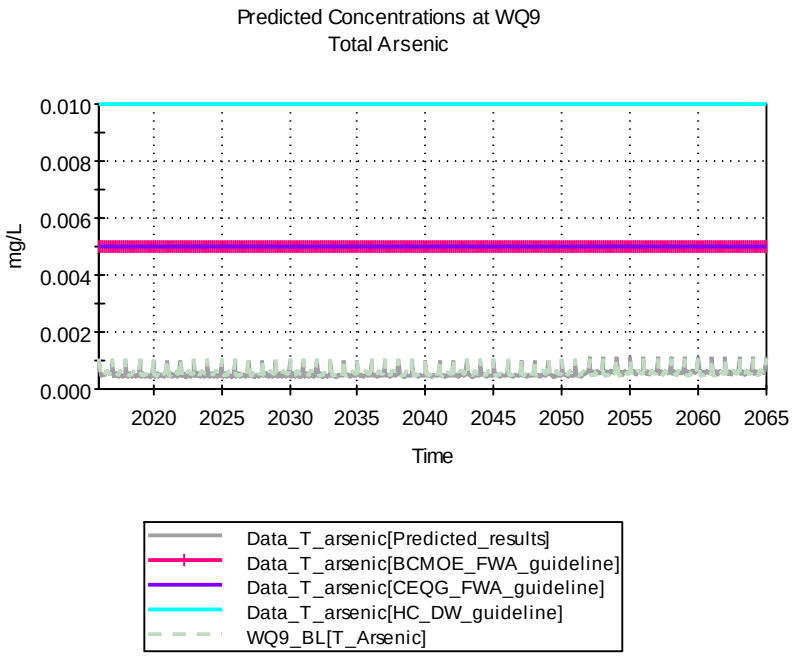




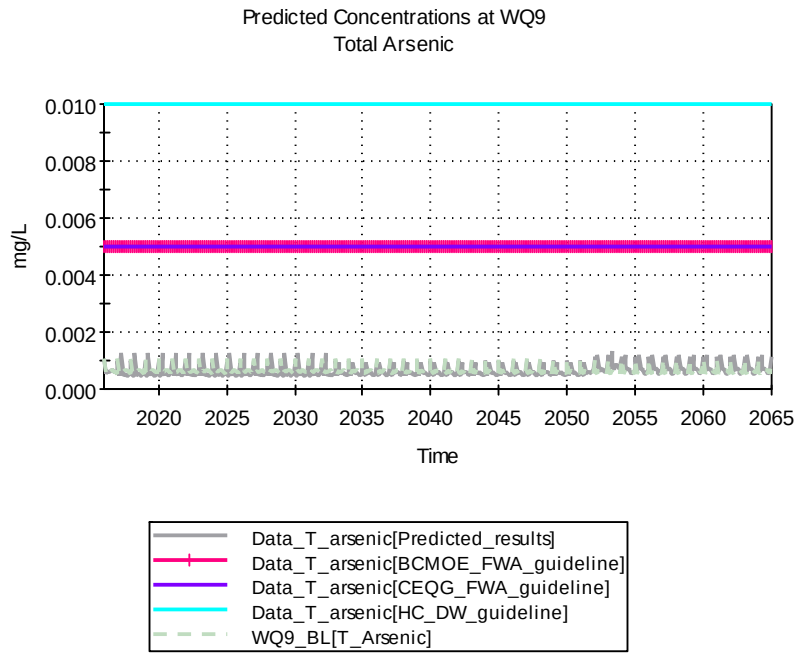


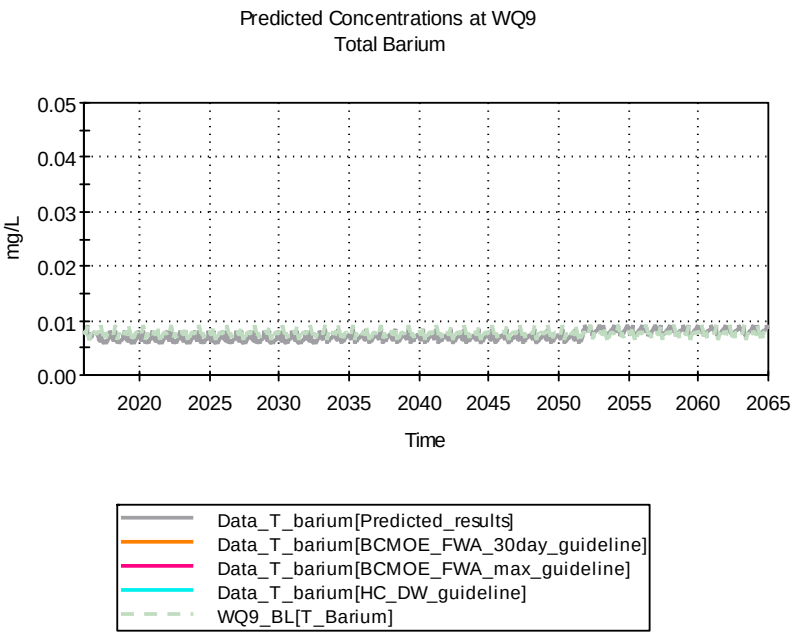


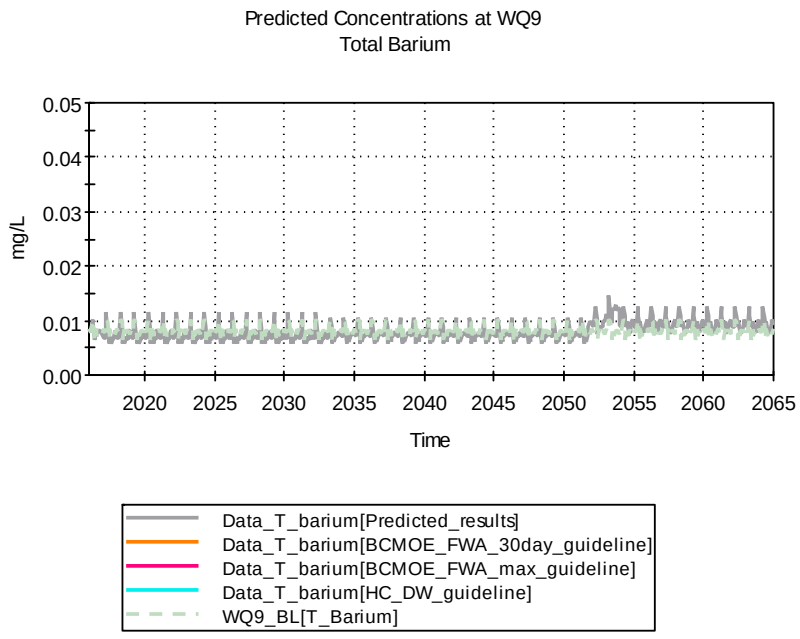
WQ9 – Best estimate

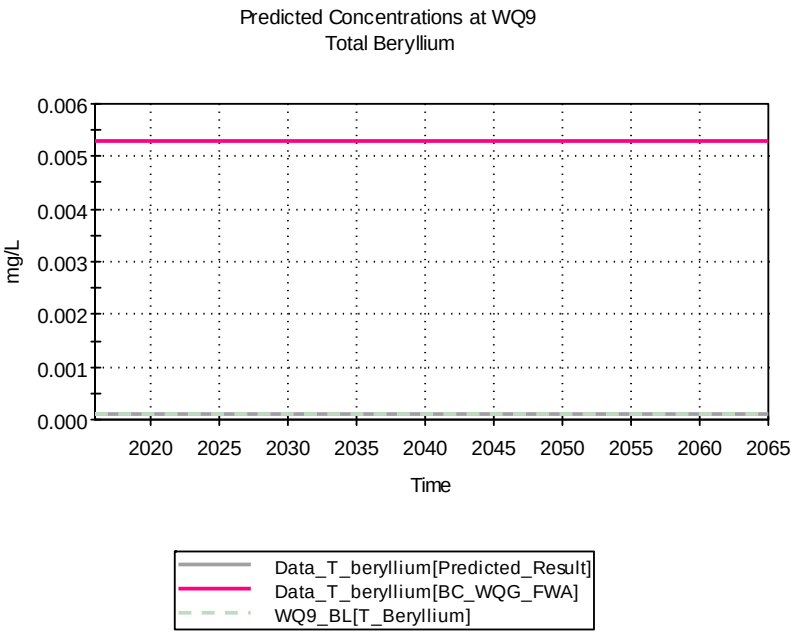


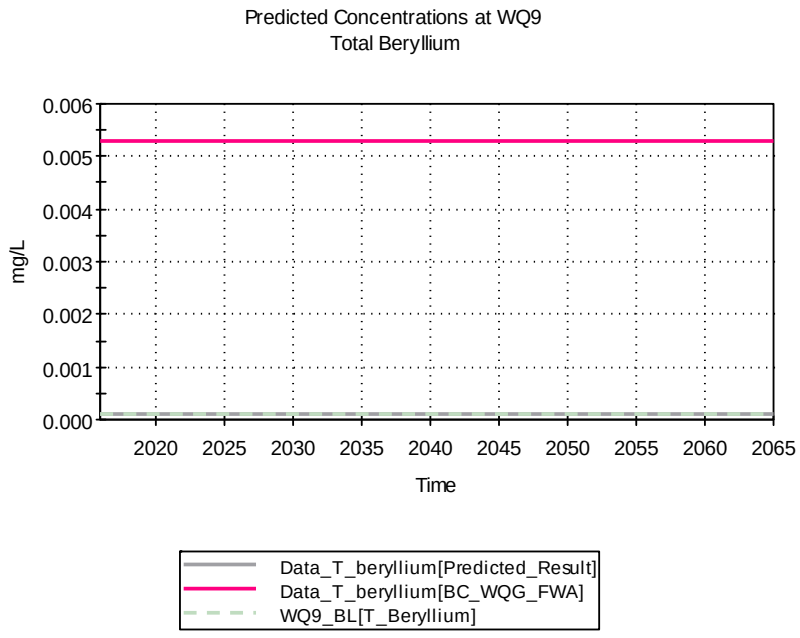
WQ9 – Worst Case

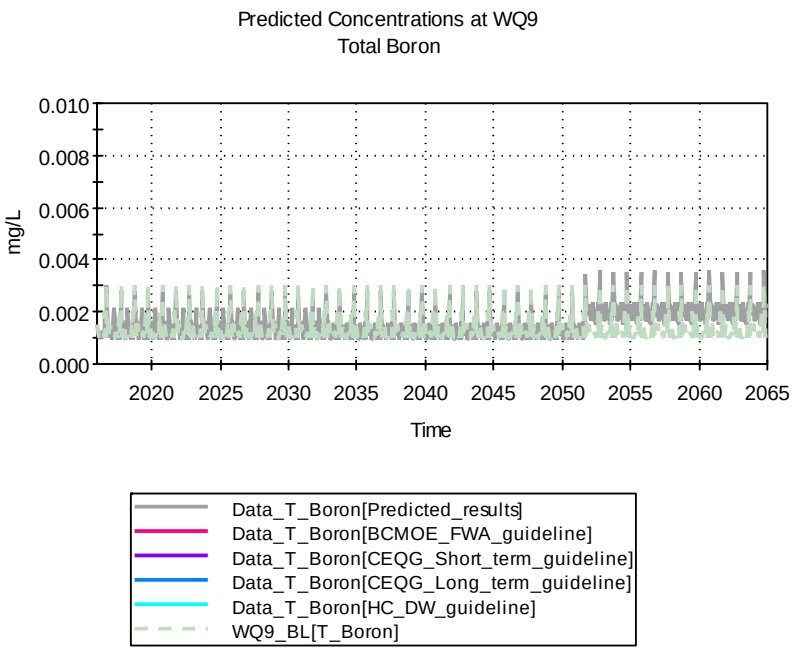


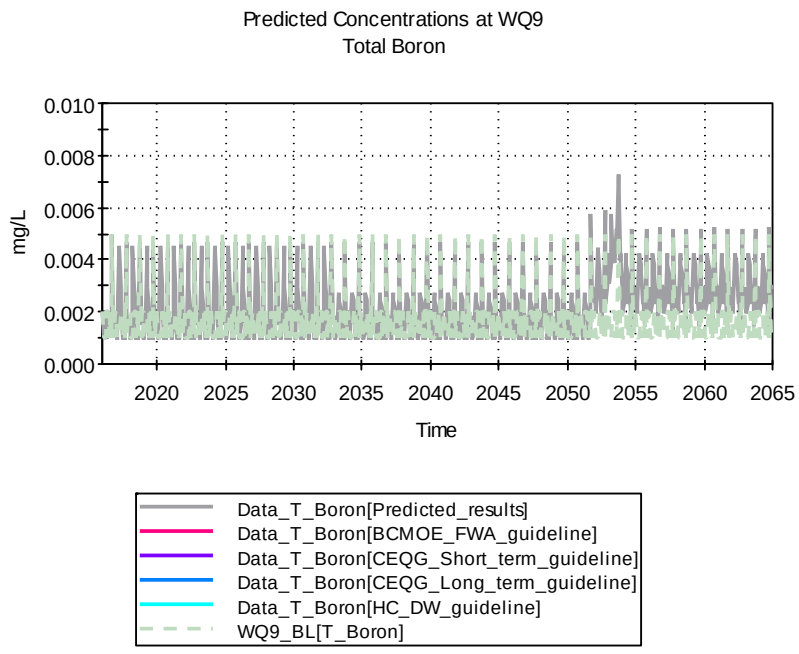




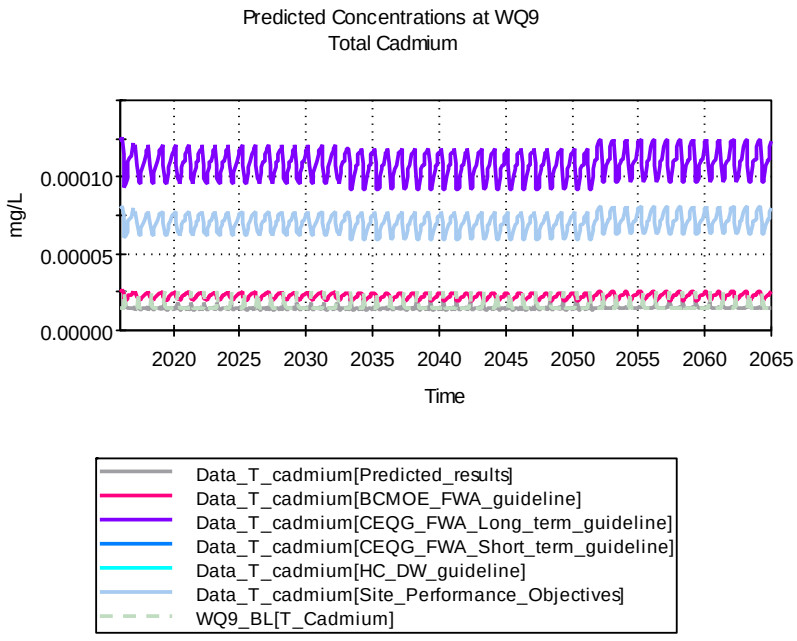




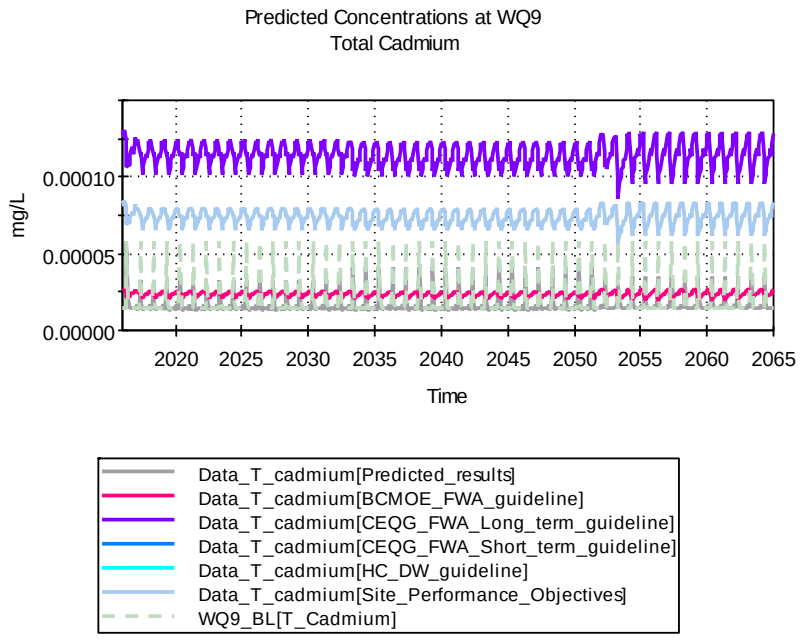


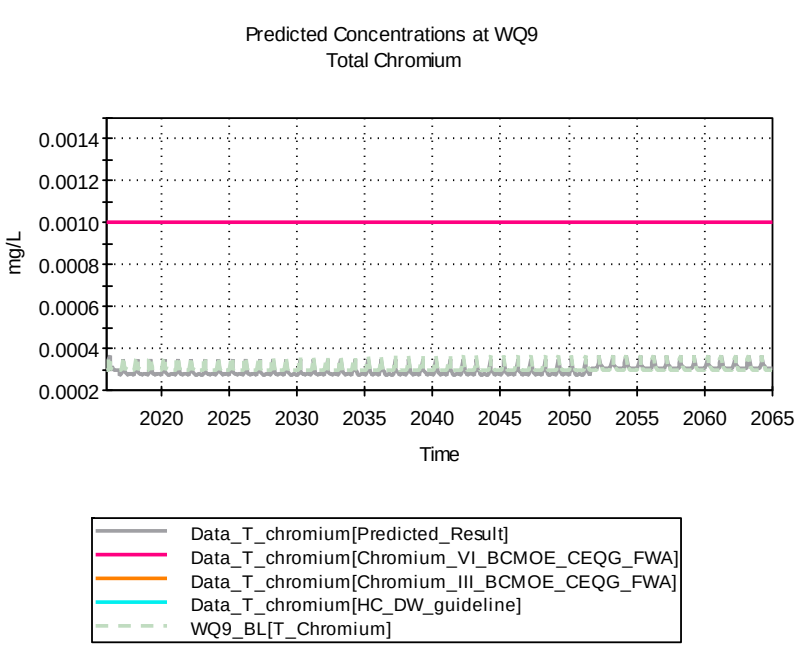


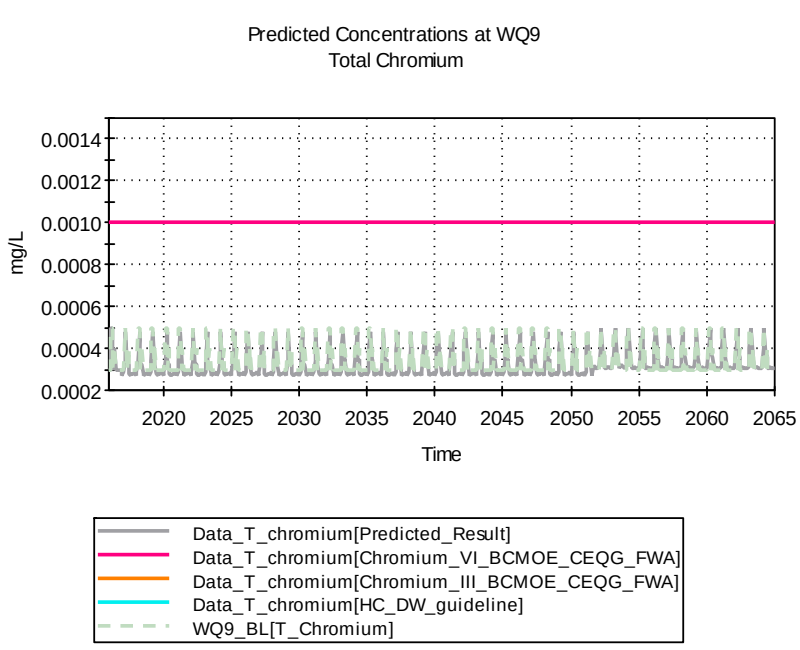
WQ9 – Best estimate

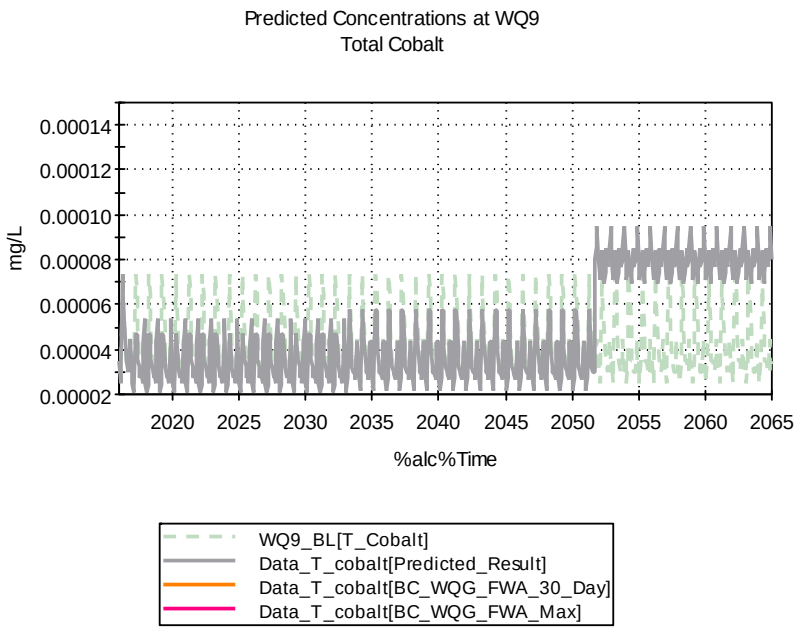


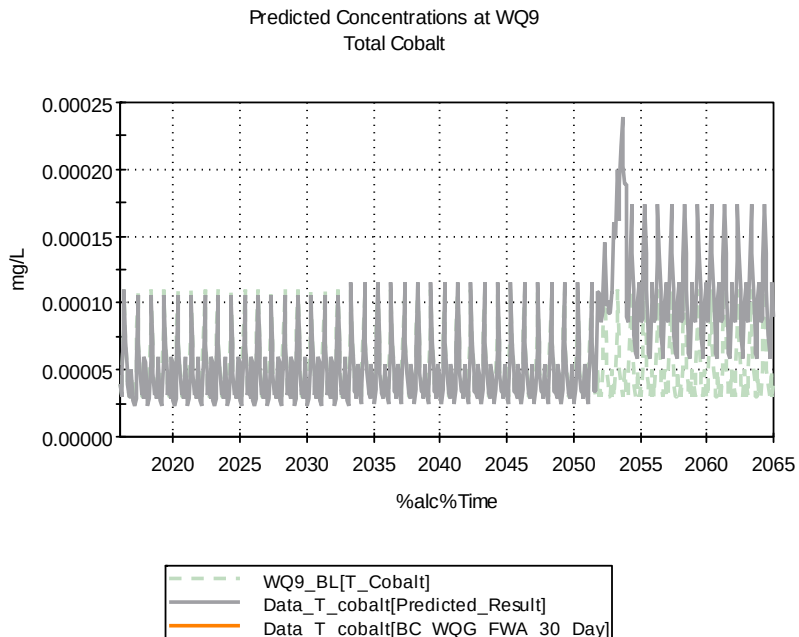
WQ9 – Worst Case

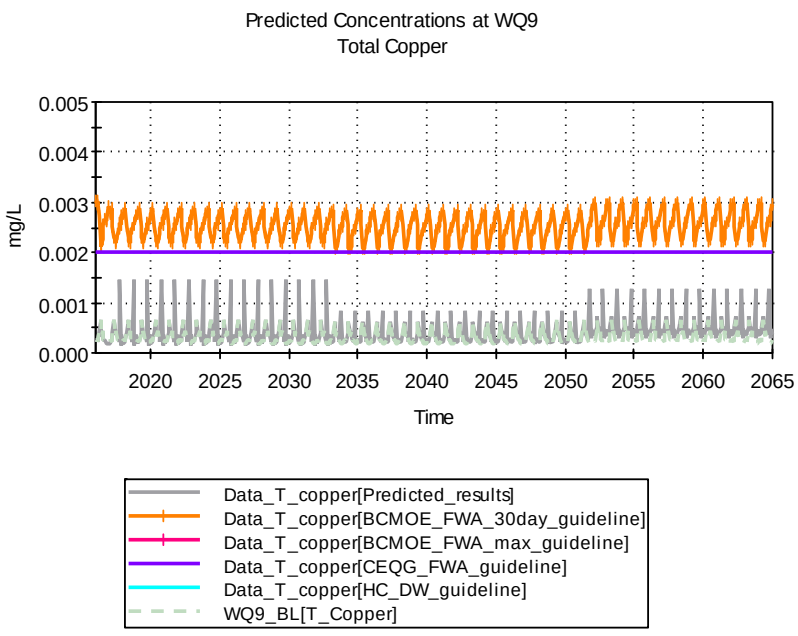


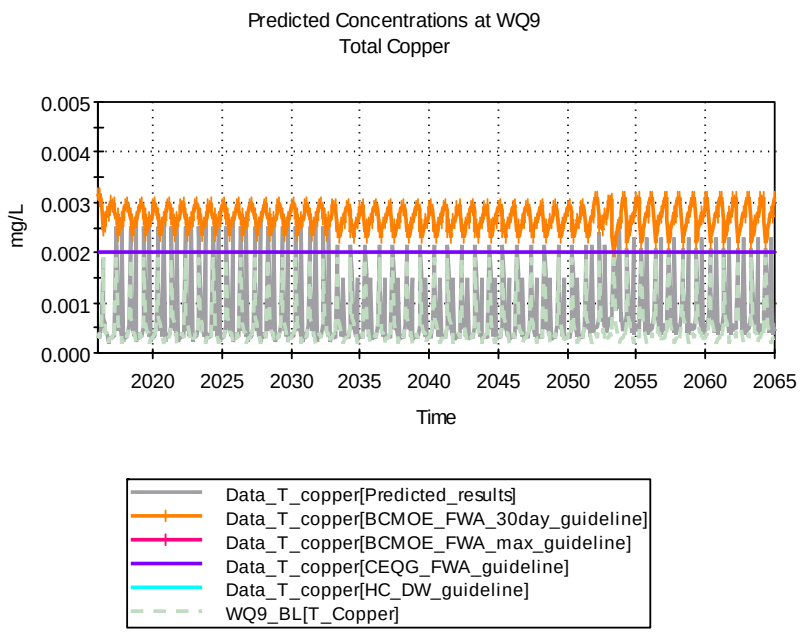




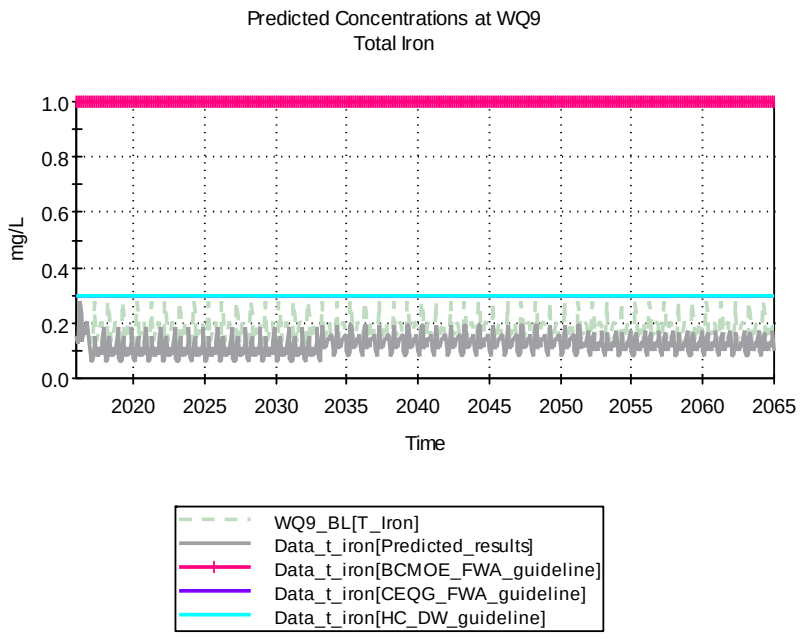


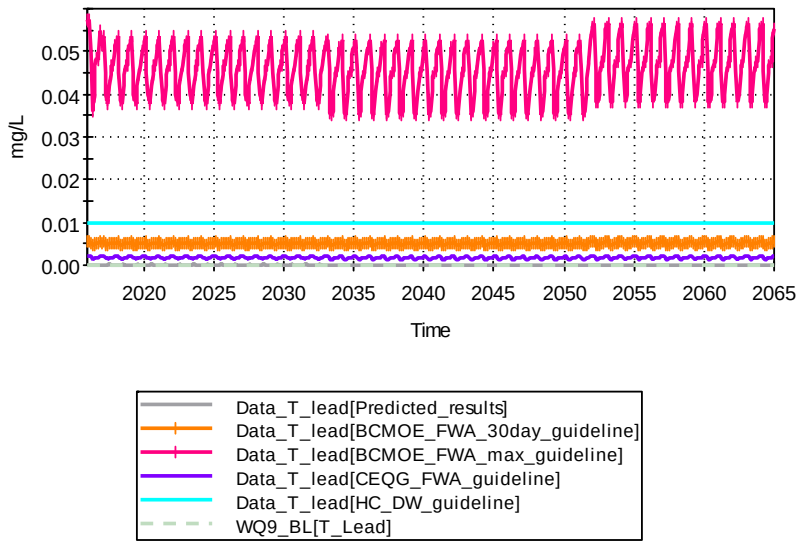


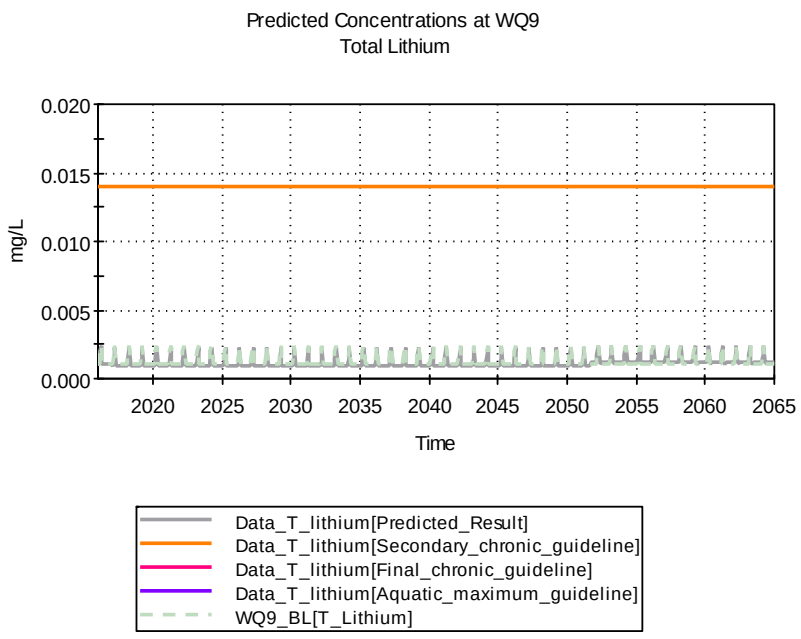


