Supplementary materials for the paper '*A systemic analysis of the environmental impacts of gold mining within the Blyde River Catchment, a strategic water area of South Africa*'

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By Selebalo, I., Scholes, M., & Clifford-Holmes, J.K.

Submitted to *Water* (under review).

Table S.1: Model specifications and run settings

Total	**Count**		**Run Specifications (specs)**	
Variables	90		Start Time	2000
Sectors	7		Stop Time	2040
Stocks	10		DT	1/4
Flows	14		Fractional DT	True
Converters	66		Save Interval	0.25
Constants	30		Sim Duration	1.5
Equations	50		Time Units	Years
Graphicals	12		Pause Interval	0
			Integration Method	Euler

Model specifications

Table S2: Full model description

Variable	Equation	Properties	Units	Documentation
"0m2_from_tailings"(t)	"0m2_from_tailings"(t - dt) + (pollution_entering_groundwater) * dt	INIT "0m2_from_tailings" = 0	mg/l	
pollution_entering_groundwater	Sulphide_concentration_at_tailings_site*seepage_time		mg/l/years	
seepage_time	0.2959		m/year	50 m2/day x 365 days
"sulphate_load_at_risk_of_contaminating_GW_(in_tons)"	"sulphate_load_at_risk_of_contaminating_GW_(in_mg)"/mg_in_a_ton		t/year	
Sulphide_concentration_at_tailings_site	1		mg/mcm	
"switch_to_synthetic-lined_tailings_dams"	0		dmnl	
total_seepage	seepage+seepage_rate_2		mcm/year	
total_wastewater_generated	wastewater_generated_from_gold_processing+wastewater_generated_from_gold_mining		mcm/year	
"Gold_mining_&_Processing_sub-model":				
annual_variability	1		dmnl/year	

Variable	Equation	Properties	Units	Documentation
average_fraction_of_gold_becoming_recovered_gold	0.0000033		dmnl	Itu parameter of 0.0033 is An average gold grade (in grams) recovered from a ton of gold ore is 3.3 grams i.e. 3.3 grams of gold are recovered from 1 ton of gold ore. There are 1 million grams in 1 ton 1 gram = 0.000001 ton Hence 3.3 grams = 0.0000033 tons
average_water_used_to_mine_1_ton_gold_ore	0.00000608		mcm/t	calculated using the Nestor mine (see Excel spreadsheet);
being_recovered	(Gold_ore_being_processed*average_fraction_of_gold_becoming_recovered_gold)*annual_variability		t/year	
"BETA_+_Rietfontein_mines"	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0), (2004.00, 0), (2005.00, 0), (2006.00, 0),		t/year	

Variable	Equation	Properties	Units	Documentation
	(2007.00, 0), (2008.00, 0), (2009.00, 440000), (2010.00, 440000), (2011.00, 440000), (2012.00, 440000), (2013.00, 440000), (2014.00, 440000), (2015.00, 440000), (2016.00, 440000), (2017.00, 440000), (2018.00, 440000), (2019.00, 440000), (2020.00, 440000), (2021.00, 440000), (2022.00, 440000), (2023.00, 440000), (2024.00, 440000), (2025.00, 0), (2026.00, 0), (2027.00, 0), (2028.00, 0), (2029.00, 0), (2030.00, 0), (2031.00, 0), (2032.00, 0), (2033.00, 0), (2034.00, 0), (2035.00, 0), (2036.00, 0), (2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)			
Buffelsfontein_mine	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0), (2004.00, 0), (2005.00, 0), (2006.00, 0), (2007.00, 0), (2008.00, 0), (2009.00, 0), (2010.00, 0), (2011.00, 0), (2012.00, 0), (2013.00, 0), (2014.00, 0), (2015.00, 0), (2016.00, 0), (2017.00, 0), (2018.00, 0), (2019.00, 0), (2020.00, 0), (2021.00, 0), (2022.00, 0), (2023.00, 0), (2024.00, 120000), (2025.00, 120000), (2026.00, 120000), (2027.00, 120000), (2028.00, 120000), (2029.00, 120000), (2030.00, 120000), (2031.00, 120000), (2032.00, 120000), (2033.00, 120000), (2034.00, 120000), (2035.00, 0), (2036.00, 0),		t/year	

