

Curraghinalt Mine
Discharge Criteria Discussion Meeting
23rd January 2024

Based on recent correspondence, this presentation outlines proposed updates to the Discharge Criteria application for the Curraghinalt Mine

Key elements informing approach

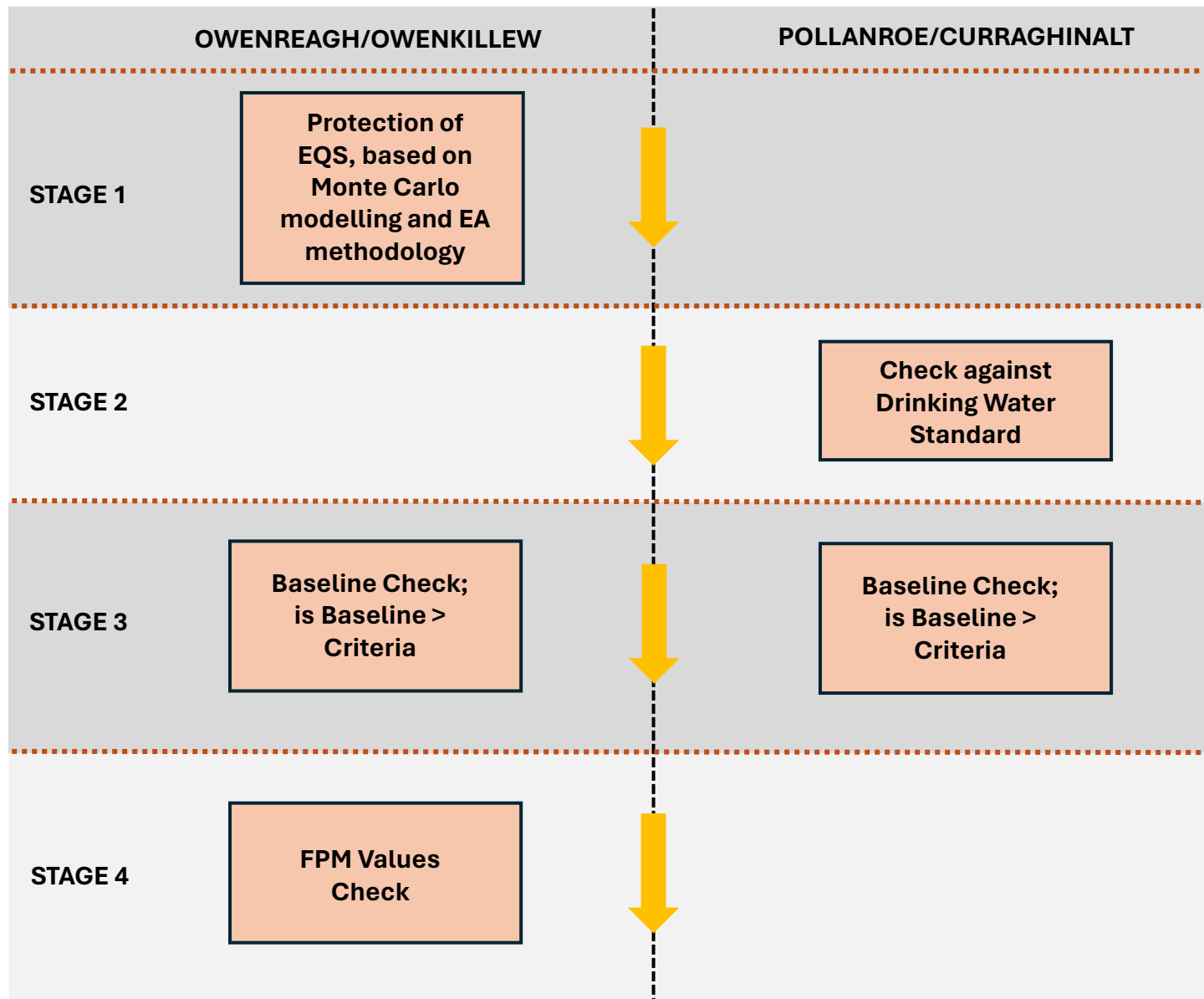
- Role of conditions (para 7)- *“rationally related to the consent sought, the nature of the discharges, the environment into which the discharges will occur and the potential for impacts from the discharges on that environment.”*
- EQS Directive and Regulations
 - maximum allowable concentration (MAC) applied to protect against short-term exposure (i.e., acute effects)
 - annual average (AA) concentrations applied to protect against long-term exposure (i.e., chronic effects)
- EQS from NI legislation, other jurisdictions and guidance identified for other non-Directive parameters.