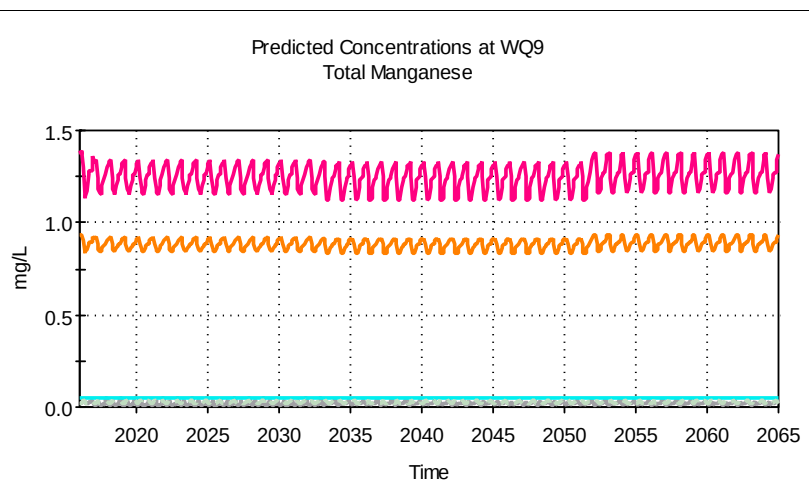


WQ9 – Best estimate

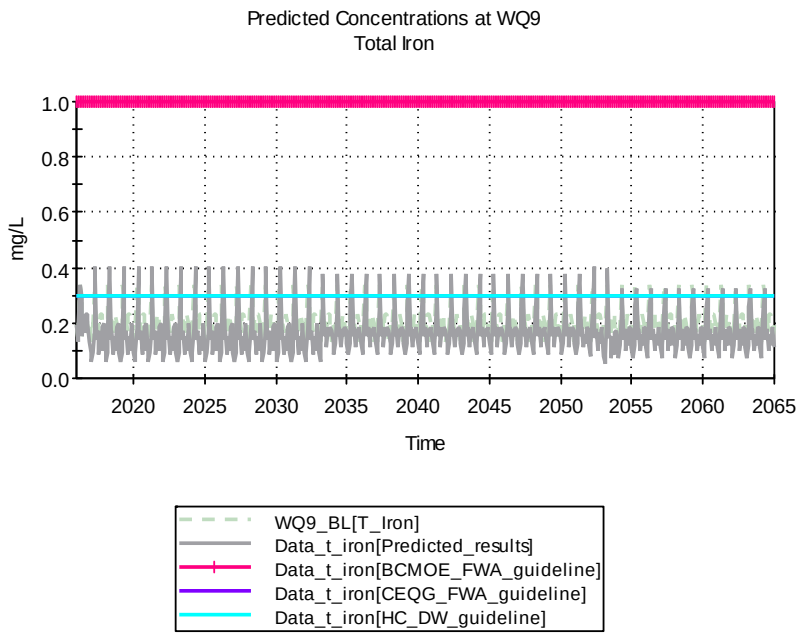


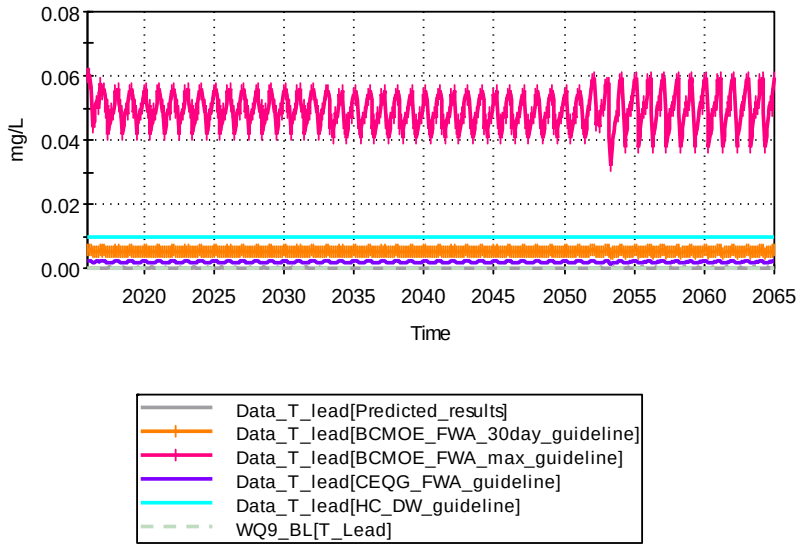


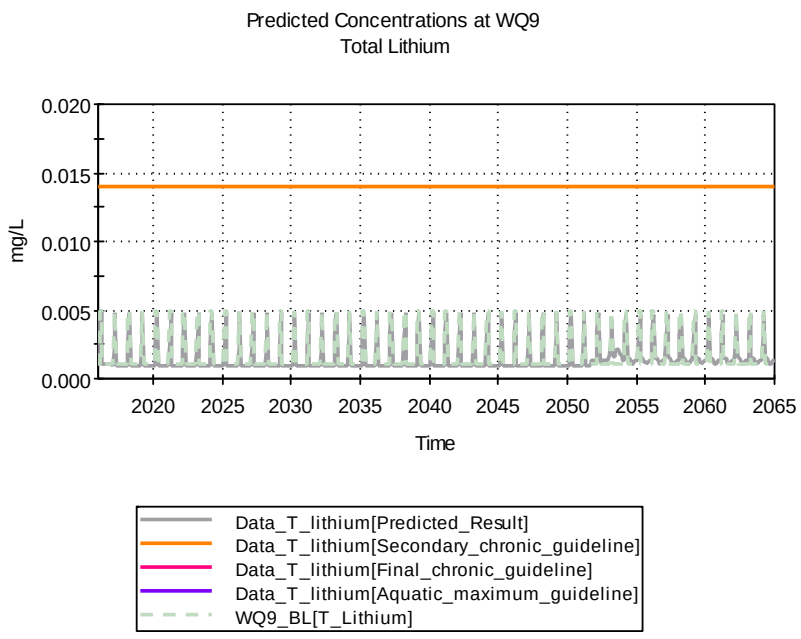


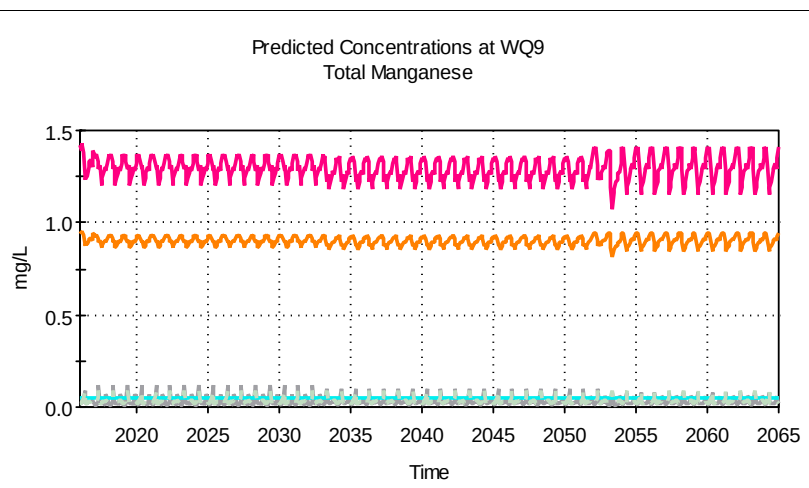


WQ9 – Worst Case

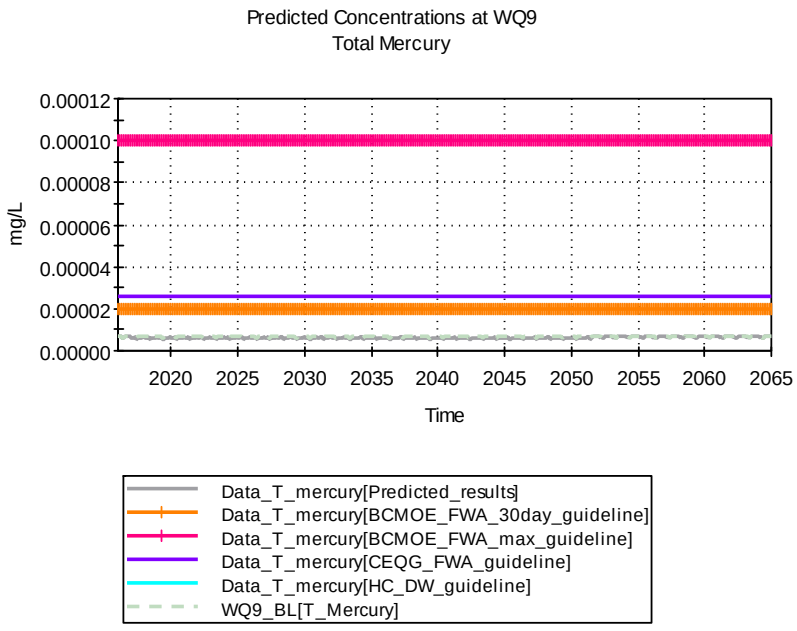




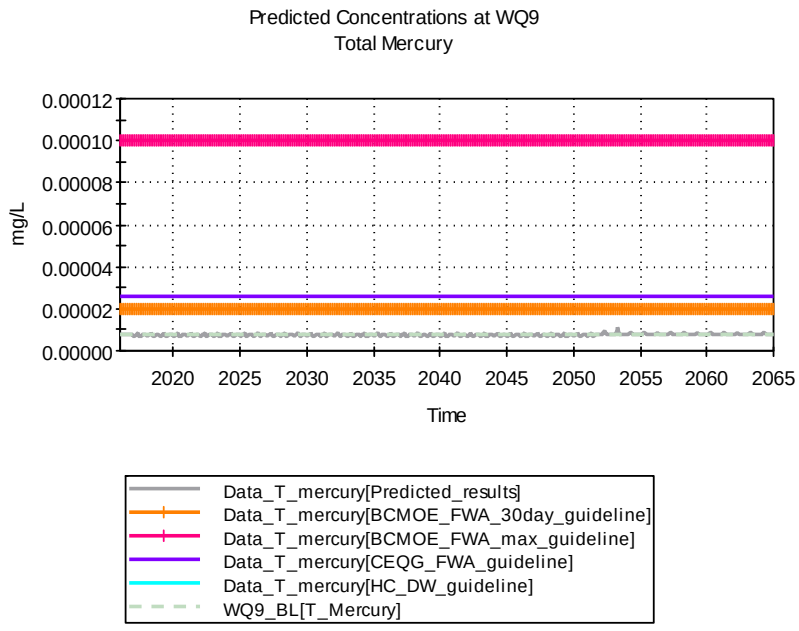


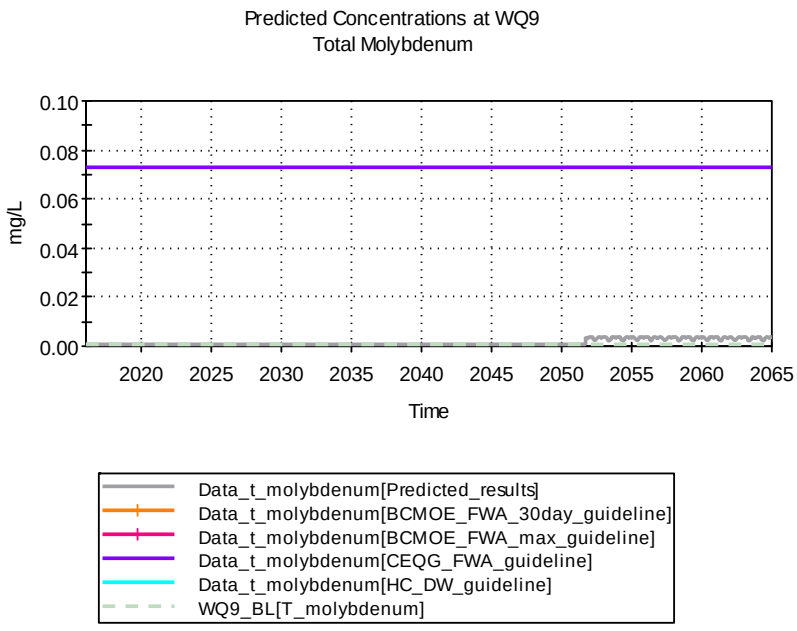


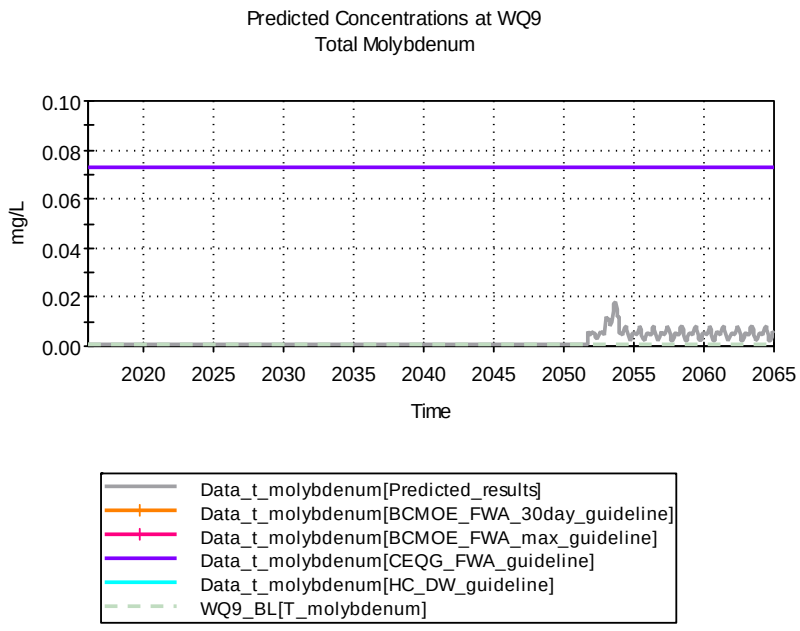
WQ9 – Best estimate

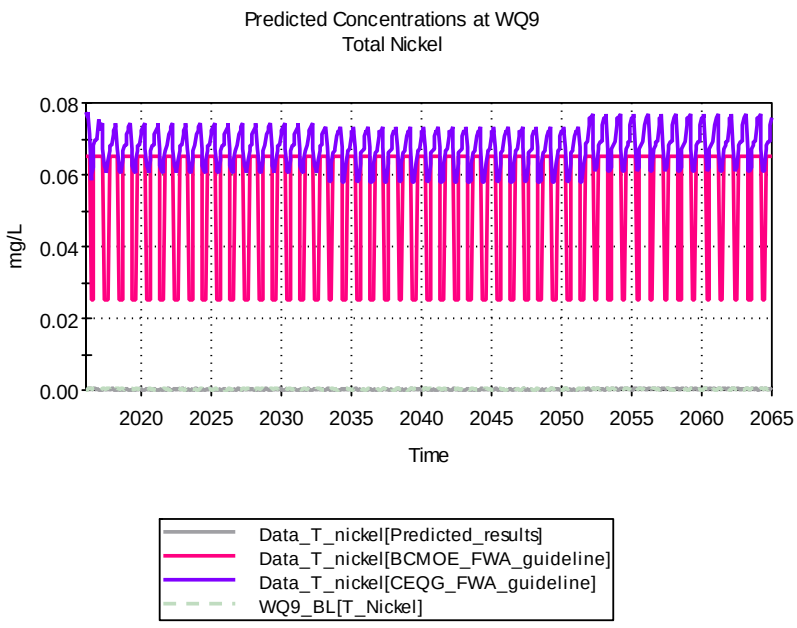


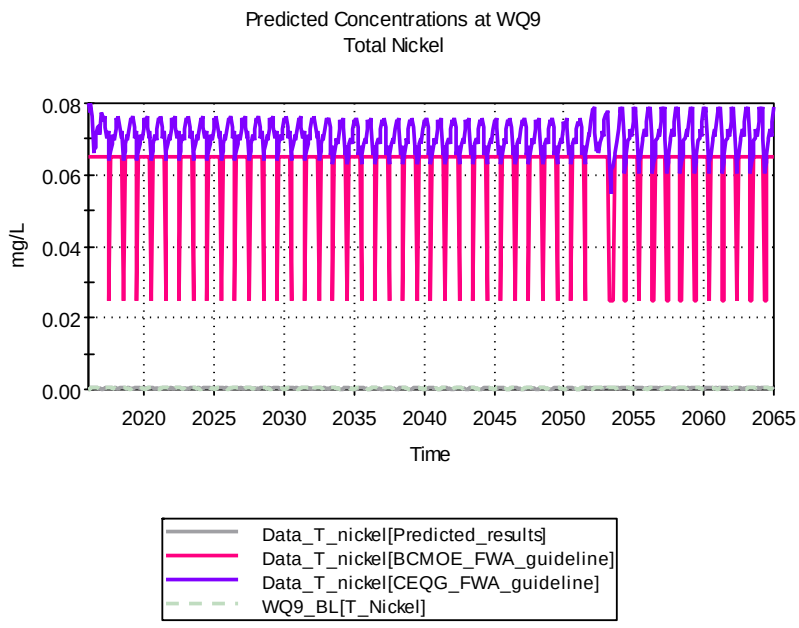
WQ9 – Worst Case

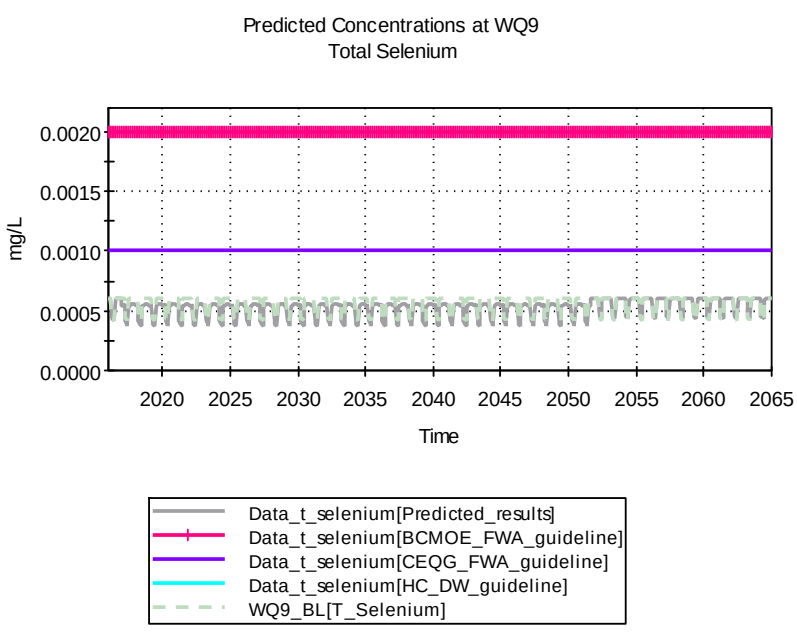


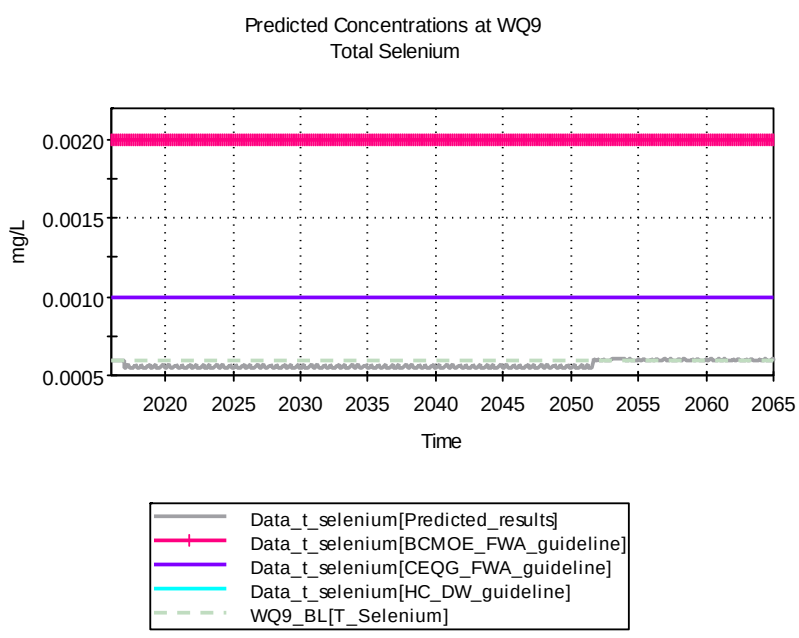




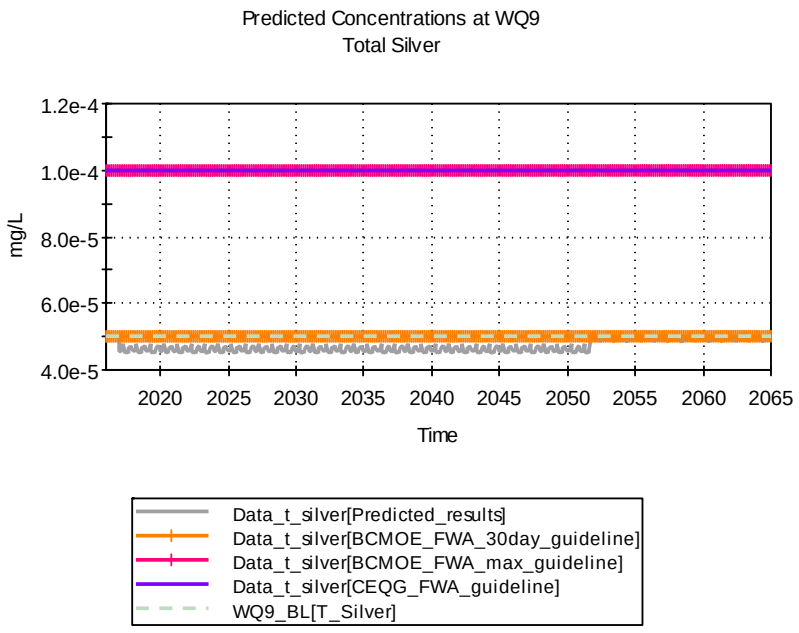


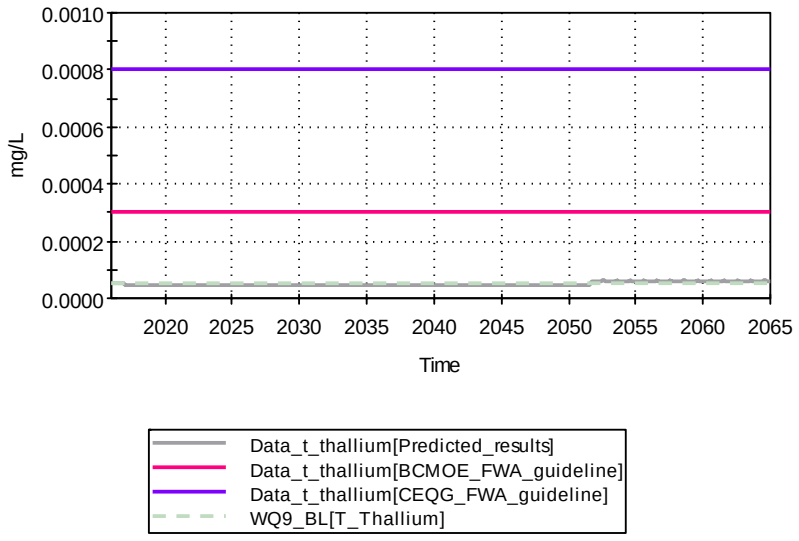


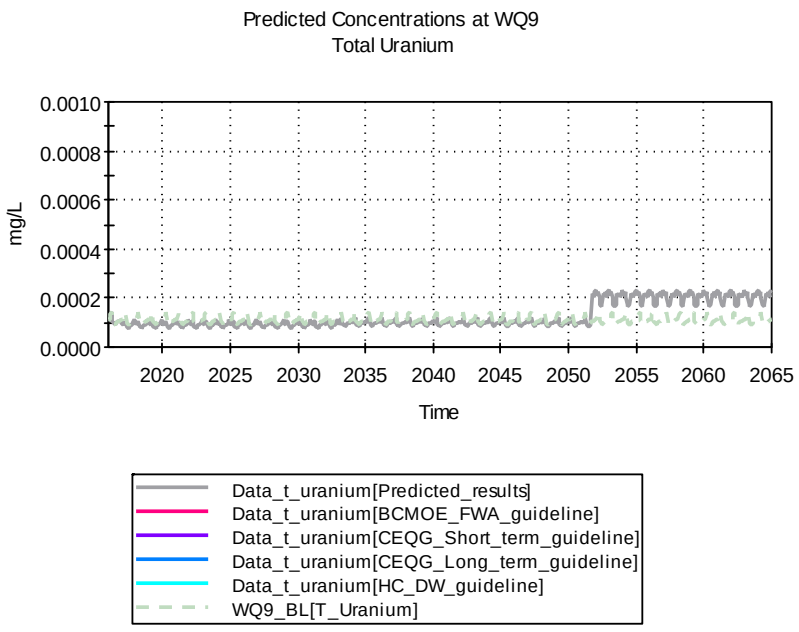


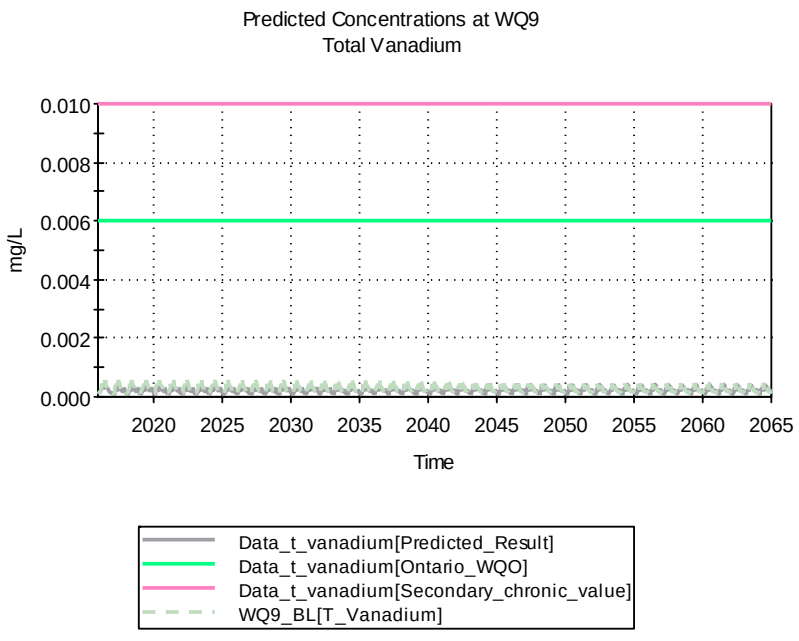


WQ9 – Best estimate

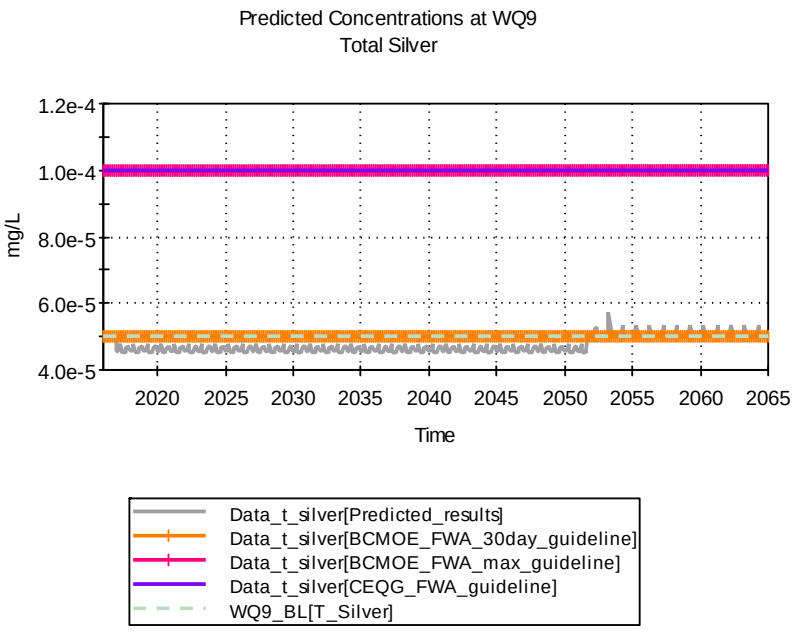


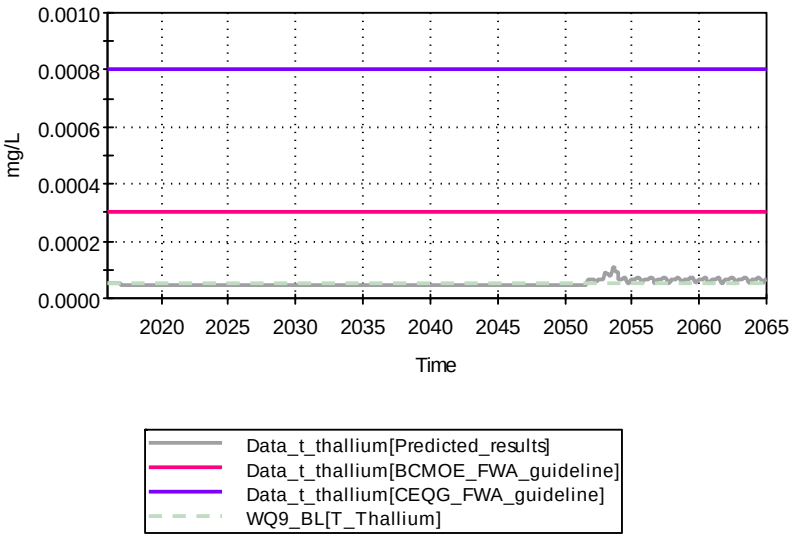


