



APPENDIX E

Water Quality Input Data Sources



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Water quality input parameter sources

Table 1: Table of water quality input sources.

Model input	Source of assumed water quality data
Non impacted runoff	25 th percentile of data from Fraser's Pit runoff.
Impacted runoff	50 th percentile of data from Fraser's Pit runoff.
Undisturbed runoff (Deepdell Stream)	90 th percentile of Deepdell Stream data from 16-08-2005 to 12-08-2010.
Undisturbed runoff (Tipperary Stream)	50 th percentile of NBWR Golden Bar Rd samples from 11-02-1993 to 04-08-2009.
Undisturbed runoff (NBWR)	30 th percentile of NBWR Gifford Rd samples from 14-09-1995 to 5-8-2010 except Zn which was reduced to the detection limit of 0.005 g/m ³ . The data available is limited and the 30 th percentile is likely strongly affected by recent disturbed runoff data.
Drain seepage TTTSF - operational	Mean of initial MTI Seepage and SPI Seepage:
Drain seepage MTI - operational	50th percentile values of the drains that report seepage from the MTI (data selected based on data trends considered most applicable for proposed operational period): <ul style="list-style-type: none"> • Western CDBC: data from 4/14/2009 onward • SumpB_SSF: data from 1/6/2009 onward • SumpB_CDW: data from 1/6/2009 onward • SumpB_CDE: data from 1/6/2009 onward
Drain seepage SPI - operational	50th percentile values of the drains that report seepage from the SPI (data selected based on data trends considered most applicable for proposed operational period): <ul style="list-style-type: none"> • CDBC Eastern Outlet: data from 6/19/2008 onward. • CDBC Western Outlet: data from 6/19/2009 onward • UD USCO Western Outlet: data from 6/19/2008 onward • UD USCO Eastern Outlet: data from 6/19/2008 onward • S Pit Southern Sump: data from 11/19/2008 onward • S Pit Chimney Drain: data from 3/17/2005 onward • S Pit Toe Drain: data from 2/17/2005 onward • SP10 Combined Seepage Outlet: data from 6/19/2008 onward
Drain seepage at closure (TTTSF, MTI, SPI)	50th Percentile of SumpB SSF drain. Pb and Zn were non-detects so average operational data values applied
TSF groundwater seepage (MTI, SPI) to MTSP operational period	From groundwater model, except arsenic is reduced to 0.6 g/m ³ which is the predicted end of time value rather than the maximum concentration after pit closure (0.98 g/m ³). This is because in a series of models used, only the latest includes a factor for As adsorption and therefore the maximum value is conservatively high. The end of time value is still considered to be conservative.
TSF groundwater seepage (MTI, SPI) to MTSP at closure	From groundwater model, except arsenic is reduced to 0.6 g/m ³ for the same reason described for operational period.
TSF groundwater seepage (TTTSF) to TCS at all stages including closure	From groundwater model Operational Stage 4 (closure).
DC07	From groundwater model.
NBWR	From groundwater model.
DC08	From groundwater model.
TC01	From groundwater model.



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CJ01	From groundwater model.
MC01	From groundwater model.
Northern gully seepage	From groundwater model.
Back road seepage	From groundwater model.
Murphys Creek seepage	From groundwater model.
NBWR	From groundwater model – corresponds to Frasers West silt pond groundwater seepage.
TCSP	From groundwater model – corresponds to Tipperary Creek groundwater seepage.
TCS	From groundwater model – corresponds to Tipperary Sump (TTTSF sump) – Stage 4 (closure) values.
Initial pit chem. RH/ GP/SP	Mean of measured Round Hill data from 02-07-1992 to 21-01-1998.
Initial pit chem. Frasers Pit	Mean of measured data from 11-01-2000 to 13-11-2000.
Pit groundwater inflows (Frasers pit groundwater)	From groundwater model.
Pit groundwater inflows (Deepdell south)	From groundwater model.
Pit groundwater inflows (RH/GP)	From groundwater model.

Abbreviations:

CDBC Eastern Outlet	SP11 – Chimney drain basal collector eastern outlet
CDBC Western Outlet	SP11 – Chimney drain basal collector western outlet
DC07	Compliance monitoring point DC07 on Deepdell Creek
MTI	Mixed Tailings Impoundment (Tailings Storage Facility)
MTSP	Maori Tommy Gully silt pond
NBWR	Nort5h Branch Waikouaiti River
Pb	Lead
S Pit Chimney Drain	Southern Pit Chimney Drain
S Pit Southern Sump	Southern Pit Southern Sump
S Pit Toe Drain	Southern Pit Toe Drain
SPI	Southern Pit Impoundment (Tailings Storage Facility)
SP10 Combined Seepage Outlet	SP10 TSF Combined Seepage Outlet
SumpB_SSF	MTI – sub-surface flow (TSF underdrain)
SumpB_CDW	MTI – Chimney Drain West
SumpB_CDE	MTI – Chimney Drain East
TCS	Tipperary Creek sump
TTTSF	Top Tipperary Tailings Storage Facility
UD USCO Western Outlet	SP11 – Underdrain, upstream cut-off western outlet
UD USCO Eastern Outlet	SP11 under drain, upstream cut-off
Western CDBC	MTI – Western Chimney Drain Basal Collector
Zn	Zinc

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