Presentation includes;

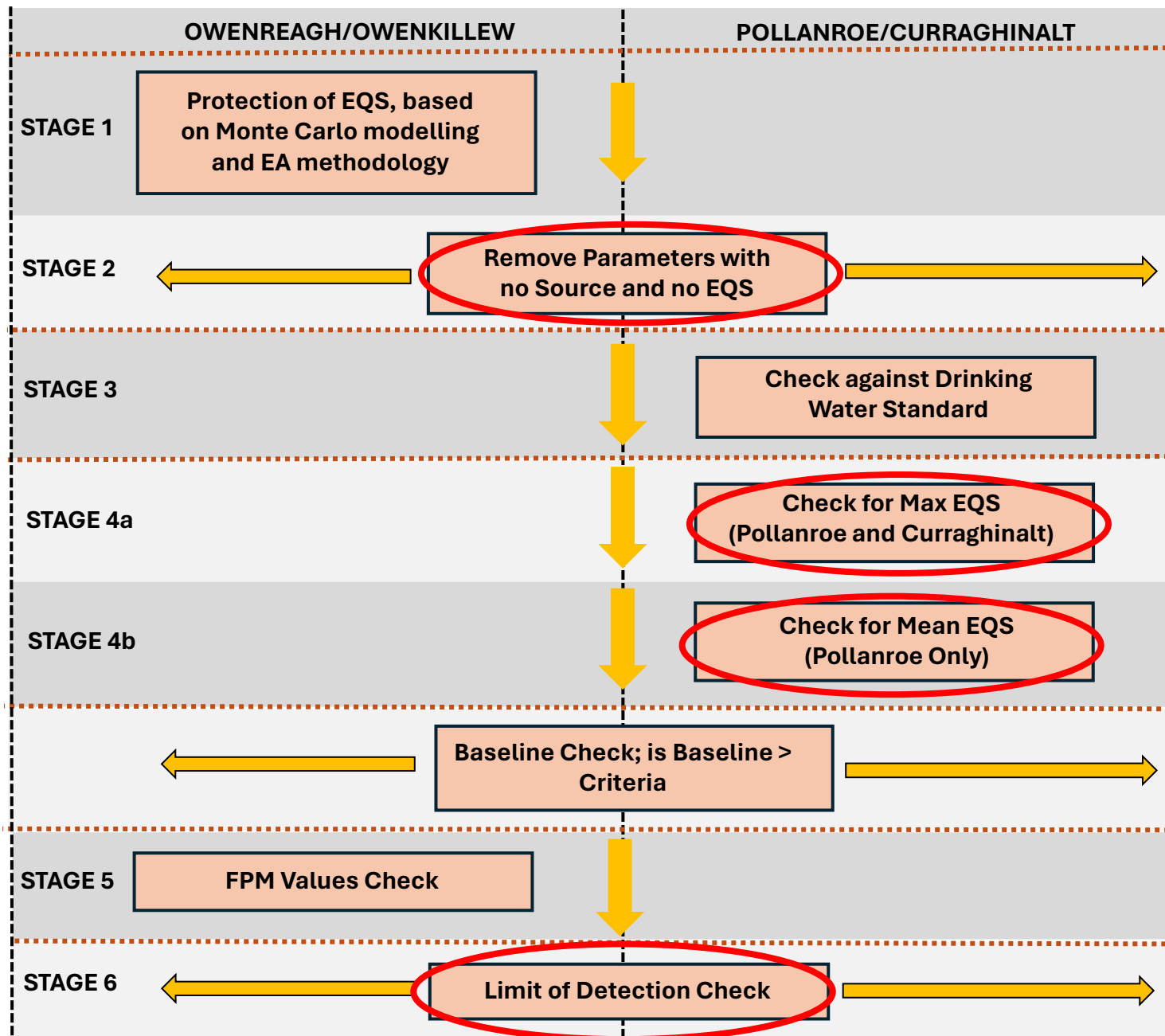
- Overview of Updated Methodology
- Table of EQS and Drinking Water Standards
- Updated Discharge Criteria for Metals for Owenreagh River and Pollanroe Burn