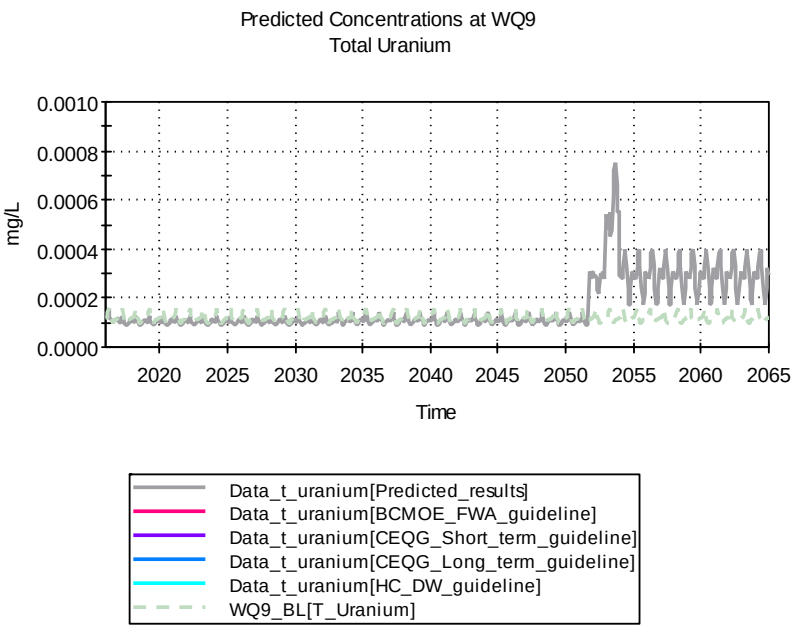


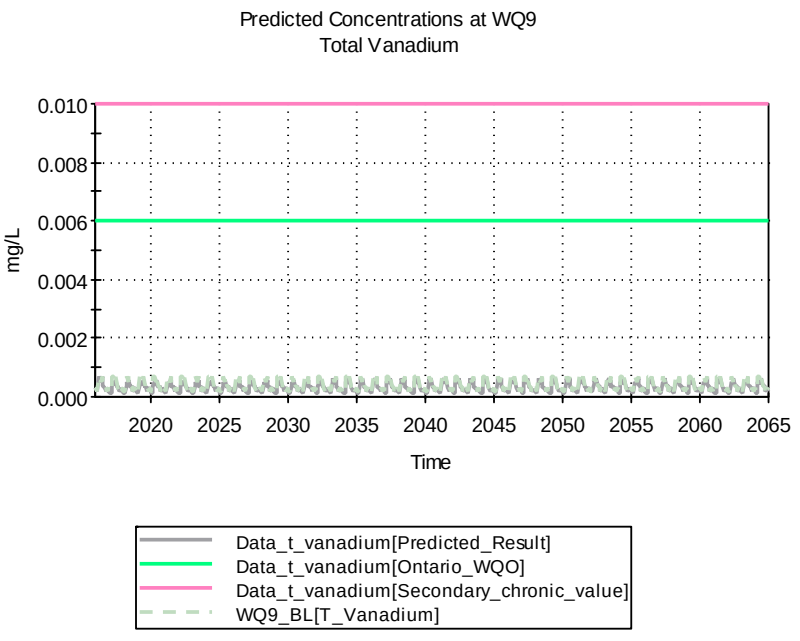


WQ9 – Worst Case

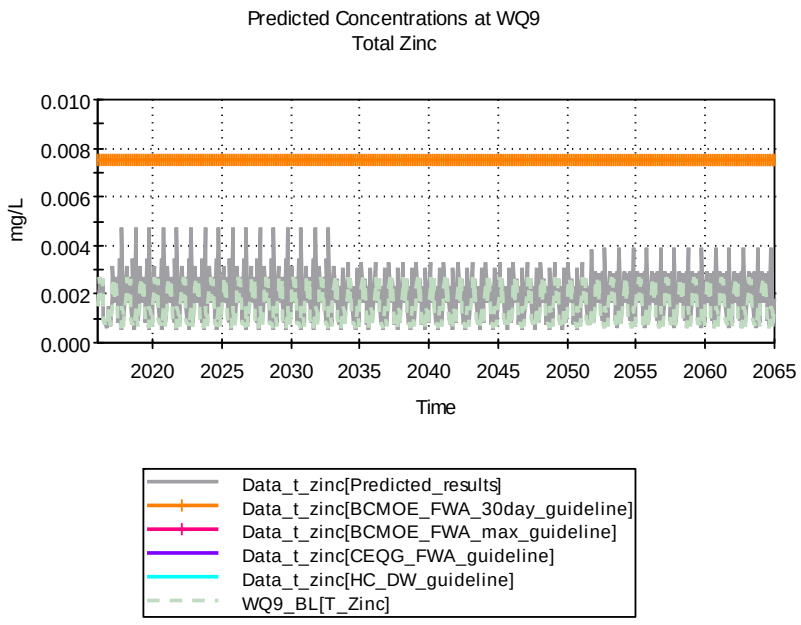


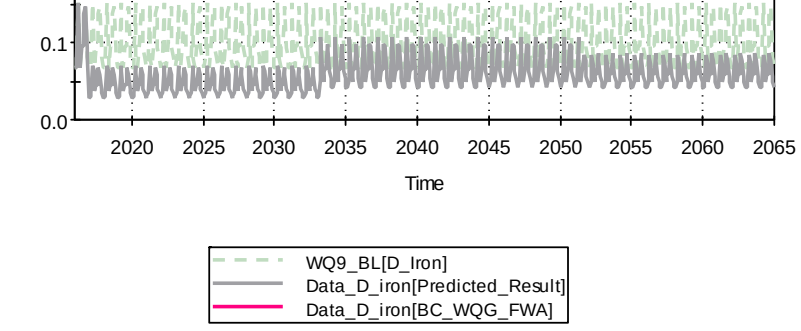


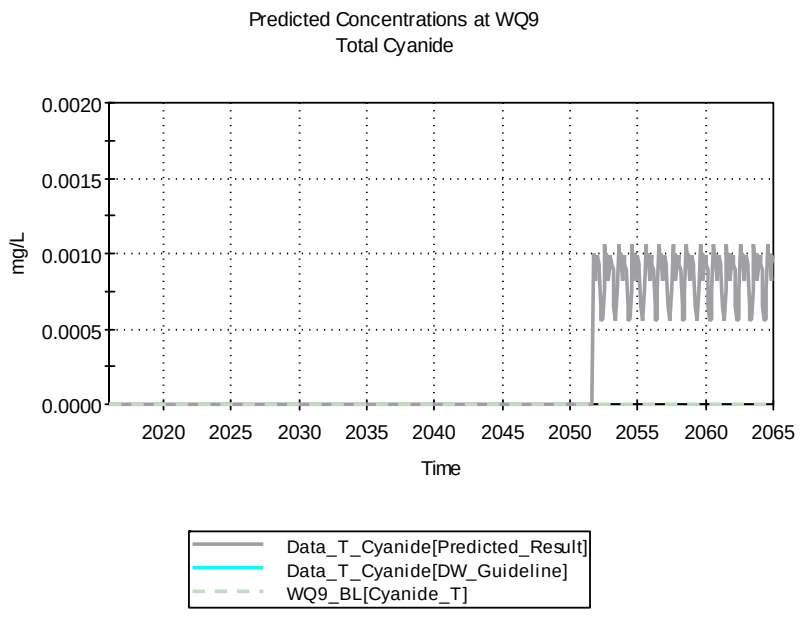




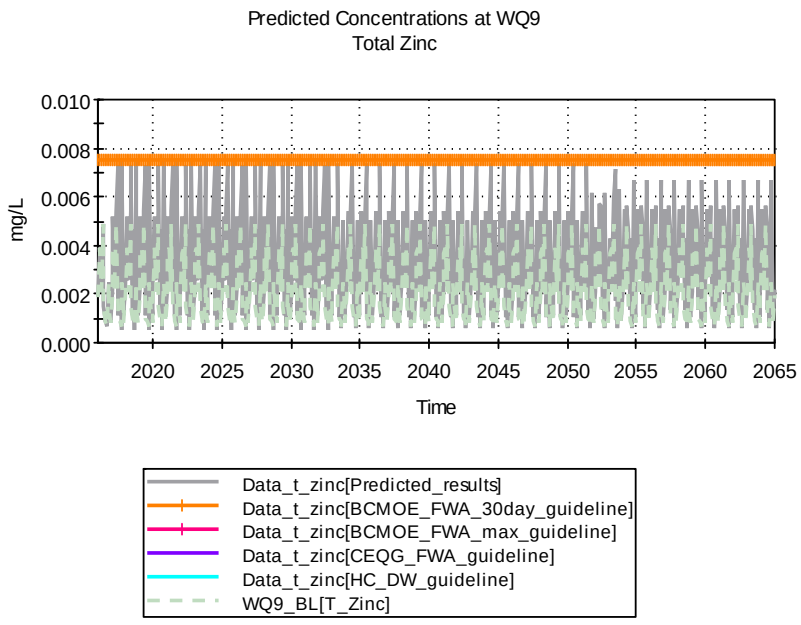
WQ9 – Best estimate

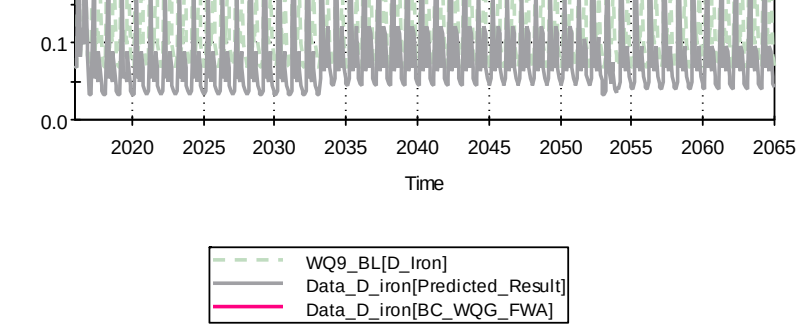


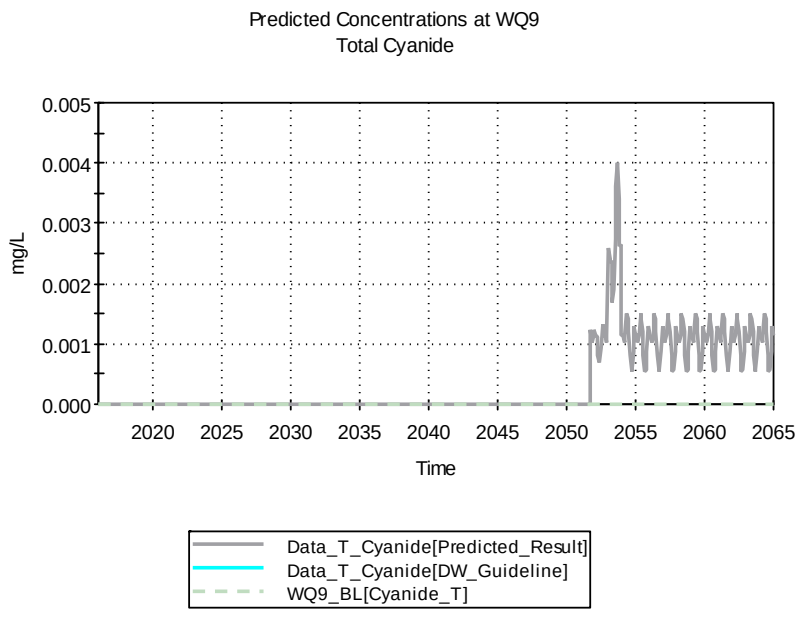




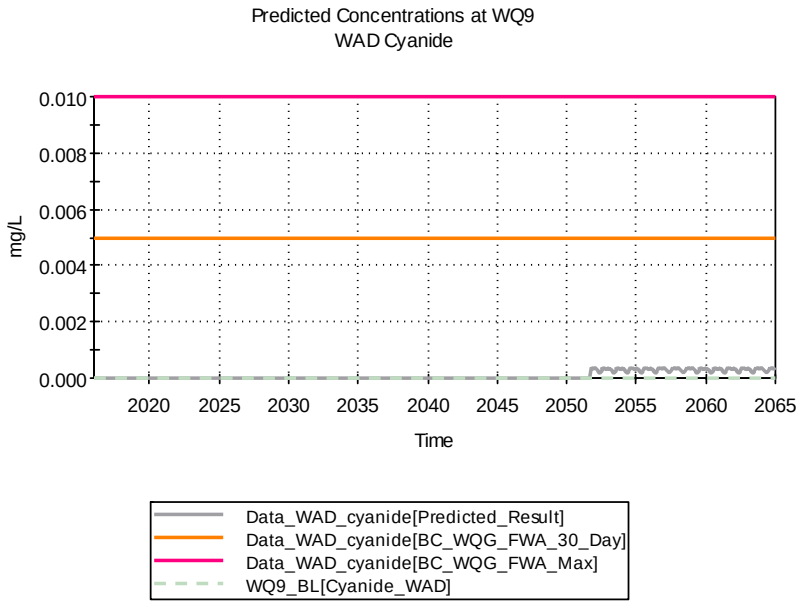
WQ9 – Worst Case



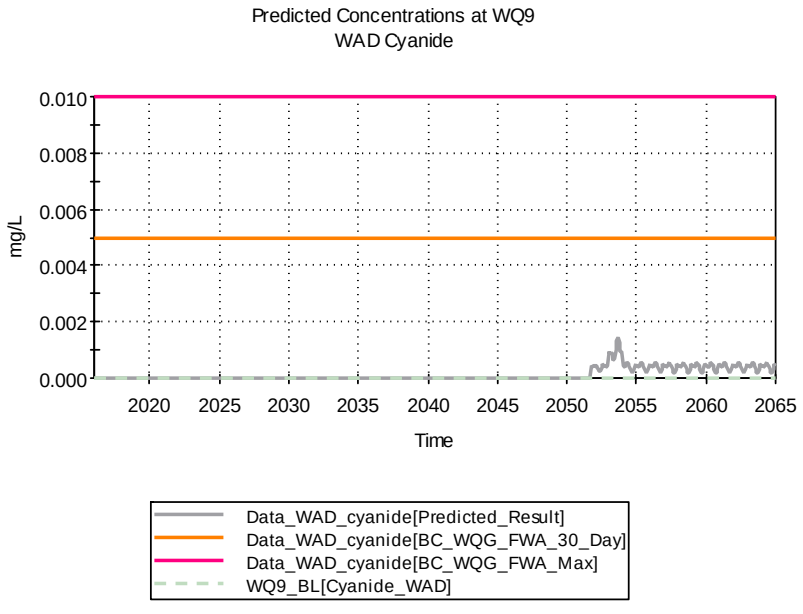




WQ9 – Best estimate



WQ9 – Worst Case



Annex B

Predicated Average Annual Water Quality at Modelled Water Quality Nodes in a Typical Year during Each Mine Phase: Construction (Year -1), Operation (Year 13), Closure (Year 18), and Post-closure (Year 33)

Annex B-1

Predicted Average Annual Water Quality at WQ10 (construction, operation, and closure) and Plunge Pool (post-closure) – Best estimate