Variable	Equation	Properties	Units	Documentation
	(2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)			
Cumulative_water_use_in_mine(t)	Cumulative_water_use_in_mine(t - dt) + (Gold_Mine_Water_use) * dt	INIT Cumulative_water_use_in_mine = 0	mcm	This stoke intend to determine the total amount of water used in the mining operation, during the life of mine.
Exploited_gold_ore(t)	Exploited_gold_ore(t - dt) + (Gold_mining - processing_gold) * dt	INIT Exploited_gold_ore = 1	t	
fraction_capacity_plant_online	GRAPH(TIME) Points: (2000.00, 1.000), (2001.00, 1.000), (2002.00, 1.000), (2003.00, 1.000), (2004.00, 1.000), (2005.00, 1.000), (2006.00, 1.000), (2007.00, 1.000), (2008.00, 1.000), (2009.00, 1.000), (2010.00, 1.000), (2011.00, 1.000), (2012.00, 1.000), (2013.00, 1.000), (2014.00, 1.000), (2015.00, 1.000), (2016.00, 2.000), (2017.00, 2.000), (2018.00, 2.000), (2019.00, 2.000), (2020.00, 3.000), (2021.00, 3.000), (2022.00, 3.000), (2023.00, 3.000), (2024.00, 3.000), (2025.00, 2.000), (2026.00, 2.000), (2027.00, 2.000), (2028.00, 1.000), (2029.00, 1.000), (2030.00, 1.000), (2031.00, 1.000), (2032.00, 1.000), (2033.00, 1.000), (2034.00, 1.000),		dmnl/year	

Variable	Equation	Properties	Units	Documentation
	(2035.00, 1.000), (2036.00, 1.000), (2037.00, 1.000), (2038.00, 1.000), (2039.00, 1.000), (2040.00, 1.000)			
fraction_gold_ore_that_can_be_processed	operational_plant_capacity/Exploited_gold_ore		dmnl	
Frankfort_mine	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0), (2004.00, 0), (2005.00, 0), (2006.00, 0), (2007.00, 0), (2008.00, 0), (2009.00, 0), (2010.00, 0), (2011.00, 0), (2012.00, 0), (2013.00, 0), (2014.00, 0), (2015.00, 0), (2016.00, 0), (2017.00, 0), (2018.00, 120000), (2019.00, 120000), (2020.00, 120000), (2021.00, 120000), (2022.00, 120000), (2023.00, 0), (2024.00, 0), (2025.00, 0), (2026.00, 0), (2027.00, 0), (2028.00, 0), (2029.00, 0), (2030.00, 0), (2031.00, 0), (2032.00, 0), (2033.00, 0), (2034.00, 0), (2035.00, 0), (2036.00, 0), (2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)		t/year	
"Glynn_+_Vaalhoek_mines"	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0), (2004.00, 0), (2005.00, 0), (2006.00, 0), (2007.00, 0), (2008.00, 0), (2009.00, 0), (2010.00, 0), (2011.00, 0), (2012.00, 0), (2013.00, 360000), (2014.00, 360000), (2015.00, 360000), (2016.00, 360000),		t/year	

Variable	Equation	Properties	Units	Documentation
	(2017.00, 360000), (2018.00, 360000), (2019.00, 360000), (2020.00, 360000), (2021.00, 360000), (2022.00, 360000), (2023.00, 360000), (2024.00, 360000), (2025.00, 360000), (2026.00, 360000), (2027.00, 360000), (2028.00, 360000), (2029.00, 0), (2030.00, 0), (2031.00, 0), (2032.00, 0), (2033.00, 0), (2034.00, 0), (2035.00, 0), (2036.00, 0), (2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)			
Gold_Mine_Water_use	total_water_used_in_gold_processing+total_water_used_for_mining_gold_ore		mcm/year	This amount of water abstracted for the mine operation every month.
Gold_mining	total_annual_gold_mined		t/year	
Gold_ore_being_processed(t)	Gold_ore_being_processed(t - dt) + (processing_gold - being_recovered) * dt	INIT Gold_ore_being_processed = 0	t	
Hendriksdal_mine	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0), (2004.00, 0), (2005.00, 0), (2006.00, 0), (2007.00, 0), (2008.00, 0), (2009.00, 0), (2010.00, 0), (2011.00, 0), (2012.00, 0), (2013.00, 0), (2014.00, 0), (2015.00, 0), (2016.00, 0), (2017.00, 0), (2018.00, 120000), (2019.00, 120000), (2020.00, 120000), (2021.00, 120000), (2022.00,		t/year	