WITHOUT PREJUDICE / FOR DISCUSSION ONLY

METHODOLOGY FOR CURRENT CONSENT APPLICATION



UPDATED METHODOLOGY



Review of Geochemical Data has identified parameters on initial list which have no significant source at the mine. If these parameters also have no EQS, then it is suggested these are removed from regulation, but can be monitored and reported along with regulated parameters.

As fugitive fish could enter Curraghinalt Burn then criteria checked against Max EQS for spot discharges (to protect against acute EQS standard)
As juvenile fish have been found in Pollanroe Burn, then check against Max EQS AND additional commitment to meet Mean EQS in discharge (i.e., to protect against acute EQS standard and chronic EQS standard)

From review of Laboratory Methods there are parameters where EQS is close to or below LOD. From a practical perspective this means monitoring for these parameters is difficult and may show exceedance due to laboratory accuracy. It is suggested these are removed from regulation but can be monitored and reported along with regulated parameters.

EQS Values

Northern Ireland SR 351 is Default

For parameters with no value under SR 351, lowest of other legislated EQS are considered;

- SEPA (Scottish Environment Protection Agency) WAT-SG-53
- CCME (Canadian Council of Ministers of the Environment)
- USEPA (United States Environmental Protection Agency)
- Old EU Freshwater Fish Directive
- Verbruggen et al. (2021), Dutch standard

Details of standards are provided in supporting documentation for discharge consent applications, apart from Verbruggen et al. (2021) which can be provided.

Drinking Water Standards

Northern Ireland Water Supply (Water Quality) Supply Regulations is Default

For parameters with no value under WSR, lowest of other standards are considered from;

- World Health Organisation
- EU Council Directive 98/83/EC
- USEPA (United States Environmental Protection Agency)
- UKTAG (UK Technical Advisory Group)

Details of standards are provided in supporting documentation for discharge consent applications.

Parameter	Unit	STANDARDS		
		EQS		Drinking Water Standards (WSR and others)
		AA	Max (or other)	
pH	S.U.	6.6 – 9.0 or 5.1 – 9.0	None	None
BOD	mg/L	None	3 (90%ile) 7 (99%ile)	None
Temperature	°C	None	20	None
TSS	mg/L	25	None	None
<i>Nutrients/Salts</i>				
Total Ammonia	mg/L N	None	0.2 (90%ile) 0.5 (99%ile)	0.39
Nitrate	mg/L N	3	124	11.3
Nitrite	mg/L N	None	None	0.15
Chloride	mg/L	250	None	250
Fluoride	mg/L	1	3	1.5
Sulphate	mg/L	218	None	250
<i>Metals (Dissolved)</i>				
Aluminium	µg/L	None	None	200
Antimony	µg/L	None	None	5
Arsenic	µg/L	50	None	10
Barium	µg/L	620	1100	1.3
Boron	µg/L	1500	29000	1000 (max)
Cadmium	µg/L	0.08	0.45	5
Chromium (III)	µg/L	4.7	32 (95%ile)	None
Chromium (VI)	µg/L	3.4	None	10
Total chromium (Cr III + Cr VI)	µg/L	8.1	None	50
Cobalt	µg/L	3	100	None
Copper (bioavailable equivalent)	µg/L	8.89	None	2000
Iron	mg/L	1	None	0.2
Lead	µg/L	7.2	14	10
Manganese (bioavailable equivalent)	µg/L	162	None	50
Mercury	µg/L	None	0.07	1
Molybdenum	µg/L	73	None	70
Nickel (bioavailable equivalent)	µg/L	10.2	34	20
Selenium	µg/L	3.1	10.48	10
Silver	µg/L	0.5	1	100
Sodium	mg/L	None	None	200
Uranium	µg/L	15	33	30
Zinc (bioavailable equivalent)	µg/L	20.3	None	3000