WQ10/Plunge Pool - Best Estimate

		Construction	Operation		Closure	Post-closure
		WQ10				Plunge Pool
	Unit	Year -1 01/01/2016 to 31/12/2016	Last year of open pit mining Year 13 01/01/2029 to 31/12/2029	Last year of LGS processing Year 17 01/01/2033 to 31/12/2033	Pit filling/TSF pumping Year 18 01/01/2034 to 31/12/2034	Pit overflow Year 37 01/01/2053 to 01/12/2053
pH	pH unit	7.82	7.87	7.87	7.87	7.59
Conductivity	mS/cm	139	180	181	181	527
TDS	mg/L	91	95	95	95	67
TSS	mg/L	8.6	9.0	9.0	9.0	3.5
Turbidity	mg/L	4.9	5.2	5.2	5.2	0.8
Total_hardness	mg/L as $CaCO_3$	67	71	71	71	42
Total_alkalinity	mg/L	73	78	78	78	49
Fluoride	mg/L	0.07	0.07	0.07	0.07	0.06
Sulphate	mg/L	3.8	18.4	19.0	19.0	185.2
Chloride	mg/L	0.39	0.40	0.40	0.40	0.35
Ammonia	mg/L	0.020	0.066	0.068	0.068	0.222
Nitrate	mg/L	0.034	0.036	0.036	0.036	0.028
Nitrite	mg/L	0.004	0.004	0.004	0.004	0.004
TKN	mg/L	0.251	0.264	0.264	0.264	0.180
Ortho_P	mg/L	0.009	0.009	0.009	0.009	0.009
Total_Diss_P	mg/L	0.017	0.017	0.017	0.017	0.015
TOC	mg/L	9.213	9.510	9.509	9.509	7.020
DOC	mg/L	1.158	1.248	1.250	1.250	1.533
T_Aluminum	mg/L	0.0455	0.0331	0.0331	0.0331	0.0616
T_Antimony	mg/L	0.0001	0.0006	0.0006	0.0006	0.0017
T_Arsenic	mg/L	0.0005	0.0007	0.0007	0.0007	0.0012
T_Barium	mg/L	0.0069	0.0073	0.0073	0.0073	0.0150
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0016	0.0019	0.0019	0.0019	0.0067
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00002	0.00001
T_Calcium	mg/L	19.9	21.0	21.0	21.0	12.5
T_Chromium	mg/L	0.0003	0.0003	0.0003	0.0003	0.0003
T_Cobalt	mg/L	0.00003	0.00064	0.00066	0.00066	0.00044
T_Copper	mg/L	0.0005	0.0006	0.0006	0.0006	0.0014
T_Iron	mg/L	0.0768	0.1003	0.1014	0.1014	0.0645
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001	0.0002
T_Lithium	mg/L	0.0011	0.0012	0.0012	0.0012	0.0028
T_Magnesium	mg/L	4.54	4.84	4.84	4.84	2.63
T_Manganese	mg/L	0.0202	0.0229	0.0229	0.0229	0.0074
T_Mercury	mg/L	0.000007	0.000007	0.000007	0.000007	0.000007
T_molybdenum	mg/L	0.0005	0.0019	0.0019	0.0019	0.0271
T_Nickel	mg/L	0.0003	0.0003	0.0003	0.0003	0.0005
T_Phosphorus	mg/L	0.0186	0.0197	0.0197	0.0197	0.0209
T_Potassium	mg/L	0.83	1.59	1.62	1.62	13.09
T_Selenium	mg/L	0.0006	0.0006	0.0006	0.0006	0.0006
T_Silicon	mg/L	4.41	4.28	4.28	4.28	4.44
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000050	0.000043
T_Sodium	mg/L	3.5	3.6	3.6	3.6	2.9
T_Strontium	mg/L	0.0958	0.1044	0.1046	0.1046	0.1744
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0017	0.0016	0.0016	0.0016	0.0013
T_Uranium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0011
T_Vanadium	mg/L	0.0002	0.0002	0.0002	0.0002	0.0002
T_Zinc	mg/L	0.0022	0.0022	0.0022	0.0022	0.0015
D_Aluminum	mg/L	0.0126	0.0040	0.0040	0.0040	0.0424
D_Antimony	mg/L	5.01E-05	5.71E-04	5.92E-04	5.92E-04	1.74E-03
D_Arsenic	mg/L	0.0005	0.0006	0.0006	0.0006	0.0011
D_Barium	mg/L	0.0061	0.0065	0.0065	0.0065	0.0146
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001	9.99881E-05
D_Boron	mg/L	0.0014	0.0018	0.0018	0.0018	0.0066
D_Cadmium	mg/L	0.000015	0.000016	0.000016	0.000016	0.000025
D_Calcium	mg/L	19.31	20.42	20.42	20.42	12.30
D_Chromium	mg/L	0.000301	0.000300	0.000300	0.000300	0.000316
D_Cobalt	mg/L	0.000021	0.000624	0.000649	0.000649	0.000440
D_Copper	mg/L	0.000284	0.000399	0.000403	0.000403	0.001404
D_Iron	mg/L	0.026	0.050	0.051	0.051	0.044
D_Lead	mg/L	5.17E-05	5.64E-05	5.66E-05	5.66E-05	1.61E-04
D_Lithium	mg/L	0.001	0.001084072	0.001087561	0.001087561	0.002668554
D_Magnesium	mg/L	4.43	4.72	4.72	4.72	2.59
D_Manganese	mg/L	0.0053	0.0066	0.0066	0.0066	0.0059
D_Mercury	mg/L	0.0000066	0.0000065	0.0000065	0.0000065	0.0000074
D_Molybdenum	mg/L	0.00050	0.00183	0.00189	0.00189	0.02702
D_Nickel	mg/L	0.00018	0.00021	0.00021	0.00021	0.00050
D_Phosphorus	mg/L	0.013	0.013	0.013	0.013	0.018
D_Potassium	mg/L	0.78	1.53	1.56	1.56	13.09
D_Selenium	mg/L	0.00056	0.00056	0.00056	0.00056	0.00058
D_Silicon	mg/L	4.20	4.07	4.07	4.07	4.30
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05	4.3E-05
D_Sodium	mg/L	3.37	3.47	3.47	3.47	2.87
D_Strontium	mg/L	0.093	0.102	0.102	0.102	0.173
D_Thallium	mg/L	5.0E-05	5.5E-05	5.5E-05	5.5E-05	1.5E-04
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010	0.00011
D_Titanium	mg/L	0.00031	0.00023	0.00023	0.00023	0.00059
D_Uranium	mg/L	9.52E-05	1.29E-04	1.31E-04	1.31E-04	1.06E-03
D_Vanadium	mg/L	0.00013	0.00013	0.00013	0.00013	0.00015
D_Zinc	mg/L	0.0015	0.0015	0.0015	0.0015	0.0022
Cyanide_T	mg/L	0	0.077	0.080	0.080	0.008
Cyanide_WAD	mg/L	0	0.00052	0.00054	0.00054	0.00299
Cyanate	mg/L	0.20	0.83	0.86	0.86	12.71
Thiocyanate	mg/L	0.17	0.79	0.82	0.82	12.40
Temp	°C	6.36	6.76	6.76	6.76	3.85

Annex B-2

Predicted Average Annual Water Quality at WQ10 (construction, operation, and closure) and Plunge Pool (post-closure) – Worst Case

newgold

Blackwater Gold Project

WQ10/Plunge Pool - Worst Case

		Construction	Operation		Closure	Post-closure
			WQ10			Plunge Pool
	Unit	Year -1 01/01/2016 to 31/12/2016	Last year of open pit mining Year 13 01/01/2029 to 31/12/2029	Last year of LGS processing Year 17 01/01/2033 to 31/12/2033	Pit filling/TSF pumping Year 18 01/01/2034 to 31/12/2034	Pit overflow Year 37 01/01/2053 to 01/12/2053
pH	pH unit	7.94	7.98	7.98	7.98	7.63
Conductivity	mS/cm	144	187	188	188	642
TDS	mg/L	110	117	117	117	73
TSS	mg/L	11.0	11.6	11.6	11.6	4.4
Turbidity	mg/L	7.4	7.8	7.8	7.8	0.9
Total_hardness	mg/L as $CaCO_3$	72	76	76	76	43
Total_alkalinity	mg/L	83	88	88	88	54
Fluoride	mg/L	0.08	0.08	0.08	0.08	0.06
Sulphate	mg/L	4.2	19.5	20.1	20.1	231.7
Chloride	mg/L	0.56	0.57	0.57	0.57	0.41
Ammonia	mg/L	0.023	0.074	0.076	0.076	0.376
Nitrate	mg/L	0.050	0.052	0.052	0.052	0.033
Nitrite	mg/L	0.005	0.005	0.005	0.005	0.004
TKN	mg/L	0.369	0.383	0.383	0.383	0.226
Ortho_P	mg/L	0.011	0.010	0.010	0.010	0.010
Total_Diss_P	mg/L	0.037	0.039	0.039	0.039	0.020
TOC	mg/L	12.006	12.671	12.669	12.669	7.831
DOC	mg/L	1.266	1.367	1.369	1.369	1.933
T_Aluminum	mg/L	0.0724	0.0492	0.0492	0.0492	0.0616
T_Antimony	mg/L	0.0001	0.0006	0.0006	0.0006	0.0022
T_Arsenic	mg/L	0.0007	0.0009	0.0009	0.0009	0.0014
T_Barium	mg/L	0.0079	0.0083	0.0083	0.0083	0.0214
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0024	0.0029	0.0029	0.0029	0.0105
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00002	0.00001
T_Calcium	mg/L	21.2	22.4	22.4	22.4	12.9
T_Chromium	mg/L	0.0003	0.0003	0.0003	0.0003	0.0003
T_Cobalt	mg/L	0.00005	0.00067	0.00069	0.00069	0.00055
T_Copper	mg/L	0.0009	0.0012	0.0012	0.0012	0.0017
T_Iron	mg/L	0.1352	0.1610	0.1622	0.1622	0.0681
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001	0.0004
T_Lithium	mg/L	0.0014	0.0014	0.0014	0.0014	0.0041
T_Magnesium	mg/L	4.76	5.09	5.09	5.09	2.78
T_Manganese	mg/L	0.0328	0.0383	0.0383	0.0383	0.0089
T_Mercury	mg/L	0.000008	0.000008	0.000008	0.000008	0.000008
T_molybdenum	mg/L	0.0006	0.0020	0.0021	0.0021	0.0449
T_Nickel	mg/L	0.0003	0.0004	0.0004	0.0004	0.0006
T_Phosphorus	mg/L	0.0366	0.0398	0.0398	0.0398	0.0400
T_Potassium	mg/L	0.88	1.68	1.72	1.72	16.29
T_Selenium	mg/L	0.0006	0.0006	0.0006	0.0006	0.0006
T_Silicon	mg/L	4.81	4.71	4.71	4.71	4.10
T_Silver	mg/L	0.000051	0.000050	0.000050	0.000050	0.000048
T_Sodium	mg/L	3.6	3.7	3.7	3.7	3.0
T_Strontium	mg/L	0.1017	0.1116	0.1118	0.1118	0.2029
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0002
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0026	0.0023	0.0023	0.0023	0.0017
T_Uranium	mg/L	0.0001	0.0002	0.0002	0.0002	0.0018
T_Vanadium	mg/L	0.0003	0.0003	0.0003	0.0003	0.0003
T_Zinc	mg/L	0.0035	0.0036	0.0036	0.0036	0.0015
D_Aluminum	mg/L	0.0166	0.0057	0.0057	0.0057	0.0387
D_Antimony	mg/L	5.09E-05	5.94E-04	6.16E-04	6.16E-04	2.17E-03
D_Arsenic	mg/L	0.0006	0.0008	0.0008	0.0008	0.0013
D_Barium	mg/L	0.0068	0.0073	0.0073	0.0073	0.0209
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001	9.99971E-05
D_Boron	mg/L	0.0021	0.0025	0.0025	0.0025	0.0104
D_Cadmium	mg/L	0.000015	0.000016	0.000016	0.000016	0.000033
D_Calcium	mg/L	20.76	21.99	21.98	21.98	12.70
D_Chromium	mg/L	0.000306	0.000300	0.000300	0.000300	0.000325
D_Cobalt	mg/L	0.000026	0.000648	0.000674	0.000674	0.000548
D_Copper	mg/L	0.000565	0.000784	0.000790	0.000790	0.001721
D_Iron	mg/L	0.054	0.087	0.088	0.088	0.043
D_Lead	mg/L	5.70E-05	6.73E-05	6.77E-05	6.77E-05	3.64E-04
D_Lithium	mg/L	0.001	0.00109485	0.001098787	0.001098787	0.003977103
D_Magnesium	mg/L	4.69	5.01	5.01	5.01	2.76
D_Manganese	mg/L	0.0125	0.0165	0.0165	0.0165	0.0070
D_Mercury	mg/L	0.0000082	0.0000080	0.0000080	0.0000080	0.0000083
D_Molybdenum	mg/L	0.00055	0.00196	0.00202	0.00202	0.04488
D_Nickel	mg/L	0.00023	0.00027	0.00027	0.00027	0.00060
D_Phosphorus	mg/L	0.015	0.017	0.017	0.017	0.034
D_Potassium	mg/L	0.84	1.64	1.67	1.67	16.29
D_Selenium	mg/L	0.00060	0.00060	0.00060	0.00060	0.00060
D_Silicon	mg/L	4.51	4.40	4.40	4.40	3.98
D_Silver	mg/L	5.0E-05	5.3E-05	5.4E-05	5.4E-05	1.5E-04
D_Sodium	mg/L	3.62	3.73	3.72	3.72	2.97
D_Strontium	mg/L	0.101	0.111	0.111	0.111	0.202
D_Thallium	mg/L	5.0E-05	5.5E-05	5.5E-05	5.5E-05	2.0E-04
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010	0.00012
D_Titanium	mg/L	0.00041	0.00028	0.00028	0.00028	0.00063
D_Uranium	mg/L	1.06E-04	1.44E-04	1.46E-04	1.46E-04	1.77E-03
D_Vanadium	mg/L	0.00019	0.00018	0.00018	0.00018	0.00020
D_Zinc	mg/L	0.0023	0.0024	0.0024	0.0024	0.0029
Cyanide_T	mg/L	0	0.080	0.083	0.083	0.010
Cyanide_WAD	mg/L	0	0.00082	0.00085	0.00085	0.00375
Cyanate	mg/L	0.20	0.99	1.02	1.02	24.82
Thiocyanate	mg/L	0.20	0.84	0.87	0.87	20.20
Temp	°C	7.32	7.79	7.78	7.78	4.14

Annex B-3

Predicted Average Annual Water Quality at WQ7 – Best Estimate

Annex B - Summary Tables

WQ7 - Best Estimate

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow	rainfall simulation month
		Year -1	Year 13	Year 18	Year 37	
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053	01/02/2053
pH	pH unit	7.77	7.85	7.85	7.64	7.73
Conductivity	mS/cm	123	152	152	442	602
TDS	mg/L	84	89	89	69	70
TSS	mg/L	7.8	7.9	8.0	3.8	2.6
Turbidity	mg/L	4.0	4.1	4.1	1.1	0.7
Total_hardness	mg/L as $CaCO_3$	60	63	63	43	53
Total_alkalinity	mg/L	64	68	68	49	62
Fluoride	mg/L	0.06	0.07	0.07	0.06	0.06
Sulphate	mg/L	3.3	12.7	12.9	148.5	208.7
Chloride	mg/L	0.38	0.39	0.39	0.35	0.41
Ammonia	mg/L	0.021	0.050	0.051	0.181	0.240
Nitrate	mg/L	0.028	0.030	0.030	0.026	0.034
Nitrite	mg/L	0.004	0.004	0.004	0.004	0.005
TKN	mg/L	0.218	0.232	0.230	0.177	0.166
Ortho_P	mg/L	0.010	0.010	0.010	0.010	0.006
Total_Diss_P	mg/L	0.036	0.033	0.036	0.021	0.015
TOC	mg/L	8.136	8.503	8.482	6.861	5.419
DOC	mg/L	1.075	1.149	1.145	1.412	1.700
T_Aluminum	mg/L	0.0751	0.0601	0.0635	0.0699	0.0273
T_Antimony	mg/L	0.0001	0.0004	0.0004	0.0014	0.0019
T_Arsenic	mg/L	0.0005	0.0006	0.0006	0.0010	0.0012
T_Barium	mg/L	0.0077	0.0079	0.0079	0.0138	0.0169
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0015	0.0017	0.0017	0.0056	0.0071
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00001	0.00003
T_Calcium	mg/L	17.5	18.6	18.4	12.8	16.0
T_Chromium	mg/L	0.0003	0.0003	0.0003	0.0003	0.0004
T_Cobalt	mg/L	0.00005	0.00043	0.00044	0.00037	0.00050
T_Copper	mg/L	0.0006	0.0006	0.0006	0.0012	0.0017
T_Iron	mg/L	0.1365	0.1434	0.1478	0.0941	0.0639
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0002	0.0002
T_Lithium	mg/L	0.0011	0.0012	0.0012	0.0025	0.0029
T_Magnesium	mg/L	4.06	4.33	4.30	2.76	3.44
T_Manganese	mg/L	0.0219	0.0236	0.0236	0.0110	0.0110
T_Mercury	mg/L	0.000007	0.000007	0.000007	0.000007	0.000007
T_molybdenum	mg/L	0.0006	0.0014	0.0014	0.0217	0.0299
T_Nickel	mg/L	0.0003	0.0003	0.0003	0.0005	0.0006
T_Phosphorus	mg/L	0.0246	0.0239	0.0249	0.0221	0.0215
T_Potassium	mg/L	0.79	1.28	1.30	10.60	14.74
T_Selenium	mg/L	0.0006	0.0006	0.0006	0.0006	0.0006
T_Silicon	mg/L	5.03	4.96	4.99	4.81	4.54
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000044	0.000046
T_Sodium	mg/L	3.7	3.7	3.8	3.1	3.4
T_Strontium	mg/L	0.0906	0.0975	0.0970	0.1563	0.2011
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0002
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0025	0.0022	0.0023	0.0017	0.0009
T_Uranium	mg/L	0.0001	0.0002	0.0002	0.0009	0.0012
T_Vanadium	mg/L	0.0003	0.0003	0.0003	0.0002	0.0002
T_Zinc	mg/L	0.0049	0.0043	0.0044	0.0030	0.0107
D_Aluminum	mg/L	0.0223	0.0150	0.0163	0.0410	0.0158
D_Antimony	mg/L	5.27E-05	3.88E-04	3.95E-04	1.40E-03	1.95E-03
D_Arsenic	mg/L	0.0004	0.0005	0.0005	0.0010	0.0012
D_Barium	mg/L	0.0067	0.0069	0.0069	0.0132	0.0162
D_Beryllium	mg/L	0.0001	0.000100612	0.000100626	0.00010035	0.00010054
D_Boron	mg/L	0.0013	0.0015	0.0015	0.0055	0.0072
D_Cadmium	mg/L	0.000016	0.000016	0.000016	0.000024	0.000027
D_Calcium	mg/L	17.02	18.11	17.95	12.53	15.65
D_Chromium	mg/L	0.000303	0.000304	0.000304	0.000315	0.000313
D_Cobalt	mg/L	0.000026	0.000414	0.000423	0.000359	0.000493
D_Copper	mg/L	0.000391	0.000439	0.000457	0.001211	0.001551
D_Iron	mg/L	0.052	0.068	0.069	0.055	0.036
D_Lead	mg/L	5.46E-05	5.75E-05	5.79E-05	1.40E-04	1.67E-04
D_Lithium	mg/L	0.001	0.0011	0.0011	0.0023	0.0028
D_Magnesium	mg/L	3.91	4.19	4.15	2.69	3.35
D_Manganese	mg/L	0.0094	0.0100	0.0101	0.0081	0.0087
D_Mercury	mg/L	0.0000066	0.0000066	0.0000066	0.0000073	0.0000075
D_Molybdenum	mg/L	0.00052	0.00138	0.00140	0.02170	0.02981
D_Nickel	mg/L	0.00020	0.00022	0.00022	0.00044	0.00054
D_Phosphorus	mg/L	0.059	0.050	0.057	0.032	0.020
D_Potassium	mg/L	0.82	1.30	1.32	10.62	14.68
D_Selenium	mg/L	0.00056	0.00056	0.00056	0.00058	0.00060
D_Silicon	mg/L	4.79	4.73	4.76	4.64	4.46
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	4.4E-05	4.6E-05
D_Sodium	mg/L	3.60	3.65	3.68	3.04	3.34
D_Strontium	mg/L	0.088	0.095	0.095	0.155	0.199
D_Thallium	mg/L	5.0E-05	5.3E-05	5.4E-05	1.3E-04	1.6E-04
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00011	0.00011
D_Titanium	mg/L	0.00041	0.00034	0.00035	0.00058	0.00030
D_Uranium	mg/L	1.22E-04	1.43E-04	1.44E-04	8.82E-04	1.16E-03
D_Vanadium	mg/L	0.00015	0.00015	0.00015	0.00016	0.00010
D_Zinc	mg/L	0.0032	0.0028	0.0029	0.0029	0.0074
Cyanide_T	mg/L	0	0.050	0.051	0.0065	0.0091
Cyanide_WAD	mg/L	0	0.00033	0.00034	0.0024	0.0034
Cyanate	mg/L	0.20	0.61	0.62	10.20	14.04
Thiocyanate	mg/L	0.18	0.58	0.59	9.94	13.62
Temp	°C	5.27	5.56	5.49	3.69	1.68

Annex B-4

Predicted Average Annual Water Quality at WQ7 – Worst Case

Blackwater Gold Project

WQ7 - Worst Case

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.89	7.97	7.96	7.68
Conductivity	mS/cm	129	160	159	590
TDS	mg/L	102	109	109	75
TSS	mg/L	12.3	11.6	11.9	5.2
Turbidity	mg/L	6.4	6.4	6.4	1.2
Total_hardness	mg/L as $CaCO_3$	66	70	69	44
Total_alkalinity	mg/L	72	77	76	54
Fluoride	mg/L	0.07	0.07	0.07	0.06
Sulphate	mg/L	3.7	13.6	13.8	209.4
Chloride	mg/L	0.57	0.58	0.58	0.43
Ammonia	mg/L	0.023	0.056	0.056	0.341
Nitrate	mg/L	0.042	0.045	0.044	0.033
Nitrite	mg/L	0.005	0.005	0.005	0.004
TKN	mg/L	0.326	0.347	0.344	0.227
Ortho_P	mg/L	0.012	0.012	0.012	0.010
Total_Diss_P	mg/L	0.413	0.339	0.393	0.105
TOC	mg/L	10.499	11.372	11.294	7.945
DOC	mg/L	1.282	1.347	1.356	1.871
T_Aluminum	mg/L	0.1355	0.1048	0.1121	0.0780
T_Antimony	mg/L	0.0001	0.0004	0.0004	0.0020
T_Arsenic	mg/L	0.0007	0.0008	0.0008	0.0013
T_Barium	mg/L	0.0090	0.0089	0.0090	0.0204
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0023	0.0025	0.0026	0.0097
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00001
T_Calcium	mg/L	18.8	20.0	19.8	13.1
T_Chromium	mg/L	0.0004	0.0004	0.0004	0.0004
T_Cobalt	mg/L	0.00008	0.00047	0.00048	0.00051
T_Copper	mg/L	0.0017	0.0016	0.0018	0.0018
T_Iron	mg/L	0.2291	0.2274	0.2350	0.0976
T_Lead	mg/L	0.0002	0.0002	0.0002	0.0004
T_Lithium	mg/L	0.0014	0.0014	0.0014	0.0038
T_Magnesium	mg/L	4.74	4.95	4.98	2.96
T_Manganese	mg/L	0.0339	0.0374	0.0372	0.0117
T_Mercury	mg/L	0.000009	0.000009	0.000009	0.000009
T_molybdenum	mg/L	0.0006	0.0015	0.0015	0.0406
T_Nickel	mg/L	0.0004	0.0004	0.0004	0.0006
T_Phosphorus	mg/L	0.1527	0.1312	0.1480	0.0652
T_Potassium	mg/L	1.19	1.66	1.72	14.85
T_Selenium	mg/L	0.0006	0.0006	0.0006	0.0006
T_Silicon	mg/L	5.44	5.40	5.42	4.37
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000048
T_Sodium	mg/L	6.2	5.8	6.1	3.6
T_Strontium	mg/L	0.0966	0.1047	0.1041	0.1920
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0002
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0048	0.0040	0.0042	0.0023
T_Uranium	mg/L	0.0002	0.0002	0.0002	0.0016
T_Vanadium	mg/L	0.0005	0.0004	0.0004	0.0003
T_Zinc	mg/L	0.0107	0.0091	0.0096	0.0034
D_Aluminum	mg/L	0.0324	0.0227	0.0249	0.0409
D_Antimony	mg/L	7.14E-05	4.17E-04	4.28E-04	1.96E-03
D_Arsenic	mg/L	0.0005	0.0006	0.0006	0.0012
D_Barium	mg/L	0.0073	0.0076	0.0076	0.0197
D_Beryllium	mg/L	0.0001	0.000100612	0.000100626	0.000100449
D_Boron	mg/L	0.0019	0.0021	0.0022	0.0096
D_Cadmium	mg/L	0.000018	0.000018	0.000018	0.000032
D_Calcium	mg/L	18.69	19.83	19.69	12.96
D_Chromium	mg/L	0.000317	0.000313	0.000315	0.000327
D_Cobalt	mg/L	0.000033	0.000433	0.000443	0.000499
D_Copper	mg/L	0.001375	0.001359	0.001478	0.001790
D_Iron	mg/L	0.074	0.097	0.098	0.051
D_Lead	mg/L	7.91E-05	8.19E-05	8.51E-05	3.39E-04
D_Lithium	mg/L	0.001	0.0011	0.0011	0.0037
D_Magnesium	mg/L	4.22	4.51	4.48	2.83
D_Manganese	mg/L	0.0147	0.0178	0.0176	0.0083
D_Mercury	mg/L	0.0000082	0.0000082	0.0000082	0.0000084
D_Molybdenum	mg/L	0.00057	0.00148	0.00150	0.04053
D_Nickel	mg/L	0.00043	0.00042	0.00045	0.00061
D_Phosphorus	mg/L	0.394	0.320	0.374	0.116
D_Potassium	mg/L	1.75	2.10	2.24	14.98
D_Selenium	mg/L	0.00061	0.00061	0.00061	0.00060
D_Silicon	mg/L	5.14	5.10	5.13	4.23
D_Silver	mg/L	5.0E-05	5.3E-05	5.3E-05	1.4E-04
D_Sodium	mg/L	6.12	5.73	6.08	3.60
D_Strontium	mg/L	0.095	0.103	0.102	0.191
D_Thallium	mg/L	5.0E-05	5.3E-05	5.4E-05	1.9E-04
D_Tin	mg/L	0.00013	0.00013	0.00013	0.00012
D_Titanium	mg/L	0.00052	0.00042	0.00044	0.00064
D_Uranium	mg/L	1.38E-04	1.62E-04	1.64E-04	1.61E-03
D_Vanadium	mg/L	0.00023	0.00022	0.00022	0.00021
D_Zinc	mg/L	0.0073	0.0062	0.0067	0.0040
Cyanide_T	mg/L	0	0.052	0.053	0.0092
Cyanide_WAD	mg/L	0	0.00053	0.00054	0.0034
Cyanate	mg/L	0.20	0.71	0.72	22.40
Thiocyanate	mg/L	0.21	0.63	0.64	18.24
Temp	°C	6.09	6.45	6.36	4.15