Variable	Equation	Properties	Units	Documentation
	120000), (2023.00, 120000), (2024.00, 120000), (2025.00, 120000), (2026.00, 120000), (2027.00, 120000), (2028.00, 120000), (2029.00, 0), (2030.00, 0), (2031.00, 0), (2032.00, 0), (2033.00, 0), (2034.00, 0), (2035.00, 0), (2036.00, 0), (2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)			
"Nestor_+_Bourkes_Luck_mines"	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0), (2004.00, 0), (2005.00, 0), (2006.00, 0), (2007.00, 0), (2008.00, 0), (2009.00, 0), (2010.00, 0), (2011.00, 0), (2012.00, 0), (2013.00, 0), (2014.00, 0), (2015.00, 0), (2016.00, 0), (2017.00, 0), (2018.00, 0), (2019.00, 0), (2020.00, 0), (2021.00, 0), (2022.00, 240000), (2023.00, 240000), (2024.00, 240000), (2025.00, 240000), (2026.00, 240000), (2027.00, 240000), (2028.00, 240000), (2029.00, 240000), (2030.00, 240000), (2031.00, 240000), (2032.00, 240000), (2033.00, 0), (2034.00, 0), (2035.00, 0), (2036.00, 0), (2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)		t/year	
"Olifantsgeraamte_+_Clewer,_Duke_and_Morgenzon_mines"	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0), (2004.00, 0), (2005.00, 0), (2006.00, 0), (2007.00, 0), (2008.00, 0), (2009.00, 0),		t/year	

Variable	Equation	Properties	Units	Documentation
	(2010.00, 0), (2011.00, 0), (2012.00, 0), (2013.00, 0), (2014.00, 0), (2015.00, 0), (2016.00, 360000), (2017.00, 360000), (2018.00, 360000), (2019.00, 360000), (2020.00, 360000), (2021.00, 360000), (2022.00, 360000), (2023.00, 360000), (2024.00, 360000), (2025.00, 360000), (2026.00, 360000), (2027.00, 0), (2028.00, 0), (2029.00, 0), (2030.00, 0), (2031.00, 0), (2032.00, 0), (2033.00, 0), (2034.00, 0), (2035.00, 0), (2036.00, 0), (2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)			
operational_plant_capacity	35000*12		t	35,000 tons/month processing capacity;
processing_gold	IF Exploited_gold_ore<operational_plant_capacity THEN (Exploited_gold_ore*fraction_capacity_plant_online) ELSE (Exploited_gold_ore*fraction_gold_ore_that_can_be_processed)*fraction_capacity_plant_online		t/year	IF (plant_monthly_capacity/Extracted_gold_being_processed)>0 THEN plant_monthly_capacity/Extracted_gold_being_processed ELSE 0
Recovered_gold(t)	Recovered_gold(t - dt) + (being_recovered) * dt	INIT Recovered_gold = 0	t	
"Rosshill_+_Williemsoord_mines"	GRAPH(TIME) Points: (2000.00, 0), (2001.00, 0), (2002.00, 0), (2003.00, 0),		t/year	