EQS Sources

SR 351

Verbruggen et al (2021)

SEPA, WAT-SG-53 or Scotland River Basin District Standards Amendments Directions 215

Freshwater Fish Directive

CCME

USEPA (2016)

WITHOUT PREJUDICE / FOR DISCUSSION ONLY

UPDATED DISCHARGE CRITERIA

OWENREAGH RIVER / POLLANROE BURN

METALS

Changed or additional values in green

Parameter	Unit	2020 Discharge Criteria	New Discharge Criteria		Comment
			Spot/Max Criteria	Mean Criteria	
<i>Dissolved metals</i>					
Aluminium	µg/L	200	200	-	Drinking Water Standard or Remove due to No Source and No EQS
Antimony	µg/L	5	5	-	Drinking Water Standard
Arsenic	µg/L	10	10	-	Drinking Water Standard, with Max already protective of Mean EQS
Barium	µg/L	1300	1100	620	Updated for Verbruggen et al. (2021)
Boron	µg/L	1000	1000	-	Drinking Water Standard which is already protective of Mean EQS
Cadmium	µg/L	0.28	0.28	0.08	Max is based on calculations for Owenreagh River, which is lower than Max EQS. Mean Standard set to NI EQS (SR351)
Chromium (III)	µg/L	20	None	-	Remove due to LOD
Chromium (VI)	µg/L	10	None	-	Remove due to LOD
Chromium (CrIII + CrVI)	µg/L	30	30	8.1	Max is based on calculations for Owenreagh River, which is lower than Drinking Water Standard. Mean Standard set to NI EQS (SR351)
Cobalt	µg/L	11.5	11.5	3	Max is based on calculations for Owenreagh River, which is lower than Max EQS. Mean Standard set to SEPA EQS
Copper	µg/L	40.0	40	8.89	Max is based on calculations for Owenreagh River, which is lower than Drinking Water Standard. Mean Standard set to NI EQS (SR351)
Iron	mg/L	0.68	0.68	-	Max set to mean baseline in Pollanroe (less than Mean EQS, but above Drinking Water). Mean criteria not required as is already protective of Mean EQS
Lead	µg/L	10	10	7.2	Max is Drinking Water, with Mean Standard set to NI EQS (SR351)
Manganese	µg/L	218	218	162	Max set to mean baseline in Pollanroe (above Drinking Water), with Mean Standard set to NI EQS (SR351)
Mercury	µg/L	0.094	0.07	-	Max updated to NI EQS Max (SR351)
Molybdenum	µg/L	68	68	-	Set to Drinking Water Standard in Pollanroe, with minor adjustment (decrease) based on review of seepage and baseline data. Max value already protective of EQS Mean value
Nickel	µg/L	20	20	10.2	Max is Drinking Water, with Mean Standard set to NI EQS (SR351)
Selenium	µg/L	10	10	3.1	Max is Drinking Water, with Mean Standard set to USEPA value for Fish
Silver	µg/L	3.24	None	-	Remove due to LOD
Sodium	mg/L	200	200	-	Drinking Water Standard or Remove due to No Source and No EQS
Uranium	µg/L	30	30	15	Max is Drinking Water, with Mean Standard set to CCME value for Fish
Zinc	µg/L	73.3	73.3	20.3	Max is Drinking Water, with Mean Standard set to NI EQS (SR351)

WITHOUT PREJUDICE / FOR DISCUSSION ONLY