Annex B-5

Predicted Average Annual Water Quality at WQ3 – Best Estimate

Annex B - Summary Tables

WQ3 - Best Estimate

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.65	7.65	7.65	7.65
Conductivity	mS/cm	90	90	90	90
TDS	mg/L	67	67	67	67
TSS	mg/L	2.7	2.7	2.7	2.7
Turbidity	mg/L	1.6	1.6	1.6	1.6
Total_hardness	mg/L as $CaCO_3$	40	40	40	40
Total_alkalinity	mg/L	46	46	46	46
Fluoride	mg/L	0.07	0.07	0.07	0.07
Sulphate	mg/L	1.6	1.6	1.6	1.6
Chloride	mg/L	0.28	0.28	0.28	0.28
Ammonia	mg/L	0.026	0.026	0.026	0.026
Nitrate	mg/L	0.024	0.024	0.024	0.024
Nitrite	mg/L	0.004	0.004	0.004	0.004
TKN	mg/L	0.141	0.141	0.141	0.141
Ortho_P	mg/L	0.024	0.024	0.024	0.024
Total_Diss_P	mg/L	0.037	0.037	0.037	0.037
TOC	mg/L	5.072	5.072	5.072	5.072
DOC	mg/L	0.861	0.861	0.861	0.861
T_Aluminum	mg/L	0.0765	0.0765	0.0765	0.0765
T_Antimony	mg/L	0.0001	0.0001	0.0001	0.0001
T_Arsenic	mg/L	0.0010	0.0010	0.0010	0.0010
T_Barium	mg/L	0.0053	0.0053	0.0053	0.0053
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0020	0.0020	0.0020	0.0020
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00002
T_Calcium	mg/L	11.7	11.7	11.7	11.7
T_Chromium	mg/L	0.0008	0.0008	0.0008	0.0008
T_Cobalt	mg/L	0.00004	0.00004	0.00004	0.00004
T_Copper	mg/L	0.0005	0.0005	0.0005	0.0005
T_Iron	mg/L	0.1419	0.1419	0.1419	0.1419
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0010	0.0010	0.0010	0.0010
T_Magnesium	mg/L	2.76	2.76	2.76	2.76
T_Manganese	mg/L	0.0101	0.0101	0.0101	0.0101
T_Mercury	mg/L	0.000006	0.000006	0.000006	0.000006
T_molybdenum	mg/L	0.0007	0.0007	0.0007	0.0007
T_Nickel	mg/L	0.0002	0.0002	0.0002	0.0002
T_Phosphorus	mg/L	0.0379	0.0379	0.0379	0.0379
T_Potassium	mg/L	0.56	0.56	0.56	0.56
T_Selenium	mg/L	0.0005	0.0005	0.0005	0.0005
T_Silicon	mg/L	7.94	7.94	7.94	7.94
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000050
T_Sodium	mg/L	3.4	3.4	3.4	3.4
T_Strontium	mg/L	0.0743	0.0743	0.0743	0.0743
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0021	0.0021	0.0021	0.0021
T_Uranium	mg/L	0.0002	0.0002	0.0002	0.0002
T_Vanadium	mg/L	0.0014	0.0014	0.0014	0.0014
T_Zinc	mg/L	0.0023	0.0023	0.0023	0.0023
D_Aluminum	mg/L	0.0336	0.0336	0.0336	0.0336
D_Antimony	mg/L	5.55E-05	5.55E-05	5.55E-05	5.55E-05
D_Arsenic	mg/L	0.0009	0.0009	0.0009	0.0009
D_Barium	mg/L	0.0047	0.0047	0.0047	0.0047
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
D_Boron	mg/L	0.0016	0.0016	0.0016	0.0016
D_Cadmium	mg/L	0.000015	0.000015	0.000015	0.000015
D_Calcium	mg/L	11.42	11.42	11.42	11.42
D_Chromium	mg/L	0.000677	0.000677	0.000677	0.000677
D_Cobalt	mg/L	0.000023	0.000023	0.000023	0.000023
D_Copper	mg/L	0.000197	0.000197	0.000197	0.000197
D_Iron	mg/L	0.059	0.059	0.059	0.059
D_Lead	mg/L	5.08E-05	5.08E-05	5.08E-05	5.08E-05
D_Lithium	mg/L	0.001	0.0010	0.0010	0.0010
D_Magnesium	mg/L	2.72	2.72	2.72	2.72
D_Manganese	mg/L	0.0047	0.0047	0.0047	0.0047
D_Mercury	mg/L	0.0000064	0.0000064	0.0000064	0.0000064
D_Molybdenum	mg/L	0.00060	0.00060	0.00060	0.00060
D_Nickel	mg/L	0.00016	0.00016	0.00016	0.00016
D_Phosphorus	mg/L	0.034	0.034	0.034	0.034
D_Potassium	mg/L	0.55	0.55	0.55	0.55
D_Selenium	mg/L	0.00055	0.00055	0.00055	0.00055
D_Silicon	mg/L	7.68	7.68	7.68	7.68
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Sodium	mg/L	3.31	3.31	3.31	3.31
D_Strontium	mg/L	0.072	0.072	0.072	0.072
D_Thallium	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010
D_Titanium	mg/L	0.00071	0.00071	0.00071	0.00071
D_Uranium	mg/L	1.47E-04	1.47E-04	1.47E-04	1.47E-04
D_Vanadium	mg/L	0.00116	0.00116	0.00116	0.00116
D_Zinc	mg/L	0.0019	0.0019	0.0019	0.0019
Cyanide_T	mg/L	0	0	0	0
Cyanide_WAD	mg/L	0	0	0	0
Cyanate	mg/L	0.20	0.20	0.20	0.20
Thiocyanate	mg/L	0.17	0.17	0.17	0.17
Temp	°C	2.38	2.38	2.38	2.38

Annex B-6

Predicted Average Annual Water Quality at WQ3 – Worst Case

WQ3 - Worst Case

		Construction	Operation	Closure	Post-closure
			Last year of open pit mining	Pit filling/TSF pumping	Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.65	7.65	7.65	7.65
Conductivity	mS/cm	90	90	90	90
TDS	mg/L	67	67	67	67
TSS	mg/L	2.7	2.7	2.7	2.7
Turbidity	mg/L	1.6	1.6	1.6	1.6
Total_hardness	mg/L as $CaCO_3$	40	40	40	40
Total_alkalinity	mg/L	46	46	46	46
Fluoride	mg/L	0.07	0.07	0.07	0.07
Sulphate	mg/L	1.6	1.6	1.6	1.6
Chloride	mg/L	0.28	0.28	0.28	0.28
Ammonia	mg/L	0.026	0.026	0.026	0.026
Nitrate	mg/L	0.024	0.024	0.024	0.024
Nitrite	mg/L	0.004	0.004	0.004	0.004
TKN	mg/L	0.141	0.141	0.141	0.141
Ortho_P	mg/L	0.024	0.024	0.024	0.024
Total_Diss_P	mg/L	0.037	0.037	0.037	0.037
TOC	mg/L	5.072	5.072	5.072	5.072
DOC	mg/L	0.861	0.861	0.861	0.861
T_Aluminum	mg/L	0.0765	0.0765	0.0765	0.0765
T_Antimony	mg/L	0.0001	0.0001	0.0001	0.0001
T_Arsenic	mg/L	0.0010	0.0010	0.0010	0.0010
T_Barium	mg/L	0.0053	0.0053	0.0053	0.0053
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0020	0.0020	0.0020	0.0020
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00002
T_Calcium	mg/L	11.7	11.7	11.7	11.7
T_Chromium	mg/L	0.0008	0.0008	0.0008	0.0008
T_Cobalt	mg/L	0.00004	0.00004	0.00004	0.00004
T_Copper	mg/L	0.0005	0.0005	0.0005	0.0005
T_Iron	mg/L	0.1419	0.1419	0.1419	0.1419
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0010	0.0010	0.0010	0.0010
T_Magnesium	mg/L	2.76	2.76	2.76	2.76
T_Manganese	mg/L	0.0101	0.0101	0.0101	0.0101
T_Mercury	mg/L	0.000006	0.000006	0.000006	0.000006
T_molybdenum	mg/L	0.0007	0.0007	0.0007	0.0007
T_Nickel	mg/L	0.0002	0.0002	0.0002	0.0002
T_Phosphorus	mg/L	0.0379	0.0379	0.0379	0.0379
T_Potassium	mg/L	0.56	0.56	0.56	0.56
T_Selenium	mg/L	0.0005	0.0005	0.0005	0.0005
T_Silicon	mg/L	7.94	7.94	7.94	7.94
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000050
T_Sodium	mg/L	3.4	3.4	3.4	3.4
T_Strontium	mg/L	0.0743	0.0743	0.0743	0.0743
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0021	0.0021	0.0021	0.0021
T_Uranium	mg/L	0.0002	0.0002	0.0002	0.0002
T_Vanadium	mg/L	0.0014	0.0014	0.0014	0.0014
T_Zinc	mg/L	0.0023	0.0023	0.0023	0.0023
D_Aluminum	mg/L	0.0336	0.0336	0.0336	0.0336
D_Antimony	mg/L	5.55E-05	5.55E-05	5.55E-05	5.55E-05
D_Arsenic	mg/L	0.0009	0.0009	0.0009	0.0009
D_Barium	mg/L	0.0047	0.0047	0.0047	0.0047
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
D_Boron	mg/L	0.0016	0.0016	0.0016	0.0016
D_Cadmium	mg/L	0.000015	0.000015	0.000015	0.000015
D_Calcium	mg/L	11.42	11.42	11.42	11.42
D_Chromium	mg/L	0.000677	0.000677	0.000677	0.000677
D_Cobalt	mg/L	0.000023	0.000023	0.000023	0.000023
D_Copper	mg/L	0.000197	0.000197	0.000197	0.000197
D_Iron	mg/L	0.059	0.059	0.059	0.059
D_Lead	mg/L	5.08E-05	5.08E-05	5.08E-05	5.08E-05
D_Lithium	mg/L	0.001	0.0010	0.0010	0.0010
D_Magnesium	mg/L	2.72	2.72	2.72	2.72
D_Manganese	mg/L	0.0047	0.0047	0.0047	0.0047
D_Mercury	mg/L	0.0000064	0.0000064	0.0000064	0.0000064
D_Molybdenum	mg/L	0.00060	0.00060	0.00060	0.00060
D_Nickel	mg/L	0.00016	0.00016	0.00016	0.00016
D_Phosphorus	mg/L	0.034	0.034	0.034	0.034
D_Potassium	mg/L	0.55	0.55	0.55	0.55
D_Selenium	mg/L	0.00055	0.00055	0.00055	0.00055
D_Silicon	mg/L	7.68	7.68	7.68	7.68
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Sodium	mg/L	3.31	3.31	3.31	3.31
D_Strontium	mg/L	0.072	0.072	0.072	0.072
D_Thallium	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010
D_Titanium	mg/L	0.00071	0.00071	0.00071	0.00071
D_Uranium	mg/L	1.47E-04	1.47E-04	1.47E-04	1.47E-04
D_Vanadium	mg/L	0.00116	0.00116	0.00116	0.00116
D_Zinc	mg/L	0.0019	0.0019	0.0019	0.0019
Cyanide_T	mg/L	0	0	0	0
Cyanide_WAD	mg/L	0	0	0	0
Cyanate	mg/L	0.20	0.20	0.20	0.20
Thiocyanate	mg/L	0.17	0.17	0.17	0.17
Temp	℃	2.38	2.38	2.38	2.38

Annex B-7

Predicted Average Annual Water Quality at WQ5 – Best Estimate

Annex B - Summary Tables

WQ5 - Best Estimate

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.30	7.30	7.30	7.30
Conductivity	mS/cm	58	58	58	58
TDS	mg/L	61	61	61	61
TSS	mg/L	3.1	3.1	3.1	3.1
Turbidity	mg/L	1.5	1.5	1.5	1.5
Total_hardness	mg/L as $CaCO_3$	25	25	25	25
Total_alkalinity	mg/L	28	28	28	28
Fluoride	mg/L	0.05	0.05	0.05	0.05
Sulphate	mg/L	1.1	1.1	1.1	1.1
Chloride	mg/L	0.31	0.31	0.31	0.31
Ammonia	mg/L	0.020	0.020	0.020	0.020
Nitrate	mg/L	0.057	0.057	0.057	0.057
Nitrite	mg/L	0.003	0.003	0.003	0.003
TKN	mg/L	0.155	0.155	0.155	0.155
Ortho_P	mg/L	0.008	0.008	0.008	0.008
Total_Diss_P	mg/L	0.011	0.011	0.011	0.011
TOC	mg/L	9.579	9.579	9.579	9.579
DOC	mg/L	0.693	0.693	0.693	0.693
T_Aluminum	mg/L	0.1208	0.1208	0.1208	0.1208
T_Antimony	mg/L	0.0001	0.0001	0.0001	0.0001
T_Arsenic	mg/L	0.0007	0.0007	0.0007	0.0007
T_Barium	mg/L	0.0056	0.0056	0.0056	0.0056
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0020	0.0020	0.0020	0.0020
T_Cadmium	mg/L	0.00003	0.00003	0.00003	0.00003
T_Calcium	mg/L	6.9	6.9	6.9	6.9
T_Chromium	mg/L	0.0003	0.0003	0.0003	0.0003
T_Cobalt	mg/L	0.00005	0.00005	0.00005	0.00005
T_Copper	mg/L	0.0004	0.0004	0.0004	0.0004
T_Iron	mg/L	0.1985	0.1985	0.1985	0.1985
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0010	0.0010	0.0010	0.0010
T_Magnesium	mg/L	2.02	2.02	2.02	2.02
T_Manganese	mg/L	0.0223	0.0223	0.0223	0.0223
T_Mercury	mg/L	0.000006	0.000006	0.000006	0.000006
T_molybdenum	mg/L	0.0002	0.0002	0.0002	0.0002
T_Nickel	mg/L	0.0002	0.0002	0.0002	0.0002
T_Phosphorus	mg/L	0.0122	0.0122	0.0122	0.0122
T_Potassium	mg/L	0.50	0.50	0.50	0.50
T_Selenium	mg/L	0.0005	0.0005	0.0005	0.0005
T_Silicon	mg/L	5.82	5.82	5.82	5.82
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000050
T_Sodium	mg/L	2.6	2.6	2.6	2.6
T_Strontium	mg/L	0.0443	0.0443	0.0443	0.0443
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0020	0.0020	0.0020	0.0020
T_Uranium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Vanadium	mg/L	0.0002	0.0002	0.0002	0.0002
T_Zinc	mg/L	0.0061	0.0061	0.0061	0.0061
D_Aluminum	mg/L	0.0981	0.0981	0.0981	0.0981
D_Antimony	mg/L	5.00E-05	5.00E-05	5.00E-05	5.00E-05
D_Arsenic	mg/L	0.0005	0.0005	0.0005	0.0005
D_Barium	mg/L	0.0053	0.0053	0.0053	0.0053
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
D_Boron	mg/L	0.0018	0.0018	0.0018	0.0018
D_Cadmium	mg/L	0.000022	0.000022	0.000022	0.000022
D_Calcium	mg/L	6.79	6.79	6.79	6.79
D_Chromium	mg/L	0.000314	0.000314	0.000314	0.000314
D_Cobalt	mg/L	0.000036	0.000036	0.000036	0.000036
D_Copper	mg/L	0.000391	0.000391	0.000391	0.000391
D_Iron	mg/L	0.130	0.130	0.130	0.130
D_Lead	mg/L	5.06E-05	5.06E-05	5.06E-05	5.06E-05
D_Lithium	mg/L	0.001	0.0010	0.0010	0.0010
D_Magnesium	mg/L	2.01	2.01	2.01	2.01
D_Manganese	mg/L	0.0072	0.0072	0.0072	0.0072
D_Mercury	mg/L	0.0000061	0.0000061	0.0000061	0.0000061
D_Molybdenum	mg/L	0.00016	0.00016	0.00016	0.00016
D_Nickel	mg/L	0.00019	0.00019	0.00019	0.00019
D_Phosphorus	mg/L	0.010	0.010	0.010	0.010
D_Potassium	mg/L	0.50	0.50	0.50	0.50
D_Selenium	mg/L	0.00049	0.00049	0.00049	0.00049
D_Silicon	mg/L	5.59	5.59	5.59	5.59
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Sodium	mg/L	2.54	2.54	2.54	2.54
D_Strontium	mg/L	0.043	0.043	0.043	0.043
D_Thallium	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010
D_Titanium	mg/L	0.00135	0.00135	0.00135	0.00135
D_Uranium	mg/L	5.72E-05	5.72E-05	5.72E-05	5.72E-05
D_Vanadium	mg/L	0.00015	0.00015	0.00015	0.00015
D_Zinc	mg/L	0.0034	0.0034	0.0034	0.0034
Cyanide_T	mg/L	0	0	0	0
Cyanide_WAD	mg/L	0	0	0	0
Cyanate	mg/L	0.20	0.20	0.20	0.20
Thiocyanate	mg/L	0.18	0.18	0.18	0.18
Temp	°C	2.93	2.93	2.93	2.93

Annex B-8

Predicted Average Annual Water Quality at WQ5 – Worst Case

newgold

Blackwater Gold Project

WQ5 - Worst Case

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.30	7.30	7.30	7.30
Conductivity	mS/cm	58	58	58	58
TDS	mg/L	61	61	61	61
TSS	mg/L	3.1	3.1	3.1	3.1
Turbidity	mg/L	1.5	1.5	1.5	1.5
Total_hardness	mg/L as $CaCO_3$	25	25	25	25
Total_alkalinity	mg/L	28	28	28	28
Fluoride	mg/L	0.05	0.05	0.05	0.05
Sulphate	mg/L	1.1	1.1	1.1	1.1
Chloride	mg/L	0.31	0.31	0.31	0.31
Ammonia	mg/L	0.020	0.020	0.020	0.020
Nitrate	mg/L	0.057	0.057	0.057	0.057
Nitrite	mg/L	0.003	0.003	0.003	0.003
TKN	mg/L	0.155	0.155	0.155	0.155
Ortho_P	mg/L	0.008	0.008	0.008	0.008
Total_Diss_P	mg/L	0.011	0.011	0.011	0.011
TOC	mg/L	9.579	9.579	9.579	9.579
DOC	mg/L	0.693	0.693	0.693	0.693
T_Aluminum	mg/L	0.1208	0.1208	0.1208	0.1208
T_Antimony	mg/L	0.0001	0.0001	0.0001	0.0001
T_Arsenic	mg/L	0.0007	0.0007	0.0007	0.0007
T_Barium	mg/L	0.0056	0.0056	0.0056	0.0056
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0020	0.0020	0.0020	0.0020
T_Cadmium	mg/L	0.00003	0.00003	0.00003	0.00003
T_Calcium	mg/L	6.9	6.9	6.9	6.9
T_Chromium	mg/L	0.0003	0.0003	0.0003	0.0003
T_Cobalt	mg/L	0.00005	0.00005	0.00005	0.00005
T_Copper	mg/L	0.0004	0.0004	0.0004	0.0004
T_Iron	mg/L	0.1985	0.1985	0.1985	0.1985
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0010	0.0010	0.0010	0.0010
T_Magnesium	mg/L	2.02	2.02	2.02	2.02
T_Manganese	mg/L	0.0223	0.0223	0.0223	0.0223
T_Mercury	mg/L	0.000006	0.000006	0.000006	0.000006
T_molybdenum	mg/L	0.0002	0.0002	0.0002	0.0002
T_Nickel	mg/L	0.0002	0.0002	0.0002	0.0002
T_Phosphorus	mg/L	0.0122	0.0122	0.0122	0.0122
T_Potassium	mg/L	0.50	0.50	0.50	0.50
T_Selenium	mg/L	0.0005	0.0005	0.0005	0.0005
T_Silicon	mg/L	5.82	5.82	5.82	5.82
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000050
T_Sodium	mg/L	2.6	2.6	2.6	2.6
T_Strontium	mg/L	0.0443	0.0443	0.0443	0.0443
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0020	0.0020	0.0020	0.0020
T_Uranium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Vanadium	mg/L	0.0002	0.0002	0.0002	0.0002
T_Zinc	mg/L	0.0061	0.0061	0.0061	0.0061
D_Aluminum	mg/L	0.0981	0.0981	0.0981	0.0981
D_Antimony	mg/L	5.00E-05	5.00E-05	5.00E-05	5.00E-05
D_Arsenic	mg/L	0.0005	0.0005	0.0005	0.0005
D_Barium	mg/L	0.0053	0.0053	0.0053	0.0053
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
D_Boron	mg/L	0.0018	0.0018	0.0018	0.0018
D_Cadmium	mg/L	0.000022	0.000022	0.000022	0.000022
D_Calcium	mg/L	6.79	6.79	6.79	6.79
D_Chromium	mg/L	0.000314	0.000314	0.000314	0.000314
D_Cobalt	mg/L	0.000036	0.000036	0.000036	0.000036
D_Copper	mg/L	0.000391	0.000391	0.000391	0.000391
D_Iron	mg/L	0.130	0.130	0.130	0.130
D_Lead	mg/L	5.06E-05	5.06E-05	5.06E-05	5.06E-05
D_Lithium	mg/L	0.001	0.0010	0.0010	0.0010
D_Magnesium	mg/L	2.01	2.01	2.01	2.01
D_Manganese	mg/L	0.0072	0.0072	0.0072	0.0072
D_Mercury	mg/L	0.0000061	0.0000061	0.0000061	0.0000061
D_Molybdenum	mg/L	0.00016	0.00016	0.00016	0.00016
D_Nickel	mg/L	0.00019	0.00019	0.00019	0.00019
D_Phosphorus	mg/L	0.010	0.010	0.010	0.010
D_Potassium	mg/L	0.50	0.50	0.50	0.50
D_Selenium	mg/L	0.00049	0.00049	0.00049	0.00049
D_Silicon	mg/L	5.59	5.59	5.59	5.59
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Sodium	mg/L	2.54	2.54	2.54	2.54
D_Strontium	mg/L	0.043	0.043	0.043	0.043
D_Thallium	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010
D_Titanium	mg/L	0.00135	0.00135	0.00135	0.00135
D_Uranium	mg/L	5.72E-05	5.72E-05	5.72E-05	5.72E-05
D_Vanadium	mg/L	0.00015	0.00015	0.00015	0.00015
D_Zinc	mg/L	0.0034	0.0034	0.0034	0.0034
Cyanide_T	mg/L	0	0	0	0
Cyanide_WAD	mg/L	0	0	0	0
Cyanate	mg/L	0.20	0.20	0.20	0.20
Thiocyanate	mg/L	0.18	0.18	0.18	0.18
Temp	°C	2.93	2.93	2.93	2.93

Annex B-9

Predicted Average Annual Water Quality at WQ12 – Best Estimate

Annex B - Summary Tables

WQ12 - Best Estimate

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.36	7.36	7.36	7.36
Conductivity	mS/cm	48	48	48	48
TDS	mg/L	45	45	45	45
TSS	mg/L	3.0	2.9	2.9	2.9
Turbidity	mg/L	1.8	1.7	1.7	1.7
Total_hardness	mg/L as $CaCO_3$	21	21	21	21
Total_alkalinity	mg/L	23	23	23	23
Fluoride	mg/L	0.04	0.04	0.04	0.04
Sulphate	mg/L	1.2	1.2	1.2	1.2
Chloride	mg/L	0.29	0.29	0.29	0.29
Ammonia	mg/L	0.020	0.020	0.020	0.020
Nitrate	mg/L	0.022	0.022	0.022	0.022
Nitrite	mg/L	0.004	0.004	0.004	0.004
TKN	mg/L	0.186	0.182	0.182	0.182
Ortho_P	mg/L	0.006	0.007	0.007	0.007
Total_Diss_P	mg/L	0.012	0.012	0.012	0.012
TOC	mg/L	7.570	7.508	7.508	7.508
DOC	mg/L	0.557	0.557	0.557	0.557
T_Aluminum	mg/L	0.0948	0.0922	0.0922	0.0922
T_Antimony	mg/L	0.0001	0.0001	0.0001	0.0001
T_Arsenic	mg/L	0.0004	0.0004	0.0004	0.0004
T_Barium	mg/L	0.0066	0.0067	0.0067	0.0067
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0011	0.0012	0.0012	0.0012
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00002
T_Calcium	mg/L	6.7	6.7	6.7	6.7
T_Chromium	mg/L	0.0011	0.0011	0.0011	0.0011
T_Cobalt	mg/L	0.00004	0.00004	0.00004	0.00004
T_Copper	mg/L	0.0003	0.0003	0.0003	0.0003
T_Iron	mg/L	0.2185	0.2173	0.2173	0.2173
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0011	0.0011	0.0011	0.0011
T_Magnesium	mg/L	1.16	1.17	1.17	1.17
T_Manganese	mg/L	0.0230	0.0228	0.0228	0.0228
T_Mercury	mg/L	0.000015	0.000016	0.000016	0.000016
T_molybdenum	mg/L	0.0006	0.0006	0.0006	0.0006
T_Nickel	mg/L	0.0001	0.0001	0.0001	0.0001
T_Phosphorus	mg/L	0.0132	0.0131	0.0131	0.0131
T_Potassium	mg/L	0.51	0.51	0.51	0.51
T_Selenium	mg/L	0.0005	0.0005	0.0005	0.0005
T_Silicon	mg/L	3.15	3.15	3.15	3.15
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000050
T_Sodium	mg/L	1.9	1.9	1.9	1.9
T_Strontium	mg/L	0.0510	0.0513	0.0513	0.0513
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0019	0.0018	0.0018	0.0018
T_Uranium	mg/L	0.0002	0.0002	0.0002	0.0002
T_Vanadium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Zinc	mg/L	0.0023	0.0023	0.0023	0.0023
D_Aluminum	mg/L	0.0477	0.0466	0.0466	0.0466
D_Antimony	mg/L	5.07E-05	5.07E-05	5.07E-05	5.07E-05
D_Arsenic	mg/L	0.0002	0.0002	0.0002	0.0002
D_Barium	mg/L	0.0058	0.0059	0.0059	0.0059
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
D_Boron	mg/L	0.0011	0.0011	0.0011	0.0011
D_Cadmium	mg/L	0.000016	0.000016	0.000016	0.000016
D_Calcium	mg/L	6.52	6.54	6.54	6.54
D_Chromium	mg/L	0.000303	0.000303	0.000303	0.000303
D_Cobalt	mg/L	0.000025	0.000025	0.000025	0.000025
D_Copper	mg/L	0.000214	0.000216	0.000216	0.000216
D_Iron	mg/L	0.129	0.128	0.128	0.128
D_Lead	mg/L	5.99E-05	5.98E-05	5.98E-05	5.98E-05
D_Lithium	mg/L	0.001	0.0010	0.0010	0.0010
D_Magnesium	mg/L	1.14	1.15	1.15	1.15
D_Manganese	mg/L	0.0110	0.0108	0.0108	0.0108
D_Mercury	mg/L	0.0000061	0.0000060	0.0000060	0.0000060
D_Molybdenum	mg/L	0.00050	0.00051	0.00051	0.00051
D_Nickel	mg/L	0.00008	0.00008	0.00008	0.00008
D_Phosphorus	mg/L	0.010	0.010	0.010	0.010
D_Potassium	mg/L	0.50	0.50	0.50	0.50
D_Selenium	mg/L	0.00051	0.00051	0.00051	0.00051
D_Silicon	mg/L	2.91	2.91	2.91	2.91
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Sodium	mg/L	1.89	1.89	1.89	1.89
D_Strontium	mg/L	0.049	0.050	0.050	0.050
D_Thallium	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010
D_Titanium	mg/L	0.00079	0.00077	0.00077	0.00077
D_Uranium	mg/L	1.60E-04	1.59E-04	1.59E-04	1.59E-04
D_Vanadium	mg/L	0.00008	0.00008	0.00008	0.00008
D_Zinc	mg/L	0.0025	0.0025	0.0025	0.0025
Cyanide_T	mg/L	0	0	0	0
Cyanide_WAD	mg/L	0	0	0	0
Cyanate	mg/L	0.20	0.20	0.20	0.20
Thiocyanate	mg/L	0.20	0.20	0.20	0.20
Temp	°C	4.15	4.15	4.15	4.15