Variable	Equation	Properties	Units	Documentation
	(2004.00, 0), (2005.00, 0), (2006.00, 0), (2007.00, 0), (2008.00, 0), (2009.00, 0), (2010.00, 0), (2011.00, 0), (2012.00, 0), (2013.00, 0), (2014.00, 0), (2015.00, 0), (2016.00, 0), (2017.00, 0), (2018.00, 0), (2019.00, 0), (2020.00, 240000), (2021.00, 240000), (2022.00, 240000), (2023.00, 240000), (2024.00, 240000), (2025.00, 240000), (2026.00, 240000), (2027.00, 240000), (2028.00, 240000), (2029.00, 240000), (2030.00, 240000), (2031.00, 0), (2032.00, 0), (2033.00, 0), (2034.00, 0), (2035.00, 0), (2036.00, 0), (2037.00, 0), (2038.00, 0), (2039.00, 0), (2040.00, 0)			
switch_WW_recycling_on	1		dmnl	
total_annual_gold_mined	"BETA_+_Rietfontein_mines"+"Glynn_+_Vaalhoek_mines"+"Olifantsgeraamte_+_Clewer,_Duke_and_Morgenzon_mines"+Frankfort_mine+Hendriksdal_mine+"Rosshill_+_Williemsoord_mines"+"Nestor_+_Bourkes_Luck_mines"+Buffelsfontein_mine		t/year	
total_water_used_for_mining_gold_ore	Gold_mining*average_water_used_to_mine_1_ton_gold_ore		mcm/year	
total_water_used_in_gold_processing	processing_gold*water_used_to_process_1_ton_of_gold_ore		mcm/year	

Variable	Equation	Properties	Units	Documentation
Unexploited_Gold(t)	Unexploited_Gold(t - dt) + (- Gold_mining) * dt	INIT Unexploited_Gold = 25280000	t	
wastewater_generated_from_gold_mining	IF switch_WW_recycling_on = 1 THEN ((Gold_mining*Wastewater_produced_per_ton_gold_mined)*Wastewater_recycling) ELSE Gold_mining*Wastewater_produced_per_ton_gold_mined		mcm/year	
wastewater_generated_from_gold_processing	IF switch_WW_recycling_on = 1 THEN ((processing_gold*Wastewater_produced_per_ton_of_gold_ore_processed)*Wastewater_recycling) ELSE processing_gold*Wastewater_produced_per_ton_of_gold_ore_processed		mcm/year	
Wastewater_produced_per_ton_gold_mined	0.000001		mcm/t	Jai revision (mcm/t) 0.001 mcm/t REVISED: 0.000001 mcm/t = 1 m3/t wastewater produced

Variable	Equation	Properties	Units	Documentation
Wastewater_produced_per_ton_of_gold_ore_processed	6.893*10^-07		mcm/t	Itu v1: 1500 m3/t ---------- Jai revision v1: 0.0015 mcm/t ---------- Revision 2 (using Ghana case): 0.689 m3/t = 6.893*10^-07
Wastewater_recycling	1-STEP (0.25, 2021)		dmnl	
water_used_to_process_1_ton_of_gold_ore	0.0000012		mcm/t	Jai revision (converting to million cubic metres):
Gold_mining_economics:				
annual_market_value	(being_recovered*ounces_in_a_ton)*USD_gold_price_per_ounce		US Dollars Per Year	

Variable	Equation	Properties	Units	Documentation
ounces_in_a_ton	35274		oz/t	
USD_gold_price_per_ounce	GRAPH(TIME) Points: (2000.00, 276), (2001.00, 267), (2002.00, 270), (2003.00, 308), (2004.00, 393), (2005.00, 430), (2006.00, 565), (2007.00, 651), (2008.00, 926), (2009.00, 926), (2010.00, 1084), (2011.00, 1332), (2012.00, 1747), (2013.00, 1666), (2014.00, 1237), (2015.00, 1282), (2016.00, 1120), (2017.00, 1215), (2018.00, 1345), (2019.00, 1318), (2020.00, 1593), (2021.00, 1480), (2022.00, 1450), (2023.00, 1490), (2024.00, 1490), (2025.00, 1390), (2026.00, 1410), (2027.00, 1420), (2028.00, 1730), (2029.00, 1370), (2030.00, 2270), (2031.00, 2100), (2032.00, 2150), (2033.00, 2400), (2034.00, 2340), (2035.00, 2490), (2036.00, 2230), (2037.00, 2470), (2038.00, 2570), (2039.00, 2600), (2040.00, 2640)		USD/oz	
value_of_recovered_gold(t)	value_of_recovered_gold(t - dt) + (annual_market_value) * dt	INIT value_of_recovered_gold = 0	USD	
"Groundwater_(GW)_+_GW_contamination_risk_sub-model":				
at_risk_GW	current_use+potential_use		mcm/year	