Annex B-10

Predicted Average Annual Water Quality at WQ12 – Worst Case

WQ12 - Worst Case

		Construction	Operation	Closure	Post-closure
			Last year of open pit mining	Pit filling/TSF pumping	Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.47	7.46	7.46	7.45
Conductivity	mS/cm	52	52	52	51
TDS	mg/L	62	62	62	60
TSS	mg/L	3.6	3.5	3.5	4.4
Turbidity	mg/L	2.4	2.3	2.3	2.6
Total_hardness	mg/L as $CaCO_3$	23	23	23	23
Total_alkalinity	mg/L	26	26	26	26
Fluoride	mg/L	0.04	0.04	0.04	0.04
Sulphate	mg/L	1.6	1.6	1.6	1.6
Chloride	mg/L	0.42	0.41	0.41	0.40
Ammonia	mg/L	0.022	0.022	0.022	0.021
Nitrate	mg/L	0.029	0.029	0.029	0.029
Nitrite	mg/L	0.005	0.005	0.005	0.004
TKN	mg/L	0.257	0.250	0.250	0.261
Ortho_P	mg/L	0.008	0.008	0.008	0.008
Total_Diss_P	mg/L	0.023	0.023	0.023	0.025
TOC	mg/L	8.692	8.594	8.594	8.401
DOC	mg/L	0.613	0.612	0.612	0.596
T_Aluminum	mg/L	0.1467	0.1404	0.1404	0.1436
T_Antimony	mg/L	0.0001	0.0001	0.0001	0.0001
T_Arsenic	mg/L	0.0005	0.0005	0.0005	0.0005
T_Barium	mg/L	0.0075	0.0075	0.0075	0.0071
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0013	0.0013	0.0013	0.0013
T_Cadmium	mg/L	0.00002	0.00002	0.00002	0.00002
T_Calcium	mg/L	7.1	7.2	7.2	7.1
T_Chromium	mg/L	0.0019	0.0019	0.0019	0.0007
T_Cobalt	mg/L	0.00006	0.00005	0.00005	0.00005
T_Copper	mg/L	0.0005	0.0005	0.0005	0.0004
T_Iron	mg/L	0.3123	0.3093	0.3093	0.2731
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0013	0.0012	0.0012	0.0012
T_Magnesium	mg/L	1.25	1.25	1.25	1.26
T_Manganese	mg/L	0.0341	0.0340	0.0340	0.0322
T_Mercury	mg/L	0.000034	0.000038	0.000038	0.000036
T_molybdenum	mg/L	0.0006	0.0006	0.0006	0.0007
T_Nickel	mg/L	0.0002	0.0001	0.0001	0.0001
T_Phosphorus	mg/L	0.0232	0.0231	0.0231	0.0249
T_Potassium	mg/L	0.52	0.52	0.52	0.52
T_Selenium	mg/L	0.0005	0.0005	0.0005	0.0005
T_Silicon	mg/L	3.47	3.46	3.46	3.10
T_Silver	mg/L	0.000050	0.000050	0.000050	0.000050
T_Sodium	mg/L	2.1	2.1	2.1	2.0
T_Strontium	mg/L	0.0550	0.0554	0.0554	0.0534
T_Thallium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0032	0.0030	0.0030	0.0030
T_Uranium	mg/L	0.0002	0.0002	0.0002	0.0003
T_Vanadium	mg/L	0.0002	0.0002	0.0002	0.0002
T_Zinc	mg/L	0.0035	0.0034	0.0034	0.0038
D_Aluminum	mg/L	0.0604	0.0587	0.0587	0.0536
D_Antimony	mg/L	5.10E-05	5.10E-05	5.10E-05	5.22E-05
D_Arsenic	mg/L	0.0003	0.0003	0.0003	0.0003
D_Barium	mg/L	0.0065	0.0065	0.0065	0.0061
D_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
D_Boron	mg/L	0.0011	0.0011	0.0011	0.0011
D_Cadmium	mg/L	0.000017	0.000017	0.000017	0.000018
D_Calcium	mg/L	7.01	7.04	7.04	6.98
D_Chromium	mg/L	0.000310	0.000310	0.000310	0.000309
D_Cobalt	mg/L	0.000028	0.000028	0.000028	0.000027
D_Copper	mg/L	0.000303	0.000302	0.000302	0.000303
D_Iron	mg/L	0.166	0.166	0.166	0.144
D_Lead	mg/L	5.99E-05	5.98E-05	5.98E-05	6.72E-05
D_Lithium	mg/L	0.001	0.0010	0.0010	0.0010
D_Magnesium	mg/L	1.24	1.24	1.24	1.25
D_Manganese	mg/L	0.0125	0.0123	0.0123	0.0157
D_Mercury	mg/L	0.0000072	0.0000072	0.0000072	0.0000067
D_Molybdenum	mg/L	0.00055	0.00055	0.00055	0.00059
D_Nickel	mg/L	0.00009	0.00009	0.00009	0.00009
D_Phosphorus	mg/L	0.010	0.010	0.010	0.011
D_Potassium	mg/L	0.51	0.51	0.51	0.51
D_Selenium	mg/L	0.00054	0.00054	0.00054	0.00053
D_Silicon	mg/L	3.09	3.09	3.09	2.77
D_Silver	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Sodium	mg/L	2.05	2.05	2.05	2.04
D_Strontium	mg/L	0.053	0.053	0.053	0.052
D_Thallium	mg/L	5.0E-05	5.0E-05	5.0E-05	5.0E-05
D_Tin	mg/L	0.00010	0.00010	0.00010	0.00010
D_Titanium	mg/L	0.00101	0.00098	0.00098	0.00090
D_Uranium	mg/L	1.78E-04	1.78E-04	1.78E-04	1.89E-04
D_Vanadium	mg/L	0.00011	0.00011	0.00011	0.00011
D_Zinc	mg/L	0.0036	0.0035	0.0035	0.0032
Cyanide_T	mg/L	0	0	0	0
Cyanide_WAD	mg/L	0	0	0	0
Cyanate	mg/L	0.20	0.20	0.20	0.20
Thiocyanate	mg/L	0.22	0.22	0.22	0.19
Temp	°C	4.89	4.86	4.86	4.88

Annex B-11

Predicted Average Annual Water Quality at WQ9 – Best Estimate

WQ9 - Best Estimate

		Construction	Operation		Closure	Post-closure
			Last year of open pit mining	Last year of LGS processing	Pit filling/TSF pumping	Pit overflow
		Year -1	Year 13	Year 17	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2033 to 31/12/2033	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.82	7.23	7.22	7.22	7.22
Conductivity	mS/cm	137	130	128	127	127
TDS	mg/L	85	84	81	81	81
TSS	mg/L	4.0	6.7	5.3	5.3	5.3
Turbidity	mg/L	1.8	3.7	2.7	2.7	2.7
Total_hardness	mg/L as $CaCO_3$	66	63	62	62	62
Total_alkalinity	mg/L	67	68	65	65	65
Fluoride	mg/L	0.07	0.06	0.06	0.06	0.06
Sulphate	mg/L	4.0	3.6	3.6	3.6	3.6
Chloride	mg/L	0.41	0.37	0.37	0.37	0.37
Ammonia	mg/L	0.019	0.019	0.018	0.018	0.018
Nitrate	mg/L	0.034	0.032	0.031	0.032	0.032
Nitrite	mg/L	0.004	0.004	0.004	0.004	0.004
TKN	mg/L	0.210	0.223	0.210	0.209	0.209
Ortho_P	mg/L	0.011	0.009	0.010	0.010	0.010
Total_Diss_P	mg/L	0.015	0.017	0.017	0.017	0.017
TOC	mg/L	9.019	8.493	8.406	8.374	8.374
DOC	mg/L	1.146	1.084	1.070	1.068	1.068
T_Aluminum	mg/L	0.0476	0.0383	0.0421	0.0429	0.0429
T_Antimony	mg/L	0.0001	0.0000	0.0000	0.0000	0.0000
T_Arsenic	mg/L	0.0006	0.0005	0.0005	0.0005	0.0005
T_Barium	mg/L	0.0077	0.0067	0.0068	0.0069	0.0069
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0014	0.0014	0.0014	0.0014	0.0014
T_Cadmium	mg/L	0.00002	0.00001	0.00001	0.00001	0.00001
T_Calcium	mg/L	19.5	18.6	18.3	18.2	18.2
T_Chromium	mg/L	0.0003	0.0003	0.0003	0.0003	0.0003
T_Cobalt	mg/L	0.00004	0.00003	0.00004	0.00004	0.00004
T_Copper	mg/L	0.0003	0.0004	0.0004	0.0004	0.0004
T_Iron	mg/L	0.1766	0.1053	0.1295	0.1342	0.1342
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0012	0.0011	0.0011	0.0011	0.0011
T_Magnesium	mg/L	4.40	4.27	4.17	4.16	4.16
T_Manganese	mg/L	0.0254	0.0218	0.0220	0.0226	0.0226
T_Mercury	mg/L	0.000006	0.000006	0.000006	0.000006	0.000006
T_molybdenum	mg/L	0.0006	0.0005	0.0005	0.0005	0.0005
T_Nickel	mg/L	0.0002	0.0002	0.0002	0.0002	0.0002
T_Phosphorus	mg/L	0.0163	0.0175	0.0169	0.0169	0.0169
T_Potassium	mg/L	0.82	0.78	0.77	0.77	0.77
T_Selenium	mg/L	0.0006	0.0005	0.0005	0.0005	0.0005
T_Silicon	mg/L	4.86	4.18	4.34	4.36	4.36
T_Silver	mg/L	0.000050	0.000046	0.000046	0.000046	0.000046
T_Sodium	mg/L	3.4	3.3	3.2	3.2	3.2
T_Strontium	mg/L	0.0975	0.0904	0.0898	0.0899	0.0899
T_Thallium	mg/L	0.0001	0.0000	0.0000	0.0000	0.0000
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0020	0.0017	0.0017	0.0018	0.0018
T_Uranium	mg/L	0.0001	0.0001	0.0001	0.0001	0.0001
T_Vanadium	mg/L	0.0003	0.0002	0.0002	0.0002	0.0002
T_Zinc	mg/L	0.0015	0.0021	0.0019	0.0019	0.0019
D_Aluminum	mg/L	0.0119	0.0072	0.0097	0.0097	0.0097
D_Antimony	mg/L	5.05E-05	4.65E-05	4.68E-05	4.68E-05	4.68E-05
D_Arsenic	mg/L	0.0005	0.0004	0.0004	0.0004	0.0004
D_Barium	mg/L	0.0072	0.0060	0.0063	0.0063	0.0063
D_Beryllium	mg/L	0.0001	9.21225E-05	9.22409E-05	9.22744E-05	9.22744E-05
D_Boron	mg/L	0.0011	0.0012	0.0011	0.0011	0.0011
D_Cadmium	mg/L	0.000016	0.000014	0.000014	0.000014	0.000014
D_Calcium	mg/L	19.04	18.15	17.81	17.77	17.77
D_Chromium	mg/L	0.000300	0.000277	0.000277	0.000277	0.000277
D_Cobalt	mg/L	0.000026	0.000021	0.000023	0.000023	0.000023
D_Copper	mg/L	0.000289	0.000280	0.000279	0.000282	0.000282
D_Iron	mg/L	0.097	0.047	0.065	0.067	0.067
D_Lead	mg/L	5.08E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05
D_Lithium	mg/L	0.001	0.0009	0.0009	0.0009	0.0009
D_Magnesium	mg/L	4.30	4.17	4.06	4.05	4.05
D_Manganese	mg/L	0.0189	0.0100	0.0129	0.0135	0.0135
D_Mercury	mg/L	0.0000066	0.0000060	0.0000060	0.0000060	0.0000060
D_Molybdenum	mg/L	0.00055	0.00048	0.00049	0.00049	0.00049
D_Nickel	mg/L	0.00021	0.00018	0.00019	0.00019	0.00019
D_Phosphorus	mg/L	0.011	0.016	0.017	0.017	0.017
D_Potassium	mg/L	0.79	0.75	0.75	0.74	0.74
D_Selenium	mg/L	0.00056	0.00051	0.00051	0.00051	0.00051
D_Silicon	mg/L	4.68	4.00	4.16	4.18	4.18
D_Silver	mg/L	5.0E-05	4.6E-05	4.6E-05	4.6E-05	4.6E-05
D_Sodium	mg/L	3.30	3.17	3.14	3.13	3.13
D_Strontium	mg/L	0.095	0.088	0.088	0.088	0.088
D_Thallium	mg/L	5.0E-05	4.6E-05	4.6E-05	4.6E-05	4.6E-05
D_Tin	mg/L	0.00010	0.00009	0.00009	0.00009	0.00009
D_Titanium	mg/L	0.00038	0.00027	0.00031	0.00031	0.00031
D_Uranium	mg/L	1.03E-04	8.62E-05	9.05E-05	9.16E-05	9.16E-05
D_Vanadium	mg/L	0.00017	0.00013	0.00014	0.00014	0.00014
D_Zinc	mg/L	0.0013	0.0015	0.0014	0.0014	0.0014
Cyanide_T	mg/L	0	0	0	0	0
Cyanide_WAD	mg/L	0	0	0	0	0
Cyanate	mg/L	0.20	0.18	0.18	0.18	0.18
Thiocyanate	mg/L	0.18	0.16	0.17	0.17	0.17
Temp	°C	5.50	5.67	5.35	5.32	5.32

Annex B-12

Predicted Average Annual Water Quality at WQ9 – Worst Case

WQ9 - Worst Case

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 01/12/2053
pH	pH unit	7.82	7.22	7.22	7.81
Conductivity	mS/cm	137	130	127	180
TDS	mg/L	85	84	81	87
TSS	mg/L	4.0	6.7	5.3	6.0
Turbidity	mg/L	1.8	3.7	2.7	3.1
Total_hardness	mg/L as $CaCO_3$	66	63	62	65
Total_alkalinity	mg/L	67	67	65	69
Fluoride	mg/L	0.07	0.06	0.06	0.07
Sulphate	mg/L	4.0	3.6	3.6	22.8
Chloride	mg/L	0.41	0.37	0.37	0.40
Ammonia	mg/L	0.019	0.019	0.018	0.041
Nitrate	mg/L	0.034	0.032	0.032	0.034
Nitrite	mg/L	0.004	0.004	0.004	0.004
TKN	mg/L	0.210	0.223	0.208	0.226
Ortho_P	mg/L	0.011	0.009	0.010	0.010
Total_Diss_P	mg/L	0.015	0.017	0.017	0.017
TOC	mg/L	9.019	8.486	8.367	8.923
DOC	mg/L	1.146	1.083	1.067	1.204
T_Aluminum	mg/L	0.0476	0.0383	0.0429	0.0452
T_Antimony	mg/L	0.0001	0.0000	0.0000	0.0002
T_Arsenic	mg/L	0.0006	0.0005	0.0005	0.0006
T_Barium	mg/L	0.0077	0.0067	0.0069	0.0081
T_Beryllium	mg/L	0.0001	0.0001	0.0001	0.0001
T_Boron	mg/L	0.0014	0.0014	0.0014	0.0020
T_Cadmium	mg/L	0.00002	0.00001	0.00001	0.00002
T_Calcium	mg/L	19.5	18.6	18.2	19.2
T_Chromium	mg/L	0.0003	0.0003	0.0003	0.0003
T_Cobalt	mg/L	0.00004	0.00003	0.00004	0.00008
T_Copper	mg/L	0.0003	0.0004	0.0004	0.0005
T_Iron	mg/L	0.1766	0.1052	0.1340	0.1218
T_Lead	mg/L	0.0001	0.0001	0.0001	0.0001
T_Lithium	mg/L	0.0012	0.0011	0.0011	0.0013
T_Magnesium	mg/L	4.40	4.27	4.15	4.37
T_Manganese	mg/L	0.0254	0.0218	0.0226	0.0221
T_Mercury	mg/L	0.000006	0.000006	0.000006	0.000007
T_molybdenum	mg/L	0.0006	0.0005	0.0005	0.0033
T_Nickel	mg/L	0.0002	0.0002	0.0002	0.0003
T_Phosphorus	mg/L	0.0163	0.0175	0.0169	0.0185
T_Potassium	mg/L	0.82	0.78	0.77	2.11
T_Selenium	mg/L	0.0006	0.0005	0.0005	0.0006
T_Silicon	mg/L	4.86	4.18	4.35	4.61
T_Silver	mg/L	0.000050	0.000046	0.000046	0.000050
T_Sodium	mg/L	3.4	3.3	3.2	3.4
T_Strontium	mg/L	0.0975	0.0903	0.0898	0.1057
T_Thallium	mg/L	0.00005	0.00005	0.00005	0.00006
T_Tin	mg/L	0.0001	0.0001	0.0001	0.0001
T_Titanium	mg/L	0.0020	0.0017	0.0018	0.0018
T_Uranium	mg/L	0.0001	0.0001	0.0001	0.0002
T_Vanadium	mg/L	0.0003	0.0002	0.0002	0.0002
T_Zinc	mg/L	0.0015	0.0021	0.0019	0.0020
D_Aluminum	mg/L	0.0119	0.0072	0.0097	0.0130
D_Antimony	mg/L	5.05E-05	4.65E-05	4.68E-05	2.25E-04
D_Arsenic	mg/L	0.0005	0.0004	0.0004	0.0005
D_Barium	mg/L	0.0072	0.0060	0.0063	0.0075
D_Beryllium	mg/L	0.0001	9.20426E-05	9.21926E-05	0.0001
D_Boron	mg/L	0.0011	0.0012	0.0011	0.0018
D_Cadmium	mg/L	0.000016	0.000014	0.000014	0.000016
D_Calcium	mg/L	19.04	18.13	17.75	18.74
D_Chromium	mg/L	0.000300	0.000276	0.000277	0.000302
D_Cobalt	mg/L	0.000026	0.000021	0.000023	0.000067
D_Copper	mg/L	0.000289	0.000280	0.000282	0.000412
D_Iron	mg/L	0.097	0.047	0.067	0.061
D_Lead	mg/L	5.08E-05	4.73E-05	4.74E-05	6.24E-05
D_Lithium	mg/L	0.001	0.0009	0.0009	0.0012
D_Magnesium	mg/L	4.30	4.16	4.05	4.26
D_Manganese	mg/L	0.0189	0.0100	0.0134	0.0121
D_Mercury	mg/L	0.0000066	0.0000060	0.0000060	0.0000067
D_Molybdenum	mg/L	0.00055	0.00048	0.00049	0.00324
D_Nickel	mg/L	0.00021	0.00018	0.00019	0.00023
D_Phosphorus	mg/L	0.011	0.016	0.017	0.016
D_Potassium	mg/L	0.79	0.75	0.74	2.08
D_Selenium	mg/L	0.00056	0.00051	0.00051	0.00056
D_Silicon	mg/L	4.68	3.99	4.17	4.42
D_Silver	mg/L	5.0E-05	4.6E-05	4.6E-05	5.0E-05
D_Sodium	mg/L	3.30	3.16	3.13	3.34
D_Strontium	mg/L	0.095	0.088	0.088	0.103
D_Thallium	mg/L	5.0E-05	4.6E-05	4.6E-05	6.0E-05
D_Tin	mg/L	0.00010	0.00009	0.00009	0.00010
D_Titanium	mg/L	0.00038	0.00027	0.00031	0.00034
D_Uranium	mg/L	1.03E-04	8.61E-05	9.15E-05	1.95E-04
D_Vanadium	mg/L	0.00017	0.00013	0.00014	0.00015
D_Zinc	mg/L	0.0013	0.0015	0.0014	0.0016
Cyanide_T	mg/L	0	0	0	0.000841612
Cyanide_WAD	mg/L	0	0	0	0.000310068
Cyanate	mg/L	0.20	0.18	0.18	1.48
Thiocyanate	mg/L	0.18	0.16	0.17	1.43
Temp	°C	5.50	5.67	5.31	5.73

Annex B-13

Predicted Average Annual Water Quality in TSF D – Best Estimate

TSF D - Best Estimate

		Construction	Operation Last year of open pit mining	Closure Pit filling/ TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 31/12/2053
pH	pH unit	7.56	9.12	8.51	7.63
Conductivity	mS/cm	78	284	195	78
TDS	mg/L	56	171	120	56
TSS	mg/L	2.5	5.7	4.4	2.5
Turbidity	mg/L	1.1	3.3	2.4	1.1
Total_hardness	mg/L as $CaCO_3$	34	72	57	34
Total_alkalinity	mg/L	38	79	62	38
Fluoride	mg/L	0.05	0.10	0.08	0.05
Sulphate	mg/L	2.3	67.0	37.6	2.3
Chloride	mg/L	0.29	0.80	0.59	0.29
Ammonia	mg/L	0.019	1.836	0.097	0.020
Nitrate	mg/L	0.022	13.618	0.178	0.022
Nitrite	mg/L	0.003	0.327	0.013	0.003
TKN	mg/L	0.137	1.511	0.850	0.137
Ortho_P	mg/L	0.011	0.024	0.019	0.011
Total_Diss_P	mg/L	0.012	0.035	0.026	0.012
TOC	mg/L	5.758	13.159	10.076	5.758
DOC	mg/L	0.744	5.223	3.323	0.759
T_Aluminum	mg/L	0.0985	0.2677	0.0833	0.0833
T_Antimony	mg/L	0.0001	0.0898	0.0568	0.0001
T_Arsenic	mg/L	0.0005	0.0119	0.0074	0.0005
T_Barium	mg/L	0.0072	0.0749	0.0500	0.0071
T_Beryllium	mg/L	0.0001	0.0002	0.0002	0.0001
T_Boron	mg/L	0.0012	0.0382	0.0238	0.0012
T_Cadmium	mg/L	0.00002	0.00498	0.00313	0.00002
T_Calcium	mg/L	10.5	35.5	19.1	10.5
T_Chromium	mg/L	0.0003	0.0018	0.0012	0.0003
T_Cobalt	mg/L	0.00003	0.09007	0.05741	0.00003
T_Copper	mg/L	0.0002	0.0249	0.0144	0.0002
T_Iron	mg/L	0.0835	0.6481	0.4312	0.0835
T_Lead	mg/L	0.0001	0.0018	0.0005	0.0001
T_Lithium	mg/L	0.0012	0.0199	0.0123	0.0012
T_Magnesium	mg/L	2.08	5.08	4.06	2.08
T_Manganese	mg/L	0.0044	0.5098	0.3233	0.0044
T_Mercury	mg/L	0.000007	0.000017	0.000013	0.000008
T_molybdenum	mg/L	0.0006	0.1508	0.0964	0.0006
T_Nickel	mg/L	0.0001	0.0053	0.0033	0.0001
T_Phosphorus	mg/L	0.0127	0.1046	0.0435	0.0127
T_Potassium	mg/L	0.50	98.24	62.49	0.50
T_Selenium	mg/L	0.0006	0.0014	0.0011	0.0006
T_Silicon	mg/L	6.02	10.29	8.88	6.02
T_Silver	mg/L	0.000050	-0.000035	0.000033	0.000033
T_Sodium	mg/L	2.8	19.7	11.7	2.8
T_Strontium	mg/L	0.0702	0.7657	0.5103	0.0702
T_Thallium	mg/L	0.0001	0.0002	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0244	0.0156	0.0001
T_Titanium	mg/L	0.0015	0.0040	0.0020	0.0015
T_Uranium	mg/L	0.0002	0.0031	0.0020	0.0002
T_Vanadium	mg/L	0.0002	0.0006	0.0003	0.0002
T_Zinc	mg/L	0.0022	0.1195	0.0692	0.0022
D_Aluminum	mg/L	0.0598	0.2531	0.0668	0.0598
D_Antimony	mg/L	5.02E-05	8.98E-02	5.68E-02	5.21E-05
D_Arsenic	mg/L	0.0004	0.0118	0.0074	0.0004
D_Barium	mg/L	0.0067	0.0747	0.0497	0.0067
D_Beryllium	mg/L	0.0001	0.000199012	0.000155607	0.000100002
D_Boron	mg/L	0.0011	0.0382	0.0238	0.0011
D_Cadmium	mg/L	0.000015	0.004953	0.003115	0.000015
D_Calcium	mg/L	10.23	35.49	18.98	10.23
D_Chromium	mg/L	0.000311	0.001753	0.001156	0.000311
D_Cobalt	mg/L	0.000022	0.090071	0.057408	0.000024
D_Copper	mg/L	0.000206	0.024899	0.014348	0.000207
D_Iron	mg/L	0.052	0.635	0.412	0.052
D_Lead	mg/L	5.92E-05	1.79E-03	4.83E-04	5.94E-05
D_Lithium	mg/L	0.001	0.0198095	0.01216638	0.001000372
D_Magnesium	mg/L	2.04	5.07	4.04	2.04
D_Manganese	mg/L	0.0021	0.5087	0.3219	0.0021
D_Mercury	mg/L	0.0000066	0.0000166	0.0000128	0.0000080
D_Molybdenum	mg/L	0.00054	0.15076	0.09642	0.00055
D_Nickel	mg/L	0.00012	0.00529	0.00330	0.00012
D_Phosphorus	mg/L	0.010	0.104	0.042	0.010
D_Potassium	mg/L	0.50	98.24	62.49	0.50
D_Selenium	mg/L	0.00056	0.00126	0.00100	0.00060
D_Silicon	mg/L	5.77	10.21	8.74	5.77
D_Silver	mg/L	5.0E-05	3.5E-05	3.3E-05	3.3E-05
D_Sodium	mg/L	2.69	19.67	11.63	2.69
D_Strontium	mg/L	0.069	0.765	0.509	0.069
D_Thallium	mg/L	5.0E-05	1.6E-04	1.1E-04	5.0E-05
D_Tin	mg/L	0.00010	0.02440	0.01559	0.00010
D_Titanium	mg/L	0.00073	0.00364	0.00154	0.00073
D_Uranium	mg/L	1.91E-04	3.10E-03	2.04E-03	1.91E-04
D_Vanadium	mg/L	0.00014	0.00056	0.00029	0.00014
D_Zinc	mg/L	0.0017	0.1194	0.0689	0.0017
Cyanide_T	mg/L	0	0.156	0.093	4.11469E-06
Cyanide_WAD	mg/L	0	0.00813	0.00515	2.29019E-07
Cyanate	mg/L	0.00	1.54	0.93	3.63607E-05
Thiocyanate	mg/L	0.00	1.92	1.17	9.09017E-05
Temp	°C	2.53	5.87	4.99	4.00

Annex B-14

Predicted Average Annual Water Quality in TSF D – Worst Case

TSF D - Worst Case

		Construction	Operation Last year of open pit mining	Closure Pit filling/TSF pumping	Post-closure Pit overflow
		Year -1	Year 13	Year 18	Year 37
	Unit	01/01/2016 to 31/12/2016	01/01/2029 to 31/12/2029	01/01/2034 to 31/12/2034	01/01/2053 to 31/12/2053
pH	pH unit	7.70	9.12	8.51	7.68
Conductivity	mS/cm	84	231	80	80
TDS	mg/L	68	180	69	69
TSS	mg/L	3.3	6.5	3.1	3.1
Turbidity	mg/L	1.8	4.0	1.8	1.8
Total_hardness	mg/L as $CaCO_3$	38	76	36	36
Total_alkalinity	mg/L	43	83	40	40
Fluoride	mg/L	0.06	0.11	0.06	0.06
Sulphate	mg/L	2.8	40.6	2.5	2.5
Chloride	mg/L	0.44	0.91	0.43	0.43
Ammonia	mg/L	0.021	1.756	0.075	0.075
Nitrate	mg/L	0.035	13.668	0.467	0.467
Nitrite	mg/L	0.004	0.329	0.014	0.014
TKN	mg/L	0.208	1.602	0.225	0.225
Ortho_P	mg/L	0.014	0.032	0.015	0.015
Total_Diss_P	mg/L	0.022	0.039	0.021	0.021
TOC	mg/L	7.492	14.904	7.827	7.828
DOC	mg/L	0.832	5.817	0.809	0.809
T_Aluminum	mg/L	0.1612	0.4528	0.1664	0.1664
T_Antimony	mg/L	0.0001	0.0928	0.0001	0.0001
T_Arsenic	mg/L	0.0007	0.0119	0.0006	0.0006
T_Barium	mg/L	0.0080	0.0786	0.0079	0.0079
T_Beryllium	mg/L	0.0001	0.0002	0.0001	0.0001
T_Boron	mg/L	0.0015	0.0396	0.0015	0.0015
T_Cadmium	mg/L	0.00002	0.00537	0.00002	0.00002
T_Calcium	mg/L	11.5	51.2	10.8	10.8
T_Chromium	mg/L	0.0004	0.0019	0.0004	0.0004
T_Cobalt	mg/L	0.00004	0.09328	0.00004	0.00005
T_Copper	mg/L	0.0004	0.0258	0.0004	0.0004
T_Iron	mg/L	0.1301	0.6650	0.1331	0.1332
T_Lead	mg/L	0.0001	0.0047	0.0001	0.0001
T_Lithium	mg/L	0.0017	0.0220	0.0017	0.0017
T_Magnesium	mg/L	2.28	5.39	2.14	2.14
T_Manganese	mg/L	0.0078	0.5421	0.0079	0.0079
T_Mercury	mg/L	0.000009	0.000017	0.000009	0.000009
T_molybdenum	mg/L	0.0007	0.1554	0.0006	0.0006
T_Nickel	mg/L	0.0002	0.0056	0.0002	0.0002
T_Phosphorus	mg/L	0.0217	0.0961	0.0211	0.0211
T_Potassium	mg/L	0.52	101.48	0.52	0.52
T_Selenium	mg/L	0.0006	0.0015	0.0006	0.0006
T_Silicon	mg/L	6.41	10.79	6.30	6.30
T_Silver	mg/L	0.000053	-0.000036	0.000051	0.000051
T_Sodium	mg/L	3.0	20.4	2.9	2.9
T_Strontium	mg/L	0.0764	0.8046	0.0731	0.0731
T_Thallium	mg/L	0.0001	0.0002	0.0001	0.0001
T_Tin	mg/L	0.0001	0.0256	0.0001	0.0001
T_Titanium	mg/L	0.0027	0.0048	0.0026	0.0026
T_Uranium	mg/L	0.0002	0.0032	0.0002	0.0002
T_Vanadium	mg/L	0.0003	0.0006	0.0003	0.0003
T_Zinc	mg/L	0.0038	0.1448	0.0029	0.0029
D_Aluminum	mg/L	0.0766	0.4152	0.0811	0.0811
D_Antimony	mg/L	5.17E-05	9.28E-02	5.17E-05	5.51E-05
D_Arsenic	mg/L	0.0005	0.0119	0.0005	0.0005
D_Barium	mg/L	0.0074	0.0783	0.0073	0.0073
D_Beryllium	mg/L	0.0001	0.000204968	0.0001	0.000100014
D_Boron	mg/L	0.0013	0.0395	0.0013	0.0013
D_Cadmium	mg/L	0.000015	0.005341	0.000015	0.000016
D_Calcium	mg/L	11.31	51.15	10.59	10.59
D_Chromium	mg/L	0.000342	0.001892	0.000343	0.000343
D_Cobalt	mg/L	0.000025	0.093269	0.000025	0.000029
D_Copper	mg/L	0.000325	0.025800	0.000342	0.000343
D_Iron	mg/L	0.067	0.630	0.069	0.069
D_Lead	mg/L	6.83E-05	4.70E-03	6.91E-05	6.96E-05
D_Lithium	mg/L	0.001	0.021767446	0.001	0.001000764
D_Magnesium	mg/L	2.25	5.38	2.10	2.10
D_Manganese	mg/L	0.0028	0.5393	0.0029	0.0029
D_Mercury	mg/L	0.0000085	0.0000172	0.0000085	0.0000085
D_Molybdenum	mg/L	0.00061	0.15535	0.00058	0.00058
D_Nickel	mg/L	0.00015	0.00558	0.00015	0.00015
D_Phosphorus	mg/L	0.011	0.094	0.011	0.011
D_Potassium	mg/L	0.51	101.48	0.51	0.51
D_Selenium	mg/L	0.00060	0.00132	0.00060	0.00060
D_Silicon	mg/L	6.09	10.72	5.95	5.95
D_Silver	mg/L	5.0E-05	3.5E-05	4.8E-05	4.8E-05
D_Sodium	mg/L	2.97	20.37	2.82	2.82
D_Strontium	mg/L	0.075	0.804	0.071	0.071
D_Thallium	mg/L	5.0E-05	1.5E-04	5.0E-05	5.0E-05
D_Tin	mg/L	0.00010	0.02557	0.00010	0.00010
D_Titanium	mg/L	0.00109	0.00399	0.00114	0.00114
D_Uranium	mg/L	2.16E-04	3.16E-03	1.99E-04	1.99E-04
D_Vanadium	mg/L	0.00022	0.00060	0.00023	0.00023
D_Zinc	mg/L	0.0028	0.1446	0.0028	0.0028
Cyanide_T	mg/L	0	0.009	0.000	7.3072E-06
Cyanide_WAD	mg/L	0	0.00747	0.00000	4.41907E-07
Cyanate	mg/L	0.00	0.34	0.18	0.18335474
Thiocyanate	mg/L	0.00	0.80	0.16	0.160448184
Temp	°C	3.17	6.89	3.46	3.46

Annex C

Knight Piésold Inc. – Site Water Balance Report

September 19, 2013

File No.:VA101-457/6-A.01
Cont. No.:VA13-00972

Mr. Paul Hosford
Feasibility Study Director
New Gold Inc.
Suite 1800, Two Bentall Centre
555 Burrard Street
Vancouver, BC V7X 1M9

Dear Paul,

Re: Blackwater Project - Feasibility Study Water Balance Model

1. GENERAL

A monthly operational and closure water balance was developed for the Blackwater Project using the GoldSim© software package. The intent of the modelling was to estimate the magnitude and extent of any water surplus and/or deficit conditions in the Tailings Storage Facility (TSF) based on a range of possible climatic conditions. The modelling timeline included one year of pre-production (Year -1) and 16.2 years of operations (Year 1 to 17.2) at a nominal milling rate of 60,000 dry metric tonnes per day, and 17 years of closure until the TSF discharges to Davidson Creek. The project layout and catchment areas assumed for the model are shown on Figure 1 and the water balance model is illustrated schematically on Figure 2. The model incorporates the following major project components:

- Open Pit
- Mill
- Low Grade Ore (LGO) stockpile
- Tailings Storage Facility (TSF) Site D
- Tailings Storage Facility (TSF) Site C, and
- Non-Acid Generating (NAG) waste rock and overburden dumps.

The model assumptions and parameters are discussed in the following sections and summarized in Table 1.

2. MODEL ASSUMPTIONS

Average Hydrometeorological Conditions

The base case monthly operational water balance model was developed using average estimated values for runoff and precipitation. The mean annual unit runoff (MAUR) for undisturbed basins in the project area is estimated to be approximately 199 mm based on the long-term MAUR for the project site station H2 on Davidson Creek. The mean annual precipitation (MAP) is estimated to be approximately 636 mm, with 49% of the annual precipitation falling as rain and the remainder as snow. The annual average potential evapotranspiration (PET) for the project site is about 443 mm. PET was assumed to equal lake evaporation and was applied to the TSF pond surface to estimate evaporation losses. The mean monthly values for precipitation, runoff, and lake evaporation are summarized in Table 2. Complete details of the derivation of the hydrometeorological parameters are included in the Engineering Hydrometeorology Report (Knight Piésold, 2013).

Table 1 Water Balance Input Parameters

Component	Assumption
Freshwater requirement for mill (m^3/hr)	120
Total Tailings Production (million tonnes)	345
Waste Rock (million tonnes of PAG / NAG3 stored in TSF C/D Years -1 to 17)	413
Mine Life (years)	16.2
Tailings slurry solids content (% by weight)	50%
Tailings dry density (tonnes/m^3)	1.3
Bulk tailings specific gravity	2.79
Waste Rock dry density (t/m^3)	2.2
Waste Rock specific gravity	2.7

Table 2 Average Hydrometeorological Inputs

Parameter	Monthly Value (mm)												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(mm)
Precipitation	73	45	39	20	50	66	52	51	47	47	74	72	**636**
Rainfall	0	0	0	13	50	66	52	51	47	31	0	0	**310**
Snowfall	73	45	39	7	0	0	0	0	0	16	74	72	**326**
Sublimation	20	20	20	0	0	0	0	0	0	0	20	20	**100**
Snowmelt	0	0	0	104	51	71	0	0	0	0	0	0	**226**
Available Precipitation	**0**	**0**	**0**	**117**	**101**	**137**	**52**	**51**	**47**	**31**	**0**	**0**	**536**
Lake Evaporation	0	0	5	18	65	93	104	93	54	12	0	0	**443**
Available Runoff	**7**	**7**	**9**	**17**	**50**	**45**	**17**	**11**	**9**	**10**	**11**	**8**	**199**

NOTES:

1. THE PRECIPITATION VALUES WERE ESTIMATED FOR THE BLACKWATER CLIMATE STATION, WHICH IS AT AN APPROXIMATE ELEVATION OF 1470 m.
2. SURFACE RUNOFF WAS ESTIMATED BY MULTIPLYING THE AVAILABLE PRECIPITATION VALUES BY THE CORRESPONDING RUNOFF COEFFICIENT FOR EACH PROJECT AREA.
3. THE LAKE EVAPORATION VALUES WERE APPLIED TO THE TSF POND AREA TO ESTIMATE EVAPORATIVE LOSSES.
4. AVAILABLE RUNOFF VALUES WERE APPLIED TO UNDISTURBED AREAS WITHIN THE MINE FOOTPRINT TO ESTIMATE RUNOFF.

Disturbed Footprint Area Runoff

Natural runoff values are not directly applicable for mine site disturbed areas because of the substantial changes in runoff caused by altering the ground cover. Therefore, the quantities of water (runoff/infiltration) generated from the mine affected areas (open pit, TSF embankments, waste rock dumps, and TSF beaches) and open water (TSF supernatant pond) were estimated by multiplying rainfall and snowmelt by a runoff coefficient. The monthly available precipitation values are summarized in Table 2. The assumed runoff coefficients for the mine site areas are summarized below.

- TSF beach: 0.5
- TSF embankments, and waste rock/overburden stockpiles: 0.5
- Reclaimed TSF beaches and embankments: 0.37
- TSF pond: 1.0
- Open pit walls: 0.8

The portion of net precipitation that is assumed to infiltrate through the stockpiles was assumed to be 100% during operations and reduced to 50% in closure based on progressive reclamation with a soil cover being effective in closure. The TSF beach and embankments were also assumed to be reclaimed at closure and the reclaimed runoff coefficient of 0.37 was based on the ratio of the available runoff to available precipitation assumed for the natural catchment (199 mm/536 mm) areas, as shown in Table 2.

Stochastic Inputs

The potential variability of climatic conditions was addressed by using a stochastic version of the water balance model that incorporates Monte Carlo type simulation techniques. The monthly climatic parameters were modelled as probability distributions rather than simply as mean values. The year-to-year variability of monthly runoff was quantified using coefficient of variation (C_v) values that were derived using a long-term synthetic streamflow record developed for the open water months of April to October for the project site station H2 on Davidson Creek. The C_v values for the months of November to March were based on the WSC station at Van Tine Creek, due to lack of measured winter flow data at the project site stations. The monthly C_v values for runoff, along with the monthly mean and corresponding standard deviation values, are presented in Table 3. The monthly mean and standard deviation values were used to develop the monthly probability distributions that are required for a Monte Carlo simulation. The distributions of monthly precipitation were modelled assuming an underlying Gamma distribution.

Table 3 Stochastic Monthly Inputs

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Runoff (mm)	7	7	9	17	50	45	17	11	9	10	11	8
Standard Deviation (mm)	6.7	5.9	7.7	10	39	37	14	7.9	5.8	4.0	11	6.3
Coefficient of Variation (C_v)	0.9	0.9	0.9	0.6	0.8	0.8	0.8	0.7	0.7	0.4	1.1	0.8

NOTES:
1. COEFFICIENT OF VARIATION = STANDARD DEVIATION / MEAN.

TSF and Open Pit Water Management Plan

The water balance provides key inputs to the site wide water management plan, particularly with respect to anticipated start-up pond size, surface water diversions/collection systems, additional make-up water needs, and TSF operating criteria (supernatant pond volumes). Figure 1 illustrates the project catchment areas and the main mine facilities.

The TSF Site C Main Dam will be constructed in the upper Davidson Creek catchment and capture runoff from the upstream catchment A2, as shown on Figure 1. Catchment A3, upstream of the TSF Site C West Dam, will be redirected to the southwest away from TSF Site C by a cofferdam built in Year -2, permanently changing the natural catchment divide in this area. Catchment A3 does not contribute to the water balance for the mine site.

A cofferdam will be constructed on Davidson Creek within the TSF Site D Main Dam footprint as of Year -1 to capture runoff from catchments A1 and A14, as shown on Figure 1. The accumulated water behind the TSF Site D cofferdam will then be pumped to the TSF Site C start-up pond beginning in the second quarter of Year -1.

The starter dam for the TSF Site D Main Dam will be completed as of the start of operations in Year 1, and will begin to capture catchment runoff from the contributing areas of the West Dump (A4), East Dump (A6), and Low Grade Ore (LGO) Stockpile (A10), as well as the corresponding upstream catchment areas (A5, A9 and A11) and area downstream of the East Dump (A12). The Environmental Control Dam (ECD) will also be constructed in Year 1 to capture seepage and surface runoff (A13) from the TSF Site D Main Dam. The recoverable seepage and surface runoff will be collected at the ECD and pumped back to TSF Site D during mine operations and into closure until the open pit is full and TSF Site D spills to Davidson Creek via the closure spillway.

The water stored in the TSF Site C start-up pond will serve as the primary process water source at the start of mill operations until the end of Year 2, with additional water being drawn from the TSF Site D pond (via the pump system at the cofferdam), as necessary. Once tailings deposition in TSF Site D commences in Year 3, and until the end of mining operations in Year 17, the TSF Site D pond will be the primary source of process water. Additional make-up water, if required during this time, can be provided by the TSF Site C pond. The pond in TSF Site C, as of Year 3, will be allowed to accumulate naturally to the closure spillway elevation at or below 1346 m, and then overflow into the pond of TSF Site D in approximately Year 27. The fresh water required for the mill throughout mine operations and any additional process water that is required above what can be supplied by the TSF ponds and open pit dewatering will be sourced from the fresh water supply pipeline from Tatelkuz Lake.

Groundwater inflow and surface runoff to the open pit, including water from the vertical depressurization wells, will be collected and recycled for use in the milling process as of Year 1 to end of open pit mining in Year 15. It is noted that pit dewatering flows during operations may be directed to the TSF depending on water quality, and this detail should be addressed in subsequent design phases. The dewatering system will be decommissioned in Year 15 once open pit mining has ceased and the pit will begin to fill as low grade ore is being processed through the mill from Year 15 to 17. Once mill operations cease in Year 17, the surplus inflow to TSF Site D (inflow minus losses) will be pumped to the open pit to aid in pit filling. Once the open pit is full (predicted in Year 33), then it will overflow via a spillway to the TSF Site D pond. Subsequently, the TSF Site D pond will overflow via the closure spillway to a plunge pool in Davidson Creek downstream of the ECD.

Mill Requirements

Water requirements at the mill were calculated based on the specified mill production rate and the expected solids content (% by weight) of the tailings. All of the process water was assumed to be supplied by the TSF reclaim system. A fresh water requirement for the mill was assumed to be 120 m^3/hr based on information provided by the mill process designers. This fresh water requirement was assumed to be in addition to any process water make-up extracted from the TSF reclaim system.

Pit Dewatering System

The water pumped from the open pit by the dewatering system includes pit wall runoff, undisturbed pit catchment runoff entering the pit, and groundwater inflows. Groundwater inflows to the open pit were estimated to be approximately 80 L/s at the maximum extent of the pit in Year 15. The inflow rate was assumed to increase linearly during the 14 years of open pit mining, from 0 L/s in Year 1 up to 80 L/s in Year 15. For modelling purposes, it was assumed that pit dewatering flows will be pumped to the mill for use in the process until Year 15.

Tailings Embankment Seepage

The total embankment seepage leaving TSF Site D was assumed to linearly increase from 0 L/s in Year -1 to 55 L/s in Year 17. The majority of the embankment seepage is assumed to be lost through the Main Embankment (53.5 L/s), of which approximately 53.3 L/s is captured and recycled back to the TSF Site D pond until the open pit is full and TSF Site D is discharging downstream via the closure spillway (Year 33). The remaining 0.2 L/s is assumed to bypass the seepage collection system and be lost to Davidson Creek downstream. The remaining 1.5 L/s of total seepage leaving TSF Site D is assumed to pass through the north (1.2 L/s) and south (0.2 L/s) abutments. Embankment seepage (21 L/s as of Year 3) from TSF Site C for Years 1 and 2 will be captured and recycled back to the TSF Site C pond with the exception of 0.4 L/s of unrecoverable seepage that will be captured in TSF Site D. The TSF Site C embankment seepage recycle system will be decommissioned at Year 3 and all subsequent seepage is assumed to be captured by TSF Site D.

Water Retained in Voids in TSF

The amount of water retained in the tailings and waste rock stored in the TSF is a function of the production schedule and the dry density and specific gravity of the solids. The dry density values for the tailings and waste rock are summarized in Table 1.

Potentially acid generating (PAG) and Non-acid generating (NAG3) waste rock will be stored in the TSF Site C and Site D. The co-disposed PAG and NAG3 waste rock will be stored and submerged in the TSF Site C beginning during pit pre-stripping in Year -1 and continuing until the end of Year 1. Subsequently, all of the PAG and NAG3 waste rock will be stored in TSF Site D beginning in Year 2 and continuing until the end of the mine life, with some additional material being backfilled in the open pit at the end of the mine life. Initially all tailings will be deposited in TSF Site C. Starting in Year 3 and continuing to the end of operations, the tailings will be deposited in TSF Site D.

<u>Reclaim Water</u>

The volume of water available for reclaim to the mill was estimated using the TSF water balance.

The primary TSF inflows are:

- Water pumped to the TSF from the mill as part of the tailings slurry
- Direct precipitation on and runoff to the TSF, which includes runoff from the upslope catchments and embankments, and
- Runoff collected from the East and West Dumps and the LGO Stockpile.

The primary TSF water balance losses were:

- Unrecoverable TSF foundation seepage
- Water retained in the tailings and waste rock voids, and
- Evaporation.

The water available for process use was assumed to be the difference between these inflows and losses. Any shortfall in the water available for milling was assumed to be made up from an external source.

3. RESULTS

Operations

The water balance model was used to determine the likelihood of having a surplus or deficit of water in TSF Sites C and D, as illustrated on Figure 3. The water balance model assumed that a start-up pond of at least 6 Mm^3 (under average conditions) will accumulate in TSF Site C in the one year prior to mill start up, of which 1.0 Mm^3 is assumed to accumulate behind the TSF Site C Main Dam based on runoff from its contributing upslope catchment of A2 (7.1 km^2), with the additional 5.0 Mm^3 generated from the TSF Site D undisturbed contributing catchments of A1 and A14 (25 km^2), as shown on Figure 1. This runoff will be collect behind a cofferdam located at the TSF Site D Main Dam location and be pumped to the TSF Site C pond until the end of Year -1. The minimum operating pond volume for TSF Sites C and D were assumed to be 3.0 Mm^3 and 7.5 Mm^3, respectively. Figure 3 presents the predicted pond volumes available throughout operations for both facilities, based on average precipitation conditions

The facilities are in a balance or surplus condition throughout operations, as the water accumulated within the supernatant ponds in TSF Sites C and D as well as open pit dewatering will satisfy the process requirements under average precipitation conditions. However, there is a constant freshwater requirement for the mill, as summarized in Table 4, which is assumed to be supplied by the freshwater pipeline from Tatelkuz Lake. In Years 5 until Year 10 when tailings are being deposited in TSF Site D, reclaim water is withdrawn from both the supernatant pond of TSF Site D and TSF Site C to meet the process water requirement. The additional process water requirement from TSF Site C is largely needed during the winter months in each year when precipitation falls as snow, but with snowmelt occurring during the spring freshet period, excess water becomes available and the system then operates in a surplus condition. The amount of surplus increases over time due to increasing runoff from the expanding surface area of the mine facilities, and also from decreases in waste rock production and corresponding decreases of water storage in waste rock voids for the mine rock stored annually within TSF Site D.

Table 4 Annual Average Volume of Makeup Water Requirement

Mine Life	Annual volume of makeup water required to supplement TSF reclaim (m^3/yr)	Annual volume of makeup water required from freshwater source (m^3/yr)
-1	0	0
1	0	1,051,200
2	0	1,051,200
3	0	1,051,200
4	0	1,054,080
5	0	1,051,200
6	0	1,051,200
7	0	1,051,200
8	0	1,054,080
9	0	1,051,200
10	0	1,051,200
11	0	1,051,200
12	0	1,054,080
13	0	1,051,200
14	0	1,051,200
15	0	1,051,200
16	0	1,054,080
17	0	259,200
TOTAL	**0**	**17,089,920**
	TOTAL MAKEUP WATER REQUIRED (m^3) =	**17,089,920**

The maximum operating pond volume for TSF Site C was assumed to be 14.3 Mm^3 (corresponding to a spillway elevation of 1346 m), with any excess water being discharged to TSF D via the closure spillway. The maximum operating pond volume for TSF Site D was assumed to be based on a spillway elevation of 1336 m. However, as shown on Figure 3, TSF Site D is predicted to exceed its maximum operating pond volume in the last year of operations, which indicates that it may be beneficial to divert a portion of the upstream contributing catchment around the facility to Davidson Creek in the later years of mine life.