Variable	Equation	Properties	Units	Documentation
current_use	0.22	OUTFLOW PRIORITY: 1	mcm/year	
discharge	28.4	OUTFLOW PRIORITY: 3	mcm/year	
exceeding_limit	IF SO4_concentration_in_seepage<SANS241_limit THEN 0 ELSE SO4_concentration_in_seepage-SANS241_limit		tons/mcm	
"Groundwater_(Pilgrim's_Rest_region)"(t)	"Groundwater_(Pilgrim's_Rest_region)"(t - dt) + (recharge - current_use - potential_use - discharge) * dt	INIT "Groundwater_(Pilgrim's_Rest_region)" = 11.9	mcm	
GW_contamination_from_mining_risk_factor	(at_risk_GW*ratio_of_seepage_concentration_to_limit)*5		mcm/year	
GW_development_in_Pilgrims_Rest_WFTZ	GRAPH(TIME) Points: (2000.00, 0.000), (2001.00, 0.000), (2002.00, 0.000), (2003.00, 0.000), (2004.00, 0.000), (2005.00, 0.000), (2006.00, 0.000), (2007.00, 0.000), (2008.00, 0.000), (2009.00, 0.000), (2010.00, 0.000), (2011.00, 0.000), (2012.00, 0.000), (2013.00, 0.000), (2014.00, 0.000),		mcm/year	

Variable	Equation	Properties	Units	Documentation
	(2015.00, 0.000), (2016.00, 0.000), (2017.00, 0.000), (2018.00, 0.000), (2019.00, 0.000), (2020.00, 0.000), (2021.00, 0.000), (2022.00, 2.300), (2023.00, 2.300), (2024.00, 2.300), (2025.00, 2.300), (2026.00, 2.300), (2027.00, 2.300), (2028.00, 4.400), (2029.00, 4.400), (2030.00, 6.500), (2031.00, 6.500), (2032.00, 6.500), (2033.00, 6.500), (2034.00, 6.500), (2035.00, 6.500), (2036.00, 6.500), (2037.00, 6.500), (2038.00, 6.500), (2039.00, 6.500), (2040.00, 6.500)			
potential_use	IF switching_for_'Scenario_of_GW_Development' = 1 THEN GW_development_in_Pilgrims_Rest_WFTZ ELSE 0	OUTFLOW PRIORITY: 2	mcm/year	
ratio_of_seepage_concentration_to_limit	SO4_concentration_in_seepage/SANS241_limit		dmnl	
recharge	34.7		mcm/year	
SANS241_limit	500		tons/mcm	
SO4_concentration_in_seepage	total_seepage*"sulphate_load_at_risk_of_contaminating_GW_(in_tons)"		tons/mcm	
switching_for_'Scenario_of_GW_Development'	1		dmnl	

Variable	Equation	Properties	Units	Documentation
Intervention_1:_recycling_water:				
"Neutralising_plant_sub-model":				
"2.5_ML/day_capacity_neutralising_plant"	0.9125		mcm/year	2.5 ML/day = 0.9125 mcm/ year
"5_ML/day_capacity_neutralising_plant"	1.825		mcm/year	5 ML/day = 1.825 mcm/year
actual_sulphide_concentration	max_sulphide_concentration_at_tailings*effect_of_ratio_on_sulphide_concentration		mg/mcm	
annual_treatment_capacity	IF switch_between_treatment_plant_options = 0 THEN 0 ELSE IF switch_between_treatment_plant_options = 1 THEN (0 + STEP ("2.5_ML/day_capacity_neutralising_plant", 2021)) ELSE IF switch_between_treatment_plant_options = 2 THEN (0 + STEP("5_ML/day_capacity_neutralising_plant", 2021)) ELSE 0		mcm/year	2.5 ML/day = 0.9125 mcm/ year ---------- 5 ML/day = 1.825 mcm/year
effect_of_ratio_on_sulphide_concentration	ratio		dmnl	
max_sulphide_concentration_at_tailings	21269*1000000000		mg/mcm	