Closure

The results of the closure pit filling model are shown on Figure 4. The open pit is assumed to begin filling in Year 15 when the dewatering system is decommissioned after open pit mining has ceased. At the end of mining operations in Year 17, the surplus inflow to TSF Site D (inflow minus losses) is assumed to be pumped to the open pit to aid in pit filling. The water balance shows this pit filling as a steady annual volume with peak monthly pumping rates in the summer. However, the TSF ponds will provide enough storage to minimize peak pumping needs during this closure phase to average monthly rates. TSF Site C is assumed to continue to naturally overflow into TSF Site D via a closure spillway in Year 27. The open pit takes approximately 19 years from the end of mining to fill based on average precipitation conditions, and was predicted to begin spilling in Year 33. TSF Site D was predicted to begin discharging via the closure spillway in that same year. Therefore it's predicted that it will take a total of 16 years after the end of operations before the system will discharge to Davidson Creek.

Stochastic results

Figure 5 presents the range of possible cumulative pond volumes available in TSF Site C and TSF Site D over the mine life, as defined by the 95th percentile wet and dry values (5% and 95% chance of being equalled or exceeded in any month, respectively). This range of volumes also indicates possible active or live storage capacity in the TSF ponds for a reasonably large range of anticipated climatic conditions. The stochastic water balance highlights the sensitivity of the TSF pond volumes to the assumed climatic inputs and pond minimum/maximum operating capacities. The stochastic results indicate that for extreme conditions (5th percentile), the accumulated TSF ponds, open pit and associated contributing catchments are not able to supply enough water to meet the process water requirements until Year 11, and the system will operate in a deficit condition until that time, as indicated in Table 5.

Table 5 Annual Stochastic Volume of Makeup Water Requirement

Mine Life	Annual volume of makeup water required to supplement TSF reclaim (m^3/yr)			Annual volume of makeup water required from freshwater source (m^3/yr)
	5th Percentile	50th Percentile (Median)	95th Percentile	
-1	0	0	0	0
1	0	0	0	1,051,200
2	2,014,900	0	0	1,051,200
3	2,375,400	0	0	1,051,200
4	2,859,600	0	0	1,054,080
5	2,619,400	0	0	1,051,200
6	2,885,600	0	0	1,051,200
7	2,896,300	0	0	1,051,200
8	2,711,900	0	0	1,054,080
9	2,675,100	0	0	1,051,200
10	1,780,900	0	0	1,051,200
11	964,510	0	0	1,051,200
12	0	0	0	1,054,080
13	0	0	0	1,051,200
14	0	0	0	1,051,200
15	0	0	0	1,051,200
16	0	0	0	1,054,080
17	0	0	0	259,200

4. REFERENCES

Knight Piésold (2013). *Engineering Hydrometeorology Report*, Ref. No. VA101-457/6-12 Rev 0, October 2013

We trust that this letter meets the current needs of the project team. Please contact the undersigned with any questions or comments.

Yours truly,

KNIGHT PIESOLD LTD.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
E. E. RAINEY
34952

Signed:
Erin Rainey, P. Eng.
Project Engineer

Reviewed:
Daniel Fontaine, P.Eng.
Project Engineer

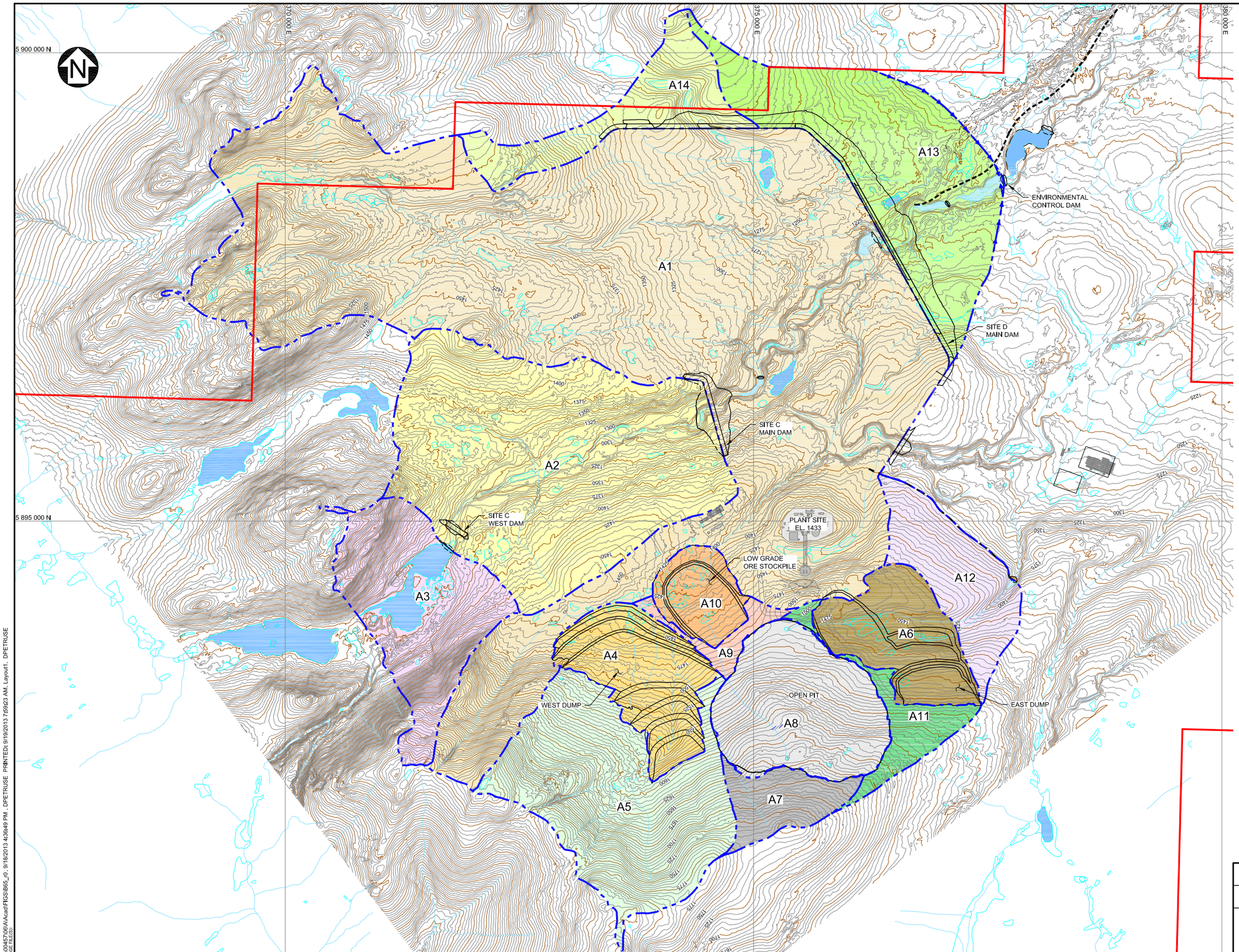
Approved:
Ken Brouwer, P.Eng.
President

Attachments:

Figure 1 Rev 0	Catchment Area – Plan
Figure 2 Rev 0	Water Balance Schematic – During Operations Year 13
Figure 3 Rev 0	Monthly TSF Pond Volume Average
Figure 4 Rev 0	Closure Pit Filling Average
Figure 5 Rev 0	Monthly Pond Volume - Stochastic

Copy To: Ryan Todd, Doug Moore, Keith Ferguson, Dave Hall

/er



ID	CATCHMENT AREA (m²)
A1	23,493,258
A2	7,203,864
A3	2,745,670
A4	1,716,662
A5	4,041,717
A6	1,584,807
A7	778,163
A8	2,380,000
A9	308,576
A10	759,710
A11	701,996
A12	1,507,979
A13	4,143,515
A14	1,567,691

LEGEND:

- CATCHMENT AREA A1
- CATCHMENT AREA A2
- CATCHMENT AREA A3
- CATCHMENT AREA A4
- CATCHMENT AREA A5
- CATCHMENT AREA A6
- CATCHMENT AREA A7
- CATCHMENT AREA A8
- CATCHMENT AREA A9
- CATCHMENT AREA A10
- CATCHMENT AREA A11
- CATCHMENT AREA A12
- CATCHMENT AREA A13
- CATCHMENT AREA A14
- CATCHMENT BOUNDARY
- NEW GOLD PROPERTY BOUNDARY

NOTES:

1. CONTOUR INTERVAL IS 5 METRES.
2. DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

SCALE A: 400 200 0 400 800 1200 1600 2000 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
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CATCHMENT AREA PLAN

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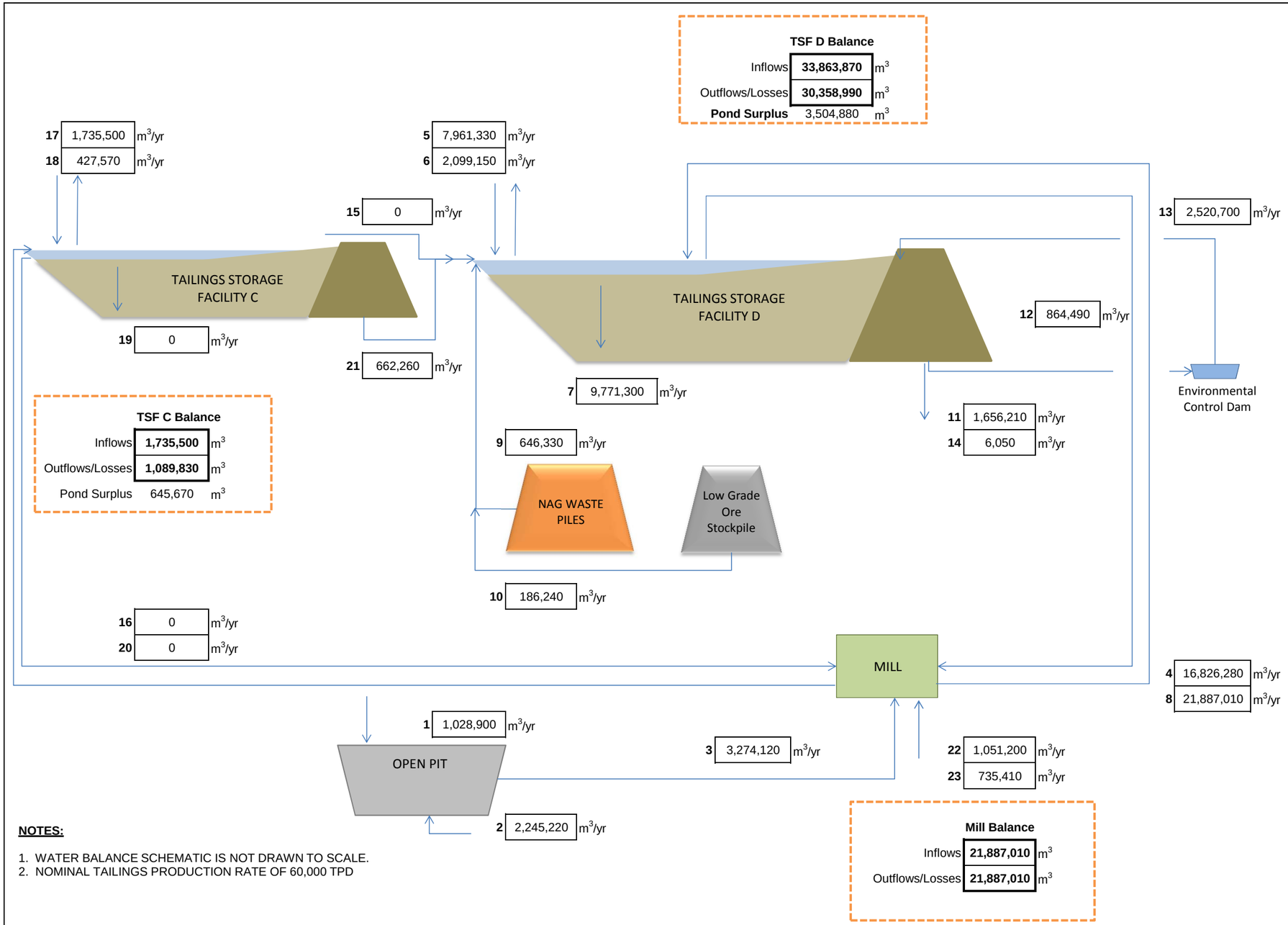
P/A NO.	REF NO.
VA101-457/6	VA13-00972

FIGURE 1 REV 0



Number	Description
	Open Pit
1	Open Pit direct precipitation and catchment runoff
2	Open Pit groundwater inflows
3	Open Pit dewatering direct to mill
	Tailings Storage Facility D
4	TSF reclaim water
5	TSF catchment and beach runoff; direct precipitation on pond
6	TSF pond evaporation
7	Water trapped in tailings and waste rock void spaces
8	Water in slurry (50% solids content, by weight)
9	NAG waste piles runoff/infiltration
10	Low Grade ore stockpile runoff/infiltration
11	TSF embankment runoff/infiltration and total seepage to ECD
12	TSF embankment runoff/infiltration and catchment runoff to ECD
13	ECD recycle to TSF pond
14	TSF foundation unrecoverable seepage
15	Overflow from TSF C
	Tailings Storage Facility C
16	TSF reclaim water
17	TSF catchment and beach runoff; direct precipitation on pond
18	TSF pond evaporation
19	Water trapped in tailings and waste rock void spaces
20	Water in slurry (50% solids content, by weight)
21	TSF embankment/foundation seepage (collected in TSF D)
	Mill
22	Freshwater to mill
23	Water in Ore

NOTES:

1. WATER BALANCE SCHEMATIC IS NOT DRAWN TO SCALE.
2. NOMINAL TAILINGS PRODUCTION RATE OF 60,000 TPD

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TAILINGS STORAGE FACILITY WATER BALANCE SCHEMATIC DURING OPERATIONS - YEAR 13

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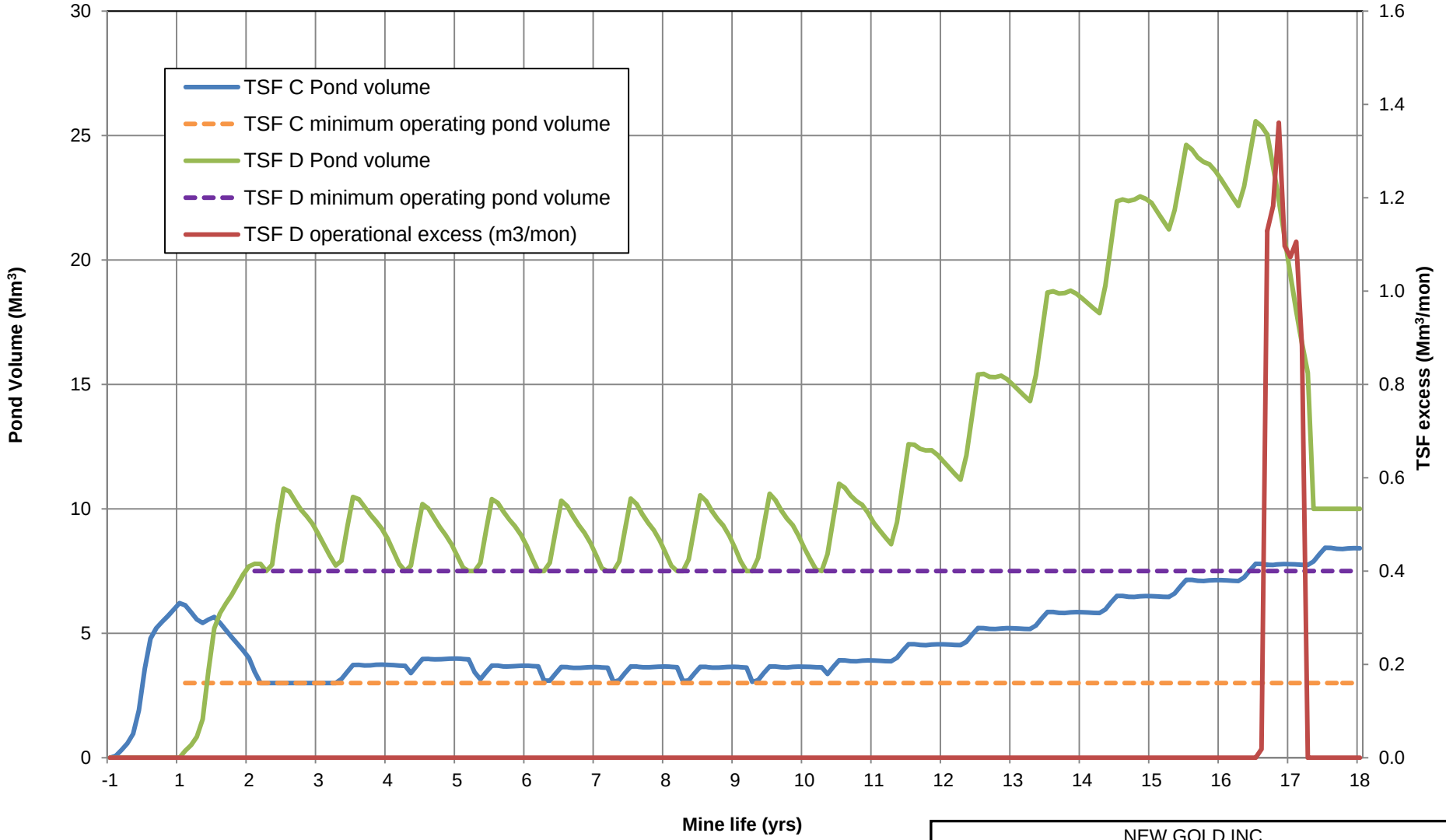
P/A NO. VA101-457/6

REF NO. VA13-00972

FIGURE 2

REV 0



NOTES:

1. TSF C OPERATING POND VOLUME ASSUMED TO BE 3 Mm^3.
2. TSF D OPERATING POND VOLUME ASSUMED TO BE EQUAL TO THREE MONTHS PROCESS WATER REQUIREMENT (7.5 Mm^3).

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TAILINGS STORAGE FACILITY C/D MONTHLY TSF POND VOLUME AVERAGE

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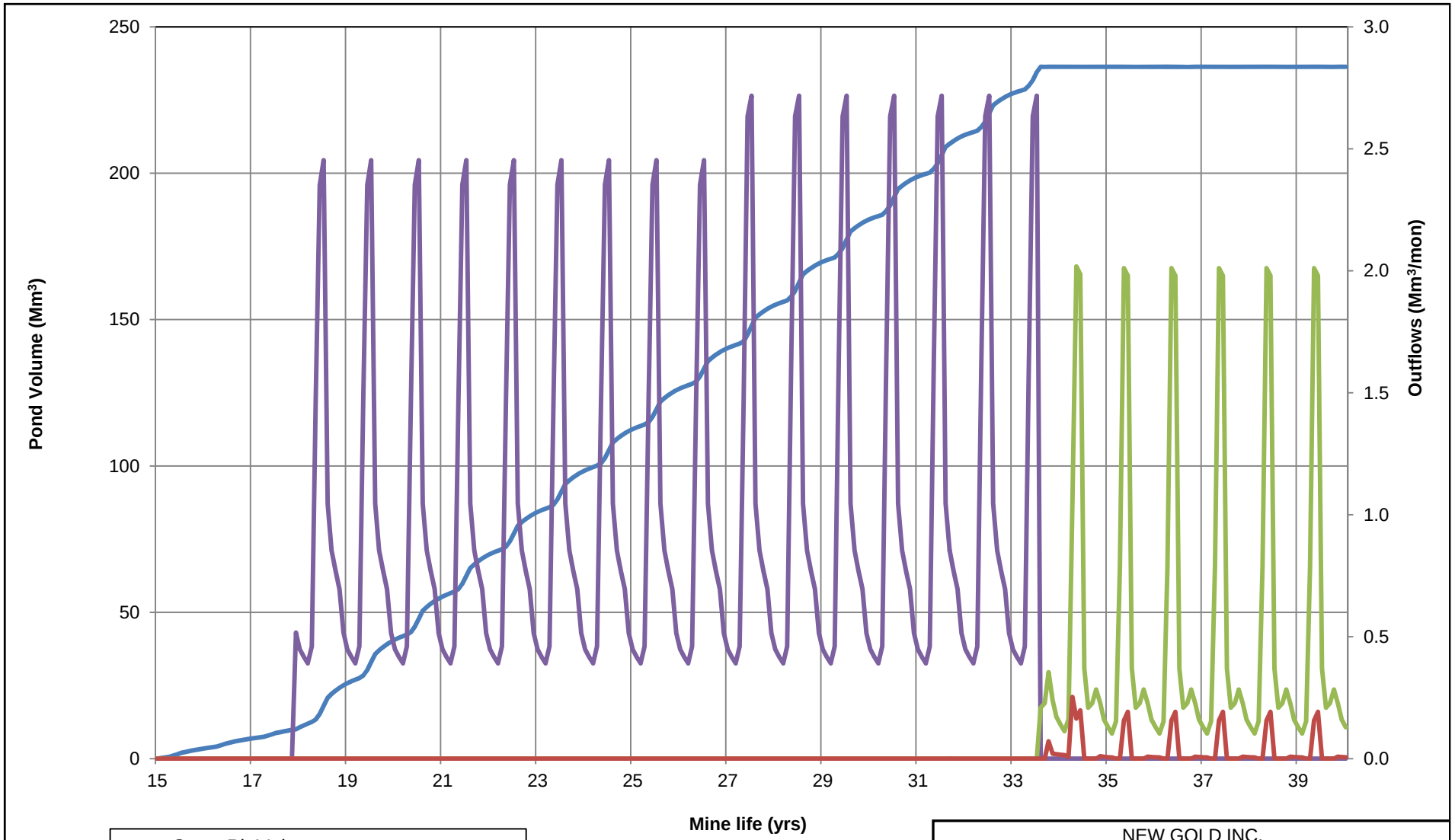
REF NO VA13-00972

FIGURE 3

REV 0



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TAILINGS STORAGE FACILITY C/D
CLOSURE PIT FILLING
AVERAGE

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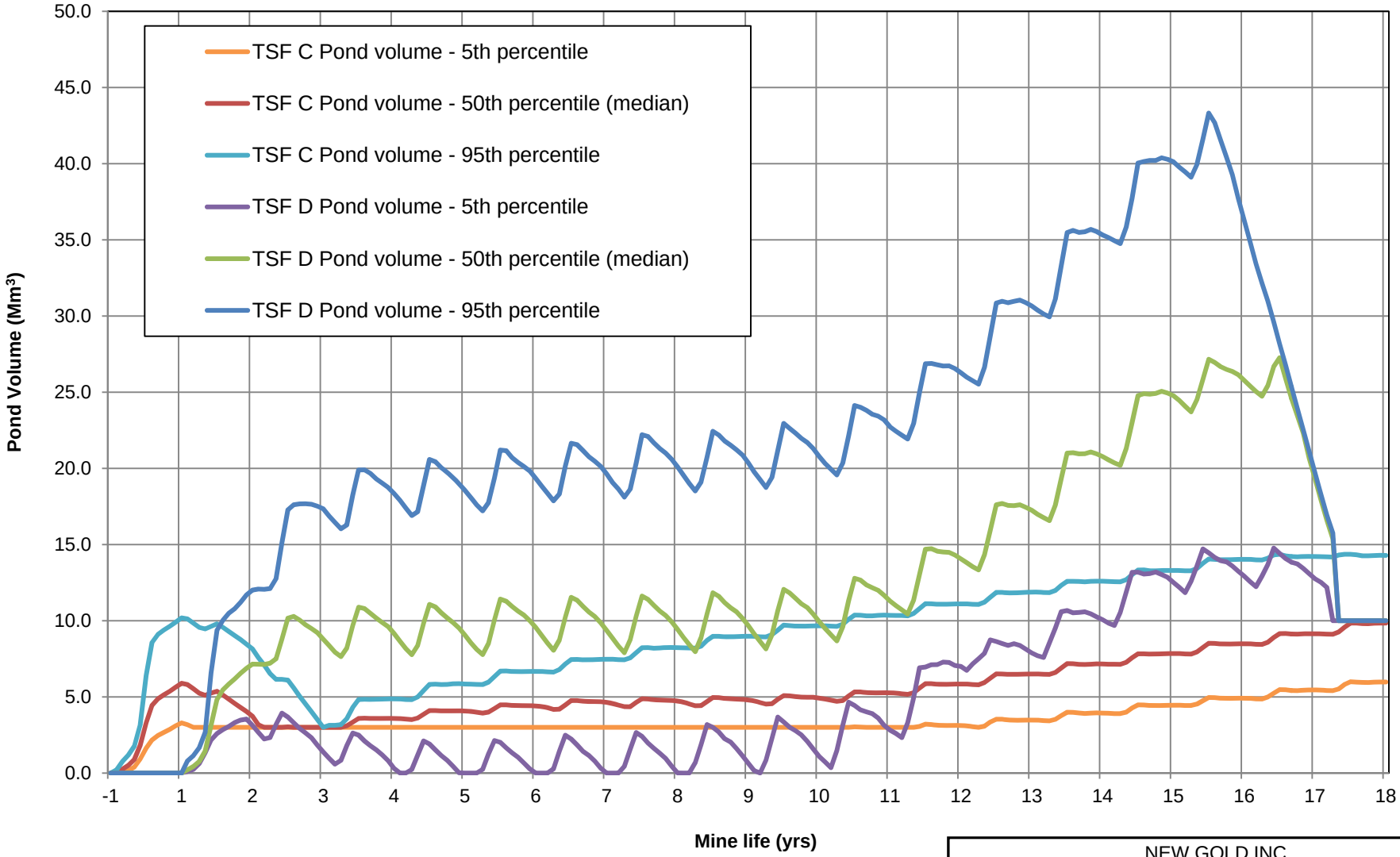
REF NO VA13-00972

FIGURE 4

REV 0



NOTES:

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TAILINGS STORAGE FACILITY C/D MONTHLY POND VOLUME STOCHASTIC

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REF NO VA13-00972

FIGURE 5

REV 0