Variable	Equation	Properties	Units	Documentation
ratio	GRAPH(wastewater_treated/wastewater_requiring_treatment) Points: (0.000, 1.0000), (0.100, 0.9673), (0.200, 0.9163), (0.300, 0.8732), (0.400, 0.8457), (0.500, 0.7960), (0.600, 0.7686), (0.700, 0.7581), (0.800, 0.7150), (0.900, 0.6640), (1.000, 0.6300)		dmnl	
switch_between_treatment_plant_options	1		dmnl	
wastewater_requiring_treatment	wastewater_generated_from_gold_mining+ wastewater_generated_from_gold_processing		mcm/year	
wastewater_treated	IF wastewater_requiring_treatment<annual_treatment_capacity THEN wastewater_requiring_treatment ELSE annual_treatment_capacity		mcm/year	
"Wastewater_in_clay-lined_tailings_+_seepage_sub-model":				
hydraulic_gradient	(0.2592*365)		m/year	
max_tailings_capacity	40		mcm	
max_tailings_dam_size	10000		m2	
"mcm_in_a_m3_[converter]"	0.000001		mcm/m3	
mg_in_a_ton	1000*1000*1000		mg/t	1000*1000*1000 1,000 (mg in a gram) x

Variable	Equation	Properties	Units	Documentation
				1,000 (grams in a kg) x 1,000 (kg in a metric ton) = 1*10^9
permeability_of_single_clay_liner	(0.000864*365)		m/year	
ratio_of_current_WW_over_max_capacity	"Wastewater_in_clay-lined_tailings_dams"/max_tailings_capacity		dmnl	
relative_area_of_tailings_dam_filled	max_tailings_dam_size*ratio_of_current_WW_over_max_capacity		m2	
seepage	"seepage_through_clay-lined_tailings"*"mcm_in_a_m3_[converter]"		mcm/year	
"seepage_through_clay-lined_tailings"	relative_area_of_tailings_dam_filled*permeability_of_single_clay_liner*hydraulic_gradient		m3/year	
"sulphate_load_at_risk_of_contaminating_GW_(in_mg)"	total_seepage*actual_sulphide_concentration		mg/year	
"Wastewater_in_clay-lined_tailings_dams"(t)	"Wastewater_in_clay-lined_tailings_dams"(t - dt) + ("WW_into_clay-lined_dams" - seepage) * dt	INIT "Wastewater_in_clay-lined_tailings_dams" = 0	mcm	
"WW_into_clay-lined_dams"	IF "switch_to_synthetic-lined_tailings_dams" = 0 THEN		mcm/year	

Variable	Equation	Properties	Units	Documentation
	total_wastewater_generated ELSE IF "switch_to_synthetic-lined_tailings_dams" = 1 THEN (IF TIME<2021 THEN total_wastewater_generated ELSE 0) ELSE total_wastewater_generated			
"Wastewater_in_synthetic-lined_tailings_+_seepage_sub-model":				
"max_tailings_capacity_(synth-lined)"	40		mcm	
"max_tailings_dam_size_(synth-lined)"	10000		m2	
ratio_of_current_over_max_1	"Wastewater_in_synthetic-lined_tailings_dams"/"max_tailings_capacity_(synth-lined)"		dmnl	
"relative_area_of_synth-lined_tailings_dam_filled"	"max_tailings_dam_size_(synth-lined)"*ratio_of_current_over_max_1		m2	
seepage_rate_2	"seepage_through_synthetic-lined_tailings"*"mcm_in_a_m3_[converter]"		mcm/year	
"seepage_through_synthetic-lined_tailings"	"relative_area_of_synth-lined_tailings_dam_filled"*synthetic_liner_permeability*hydraulic_gradient		m3/year	
synthetic_liner_permeability	0.0031536		m/year	

Variable	Equation	Properties	Units	Documentation
"Wastewater_in_synthetic-lined_tailings_dams"(t)	"Wastewater_in_synthetic-lined_tailings_dams"(t - dt) + ("WW_into_synthetic-lined_dams" - seepage_rate_2) * dt	INIT "Wastewater_in_synthetic-lined_tailings_dams" = 0	mcm	
"WW_into_synthetic-lined_dams"	IF "switch_to_synthetic-lined_tailings_dams" = 1 THEN (IF TIME>2021 THEN total_wastewater_generated ELSE 0) ELSE 0		mcm/year	